SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

Seismological Institute
Uppsala

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å, U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

J A N U A R Y 1 - 31, 1969

1969				
Jan.	1	Up	eP	05 04 36
		Ki	iP	05 03 43.0
			ipP	05 03 56.1
		Um	iP	05 04 09.4
			ipP	05 04 19.9
		Ud	iP	05 04 35.1
			ipP	05 04 47.0
		De	iP	05 04 57.9
			ipP	05 05 07.6

Aleutian Islands.
h = 40 km (Ki,Um,Ud,De).

"	1	Up	iP		09 18 03.5 C
					micr sec
			P	Z'	0.5 0.8
		Ki	iP		09 17 10.8
					micr sec
			P	Z'	0.1 0.8
		Sk	iP		09 17 42.5
		Um	iP		09 17 36.0
			i		09 17 56.5
		Ud	iP		09 18 04.4
		De	iP		09 18 26.5

Aleutian Islands
(h = 35 km).
Remarkable PZ'-amplitude difference between Up and Ki.

"	1	Um	iP	10 03 30.9
"	1	Ud	iP	13 13 36.4

North Atlantic Ocean
(h = N).

"	1	Up	iP	16 21 13.8
		Ki	eP	16 21 52
		Um	eP	16 21 28
		Ud	iP	16 21 26.3

Arabian Sea (h = N).

1969				
Jan.	1	Um	iSKP	17 56 59.6
		Ud	iPKP	17 54 18.9 C
			i	17 54 38.4

Tonga-Kermadec Islands
(h = 660 km).

"	1	Up	eP	21 46 35
		Sk	iP	21 47 20.0
		Um	iP	21 47 07.9
		Ud	iP	21 46 42.6
			i	21 46 47.2
		De	iP	21 46 07.7

Greece (h = 10 km).

"	2	Ud	iP	00 44 42.5

North Atlantic Ocean
(h = N).

"	2	Ud	iP	05 40 07.9
"	2	Ud	iP	09 08 03.4
"	2	Up	ipPKP	10 45 30.9
		Ki	iPKP	10 45 08.5
		Um	iPKP	10 45 04.9
		Ud	ipPKP	10 45 38.3

New Zealand (h = 130 km).

"	2	Ki	iP	12 20 08.9

North Atlantic Ocean
(h = N).

"	2	Up	iP	14 17 22.7
		Ki	eP	14 16 26
			i	14 16 29.5
		Ud	iP	14 17 25.6
		De	iP	14 17 48.9

Kamchatka (h = 80 km).

"	2	Ki	iP	15 24 05.5

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 2 (cont.)

Sk	eP		15 23 40	
Ud	iP		15 23 08.8	
De	iP		15 22 38.9	

Rhodes Island (h = N).

" 2 Um iPKP 16 05 44.0 C
Santa Cruz Islands
(h = 640 km).

" 2

Up	iPKP		18 09 28.4	
Ki	iPKP		18 09 43.9	C
	iSKP		18 12 53.8	
			micr	sec
	SKP	Z'	0.2	1.5
Um	iPKP		18 09 36.6	
	iSKP		18 12 40.9	
	i		18 13 01.7	
Ud	iPKP		18 09 26.7	

South Sandwich Islands
(h = 80 km).

" 2

Up	iP		18 18 05.4	
Ki	iP		18 17 22.2	
Um	iP		18 17 41.3	C
Ud	iP		18 18 12.1	C
De	eP		18 18 28	

Japan (h = 70 km).

" 3 Ud iPKP 00 37 47.6
Tonga-Kermadec Islands
(h = 70 km).

" 3

Up	iP		03 23 25.5	
	i		03 23 28.1	
	iPn		03 24 31.3	
			micr	sec
	P	Z'	0.2	1.3
	Mx	E	1.0	11
	Mx	N	2.2	14
	Mx	Z	1.7	11
Ki	iP		03 23 51.3	
	i		03 23 53.9	
	iPn		03 25 04.5	
			micr	sec
	P	Z'	0.3	1.0
	Mx	E	4.0	12
	Mx	N	3.3	17
	Mx	Z	4.6	12
Sk	iP		03 23 57.7	
	i		03 24 00.7	
	iPn		03 25 20.9	
Um	iP		03 23 31.5	
	i		03 23 34.9	

(cont.)

1969
Jan. 3 (cont.)

Um	iPP		03 24 55.6	
	iSS		03 31 45	
Ud	iP		03 23 41.9	C
	i		03 23 44.6	
	iPn		03 24 56.7	
De	iP		03 23 33.6	
	iPn		03 24 45.7	

Iran-USSR (h = 10 km).
m = 5.9, M = 5.2 (Up,Ki).
Double P with P2 - P1 =
= 2.9 sec in average.
Clear Pn phases.

" 3 Ki iP 06 48 40.7 C

" 3 Ud iP 07 52 23.7
Aleutian Islands (h = N).

" 3 Up iP 10 10 19.4

" 3 Ud iP 11 31 40.0
ipP 11 32 02.8
Guatemala. h = 90 km (Ud).

" 3

Up	iP		11 43 03.0	
Um	iP		11 42 40.1	
	i		11 42 55.5	
Ud	e(P)		11 42 54	

" 3 Um iP 13 07 05.9

" 3

Up	iP		13 39 13.2	C
	i		13 39 34.3	
			micr	sec
	P	Z'	0.9	0.9
Ki	iP		13 38 20.1	C
	iX		13 38 24.6	
			micr	sec
	P	Z'	0.1	0.8
Sk	iP		13 38 52.0	C
Um	iP		13 38 46.2	C
	iX		13 38 50.4	
Ud	iP		13 39 13.7	C
	iX		13 39 18.4	
	i		13 39 29.5	
De	iP		13 39 35.8	C
	iX		13 39 39.9	

Aleutian Islands
(h = 30 km).
X - P = 4.4 sec in average.
If X were pP, h would be
about 15 km only.
Remarkable PZ'-amplitude
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan. 3 (cont.)
difference between Up and Ki; cf Jan. 1, 09 18.

" 3 Ki iSg 17 34 26.6
Sk iSg 17 34 31.1
Um iSg 17 34 53.9
i 17 35 06.5
Ud iSg 17 36 21.3
Nordland, Norway, 66.4°N, 14.8°E.
Origin time = 17 32 58.
Explosion?

" 4 Up iP 01 38 12.6

" 4 Up iP 06 14 53.5
i 06 14 59.8
Ki eP 06 14 34
i 06 14 45.8
Ud iP 06 15 00.8
ipP 06 15 14.4
Luzon. h = 50 km (Ud).

" 4 Ki iP 07 48 48.3
i 07 49 19.7

" 4 Ud eP 13 17 37

" 4 Up iP 16 17 15.9 C
Ki iP 16 16 20.7 C
micr sec
P Z' 0.1 1.0
Sk iP 16 16 49.1
Ud iP 16 17 13.0 C
De i(P) 16 17 24.1
Kodiak Island (h = 60 km).

" 4 Up iPKP 22 33 50.2
Ud iPKP 22 33 52.2
De iSKP 22 36 47.7
Tonga-Kermadec Islands (h = 600 km).

" 4 Ud iP 22 50 59.5
ePKP 22 55 03
Banda Sea (h = 110 km).

" 5 Ki iP 01 46 20.6
Um iP 01 46 27.1
Ud iP 01 46 42.3
Molucca Passage (h = N).

" 5 Ud iP 02 46 49.1
(cont.)

1969 Jan. 5 (cont.)
Ud i 02 46 56.5
Sinkiang, China (h = N).

" 5 Ki iP 06 16 24.5

" 5 Ki iP 07 42 06.3
Talaud Islands (h = 60 km).

" 5 Up iP 10 06 11.3 C
Sk iP 10 06 30.9
Ud iP 10 06 25.6 C
Nepal (h = N).

" 5 Up iP 13 15 37.3 C
Ki iP 13 14 50.9
micr sec
P Z' 0.1 1.0
Um iP 13 15 11.8
Ud iP 13 15 42.8
Sea of Okhotsk (h = 470 km).

" 5 Up eP 13 41 43
iPKP 13 45 26.5
iPP 13 46 51
iSKS 13 52 22
i 13 52 50
iPKKP 13 55 51.0
micr sec
PKP Z' 0.2 0.7
PP Z 2.5 5
SKS N 2.1 6
Mx E 49 22
Mx N 83 23
Mx Z 86 22
Ki iPKP 13 45 14.2
i(PP) 13 45 58.9
micr sec
Mx E 65 24
Mx N 56 22
Mx Z 110 22
Sk iPKP 13 45 25.1 C
ipPKP 13 45 40.0
iPP 13 46 45.4
Um iP 13 41 30
iPKP 13 45 20.5
i(PP) 13 46 20
iPP 13 46 28
iSKS 13 52 18
i 13 52 35
Ud iPKP 13 45 28.6
ipPKP 13 45 45.1
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 5 (cont.)

Ud	iPP	13 47 01.5	
De	iPKP	13 45 31.7	
	ipPKP	13 45 46.9	
	iPP	13 47 22.4	

Solomon Islands.
h = 60 km (Sk,Ud,De).
M = 7.4 (Up,Ki).

" 5

Ki	iP	16 27 48.4	C
Ud	eP	16 28 13	

Molucca Passage (h = N).

" 5

Sk	iPP	17 09 23.3	
Ud	iPP	17 09 23.9	
	i	17 09 31.7	

Flores Island
(h = 25 km).

" 5

Up	iP	19 01 38.8	
Ki	iP	19 01 29.4	
Ud	iP	19 01 51.6	

Burma (h = 50 km).

" 6

Up	iP	05 58 07.9	
Ki	iP	05 57 14.6	
	ipP	05 57 24.9	
Ud	iP	05 58 05.9	

Unimak Island.
h = 40 km (Ki).

" 6

Ki	iP	06 59 19.8	

Mariana Islands (h = N).

" 6

Ud	iP	07 08 45.6	

" 6

Ki	iSKP	12 49 49.4	
Um	iSKP	12 50 03.4	
Ud	iPKP	12 47 30.3	
	iSKP	12 50 16.3	
De	iPKP	12 47 44.0	

Tonga-Kermadec Islands
(h = 590 km).

" 6

Up	iPKP	15 50 00.1	
	i	15 50 10.7	
	i	15 53 03.3	
		micr	sec
	PKP Z'	0.3	0.7
Sk	iPKP	15 49 53.2	C
Um	iPKP	15 49 47.8	C
Ud	iPKP	15 50 01.1	C
	ipPKP	15 50 41.8	

Kermadec Islands.
h = 150 km (Ud).

1969
Jan. 6

Up	iPKP	15 57 58.5	
	i	15 58 00.2	
		micr	sec
	PKP Z'	0.1	0.8
	Mx E	20	21
	Mx N	50	25
	Mx Z	53	26
Ki	iPKP	15 57 47.1	
	ePP	15 59 07	
	i	16 02 12	
		micr	sec
	PKP Z'	0.2	1.1
	Mx E	25	21
	Mx N	18	22
	Mx Z	40	21
Sk	ePKP	15 57 55	
	i	15 57 58.0	
Um	iPKP	15 57 52.9	
	i	15 58 00.8	
	iPP	15 59 21	
	iSKKS	16 06 21	
	iPS	16 09 09	
Ud	iPKP	15 58 00.9	
	i	15 58 02.7	

Santa Cruz Islands
(h = 30 km).
M = 7.1 (Up,Ki).

" 6

Up	iPKP	17 52 37.7	
		micr	sec
	Mx E	1.8	23
	Mx N	4.9	26
	Mx Z	6.1	26
Ki		---	
		micr	sec
	Mx E	1.4	19
	Mx N	2.0	22
	Mx Z	2.8	19
Sk	iPKP	17 52 35.4	
Um	ePKP	17 52 30	
Ud	iPKP	17 52 39.9	C

Santa Cruz Islands
(h = N).
M = 6.1 (Up,Ki).

" 6

Up	iPKP	21 09 48.4	C
	i	21 09 52.0	
Sk	iPKP	21 09 41.7	C
Um	iPKP	21 09 36.8	
Ud	iPKP	21 09 49.9	C
	i	21 09 52.9	

Kermadec Islands
(h = 190 km).

" 6

Sk	iP	22 07 54.8	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan.	6	(cont.)		
		Ud	iP	22 07 16.7
		Italy (h = 7 km).		
"	7	Up	iP	00 55 34.4
		Sk	iP	00 56 14.2
		Ud	iP	00 55 42.0 D
		Greece (h = 15 km).		
"	7	Up	iPKP	04 59 31.0
			ipPKP	04 59 42.3
			iPKS	05 02 52.7
		Ki	iPKP	04 59 14.4
			ipPKP	04 59 28.2
		Sk	ePKP	04 59 27
			ipPKP	04 59 38.8
		Um	iPKP	04 59 22.0
			ipPKP	04 59 34.1
		Ud	iPKP	04 59 31.7
			ipPKP	04 59 44.1
		New Hebrides Islands.		
		h = 45 km (Up,Ki,Sk,Um,Ud).		
"	7	Ud	e	05 31 30
			i(Sg)	05 31 53.4
"	7	Up	iP	07 13 47.4
			ipP	07 13 58.0
				micr sec
			P Z'	0.1 0.9
		Ki	iP	07 13 18.7 C
		Sk	iP	07 13 50.1
		Um	iP	07 13 30.0
		Ud	iP	07 13 55.3
			ipP	07 14 05.2
		Ryukyu Islands.		
		h = 40 km (Up,Ud).		
"	7	Up	iPKP	11 51 42.1
		New Hebrides Islands		
		(h = 35 km).		
"	7	Um	iP	13 00 54.4 C
		Ud	eP	13 01 11
			i	13 01 24.1
"	7	Ud	iP	17 28 02.8
"	7	Um	iPKP	18 05 36.5
		Ud	iPKP	18 05 46.7
		Santa Cruz Islands		
		(h = 30 km).		
"	7	Ki	iP	19 38 59.3
		(cont.)		

1969 Jan.	7	(cont.)		
		Ud	iP	19 39 15.0
		Tien-Shan.		
"	7	Up	iP	21 48 30.4 C
		Ki	eP	21 48 11
"	7	Up	iP	22 07 41.9 C
				micr sec
			P Z'	0.2 1.3
		Ki	iP	22 06 49.7 C
				micr sec
			P Z'	0.1 1.1
		Um	iP	22 07 14.0 C
			ipP	22 07 25.8
		Ud	iP	22 07 45.6
			ipP	22 07 58.0
		Kamchatka. h = 45 km (Um, Ud).		
		m = 6.0 (Up,Ki).		
"	8	Ki	iP	06 13 05.8
		Arabian Sea (h = 30 km).		
"	8	Um	iP	12 00 09.1 C
"	8	Ki	iPn	13 34 52.8
			iSn	13 35 40.3
			iLg1	13 35 54.4
			D = 430 km = 3.9°.	
		Probably northwest Russia.		
		Origin time = 13 33 51.		
		Explosion?		
"	8	Ki	iP	22 08 48.7
		Um	iP	22 08 59.2
		Mariana Islands (h = N).		
"	8	Ki	iP	23 53 44.4
		Um	eP	23 53 09
			i	23 53 11.6
			iSn	23 56 53.9
		Ud	iP	23 53 03.1
			iPn	23 53 21.0
			iSn	23 56 41.2
		De	iP	23 52 39.4
		Caucasus (h = 35 km).		
"	9	Um	iP	03 18 57.9
		Ud	iP	03 19 29.7
"	9	Ki	eP	07 48 41
			i	07 49 07.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan.	9	Ki	iP	07 52 38.2	
		Sk	iP	07 52 58.3	
		Um	iP	07 52 30.5	
		Ud	iP	07 52 51.4	
		Tadzhik-Sinkiang (h = 140 km).			
"	9	Um	eP	19 07 59	
			i	19 08 12.3	
"	9	Up	iPKP	19 11 31.0	
		Um	iPKP	19 11 27.6	
			iSKP	19 14 07.8	
		Ud	iPKP	19 11 33.0	
			i	19 11 38.1	
		De	iPKP	19 11 37.4	D
			i	19 11 40.9	
		Tonga-Kermadec Islands (h = 550 km).			
"	9	Um	iP	21 43 50.5	
		Ud	iP	21 44 21.3	C
		Japan (h = 130 km).			
"	10	Up	i	01 28 45.4	
			iPP	01 29 09.1	
		Ki	eP	01 29 20	
			iPP	01 30 02.7	
		Um	iP	01 28 46.6	
		Ud	iP	01 28 45.8	
		Turkey.			
"	10	Up	iP	03 32 13.7	
"	10	Up	iP	03 32 39.0	
			ipP	03 32 49.2	
				micr	sec
			Mx E	2.2	15
			Mx N	1.6	16
			Mx Z	3.9	14
		Ki	iP	03 32 08.1	
				micr	sec
			Mx E	1.4	17
			Mx N	1.1	16
			Mx Z	2.5	15
		Sk	iP	03 32 38.8	
		Um	iP	03 32 20.6	
			ipP	03 32 30.5	
			iS	03 41 44	
		Ud	iP	03 32 47.9	
			ipP	03 32 57.7	
		Ryukyu Islands.			
		h = 35 km (Up,Um,Ud).			
		M = 5.6 (Up,Ki).			

1969 Jan.	10	Up	iP	04 36 41.2	D
			iX	04 36 51.2	
				micr	sec
			P Z'	0.2	0.7
		Ki	iP	04 37 57.7	
		Sk	iP	04 37 22.7	
			i	04 37 24.1	
		Um	iP	04 37 21.0	
			iX	04 37 30.5	
		Ud	iP	04 36 47.7	
			iX	04 36 56.2	
		Greece-Albania (h = N).			
"	10	Ud	iP	04 43 28.2	
"	10	Up	iPKP	06 07 43.9	C
		Sk	iPKP	06 07 38.4	
		Um	iPKP	06 07 33.6	C
		Ud	iPKP	06 07 46.0	
"	10	Ki	iP	11 30 21.9	
		Ud	iP	11 29 57.8	
		De	iP	11 29 39.8	
		Iran-Iraq.			
"	10	Ud	iP	12 06 57.0	
"	10	Ud	iP	12 25 28.9	
"	10	Up	iP	15 05 38.1	
"	10	Up	iP	16 21 17.3	
			i	16 21 23.2	
		Um	iP	16 22 03.3	
		Ud	eP	16 21 16	
			i	16 21 21.5	
		Italy (h = 10 km).			
"	10	Up	eP	16 37 52	
		Ki	iP	16 38 56.8	
			i	16 39 17.6	
		Sk	eP	16 38 36	
			i	16 38 47.5	
		Um	iP	16 38 24.8	
			e	16 43 07	
		Ud	iP	16 38 07.3	
			iS	16 42 02.9	
		De	iP	16 37 31.9	
		Turkey (h = 20 km).			
"	10	Up	iP	23 23 17.0	
		Ki	iP	23 23 59.0	
		Sk	iP	23 23 58.3	
		Um	iP	23 23 33.1	
		Ud	iP	23 23 33.0	
		Iran (h = 60 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan. 11	Up	iPKP		04 46 00.6		C
				micr	sec	
		PKP	Z	0.8	4	
		PKP	Z'	0.1	0.8	
	Ki			---		
				micr	sec	
		Mx	E	0.8	16	
		Mx	N	1.3	20	
		Mx	Z	2.5	18	
	Sk	iPKP		04 45 53.1		
		ipPKP		04 46 05.1		
	Um	iPKP		04 45 50.5		
		ipPKP		04 46 06.1		
	Ud	iPKP		04 46 02.5		C
		i		04 46 40.7		
	De	iPKP		04 46 08.6		C
		i		04 46 11.0		
	Kermadec Islands.					
	h = 50 km (Sk,Um).					
" 11	Up	iPKP		05 07 17.2		
				micr	sec	
		Mx	E	0.9	16	
		Mx	N	1.7	17	
		Mx	Z	1.4	18	
	Ki	iPKP		05 07 02.4		
		ipPKP		05 07 14.9		
				micr	sec	
		Mx	E	1.2	18	
		Mx	N	1.0	17	
	Sk	iPKP		05 07 09.5		D
	Um	iPKP		05 07 08.3		
		i		05 07 14.9		
		ipPKP		05 07 23.5		
	Ud	iPKP		05 07 18.8		
	De	iPKP		05 07 25.1		D
	Kermadec Islands.					
	h = 50 km (Ki,Um).					
	M = 5.9 (Up,Ki).					
" 11	Up	iPKP		05 22 32.1		
		i		05 22 38.5		
		i		05 22 43.4		
	Ki	ePKP		05 22 21		
	Sk	iPKP		05 22 23.0		
	Um	ePKP		05 22 24		
	Ud	iPKP		05 22 34.1		
		ipPKP		05 22 57.7		
		i		05 23 04.0		
	De	iPKP		05 22 42.2		
		i		05 22 50.1		
		ipPKP		05 23 02.9		
	Kermadec Islands.					
	h = 80 km (Ud,De).					

1969 Jan. 11	Up	eP	10 26 44	
	Sk	eP	10 27 19	
	Ud	iP	10 26 46.3	
	Greece (h = N).			
" 11	Up	iP	12 10 20.9	
	Ki	iP	12 11 03.8	
	Um	iP	12 10 44.2	C
		i	12 10 49.7	
		i	12 12 33.0	
	Ud	iP	12 10 15.6	
	Ascension Island (h = N).			
" 11	Ki	iPg	19 02 10.2	
		iSg	19 02 47.6	
		D = 320 km = 2.9°.		
	Um	eSg	19 04 36	
	Northern Finland.			
	Origin time = 19 01 12.			
	Explosion?			
" 11	Um	iP	23 13 16.3	D
	Ud	iP	23 13 29.8	
" 11	Ki	iP	23 58 34.6	
	Um	iP	23 58 48.9	
	Ud	iP	23 59 15.2	
	South of Japan			
	(h = 470 km).			
" 12	Ud	iPKP	04 27 38.0	C
	De	iPKP	04 27 51.1	
	Tonga-Kermadec Islands			
	(h = 700 km).			
" 12	Um	iP	11 55 59.5	
" 13	Up	iPKP	03 13 04.7	
		ipPKP	03 13 08.3	
	Sk	iPKP	03 12 57.8	
		ipPKP	03 13 03.0	
	Um	iPKP	03 12 52.9	
		ipPKP	03 12 56.4	
	Ud	iPKP	03 13 06.7	D
		ipPKP	03 13 10.8	
	De	iPKP	03 13 13.7	
		ipPKP	03 13 18.7	
	Kermadec Islands.			
	h = 15 km (Up,Sk,Um,Ud,De).			
" 13	Up	iP	05 49 50.3	
	Ki	iP	05 49 33.3	
	Um	iP	05 49 38.8	C
	Ud	iP	05 49 59.3	
	Mindoro (h = 120 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan.	13	Up	iP	05 51 27.6	
		Ki	iP	05 52 42.8	
		Sk	iP	05 52 09.1	C
			i	05 52 23.9	
		Um	iP	05 52 05.3	
		Ud	iP	05 51 36.2	
			i	05 51 45.1	
		De	iP	05 50 57.1	
		Greece (h = 50 km).			
"	13	Um	iP	05 55 36.5	C
			i	05 55 40.5	
"	13	Up		---	
				micr sec	
			Mx E	1.4 19	
			Mx N	1.5 19	
			Mx Z	2.6 20	
		Ki		---	
				micr sec	
			Mx E	1.1 20	
			Mx N	0.7 16	
			Mx Z	1.3 20	
		Um	iSS	07 14 13	
			iSSS	07 18 54	
		Chile (h = N).			
		M = 5.7 (Up,Ki).			
"	13	Ki	iP	08 03 40.0	
		Sk	eP	08 03 11	
		Um	iP	08 03 05.9	
			i	08 03 29.9	
		Ud	iP	08 02 40.2	
		De	iP	08 02 05.6	
		Crete (h = 50 km).			
"	13	Sk	iPKP	09 13 49.1	
		Um	iPKP	09 13 43.5	
		Ud	iPKP	09 13 52.9	
		De	iPKP	09 13 56.6	
			ipPKP	09 14 09.7	
		Solomon Islands.			
		h = 45 km (De).			
"	13	Ki	i(P)	10 49 56.8	
"	14	Ud	eP	10 34 36	
			i	10 34 46.7	
"	14	Up	iP	16 13 22.6	
		Ki	iP	16 12 42.5	C
		Sk	iP	16 13 16.2	
		Um	iP	16 13 00.0	C
		Ud	iP	16 13 29.5	
		Japan (h = 60 km).			

1969 Jan.	14	Up	iP	19 55 18.4	
"	14	Um	iPKP	21 43 53.5	
		Kermadec Islands			
		(h = 400 km).			
"	14	Up	iP	23 17 28.3	
			i	23 17 36.6	
			iS	23 21 40	
			i	23 21 56	
				micr sec	
			P N	5.0 5	
			P Z	4.2 5	
			P Z'	0.3 0.6	
			S E	2.2 6	
			S N	1.2 4	
			Mx E	83 19	
			Mx N	43 18	
			Mx Z	40 16	
			D = 2800 km = 25°.		
		Ki	iP	23 18 33.1	
			i	23 18 43	
			iPP	23 19 36	
			iS	23 23 53	
			i	23 26 17	
				micr sec	
			P Z	2.0 6	
			P Z'	0.4 1.3	
			PP N	1.2 7	
			S E	6.9 6	
			S N	1.8 6	
			Mx E	27 8	
			Mx N	18 11	
			Mx Z	18 10	
			D = 3550 km = 32°.		
		Sk	iP	23 18 08.9	C
			i	23 18 14.8	
		Um	iP	23 17 58.1	
			i	23 18 04.3	
			iPP	23 19 03	
			iS	23 22 45	
		Ud	iP	23 17 37.5	C
			i	23 17 44.4	
			i	23 17 48.7	
		De	iP	23 17 07.0	C
			i	23 17 11.0	
			i	23 17 14.6	
		Turkey (h = N).			
		m = 6.3, M = 6.4 (Up,Ki).			
		Higher-mode surface			
		waves.			
"	14	Up	eP	23 49 04	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan. 15	Up	iP	08 49 55.8	
		i	08 50 08.0	
		ipP	08 50 23.5	
		iS	08 52 39.0	
			micr sec	
		P Z'	0.2 0.5	
		D = 1650 km = 15°.		
	Sk	eP	08 50 49	
		i	08 50 51.1	
		i(PcP)	08 54 49.3	
	Um	iP	08 50 37.4	C
		i	08 50 52.8	
		iS	08 53 58.0	
	Ud	iP	08 50 11.1	
	De	iP	08 49 31.8	
		i	08 49 39.6	
		iLg1	08 53 53.3	
	Rumania. h = 140 km (Up).			
" 15	Um	iSS	13 30 39	
	Celebes (h = N).			
" 15	Up	iSg	14 24 59.6	
	Ki	e	14 27 10	
		iSg	14 27 52.7	
	Sk	e	14 26 56	
		iSg	14 27 11.9	
	Um	iSg	14 25 44.8	
		i	14 26 06.6	
	Ud	iSn	14 25 46.0	
		iSg	14 26 14.6	
	De	iSg	14 26 50.9	
	Esthonia-Gulf of Finland. Explosion?			
" 15	Ki	iPn	15 08 36.6	
		iP^x	15 08 46.1	
		iSn	15 09 24.9	
		iLg1	15 09 38.5	
		D = 440 km = 4.0°.		
	Sk	eSg	15 12 25	
	Um	iSg	15 11 04.3	
	Northwest Russia, 68.5°N, 31.1°E. Origin time = 15 07 34. Explosion?			
" 15	Up	iP	19 41 48.6	
	Ki	iP	19 41 14.3	C
	Um	iP	19 41 33.9	C
	Ud	iP	19 41 40.4	C
	Nevada. Underground explosion.			
" 16	Ki	iP	07 02 30.6	

1969 Jan. 16	Up	iP	07 26 46.4	
	Ki	iP	07 26 46.6	
	Um	iP	07 26 43.2	
	Ud	iP	07 26 56.3	C
		ipP	07 27 08.8	
	Sumatra. h = 45 km (Ud).			
" 16	Up	iP	08 18 13.4	
		i	08 18 14.9	
" 16	Ud	iPKP	11 26 02.5	
	De	iPKP	11 26 10.1	C
	Tonga-Kermadec Islands (h = 45 km).			
" 16	Ud	i(Sg)	13 55 05.5	
" 16	Up	iP	15 32 28.4	
	Ki	iP	15 32 01.1	C
	Sk	iP	15 32 30.9	
	Um	iP	15 32 12.3	
	Ud	iP	15 32 38.0	C
	Ryukyu Islands (h = 40 km).			
" 16	Um	iP	15 46 03.3	
	Ud	iP	15 46 33.0	
	Japan (h = 45 km).			
" 16	Ki	e(P)	17 19 17	
	Um	e(P)	17 19 27	
	Mariana Islands.			
" 16	Ki	iSg	17 37 02.6	
	Sk	iSg	17 37 07.1	
	Um	iSg	17 37 30.0	
	Nordland, Norway, 66.4°N, 14.8°E. Origin time = 17 35 34. Explosion?			
" 16	Um	iP	19 22 00.1	C
" 17	Ud	iP	08 37 49.8	
		ipP	08 37 56.4	
	Kurile Islands. h = 25 km (Ud).			
" 17	Ki	iPn	11 03 20.4	C
		iSn	11 04 19.0	
		iLg1	11 04 38.6	
		D = 540 km = 4.9°.		
	Sk	iSg	11 07 09.6	
	Um	iSn	11 04 59.0	
	(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 17 (cont.)

Um	iSg		11 05 34.2	
Northwest Russia, 67.5°N, 33.4°E.				
Origin time = 11 02 04.				
Explosion?				
" 17	Sk	iP	15 09 11.3	
		i	15 09 15.2	
" 17	Um	iP	16 18 39.3	
		i	16 18 55.2	
" 17	Ud	iP	21 12 46.7	
Mindanao (h = 40 km).				
" 17	Ud	iP	23 44 15.5	
" 18	Up	iPKP	03 21 14.2	C
		i	03 21 25.1	
		iPKKP	03 31 14.5	
			micr sec	
		PKP Z'	0.2 0.5	
		Mx N	1.2 20	
		Mx Z	1.8 19	
	Ki	iPKP	03 21 29.3	C
		ipPKP	03 22 03.3	
		iSKP	03 24 37.9	
			micr sec	
		PKP Z'	0.4 1.0	
		SKP Z'	0.3 1.7	
		Mx N	0.9 19	
		Mx Z	1.3 20	
	Sk	iPKP	03 21 19.1	C
	Um	iPKP	03 21 22.4	C
		i	03 23 43.5	
		i(PKKP)	03 31 19.3	
		eSS	03 40 17	
	Ud	iPKP	03 21 12.5	C
		iPP	03 23 10.2	
		i	03 24 35.7	
		iPKKP	03 31 19.4	
South Sandwich Islands.				
h = 130 km (Ki).				
M = 5.6 (Up,Ki).				
M not corrected for focal depth.				
" 18	Up		---	
			micr sec	
		Mx E	1.2 21	
		Mx N	1.9 19	
	Ki	eSS	04 21 21	

(cont.)

1969
Jan. 18 (cont.)

Ki			micr sec	
	Mx	E	1.3 16	
	Mx	N	4.8 24	
	Mx	Z	1.7 19	
Celebes (h = N).				
M = 5.7 (Up,Ki).				
" 18	Ki	iPn	11 35 23.8	
		iSn	11 36 00.7	
		iSg	11 36 13.8	
		D = 330 km = 3.0°.		
	Um	iSn	11 36 43.3	
		iSg	11 37 09.3	
Probably northern Finland.				
Origin time = 11 34 34.				
Explosion?				
" 18	Ki	iPn	14 20 32.9	
		eSn	14 21 16	
		iSg	14 21 32.8	
		D = 390 km = 3.5°.		
	Um	iSg	14 22 59.8	
Probably northwest Russia.				
Origin time = 14 19 36.				
Explosion?				
" 18	Um	eP	17 21 11	
		i	17 22 05.3	
" 18	Um	iP	22 44 38.4	
	Ud	iP	22 44 41.8	
	De	iP	22 44 27.6	
		i	22 46 46.4	
" 19	Ki	iP	03 34 17.3	
Luzon (h = N).				
" 19	Up	iP	07 12 32.0	C
		ipP	07 13 33	
		iS	07 20 56	
		ipS	07 22 00	
		i	07 24 55	
		iP'P'	07 40 55.7	
			micr sec	
		P E	1.8 2	
		P N	11 3	
		P Z	19 3	
		P Z'	1.5 0.6	
		S E	26 9	
		S N	54 7	
		S Z	9.7 6	
		S Z'	4.0 1.7	
		Mx E	33 15	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 19 (cont.)

Up			micr	sec	
	Mx	N	33	15	
	Mx	Z	18	18	
	D = 7450 km = 67°.				
Ki	iP		07 11 46.9		C
	iS		07 19 33		
	isS		07 21 12		
	iSa		07 26 24		
	i		07 27 40		
			micr	sec	
	P	E	7.7	6	
	P	N	6.9	6	
	P	Z	22	6	
	P	Z'	5.0	1.0	
	S	E	74	8	
	S	N	74	9	
	S	Z	11	7	
	S	Z'	5.0	2.6	
	Mx	E	40	17	
	Mx	N	22	13	
	Mx	Z	20	13	
	D = 6650 km = 60°.				
Sk	iP		07 12 23.7		C
	iPP		07 14 48.5		
	iS		07 20 45.0		
	iP'P'		07 41 07.1		
Um	iP		07 12 06.9		C
	iPP		07 14 29.7		
	i		07 17 15		
	iS		07 20 09		
	isS		07 21 34.2		
	iP'P'		07 41 10.7		
Ud	iP		07 12 38.4		C
	iPP		07 15 17.0		
	iS		07 21 14.1		
	ipS		07 22 12.6		
De	iP		07 12 55.1		C
	iPP		07 15 25.5		
	i(S)		07 21 47.9		

Japan. h = 220 km (Ki,Um).
m = 7.2, M = 6.8 (Up,Ki).
M not corrected for focal depth.

" 19	Ki	iP	07 39 20.2		C
			micr	sec	
		P Z'	0.1	1.3	
	Um	iP	07 39 26.0		
	Ud	iP	07 39 44.9		

Molucca Passage
(h = 40 km).

" 19	Ki	iPn	08 20 01.6		

(cont.)

1969
Jan. 19 (cont.)

Ki	iSn		08 21 01.1		
	iLg1		08 21 22.2		
	D = 540 km = 4.9°.				
Sk	eSn		08 22 52		
	iSg		08 23 49.4		
Um	iSn		08 21 37.8		
	iS^x		08 21 53.7		
	iSg		08 22 10.5		
Ud	iSg		08 24 48.8		

Northwest Russia,
67.1°N, 33.2°E.
Origin time = 08 18 46.
Explosion?

" 19	Um	iP	08 38 33.3		
" 19	Um	eP	18 15 14		
		i	18 15 22.8		
	Ud	iP	18 15 36.3		

Japan (h = 60 km).

" 19	Up	eP	19 06 41		
		e(PKP)	19 09 40		
		iPKP	19 09 48.6		
		iPP	19 11 49		
		iSKP	19 13 01.6		
		iX	19 22 13.2		
		i	19 22 28.3		
			micr	sec	
		PKP Z'	0.1	0.8	
		PP Z	0.9	5	
		SKP E	2.0	4	
		SKP N	2.8	2	
		SKP Z	3.3	4	
		SKP Z'	0.8	0.7	
		Mx E	4.3	19	
		Mx N	5.8	18	
		Mx Z	5.2	18	
		(D = 14350 km = 129°).			
	Ki	e(PKP)	19 09 32		
		iPKP	19 09 35.4		
		iPP	19 11 09.6		
		iSKS	19 16 24		
		iX	19 22 59.3		
			micr	sec	
		PKP Z'	0.5	0.9	
		PP E	0.7	8	
		PP N	1.2	7	
		PP Z	2.6	8	
		PP Z'	0.9	1.7	
		SKS N	2.0	7	
		Mx E	5.2	18	
		Mx N	4.5	19	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 19 (cont.)

Ki			micr	sec	
	Mx	Z	9.7	16	
	(D = 13650 km = 123°).				
Sk	iPKP		19 09 46.5		
	ipPKP		19 10 27.8		
	iSKP		19 12 55.9		
	iX		19 22 19.7		
Um	eP		19 06 21		
	i(PKP)		19 09 32.5		
	iPKP		19 09 41.8		
	ipPKP		19 10 26.4		
	iPP		19 11 31.9		
	i		19 11 37		
	eX		19 22 23		
	iSS		19 28 31		
Ud	i(PKP)		19 09 36.0		
	iPKP		19 09 50.7		
	i		19 10 01.4		
	iPP		19 11 55.2		
	iSKP		19 13 05.8		
	ipSKP		19 14 10.2		
	iX		19 22 30.9		
De	i(PKP)		19 09 45.2		
	iPKP		19 09 51.0		
	ipPKP		19 10 41.3		
	iSKP		19 13 15.9		
	ipSKP		19 14 25.3		
	iX		19 22 43.7		

New Hebrides Islands.
h = 180 km (Sk,Um,De).
m = 6.4, M = 6.4 (Up,Ki).
M not corrected for focal depth.

" 20	Up	ePKP	01 22 23	
		i	01 22 31.4	
	Sk	ePKP	01 22 21	
	Um	iPKP	01 22 19.7	
	Ud	iPKP	01 22 25.1	

Kermadec Islands
(h = 70 km).

" 20	Ki	iP	04 18 07.9	C
	Sk	iP	04 18 41.2	
	Um	iP	04 18 23.1	C
	Ud	iP	04 18 52.2	C

Japan (h = 350 km).

" 20	Ki	iP	05 49 48.3
	Um	iP	05 50 16.7

Kodiak Island (h = 40 km).

" 20	Sk	eP	06 04 20

(cont.)

1969
Jan. 20 (cont.)

	Um	iP		06 04 19.1	

Adriatic Sea.

" 20	Ud	iP		09 32 34.0	
" 20	Up	iPKP		12 43 43.5	
				micr	sec
		Mx	E	2.3	20
		Mx	N	4.7	23
		Mx	Z	5.3	23
	Ki	iSKSP		12 54 24	
				micr	sec
		Mx	E	1.9	20
		Mx	N	2.8	22
		Mx	Z	4.7	22
	Um	iPKP		12 43 29.9	
		i		12 43 36.7	
		iPP		12 44 56	
		i(PS)		12 54 37	
		iSKSP		12 54 51	
		iSS		13 01 47	
	Ud	iPKP		12 43 46.4	

Santa Cruz Islands
(h = 4 km).
M = 6.1 (Up,Ki).

" 20	Up	iP		14 30 36.0	C
		i		14 30 42.6	
		eS		14 39 00	
				micr	sec
		P	N	1.2	2
		P	Z	1.9	2
		P	Z'	1.5	1.2
		Mx	E	2.0	18
		Mx	N	4.3	18
		Mx	Z	4.5	20
		D = 7000 km = 63°.			
	Ki	iP		14 29 41.2	C
		iS		14 37 19	
				micr	sec
		P	Z'	1.5	1.1
		S	N	0.6	7
		Mx	E	1.8	18
		Mx	N	3.3	18
		Mx	Z	3.6	18
		D = 6100 km = 55°.			
	Sk	iP		14 30 17.9	C
	Um	iP		14 30 07.4	C
		i		14 30 22.1	
		iS		14 38 09	
	Ud	iP		14 30 38.7	C
		iPP		14 32 57.5	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 20 (cont.)

	De	iP	14 31 01.5	C
		i	14 31 14.9	

Komandorsky Islands (h = 25 km).
m = 7.0, M = 5.7 (Up,Ki).

" 20	Ki	iSg	18 16 40.7	
		i	18 16 45.2	
	Sk	iSg	18 16 45.7	
	Um	e	18 17 01	
		iSg	18 17 09.1	

Nordland, Norway, 66.4°N, 14.8°E.
Origin time = 18 15 13.
Explosion?

" 20	Um	iP	20 32 01.2	
" 21	Up	eP	02 00 22	
		ipP	02 00 38.8	
	Ki	iP	02 00 21.6	
		ipP	02 00 38.3	
			micr sec	
		P Z'	0.1 1.0	
	Sk	iP	02 00 36.3	
	Um	iP	02 00 20.0	C
		ipP	02 00 38.2	
	Ud	iP	02 00 32.1	
		ipP	02 00 50.6	

Sumatra. h = 65 km (Up, Ki,Um,Ud).

" 21	Ki	iP	02 01 19.6	
	Um	iP	02 01 24.1	

Banda Sea (h = 90 km).

" 21	Up	iPKP	04 25 54.2	
	Sk	iPKP	04 25 44.4	
	Ud	iPKP	04 25 53.6	
" 21	Up	iPKP	04 27 24.0	
	Sk	iPKP	04 27 21.4	
	Ud	iPKP	04 27 26.9	
" 21	Ud	iP	07 23 06.4	
" 21	Up	iS	08 22 06	
			micr sec	
		S E	0.6 8	
		Mx E	0.9 16	
		Mx N	1.1 19	
		Mx Z	0.9 15	

(cont.)

1969
Jan. 21 (cont.)

	Ki	eP	08 15 02	
	Sk	iP	08 14 33.4	
	Um	iP	08 14 56	
		iS	08 22 21	
		iPS	08 22 43	
		iSS	08 26 09	

North Atlantic Ocean (h = N).

" 21	Ud	iP	10 54 24.6	
" 21	Um	iP	12 26 02.6	
" 21	Up	iP	12 55 42.6	
	Ki	eP	12 55 34	
	Um	iP	12 55 12.5	
" 21	Up	iP	14 44 38.3	C
			micr sec	
		Mx E	0.8 15	
		Mx N	2.2 18	
		Mx Z	0.8 13	
	Ki	iP	14 44 45.5	
			micr sec	
		Mx E	1.5 10	
		Mx N	1.3 9	
		Mx Z	1.6 10	
	Sk	iP	14 45 03.3	
		i	14 45 13.8	
	Um	iP	14 44 34.7	
	Ud	iP	14 44 53.4	
		iPP	14 46 32.5	

Tadzhik SSR (h = 50 km).
M = 5.3 (Up,Ki).

" 21	Ki	iPn	19 19 11.6	
		iP^{x}	19 19 19.9	
		iSn	19 19 58.0	
		iLg1	19 20 12.6	

D = 420 km = 3.8°.

	Sk	eSg	19 23 00	
	Um	iSg	19 21 44.1	
		i	19 21 51.3	

Northwest Russia, 68.9°N, 30.4°E.
Origin time = 19 18 12.
Explosion?

" 21	Ki	iP	21 11 30.7	
		iS	21 12 31.2	
		iSS	21 12 54.0	
	Sk	eP	21 12 21	
		iS	21 14 10.3	
	Um	iP	21 12 25.1	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 21 (cont.)

Um	i	21 12 41.3	
	iS	21 14 06.6	
Ud	eP	21 13 09	
	i	21 13 20.0	

Norwegian Sea (h = 7 km).

" 21	Up	iP	23 22 24.0	
	Ki	iP	23 21 29.2	C
	Sk	eP	23 22 06	
	Um	iP	23 21 55.5	
	Ud	iP	23 22 27.1	C
		i	23 22 40.5	

Kamchatka (h = 25 km).

" 22	Up	iP	00 52 43.4		C
			micr	sec	
		P	Z' 0.3	1.0	
		Mx	E 0.8	15	
		Mx	N 1.0	17	
		Mx	Z 1.4	18	
	Ki	iP	00 51 48.3		C
			micr	sec	
		P	Z' 0.4	1.0	
		Mx	E 0.9	15	
		Mx	N 0.5	13	
		Mx	Z 1.4	17	
	Sk	iP	00 52 25.5		C
		iPcP	00 53 15.0		
	Um	iP	00 52 14.4		C
		iPcP	00 53 08.9		
		eSS	01 04 29		
	Ud	iP	00 52 46.6		C
	De	iP	00 53 09.6		C

Kamchatka (h = N).
m = 6.5, M = 5.2 (Up,Ki).

" 22	Up	iP	03 27 46.8	C
	Ki	iP	03 26 51.5	C
	Sk	iP	03 27 28.3	
	Um	iP	03 27 17.6	
	Ud	iP	03 27 49.6	C
	De	iP	03 28 13.4	

Kamchatka (h = N).

" 22	Up	iP	04 04 44.1	
	Ki	iP	04 03 48.9	
	Sk	iP	04 04 26.2	
	Um	iP	04 04 15.2	
	Ud	iP	04 04 47.4	C

Kamchatka (h = 25 km).

" 22	Um	iP	04 23 41.9

(cont.)

1969
Jan. 22 (cont.)

Ud	iP	04 23 59.4	
De	iP	04 23 58.0	

Hindu Kush (h = 140 km).

" 22	Um	iP	04 56 03.8
" 22	Ki	eP	05 11 21
" 22	Ki	iPn	09 40 26.1
		iSn	09 41 25.4
		iLg1	09 41 44.4
		D = 540 km = 4.9°.	
	Sk	eSg	09 44 14
	Um	iSg	09 42 38.9

Northwest Russia, 67.3°N, 33.2°E.
Origin time = 09 39 10.
Explosion?

" 22	Up	iP	17 25 23.7		
			micr	sec	
		Mx	E	0.9	19
		Mx	N	1.2	20
		Mx	Z	1.6	20
	Ki	iP	17 24 33.7		
			micr	sec	
		Mx	E	0.8	19
		Mx	N	0.7	18
		Mx	Z	1.3	18
	Sk	iP	17 25 09.7		
	Um	iP	17 24 56.7		
	Ud	iP	17 25 28.4		

Kurile Islands (h = 50 km).
M = 5.0 (Up,Ki).

" 22	Up	iP	18 10 30.8	C
	Ki	iP	18 09 29.0	
	Um	iP	18 09 56.1	
	Ud	iP	18 10 21.4	

Unimak Island (h = N).

" 22	Up	iP	19 50 25.5	
		i	19 50 28.1	
	Ki	eP	19 50 39	
	Sk	iP	19 50 52.3	
		i	19 50 55.2	
	Um	iP	19 50 26.3	D
		i	19 50 29.1	
	Ud	iP	19 50 41.7	

West Pakistan (h = 40 km).

" 22	Ud	eP	22 06 49

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969						
Jan.	22	Up	iP		22 30 57.2	
"	23	Up	iP		02 10 48.0	
					micr	sec
			P	Z'	0.1	0.5
		Ki	eP		02 10 16	
		Um	iP		02 10 29.2 D	
		Ud	iP		02 10 55.0 D	
		De	iP		02 11 07.3	
		South of Japan (h = 410 km).				
"	23	Up	iP		05 28 32.1	
		Ki	eP		05 29 12	
		Sk	iP		05 28 43.4	
		Um	iP		05 28 53.2	
			i		05 29 00.1	
		Ud	iP		05 28 27.1	
			i		05 28 39.7	
		South Atlantic Ocean (h = N).				
"	23	Up	i(P)		10 12 31.9	
"	23	De	iP		13 47 41.3	
			i		13 47 45.1	
"	23	Ud	iP		14 32 17.4	
"	23	Ud	iP		18 33 31.7	
		Spain (h = N).				
"	23	Um	iP		23 54 55.4	
		Kashmir-India (h = N).				
"	24	Ud	iP		01 25 51.3	
"	24	Up	iPKP		02 51 18.4	
			iSKP		02 53 59	
			iPP		02 54 28	
			iPKS		02 55 02	
			ipPKS		02 57 17	
			iSKKP		03 02 37.8	
			iSS		03 12 07	
					micr	sec
			PKP	Z'	0.3	0.5
			SKP	Z	1.7	3
			SKP	Z'	1.4	1.5
			PP	N	0.8	3
			PP	Z	1.7	3
			PP	Z'	1.0	1.5
			PKS	N	1.2	4
			SKKP	Z'	0.9	1.5
			Mx	E	1.0	20
			Mx	N	1.7	21
		(cont.)				

1969						
Jan.	24	(cont.)				
		Up			micr	sec
			Mx	Z	1.3	20
		(D = 15550 km = 140°).				
		Ki	i(PKP)		02 50 56.8	
			iPKP		02 51 11.5	
			iSKP		02 53 40	
			iPKS		02 54 38	
			ipPKS		02 56 50	
			i		02 59 34	
			iSKKP		03 03 14.2	
					micr	sec
			PKP	Z	1.0	4
			PKP	Z'	0.2	1.0
			SKP	E	0.6	4
			SKP	N	1.3	5
			SKP	Z	6.1	6
			SKP	Z'	2.1	1.7
			PKS	E	1.3	6
			PKS	N	1.3	7
			SKKP	Z'	0.3	1.5
			Mx	E	2.5	15
			Mx	N	1.2	13
			Mx	Z	0.8	12
		(D = 14700 km = 132 1/2°).				
		Sk	i(PKP)		02 51 10.0	
			iPKP		02 51 12.0	
			i		02 51 47.3	
			ipPKP		02 53 30.5	
			iSKP		02 53 59.5	
		Um	i(PKP)		02 51 03.3	
			iPKP		02 51 12.8	
			i		02 51 18.5	
			iSKP		02 53 54.4	
			iPKS		02 54 47	
			ipPKS		02 56 59	
			isPKS		02 58 05	
			iSKKP		03 02 58.1	
			iSS		03 11 09	
		Ud	iPKP		02 51 19.9	
			iSKP		02 54 08.3	
			iSKKP		03 02 35.4	
			iSP		03 04 16.9	
		De	iPKP		02 51 31.8	
			iSKP		02 54 17.0	
			iSKKP		03 02 21.8	
		Fiji Islands. h = 600 km (Up,Ki,Sk,Um).				
		m = 6.6, M = 6.1 (Up,Ki).				
		M not corrected for focal depth.				
"	24	Ki	iP		03 27 00.8	
		Sk	iP		03 27 23.3	
		Um	iP		03 27 16.3	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan. 24	(cont.)				
	Ud	iP		03 27 37.9	
" 24	Ud	iP		05 20 57.9	
" 24	Up	i		13 15 13.2	
		i(Sg)		13 15 32.7	
	Ki	e		13 17 55	
		iSg		13 18 03.2	
		i		13 18 13.8	
	Sk	eSg		13 17 21	
	Um	iSg		13 16 00.3	
	Ud	eSn		13 15 59	
		iSg		13 16 30.2	
	De	eSg		13 16 55	
	Esthonia-Gulf of Finland. Explosion?				
" 24	Ud	iP		14 02 18.1	
" 24	Ud	iP		14 38 26.2	
" 24	De	iP		15 12 51.9	
" 24	Um	iP		16 18 52.7	
" 24	Ki	iSg		17 33 13.8	
	Sk	iSg		17 33 18.8	
	Um	i		17 33 28.7	
		iSg		17 33 41.0	
	Ud	eSg		17 35 15	
	Nordland, Norway, 66.4°N, 14.8°E. Origin time = 17 31 45. Explosion?				
" 24	Sk	iP		17 59 19.0	
	Um	eP		17 59 07	
	Ud	iP		17 59 32.4	
" 24	Ud	eP		19 55 43	
	Japan (h = N).				
" 24	Up	iP		21 42 59.4	C
" 25	Up	iP		05 32 54.8	
		i		05 32 59.8	
		i		05 35 07.3	
		iSKS		05 43 28	
		iS		05 44 13	
				micr	sec
		Mx	E	1.9	20
		Mx	N	3.5	24
	(cont.)				

1969 Jan. 25	(cont.)				
	Up			micr	sec
		Mx	Z	3.2	20
	D = 11000 km = 99°.				
	Ki	iP		05 32 37.6	
		iPP		05 36 27	
		iSKS		05 43 12	
				micr	sec
		P	Z'	0.3	1.3
		PP	Z	0.5	7
		SKS	E	0.5	7
		Mx	E	1.9	17
		Mx	N	2.8	22
		Mx	Z	3.6	17
	Sk	eP		05 32 58	
	Um	iP		05 32 43.4	C
		iPP		05 36 31.7	
		i(SKS)		05 43 09	
		iSKS		05 43 21	
		iS		05 43 53	
	Ud	iP		05 33 02.0	C
		iX		05 36 08.7	
		i		05 37 29.9	
	De	iP		05 33 08.6	
		iX		05 36 37.0	
	Molucca Passage (h = 25 km). m = 6.4, M = 6.0 (Up,Ki). X (Ud,De) belongs to the group of unidentified phases arriving before PP.				
" 25	Ki	ePn		11 12 29	
		iSn		11 13 20.9	
		iSg		11 13 44.0	
	D = 490 km = 4.4°.				
	Sk	eSg		11 16 03	
	Um	iS^X		11 14 15.4	
		iSg		11 14 30.1	
	Northwest Russia, 67.2°N, 31.7°E. Origin time = 11 11 19. Explosion?				
" 25	Up	ePKP		11 25 43	
	Um	iPKP		11 25 29.5	
	Ud	ePKP		11 25 43	
		i		11 25 59.3	
	South of Kermadec Islands (h = 15 km).				
" 25	Up	eP		12 12 23	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan. 25	Up	iP	12 20 27.5	
		i	12 20 34.7	
	Ki	iP	12 19 31.2	
		i	12 19 41.1	
	Um	iP	12 19 57.5	
		i(PcP)	12 20 59.0	
		i	12 21 19.6	
	Ud	iP	12 20 29.5	
	Kamchatka (h = N).			
" 25	Ud	iP	13 26 20.9	
	Java (h = 15 km).			
" 25	Ki	iP	16 02 11.1	
	Alaska (h = 70 km).			
" 25	Up	eP	21 02 51	
	Ki	eP	21 04 08	
	Sk	eP	21 03 33	
	Um	iP	21 03 32.7	
	Ud	iP	21 03 03.2	
	De	eP	21 02 22	
" 25	Up	iP	23 44 49.9	
		ipP	23 45 04.0	
			micr sec	
		pP Z'	0.1 0.6	
	Ki	iP	23 44 46.1	
		ipP	23 45 00.2	
	Sk	iP	23 45 06.6	
		ipP	23 45 20.9	
	Um	iP	23 44 43.6	
		ipP	23 44 57.1	
	Ud	iP	23 45 03.5	
		ipP	23 45 17.7	
	De	ipP	23 45 17.8	
		isP	23 45 24.7	
	India-East Pakistan. h = 55 km (Up,Ki,Sk,Um, Ud). pP is considerably bigger than P at all our stations.			
" 26	Up	ePKP2	00 12 50	
	Ki	iPKP	00 12 34.7	
	Um	ePKP	00 12 32	
	Ud	iPKP2	00 13 00.9	
	West of Macquarie Islands (h = N).			
" 26	Up	eP	02 32 26	
		iPn	02 33 01.2	
		iPP	02 33 29.7	
	(cont.)			

1969 Jan. 26	(cont.)		
	Ki	iP	02 33 00.8
		ePn	02 33 55
	Sk	ePn	02 33 50
	Um	eP	02 32 37
		iPP	02 33 36.8
		i	02 34 05.3
		iSn	02 40 05.9
	Ud	iP	02 32 44.4
		iPn	02 33 37.4
	De	iP	02 32 34.2
		iPn	02 33 17.3
	Iran (h = 50 km). The average group velocity for Pn for this earthquake amounts to 8.58 km/sec, which is remarkably high (cf M. Båth, Pure and Appl. Geophysics, Vol. 66, 1967, pp. 30-36).		
" 26	Up	iP	06 19 18.4
		ipP	06 19 31.0
	Ki	iP	06 19 02.1
	Sk	iP	06 19 22.2
	Um	iP	06 19 06.9 D
		i	06 19 10.5
		ipP	06 19 18.8
	Ud	iP	06 19 26.9 D
		ipP	06 19 38.9
	De	iP	06 19 33.5
		ipP	06 19 45.7
	Mindanao. h = 45 km (Up, Um,Ud,De).		
" 26	Up	e	07 34 41
		iLg1	07 35 17.5
		iSg	07 35 28.3
	Ki	iPn	07 31 12.8
		iSn	07 32 10.3
		iLg1	07 32 27.2
		D = 530 km = 4.8°.	
	Sk	iSg	07 34 59.3
	Um	iSn	07 32 49.1
		iSg	07 33 27.0
	Northwest Russia, 67.6°N, 32.9°E. Origin time = 07 29 57. Explosion?		
" 26	Um	iP	08 36 55.5
		e	08 39 15

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan.	26	Up	iP	10 06 43.3	
			ipP	10 07 15.5	
		Ki	iP	10 06 47.1	
			ipP	10 07 20.0	
		Sk	eP	10 07 07	
		Um	iP	10 06 39.2	
			i	10 06 42.1	
			ipP	10 07 11.1	
		Ud	iP	10 06 59.6	
			ipP	10 07 32.0	
		De	iP	10 06 58.0	
		Tadzhik-Sinkiang. h = 150 km (Up,Ki,Um,Ud).			
"	26	Up	eP	11 13 27	
"	26	Ki	ePKP	13 42 52	
			i	13 42 54.4	
				micr sec	
			PKP Z'	0.1 1.3	
		South Sandwich Islands (h = N).			
"	26	Ud	eP	14 31 44	
		De	eP	14 31 09	
		Algeria (h = 30 km).			
"	26	Up	iP	15 15 48.7	C
			ipP	15 15 57.5	
			iPcP	15 16 36.2	
			iPa	15 19 41	
			iS	15 24 11	
				micr sec	
			P Z'	0.1 0.5	
			Mx E	2.9 19	
			Mx N	5.4 18	
			Mx Z	5.2 18	
			D = 6850 km = 61 1/2°.		
		Ki	iP	15 14 53.5	C
			eSa	15 26 42	
				micr sec	
			P Z'	0.2 1.2	
			Mx E	3.1 18	
			Mx N	3.3 17	
			Mx Z	6.1 18	
		Sk	iP	15 15 30.7	
		Um	iP	15 15 19.6	C
			ipP	15 15 29.2	
			iPcP	15 16 20.1	
			iPa	15 18 53	
			iS	15 23 23	
		Ud	iP	15 15 51.8	C
			i	15 16 13.1	
		(cont.)			

1969 Jan.	26	(cont.)			
		Ud	i(PP)	15 17 59.6	
		De	iP	15 16 14.3	C
			ipP	15 16 25.7	
		Kamchatka. h = 35 km (Up, Um,De).			
		m = 6.2, M = 5.8 (Up,Ki).			
"	26	Ki	iP	15 28 03.8	
		Um	eP	15 28 30	
		Ud	iP	15 29 02.1	
		Kamchatka (h = N).			
"	26	Up	iP	15 51 28.7	C
		Ki	iP	15 51 03.7	
		Sk	iP	15 51 31.8	
		Um	iP	15 51 12.5	
			i	15 51 27.1	
			ipP	15 51 49.5	
		Ud	iP	15 51 37.7	
			ipP	15 52 15.1	
		Formosa. h = 150 km (Um, Ud).			
"	26	Ki	iP	15 53 44.6	
		Ud	iP	15 54 42.7	
		Kamchatka (h = N).			
"	26	Up	iP	15 59 15.3	
		Ki	iP	15 58 18.3	C
		Ud	iP	15 59 16.6	C
		Kamchatka (h = N).			
"	26	Up	iP	16 36 30.7	
		Ki	iP	16 35 33.2	C
		Um	iP	16 35 59.3	
		Ud	iP	16 36 31.6	
		Kamchatka (h = 20 km).			
"	26	Ki	eP	16 52 03	
		Ud	iP	16 52 27.5	
		Molucca Passage (h = 90 km).			
"	26	Up	iP	16 55 28.1	
		Ki	iP	16 54 32.9	C
				micr sec	
			P Z'	0.1 0.8	
		Sk	iP	16 55 10.3	
		Um	iP	16 54 59.3	
		Ud	iP	16 55 31.3	
		De	iP	16 55 54.0	
		Kamchatka (h = N).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan.	26	Up	iP		16 59 07.7	
					micr	sec
			P	Z'	0.1	1.2
		Ki	iP		16 58 12.3	C
			i		16 58 21.9	
					micr	sec
			P	Z'	0.1	1.0
		Sk	iP		16 58 49.9	
		Um	iP		16 58 38.4	
		Ud	iP		16 59 10.6	C
			i		16 59 23.8	
		Kamchatka (h = 20 km).				
		m = 5.9 (Up,Ki).				
"	26	Ki	eP		21 17 47	
"	27	Up	iPKP		03 14 23.7	
					micr	sec
			PKP	Z'	0.1	1.2
		Ki			---	
					micr	sec
			Mx	N	0.8	18
			Mx	Z	1.8	21
		Sk	iPKP		03 14 17.9	
			i		03 14 29.7	
		Um	iPKP		03 14 12.1	D
			i		03 14 19.0	
			i		03 16 05.1	
			iSS		03 36 23	
		Ud	iPKP		03 14 24.7	
		De	iPKP		03 14 34.5	
			i		03 14 46.0	
		Kermadec Islands (h = N).				
"	27	Up	iPKP		03 29 03.0	
		Ki			---	
					micr	sec
			Mx	N	0.8	18
		Sk	iPKP		03 28 56.3	C
		Um	iPKP		03 28 49.4	
			i		03 29 02.0	
			iSS		03 50 59	
		Ud	iPKP		03 29 04.0	
			i		03 29 22.0	
		Kermadec Islands (h = 25 km).				
"	27	Up	iP		04 41 44.1	
"	27	Up	iP		06 44 34.9	
			ipP		06 44 43.5	
			iS		06 50 02	
					micr	sec
			P	Z'	0.1	1.0
		(cont.)				

1969 Jan.	27	(cont.)				
		Up			micr	sec
			Mx	E	1.7	13
			Mx	N	1.0	16
			Mx	Z	1.2	15
		D = 3700 km = 33 1/2°.				
		Ki	iP		06 43 24.7	D
			eS		06 48 03	
					micr	sec
			P	Z'	0.1	1.0
			S	N	0.9	8
			Mx	E	1.7	13
			Mx	N	0.9	13
			Mx	Z	1.4	13
		D = 2900 km = 26°.				
		Sk	iP		06 44 10.8	D
			ipP		06 44 19.2	
			iPP		06 45 10.2	
		Um	iP		06 43 59.0	
			ipP		06 44 09.2	
			iS		06 48 51	
		Ud	iP		06 44 38.4	
			ipP		06 44 46.4	
		De	iP		06 45 07.8	
			ipP		06 45 16.2	
		Arctic Ocean. h = 45 km (Up,Sk,Um,Ud,De).				
		m = 5.6, M = 5.0 (Up,Ki).				
"	27	Ud	iP		10 10 09.2	
"	27	Um	i(P)		10 14 31.0	
"	27	Up	iPKP		10 20 17.2	D
			i		10 20 22.5	
					micr	sec
			PKP	Z'	0.2	0.6
		Ki	iPKP		10 19 54.1	
		Sk	iPKP		10 20 11.0	D
		Um	iPKP		10 20 06.0	D
		Ud	iPKP		10 20 18.6	
			i		10 20 25.6	
		De	iPKP		10 20 27.2	
			i		10 20 39.0	
		Kermadec Islands (h = 300 km).				
"	27	Up	iP		10 35 17.0	
"	27	Ki	iP		10 43 05.3	
		Ud	iP		10 44 03.3	
		Kamchatka (h = N).				
"	27	Up	eP		11 07 03	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 27 (cont.)

Ki	iP		11 07 11.1	
Sk	iP		11 07 28.9	
Um	iP		11 07 01.2	
Ud	iP		11 07 20.5	C
De	iP		11 07 17.6	

Afghanistan-USSR
(h = 50 km).

" 27	Um	iP	11 35 07.5	C
" 27	Ud	i(Sg)	13 12 46.9	
" 27	Up	iPP	13 33 01	
		ePS	13 41 42	
			micr	sec
		Mx E	4.1	18
		Mx N	4.2	19
		Mx Z	5.7	18
	Ki	iP	13 28 33.5	C
			micr	sec
		P Z'	0.2	1.5
		Mx E	4.0	18
		Mx N	3.8	17
		Mx Z	7.3	17
	Um	iP	13 28 42.5	C
		iPP	13 32 29	
		iSKS	13 39 23	
		iPS	13 41 04	
	Ud	iP	13 29 03.0	

Caroline Islands
(h = 5 km).
M = 6.1 (Up,Ki).

" 27	Sk	iP	14 01 18.5	
" 27	Up	iP	14 52 19.1	
	Ki	iP	14 52 05.3	C
			micr	sec
		P Z'	0.1	1.3
	Sk	iP	14 52 27.2	
	Um	iP	14 52 09.0	C
	Ud	iP	14 52 28.9	C
		i	14 52 38.7	
	De	iP	14 52 33.2	

South China Sea (h = N).

" 27	Up	iP	16 38 06.0	
	Ud	iP	16 37 52.0	
" 27	Up	iPKP	18 43 13.3	
	Ki	iPKP	18 42 59.9	
			micr	sec
		PKP Z'	0.1	1.5

(cont.)

1969
Jan. 27 (cont.)

Sk	iPKP		18 43 11.7	
Um	iPKP		18 43 06.5	C
Ud	iPKP		18 43 17.0	C
De	iPKP		18 43 21.9	

New Hebrides Islands
(h = 130 km).

" 27	Ki	iP	18 47 27.4	
	Sk	iP	18 48 03.8	
	Um	iP	18 47 46.8	
	Ud	iP	18 48 18.2	

Japan (h = 220 km).

" 27	Um	iP	21 17 47.5	
" 28	Ki	eP	00 37 06	
		i	00 37 23.9	
	Um	eP	00 37 17	
		i	00 37 27.1	
	Ud	iP	00 37 39.7	
		i	00 37 53.8	

Luzon (h = 80 km).

" 28	Um	iP	04 17 42.7	
" 28	Um	iP	04 32 32.4	C
	Ud	eP	04 32 39	
" 28	Ud	iP	05 49 37.2	
		i	05 50 32.0	

Japan (h = 50 km).

" 28	Um	iP	10 06 19.5	
	Ud	iP	10 06 45.5	

South of Japan
(h = 130 km).

" 28	Ki	ePn	10 15 20	
		iPg	10 15 38.1	
		iSn	10 16 18.4	
		iLg1	10 16 37.5	
		D = 530 km = 4.8°.		
	Sk	eSg	10 19 05	
	Um	iSn	10 16 57.9	
		iSg	10 17 32.1	

Northwest Russia,
67.5°N, 32.9°E.
Origin time = 10 14 05.
Explosion?

" 28	Ud	iP	10 31 08.4	
" 28	Um	iPKP	11 47 55.5	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Jan. 28	(cont.)			
	Ud	iPKP	11 47 57.5	
	De	iPKP	11 48 08.7	
	Fiji Islands (h = 640 km).			
" 28	Up	iSg	12 28 20.5	
	Um	iSg	12 28 49.5	
	Ud	iSg	12 29 18.6	
	Esthonia-Gulf of Finland. Explosion?			
" 28	Um	iP	13 21 45.5	
		i	13 21 59.3	
	Ud	eP	13 22 14	
" 28	Ki	iP	18 20 24.3	
" 28	Ki	iP	19 43 39.4	
	Java (h = 80 km).			
" 28	Up	eP	23 14 47	
" 28	Um	iP	23 29 03.3	
" 29	Ud	iP	00 44 38.4	
" 29	Um	iP	01 46 22.6	
		i	01 46 40.7	
" 29	De	iP	01 55 29.8	
" 29	Up	eP	04 55 47	
		i	04 55 51.8	
	Um	iP	04 55 35.6	
	Ud	iP	04 55 48.8	
		i	04 55 54.8	
	These phases could be PKP instead of P.			
" 29	Ud	iP	05 05 14.1	
" 29	Up	iP	05 29 22.0	
	Ki	iP	05 28 26.9	C
	Um	iP	05 28 55.1	
	Ud	iP	05 29 25.1	C
	De	iP	05 29 46.6	
	Kamchatka (h = N).			
" 29	Up	iP	05 30 22.1	
	Ki	iP	05 29 27.4	
	Ud	iP	05 30 25.6	
	Kamchatka. Origin time = 05 20 10.			
1969 Jan. 29	Ud	i(Sg)	09 43 00.5	
" 29	Ud	iP	09 54 35.0	
" 29	Ud	iP	11 11 28.2	C
" 29	Up	iP	11 34 24.6	
	Ki	eP	11 34 02	
	Um	iP	11 34 11.1	
	Ud	eP	11 34 32	
	Formosa (h = 80 km).			
" 29	Ud	iP	17 35 11.6	
" 29	Um	iP	18 00 54.5	
" 29	Up	iPKP	18 03 51.6	
	Ki	iPKP	18 03 35.0	
	Um	iPKP	18 03 42.6	C
		i	18 04 22.9	
		iPKS	18 07 04	
		eSS	18 23 45	
	Ud	i(PKP)	18 03 40.3	
		iPKP	18 03 51.0	
	De	i(PKP)	18 03 51.0	
		iPKP	18 04 01.2	
	Tonga Islands (h = N).			
" 29	Up	iPKP	19 49 11.3	
	Um	iPKP	19 49 03.7	C
	Ud	iPKP	19 49 14.0	C
	De	iPKP	19 49 20.0	
	Santa Cruz Islands (h = 150 km).			
" 29	Up	iP	21 05 31.6	
" 30	Up	iP	02 46 52.8	
			micr	sec
		P Z'	0.1	1.0
	Ki	iP	02 46 36.8	
			micr	sec
		P Z'	0.1	1.0
	Um	iP	02 46 42.2	
		ipP	02 46 58.8	
	Ud	iP	02 47 01.4	C
	Talaud Islands. h = 60 km (Um). m = 6.2 (Up,Ki).			
" 30	Ki	i(Sn)	10 08 58.5	
		i(Lg1)	10 09 25.1	
" 30	Up (cont.)	iP	10 42 58.4	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 30 (cont.)

Up	i		10 43 06.0	
	iX		10 43 26.7	
	iPP		10 46 49	
	i		10 47 02	
	iSKS		10 53 29	
	iS		10 54 06	
			micr	sec
	P	Z'	0.3	0.8
	PP	E	0.8	4
	PP	Z	3.5	3
	PP	Z'	1.6	1.3
	SKS	E	0.9	3
	Mx	E	180	21
	Mx	N	280	22
	Mx	Z	190	20
	D = 10500 km = 94 1/2°.			
Ki	iP		10 42 41.3	
	ipP		10 42 53.2	
	iSKS		10 53 16	
	iS		10 53 44	
			micr	sec
	P	Z'	0.3	1.3
	pP	Z'	1.0	1.2
	S	E	20	9
	S	N	22	17
	Mx	E	220	20
	Mx	N	300	23
	Mx	Z	440	20
	D = 10100 km = 91°.			
Um	iP		10 42 46.4 C	
	i		10 42 48.5	
	ipP		10 42 59.6	
	iX		10 43 13.0	
	i(PP)		10 46 11.2	
	i		10 46 44	
Ud	iP		10 43 05.9	
	i		10 43 12.8	
	ipP		10 43 19.0	
	iPP		10 46 50.8	
De	iP		10 43 14.4	
	i		10 43 19.4	
	iX		10 43 45.6	
	iPP		10 47 09.7	

Talaud Islands. h = 50 km (Ki,Um,Ud).
m = 7.0, M = 7.9 (Up,Ki).

" 30	Ud	i(Sg)	12 47 29.7	
" 30	Ki	iP	12 51 28.9	
	Ud	iP	12 51 53.1	

Talaud Islands (h = 70 km).

1969
Jan. 30

Ud	i(Pg)	13 31 38.9	
	i(Sg)	13 32 00.4	
	i	13 32 11.0	
" 30 Ki	iP	15 11 15.2	
Ud	iP	15 11 41.4	

Nevada. Underground explosion.

" 30 Ki	iP	16 20 10.2	
" 30 Ud	iP	16 53 21.1	

Mindanao (h = 80 km).

" 30 Up	iP	17 32 52.5	
	ipP	17 33 12.3	
Ki	iP	17 32 34.4	C
Ud	iP	17 33 01.1	
	ipP	17 33 21.6	
De	iPP	17 37 07.3	

Talaud Islands.
h = 75 km (Up,Ud).

" 30 Up	iP	18 48 59.6	
Ki	iP	18 48 45.8	
Um	iP	18 48 50.5	
Ud	iP	18 49 08.2	
De	iP	18 49 13.2	

Celebes Sea (h = 520 km).

" 30 Up	iP	21 05 21.0	
Ki	iP	21 04 36.8	C
Um	iP	21 04 56.0	C
Ud	iP	21 05 27.6	
	i	21 05 38.5	

Japan (h = 8 km).

" 31 Up	iP		00 57 38.3	
	ipP		00 57 52.5	
	iPP		01 01 36.1	
	iSKS		01 08 09	
	iS		01 08 54	
			micr	sec
	P	Z'	0.1	1.0
	PP	Z'	0.1	1.2
	Mx	E	9.9	20
	Mx	N	15	21
	Mx	Z	12	22
	D = 10650 km = 96°.			
Ki	iP		00 57 21.0	
	ipP		00 57 35.4	
	iPP		01 01 11	
	iSKS		01 07 51	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Jan. 31 (cont.)

Ki	eS		01 08 24	
			micr	sec
	P	Z'	0.4	1.5
	SKS	E	4.2	5
	Mx	E	12	20
	Mx	N	20	22
	Mx	Z	19	20
	D = 10300 km = 92 1/2°.			
Um	iP		00 57 29.1	
	ipP		00 57 41.2	
	iPP		01 01 13.3	
	iSKS		01 07 57	
	iS		01 08 37	
Ud	iP		00 57 47.0	
	ipP		00 57 58.9	
De	ePP		01 01 59	

Halmahera. h = 50 km (Up, Ki,Um,Ud).
m = 6.3, M = 6.6 (Up,Ki).

" 31

Up	iP		04 20 36.8 D	
	ipP		04 21 12.8	
			micr	sec
	P	Z'	0.6	1.0
Ki	iP		04 19 43.0	
			micr	sec
	P	Z'	0.1	0.9
Um	iP		04 20 08.5 D	
	i		04 20 17.0	
Ud	iP		04 20 40.6 D	
	i		04 20 49.8	
De	iP		04 21 01.9	
	i		04 21 11.5	

Kamchatka. h = 150 km (Up).

" 31 Ud iP 09 10 17.0
Halmahera (h = N).

" 31 Ki i(Sg) 13 11 27.7

" 31

Up			---	
			micr	sec
	Mx	E	1.9	20
	Mx	N	3.4	17
Ki	iP		14 01 31.4	
			micr	sec
	Mx	E	1.8	18
	Mx	N	2.6	21
	Mx	Z	3.5	21
Ud	iP		14 01 58.2	

Halmahera (h = N).
M = 5.9 (Up,Ki).

1969
Jan. 31

Ki	iP	14 46 43.1
Um	iP	14 46 07.7
Ud	iP	14 45 44.7
De	iP	14 45 11.7

Crete (h = 35 km).

" 31

Ki	iPKP	15 18 06.7
Um	iPKP	15 18 13.0
Ud	iPKP	15 18 22.8
De	iPKP	15 18 20.0

Tonga Islands (h = 260 km).

" 31 Up iP 15 39 12.3 C
Greece-Albania (h = N).

" 31 Ki iP 20 20 20.4
Talaud Islands (h = 70 km).

" 31 Um iP 22 35 49.1 D
Bonin Islands (h = 380 km).

" 31

Up	iPKP		23 50 19.5	
	i		23 50 26.7	
	ipPKP		23 51 52.8	
			micr	sec
	PKP	Z'	0.8	0.7
Ki	iPKP		23 49 58.1	
			micr	sec
	PKP	Z'	0.1	1.0
Um	iPKP		23 50 07.9	
	ipPKP		23 51 47.7	
De	iPKP		23 50 29.0	
	i		23 50 43.3	

South of Kermadec Islands.
h = 410 km (Up,Um).

Markus Båth
July 25, 1969

Seismological Institute
Uppsala

SEISMOLOGISKA INSTITUTIONEN
BOX 517
751 20 UPPSALA 1

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å, U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

F E B R U A R Y 1 - 28, 1969

1969				
Feb.	1	Ki	iP	05 20 47.2
"	1	Up	iP	07 54 27.1
		Ki	iP	07 54 06.5
		Um	iP	07 54 12.0
		Ud	iP	07 54 32.6
		Mindanao (h = N).		
"	1	Ki	iSn	13 29 10.1
			iSg	13 29 26.2
		Um	iSn	13 29 52.4
			iSg	13 30 22.0
		Off coast of Norway, near Lofoten, 67.5°N, 10.7°E. Origin time = 13 27 24. Solution obtained by combination with the Tromsö reading of Pg.		
"	1	Up	iP	14 00 52.6
"	1	Ud	iP	14 48 49.7
		Talaud Islands (h = N).		
"	1	Um	iP	15 02 59.4
"	1	Up	iP	16 32 40.4
		Ki	iP	16 32 23.8 C
		Um	eP	16 32 32
		Ud	iP	16 32 49.4
		North of Halmahera (h = N).		
"	1	Up	iP	20 14 07.3
		Ki	iP	20 14 40.7
		Um	iP	20 14 26.7
		Ud	iP	20 13 59.2
		(cont.)		

1969				
Feb.	1	(cont.)		
		Atlantic Ocean (h = N).		
"	1	Ud	iP	22 24 52.9
		Aleutian Islands (h = 25 km).		
"	2	Ki	eP	00 30 46
		Ud	iP	00 31 03.4
		North of Halmahera (h = N).		
"	2	Up	iP	01 52 11.4
			i	01 52 22.1
			iSKS	02 02 51
			iS	02 03 27
				micr sec
			Mx E	3.4 18
			Mx N	3.6 18
			Mx Z	4.5 20
		D = 10700 km = 96 1/2°.		
		Ki	iP	01 51 54.7
				micr sec
			Mx E	2.4 18
			Mx N	2.5 16
			Mx Z	3.6 15
		Um	iP	01 52 01.3
			iPP	01 55 44
			iSKS	02 02 31
			iS	02 03 06
			iPS	02 04 31
		Ud	iP	01 52 19.8
			i	01 52 25.4
		North of Halmahera (h = N). M = 6.0 (Up,Ki).		
"	2	Up	iP	02 20 28.3
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 2 (cont.)

Ki	iP	02 20 11.6	
Um	iP	02 20 15.8	
Ud	iP	02 20 36.6	

North of Halmahera (h = N).

" 2

Ud	iP	02 47 46.0	

North of Halmahera (h = N).

" 2

Um	iP	05 34 42.8	
Ud	iP	05 35 01.5	

North of Halmahera (h = N).

" 2

Up	iPcP	08 08 04.5	
Ki	eP	08 07 06	
Um	iP	08 07 21.5	

Japan (h = 60 km).

" 2

Ki	eP	16 34 29	
Um	iP	16 34 33.9	
Ud	eP	16 34 53	

North of Halmahera (h = N).

" 3

Ki	ePg	01 26 05	
	iSg	01 26 24.1	
	D = 170 km = 1.5°.		
Um	iSg	01 27 55.9	

Nordland, Norway, 67.9°N, 16.5°E.
Origin time = 01 25 34.
Solution obtained by combination with the Tromsö readings of Pg and Sg.

" 3

Up	iPKP	08 09 47.2	
	iSKP	08 12 29.7	
		micr sec	
	PKP Z'	0.7 0.6	
Ki	ePKP	08 09 33	
	iSKP	08 12 10.9	
		micr sec	
	SKP Z'	0.4 1.5	
Um	iPKP	08 09 35.7	
	i	08 09 44.6	
	iSKP	08 12 21.4	
Ud	iPKP	08 09 49.8	D
	ipPKP	08 12 15.3	

(cont.)

1969
Feb. 3 (cont.)

De	iPKP	08 09 59.2	
	iPKP2	08 10 25.5	
	ipPKP	08 12 19.3	

Tonga-Kermadec Islands. h = 650 km (Ud,De). pPKP at De is remarkably large (on Z').

" 3

Up	i(P)	08 21 03.8	
Ud	iP	08 20 38.4	

These phases could possibly be SKKP to the preceding shock.

" 3

Up	iPKP	08 32 06.8	C
	iSKP	08 34 50.6	
		micr sec	
	PKP Z'	0.4 0.7	
Ki	iSKP	08 34 31.2	
Um	iPKP	08 31 55.4	C
Ud	iPKP	08 32 09.4	
	iSKP	08 34 52.7	
De	iPKP	08 32 19.7	
	ipPKP	08 34 39.9	

Tonga-Kermadec Islands. h = 640 km (De).

" 3

Up	iPKP	08 36 35.0	D
		micr sec	
	PKP Z'	0.8 0.6	
Um	iSKP	08 39 04.9	
Ud	iPKP	08 36 37.5	D
	iSKP	08 39 16.8	
De	iPKP	08 36 47.0	D
	i	08 36 51.4	

Tonga-Kermadec Islands (h = 650 km).

" 3

Up	iP	09 07 49.3	
Ki	iP	09 06 59.3	C
	i	09 07 04.5	
Um	iP	09 07 21.7	
Ud	iP	09 07 53.8	
De	iP	09 08 13.2	

Kurile Islands (h = N).

" 3

Up	eP	09 57 58	
Um	iP	09 57 44.1	
Ud	eP	09 58 10	
	i	09 58 19.4	

Luzon (h = 60 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969						
Feb.	3	Up	iSg		12 30 30.2	
		Um	iSg		12 31 16.2	
		Ud	iSg		12 31 43.6	
		Esthonia-Gulf of Finland.				
		Explosion?				
"	3	Um	iP		15 26 19.6	
			i		15 26 25.2	
"	3	Ud	iP		17 25 25.4	
		North of Halmahera				
		(h = N).				
"	3	Up	eP		19 14 52	
			ePP		19 18 54	
					micr	sec
			Mx	E	1.7	18
			Mx	N	3.0	21
			Mx	Z	2.9	18
		Ki	iP		19 14 37.7	C
					micr	sec
			Mx	E	2.4	19
			Mx	N	3.7	21
			Mx	Z	2.0	18
		Um	iP		19 14 43.4	
			i		19 15 01.7	
			iPP		19 18 34.3	
			iSKS		19 25 10	
			iS		19 25 51	
		Ud	iP		19 15 02.9	
		North of Halmahera				
		(h = N).				
		M = 6.0 (Up,Ki).				
"	3	Ud	iP		19 34 59.1	
"	3	Ud	iP		21 43 07.7	
"	3	Up	iP		21 55 03.9	C
			i		21 55 07.0	
			i		21 58 51	
			iPP		21 58 56	
			iSKS		22 05 32	
			iS		22 06 13	
			iPS		22 07 34.7	
					micr	sec
			P	Z'	0.7	1.0
			PP	E	2.2	6
			PP	Z	1.5	3
			PP	Z'	1.0	1.7
			SKS	E	1.5	4
			S	E	6.5	4
			S	N	7.0	5
		(cont.)				

1969						
Feb.	3	(cont.)				
		Up			micr	sec
			Mx	E	17	19
			Mx	N	40	20
			Mx	Z	23	18
		D = 10550 km = 95°.				
		Ki	iP		21 54 46.8	C
			i		21 54 51.3	
			i		21 58 20.3	
			iPP		21 58 26	
			iSKS		22 05 13	
			iS		22 05 34	
					micr	sec
			P	E	1.6	4
			P	Z	3.8	8
			P	Z'	0.8	1.0
			PP	E	3.1	9
			PP	Z	4.8	8
			PP	Z'	0.5	1.7
			SKS	E	7.0	4
			SKS	N	2.2	4
			S	N	5.9	5
			Mx	E	19	20
			Mx	N	35	21
			Mx	Z	37	22
		D = 10150 km = 91 1/2°.				
		Um	iP		21 54 53.1	C
			i		21 54 55.4	
			i		21 58 21.5	
			i		21 58 26	
			iPP		21 58 32	
			iSKS		22 05 21	
			iS		22 05 44	
			iPS		22 07 08	
		Ud	iP		21 55 12.1	C
			i		21 59 00.8	
			iPP		21 59 16.1	
			iScS		22 06 30.5	
		De	iP		21 55 20.1	
			iPP		21 59 19.6	
		Talaud Islands (h = N).				
		m = 7.0, M = 7.0 (Up,Ki).				
		Multiple P and PP.				
"	4	Up			---	
					micr	sec
			Mx	E	6.9	21
			Mx	N	6.8	22
			Mx	Z	8.2	21
		Ki	eP		01 51 54	
			eSKS		02 02 31	
					micr	sec
			Mx	E	7.7	22
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Feb. 4 (cont.)

Ki			micr	sec
	Mx	N	13	22
	Mx	Z	12	22
Um	iP		01 51 50.6	
	i(PP)		01 55 30.1	
	iPP		01 55 46	
	iSKS		02 02 20	
	iS		02 02 59	
	iSS		02 09 40	
Ud	iP		01 52 07.1	
	i		01 52 13.9	
	i(PP)		01 56 01.9	

Celebes (h = N).
M = 6.3 (Up,Ki).

" 4	Up	iP	03 24 15.5	
		i	03 24 23.7	
" 4	Up	eP	04 23 55	
		i	04 24 15.1	
		iSKS	04 34 33	
		iS	04 35 37	
			micr	sec
		SKS E	0.7	8
		Mx E	3.8	22
		Mx N	1.9	19
		Mx Z	5.0	22

D = 11200 km = 101°.

Ki	eP		04 24 06	
	iX		04 24 18.4	
	iPP		04 28 18	
	iSKS		04 34 39	
			micr	sec
	PP	E	0.8	7
	PP	Z	1.0	7
	SKS	E	1.2	10
	Mx	E	2.2	20
	Mx	N	2.8	22
	Mx	Z	6.3	22

D = 11350 km = 102°.

Um	iP	04 24 07.2	
	iX	04 24 19.0	
	iPP	04 28 14	
	i(PP)	04 28 30.4	
	iSKS	04 34 40	
	iS	04 35 42	
	iPS	04 37 16	
Ud	iP	04 23 54.2	D
	iX	04 24 06.0	
De	iP	04 23 55.5	
	iX	04 24 06.3	

(cont.)

1969 Feb. 4 (cont.)

Peru (h = 15 km).
m = 6.5, M = 6.0 (Up,Ki).
If X is interpreted as pP, the focal depth becomes 45 km (Ki,Um,Ud,De).

" 4	Ki	iP	04 55 08.4
" 4	Um	iP	10 33 53.4
" 4	Ud	eP	11 21 01
		i	11 21 08.3
" 4	Ki	iSKP	11 49 16.2
	Um	iPKP	11 46 53.1
		iSKP	11 49 27.9
	Ud	iPKP	11 46 54.6
		iSKP	11 49 42.1
	De	iSKP	11 49 51.4

Fiji Islands (h = 620 km).

" 4	Up	eSn	12 14 47
		iSx	12 14 55.6
		iRg	12 15 13.9
	Ki	iSg	12 17 43.2
		iRg	12 18 04.7
	Um	iSg	12 15 43.2
	Ud	eSg	12 16 10
	De	iSg	12 16 37.7

Esthonia, near Reval.
Origin time = 12 13 00.
Probably explosion.

" 4	Ki	iP	17 33 18.1 C
" 5	Um	iP	05 35 08.6
" 5	Ud	iP	05 52 04.9
" 5	Ud	iP	09 25 45.5
	De	iP	09 25 13.4

Crete (h = 60 km).

" 5	Um	iP	10 02 34.8
	Ud	iP	10 02 59.0

Bonin Islands (h = N).

" 5	Ud	iP	10 50 03.3

North of Halmahera (h = 35 km).

" 5	Up	iSg	12 10 53.9

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 5 (cont.)
Ud iPg 12 10 04.9
iSg 12 10 23.7
D = 160 km = 1.4°.
De iSg 12 10 43.6
Västergötland, Sweden, 58.6°N, 13.6°E.
Origin time = 12 09 36.

" 5 Um eP 20 11 22
Mindanao (h = 60 km).

" 5 Um iP 20 29 52.9
Ud iP 20 29 54.1
Iran-USSR (h = N).

" 5 Ud eP 23 56 18
Atlantic Ocean (h = N).

" 6 Up eP 04 41 29
Um iP 04 41 07.7
Ud iP 04 41 39.1 C
Japan (h = N).

" 6 Up eP 05 36 58
Um iP 05 36 39.1
Ud iP 05 37 06.3 C
Japan.
Origin time = 05 26.0.

" 6 Up iP 07 45 46.0
Ki iP 07 45 15.5
Um iP 07 45 28.7
Ud iP 07 45 52.3
De iP 07 46 03.3
Mariana Islands (h = 60 km).

" 6 Up iP 08 46 55.3
Ki iP 08 46 06.4
Um iP 08 46 25.9
ipP 08 46 31.1
Ud iP 08 46 57.6
ipP 08 47 02.2
De iP 08 47 14.8
Japan. h = 20 km (Um,Ud).

" 6 Up iP 09 44 43.4
Um iP 09 44 16.2
iPcP 09 44 49.5
Ud iP 09 44 42.7
ipP 09 44 56.0
(cont.)

1969
Feb. 6 (cont.)
De iP 09 45 04.3
Aleutian Islands.
h = 50 km (Ud).

" 6 Um iP 13 08 12.7
i 13 08 27.9
Ud iP 13 07 38.3
(Italy).

" 6 Up iP 14 52 41.6
Ki iP 14 51 47.4
Um iP 14 52 15.0
Ud iP 14 52 39.8
ipP 14 52 54.9
De iP 14 53 03.1 D
Alaska. h = 60 km (Ud).

" 6 Ki i(P) 14 54 04.3

" 7 Ki iP 01 10 29.0
i 01 10 35.8
Um iP 01 10 03.5
Ud iP 01 10 00.4
De iP 01 09 48.6
Iran (h = 50 km).

" 7 Ud iP 01 17 11.1 C

" 7 Ud iP 07 19 59.4 D

" 7 Um iP 09 35 32.7
Ud iP 09 35 55.2
India (h = N).

" 7 Ki iPn 10 13 00.3
iSn 10 13 59.8
iLg1 10 14 18.6
D = 560 km = 5.0°.
Sk iSg 10 16 47.9
Um iSn 10 14 38.2
iSg 10 15 14.7
Ud eLg1 10 17 44
Northwest Russia, 67.5°N, 33.5°E.
Origin time = 10 11 42.
Explosion?

" 7 Ki iP 20 58 49.2

" 7 Um iP 21 37 13.3 D
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Feb. 7	(cont.)				
	Ud	iP	21 37 23.3	D	
	California (h = 6 km).				
" 7	Up	iSn	22 28 05.3		
	Ki	iPn	22 25 30.7	C	
		iSn	22 26 11.4		
		iSg	22 26 27.8		
		D = 370 km = 3.3°.			
	Sk	iPn	22 25 38.1		
		iSn	22 26 25.3		
		iSg	22 26 43.2		
		i	22 27 03.1		
		D = 420 km = 3.8°.			
	Um	iPn	22 25 57.1	C	
		iSn	22 26 57.9		
		i	22 27 01.8		
		iLg1	22 27 14.1		
		D = 570 km = 5.1°.			
	Ud	iPn	22 26 26.4		
		iSn	22 27 51.0		
	Off west coast of Norway, near Lofoten, 67.5°N, 11.8°E. Origin time = 22 24 38.				
" 7	Um	iP	23 18 02.7		
" 7	Ki	i(Sg)	23 23 09.4		
" 8	Ki	iP	05 28 18.2		
" 8	Ki	iP	06 22 20.2		
" 8	Ki	eP	07 45 10		
		i	07 46 50.7		
" 8	Ki	iP	07 50 18.0		
" 8	Ki	iP	11 08 54.8		
" 8	Ki	iPn	12 15 07.8		
		iSn	12 15 45.4		
		iSg	12 16 01.2		
		D = 340 km = 3.1°.			
	Sk	eSg	12 18 26		
	Um	iSn	12 16 27.4		
		iSg	12 16 58.2		
	Northern Finland, 67.4°N, 28.5°E. Origin time = 12 14 17. Explosion?				
" 8	Up	iP	12 28 59.4		
" 8	Ud	iP	16 48 15.6		
		i(Sg)	16 48 31.4		

1969 Feb. 8	Up	iP	23 30 43.4		
	Ki	iP	23 31 22.2	C	
		iPP	23 33 07.9		
	Um	iP	23 30 58.7		
		i	23 31 12.7		
	Ud	iP	23 30 58.5	C	
	De	iP	23 30 41.0	C	
	Iran (h = 50 km).				
" 9	Ud	iP	04 25 38.5	D	
	North of Halmahera (h = 50 km).				
" 9	Ud	iP	14 40 34.2		
	Mindanao (h = 140 km).				
" 9	Up	eP	15 45 45		
		ipP	15 45 54.8		
			micr	sec	
		Mx N	2.0	20	
	Ki	iP	15 45 32.5		
			micr	sec	
		Mx E	0.6	11	
		Mx N	0.4	10	
		Mx Z	0.8	12	
	Um	iP	15 45 29.0		
	Ud	iP	15 45 56.4		
		ipP	15 46 06.4		
	Burma-China. h = 35 km (Up,Ud). M = 5.3 (Up,Ki).				
" 9	Ki	i(Sg)	16 00 39.0		
" 9	Up	iP	18 38 39.0	C	
	Ki	i(P)	18 39 24.8		
	Um	iP	18 39 08.6	C	
	Ud	iP	18 38 36.1		
	Ghana (h = N).				
" 9	Up	iP	23 11 32.7		
	Ki	iP	23 13 04.6		
	Sk	iP	23 12 17.0		
	Um	iP	23 12 14.0		
	Ud	iP	23 11 29.0		
	De	iP	23 10 40.3		
	Hungary (h = N).				
" 10	Ki	iP	05 44 39.6	D	
" 10	Ki	iP	07 28 36.7		
	Um	iP	07 28 33.1		
	Ud	eP	07 28 46		
	Sumatra (h = N).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Feb.	10	Um	iP	07 39 23.0	
"	10	Up	iP	12 13 21.2	
"	10	Ud	iP	14 22 54.2	
		North of Halmahera (h = 80 km).			
"	10	Up	iP	14 33 14.9	
		Ki	iP	14 33 00.0	
				micr	sec
			P Z'	0.1	1.0
		Sk	eP	14 33 20	
		Um	iP	14 33 04.7	
		Ud	iP	14 33 23.0	
		Talaud Islands (h = 60 km).			
"	10	Up	iP	18 13 19.1	D
			i	18 13 22.7	
		Um	iP	18 13 06.0	
"	10	Ki	iP	20 04 47.6	C
"	10	Um	iP	20 27 53.4	
			i	20 27 59.7	
		Svalbard (h = 30 km).			
"	10	Up	iP	21 58 56.8	
		Um	iP	21 58 32.0	
		Ud	iP	21 59 02.7	
		De	iP	21 59 20.7	
		Kurile Islands (h = N).			
"	10	Up	iP	23 13 42	
			i(PKP)	23 16 15.3	
			iPKP	23 16 16.9	
			iSKP	23 18 57.9	
			iPP	23 19 27	
			iPKS	23 19 57	
			iSKKP	23 27 25.7	
				micr	sec
			PKP Z	4.7	6
			PKP Z'	1.1	0.7
			SKP Z	4.6	3'
			SKP Z'	0.7	0.7
			PKS E	0.9	3
			PKS N	3.8	3
			SKKP Z	1.6	2
			SKKP Z'	1.7	1.5
			Mx E	7.2	22
			Mx N	9.0	22
			Mx Z	6.1	19
			(D = 15650 km = 141°).		
			(cont.)		

1969 Feb.	10	(cont.)			
		Ki	i(PKP)	23 15 53.2	
			iPKP	23 16 07.1	
			iSKP	23 18 35.6	
			iPKS	23 19 36	
				micr	sec
			PKP Z	2.7	4
			PKP Z'	1.2	1.0
			SKP E	2.1	9
			SKP N	4.8	10
			SKP Z	12	9
			SKP Z'	8.1	2.0
			PKS E	4.9	9
			PKS N	5.5	10
			Mx E	4.9	18
			Mx N	4.0	20
			Mx Z	9.9	21
			(D = 14800 km = 133°).		
		Sk	i(PKP)	23 16 08.4	
			iPKP	23 16 11.3	
			iSKP	23 18 52.3	
			iSKKP	23 27 38.4	
		Um	iP	23 13 24	
			i(PKP)	23 16 00.9	
			iPKP	23 16 03.2	
			iSKP	23 18 46.5	
			iPKS	23 19 44	
			iSKKP	23 27 42.9	
		Ud	iPKP	23 16 17.1	
			iSKP	23 18 58.6	
			iSKKP	23 27 24.6	
		De	iPKP	23 16 29.5	
			iSKP	23 19 03.9	
			iSKKP	23 27 08.7	
		Tonga-Kermadec Islands (h = 670 km).			
		M = 6.5 (Up,Ki).			
		M not corrected for focal depth.			
"	10	Ki	iPKS	23 24 30	
				micr	sec
			PKS N	3.7	8
		Um	iSKP	23 23 40.0	
		De	iPKP	23 21 21.4	
		Tonga-Kermadec Islands (h = 670 km).			
"	10	Ud	i(P)	23 45 07.4	
"	10	Ki	iSKP	23 52 00.8	
		Sk	eSKP	23 52 22	
		Um	i(PKP)	23 48 59.9	
			iSKP	23 52 15.7	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Feb. 10 (cont.)

		Ud	iPKP	23 49 04.5	
			iSKP	23 52 36.8	
		De	iPKP	23 49 15.3	D
"	11	Um	iP	04 16 24.1	D
"	11	Up	eP	04 44 14	
"	11	Up	eP	15 05 21	
"	11	Um	eP	17 19 05	
"	11	Up	iP	19 54 54.8	
"	11	Um	iP	20 48 07.6	
			i	20 48 15.1	
"	11	Up	iP	22 16 39.8	C
			iPP	22 18 18	
			iS	22 23 02	
			eSa	22 25 37	
			iSS	22 26 01	
				micr	sec
			P Z	2.7	3
			P Z'	1.8	1.0
			PP E	2.4	3
			PP Z	3.7	6
			S N	2.8	5
			Mx E	72	8
			Mx N	150	18
			Mx Z	69	8
			D = 4600 km = 41 1/2°.		
		Ki	iP	22 16 33.6	C
			i	22 16 37.8	
			iPP	22 18 13	
			iS	22 22 49	
			eSa	22 25 03	
			eSS	22 25 38	
			iLi	22 28 42	
				micr	sec
			P E	3.1	4
			P Z	3.2	4
			P Z'	0.8	1.0
			PP E	2.7	8
			PP Z	3.3	9
			S E	2.6	7
			S N	2.7	5
			Mx E	150	11
			Mx N	77	10
			Mx Z	180	11
			D = 4550 km = 41°.		

(cont.)

1969 Feb. 11 (cont.)

		Sk	iP	22 16 59.1	C
		Um	iP	22 16 30.3	C
			i	22 16 36.5	
			iPP	22 18 04	
			iS	22 22 38	
			iSS	22 25 19	
		Ud	iP	22 16 56.0	C
		De	iP	22 16 58.3	C
		Kirghiz-Sinkiang (h = N).			
		m = 6.4, M = 7.1 (Up,Ki).			
		Double P.			
"	11	Up	iP	22 29 35.4	
				micr	sec
			P Z'	0.1	0.9
			Mx E	14	21
			Mx N	18	20
			Mx Z	13	20
		Ki	iP	22 29 22.5	
			iSKS	22 39 17	
			ipS	22 42 21	
				micr	sec
			P Z'	0.7	1.0
			SKS E	29	9
			Mx E	23	18
			Mx N	13	19
			Mx Z	51	19
		Sk	iP	22 29 42.5	C
		Um	iP	22 29 25.3	
		Ud	iP	22 29 43.2	
		De	iP	22 29 49.7	C
		Banda Sea (h = 450 km).			
		m = 7.0, M = 6.8 (Up,Ki).			
		M not corrected for focal depth.			
"	11	Ki	iP	22 44 59.0	
"	11	Up	iP	22 51 47.2	
		Ki	iP	22 51 40.8	
			i	22 51 45.0	
		Um	iP	22 51 38.3	C
		Ud	iP	22 52 03.6	
		De	iP	22 52 06.0	
		Kirghiz-Sinkiang (h = N).			
		Origin time = 22 44 02.3.			
		Same hypocenter as for Feb. 11, 22 16.			
"	12	Up	iP	00 30 21.7	
			i	00 30 25.1	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 12 (cont.)

Ki	iP		00 30 16.0	
	i		00 30 20.7	
Sk	iP		00 30 41.6	
Um	iP		00 30 15.5	
	i		00 30 17.7	
Ud	iP		00 30 38.8	
	i		00 30 43.8	
De	iP		00 30 40.5	

Kirghiz-Sinkiang (h = N).
Double P.

" 12	Ud	iP	04 25 20.0	

Kirghiz-Sinkiang (h = N).

" 12	Up	iP	08 47 43.3	
	Ki	iP	08 48 51.9	
		i	08 49 23.5	
	Um	iP	08 48 16.3	
	Ud	iP	08 47 57.1	C
	De	iP	08 47 24.9	

Turkey.

" 12	Um	iP	12 28 05.3	
" 12	Ud	iP	13 38 41.9	
" 12	Up	iP	14 49 52.9	
" 12	Up	iP	15 50 07.3	
	Ki	iP	15 49 11.6	C
			micr sec	
		P Z'	0.1 1.2	
	Sk	iP	15 49 49.0	
	Um	iP	15 49 38.3	
	Ud	iP	15 50 10.4	C
	De	iP	15 50 32.8	

Kamchatka (h = 45 km).

" 12	Um	iP	16 08 43.9	
	Ud	iP	16 08 04.8	
" 12	Sk	eP	16 24 36	
		i	16 24 45.3	
" 12	Um	ePKP	18 59 01	
	Ud	iPKP	18 59 11.2	C
	De	iPKP	18 59 20.9	

Tonga-Kermadec Islands
(h = 470 km).

" 12	Um	iP	19 10 13.3	C
" 12	Up	iP	21 46 29.7	C

1969
Feb. 13

Up	iP		01 46 51.9	
	i		01 46 56.5	
	ipP		01 47 04.1	
Ki	iP		01 45 59.8	C
	i		01 46 03.5	
	ipP		01 46 10.4	
			micr sec	
	P	Z'	0.2 1.0	
Sk	iP		01 46 29.6	C
	iX		01 47 16.9	
Um	iP		01 46 26.0	C
	ipP		01 46 37.8	
	iX		01 47 14.3	
Ud	iP		01 46 51.8	C
	ipP		01 47 03.4	
De	iP		01 47 14.6	C

Aleutian Islands.
h = 45 km (Up,Ki,Um,Ud).
The phase denoted X could be P of another shock.

" 13	Ki	iP	02 55 43.4	
	Um	iP	02 55 42.0	

Java (h = 15 km).

" 13	Um	iP	07 04 16.1	
" 13	Ud	iP	09 02 56.9	

North of Halmahera
(h = N).

" 13	Up	iPKP	10 22 39.5	
	Ki	iPKP	10 22 21.2	
	Sk	iPKP	10 22 33.0	
		i	10 22 34.8	
	Um	iPKP	10 22 27.8	
		i	10 22 32.9	
	Ud	iPKP	10 22 41.7	
	De	iPKP	10 22 52.3	
		i	10 22 55.5	

Kermadec Islands
(h = 25 km).

" 13	Ki	iPKP	10 32 21.2	
	Ud	iPKP	10 32 43.9	
		i	10 32 49.6	
" 13	Up		---	
			micr sec	
		Mx E	1.5 16	
		Mx N	1.8 18	
		Mx Z	2.2 17	
	Ki	iP	10 35 32.0	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 13 (cont.)

Ki	i(pP)		10 35 41.5	
	i		10 35 50.4	
	eS		10 46 30	
			micr	sec
	S	N	0.8	12
	Mx	E	1.5	18
	Mx	N	2.8	22
	Mx	Z	2.8	19
	D = 10100 km = 91°.			
Um	iS		10 46 37	
Ud	eP		10 35 58	
	i(pP)		10 36 07.8	

Mindanao (h = N).
M = 5.8 (Up,Ki).

" 13

Up	iP		11 19 53.0	
			micr	sec
	Mx	E	0.8	14
	Mx	N	1.5	15
	Mx	Z	1.3	17
Ki	iP		11 20 18.2	
	ipP		11 20 27.3	
			micr	sec
	Mx	E	2.7	14
	Mx	N	2.1	14
	Mx	Z	4.7	15
Sk	iP		11 20 23.8	
	ipP		11 20 32.8	
Um	iP		11 20 00.8	
	i		11 20 15.5	
	iPP		11 21 50.9	
Ud	iP		11 20 08.0	C
	ipP		11 20 17.6	
	i		11 20 29.3	
	iPP		11 22 01.4	
De	iP		11 19 55.9	

West Pakistan.
h = 40 km (Ki,Sk,Ud).
M = 5.4 (Up,Ki).

" 13

Up	iSg		12 04 31.1
	iRg		12 04 40.9
Um	iSg		12 05 10.6
Ud	iSn		12 05 12.0
	iSg		12 05 45.1

Esthonia-Gulf of Finland.
Probably explosion.

" 13 Ud iP 13 56 48.1

" 13 Up eP 14 06 36

" 13 Ki iP 14 30 21.7

1969
Feb. 13

Ki	iP		15 16 07.3
Um	eP		15 15 36
	i		15 15 54.7
Ud	iP		15 15 02.4
De	iP		15 14 33.8

Crete (h = N).

" 13

Up	ePKP		15 30 56
Sk	ePKP		15 30 51
Um	iPKP		15 30 44.6
Ud	ePKP		15 30 58

" 13 Um iP 15 42 55.9

" 13

Ki	iSg		16 19 02.5
Sk	iSg		16 19 09.4
Um	iSn		16 19 17.6
	iSg		16 19 36.9

Nordland, Norway,
66.6°N, 14.1°E.
Origin time = 16 17 32.
Explosion?

" 13

Up	eSg		18 05 17
	i		18 05 19.5
Sk	iLg1		18 06 14.0
Ud	iPg		18 04 17.6 C
	iSg		18 04 27.7
	D = 90 km = 0.8°.		
De	iSg		18 05 36.7

Värmland, Sweden,
59.4°N, 13.0°E.
Origin time = 18 04 02.

" 13 Ud iP 21 02 42.9

" 13

Up	iPKP		21 41 00.4
Sk	iPKP		21 40 54.2 C
Um	iPKP		21 40 49.2 C
Ud	iPKP		21 41 02.7 C

" 13

Up	iSg		23 30 46.5
Um	iSg		23 32 21.4
Ud	ePg		23 30 17
	iSg		23 30 25.6
	iRg		23 30 28.4
	D = 80 km = 0.7°.		

Dalekarlia, Sweden,
60.3°N, 15.1°E.
Origin time = 23 30 03.
Explosion?

" 13 Up iP 23 47 46.4
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 13 (cont.)

Ki	iP	23 47 14.1	
Um	iP	23 47 28.2	
Ud	iP	23 47 53.3	

Bonin Islands
(h = 410 km).

"	14	Um	ePS	01 07 47

Peru (h = 20 km).

"	14	Ki	eP	05 06 29
		Ud	iP	05 06 51.6

Talaud Islands
(h = 100 km).

"	14	Ud	iP	08 44 16.3
			i	08 44 31.0

Vancouver Island (h = N).

"	14	Um	iP	10 27 09.8
"	14	Um	iP	10 43 54.6
"	14	Up	iSg	12 26 24.2
		Ud	iPg	12 26 08.2
			iSg	12 26 29.0

D = 180 km = 1.6°.

		De	iSg	12 26 48.4

Östergötland, Sweden,
58.6°N, 15.5°E.
Origin time = 12 25 36.

"	14	Ki	eP	13 23 16
		Um	iP	13 23 23.4
			i	13 23 29.0

Mexico (h = 20 km).

"	14	Um	iP	13 40 14.7
		Ud	iP	13 40 46.3

Japan (h = 60 km).

"	14	Um	iP	13 47 40.3	C
"	14	Ki	iP	16 17 42.4	
"	14	Ki	iP	16 20 53.5	
"	14	Up	iP	16 51 04.1	
		Sk	eP	16 50 55	
		Ud	iP	16 51 05.3	
"	14	Up	iP	19 10 43.1	
"	14	Ud	iPg	21 11 45.1	

(cont.)

1969
Feb. 14 (cont.)

Ud	iSg	21 11 53.8
	iRg	21 11 57.6

D = 80 km = 0.7°.
Origin time = 21 11 31.
Explosion?

"	15	Up	i(Sg)	00 07 03.5
		Ud	i(Sg)	00 06 03.3
"	15	Um	iP	00 37 06.0
"	15	Ud	iP	01 35 25.8 C
"	15	Um	iP	04 56 09.7
		Ud	iP	04 56 23.8
"	15	Up	iPKP	09 02 00.5
		Um	iPKP	09 01 58.5
			iSKP	09 04 43.0
			i	09 04 46.4
		Ud	iPKP	09 02 02.8 C
			i	09 02 18.4
			iSKP	09 04 55.1
		De	iPKP	09 02 13.8 C

Tonga-Kermadec Islands
(h = 550 km).

"	15	Ud	iP	09 29 08.5
"	15	Um	iP	11 28 38.4
			i	11 28 42.7
			i	11 29 06.0

Haiti (h = N).

"	15	Up	iPKP	14 07 56.4	
			i	14 07 59.3	
		Ki	iPKP	14 07 43.4	C
				micr	sec
			PKP Z'	0.1	0.9
		Sk	iPKP	14 07 53.6	C
		Um	iPKP	14 07 48.8	C
		Ud	iPKP	14 07 58.4	
		De	iPKP	14 08 04.8	
			iSKP	14 11 15.8	

New Hebrides Islands
(h = 210 km).

"	15	Up	iPKP	15 21 30.7	D
			i	15 21 34.4	
				micr	sec
			PKP Z'	0.2	0.8
		Ki	iPKP	15 21 13.1	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 15 (cont.)

Um	iPKP		15 21 18.5	
	i		15 21 27.0	
Ud	iPKP		15 21 32.9	D
De	iPKP		15 21 42.6	D

Tonga-Kermadec Islands (h = 680 km).

" 15 Ud iP 20 38 08.1

" 16

Up	iP		00 06 55.9	
	iX		00 07 05.1	
			micr	sec
	X	Z'	0.1	0.8
	Mx	E	0.4	9
	Mx	N	0.5	10
	Mx	Z	0.7	9
Ki	iP		00 06 49.5	C
	iX		00 06 59.3	
	iLg1		00 20 46	
			micr	sec
	Mx	E	0.8	11
	Mx	N	0.4	9
	Mx	Z	0.9	11
Sk	iP		00 07 15.0	C
	iX		00 07 25.1	
	i		00 07 29.0	
Um	iP		00 06 46.7	
	iX		00 06 56.1	
	iPP		00 08 29.1	
	i		00 17 58	
	iLi		00 19 14	
	iLg1		00 20 03	
Ud	iP		00 07 12.1	C
	iX		00 07 21.9	
De	iP		00 07 24.0	

Kirghiz-Sinkiang (h = N).
M = 5.0 (Up,Ki).
The phase marked X is considerably bigger than P; either it is the P of a new shock in the same place or pP. In the latter case, the focal depth becomes 45 km.

" 16 Um iP 09 29 15.6

" 16 Ud iP 15 11 18.3
Tadzhik SSR.

" 16 Ki iP 16 40 27.2
Ud iP 16 39 26.9
Crete.

1969
Feb. 16

Ki	iP		23 18 56.7	
Um	iP		23 19 02.4	C

Cuba (h = N).

" 17

Up	iP		00 56 30.8	C
	i(PP)		01 00 07.8	
	eSKS		01 07 09	
	iS		01 07 40	
			micr	sec
	P	Z'	0.1	0.7
	S	N	4.0	18
	Mx	E	9.8	22
	Mx	N	15	21
	Mx	Z	9.0	20
	D = 10800 km = 97°.			
Ki	iP		00 56 13.5	C
	iSKS		01 06 45	
	eS		01 07 12	
	ePKPPKS		01 25 08	
			micr	sec
	P	Z'	0.2	1.0
	SKS	E	2.8	9
	SKS	N	0.6	7
	S	N	2.9	15
	Mx	E	10	19
	Mx	N	12	22
	Mx	Z	16	20
	D = 10400 km = 93 1/2°.			
Sk	eP		00 56 36	
	iPP		01 00 48.8	
Um	iP		00 56 19.5	
	iPP		01 00 06	
	i		01 01 08.6	
	iS		01 07 23	
	iPS		01 08 47	
	iPKKP		01 13 19.0	
	iSS		01 13 52	
Ud	iP		00 56 36.9	
	i		00 56 39.3	
	iPP		01 00 41.0	
	i		01 05 53.8	
	i		01 07 40.0	
	iPKKP		01 13 08.0	
De	iP		00 56 45.4	

North of Halmahera (h = 15 km).
m = 6.5, M = 6.5 (Up,Ki).
Up: (PP) may belong to the group of early PP-phases, typical for this distance range. Ud: the phases at 01 05 and 01 07 may belong to another shock.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Feb. 17	Up	eP	01 29 17	
	Ki	iP	01 29 03.0	
		i	01 29 08.7	
	Sk	eP	01 29 22	
	Um	iP	01 29 05.7	
		i	01 29 14.6	
	Ud	iP	01 29 24.6	
	North of Halmahera (h = 90 km).			
" 17	Ki	iP	01 39 20.5	
	Ud	iP	01 39 45.5	D
		i	01 39 57.7	
	North of Halmahera (h = N).			
" 17	Ud	iP	01 50 05.0	
	North of Halmahera (h = N).			
" 17	Ud	iP	01 52 09.4	
	North of Halmahera (h = N).			
" 17	Ud	iP	02 14 06.5	
	North of Halmahera (h = 80 km).			
" 17	Sk	iP	02 17 52.7	
" 17	Ud	iP	02 48 48.1	C
		i	02 49 02.9	
	North of Halmahera (h = 30 km).			
" 17	Ud	iP	04 18 48.9	
	North of Halmahera (h = N).			
" 17	Ki	iP	06 53 27.6	
	Ud	iP	06 53 44.7	
	North of Halmahera (h = 100 km).			
" 17	Up	iP	07 09 39.3	
	Um	iP	07 09 13.5	C
	Ud	iP	07 09 44.8	
	De	iP	07 10 03.5	
	Kurile Islands (h = 50 km).			
" 17	Up	iP	07 40 24.1	
		ipP	07 40 46.2	
	Ki	iP	07 39 47.2	
		ipP	07 40 05.7	
	(cont.)			

1969 Feb. 17	(cont.)			
	Um	iP	07 40 02.1	
		ipP	07 40 23.4	
	Ud	eP	07 40 32	
		ipP	07 40 53.1	
	De	eP	07 40 48	
		ipP	07 41 08.3	
	Japan. h = 80 km (Up,Ki,Um,Ud,De).			
" 17	Ki	iP	09 18 25.6	
	Sk	iP	09 17 57.6	
	Ud	iP	09 17 25.6	
	De	iP	09 16 53.6	
	Crete (h = 15 km).			
" 17	Ki	eP	20 27 09	
	Um	iSKS	20 37 35	
		eS	20 38 11	
	Philippine Islands (h = 70 km).			
" 18	Ki		---	
			micr	sec
		Mx E	0.5	15
		Mx N	0.6	16
		Mx Z	0.8	14
	Um	iS	02 18 52	
	Gulf of California (h = N).			
" 18	Up	iPKP	05 34 12.9	
	Ki	iPKP	05 34 03.9	
		iSKP	05 37 30.5	
	Um	iPKP	05 34 09.9	
		iSKP	05 37 36.2	
	Ud	iPKP	05 34 14.9	
	De	iPKP	05 34 26.1	C
		ipPKP	05 34 54.7	
	Tonga-Kermadec Islands. h = 100 km (De).			
" 18	Um	iPKP	10 55 08.7	
		i	10 55 15.3	
	Ud	e(PKP)	10 55 27	
	Kermadec Islands (h = N).			
" 18	Up	iSg	13 02 03.7	
	Sk	eSg	13 03 52	
	Um	iSg	13 02 47.2	
	Ud	iSg	13 03 02.1	
	Southwest Finland. Explosion?			
" 18	De	iP	13 39 36.4	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Feb. 18	Um	iSg	14 01 29.7	
	Ud	iSn	14 02 09.7	
		iSg	14 02 37.3	
	Probably southwest Finland. Explosion?			
" 18	Ki	iP	14 48 17.4	
" 18	Up	iP	15 14 58.1	
" 18	Ki	iP	16 19 03.9	
" 18	Ki	eP	16 31 21	
" 18	Up	iS	19 58 41	
	Um	iS	19 59 24	
	Atlantic Ocean (h = N).			
" 18	Up	iP	19 59 39.9	
		i	19 59 43.4	
	Ki	iP	19 59 56.7	
	Sk	iP	20 00 08.9	
	Um	iP	19 59 43.1	
	Ud	iP	19 59 56.0	C
	West Pakistan (h = 50 km).			
" 18	Ki	iSKP	21 03 45.2	
	Um	iPKP	21 01 24.3	
		iSKP	21 03 57.2	
	Ud	iSKP	21 04 11.9	
	De	iPKP	21 01 31.0	
	Fiji Islands (h = 570 km).			
" 18	Up	iP	21 13 48.9	C
			micr sec	
		P Z'	0.1 0.5	
	Ki	iP	21 13 41.6	C
	Sk	iP	21 14 03.5	
	Um	iP	21 13 40.8	C
	Ud	iP	21 14 01.8	C
	De	iP	21 14 03.3	
	Burma (h = 160 km).			
" 18	Ki	iPg	21 30 31.9	
		iSg	21 30 43.7	
		D = 100 km = 0.9°.		
	Origin time = 21 30 14.			
" 19	Ki	iP	03 38 23.5	
" 19	Um	iPKP	03 41 03.0	
	Ud	iPKP	03 41 05.7	C
	(cont.)			

1969 Feb. 19	(cont.)			
	De	iPKP	03 41 17.3	C
	Tonga-Kermadec Islands (h = 160 km).			
" 19	Ud	iP	04 06 52.3	
		i	04 06 58.8	
	Atlantic Ocean (h = N).			
" 19	Ki	iP	08 49 48.1	
	Um	eP	08 49 56	
	Ud	iP	08 50 22.1	
	Formosa (h = 60 km).			
" 19	Um	i(Sg)	10 09 16.3	
" 19	Um	iP	13 07 52.8	
		i	13 08 22.6	
" 19	Up	i(P)	18 22 33.8	
	Ud	iP	18 22 34.1	C
" 19	Up	iP	18 38 19.9	
	Ud	iP	18 38 34.9	C
" 19	Um	iP	18 41 02.9	
" 19	Ki	iP	20 39 50.5	C
" 20	Um	iPKP	01 13 40.0	D
	New Hebrides Islands (h = 190 km).			
" 20	Um	ePKP	03 18 29	
	Ud	iPKP	03 18 34.6	
	De	iPKP	03 18 46.7	
	Tonga Islands (h = N).			
" 20	Ki	iPn	04 53 14.2	
		iSn	04 53 52.1	
		iSg	04 54 07.0	
		D = 340 km = 3.1°.		
	Um	iSn	04 55 02.8	
		iSg	04 55 39.7	
	Northern Finland. Origin time = 04 52 24. Explosion?			
" 20	Ki	iP	06 42 06.8	
" 20	Up	iP	10 09 01.7	
		i(PP)	10 12 45	
		iSKS	10 19 34	
	(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 20 (cont.)

Up			micr	sec
	P	Z'	0.1	1.0
	Mx	E	8.1	21
	Mx	N	8.5	17
	Mx	Z	8.6	18
Ki	iP		10 08 44.2 C	
	i		10 08 48.2	
	iPP		10 12 43	
	iSKS		10 19 16	
	iS		10 19 51	
			micr	sec
	P	Z	0.8	4
	P	Z'	0.4	1.3
	PP	E	0.9	4
	SKS	E	1.5	6
	S	N	0.9	7
	Mx	E	12	19
	Mx	N	10	20
	Mx	Z	15	19
	D = 10350 km = 93°.			
Sk	iP		10 09 07.0	
	i		10 09 12.7	
Um	iP		10 08 50.6	
	i		10 08 54.4	
	i(PP)		10 12 27	
	i(SKS)		10 19 15	
	iS		10 19 58	
	iPKKP		10 25 52.3	
Ud	iP		10 09 07.2	
	i		10 09 13.6	
	i		10 15 13.6	
	i		10 19 58.8	
	iPKKP		10 25 37.8	
De	iP		10 09 20.4	

North of Halmahera
(h = 30 km).
m = 6.5, M = 6.5 (Up,Ki).
Up and Um: (PP) denotes early PP. Ud: the phases at 10 15 and 10 19 may belong to another shock.

" 20

Up	iP		10 43 46.9	
	iPP		10 47 42	
			micr	sec
	P	Z'	0.1	1.0
	Mx	E	6.1	18
	Mx	N	11	21
	Mx	Z	8.1	17
Ki	iP		10 43 29.5 C	
	ePKKP		11 00 41	

(cont.)

1969
Feb. 20 (cont.)

Ki			micr	sec
	P	Z'	0.6	1.5
	Mx	E	8.2	20
	Mx	N	9.1	19
	Mx	Z	14	20
Sk	iP		10 43 50.9 C	
Um	iP		10 43 35.6 C	
	isP		10 44 12.0	
	iX		10 47 13.1	
	iPP		10 47 28.2	
	iPKKP		11 00 35.8	
Ud	iP		10 43 53.9	
	iX		10 46 59.4	
	iPKKP		11 00 23.6	
De	iP		10 44 01.0 C	
	iX		10 47 14.0	
	iPP		10 48 07.6	

North of Halmahera
(h = 80 km).
m = 6.6, M = 6.4 (Up,Ki).
The phases marked X probably belong to the group of early PP phases.

" 20 Ud iP 11 06 59.6
North of Halmahera
(h = 30 km).

" 20 Ud iP 11 17 39.5
North of Halmahera
(h = 70 km).

" 20 Ud iP 12 28 11.6 C
North of Halmahera
(h = 70 km).

" 20 Ki eP 12 43 55
Ud iP 12 44 19.9
North of Halmahera
(h = 80 km).

" 20 Um iP 13 08 30.7

" 20 Um iP 13 08 45.6
Ud iP 13 09 01.7
North of Halmahera
(h = 60 km).

" 20 Ud iP 13 19 43.4
i 13 19 51.1
North of Halmahera
(h = 70 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Feb.	20	Ud	iP	13 42 37.6	
		North of Halmahera (h = 80 km).			
"	20	Ud	iP	15 51 36.2	
		North of Halmahera (h = 60 km).			
"	20	Up	eP	17 11 42	
			ipP	17 11 52.7	
			iSKS	17 22 17	
				micr	sec
			Mx E	3.4	18
			Mx N	6.5	20
			Mx Z	5.2	18
		Ki	eP	17 11 24	
			ipP	17 11 33.7	
			iSKS	17 21 53	
				micr	sec
			pP Z'	0.2	1.4
			Mx E	4.0	18
			Mx N	5.5	21
			Mx Z	5.7	19
		Sk	ipP	17 11 55.8	
		Um	iP	17 11 31.7	C
			ipP	17 11 38.6	
			iPP	17 15 14	
			iSKS	17 22 00	
		Ud	iP	17 11 48.9	C
			ipP	17 11 57.5	
			iPP	17 15 40.0	
		North of Halmahera. h = 35 km (Up,Ki,Um,Ud). M = 6.1 (Up,Ki). pP is bigger than P (on Z').			
"	20	Up	iP	17 26 03.5	
		Um	iP	17 25 52.7	
		Ud	iP	17 26 05.5	
"	20	Ud	iPKP	18 16 32.4	C
		Tonga-Kermadec Islands (h = 620 km).			
"	20	Up	iP	19 40 30.6	
		Ki	eP	19 40 11	
		Ud	eP	19 40 32	
			i	19 40 38.2	
		North of Halmahera (h = 80 km).			
"	20	Um	iP	20 19 37.8	
"	20	Ud	iP	21 58 14.0	

1969 Feb.	21	Ki	iP	07 23 25.9	
		North of Halmahera (h = 90 km).			
"	21	Up	iP	07 33 53.9	
"	21	Um	iP	08 50 39.7	
		Alaska (h = N).			
"	21	Up	iSg	11 01 59.6	
		Ki	ePg	10 59 14	
			iSg	10 59 52.8	
		Sk	ePg	10 59 18	
			iSg	10 59 57.6	
		Um	iPg	10 59 31.1	
			iSn	11 00 05.7	
			iSg	11 00 20.1	
		Ud	iSn	11 01 14.1	
			i	11 01 28.4	
			i(Lg1)	11 01 46.0	
		De	iSg	11 03 41.6	
		Nordland, Norway, 66.4°N, 14.8°E. Origin time = 10 58 24. Solution checked with readings from Norwegian and Finnish stations.			
"	21	Um	iP	11 33 19.3	
"	21	Ki	e	17 34 30	
			iSg	17 34 37.5	
		Sk	iSg	17 34 45.4	
		Um	iPg	17 34 17.0	
			iS^{x}	17 34 55.0	
			iSg	17 35 04.5	
		Ud	eSn	17 36 02	
			i(Lg1)	17 36 32.3	
		Nordland, Norway, 66.4°N, 14.8°E. Origin time = 17 33 10. Explosion?			
"	21	Ki	iP	18 09 52.2	C
"	21	Up	iP	18 44 35.7	
		Sk	iP	18 45 18.7	
		Um	iP	18 45 16.5	
			i	18 45 30.5	
		Ud	eP	18 44 43	
			i	18 44 46.1	
		De	eP	18 44 05	
			i	18 44 17.2	
		Greece (h = 40 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969				
Feb. 21	Up	i(P)	20 45 54.5	
" 21	Um	ePKP	21 05 29	
	De	iPKP	21 05 47.4	
	Tonga Islands (h = 40 km).			
" 21	Up	iP	21 53 00.4	
	Ud	iP	21 52 47.2	
" 21	Up	i(P)	22 02 10.0	
		i	22 02 15.1	
	Probably local.			
" 21	Up	iP	23 46 54.1	C
" 22	Um	eP	00 40 26	
	Ud	iP	00 39 54.4	
	Albania.			
" 22	Ud	iP	02 29 56.6	
" 22	Ud	iP	03 38 27.2	
" 22	Up	iP	04 51 01.5	
		i	04 51 06.7	
	Ki	iP	04 50 54.8	C
	Um	iP	04 50 56.5	C
	Ud	iP	04 51 17.9	
	De	eP	04 51 20	
		i	04 51 24.1	
" 22	Up	eP	10 00 04	
	Ki	iP	09 59 10.7	
	Um	iP	09 59 38.7	
	Ud	iP	10 00 12.8	
	De	iP	10 00 25.5	
	Kodiak Island (h = 70 km).			
" 22	Up	iP	10 04 34.8	
" 22	Ki	i(P)	10 35 12.4	
" 22	Ki	iPn	10 51 08.6	
		iSn	10 51 46.1	
		iSg	10 52 01.6	
		D = 330 km = 3.0°.		
	Um	iSn	10 52 27.1	
		iSg	10 52 58.8	
	Northern Finland.			
	Origin time = 10 50 20.			
	Explosion?			
" 22	De	iPKP	12 34 06.7	
	(cont.)			

1969				
Feb. 22	(cont.)			
	De	i	12 34 10.2	
	Tonga-Kermadec Islands (h = 240 km).			
" 22	Up	iSg	12 38 26.2	
	Um	iSg	12 38 59.2	
	Ud	iSg	12 39 27.1	
	De	eSg	12 39 54	
	Esthonia-Gulf of Finland.			
	Explosion?			
" 22	Up	iP	13 11 15.4	
		i	13 11 18.7	
" 22	Ud	iP	13 18 22.5	D
" 22	Ki	iPn	15 08 05.2	
		iSn	15 08 55.3	
		iLg1	15 09 06.4	
		D = 470 km = 4.2°.		
	Um	eSg	15 10 36	
	Northwest Russia.			
	Origin time = 15 06 57.			
	Explosion?			
" 22	Up	iP	17 36 45.1	
		i	17 36 46.7	
	De	iP	17 36 34.7	
" 22	Up	eP	18 07 12	
	Ki	iP	18 06 55.3	
	Um	iP	18 07 01.2	
	Ud	iP	18 07 20.1	
	North of Halmahera (h = 100 km).			
" 22	Up	iPKP	18 30 15.3	
			micr sec	
		PKP Z'	0.1 1.0	
	Ki	ePKP	18 30 04	
	Um	iPKP	18 30 06.9	
		i	18 30 14.0	
		iSKP	18 33 25.8	
	Ud	iPKP	18 30 17.3	C
	De	iPKP	18 30 28.5	C
	Tonga-Kermadec Islands (h = 140 km).			
" 22	Up	iP	20 47 08.0	
		i	20 47 12.2	
		i	20 47 33.6	
	Ki	iP	20 47 01.9	
	Sk	iP	20 47 24.0	
	(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 22 (cont.)

Um	iP	20 47 00.2	C
Ud	iP	20 47 21.7	C

India (h = 50 km).

" 22	Um	iP	20 56 59.6	
	Ud	iP	20 57 15.1	

North of Halmahera.

" 22	Ki	iP	23 11 39.7	C
	Um	iP	23 11 43.0	C
		iSKS	23 21 30	
		iS	23 22 32	
		iSS	23 30 05	
	Ud	eP	23 12 00	

Banda Sea (h = 540 km).

" 23	Ud	iP	00 17 44.1	
" 23	Up	iP	00 50 34.3	
		i(PP)	00 54 29.1	
		iPP	00 54 37	
		i	00 54 44.7	
		iS	01 01 54	
		iPS	01 03 27	

		micr	sec
P	Z	1.3	6
P	Z'	0.1	1.5
PP	E	2.3	5
PP	Z	4.2	5
PP	Z'	1.3	2.0
Mx	E	43	18
Mx	N	75	19
Mx	Z	49	17

D = 10900 km = 98°.

Ki	iP	00 50 23.5	C
	i(PP)	00 54 16.2	
	iPP	00 54 19	
	iS	01 01 37	

		micr	sec
P	E	0.9	7
P	Z	2.6	7
P	Z'	0.5	1.8
PP	E	6.6	7
PP	N	0.9	7
PP	Z	9.6	7
PP	Z'	4.3	3.0
S	N	12	15
Mx	E	60	18
Mx	N	99	21
Mx	Z	76	18

D = 10650 km = 96°.

Sk	iP	00 50 45.2	
	iPP	00 54 52.8	

(cont.)

1969
Feb. 23 (cont.)

Um	iP	00 50 26.0	C
	i(PP)	00 54 16.8	
	iPP	00 54 27	
	i	00 54 31.2	
	iS	01 01 42	
Ud	iP	00 50 43.1	C
	i(PP)	00 54 45.8	
De	iP	00 50 48.8	C
	i(PP)	00 54 50.0	
	i	00 55 06.6	

Celebes (h = 15 km).
m = 7.0, M = 7.4 (Up,Ki).
The phases marked as (PP) belong to the group of early PP phases.

" 23	Um	iP	02 21 26.1
		i	02 21 36.5

Japan (h = 30 km).

" 23	Up	iPP	02 34 39.3
	Um	e(PP)	02 34 15
	De	iPP	02 35 02.7

Celebes (h = N).

" 23	Um	eP	05 34 57
" 23	Up	i(PP)	06 21 12.8

		micr	sec
Mx	E	1.7	18
Mx	N	2.4	20
Mx	Z	2.3	18

Ki ---

		micr	sec
Mx	E	1.7	19
Mx	N	2.0	20
Mx	Z	2.3	19

Sk	iP	06 17 28.8	
Um	eP	06 17 11	
	i	06 21 22.2	
Ud	iP	06 17 36.2	
	i(PP)	06 21 34.0	

Celebes (h = 7 km).
M = 5.8 (Up,Ki).

" 23	Up	i	11 20 33.1
		iSg	11 20 53.5
	Sk	i	11 19 26.6
		iSg	11 19 31.3
	Um	i	11 20 50.2
		iSg	11 21 19.0
	Ud	iP	11 18 50.3
		iSn	11 19 31.8

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 23 (cont.)

Ud	iSg	11 19 53.1	
De	iLg1	11 21 07.5	

Norway, 62.0°N, 6.3°E.
Origin time = 11 17 40.
Solution checked with readings from Norwegian stations.

" 23	Um	iP	12 17 08.9	
		i	12 17 21.6	
" 23	Up	iP	12 52 39.8	
	Ud	iP	12 52 59.6	

Ryukyu Islands
(h = 110 km).

" 23	Up	iPKP	14 54 26.4	
	Um	iPKP	14 54 33.1	

South Sandwich Islands
(h = N).

" 24	Up	iP	00 22 57.4	
		iS	00 34 43	
		eSS	00 42 18	
			micr	sec
		Mx	E 1.1	20
		Mx	N 2.7	22
		Mx	Z 2.2	22
	Ki	iP	00 22 42.9	
		ipP	00 23 15.0	
		i(PP)	00 26 31.9	
		iPP	00 26 57.1	
		iSKS	00 33 09	
		iS	00 34 18	
		ePS	00 36 02	
		ePKKP	00 38 37	
		iSS	00 41 42	
			micr	sec
		P	Z' 0.1	1.5
		SKS	E 0.7	5
		S	E 0.8	7
		S	N 0.6	9
		Mx	E 1.9	20
		Mx	N 2.0	20
		Mx	Z 3.5	21
	Sk	eP	00 23 06	
		iPP	00 27 35.2	
	Um	iP	00 22 47.3	
		i	00 22 49.1	
		ipP	00 23 18.2	
		iPP	00 27 11.1	
		iSKS	00 33 18	
		iS	00 34 22	

(cont.)

1969
Feb. 24 (cont.)

Um	iPKKP	00 38 32.1	
	iSS	00 41 43	
	iPKKS	00 42 20	
Ud	iP	00 23 05.1	
	i	00 23 07.4	
	ipP	00 23 38.5	
	iPKKP	00 38 19.8	

Tanimbar Islands.
h = 130 km (Ki,Um,Ud).
m = 6.4, M = 6.0 (Up,Ki).
M not corrected for focal depth.

" 24	Up	iP	00 32 56.3	
	Ud	iP	00 32 58.5	D
" 24	Up	iP	01 01 59.0	C
	Ud	iP	01 02 00.4	
		i	01 02 10.5	
" 24	Up	iP	01 14 50.5	
	Ki	iP	01 14 32.9	
	Um	iP	01 14 35.4	
	Ud	iP	01 14 55.9	

Molucca Passage (h = 15 km).

" 24	Ki	eL	05 14	
			micr	sec
		Mx	E 0.6	20
		Mx	N 0.7	18
		Mx	Z 1.0	18

Celebes (h = N).

" 24	Ki	eP	11 53 20
" 24	Ki	eP	14 16 18
" 24	Ki	iP	15 38 06.8
	Um	iP	15 38 11.8
	Ud	iP	15 38 37.8

Mindanao (h = 50 km).

" 24	Ki	iP	15 41 26.2
" 24	Ki	i(P)	16 55 03.1
	Um	i(P)	16 55 12.2
		iSKS	17 05 35
		iPS	17 07 33
	Ud	iP	16 55 20.3
		ipP	16 55 31.9

North of Halmahera.
h = 40 km (Ud).
The phase denoted (P) at Ki, Um could be pP.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Feb.	24	Ki	iP	19 28 30.7	
"	24	Ud	iP	20 29 15.8	
"	24	Up	iP	22 56 30.8	
		Ki	iP	22 56 33.9	
		Sk	iP	22 56 18.4	
		Um	iP	22 56 35.5	D
			ipP	22 57 17.7	
		Ud	iP	22 56 20.6	
			i	22 56 26.4	
			ipP	22 57 08.6	
		Colombia.			
		h = 180 km (Um,Ud).			
"	25	Ki	iP	01 40 02.5	
		Um	iP	01 39 40.2	
		Arabian Sea (h = N).			
"	25	Up	iP	01 48 17.1	
		Ki	iP	01 48 00.4	C
			i	01 48 06.2	
				micr sec	
			P Z'	0.2 1.0	
		Sk	iP	01 48 21.8	
		Um	iP	01 48 05.9	C
			iSKS	01 58 35	
			iS	01 59 07	
		Ud	iP	01 48 25.2	C
		Mindanao (h = 70 km).			
"	25	Ki	iP	02 14 08.3	
		Sk	iP	02 13 58.3	D
			i	02 14 02.5	
		Um	iP	02 14 15.4	D
			i	02 14 18.9	
		Ud	iP	02 14 06.2	
		Honduras (h = 15 km).			
"	25	Ki	eP	03 30 22	
"	25	Up	iPKP	04 10 55.8	C
				micr sec	
			PKP Z'	0.1 0.5	
		Ki	iPKP	04 10 34.6	
			iSKP	04 13 43.6	
		Sk	iPKP	04 10 50.6	
			iX	04 11 19.7	
		Um	iPKP	04 10 45.4	C
			iX	04 11 19.3	
			ipPKP	04 12 09	
			isPKP	04 12 37	
			iSKP	04 13 51.7	
		Ud	iPKP	04 10 57.7	
		(cont.)			

1969 Feb.	25	(cont.)			
		Ud	iX	04 11 31.4	
		South of Kermadec Islands.			
		h = 350 km (Um).			
"	25	Ki	iP	05 16 54.6	
"	25	Up	eP	07 51 32	
			i	07 51 36.8	
			iS	08 01 56	
				micr sec	
			P Z'	0.1 1.0	
		D = 9400 km = 84 1/2°.			
		Ki	iP	07 51 24.4	
				micr sec	
			P Z'	0.1 1.0	
		Sk	iP	07 51 15.0	
			i	07 51 18.4	
		Um	iP	07 51 31.7	
			i	07 51 35.4	
			iS	08 01 57	
		Ud	iP	07 51 22.8	D
		De	iP	07 51 29.2	
		Honduras (h = 15 km).			
		m = 6.0 (Up,Ki).			
"	25	Ki	iPn	10 07 47.0	
			iSn	10 08 45.9	
			iSg	10 09 09.4	
		D = 540 km = 4.9°.			
		Probably northwest Russia.			
		Origin time = 10 06 30.			
		Explosion?			
"	25	Up	iPKP	10 54 55.7	D
			i	10 55 01.9	
				micr sec	
			PKP Z'	0.1 0.7	
		Ud	iPKP	10 54 56.8	
		Tonga-Kermadec Islands (h = 60 km).			
"	25	Um	iP	13 17 30.0	
		Ud	iP	13 17 05.8	
		South Atlantic Ocean (h = N).			
"	25	Up	iP	13 48 29.7	
			iSn	13 52 03.4	
		Ki	iP	13 49 31.2	
		Sk	eP	13 49 19	
		Um	iP	13 48 57.5	
			iSn	13 53 16.7	
		Ud	iP	13 48 43.2	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 25 (cont.)

Ud	iSn		13 52 36.5	

Turkey (h = 30 km).

" 25	Up	iP	14 18 25.3	
		eS	14 28 36	
	Ki		---	
			micr	sec
		Mx E	0.6	16
		Mx N	0.5	15
		Mx Z	0.7	15
	Sk	eP	14 18 36	
	Um	iP	14 18 42.3	
		iS	14 29 21	
	Ud	iP	14 18 17.0	
		i	14 18 21.5	

South Atlantic Ocean (h = N).

" 25	Up	iPKP	15 01 25.6	
	Ki	iPKP	15 01 11.2	C
	Sk	iPKP	15 01 22.0	
	Um	iPKP	15 01 17.2	C
		i	15 01 31.7	
	Ud	iPKP	15 01 27.1	

New Hebrides Islands (h = 130 km).

" 25	Ki	iP	16 33 05.2	
			micr	sec
		Mx E	0.2	11
		Mx N	0.5	17
		Mx Z	0.7	17
	Um	iP	16 33 57.0	
		i	16 34 07.9	
	Ud	iP	16 34 41.0	
		i	16 34 50.5	

Svalbard (h = N).

" 25	Ki	iPg	16 55 08.8	C
		iSg	16 55 19.3	
		iRg	16 55 23.9	
		D = 90 km = 0.8°.		
	Um	iSg	16 56 39.0	

Probably explosion at Gällivare, Swedish Lapland. Origin time = 16 54 53.

" 25	Ki	iSg	17 34 50.1	
	Sk	iSg	17 34 54.5	
	Um	iSg	17 35 17.4	
	Ud	iSg	17 36 47.9	

(cont.)

1969
Feb. 25 (cont.)

Nordland, Norway, 66.4°N, 14.8°E. Origin time = 17 33 21. Explosion?

" 25	Ki	eP	18 27 19	
" 26	Up	iP	01 31 17.7	
		iS	01 33 56.2	
		iLg1	01 34 55	
			micr	sec
		Mx E	0.4	8
		Mx N	0.6	8
		Mx Z	0.4	7
	Ki	iP	01 32 28.8	
		i	01 37 40.5	
		iLg1	01 39 02.6	
			micr	sec
		Mx E	0.6	9
		Mx N	0.3	10
	Sk	iP	01 31 40.7	
		iLg2	01 36 35.5	
	Um	eP	01 31 54	
		i	01 35 59.9	
		iLg1	01 37 06.1	
	Ud	eP	01 30 56	
		iS	01 33 24.7	
		iLi	01 34 11.6	
	De	iP	01 30 04.6	C
		i	01 30 26.5	
		iLg1	01 32 42.9	

South Germany (h = 25 km). M = 4.3 (Up,Ki).

" 26	Um	iS	01 53 17	
		isS	01 57 23	
	Ud	iP	01 43 35.6	C

Celebes Sea. h = 670 km (Um).

" 26	Ud	iP	02 17 11.9	
" 26	Ud	iP	04 36 57.8	
" 26	Ki	eP	08 43 31	
" 26	Ki	iPn	09 53 24.8	
		iSn	09 54 24.3	
		iLg1	09 54 43.8	
		D = 540 km = 4.9°.		
	Sk	iSg	09 57 12.9	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 26 (cont.)

Um	iSg	09 55 33.0	

Northwest Russia,
67.2°N, 33.1°E.
Origin time = 09 52 09.
Explosion?

"	26	Ki	iP	11 22 47.6
"	26	Um	iP	12 25 17.5
"	26	Up	iP	12 41 01.8
		Ki	iP	12 42 08.2
		Sk	iP	12 41 41.5 C
		Ud	iP	12 41 09.7
			i	12 41 19.9
		De	iP	12 40 39.0

Dodecanese Islands
(h = 25 km).

"	26	Ki	eP	13 55 15
"	26	Ki	iPn	14 36 22.2
			iSn	14 37 11.1
			iLg1	14 37 24.6

D = 460 km = 4.1°.

		Sk	eSg	14 40 13
		Um	iSg	14 38 59.7

Northwest Russia.
Origin time = 14 35 16.
Explosion?

"	26	Ud	iP	15 07 40.8 C
"	26	Ud	iP	16 56 39.1
"	26	Ki	eP	17 50 33
			i	17 50 36.8
"	26	Um	iP	19 14 22.3 C
		Ud	iP	19 14 20.2 C
"	26	Um	iP	21 01 00.5
			i	21 01 16.1
"	27	Ki	iP	04 16 16.9
"	27	Ud	iP	12 08 42.3
"	27	Ud	i(Sg)	12 19 54.8
"	27	Up	iSg	13 53 29.5
		Ki	iSg	13 56 04.9

(cont.)

1969
Feb. 27 (cont.)

Um	iSg	13 54 02.9	
Ud	i	13 54 05.8	
	iSg	13 54 31.6	
De	iSg	13 54 57.0	

Esthonia-Gulf of Finland.
Explosion?

"	27	Um	iP	14 02 12.0
"	27	Sk	eP	14 58 47
"	27	Ud	eP	16 35 39
"	27	Ki	iP	17 35 16.2
		Sk	iP	17 35 22.6
			i	17 35 29.8
		Um	eP	17 35 23
			i	17 35 44.6
"	27	Up	i(P)	21 17 24.9
		Um	iP	21 16 45.1 C
			i	21 17 05.1
		Ud	iP	21 17 34.5
"	27	Ud	iP	21 27 10.9
"	27	Up	iP	21 46 23.4
"	28	Up	iP	02 46 40.5 C
			iS	02 51 34

		micr	sec
P	E	67	12
P	N	53	12
P	Z'	3.3	0.7
S	E	1960	25
S	N	850	20
Mx	E	2520	24
Mx	N	2620	23

D = 3300 km = 29 1/2°.

Ki	iP	02 47 36.5 C	

		micr	sec
P	E	68	6
P	N	65	6
P	Z	120	8
P	Z'	8.4	1.0

Sk	iP	02 46 49.7 C	
Um	iP	02 47 12.0 C	
Ud	iP	02 46 28.8 C	
De	iP	02 46 08.6 C	

Atlantic Ocean, off Portugal
(h = 20 km).
m = 7.7, M = 7.9 (Up,Ki).
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Feb. 28 (cont.)
The amplitudes given for long-period records at Up derive in this case from Wiechert. Clear PL waves.

" 28 Up iP 03 18 38.9
Ud iP 03 18 44.5

" 28 Up iP 04 31 42.0 C
micr sec
P Z' 0.7 0.9
Ki iP 04 32 37.9 C
micr sec
P Z' 3.1 2.5
Sk iP 04 31 51.1 C
i 04 32 04.5
Um iP 04 32 13.4 C
Ud iP 04 31 30.6 C
De iP 04 31 09.8 C
Atlantic Ocean, off Portugal (h = N).
m = 6.5 (Up,Ki).

" 28 Ud iP 08 09 52.2

" 28 Up iP 10 05 57.4
Um iP 10 06 28.2
i 10 06 46.2
Ud iP 10 05 45.1
i 10 06 08.8
Atlantic Ocean, off Portugal (h = 25 km).

" 28 Ud iP 12 05 17.8
i 12 05 42.7

" 28 Up ---
micr sec
Mx E 0.9 19
Mx N 1.5 19
Mx Z 1.3 17
Ki ---
micr sec
Mx E 1.9 20
Mx N 3.3 20
Mx Z 3.2 20
Um eSS 13 49 27
Celebes (h = 50 km).
M = 5.8 (Up,Ki).

" 28 Up iP 13 57 42.4
(cont.)

1969
Feb. 28 (cont.)
Ud iP 13 57 46.6
Kamchatka (h = 60 km).

" 28 De iP 15 17 30.8

" 28 Um iP 15 27 18.6
Ud iP 15 26 35.5
Atlantic Ocean, off Portugal (h = 25 km).

" 28 Ud iP 17 52 04.1

" 28 Um iP 18 22 59.8

" 28 Um iP 18 31 15.4
Ud iP 18 30 33.0
Atlantic Ocean, off Portugal (h = N).

" 28 Ud iP 19 37 48.8

" 28 Ki iP 21 24 46.5
Ud iP 21 23 30.5

" 28 Um iP 21 43 13.7
i 21 43 39.4
Ud iP 21 43 40.3
e 21 44 16.2

" 28 Um iP 21 47 13.3 C
Ud iP 21 47 38.9 C

Markus Båth
December 1, 1969

Seismological Institute
Uppsala

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å, U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

M A R C H 1 - 31, 1969

1969 Mar.	1	Up	eP	00 51 04
		Ki	iP	00 51 23.7
		Um	iP	00 51 01.8
			i	00 51 12.9
		Ud	eP	00 51 31
			e	00 51 47
"	1	Ki	i(Sg)	01 30 58.2
"	1	Um	iP	02 13 21.8
			i	02 13 30.6
		Ud	iP	02 13 52.7
			i	02 14 03.2

Japan (h = 60 km).
If the second phases are pP, the focal depth becomes 30 km.

"	1	Ki	iPn	08 18 20.3
			iSn	08 19 14.9
			iLg1	08 19 32.4

D = 510 km = 4.6°.

		Sk	eSg	08 22 14
		Um	iSn	08 20 00.3
			i	08 20 16.7
			iSg	08 20 41.8

Northwest Russia, 68.0°N, 32.7°E.
Origin time = 08 17 08.
Explosion?

"	1	Up	iP	10 48 59.0
			ipP	10 49 11.5
		Sk	eP	10 48 45
		Um	iP	10 48 32.5 C
		Ud	iP	10 49 03.8 C
			ipP	10 49 14.3

Kurile Islands.
h = 40 km (Up,Ud).

"	1	Up	iP	11 00 02.6

(cont.)

1969 Mar.	1	(cont.)		
		Um	iP	10 59 36.2
		Ud	iP	11 00 07.1
			i	11 00 17.2

Kurile Islands (h = 80 km).

"	1	Um	iP	12 24 23.9
"	1	Ki	iPn	12 49 08.8
			iSn	12 50 05.0
			iLg1	12 50 23.1

D = 520 km = 4.7°.

		Um	iSn	12 50 48.4
			iSg	12 51 28.8
		Sk	iSg	12 52 58.1

Northwest Russia, 67.9°N, 32.8°E.
Origin time = 12 47 55.
Explosion?

"	1	Um	iP	13 40 20.0
"	1	Up	iP	15 08 05.7
			i	15 08 11.7
		Ki	iP	15 07 59.3
			i	15 08 05.0
		Sk	iP2	15 08 30.7
		Um	iP2	15 08 01.8
		Ud	iP	15 08 21.8
			i	15 08 27.6
		De	iP	15 08 24.6

Kirghiz-Sinkiang (h = N).
Double P, cf Feb. 11, 1969, 22 16. Sk and Um have recorded only the second P. If the second phase is interpreted as pP, the focal depth becomes 25 km.

"	1	Ud	iP	19 08 58.3

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 1 (cont.)

Ud	i		19 09 10.0	
" 2 Up	iLg1		03 47 21.9	
Ki	ePg		03 44 13	
	iSg		03 44 40.3	
Um	iSn		03 45 07.1	
	iSg		03 45 23.5	
Ud	eSg		03 47 59	

Northern Finland, 66.7°N, 24.8°E.
Origin time = 03 43 31.
Explosion?

" 2 Up	iP		05 01 01.8	
Ki	iP		05 00 45.6	
			micr sec	
	P	Z'	0.1 1.0	
Um	iP		05 00 50.7	
Ud	iP		05 01 09.9	

Halmahera (h = 140 km).

" 2 Sk	e		06 35 46	
	iSg		06 35 53.1	
Ud	iPg		06 35 42.3	
	iSn		06 36 04.5	
	iSg		06 36 09.5	

Southern Norway.

" 2 De	iP		08 52 33.6	
" 2 Up	iP		13 07 36.0	
	ipP		13 07 43.7	
Um	iP		13 07 08.9	
Ud	iP		13 07 37.5	
	ipP		13 07 45.2	

Aleutian Islands.
h = 30 km (Up,Ud).

" 2 Up	iPKP		14 14 42.7	D
	i		14 15 03.6	
Ud	iPKP		14 14 45.1	D
De	iPKP		14 14 55.1	

Tonga-Kermadec Islands
(h = 450 km).

" 2 Up			---	
			micr sec	
	Mx	E	0.8 17	
	Mx	N	1.9 19	
	Mx	Z	1.4 18	
Ki			---	
			micr sec	
	Mx	E	0.8 17	
	Mx	N	1.2 19	

(cont.)

1969 Mar. 2 (cont.)

Ki			micr sec	
	Mx	Z	1.4 15	
Um	eSS		14 28 59	

Celebes (h = 50 km).
M = 5.6 (Up,Ki).

" 2 Up	iP		18 07 04.5	
	i		18 07 18.8	
Um	iP		18 07 35.9	C
	i!		18 07 57.8	
Ud	iP		18 06 53.3	
	i		18 07 14.8	

Atlantic Ocean, off Portugal (h = 20 km).

" 2 Um	iP		21 33 03.8	C
" 2 Up	iP		22 33 50.9	
	i		22 34 00.0	
			micr sec	
	Mx	N	1.6 20	
Ki	eP		22 33 39	
			micr sec	
	Mx	E	0.6 13	
	Mx	N	1.2 19	
Um	iP		22 33 43.8	
Ud	iP		22 34 05.5	

Mindoro (h = 50 km).
M = 5.5 (Up,Ki).

" 2 Up	iP		22 35 43.5	
	i		22 35 46.5	
Ki	iP		22 35 31.2	
Um	iP		22 35 34.6	
Ud	iP		22 35 54.8	

Mindoro (h = 80 km).

" 2 Um	iP		22 49 24.7	
Ud	iP		22 49 45.6	

Mindoro (h = 50 km).

" 3 Up	iP		01 03 52.3	D
	i		01 03 53.9	
	iS		01 07 38	
	iPcP		01 08 01.0	
	iLi		01 09 31	
	iLg1		01 09 55.6	
	iLg2		01 10 42	
			micr sec	
	P	N	0.8 2	
	P	Z	0.8 2	
	P	Z'	0.4 1.2	
	S	E	2.4 6	
	S	N	3.2 9	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 3 (cont.)

Up			micr	sec	
	S	Z	2.2	8	
	Mx	E	15	12	
	Mx	N	15	13	
	Mx	Z	20	13	
	D = 2300 km = 20 1/2°.				
Ki	iP		01 05 05.5		
	iS		01 09 51		
	eSa		01 10 08		
	iLi		01 13 13		
			micr	sec	
	P	Z'	0.3	1.5	
	S	N	2.2	10	
	S	Z	1.7	6	
	Mx	E	11	13	
	Mx	N	6.8	14	
	Mx	Z	9.3	10	
	D = 3100 km = 28°.				
Sk	iP		01 04 37.8		
	iPcP		01 08 12.6		
	iPcS		01 11 47.5		
	iLg1		01 12 41.4		
Um	iP		01 04 27.8	D	
	iPP		01 04 55		
	iPcP		01 08 07.5		
	iS		01 08 43		
	iSa		01 08 51		
Ud	iP		01 04 03.1		
De	iP		01 03 27.0	D	
	iPP		01 03 40.4		
	iLg2		01 09 38.7		
Turkey (h = 4 km).					
m = 5.7, M = 5.8 (Up,Ki).					

" 3	Up	iP		06 29 20.7		
		i		06 29 24.3		
				micr	sec	
		P	Z'	0.1	0.6	
	Ki	iP		06 29 24.4	C	
	Sk	iP		06 29 42.8	C	
	Um	iP		06 29 17.2	C	
	Ud	iP		06 29 36.2	C	
	De	iP		06 29 33.6		
	Tibet-India (h = 20 km).					
" 3	Up	iP		09 06 35.7		
		ipP		09 06 56.8		
	Ki	iP		09 06 16.4		
		ipP		09 06 39.4		
	Um	iP		09 06 22.6		
		ipP		09 06 45.3		
	Ud	iP		09 06 42.2	D	
		ipP		09 07 05.2		
	Leyte. h = 90 km (Up,Ki,Um, Ud).					

1969
Mar. 3

Um	iP		14 11 20.8		
	i		14 11 27.6		
Ud	iP		14 11 36.6		
West Pakistan (h = N).					
" 3	Up	iP		15 00 06.9	C
		ipP		15 00 18.5	
		iPP		15 02 30.3	
		iS		15 08 51	
				micr	sec
		P	Z'	0.6	1.0
		Mx	E	3.0	22
		Mx	N	5.8	18
		Mx	Z	6.5	17
	D = 7200 km = 65°.				
	Ki	iP		14 59 14.1	C
				micr	sec
		P	Z'	0.5	1.0
		Mx	E	5.6	17
		Mx	N	4.3	17
		Mx	Z	9.2	18
	Sk	iP		14 59 50.4	C
	Um	iP		14 59 38.8	C
		ipP		14 59 50.3	
		iPa		15 03 31	
		iS		15 07 51	
	Ud	iP		15 00 10.4	C
		ipP		15 00 21.9	
	De	iP		15 00 31.3	C
		ipP		15 00 43.1	
		iPP		15 03 00.8	
Kamchatka.					
h = 40 km (Up,Um,Ud,De).					
m = 6.7, M = 5.8 (Up,Ki).					

" 3	Up	iPKP		17 09 51.2	
	Ud	iPKP		17 09 53.2	
	De	iPKP		17 10 02.9	C
" 3	Up			---	
				micr	sec
		Mx	N	1.6	20
	Ki	eL		17 36	
				micr	sec
		Mx	N	1.5	21
		Mx	Z	2.8	21
Samoa Islands (h = N).					
M = 5.9 (Up,Ki).					
" 4	Up	iP		01 52 35.5	
		i		01 52 49.9	
		iPcP		01 56 10.9	
				micr	sec
		P	Z'	0.1	0.5
	Ki	iP		01 53 37.8	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 4 (cont.)

Sk	iP•P	01 56 20.7	
Um	iP	01 53 03.6	
	iPcP	01 56 17.8	
Ud	iP	01 52 46.3	
	i .	01 52 48.5	
De	iP	01 52 17.4	
	iPcP	01 56 07.5	

Turkey (h = 110 km).

" 4 Ud iP 02 15 47.1

" 4

Up	iPKP	06 41 48.5	
Um	iPKP	06 41 36.7	
	iSKP	06 44 28.4	
Ud	iPKP	06 41 50.5	D
	i	06 43 28.2	
De	iPKP	06 42 01.5	D

Tonga-Kermadec Islands (h = 530 km).

" 4

Up	iSg	12 47 20.7
Um	iSg	12 47 49.5
Ud	iSg	12 48 15.1

Esthonia-Gulf of Finland. Explosion?

" 4 Ud iP 18 12 55.2
Kurile Islands (h = N).

" 5

Up	iSg	00 30 10.5	
Ki	iPn	00 26 39.2	
	iSg	00 27 34.1	
	i	00 27 44.7	
Sk	e(Pn)	00 26 56	
	eSn	00 27 32	
	eSg	00 27 56	
Um	iPn	00 27 05.3	C
	iSn	00 28 03.0	
	iSx	00 28 16.3	
	iSg	00 28 29.9	
Ud	eSn	00 29 09	
	iSg	00 29 49.0	
	i	00 30 06.8	

Off coast of Norway, near Lofoten, 67.4°N, 12.4°E. Origin time = 00 25 50. Solution checked with readings from Finnish and Norwegian stations.

" 5

Up	iP	03 03 41.6	
	i	03 03 53.2	
Ki	eP	03 04 37	
Um	iP	03 04 13.2	
Ud	iP	03 03 29.0	

(cont.)

1969
Mar. 5 (cont.)

De iP 03 03 09.4 C
Atlantic Ocean, off Portugal (h = N).

" 5

Ud	iP	09 04 23.2
	ipP	09 04 38.2

Mindanao. h = 60 km (Ud).

" 5

Up	iP		14 05 29.2	
	iS		14 16 37	
			micr	sec
	Mx	E	5.1	22
	Mx	N	5.4	18
	Mx	Z	6.5	20
	D = 10650 km = 96°.			
Ki	iP		14 05 12.0	
			micr	sec
	Mx	E	3.5	16
	Mx	N	6.0	22
	Mx	Z	6.8	19
Um	iP		14 05 19.7	
	iPP		14 09 07	
	iSKS		14 15 51	
	iS		14 16 29	
Ud	iP		14 05 36.5	

North of Halmahera. (h = 50 km). M = 6.2 (Up,Ki).

" 5

Up	iP	14 46 00.1
	i	14 46 10.8
Sk	eP	14 46 40
Um	iP	14 46 31.0
Ud	iP	14 46 07.5
De	iP	14 45 34.9

Turkey (h = N).

" 5

Up			---	
			micr	sec
	Mx	E	1.6	17
	Mx	N	2.2	18
	Mx	Z	2.9	18
Ki	iP		16 24 19.8	
	ipP		16 24 33.8	
			micr	sec
	Mx	N	2.4	22
	Mx	Z	3.2	17
Ud	iP		16 24 44.7	C
	isP		16 25 06.2	

North of Halmahera. h = 50 km (Ki,Ud). M = 5.7 (Up,Ki).

" 5

Up	iP	19 40 46.6 C
	ipP	19 41 30.7

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 5 (cont.)

Up	isP		19 41 52.7	
	ipPP		19 43 02.3	
	iX		19 43 21	
	iS		19 46 41	
	isS		19 47 55	
	iSn		19 49 28.4	
	iSS		19 49 59	
			micr	sec
	P	E	1.6	2
	P	Z	2.6	2
	P	Z'	0.8	0.5
	S	N	4.5	5
	Mx	E	3.8	11
	Mx	N	5.3	9
	Mx	Z	4.0	10

D = 4500 km = 40 1/2°.

Ki	iP		19 40 55.6	C
	ipP		19 41 42.2	
	isP		19 42 02	
	iPP		19 42 33.6	
	iX		19 43 35	
	eS		19 46 57	
	isS		19 48 12	
			micr	sec
	P	Z	4.6	3
	P	Z'	1.9	1.0
	PP	Z'	1.3	1.7
	S	N	6.2	6
	Mx	E	8.2	10
	Mx	N	8.1	12
	Mx	Z	19	20

D = 4600 km = 41 1/2°.

Sk	iP		19 41 11.8	C
	ipP		19 41 56.7	
	iPP		19 42 57.0	
Um	iP		19 40 44.9	C
	ipP		19 41 29.7	
	isP		19 41 49	
	iX		19 43 11	
	iS		19 46 30	
	isS		19 47 51	
Ud	iP		19 41 02.8	C
	ipP		19 41 47.5	
	isP		19 42 09.9	
De	iP		19 40 58.9	C
	ipP		19 41 43.6	
	isP		19 42 07.2	
	iPP		19 42 36.2	

Hindu Kush. h = 210 km (Up, Ki,Sk,Um,Ud,De).
m = 6.5, M = 6.0 (Up,Ki).
M uncorrected for focal depth. The phase X (Up,Ki, Um) does not fit any given (cont.)

1969 Mar. 5 (cont.)

phases. It appears only on E and N long-period components and propagates apparently with a constant velocity of 7.54 km/sec. Therefore, it reminds of Pa, except that the velocity is too low.

"	5	Up	iP	20 44 23.3
"	5	Up	iS	22 47 35.9
		Ki	iP	22 43 29.7 C
			i	22 43 38.7
		Sk	eP	22 43 36
			i	22 45 24.6
		Um	iP	22 44 05.6
			iPP	22 44 23.9
			i	22 46 13.3
			iS	22 46 33.3
		Ud	iP	22 44 22.3

Jan Mayen (h = N).

"	6	Up	iP	01 12 55.8

Mariana Islands (h = N).

"	6	Ud	iP	01 19 34.1
			ipP	01 19 43.2

North of Halmahera.
h = 35 km (Ud).

"	6	Up	iP	01 34 12.9
		Ki	iP	01 33 56.0
		Um	iP	01 34 02.8
			ipP	01 34 10.0
		Ud	iP	01 34 20.8

North of Halmahera.
h = 25 km (Um).

"	6	Ud	iP	02 00 06.9

North of Halmahera.
(h = 80 km).

"	6	Up	iP	03 39 21.7
		Ud	iP	03 39 28.4

North of Halmahera (h = N).

"	6	Up	iP	07 15 03.4
		Ud	iP	07 15 04.9

Kamchatka (h = N).

"	6	Up	iP	07 53 56.0
		Ki	iP	07 53 36.3
		Ud	iP	07 54 04.7 D

Luzon (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar.	6	Up	iP	19 29 51.0	
			iX	19 30 07.7	
		Ki	iP	19 30 46.7	
			iX	19 31 03.4	
		Um	iP	19 30 22.3	
		Ud	iP	19 29 38.6	
		De	iP	19 29 18.5	
		Atlantic Ocean, off Portugal (h = N).			
"	7	Up	iP	08 33 52.4	C
			i	08 34 46.4	
			iPn	08 34 59.2	
			iPP	08 35 10.5	
				micr sec	
			P Z'	0.1 0.5	
		Ki	iP	08 33 36.7	C
				micr sec	
			P Z'	0.3 0.5	
		Sk	iP	08 34 07.8	
		Um	iP	08 33 36.7	
		Ud	iP	08 34 08.8	C
			iPn	08 35 21.1	
		De	iP	08 34 15.4	
			iPP	08 35 43.1	
		Kazakh SSR. m = 6.3 (Up,Ki). Underground explosion.			
"	7	Sk	i(P)	10 15 11.4	
"	7	Ki	iPn	10 14 06.8	
			iSn	10 15 05.4	
			iLg1	10 15 24.8	
			D = 530 km = 4.8°.		
		Sk	iSg	10 17 56.2	
		Um	iSn	10 15 44.3	
			iSg	10 16 20.8	
		Northwest Russia, 67.5°N, 33.0°E. Origin time = 10 12 53. Explosion?			
"	7	Up	iSg	15 16 11.0	
		Um	iLg1	15 18 09.8	
		Ud	iPg	15 15 25.7	
			iSg	15 15 48.8	
			D = 200 km = 1.8°.		
		Västergötland, Sweden, 58.2°N, 13.8°E. Origin time = 15 14 50. Cf Sep. 3, 1968, 22 35.			
"	7	Up	iP	16 48 06.2	

1969 Mar.	7	Up	iPg	21 33 33.9	
			iSg	21 33 50.6	
			D = 140 km = 1.3°.		
		Um	iPg	21 34 30.4	
			iSg	21 35 28.4	
			D = 470 km = 4.2°.		
		Ud	iPg	21 33 21.3	
			iSg	21 33 30.3	
			D = 80 km = 0.7°.		
		De	i(Lg1)	21 35 05.8	
		Dalekarlia, Sweden, 60.3°N, 15.0°E. Origin time = 21 33 08. Cf Feb. 2, 1969, 23 30.			
"	7	Ki	iP	23 08 31.4	
			ipP	23 08 46.7	
		Ud	iP	23 08 57.2	
			ipP	23 09 11.8	
		Philippine Islands. h = 60 km (Ki,Ud).			
"	8	Ki	eP	01 25 04	
			e	01 25 58	
			iS	01 26 21.5	
			eT	01 30 17	
			i	01 30 36.5	
		Ud	iP	01 26 43.7	
		NE of Jan Mayen.			
"	8	Ud	iP	03 41 55.0	
		Atlantic Ocean, off Portugal (h = N).			
"	8	Up	iP	10 30 53.3	
			iX	10 31 02.5	
			iPcP	10 31 17.1	
			ipP	10 31 37.4	
		Ki	iP	10 30 12.4	
			iX	10 30 22.4	
			iPP	10 32 29.9	
		Sk	iP	10 30 51.5	
		Um	iP	10 30 30.5	C
			ipP	10 31 15.2	
		Ud	iP	10 31 00.8	C
			ipP	10 31 42.7	
		De	iP	10 31 17.3	
		Japan. h = 170 km (Up,Um,Ud).			
"	8	Ki	iP	11 43 36.1	
		North of Halmahera (h = 60 km).			
"	8	Um	iP	12 58 35.1	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar.	8	Ki	eP	14 04 16
		Sk	iP	14 04 21.9
		Um	iP	14 04 38.0
"	8	Ki	iPKP	18 27 47.3
		Um	iPKP	18 27 54.3
		Ud	iPKP	18 28 03.2
		Tonga Islands (h = 150 km).		
"	8	Up	iP	22 37 18.6
			i	22 37 34.1
"	9	Um	iP	05 28 12.3
			i	05 28 46.5
"	9	Up	iP	11 09 03.3
		Alaska (h = 70 km).		
"	9	Up	iP	11 45 32.2 D
		Ki	iP	11 44 45.0 D
		Um	iP	11 45 06.5 D
		Ud	iP	11 45 37.8
		Okhotsk Sea (h = 390 km).		
"	9	Ki	iP	12 22 23.5 C
		Sk	iP	12 22 54.3
		Um	iP	12 22 49.8
		Ud	iP	12 23 15.7
		Aleutian Islands (h = 70 km).		
"	9	Up	iPKP	12 48 46.0
		Ud	iPKP	12 48 46.4
		Fiji Islands (h = 520 km).		
"	9	Um	iP	13 14 53.5
		Atlantic Ocean, off Portugal (h = N).		
"	9	Ki	iP	13 19 43.1 D
		Um	iP	13 19 48.6
		Molucca Passage (h = 40 km).		
"	9	Up	eP	14 02 28
			iS	14 14 22
			iPS	14 16 03
				micr sec
			Mx E	12 21
			Mx N	20 22
			Mx Z	19 23
		Ki	iP	14 02 01.8
			iSS	14 21 03
				micr sec
			Mx E	12 20
			Mx N	8.3 20
		(cont.)		

1969 Mar.	9	(cont.)		
		Ki		micr sec
			Mx Z	22 20
		Um	iP	14 02 08.5
			i	14 02 19.3
			iPP	14 06 33
			iSKS	14 12 52
			iS	14 13 59
			iSS	14 21 13
		Ud	iP	14 02 37.3
		New Guinea (h = 15 km).		
		M = 6.6 (Up,Ki).		
		All phases exhibit large positive residuals in relation to the USCGS' solution, averaging +7 sec even if a focal depth of zero is assumed and JB tables used.		
"	9	Up	iP	14 38 16.5
			i	14 38 20.6
			i	14 38 29.8
		Ki	iP	14 37 41.3
			i	14 39 07.5
		Um	iP	14 37 56.6
		Ud	iP	14 38 23.6
			i	14 39 26.3
		South of Japan (h = N).		
"	9	Up		---
				micr sec
			Mx E	2.7 20
			Mx N	4.1 20
			Mx Z	4.5 20
		Ki	eP	14 52 59
				micr sec
			Mx E	2.4 19
			Mx N	1.7 18
			Mx Z	5.1 19
		New Guinea (h = N).		
		M = 6.0 (Up,Ki).		
"	10	Um	iP	02 52 04.2
			i	02 53 31.3
"	10	Up	iP	05 47 04.7
			i	05 47 15.8
		Ki	iP	05 46 44.2
		Um	iP	05 46 52.4
		Ud	iP	05 47 13.7 C
		Formosa (h = 35 km).		
"	10	Up		---
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 10 (cont.)

Up			micr	sec
	Mx	E	2.7	20
	Mx	N	6.1	19
	Mx	Z	3.6	22
Ki	iP		07 08 17.1	
	iPKP		07 12 20.8	
	e		07 23 03	
	iPKKP		07 23 34.8	
			micr	sec
	Mx	E	1.9	17
	Mx	N	1.5	21
	Mx	Z	2.5	18
Sk	iP		07 08 41.2	
	iPKP		07 12 31.4	
	iPKKP		07 23 18.0	
Um	iP		07 08 26.7	
	iPKP		07 12 25.5	
	iPP		07 13 05	
	iS		07 20 15	
	iSS		07 28 19	
Ud	iP		07 08 48.3	
	iPKP		07 12 34.7	
	iPP		07 13 37.0	
	ePKKP		07 23 11	
De	iPKP		07 12 38.9	
	i		07 12 40.5	

New Guinea (h = 210 km).
M = 6.1 (Up,Ki).
M uncorrected for focal depth. Clear diffracted P (Ki,Sk,Um,Ud) on short-period Z-records within the distance range of 108°-115°.

" 10	Ki	iP	08 27 40.0	
	Um	iP	08 27 46.0	
		ipP	08 28 02.6	
	Ud	iP	08 27 39.3	

Nicaragua. h = 60 km (Um).

" 10	Um	iP	16 03 48.2	D

Japan (h = 60 km).

" 10	Up	iP	18 58 21.3	
		i	18 58 27.2	
	Ki	iP	18 58 32.0	
	Um	eP	18 58 18	
		ipP	18 58 48.0	
	Ud	iP	18 58 38.2	
		i	18 58 43.8	
	De	iP	18 58 40.0	

Hindu Kush. h = 150 km (Um).

1969 Mar. 10

Up	iP		19 11 27.6	C
	iPP		19 13 17.0	
			micr	sec
	P	Z'	0.2	0.5
Ki	iP		19 11 36.2	C
			micr	sec
	P	Z'	0.1	0.6
Sk	iP		19 11 53.3	
Um	iP		19 11 25.9	C
	ipP		19 12 08.3	
	i		19 14 08.7	
Ud	iP		19 11 44.0	C
De	iP		19 11 40.6	

Hindu Kush. h = 210 km (Um).
m = 5.7 (Up,Ki).

" 11	Um	iP	01 37 37.3	
" 11	Um	iP	08 06 17.2	C
	Ud	iP	08 06 28.9	C
" 11	Up	iP	09 44 04.8	
	Um	iP	09 43 46.4	

South of Japan (h = 40 km).

" 11	Um	iP	12 42 41.8	
	Ud	iP	12 43 11.6	

Japan (h = 50 km).

" 11	Up	iP	15 16 02.6	
" 11	Up	iP	15 45 15.9	
		ipP	15 46 05.0	
	Ki	iP	15 44 50.1	
		ipP	15 45 38.2	
	Um	iP	15 44 59.6	
		ipP	15 45 47.3	
	Ud	iP	15 45 25.2	
		ipP	15 46 14.1	

NE of Formosa.
h = 200 km (Up,Ki,Um,Ud).

" 11	Up	iP	16 13 05.2	
" 11	Ki	iSg	17 36 34.5	
	Um	iPg	17 36 17.6	
		iSg	17 37 01.4	
	Ud	i(Lg1)	17 38 28.7	

Nordland, Norway, 66.4°N, 14.6°E.
Origin time = 17 35 07.
Explosion?

" 11	Um	iP	18 20 22.5	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 11 (cont.)

Um	i	18 20 35.3	
Ud	eP	18 20 50	
	i	18 20 59.5	

South of Japan (h = N).

" 11	Up	iP	19 28 14.5	
		i	19 28 19.6	
	Ki	iP	19 28 07.2	
		i	19 28 14.1	
	Um	eP	19 28 05	
		e	19 28 09	
	Ud	iP	19 28 30.1	
		i	19 28 36.2	
	De	iP	19 28 34.5	

Kirghiz-Sinkiang (h = N).
Double P, cf Feb. 11, 1969, 22 16.

" 11	Um	iPKP	22 25 16.2	

New Hebrides Islands (h = 160 km).

" 12 Long-period microseisms (T around 16 sec) recorded at Umeå Mar. 12-13.

" 12	De	iP	07 42 25.0	
" 12	Ki	iSn	10 26 52.2	
		iLg1	10 27 11.4	
	Um	iSg	10 28 05.7	

Probably northwest Russia.
Explosion?

" 12	Ki	eP	10 56 04	
	Um	iP	10 56 20.7	
		ipP	10 56 32.1	
	Ud	eP	10 56 44	

South of Japan.
h = 40 km (Um).

" 12	Ud	iP	12 05 41.8	C
	De	i(P)	12 04 44.1	
" 12	Ki	ePn	13 30 45	
		iSn	13 31 30.2	
		iSg	13 31 43.8	

D = 410 km = 3.7°.

	Um	iSg	13 32 41.9	
	Ud	iLg1	13 35 08.6	

Northwest Russia, 67.5°N, 30.1°E.
(cont.)

1969 Mar. 12 (cont.)
Origin time = 13 29 44.
Explosion?

" 12	Ki	i(Sg)	13 36 03.9	
" 12	Um	iP	13 58 55.9	
		ipP	13 59 05.4	
	Ud	iP	13 59 22.7	

South of Japan.
h = 35 km (Um).

" 12	Ud	i(P)	14 08 32.0	C
" 12	Um	iP	14 29 01.3	
" 12	Up	iP	17 51 06.2	
	Ki	iP	17 51 43.0	
	Um	iP	17 51 19.8	
	Ud	iP	17 51 21.1	
	De	iP	17 51 05.8	

Iran (h = 15 km).

" 12	Um	iP	20 35 35.7	
		i	20 35 40.9	
	Ud	eP	20 36 03	

South of Japan (h = 60 km).

" 12	Um	iP	20 50 23.7	C
" 12	Ud	iP	22 47 17.4	

Leyte (h = 80 km).

" 13	Um	eP	00 25 01	
	Ud	iP	00 25 19.9	

Molucca Passage (h = N).

" 13	Ud	iP	04 45 34.5	
" 13	Ud	iP	05 40 22.4	
" 13	Ud	iP	16 52 07.6	
		i	16 52 14.9	
" 13	Up	iP	18 53 14.6	
	Ki	iP	18 52 17.6	

		micr	sec
P	Z'	0.1	1.4

	Um	iP	18 52 47.6	D
		i	18 53 23.7	
	Ud	iP	18 53 06.1	

Canada (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar.	13	Up	iP	20 52 46.7	C
		Ki	iP	20 52 41.1	
		Sk	iP	20 52 58.0	C
		Um	iP	20 52 41.2	C
		Ud	iP	20 52 55.3	C

Java Sea (h = 500 km).

"	13	Ud	i(P)	21 14 03.8	
		Ki	iPg	22 53 38.3	
			iSg	22 53 49.7	
			iRg	22 53 52.7	
			D = 100 km = 0.9°.		
		Um	iSg	22 55 03.0	

Probably explosion in the Gällivare area, Swedish Lapland.
Origin time = 22 53 20.

"	14	Ki	e(Sn)	06 29 13	
			i(Lg1)	06 29 34.5	
"	14	Up	iP	08 59 36.6	C
			ipP	09 00 22.1	
			iPP	09 03 01.7	
			eS	09 09 40	
			i	09 11 11	

		micr	sec
P	Z	0.8	5
pP	Z	0.9	5
pP	Z'	0.1	1.0
PP	Z	1.3	5
PP	Z'	0.1	1.2
S	E	1.2	8
Mx	E	1.9	20
Mx	N	2.3	22
Mx	Z	2.6	20

D = 9550 km = 86°.

		Ki	iP	08 59 29.4	C
			ipP	09 00 14.0	
			iPP	09 02 43.8	
			iS	09 09 34	
			esS	09 10 45	
			iPKKP	09 17 38.4	

		micr	sec
P	Z	1.3	7
P	Z'	0.1	1.5
pP	Z	1.4	5
pP	Z'	1.3	2.5
PP	Z'	0.2	1.5
S	E	1.7	8
S	N	0.8	9
Mx	E	2.5	15
Mx	N	1.4	18
Mx	Z	1.9	20

D = 9350 km = 84°.

		Sk	iP	08 59 19.5	

(cont.)

1969 Mar. 14 (cont.)

		Sk	ipP	09 00 04.2	
			iPP	09 02 28.4	
			iPKKP	09 17 43.7	
		Um	iP	08 59 36.1	C
			ipP	09 00 20.6	
			iPP	09 02 59.3	
			ipPP	09 03 55	
			iS	09 09 37	
			isS	09 10 48	
			iPKKP	09 17 35.2	
		Ud	iP	08 59 26.6	C
			ipP	09 00 11.3	

Nicaragua.
h = 180 km (Up,Ki,Sk,Um,Ud).
m = 5.9, M = 5.7 (Up,Ki).
M uncorrected for focal depth.

"	14	Um	iP	10 00 28.6	
			i	10 01 03.2	
"	14	Up	iSg	12 44 48.6	
		Um	iSg	12 45 17.4	
		Ud	iSg	12 45 47.3	

Esthonia-Gulf of Finland.
Explosion?

"	14	Up	i(P)	14 12 32.9	
		Um	iP	14 12 26.6	C
"	14	Up	iPKP	14 17 51.1	
		Sk	iPKP	14 17 43.0	
		Ud	iPKP	14 17 51.9	C
			i	14 18 06.7	

Kermadec Islands
(h = 130 km).

"	14	Ki	iSg	18 33 40.4	
		Sk	eSg	18 33 44	
			i	18 33 47.2	
		Um	iSg	18 34 07.7	

Nordland, Norway,
66.4°N, 14.8°E.
Origin time = 18 32 11.
Explosion?

"	15	Up	iP	03 13 02.1	
		Ki	iP	03 12 17.1	
		Sk	iP	03 12 52.2	
		Um	iP	03 12 37.0	
		Ud	iP	03 13 07.7	

Japan (h = N).

"	15	Up	iP	04 31 04.0	C
		Ki	iP	04 30 15.2	C

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 15 (cont.)

Um	iP	04 30 37.5	
Ud	iP	04 31 08.8	

Okhotsk Sea (h = 520 km).

" 15	Um	iP	06 36 07.1	
" 15	Up	iP	08 31 38.0	
		i	08 31 40.1	
		iPn	08 31 54.3	
	Ki	iP	08 32 11.5	C
		iPn	08 32 57.1	
	Sk	ePn	08 32 58	
	Um	iPn	08 32 20.0	
		iS	08 36 55.4	
	Ud	iP	08 31 54.7	C

Caspian Sea (h = 45 km).
The average group velocity of Pn is 8.32 km/sec for this case.

" 15	Ki	iP	11 58 18.1	
	Um	iP	11 58 23.0	
		ipP	11 58 32.7	

Ceram Sea. h = 35 km (Um).

" 15	Um	iP	12 45 16.7		
" 15	Up	iP	13 46 32.5		C
		ipP	13 46 45.5		
			micr	sec	
		P	Z'	0.2	0.7
		Mx	E	0.8	18
		Mx	N	1.2	20
	Ki	iP	13 45 40.0		
		ipP	13 45 52.5		
			micr	sec	
		P	Z'	0.1	1.0
		Mx	E	1.1	17
		Mx	N	1.0	17
	Sk	iP	13 46 10.3		
	Um	iP	13 46 05.5		C
		ipP	13 46 17.6		
	Ud	iP	13 46 33.2		C
		ipP	13 46 44.7		

Aleutian Islands.
h = 45 km (Up,Ki,Um,Ud).
m = 6.2, M = 5.3 (Up,Ki).

" 15	Um	iPKP	15 17 28.9

South of Australia (h = N).

" 15	Ki	iPn	21 00 50.1
		iSn	21 01 36.4
		iLg1	21 01 51.0

D = 420 km = 3.8°.
(cont.)

1969
Mar. 15 (cont.)

Um	iSg	21 03 19.4

Probably northwest Russia.
Origin time = 20 59 50.
Explosion?

" 15	Um	iP	22 47 47.6
" 16	Um	iP	03 01 56.3
		i	03 02 02.2
" 16	Um	iPKP	03 42 19.1 C

Loyalty Islands (h = N).

" 16	Up	iP	14 20 44.6 C
	Ki	iP	14 21 17.2 C
	Sk	iP	14 21 14.3
	Um	iP	14 20 57.2
		i	14 21 06.0
	Ud	iP	14 20 56.2 C

Carlsberg Ridge (h = N).

" 16	Up	iP	16 05 38.0		C
		ipP	16 05 52.3		
		iS	16 14 53		
			micr	sec	
		P	Z'	0.2	1.2
		S	N	1.0	6
		Mx	E	2.8	21
		Mx	N	4.3	18
		Mx	Z	5.7	18

D = 8000 km = 72°.

	Ki	iP	16 04 57.0		C
		iPP	16 07 20.9		
		iS	16 13 40		
			micr	sec	
		P	Z'	0.1	1.3
		S	N	1.4	8
		Mx	E	5.6	20
		Mx	N	3.3	18
		Mx	Z	6.1	18

D = 7200 km = 6.5°.

	Sk	iP	16 05 30.5	
	Um	iP	16 05 15.1	C
		ipP	16 05 29.5	
		iS	16 14 13	
		iScS	16 15 05	
		eSS	16 18 37	
	Ud	iP	16 05 44.9	C

Japan. h = 55 km (Up,Um).
m = 6.1, M = 5.8 (Up,Ki).

" 16	Um	iP	16 08 36.6
	Ud	iP	16 09 06.7
		ipP	16 09 21.9

Japan. h = 55 km (Ud).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969					
Mar. 16	Um	iP		16 27 14.4	
" 16	Um	iP		17 07 50.5	
		i		17 08 06.9	
	Ud	eP		17 08 25	
		i		17 08 35.5	
	Japan (h = 40 km).				
" 16	Up	iP		23 11 31.9	
	Ki	iP		23 11 08.7	D
	Sk	iP		23 11 35.7	
	Um	iP		23 11 16.7	D
		i		23 11 28.2	
	Ud	iP		23 11 41.0	
	Formosa (h = 150 km).				
" 17	Up	iSKP		01 16 54.4	
		i		01 17 01.7	
	Ki	iPKP		01 14 03.3	
		iSKP		01 16 28.4	
				micr	sec
		SKP	Z'	0.1	1.3
	Sk	iSKP		01 16 47.0	
		i		01 16 50.6	
	Um	iPKP		01 14 05.4	
		iSKP		01 16 41.4	
	Ud	ePKP		01 14 18	
		iSKP		01 16 55.7	
		i		01 17 04.2	
	Fiji Islands (h = 610 km).				
" 17	Ki	ePKP		01 19 51	
	Um	iPKP		01 19 58.8	
		iSKP		01 22 31.4	
	Ud	iPKP		01 20 09.5	
	Fiji Islands (h = 630 km).				
" 17	Um	iP		01 25 24.3	
" 17	Up	e(PKP)		01 48 07	
	Ki	iPKP		01 48 03.5	
	Sk	iPKP		01 48 14.4	
	Um	ePKP		01 48 06	
		iSKP		01 50 42.9	
	Ud	iPKP		01 48 20.6	
	Fiji Islands (h = 620 km).				
" 17	Ud	iP		03 36 34.8	
" 18	Up			---	
				micr	sec
		Mx	E	1.0	20
		Mx	N	1.7	21
		Mx	Z	2.7	21
	Ki	ePKP		03 44 45	
	(cont.)				

1969					
Mar. 18	(cont.)				
	Ki			micr	sec
		Mx	E	0.9	20
		Mx	N	1.0	20
		Mx	Z	2.8	19
	Sk	iPKP		03 44 54.2	
	Um	iPKP		03 44 42.3	
	Loyalty Islands (h = 15 km).				
	M = 5.8 (Up,Ki).				
" 18	Sk	ePKP		03 52 12	
	Um	ePKP		03 52 06	
	Loyalty Islands (h = N).				
" 18	Um	iPKP		04 00 45.0	
		i		04 00 53.3	
	Tonga Islands (h = 40 km).				
" 18	Ki	eP		04 24 46	
	Um	eP		04 24 14	
	Atlantic Ocean, off Portugal (h = 25 km).				
" 18	Up	iP		05 20 03.7	C
	Ki	eP		05 19 16	
	Sk	eP		05 19 46	
	Um	iP		05 19 38.0	
	Ud	iP		05 20 08.8	C
	Kurile Islands (h = 35 km).				
" 18	Sk	iP		09 21 55.9	
" 18	Sk	iP		13 02 57.2	
" 18	Up	iP		16 27 44.2	D
		ipP		16 27 57.1	
				micr	sec
		P	Z'	0.4	1.2
		Mx	N	1.2	20
		Mx	Z	1.3	17
	Ki	iP		16 26 58.2	D
		ipP		16 27 11.1	
		i		16 27 21.5	
				micr	sec
		P	Z'	0.3	1.0
		Mx	E	0.5	13
		Mx	N	0.4	13
		Mx	Z	0.7	15
	Sk	iP		16 27 32.7	
		ipP		16 27 46.0	
	Um	iP		16 27 19.5	D
		ipP		16 27 32.0	
		i		16 27 42.1	
	(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 18 (cont.)

Um	iS	16 36 01	
	iSS	16 40 19	
Ud	iP	16 27 49.3	D
	ipP	16 28 02.8	
De	iP	16 28 07.4	
	ipP	16 28 20.4	

Kurile Islands.
h = 50 km (Up,Ki,Sk,Um,Ud, De).
m = 6.4, M = 5.2 (Up,Ki).
The dilatation (D) for P is probably preceded by a very small compressional motion.

" 18 Up iP 20 19 11.4

" 18

			micr	sec
Up	iP		20 42 21.0	
Ki	iP		20 41 34.3	
	Mx	E	0.5	14
	Mx	N	0.6	17
	Mx	Z	2.0	22
Sk	eP		20 41 51	
	i		20 41 57.0	
Um	iP		20 41 59.2	
	iS		20 50 42	
Ud	iP		20 42 12.6	

Vancouver Island (h = N).

" 18 Um iP 20 46 26.6

" 18

Up	iPKP	22 54 54.4
Um	iPKP	22 54 47.6
Ud	iPKP	22 54 54.9
	i	22 55 00.5
De	iPKP	22 55 06.6

Tonga-Kermadec Islands (h = 70 km).

" 18

Up	iP	23 04 56.1	
Ki	iP	23 04 23.9	C
Sk	eP	23 04 54	
Um	iP	23 04 36.9	C
	i	23 04 47.5	
Ud	iP	23 05 04.0	

Japan (h = 60 km).

" 18

Up	iP	23 41 10.7
Ki	iP	23 40 19.5
Sk	iP	23 40 57.1
Um	iP	23 40 43.8
Ud	iP	23 41 15.5

Kurile Islands (h = 90 km).

" 19 Ud iP 08 41 08.3
(cont.)

1969 Mar. 19 (cont.)
Aleutian Islands (h = N).

" 19

Ki	iPn	12 44 57.9
	iSn	12 45 56.0
	iSg	12 46 19.1

D = 530 km = 4.8°.

Sk	iSg	12 48 43.2
Um	iSn	12 46 32.0
	iSg	12 47 17.6

Northwest Russia, 67.5°N, 33.0°E.
Origin time = 12 43 42.
Explosion?

" 19

			micr	sec
Up	iP		14 10 49.0	
	ipP		14 11 30.8	
	iX		14 11 41.9	
	iS		14 20 11	
	iScS		14 20 39	
	P	Z'	0.1	0.6
	pP	Z'	0.3	0.8
	S	E	0.3	3
	Mx	E	0.9	12
	Mx	N	0.8	14
	Mx	Z	0.9	12

D = 8300 km = 74 1/2°.

			micr	sec
Ki	iP		14 10 19.0	
	iPcP		14 10 41.1	
	ipP		14 11 00.4	
	iPa		14 15 13	
	iS		14 19 15	
	iScS		14 20 01	
	P	Z'	0.1	1.0
	pP	Z'	0.2	1.2
	S	E	0.7	5
	Mx	E	0.4	9
	Mx	N	0.4	10
	Mx	Z	0.6	9

D = 7800 km = 70°.

Sk	iP	14 10 50.0
	ipP	14 11 30.4
	eS	14 20 14
Um	iP	14 10 30.9
	ipP	14 11 11.0
	iX	14 11 24.4
	iPP	14 13 18
	iS	14 19 36
	iScS	14 20 14
Ud	iP	14 10 57.6
	ipP	14 11 39.7
	iX	14 11 50.3
De	iP	14 11 10.9
	i	14 11 46.5

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 19 (cont.)
Ryukyu Islands.
h = 160 km (Up,Ki,Sk, Um,Ud).
m = 5.7, M = 5.3 (Up,Ki).
M uncorrected for focal depth. Well developed higher-mode surface waves (Up Press-Ewing).

"	19	Up	iP	15 27 07.8	
"	19	Up	iP	16 02 12.3	
"	19	Up	iP	16 19 19.7	
			i	16 19 31.1	
				micr	sec
			P	Z' 0.1	0.5
		Ki	iP	16 19 00.8	
				micr	sec
			P	Z' 0.1	1.0
		Um	iP	16 19 07.8	
		Ud	iP	16 19 27.8	

Luzon (h = 80 km).
m = 6.1 (Up,Ki).

"	19	Up	iP	18 30 03.8	
		Ki	iP	18 29 17.5	C
				micr	sec
			P	Z' 0.1	1.0
		Sk	iP	18 29 52.6	C
		Um	iP	18 29 38.4	
			i	18 30 01.1	
		Ud	iP	18 30 09.3	C

Kurile Islands (h = 50 km).

"	19	Up	iP	21 32 19.0	
		Um	iP	21 32 27.7	
			i	21 32 33.8	
		Ud	iP	21 32 29.2	C
			i	21 32 37.1	
"	19	Ud	iP	22 53 32.2	
"	20	Up	iP	08 29 55.8	
			iSKS	08 40 12	
				micr	sec
			P	Z' 0.2	1.2
			SKS	E 0.4	9
			SKS	N 0.6	7
			Mx	E 1.3	17
			Mx	N 2.7	17
			Mx	Z 3.0	16

(cont.)

1969
Mar. 20 (cont.)

		Ki	iP	08 29 26.2
			iS	08 39 02
			iSKS	08 39 42
				micr sec
			P	Z' 0.2 1.3
			S	E 0.7 8
			SKS	N 0.6 8
			Mx	E 1.9 13
			Mx	N 1.6 16
			Mx	Z 3.4 19

D = 8450 km = 76°.

		Sk	iP	08 29 31.8 C
		Um	iP	08 29 43.4 C
			iS	08 39 41
		Ud	iP	08 29 48.1
		De	iP	08 30 02.6

Gulf of California (h = 20 km).
m = 6.0, M = 5.7 (Up,Ki).

"	20	Up	iP	08 35 16.8
		Ki	eP	08 34 45
		Sk	eP	08 34 52
		Ud	eP	08 35 08

Gulf of California (h = N).

"	20	Up	iSg	12 40 54.0
		Ki	eSg	12 43 25
		Um	iSg	12 41 24.3
		Ud	iSg	12 41 55.0
		De	iSg	12 42 20.6

Esthonia-Gulf of Finland. Explosion?

"	20	Up	iP	13 42 20.9
				micr sec
			P	Z' 0.1 0.6
		Ki	eP	13 41 43
		Sk	eP	13 42 18
		Um	iP	13 42 02.3
		Ud	iP	13 42 27.8
		De	iP	13 42 40.6

South of Japan (h = 430 km).

"	20	Up	iP	15 32 08.1
"	20	Ki	iSg	16 19 05.5
		Sk	iSg	16 19 09.9
		Um	iSg	16 19 32.9
		Ud	iSg	16 21 00.3

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 20 (cont.)
Nordland, Norway,
66.4°N, 14.8°E.
Origin time = 16 17 37.
Explosion?

" 20 Up iP 16 32 02.6 D
i 16 32 15.7
iY 16 35 04.7
iSKS 16 42 30
iS 16 43 00

		micr	sec
P	Z	0.9	2
P	Z'	0.5	0.9
SKS	E	1.9	7
SKS	N	0.7	6
S	E	3.6	9
S	N	1.0	6
Mx	E	7.3	17
Mx	N	4.0	18
Mx	Z	9.2	18

D = 10200 km = 92°.

Ki iP 16 31 44.4 D
iX 16 31 48.6
iSKS 16 42 06
iS 16 42 33

		micr	sec
P	E	0.7	5
P	Z	2.3	6
P	Z'	0.7	1.3
SKS	E	6.7	10
S	N	3.0	8
Mx	E	6.0	16
Mx	N	3.9	16
Mx	Z	7.3	16

D = 9800 km = 88°.

Sk iP 16 32 06.5 D
iX 16 32 11.0
ePKKP 16 49 17

Um iP 16 31 51.1 D
iX 16 31 55.4
iPP 16 35 25
iSKS 16 42 12
iPKKP 16 49 25.2
eP'P' 16 57 31

Ud iP 16 32 10.3
i(PP) 16 36 09.9
iPKKP 16 49 14.7

De iP 16 32 17.7 D
iX 16 32 22.3
iY 16 35 11.8
iPP 16 36 06.4

Mindanao (h = N).
(cont.)

1969 Mar. 20 (cont.)
m = 6.7, M = 6.3 (Up,Ki).
Double P; X - P = 4.4 sec in average (Ki,Sk,Um,De).
If X is interpreted as pP, the focal depth becomes 15 km. The phases Y (Up,De) probably belong to the group of early PP arrivals.

" 20 Up iP 16 38 00.2
Ud iP 16 37 57.4

" 20 Ud iP 16 51 38.1

" 20 Ud iP 16 54 19.4

" 20 Up iP 17 20 50.5
Ud iP 17 20 59.4
Mindanao (h = N).

" 20 Ud iP 18 23 41.9
Nevada.
Underground explosion.

" 20 Up iP 18 27 03.0
iPcP 18 27 29.5

		micr	sec
P	Z'	0.1	0.8

Ki iP 18 26 08.7
Sk iP 18 26 41.4
i 18 26 48.9
Um iP 18 26 36.0 C
ipP 18 26 47.8
iPcP 18 27 10.5
Ud iP 18 27 02.8 C
ipP 18 27 15.5
De iP 18 27 25.3
Aleutian Islands.
h = 45 km (Um,Ud).

" 20 Ud i(P) 18 30 33.2

" 20 Ki iP 21 48 02.0
Um iP 21 48 16.9
Ud iP 21 48 42.6
Bonin Islands.

" 20 Um e(P) 23 32 23
Ud iP 23 31 42.1
Up iP 23 51 47.5
Ki iP 23 51 28.5
Sk iP 23 51 51.1
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 20 (cont.)

Um	iP		23 51 35.3
	iY		23 54 06.8
Ud	iP		23 51 54.7
De	iP		23 52 04.7

Mindanao (h = N).
Y (Um): cf Mar. 20, 1969, 16 32.

" 21

Up	iP		03 16 25.2	C
	ipP		03 16 35.0	
	iPP		03 19 01.2	
	eS		03 25 36	
			micr	sec
	P	Z'	0.1	1.0
	S	E	0.4	8
	Mx	E	1.4	19
	Mx	N	1.5	15
	Mx	Z	1.3	16
	D = 7850 km = 70 1/2°.			
Ki	iP		03 15 43.2	C
	ipP		03 15 52.8	
	iPP		03 17 57.2	
	iS		03 24 17	
	iScS		03 25 38	
			micr	sec
	P	Z'	0.1	1.0
	S	E	0.6	10
	Mx	E	3.1	18
	Mx	N	2.2	18
	Mx	Z	3.1	18
	D = 7100 km = 64°.			
Sk	iP		03 16 17.4	C
	i		03 16 38.2	
	iPP		03 18 49.5	
Um	iP		03 16 01.9	C
	ipP		03 16 10.8	
	iS		03 24 52	
Ud	iP		03 16 32.1	C
	ipP		03 16 42.1	
De	iP		03 16 48.7	C

Japan.
h = 35 km (Up,Ki,Um,Ud).
m = 5.8, M = 5.6 (Up,Ki).

" 21

Ki	iP	03 19 15.4
Ud	iP	03 19 39.6

Gulf of California
(h = N).

" 21

Up	iP	03 21 33.0
Ki	iP	03 21 02.9
Um	iP	03 21 24.3 C

(cont.)

1969
Mar. 21 (cont.)

Ud	iP	03 21 29.0

Gulf of California.
Origin time = 03 09 23.
Approximate origin times are given for those earthquakes in this series, which have not been reported by the USCGS.

" 21

Up	iP	03 32 51.0
Ki	iP	03 32 20.8 C
Sk	iP	03 32 26.4
Um	iP	03 32 38.5
Ud	iP	03 32 42.4

Gulf of California.
Origin time = 03 20 39.

" 21

Up	iP	03 44 34.2
Ki	iP	03 44 04.7
Um	iP	03 44 21.3
Ud	iP	03 44 25.8
	i	03 44 32.1

Gulf of California.
Origin time = 03 32 22.

" 21

Up	iP	03 46 56.7
Ki	eP	03 46 23
Sk	eP	03 46 30
Um	eP	03 46 42

Gulf of California.
Origin time = 03 34 43.

" 21

Up	iP	04 05 53.5
Ki	iP	04 05 23.5
Sk	iP	04 05 29.9
Um	iP	04 05 40.3
Ud	iP	04 05 45.5
De	iP	04 05 59.0

Gulf of California
(h = N).

" 21

Up	iP		04 08 28.6	
			micr	sec
	Mx	E	0.7	18
	Mx	N	0.8	16
	Mx	Z	1.0	16
Ki	iP		04 07 58.5	
			micr	sec
	Mx	E	1.0	14
	Mx	N	0.5	15
	Mx	Z	1.0	14
Sk	eP		04 08 04	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 21 (cont.)

Um	iP	04 08 13.3
Ud	iP	04 08 19.4

Gulf of California.
Origin time = 03 56 16.
M = 5.3 (Up,Ki).

" 21

Up	iP	04 15 44.6
Ki	iP	04 15 13.9
Um	eP	04 15 30

Gulf of California.
Origin time = 04 03 32.

" 21

Up	eP	04 24 38
Ki	iP	04 24 09.2
Sk	iP	04 24 14.4
Um	iP	04 24 26.3
Ud	iP	04 24 29.9

Gulf of California (h = N).

" 21

Up	iP	04 34 05.5
Ki	eP	04 33 34
Sk	eP	04 33 41

Gulf of California (h = N).

" 21

Up	iP	04 34 39.4
Ki	iP	04 34 09.2
Um	eP	04 34 26

Gulf of California.
Origin time = 04 22 27.

" 21

Up	iP	04 38 35.7
Ki	iP	04 38 05.9
Sk	iP	04 38 12.0
Um	iP	04 38 23.8
Ud	iP	04 38 28.2

Gulf of California (h = N).

" 21

Ki	eP	04 50 39
	i	04 51 08.6
Sk	eP	04 50 47

Gulf of California.
Origin time = 04 38 58.

" 21

Up	iP	04 56 42.7
Ki	iP	04 56 13.4
Um	iP	04 56 30.4

Gulf of California (h = N).

" 21

Up	iP	04 59 16.7
Ki	iP	04 58 47.6
Sk	eP	04 58 52
Um	iP	04 59 03.6

(cont.)

1969
Mar. 21 (cont.)

Ud	iP	04 59 09.9

Gulf of California (h = N).

" 21

Up	iP	05 08 33.3
	i	05 08 35.7
	iS	05 18 43

		micr	sec
P	Z'	0.2	1.3
S	E	0.5	9
Mx	E	1.5	16
Mx	N	2.0	20
Mx	Z	2.7	17

D = 9000 km = 81°.

Ki	iP	05 08 03.1
	i	05 08 05.4
	eS	05 17 47
	iScS	05 18 20

		micr	sec
P	Z'	0.3	1.5
S	E	0.7	8
Mx	E	2.1	14
Mx	N	2.0	17
Mx	Z	3.6	15

D = 8400 km = 75 1/2°.

Sk	iP	05 08 08.2
	i	05 08 11.1
Um	iP	05 08 18.5
	i	05 08 23.4
	iS	05 18 20
Ud	iP	05 08 24.9
	i	05 08 27.4
De	iP	05 08 40.4
	i	05 08 41.8

Gulf of California (h = N).
m = 5.9, M = 5.7 (Up,Ki).
Multiple P.

" 21

Um	iP	05 10 14.4
Ud	iP	05 17 57.1

" 21

Ki	eP	05 20 09

" 21

Up	iP	05 26 39.8
Ki	iP	05 26 08.7
Um	iP	05 26 27.0 C

Gulf of California (h = N).

" 21

Ki	iP	05 51 42.0

Gulf of California
(h = 30 km).

" 21

Ki	iP	06 02 24.5

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 21 (cont.)

Sk	iP		06 02 30.9	
Um	iP		06 02 42.0	

Gulf of California (h = N).

" 21

Up	iP		06 11 29.6	
Ki	iP		06 11 00.1	
			micr	sec
	P	Z'	0.1	1.5
Sk	iP		06 11 05.8	
Um	iP		06 11 17.5	
Ud	eP		06 11 21	

Gulf of California (h = N).

" 21

Up	iP		06 17 30.0	
Ki	iP		06 17 00.3	
Sk	iP		06 17 05.4	
Um	iP		06 17 18.7	
Ud	iP		06 17 21.9	

Gulf of California (h = 20 km).

" 21

Up	iP		06 46 39.4	
	iS		06 56 47	
			micr	sec
	P	Z	0.6	4
	S	E	0.4	8
	S	N	0.3	5
	Mx	E	1.4	18
	Mx	N	1.7	17
	Mx	Z	1.6	17

D = 9000 km = 81°.

Ki	iP		06 46 08.9	
	eS		06 55 49	
	eScS		06 56 20	
			micr	sec
	P	Z'	0.3	1.5
	S	E	0.5	8
	Mx	E	1.4	15
	Mx	N	1.5	17
	Mx	Z	2.6	14

D = 8400 km = 75 1/2°.

Sk	iP		06 46 15.0	
Um	iP		06 46 26.8	
	iS		06 56 25	
Ud	iP		06 46 31.1	
De	iP		06 46 46.7	

Gulf of California (h = 4 km).
m = 6.0, M = 5.6 (Up,Ki).

" 21

Ud	iP		06 53 26.5	

Japan (h = N).

1969
Mar. 21

Up	iP		07 33 25.5	
			micr	sec
	Mx	E	0.7	16
	Mx	N	1.4	17
	Mx	Z	1.5	19
Ki	iP		07 32 54.8	
			micr	sec
	P	Z'	0.1	1.0
	Mx	E	1.0	14
	Mx	N	0.7	16
	Mx	Z	1.6	14
Sk	iP		07 32 58.7	
Um	iP		07 33 10.6	
Ud	iP		07 33 16.7	

Gulf of California (h = N).
M = 5.4 (Up,Ki).

" 21

Ki	eP		07 36 15	
Um	eP		07 36 32	
Ud	iP		07 36 38.0	

Gulf of California.
Origin time = 07 24 33.

" 21

Ki	iP		08 16 03.1	
	i		08 17 21.0	
Um	iP		08 16 23.3	
Ud	eP		08 16 27	

Gulf of California (h = N).

" 21

Up	iP		08 51 05.6	
Ki	iP		08 50 35.7	
Sk	iP		08 50 41.3	
Um	iP		08 50 53.2	
Ud	iP		08 50 56.7	

Gulf of California (h = N).

" 21

Sk	iP		09 08 07.1	

Gulf of California (h = N).

" 21

Ud	iP		10 13 09.6	

" 21

Sk	eP		10 13 23	

Gulf of California (h = N).

" 21

Up	iP		10 22 27.6	C
	iS		10 32 39	
			micr	sec
	P	Z'	0.2	1.4
	Mx	E	0.8	17

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 21 (cont.)

Up	Mx	N	1.4	17
	Mx	Z	1.7	18
	D = 9000 km = 81°.			
Ki	iP		10 21 56.8	
	iS		10 31 37	
	eScS		10 32 11	
			micr	sec
	S	E	0.4	8
	Mx	E	0.8	14
	Mx	N	0.8	15
	Mx	Z	1.4	15
	D = 8400 km = 75 1/2°.			
Sk	iP		10 22 02.3	
Um	iP		10 22 14.4	
	iS		10 32 13	
Ud	iP		10 22 19.4	

Gulf of California
(h = 5 km).
m = 5.9, M = 5.4 (Up,Ki).

" 21	Up	iP	10 37 02.2	
	Ki	eP	10 36 46	
	Sk	iP	10 37 06.2	
	Um	iP	10 36 49.4	
	Ud	iP	10 37 09.6	

Mindanao (h = N).

" 21	Ki	iPn	10 58 02.0	C
		iSn	10 59 01.8	
		iLg1	10 59 21.1	
	D = 560 km = 5.0°.			
	Sk	eSg	11 01 46	
	Um	iSg	11 00 10.1	

Northwest Russia,
67.1°N, 33.2°E.
Origin time = 10 56 44.
Explosion?

" 21	Up	i(P)	11 31 33.0	
			micr	sec
		(P) Z'	0.1	0.6
" 21	Up	iP	12 01 12.2	
" 21	Ud	iP	12 11 37.2	
" 21	Up		---	
			micr	sec
		Mx E	0.7	23
		Mx N	1.0	19
		Mx Z	1.4	22
	Ki	eP	12 15 02	

(cont.)

1969
Mar. 21 (cont.)

Ki			micr	sec
	Mx	E	0.6	20
	Mx	N	0.4	18
	Mx	Z	0.6	16
Um	iP		12 15 30.3	
Ud	iP		12 16 01.3	
	i		12 16 04.2	

Kurile Islands (h = 50 km).
M = 5.0 (Up,Ki).

" 21	Up	eP	12 36 18	
	Ki	iP	12 35 44.4	C
			micr	sec
		Mx E	0.3	14
		Mx N	0.3	16
	Sk	eP	12 35 49	
	Um	iP	12 36 01.1	
	Ud	iP	12 36 06.2	

Gulf of California
(h = 15 km).

" 21	Um	i(P)	12 41 07.8
" 21	Up	eP	14 41 48
		i	14 42 05.7
	Ki	iP	14 41 15.2 C
	Sk	eP	14 41 23
	Um	iP	14 41 33.5
	Ud	iP	14 41 41.2

Nevada.
Underground explosion.

" 21	Ud	iP	15 13 12.8
" 21	Up	iP	16 10 00.0
	Ki	iP	16 09 28.6
	Sk	eP	16 09 34
	Um	iP	16 09 46.6
	Ud	iP	16 09 50.8

Gulf of California
(h = 2 km).

" 21	Up	iP	16 41 54.0	
	Ki		---	
			micr	sec
		Mx E	0.3	15
		Mx N	0.3	16
		Mx Z	0.7	15
	Um	eP	16 41 42	

Gulf of California (h = N).

" 21	Up	iP	18 12 33.1

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 21 (cont.)

Ki	iP		18 12 03.0	
			micr	sec
	Mx	E	0.5	14
	Mx	N	0.6	22
	Mx	Z	0.7	15
Um	iP		18 12 20.4	

Gulf of California (h = N).

" 21	Ud	iP	21 29 00.6	
		i	21 29 59.2	
" 22	Sk	eP	00 17 44	
" 22	Um	iP	02 02 28.5	
		i	02 03 30.0	
		i(Pn)	02 04 26.0	
	Ud	iP	02 02 47.3	
	De	iP	02 02 44.5	

Hindu Kush (h = 220 km).

" 22	Up	iP	04 21 08.1	C
	Ki	iP	04 21 14.7	
	Sk	iP	04 21 32.5	
	Um	iP	04 21 05.2	
	Ud	iP	04 21 24.7	C
		iPP	04 23 07.8	
	De	iP	04 21 22.0	

Afghanistan-USSR.
Origin time = 04 13 41.

" 22	Up	iP		05 00 00.3	D
		iPa		05 01 20	
		iPP		05 01 26	
		iSa		05 08 09	
				micr	sec
		P	Z'	0.1	0.9
		PP	E	0.4	2
		PP	Z	0.5	3
		PP	Z'	0.1	1.0
		Mx	E	0.7	13
		Mx	N	2.7	9
		Mx	Z	1.8	14
	Ki	iP		05 00 06.5	
		iPP		05 01 44.9	
		iLg1		05 13 05	
				micr	sec
		PP	Z'	0.2	1.4
		Mx	E	2.1	10
		Mx	N	3.1	13
		Mx	Z	2.5	10
	Sk	iP		05 00 25.6	D
		iPn		05 01 51.2	

(cont.)

1969
Mar. 22 (cont.)

Sk	iPP		05 02 01.5	
	i		05 11 42.7	
Um	iP		04 59 57.2	D
	iPn		05 01 11.0	
	iPP		05 01 23	
	iS		05 06 04	
	i		05 10 04	
	iLg1		05 12 23	
	iLg2		05 13 26	
Ud	iP		05 00 17.4	D
	iPP		05 01 49.5	
De	iP		05 00 15.0	
	iPP		05 01 52.1	

Afghanistan-USSR (h = 8 km).
m = 5.7, M = 5.5 (Up,Ki).

" 22	Up	iPKP	06 03 17.3	
		i	06 03 25.3	
			micr	sec
		Mx	E 0.6	20
		Mx	N 1.1	21
		Mx	Z 1.3	20
	Ki	iPKP	06 03 01.0	
			micr	sec
		Mx	E 1.0	21
		Mx	N 0.7	21
		Mx	Z 1.3	20
	Sk	ePKP	06 03 09	
	Um	iPKP	06 03 04.4	
		i	06 03 08.5	
		iSS	06 22 45	
	Ud	iPKP	06 03 17.2	
	De	iPKP	06 03 26.7	

Fiji Islands (h = N).
M = 5.6 (Up,Ki).

" 22	Up	iP	07 37 47.4	C
		i	07 37 51.4	
			micr	sec
		Mx	E 0.8	17
		Mx	N 1.0	16
		Mx	Z 1.3	17
	Ki	iP	07 37 17.4	
		iS	07 47 00	
			micr	sec
		P	Z' 0.1	1.2
		S	E 0.3	8
		S	N 0.3	8
		Mx	E 0.9	15
		Mx	N 0.7	16
		Mx	Z 1.8	15

D = 8400 km = 75 1/2°.

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 22 (cont.)

Sk	iP	07 37 23.2	
Um	iP	07 37 35.1	
	iS	07 47 32	
Ud	iP	07 37 39.5	
	i	07 37 43.1	

Gulf of California (h = N).
m = 5.7, M = 5.3 (Up,Ki).

" 22

Up	i	12 15 52.0	
	iSg	12 16 07.1	
Um	iSg	12 16 37.9	
Ud	iSg	12 17 08.0	

Esthonia-Gulf of Finland.
Explosion?

" 22

Um	iP	13 11 39.1	

" 22

Up	iP	13 47 09.3	C
Ki	iP	13 46 23.4	
	ipP	13 46 35.4	
Um	iP	13 46 44.0	
Ud	iP	13 47 15.5	C

Kurile Islands.
h = 45 km (Ki).

" 22

Ki	eL	14 33		
		micr	sec	
	Mx	N	0.8	22
	Mx	Z	1.1	21

Fiji Islands (h = N).

" 22

Um	iP	14 33 09.8	
	i	14 33 17.2	

" 22

Sk	eP	16 53 40	

" 22

Up	iPP	17 48 43.7		
	i	17 48 59.5		
		micr	sec	
	Mx	N	1.2	24
Ki		---		
		micr	sec	
	Mx	E	0.5	16
	Mx	N	2.4	24
	Mx	Z	0.8	16
Um	i(PP)	17 48 38.4		
	eS	17 55 32		
Ud	iPP	17 49 02.4		

Celebes (h = 40 km).
M = 5.5 (Up,Ki).

" 22

Up	iP	18 05 47.9	

(cont.)

1969
Mar. 22 (cont.)

Up	i	18 05 52.1	
Ki	eP	18 06 54	
Sk	eP	18 06 27	
Um	iP	18 06 18.8	
Ud	iP	18 05 56.1	C
	i	18 06 01.8	
De	iP	18 05 22.7	

Turkey (h = N).
Negative residuals, averaging 10 sec, are obtained in relation to the USCGS' solution.

" 22

Up	eP	18 35 16	
Ud	eP	18 35 05	

Gulf of California (h = 20 km).

" 23

Up	eP	00 20 38	
Um	iP	00 21 10.8	
	iS	00 25 42	
Ud	iP	00 20 50.7	

Turkey (h = N).

" 23

Sk	iP	00 38 58.7	

" 23

Up	eP	00 59 53	
Ud	iP	01 00 01.7	C

" 23

Up	iPKP	02 26 21.3		D
	i	02 26 26.3		
		micr	sec	
	PKP	Z'	0.1	0.6
Um	iPKP	02 26 09.0		
	iSKP	02 29 04.8		
Ud	iPKP	02 26 23.3		D
De	iPKP	02 26 33.8		

Tonga-Kermadec Islands (h = 550 km).

" 23

Up	iP	02 58 35.5	

" 23

Up	iP	03 16 28.6	

" 23

Um	iP	03 56 22.0	
Ud	iP	03 56 00.6	

Turkey.

" 23

Up	iS^x	04 04 32.1	
	iLg1	04 04 52.8	
	iSg	04 05 03.1	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 23 (cont.)

Ki	iPn	04 00 51.3	
	iSn	04 01 49.7	
	iSg	04 02 13.6	
	D = 540 km = 4.9°.		
Sk	i	04 04 38.1	
	iSg	04 04 45.4	
Um	iSn	04 02 28.6	
	iSg	04 03 00.8	
Ud	i	04 04 30.7	
	iSg	04 05 37.0	

Northwest Russia,
67.5°N, 33.4°E.
Origin time = 03 59 34.
Explosion?

" 23	Up	iP	04 30 26.8	
	Ki		---	
			micr	sec
		Mx N	0.3	13
	Ud	iP	04 30 41.8	

India-West Pakistan
(h = 15 km).

" 23	Up	iSg	05 58 01.5	
	Ki	iPn	05 53 44.3	
		iSn	05 54 42.1	
		iSg	05 55 05.9	
		D = 530 km = 4.8°.		
	Sk	eSg	05 57 35	
	Um	iSn	05 55 21.8	
		iSg	05 55 56.2	
	Ud	eLg1	05 58 26	

Northwest Russia,
67.6°N, 33.1°E.
Origin time = 05 52 28.
Explosion?

" 23	Um	iP	08 35 10.3	
" 23	Um	iS	11 54 25	

Baja California (h = N).

" 23	Up	iP	12 02 21.8	
			micr	sec
		Mx E	1.0	17
		Mx N	1.5	19
		Mx Z	1.6	20
	Ki	iP	12 02 22.7	
			micr	sec
		Mx E	1.3	16
		Mx N	1.1	18
		Mx Z	1.7	19

(cont.)

1969
Mar. 23 (cont.)

Sk	iP	12 02 07.9	
Um	iP	12 02 25.1	C
Ud	iP	12 02 12.1	C
De	iP	12 02 14.1	

Colombia (h = 25 km).
M = 5.5 (Up,Ki).

" 23	Up	iP	12 11 58.8
		i	12 12 07.0
		i	12 12 16.0
	Ki	eP	12 12 37
	Um	iP	12 12 26.0
	Ud	iP	12 11 51.3
		iPcP	12 12 16.7

Atlantic Ocean (h = N).

" 23	Sk	iP	12 27 16.5
" 23	Um	iP	14 02 36.2
	Ud	eP	14 03 07
" 23	Ud	iP	14 42 39.3
" 23	Up	iP	15 51 19.1
	Ki	iP	15 50 47.0
		i	15 51 00.3
	Sk	iP	15 50 54.5
	Um	iP	15 51 03.9
	Ud	iP	15 51 11.4

Gulf of California
(h = 15 km).

" 23	Up	iP	21 13 35.1	
		i	21 13 46.4	
		iS	21 17 34	
		iLi	21 19 39	
		iLg1	21 20 21	
			micr	sec
		P E	1.2	5
		P N	3.5	5
		P Z	3.1	5
		P Z'	0.9	1.7
		S E	5.5	6
		S N	5.0	6
		S Z	3.7	8
		Mx E	57	18
		Mx N	31	12
		Mx Z	29	11
		D = 2450 km = 22°.		
	Ki	iP	21 14 44.5	D
		i	21 14 47.5	
		iS	21 19 31	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 23 (cont.)

Ki	i		21 22 45	
			micr	sec
	P	N	1.4	5
	P	Z	1.7	5
	P	Z'	0.7	1.5
	S	E	1.5	7
	S	N	3.8	14
	Mx	E	24	11
	Mx	N	12	11
	Mx	Z	18	11
	D = 3300 km = 29 1/2°.			
Sk	iP		21 14 18.8 D	
Um	iP		21 14 09.2	
	iS		21 18 30	
Ud	iP		21 13 46.2 D	
	i		21 13 48.7	
De	iP		21 13 11.2	
	i		21 13 14.4	

Turkey (h = 10 km).
m = 6.1, M = 6.2 (Up,Ki).
Double P (Ki,Ud,De).

" 23 Um iP 23 39 23.5
Turkey.

" 24 Um iPKP 01 13 12.1
Tonga Islands (h = 210 km).

" 24 Up iP 02 04 23.9

	iS		02 08 22.3	
	i		02 08 30.5	
			micr	sec
	P	N	0.3	3
	S	E	0.6	7
	S	N	0.7	6
	Mx	E	4.8	17
	Mx	N	3.1	17
	Mx	Z	1.9	12
	D = 2450 km = 22°.			
Ki	iP		02 05 33.3	
			micr	sec
	Mx	E	2.6	12
	Mx	N	1.5	11
	Mx	Z	2.3	11
Sk	iP		02 05 08.0	
Um	iP		02 04 57.4	
	iPcP		02 08 29.9	
	iS		02 09 23	
Ud	iP		02 04 35.7	
De	iP		02 04 03.8	

Turkey (h = 6 km).
m = 5.3, M = 5.1 (Up,Ki).

1969
Mar. 24

Sk	iP	03 04 27.9
Um	iP	03 04 16.2
Ud	iP	03 03 55.2

Turkey (h = 3 km).

" 24 Ki eP 08 19 03

Sk	iP	08 18 38.5
Um	iP	08 18 27.8
	iS	08 23 03
Ud	iP	08 18 06.9

Turkey (h = 7 km).

" 24 Um iP 09 40 24.3
Ud eP 09 39 24
Atlantic Ocean, off Portugal (h = N).

" 24 Ki iPn 11 00 06.8

	iSn	11 00 34.6
	iSg	11 00 39.2
	D = 240 km = 2.2°.	
Sk	iSg	11 02 58.9
Um	iSg	11 01 36.6

Northern Finland, 67.1°N, 25.7°E.
Origin time = 10 59 28.
Explosion?

" 24 De i(P) 11 14 12.9

" 24 Um iP 11 28 51.7
Turkey.

" 24 Up iP 11 39 24.2

	i	11 40 06.4
Ki	iP	11 40 32.2
Sk	iP	11 40 07.4
Um	iP	11 39 57.3
	iS	11 44 28
	eLg2	11 48 13
	iRg	11 49 24
Ud	iP	11 39 34.6
De	iP	11 39 01.0

Turkey (h = 15 km).

" 24 Sk i(Sg) 12 00 28.9

" 24 Up iP 12 00 59.7

	i	12 01 11.6
Ki	iP	12 01 58.3
	i	12 02 04.4
		micr sec
	Mx E	0.4 9

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 24 (cont.)

Ki			micr	sec
	Mx	N	0.3	10
	Mx	Z	0.6	12
Sk	iP		12 01 37.7	
Um	iP		12 01 26.0	
Ud	iP		12 01 09.6	C

Egypt (h = 20 km).

" 24	Up	iP	12 18 09.1	
	Sk	iP	12 18 55.9	
	Um	iP	12 18 45.3	C
	Ud	iP	12 18 22.3	

Turkey (h = 10 km).

" 24	Up	iP	12 57 33.8	C
	Ki	iP	12 58 32.1	C
	Sk	iP	12 58 11.6	C
	Um	iP	12 58 00.1	C
	Ud	iP	12 57 43.4	

Egypt (h = N).

" 24	Ud	iP	13 13 19.2	
" 24	Up	iP	15 12 16.8	
	Ki	eP	15 11 52	C
	Sk	iP	15 12 19.3	
	Um	iP	15 12 00.6	
	Ud	iP	15 12 26.2	C
	De	iP	15 12 35.3	

Ryukyu Islands (h = 70 km).

" 24	De	iP	15 52 06.2	
" 24	Ud	iP	16 31 38.4	
" 24	Um	iP	16 42 32.7	
" 24	Ki	eP	16 49 03	

Gulf of California (h = N).

" 24	Ki	iPg	18 09 50.8	
		iSg	18 09 55.1	
		iRg	18 09 57.7	
		D = 30 km = 0.3°.		
	Sk	eSg	18 12 38	
	Um	iSg	18 11 45.7	

Swedish Lapland, 67.6°N, 21.1°E.
Origin time = 18 09 45.
Explosion?

" 25	Up	eP	01 13 42	
		i	01 13 43.3	

(cont.)

1969 Mar. 25 (cont.)

	Sk	eP	01 13 48	
	Um	eP	01 13 30	
	Ud	iP	01 13 50.1	
" 25	Up	iP	01 18 14.3	
	Sk	iP	01 18 29.5	
	Ud	iP	01 18 22.5	
" 25	Up	iP	02 36 58.8	C
		ipP	02 37 11.9	
	Ki	iP	02 36 23.0	
	Um	iP	02 36 38.6	
	Ud	iP	02 37 05.3	

South of Japan.
h = 50 km (Up).

" 25	Um	iP	02 41 13.4	
	Ud	iP	02 41 47.5	

(South of Japan).

" 25	Ud	iP	03 41 36.3	
" 25	Up	i(Sn)	04 29 33.6	
		iS^x	04 29 53.6	
		iLg1	04 30 04.9	
	Ki	ePn	04 26 36	
		iPg	04 26 46.6	
		iSg	04 27 39.4	
	Sk	iPn	04 26 46.8	
		i(Pg)	04 26 58.5	
		iSn	04 27 40.2	
		iRg	04 28 14.5	
	Um	iPn	04 27 04.5	
		i	04 27 10.3	
		iSn	04 28 08.5	
		iLg1	04 28 31.6	
	Ud	iSn	04 29 04.2	
		iLg1	04 29 38.6	

Off coast of Norway, near Lofoten, 67.8°N, 11.2°E.
Origin time = 04 25 42.
Solution checked with readings from Finnish and Norwegian stations.

" 25	Up	iPKP	07 29 10.0	
		i	07 29 16.2	
	Sk	ePKP	07 28 58	
	Um	iPKP	07 28 53.2	
		i	07 29 06.1	
	Ud	iPKP	07 29 06.6	C

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 25 (cont.)

De iPKP 07 29 27.8 C
Kermadec Islands
(h = 40 km).

" 25 Um iP 10 10 53.2
Turkey.

" 25 Up iP 13 26 06.0 C
Ki iP 13 27 13.5
Sk iP 13 26 46.4
Um iP 13 26 36.3 C
iS 13 31 01
Ud iP 13 26 13.6
De iP 13 25 39.4
Turkey (h = 25 km).

" 25 Up iP 13 26 23.2
iS 13 30 21
iLg1 13 33 15

		micr	sec
P	E	1.3	7
P	N	2.7	5
P	Z	3.1	5
P	Z'	0.8	1.5
S	E	3.3	7
S	N	5.3	10
S	Z	4.0	8
Mx	E	71	20
Mx	N	40	18
Mx	Z	30	12

D = 2450 km = 22°.

Ki iP 13 27 32.0 D
iS 13 32 24
iSa 13 32 38
i 13 34 47
iLi 13 35 40
iLg1 13 36 21

		micr	sec
P	N	1.2	6
P	Z	1.5	6
P	Z'	0.6	1.1
S	E	3.4	10
S	N	4.5	16
Mx	E	24	11
Mx	N	15	11
Mx	Z	26	11

D = 3220 km = 29°.

Sk iP 13 27 06.7
Um iP 13 26 57.0 D
iS 13 31 16
Ud iP 13 26 34.0 D
(cont.)

1969 Mar. 25 (cont.)

De iP 13 26 00.6
Turkey (h = 25 km).
m = 6.0, M = 6.2 (Up,Ki).

" 25 Ud iPKP 13 31 55.8
De iPKP 13 32 07.2
ipPKP 13 33 14.7
Tonga-Kermadec Islands.
h = 270 km (De).

" 25 Um iS 14 26 26
Gulf of California (h = N).

" 25 Up iP 14 23 42.0
i 14 23 45.8
iPP 14 24 15.5
i 14 24 23.1
iS 14 27 38

		micr	sec
Mx	E	1.6	17
Mx	N	1.4	18
Mx	Z	1.1	9

D = 2450 km = 22°.

Ki iP 14 24 51.1 C
i 14 24 54.7

		micr	sec
Mx	E	0.9	12
Mx	N	0.5	12
Mx	Z	1.3	12

Sk iP 14 24 25.5
i 14 24 30.9
Um iP 14 24 15.8 C
iS 14 28 51
Ud iP 14 23 52.9 C
De iP 14 23 20.9
Turkey (h = 25 km).
M = 4.7 (Up,Ki).

" 25 Um iP 14 45 52.6
Turkey (h = 25 km).

" 25 Up eP 15 31 32

" 25 Up eP 15 54 14
i 15 54 23.7

" 25 Up eP 16 18 20
iS 16 22 25

		micr	sec
Mx	E	0.7	16
Mx	N	0.5	17

Ki eP 16 19 29
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 25 (cont.)

Ki			micr	sec	
	Mx	E	0.4	10	
	Mx	Z	0.4	10	
Sk	iP		16 19 03.3		
Um	iP		16 18 53.6		C
	iS		16 23 29		
Ud	iP		16 18 30.6		
	i		16 18 37.2		
De	iP		16 17 58.1		

Turkey (h = 15 km).
M = 4.3 (Up,Ki).

" 25	Ki	iSg	17 35 20.7		
	Sk	eSg	17 35 25		
		i	17 35 34.2		
	Um	iSn	17 35 30.3		
		iSg	17 35 47.5		
	Ud	iSg	17 37 13.8		

Nordland, Norway,
66.4°N, 14.8°E.
Origin time = 17 33 52.
Explosion?

" 25	Um	iP	17 56 45.7		

Turkey.

" 25	Up	iSg	18 56 21.9		
	Ki	iSn	18 52 24.4		
		iSg	18 52 42.1		
	Sk	iSg	18 55 23.9		
	Um	iPg	18 52 43.4		
		iSn	18 53 33.3		
		iSg	18 54 13.6		
	Ud	eLg1	18 56 38		

Northwest Russia,
69.2°N, 30.3°E.
Origin time = 18 50 35.
Explosion?

" 25	Ud	iP	19 06 40.2		
		i	19 06 44.6		
" 26	Sk	iP	03 36 59.4		
	Um	iP	03 36 49.2		C
		iS	03 41 24		
	Ud	iP	03 36 29.1		

Turkey (h = 25 km).

" 26	Ki	eSg	08 32 22		
		i	08 32 28.5		
	Sk	iSg	08 32 50.7		
	Um	iSg	08 31 03.4		

(cont.)

1969 Mar. 26 (cont.)

	Ud	iSg	08 32 40.2		

Lake Ladoga.
Explosion?

" 26	Sk	iP	09 24 56.5		
" 26	Ud	iPKP	09 43 48.5		
	De	iPKP	09 43 59.2		

Tonga-Kermadec Islands
(h = 50 km).

" 26	Ki	ePP	12 09 35		
	Ud	iP	12 08 16.7		

Caspian Sea.

" 26	Up	iSn	12 40 41.6		
		iSg	12 40 56.0		
	Ki	iSg	12 43 31.5		
	Sk	e	12 42 46		
		iSg	12 42 57.9		
	Um	iSg	12 41 29.1		
	Ud	iSg	12 41 58.0		

Esthonia-Gulf of Finland.
Explosion?

" 26	Sk	e(Sg)	15 08 06		
	Ud	i(Sg)	15 08 29.9		
" 26	Up	iP	15 40 16.1		
		iX	15 40 38.6		
			micr	sec	
		Mx	E	0.6	17
		Mx	N	1.1	21
		Mx	Z	1.3	17
	Ki	iP	15 39 50.4		
			micr	sec	
		Mx	E	0.8	14
		Mx	N	0.3	13
		Mx	Z	1.0	16
	Sk	iP	15 40 18.0		
	Um	eP	15 40 02		
		i	15 40 19.1		
		i	15 49 52		
	Ud	iP	15 40 12.4		
		iX	15 40 35.2		

Luzon (h = 35 km).
M = 5.3 (Up,Ki).

" 26	Ud	iP	15 50 54.4		
" 26	Ud	iP	17 19 10.2		

Dodecanese Islands (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar.	26	Up	iPKP		17 49 57.0	
			i		17 50 05.2	
			i		17 50 17.2	
		Ki	i(PKP)		17 49 49.9	
		Sk	iPKP		17 49 51.0	
		Um	iPKP		17 49 47.1	
			i		17 50 00.6	
		Ud	iPKP		17 49 58.8	
		South of Kermadec Islands (h = 45 km).				
"	26	Up	eP		19 35 17	
		Um	iP		19 35 04.8	
		Ud	iP		19 35 25.9	
		Mindanao (h = 30 km).				
"	26	Up	iP		19 44 03.3	
		Ud	iP		19 44 10.6	
		Mindanao (h = 20 km).				
"	26	Um	iP		21 02 28.6	
		Ud	iP		21 02 35.6	
		Baja California (h = N).				
"	27	Sk	eP		01 37 36	
"	27	Um	iP		02 19 11.3	
"	27	Ud	iPKP		03 30 10.2	
		Santa Cruz Islands (h = 250 km).				
"	27	Ud	iP		03 41 39.2	
"	27	Up	eP		04 59 59	
					micr	sec
			Mx	E	1.3	14
			Mx	N	2.3	19
			Mx	Z	2.6	20
		Ki			---	
					micr	sec
			Mx	E	2.8	16
			Mx	N	1.4	16
			Mx	Z	3.2	17
		Um	iP		04 59 43.6	
			iPP		05 03 34	
			iSKS		05 10 21	
			iS		05 10 52	
		Ud	iP		05 00 01.6	
			iY		05 02 57.7	
			i		05 03 06.3	
		North of Halmahera (h = N).				
		(cont.)				

1969 Mar.	27	(cont.)		
		M = 5.9 (Up,Ki).		
		Y (Ud): cf Mar. 20, 1969, 16 32.		
"	27	Ud	e(Sg)	05 36 21
"	27	Up	iP	06 22 14.1 C
		Ki	iP	06 23 12.1
		Ud	iP	06 22 23.7
			i	06 22 47.1
		Egypt (h = N).		
"	27	Up	iP	06 22 50.8
			i	06 22 57.9
		Sk	iP	06 22 45.5
		Um	iP	06 22 30.6 C
		Ud	iP	06 22 57.4
		De	iP	06 23 10.9
		South of Japan (h = 30 km).		
"	27	Ud	iP	07 48 41.0
		East of Crete.		
"	27	Up	iP	08 35 29.9
			i	08 35 39.4
		Ki	iP	08 35 02.0
		Sk	iP	08 35 27.5
		Um	iP	08 35 13.8
		Ud	iP	08 35 36.4
		Mariana Islands (h = 380 km).		
"	27	Up	eP	11 27 04
				micr sec
			Mx N	0.9 17
		Ki	iP	11 27 06.5
		Um	iP	11 26 53.5
		Ud	iP	11 27 13.8 C
			i	11 27 21.1
		Tadzhik SSR (h = 35 km).		
"	27	Up	iSg	12 53 03.7
		Sk	iSg	12 54 55.8
		Um	iSg	12 53 37.3
		Ud	iSg	12 54 05.2
		Esthonia-Gulf of Finland. Explosion?		
"	27	Up	iP	12 54 58.3 C
			i	12 55 02.3
			iPP	12 58 49.3
			iSKS	13 05 29
			i(S)	13 05 53
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 27 (cont.)

			micr	sec	
Up					
	P	Z	0.6	3	
	P	Z'	0.1	0.6	
	PP	E	0.6	3	
	PP	Z	1.2	3	
	(S)	E	1.2	4	
	(S)	N	1.0	6	
	Mx	E	21	19	
	Mx	N	32	24	
	Mx	Z	36	20	

D = 10600 km = 95 1/2°.

Ki	iP	12 54 41.8	C
	i	12 54 45.5	
	iPP	12 58 25.8	
	eSKS	13 05 06	
	iS	13 05 33	

		micr	sec
P	E	2.5	16
P	Z	1.6	4
P	Z'	0.3	1.2
PP	E	2.7	8
PP	Z	3.6	8
SKS	E	3.8	5
SKS	N	2.0	5
S	E	6.1	7
S	N	2.1	6
Mx	E	30	23
Mx	N	23	20
Mx	Z	51	20

D = 10200 km = 92°.

Sk	iP	12 55 02.8	
	iPP	12 58 52.7	
Um	iP	12 54 47.1	C
	i	12 58 18.4	
	iPP	12 58 40.3	
	i(S)	13 06 00	
Ud	iP	12 55 06.3	
De	eP	12 55 16	
	iPP	12 59 12.1	

Talaud Islands (h = 30 km).
m = 6.7, M = 6.9 (Up,Ki).

"	27	Up	iP	13 40 52.9	C
"	27	Ud	iP	14 21 34.1	

Aegean Sea.

"	27	Up	iP	16 22 34.2	D
"	27	Ki	iSg	17 34 50.9	
		Sk	iSg	17 34 54.9	
		Um	iSg	17 35 16.8	

(cont.)

1969 Mar. 27 (cont.)

Nordland, Norway,
66.4°N, 14.8°E.
Origin time = 17 33 22.
Explosion?

"	27	Ki	iPg	18 10 34.1 C
			iSg	18 10 38.8
			iRg	18 10 41.1

D = 40 km = 0.4°.
Origin time = 18 10 26.
Explosion?

"	27	Um	iP	18 12 25.9
			i	18 12 30.1
		Ud	eP	18 12 04
		De	iP	18 11 30.5

Turkey (h = 30 km).

"	27	Up	iP	19 45 06.4
			i	19 45 12.0
		Ki	iP	19 45 17.3
		Sk	iP	19 45 37.3
		Um	iP	19 45 08.2
		Ud	iP	19 45 29.1 C
		De	eP	19 45 24

Tadzhik SSR (h = N).

"	27	Ud	iP	20 29 26.4
"	27	Ud	iP	22 37 54.4

Eastern Mediterranean.

"	27	Ud	eP	22 55 37
"	28	Um	iPKP	01 38 55.4

Loyalty Islands (h = N).

"	28	Up	iP	01 53 29.3
			i	01 53 31.7
			iS	01 57 35
			iLg2	02 00 40

		micr	sec
P	E	3.2	8
P	N	11	9
P	Z	12	8
P	Z'	0.5	1.0
S	E	110	18
S	N	34	9
S	Z	58	20
Mx	E	450	21
Mx	N	200	19
Mx	Z	110	19

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholn, De = Delary

1969 Mar. 28 (cont.)

D = 2450 km = 22°.

Ki	iP		01 54 37.6		D
	i		01 54 41.1		
	iPa		01 55 06		
	iS		01 59 30		
	iLg1		02 03 55		
			micr	sec	
	P	E	1.1	6	
	P	N	4.3	6	
	P	Z	6.1	6	
	P	Z'	0.4	1.0	
	S	E	12	10	
	S	N	61	18	
	Mx	E	89	13	
	Mx	N	110	16	
	Mx	Z	130	15	

D = 3300 km = 29 1/2°.

Sk	iP		01 54 11.7	
	i		01 54 14.3	
Um	iP		01 54 02.2	D
	i		01 54 05.5	
	i		01 54 08.8	
	eS		01 58 22	
Ud	iP		01 53 40.1	
	i		01 53 41.9	
De	iP		01 53 06.9	
	i		01 53 09.5	

Turkey (h = 9 km).
m = 6.6, M = 6.8 (Up,Ki).
Multiple P.

" 28

Up	eP		03 18 48	
	ipP		03 19 06.8	
Um	iP		03 18 26.5	D
	ipP		03 18 46.6	
Ud	iP		03 18 54.7	

South of Japan. h = 70 km (Up,Um).

" 28

Um	iP		05 45 48.8	
Ud	iP		05 45 26.3	
	i		05 45 30.5	

Turkey (h = 3 km).

" 28

Up	iP		09 36 38.3	
Ki	iP		09 36 09.2	D
Sk	eP		09 36 37	
Um	iP		09 36 21.7	D
	ipP		09 37 08.0	
Ud	iP		09 36 45.2	
	ipP		09 37 31.7	

(cont.)

1969 Mar. 28 (cont.)

De	eP		09 36 56	

Volcano Islands.
h = 190 km (Um,Ud).

" 28

Up	iP		10 07 06.4	
	i		10 07 11.0	
	i		10 07 21.4	
	iS		10 11 08	
			micr	sec
	Mx	E	2.7	20
	Mx	N	1.8	18
	Mx	Z	1.2	8

D = 2450 km = 22°.

Ki	iP		10 08 15.7	
			micr	sec
	Mx	E	1.3	13
	Mx	N	0.8	12
	Mx	Z	1.3	12
Sk	iP		10 07 50.7	C
Um	iP		10 07 40.7	
	iS		10 12 13	
Ud	iP		10 07 19.9	
De	iP		10 06 45.6	C

Turkey (h = N).
M = 4.8 (Up,Ki).

" 28

Ki	iPn		10 48 57.0	
	iP^x		10 49 04.2	
	iSn		10 49 55.4	
	iSg		10 50 19.1	

D = 530 km = 4.8°.

Sk	eSg		10 52 43	
Um	i		10 51 03.4	
	iSg		10 51 09.0	

Northwest Russia, 67.5°N, 32.9°E.
Origin time = 10 47 41.
Explosion?

" 28

Um	iP		12 39 44.6	
	i		12 39 54.7	
Ud	iP		12 40 13.7	
De	iP		12 40 38.9	

" 28

Up	eP		15 31 55	
			micr	sec
	Mx	N	1.3	16
	Mx	Z	1.9	15
Ki			---	
			micr	sec
	Mx	E	1.1	13

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar. 28 (cont.)

Ki			micr	sec	
	Mx	N	1.0	17	
Ud	iP		15 31 46.4		C

Gulf of California (h = N).
M = 5.5 (Up,Ki).

" 28	Um	iP	23 01 28.6		
	Ud	iP	23 01 08.0		
	De	iP	23 01 20.9		

North Atlantic Ocean (h = N).

" 29		iP	01 47 44.9		
		i	01 47 46.7		
		i	01 47 56.6		
		iS	01 51 10.6		
		iSn	01 51 28.9		
	Sk	iP	01 48 22.8		
	Um	iP	01 48 27.4		
		iPn	01 49 12.7		
		iSn	01 53 20.5		
		i	01 55 06.5		
	Ud	iP	01 47 48.7		
		iS	01 51 15.2		
	De	iP	01 47 11.5		
		i	01 47 18.0		

Italy (h = 310 km). Note the existence of teleseismic Pn and Sn (Up,Um), indicating propagation across a relatively homogeneous structure.

" 29	Up	iP	07 13 35.0		
		i	07 13 44.4		
	Um	eP	07 13 28		
	Ud	iP	07 13 53.9		

" 29	Up	iP	09 24 53.1		C
		iPP	09 27 03		
		iS	09 32 12		
			micr	sec	
		P	Z 0.9	3	
		P	Z' 0.8	2.0	
		S	E 2.4	6	
		S	N 7.6	11	
		Mx	E 14	18	
		Mx	N 17	19	
		Mx	Z 12	19	

D = 5650 km = 51°.

	Ki	eP	09 25 40		
		i	09 25 44.4		
		i	09 26 18.5		
		ePa	09 29 14		
		iS	09 33 41		

(cont.)

1969 Mar. 29 (cont.)

Ki	iPS		09 33 55		
	iSa		09 39 57		
			micr	sec	
	P	Z'	0.5	1.7	
	S	E	4.2	9	
	S	N	3.2	11	
	Mx	E	15	18	
	Mx	N	12	15	
	Mx	Z	19	15	

D = 6350 km = 57°.

Sk	iP		09 25 26.6		C
Ud	iP		09 25 02.4		
De	iP		09 24 39.9		

Ethiopia (h = N).
m = 6.3, M = 6.3 (Up,Ki).

" 29	Ki	iSn	10 34 00.3		
		iLg1	10 34 14.7		
	Um	iSn	10 34 45.4		
		iSg	10 35 25.2		
		i	10 35 33.1		

Probably northwest Russia. Explosion?

" 29	Up	eP	11 13 50		C
		i	11 13 52.5		
		iS	11 21 09		
			micr	sec	
		P	Z 0.8	5	
		P	Z' 0.3	1.5	
		S	E 1.0	6	
		S	N 1.2	9	
		Mx	E 4.5	17	
		Mx	N 5.4	17	
		Mx	Z 5.4	17	

D = 5650 km = 51°.

	Ki	iP	11 14 39.2		
		eSa	11 29 04		
			micr	sec	
		P	Z' 0.3	1.7	
		Mx	E 5.6	17	
		Mx	N 6.6	14	
		Mx	Z 9.0	15	
	Sk	iP	11 14 25.3		C
	Um	iP	11 14 13.0		
		iS	11 21 45		
	Ud	iP	11 14 01.7		
	De	iP	11 13 38.0		
		i	11 13 50.6		

Ethiopia (h = 4 km).
m = 5.9, M = 5.9 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969					
Mar. 29	Up	iP		11 16 29.4	
		eS		11 23 47	
				micr	sec
		P	Z	0.5	3
		S	N	2.1	7
		D = 5650 km = 51°.			
	Ki	iP		11 17 16.8	C
		i		11 17 27.9	
		iSa		11 31 40	
				micr	sec
		P	Z'	0.4	1.8
	Sk	iP		11 17 00.6	
	Um	iP		11 16 49.6	
	Ud	iP		11 16 38.8	
	De	iP		11 16 16.3	
		i		11 16 34.6	
		i(PP)		11 18 20.1	
	Ethiopia (h = N).				
	m = 6.0 (Up,Ki).				
	P(Z') exhibits relatively long periods in this series of Ethiopian shocks.				
" 29	Um	iP		11 24 43.8	
		i		11 25 11.4	
" 29	Up	iP		13 17 15.7	
	Ki	iP		13 18 03.3	
				micr	sec
		P	Z'	0.4	1.8
	Sk	iP		13 17 49.0	
	Um	iP		13 17 37.1	
		i		13 17 41.6	
	Ud	iP		13 17 25.3	
	De	iP		13 17 03.0	
	Ethiopia (h = 4 km).				
" 29	Ud	iP		13 25 49.3	
" 29	Up	iPg		13 51 34.6	
		iSg		13 51 41.1	
		iRg		13 51 44.3	
		D = 60 km = 0.5°.			
	Ud	iSg		13 52 33.5	
	Events of this kind, probably explosions, not far from Uppsala, are often recorded but generally excluded from our bulletin.				
" 29	Up	iP		13 58 43.2	C
		ipP		13 58 51.0	
	(cont.)				

1969					
Mar. 29	(cont.)				
	Up			micr	sec
		P	Z'	0.2	1.0
		Mx	E	1.5	16
		Mx	N	0.7	15
	Ki	iP		13 59 16.7	C
		ipP		13 59 23.7	
		iPP		14 01 31.5	
				micr	sec
		P	Z'	0.3	1.0
		PP	Z'	0.1	1.4
		Mx	E	1.8	18
		Mx	N	2.8	18
		Mx	Z	4.1	18
	Sk	iP		13 59 12.3	
		ipP		13 59 20.9	
	Um	iP		13 58 56.5	C
		ipP		13 59 03.9	
		iPP		14 01 06.8	
		i		14 03 22.8	
	Ud	iP		13 58 54.8	C
		ipP		13 59 02.1	
		i		14 00 44.7	
		iPP		14 01 06.0	
	De	iP		13 58 38.8	C
		ipP		13 58 46.2	
	Carlsberg Ridge.				
	h = 30 km (Up,Ki,Sk,Um,Ud, De).				
	m = 6.2, M = 5.4 (Up,Ki).				
" 29	Ud	eP		15 47 01	
" 29	Up	iP		19 13 49.0	
	Ud	iP		19 14 05.2	
" 29	Um	iP		21 42 29.7	
" 29	Um	iP		22 33 14.3	
" 30	Up	eP		01 21 16	
" 30	Up	eP		02 41 00	
	Ki	eP		02 41 40	
	Ud	iP		02 40 55.2	
	Atlantic Ocean (h = N).				
" 30	Up	eP		03 04 26	
		i		03 04 39.5	
	Um	iP		03 04 37.9	
	Ud	iP		03 04 22.0	
	Atlantic Ocean (h = N).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Mar.	30	Um	iP	03 34 31.4
"	30	Um	iP	05 01 09.2
			i	05 01 13.9
"	30	Um	iP	05 12 15.8
"	30	Up	eSg	05 20 13
		Ki	iSn	05 17 01.8
			iLg1	05 17 20.8
		Sk	eSg	05 19 55
		Um	e	05 18 07
			iSg	05 18 17.0

Northwest Russia, 67.4°N, 33.2°E.
Origin time = 05 14 47.
Explosion?

"	30	Up	i	05 48 45.9
			iLg1	05 48 59.5
		Ki	ePn	05 45 02
			iSn	05 45 49.0
			iSg	05 46 09.4
			D = 430 km = 3.9°.	
		Sk	iSg	05 48 37.7
		Um	iSn	05 46 29.5
			iSg	05 47 05.3

Northwest Russia, 67.6°N, 30.8°E.
Origin time = 05 44 00.
Explosion?

"	30	Ud	iP	06 05 44.9 D
"	30	Ki	eP	07 24 14
		Ud	iP	07 24 39.0

North of Halmahera (h = 70 km).

"	30	Up	eP		08 08 32
			ipP		08 08 42.7
			eY		08 12 22
			iPP		08 12 36.4
					micr sec
			Mx	E	0.8 17
			Mx	N	1.2 20
		Ki	eP		08 08 14
			ipP		08 08 24.7
					micr sec
			Mx	N	1.2 19
		Sk	iP		08 08 36.2
			ipP		08 08 46.9
		Um	eP		08 08 20
			ipP		08 08 31.1

(cont.)

1969 Mar.	30	(cont.)		
		Um	iY	08 11 33.3
			i	08 12 11.3
			iPP	08 12 19.6
		Ud	iP	08 08 40.0
			ipP	08 08 50.6

North of Halmahera.
h = 40 km (Up,Ki,Sk,Um,Ud).
M = 5.4 (Up,Ki).
Y (Up,Um) probably belong to the group of early PP arrivals.

"	30	Up	iSg	08 31 46.0
		Ki	iSg	08 32 33.9
		Um	iSg	08 31 09.1

Lake Ladoga.
Explosion?

"	30	Ud	iP	10 00 40.8 C
"	30	Ud	iP	15 25 49.1
"	30	Ki	iPn	17 39 18.1
			iSn	17 40 04.5
			iLg1	17 40 18.8
			D = 430 km = 3.9°.	
		Um	iSg	17 41 51.6

Probably northwest Russia.
Origin time = 17 38 16.
Explosion?

"	30	Um	iP	19 44 23.2
"	30	Ki	iP	21 10 02.4
		Ud	iP	21 10 26.6

Talaud Islands (h = 60 km).

"	30	Um	iP	23 01 05.8
"	30	Um	i(Sg)	23 16 34.9
"	31	Um	iP	00 25 05.6
"	31	Ud	iP	01 53 35.3

South of Greece.

"	31	Um	iP	01 54 08.3
			i	01 54 23.6

Alaska (h = N).

"	31	Um	eP	02 34 32
			i	02 34 44.5
"	31	Up	iP	07 22 35.4

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 31 (cont.)

Up	i		07 22 38.0	D
	iS		07 28 02	
			micr	sec
	P	E	3.9	8
	P	N	9.5	8
	P	Z	18	9
	P	Z'	0.9	0.8
	S	E	29	12
	S	N	39	10
	S	Z	9.2	8
	Mx	E	35	15
	Mx	N	61	22
	Mx	Z	35	17
	D = 3800 km = 34°.			
Ki	iP		07 23 33.8	
	i		07 23 36.2	D
	iPP		07 25 04	
	iPcS		07 29 27	
	iS		07 29 44	
	iSS		07 32 43	
			micr	sec
	P	E	3.9	9
	P	N	11	9
	P	Z	20	10
	P	Z'	1.5	1.0
	PP	E	14	9
	PP	N	43	9
	PP	Z	43	9
	S	E	16	9
	S	N	27	11
	S	Z	13	9
	Mx	E	46	13
	Mx	N	37	13
	Mx	Z	38	11
	D = 4550 km = 41°.			
Sk	iP		07 23 14.2	C
	i		07 23 15.7	D
Um	iP		07 23 01.9	
	i		07 23 04.5	D
	iS		07 28 45	
Ud	iP		07 22 45.7	
	i		07 22 48.4	D
De	iP		07 22 21.4	D

Red Sea (h = N).
m = 7.0, M = 6.6 (Up,Ki).
Double P, small and large, at an average interval of 2.4 sec.
Unusual location for such a big shock.

" 31 Ki iP 08 02 54.4

1969
Mar. 31

Ki	iP		09 08 49.3	
Sk	i(P)		09 08 21.5	
	iP		09 08 29.7	
Um	iP		09 08 18.0	
	i		09 08 34.1	
Ud	iP		09 08 01.0	

Egypt (h = N).

" 31 Sk eP 09 12 14

" 31

Sk	ePKP		09 45 46
Um	iPKP		09 45 39.4
	i		09 45 43.2
Ud	iPKP		09 45 53.0
	i		09 45 58.2

" 31

Ki	iP		11 37 43.2 C
Sk	iP		11 37 21.9
Um	iP		11 37 11.0
Ud	iP		11 36 54.9 C

Red Sea (h = 25 km).

" 31

Um	iP		12 34 02.5 C
Ud	iP		12 34 21.9

" 31 Um i(Sg) 13 20 05.8

" 31

Ki	iSg		17 34 05.3
Sk	iSg		17 34 09.9
Um	iSg		17 34 33.6

Nordland, Norway, 66.4°N, 14.8°E.
Origin time = 17 32 37.
Explosion?

" 31

Up	iP1		19 35 49.5
	iP2		19 35 53.5 D
	ipP		19 37 22
	iS1		19 44 18
	iS2		19 44 21
	i		19 44 44
	iScS		19 45 06
	e(P'P')		20 03 53
	iP'P'		20 04 02.3
			micr sec
	P2	Z'	1.9 1.0
	S2	E	6.7 5
	S2	N	16 7
	S2	Z	1.9 5
	P'P'	Z'	0.2 1.5
	Mx	E	3.7 18
	Mx	N	4.1 17

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Mar. 31 (cont.)

Up			micr	sec	
	Mx	Z	2.8	13	
	D = 7800 km = 70°.				
Ki	iP1		19 35 12.5		
	iP2		19 35 16.1		D
	ipP		19 36 41.9		
	iS1		19 43 10		
	iS2		19 43 14		
	iScS		19 44 24		
	isS		19 45 50		
	e(P'P')		20 03 47		
	iP'P'		20 04 05.9		
			micr	sec	
	P2	E	1.1	7	
	P2	N	0.7	7	
	P2	Z	3.2	7	
	P2	Z'	1.8	1.0	
	S2	E	6.6	7	
	S2	N	19	8	
	S2	Z	2.7	7	
	P'P'	Z'	0.1	1.5	
	Mx	E	4.4	20	
	Mx	N	4.8	13	
	Mx	Z	5.6	18	
	D = 7100 km = 64°.				
Sk	iP1		19 35 46.1		
	iP2		19 35 49.4		D
	ipP		19 37 22.9		
	iS		19 44 17.1		
Um	iP1		19 35 28.2		D
	iP2		19 35 32.1		D
	iPcP		19 35 59.4		
	ipP		19 36 56		
	iS		19 43 42		
	iScS		19 44 42		
	isS		19 46 15		
	i(P'P')		20 03 26.5		
	iP'P'		20 04 04.9		
Ud	iP1		19 35 57.6		D
	iP2		19 36 01.6		D
	ipP		19 37 30.9		
	iS		19 44 40.2		
	iP'P'		20 03 50.8		
De	iP1		19 36 12.1		
	iP2		19 36 15.7		D
	ipP		19 37 44.8		
	iScS		19 45 36.2		

Sea of Japan. h = 410 km (Up,Ki,Sk,Um,Ud,De).
m = 6.5, M = 5.9 (Up,Ki).
M uncorrected for focal depth. Two successive shocks in nearly the same
(cont.)

1969
Mar. 31 (cont.)
place; in average P2 - P1 = 3.7 sec and S2 - S1 = 3.7 sec. Phases without index refer to the second, much larger shock.

" 31	Um	iP	20 32 42.1	

Volcano Islands (h = N).

" 31	Up	iP	20 37 25.0	
	Ki	iP	20 36 50.3	
	Um	iP	20 37 05.6	D
		i	20 37 15.0	
	Ud	iP	20 37 32.4	

South of Japan (h = 100 km).

" 31	Up	iP	21 51 15.6	C
		i	21 51 20.2	
	Ki	iP	21 52 14.0	C
	Sk	iP	21 51 53.8	
	Um	iP	21 51 42.1	
		i	21 51 47.8	
	Ud	iP	21 51 26.1	C
	De	iP	21 50 59.7	

Red Sea (h = 6 km).

" 31	Up	iP	22 47 31.7	
		i	22 47 37.9	
	Ki	iP	22 48 30.3	
	Sk	iP	22 48 09.6	
	Um	iP	22 47 58.2	C
	Ud	iP	22 47 41.9	C

Red Sea (h = N).

" 31	Ud	iP	23 10 55.2

Aleutian Islands (h = 80 km).

Markus Båth
January 26, 1970

Seismological Institute
Uppsala

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å, U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

A P R I L 1 - 30, 1969

1969 Apr.	1	Up	iPKP		00 20 55.4	
		Ud	iPKP		00 20 58.3	C
		Tonga-Kermadec Islands (h = 550 km).				
"	1	Up	iP		04 14 43.0	
					micr	sec
			Mx	E	0.6	13
			Mx	N	0.7	15
			Mx	Z	0.7	15
		Ki	eP		04 14 12	
			iS		04 16 54.3	
					micr	sec
			Mx	E	0.6	13
			Mx	N	1.1	14
			Mx	Z	1.0	16
			D = 1600 km = 14 1/2°.			
		Sk	eP		04 13 50	
		Um	iP		04 14 29.5	
			i		04 14 32.4	
			i		04 17 54.1	
		Ud	iP		04 14 26.2	
		Iceland (h = N). Double P - a usual property for earthquakes in this region.				
"	1	Up	iP		05 56 31.9	
		Ki	eP		05 56 41	
		Um	iP		05 56 29.9	
			ipP		05 57 11.7	
		Ud	iP		05 56 48.7	D
			iPP		05 58 31.9	
		Hindu Kush. h = 210 km (Um).				
"	1	Ki	iP		07 42 16.7	

1969 Apr.	1	Ki	iPn		10 58 54.5	
			eSn		10 59 51	
			iSg		11 00 13.6	
			D = 520 km = 4.7°.			
		Um	iSg		11 01 07.5	
		Northwest Russia. Origin time = 10 57 40. Explosion?				
"	1	Ud	iP		14 14 59.4	
		De	iP		14 14 28.9	
"	1	Up	iP		16 44 34.5	
		Sk	eP		16 45 03	
		Um	iP		16 44 37.7	
		Ud	iP		16 44 50.1	C
		De	iP		16 44 42.4	
		West Pakistan (h = 20 km).				
"	1	Up	iP		16 50 17.0	
		Ud	iP		16 50 40.9	
"	1	Ud	eP		16 55 47	
		Montana (h = 10 km).				
"	1	Ud	iP		18 06 03.0	
"	1	Ud	iP		18 16 16.8	
"	1	Up	iP		20 42 28.2	
			ipP		20 42 40.5	
					micr	sec
			P	Z'	0.1	0.5
		Ki	iP		20 42 28.3	
			ipP		20 42 41.1	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 1 (cont.)

Sk	iP	20 42 43.7
Um	iP	20 42 25.5
Ud	iP	20 42 38.0 D
De	iP	20 42 36.1

Sumatra. h = 45 km (Up,Ki).

" 1

Ki	iP	20 58 18.0
Sk	eP	20 58 54
Ud	iP	20 59 12.6
	i	20 59 16.3

Kamchatka (h = 30 km).

" 1

Um	i(P)	21 32 43.5

Central America (h = 70 km).

" 1

Up	iP	21 43 42.4
Ki	iP	21 42 48.4 C
Um	iP	21 43 15.5
Ud	iP	21 43 40.1
De	iP	21 44 03.8

Alaska (h = 60 km).

" 2

Um	iSKP	00 44 56.6
De	iPKP	00 42 37.2 D

Fiji Islands (h = 600 km).

" 2

Up	iP		01 42 23.7	
	iS		01 46 00.9	
			micr	sec
	P	Z'	0.2	1.0
	D = 2350 km = 21°.			
Ki	iP		01 43 38.2	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		01 42 59.5	
	i		01 43 02.7	
Um	iP		01 43 02.0	
	i		01 43 05.9	
Ud	iP		01 42 25.2 D	
	iS		01 46 08.0	
De	iP		01 41 48.7 D	
	i		01 41 53.3	

Tyrrhenian Sea (h = 260 km).
m = 5.5 (Up,Ki).
Double P.

" 2

Um	iP	03 05 17.5

South of Japan (h = 460 km).

" 2

Ud	i(P)	03 06 36.1

1969
Apr. 2

Up	iP	05 02 21.5 C
Sk	iP	05 03 00.4
Um	iP	05 03 01.9
	i	05 03 12.0
Ud	iP	05 02 28.6 C

Greece (h = N).

" 2

Up	iP	07 37 30.9
	i	07 37 32.4
Ki	iP	07 37 27.3 C
Sk	iP	07 37 42.8
Um	iP	07 37 27.2 C
Ud	iP	07 37 41.7

Java (h = 110 km).

" 2

Ki	iP	09 58 21.9

" 2

Ki	iPn	12 01 25.8
	iSn	12 02 24.0
	iLgl	12 02 43.9
	D = 530 km = 4.8°.	
Sk	iSg	12 05 12.6
Um	iSg	12 03 41.5

Northwest Russia,
67.5°N, 32.9°E.
Origin time = 12 00 12.
Explosion?

" 2

Ki	i(Pn)	12 44 52.4
	i(Sn)	12 45 52.1

" 2

Up	eP	12 48 23
Ki	iP	12 48 21.9
	i	12 48 28.1
Sk	eP	12 48 40
Um	iP	12 48 17.1
Ud	iP	12 48 31.6

Nicobar Islands (h = N).

" 2

Up	iP	15 31 31.7

" 2

Up	iP	16 17 07.6 C

" 2

Up	iP	19 43 02.9
Ki	iP	19 42 46.7
	i	19 42 51.7
Um	iP	19 42 51.1
	i	19 42 57.6
Ud	iP	19 43 12.2

Mindoro (h = 15 km).

" 2

Um	iPKP	20 43 03.5

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	2	(cont.)			
		Ud	ePKP	20 43 14	
		Fiji Islands (h = 460 km).			
"	2	Um	iP	21 48 17.9	
"	2	Ud	iP	22 59 15.9	
"	2	Up	iP	23 59 55.1	D
"	3	Up	iP	00 10 49.5	
		Ki	eP	00 10 56	
			i	00 12 05.1	
		Um	eP	00 10 42	
			i	00 10 46.9	
		Ud	iP	00 11 06.4	D
		De	iP	00 11 03.9	
		Afghanistan-USSR (h = 160 km).			
"	3	Um	iP	00 39 43.1	
		South of Japan (h = 140 km).			
"	3	Up	eP	03 00 36	
			i	03 00 42.5	
		Ki	eP	03 00 32	
			i	03 00 36.2	
				micr sec	
			Mx N	0.9 14	
		Sk	iP	03 01 01.6	
		Um	eP	03 00 21	
		Ud	iP	03 00 53.2	
			i	03 00 56.7	
		De	iP	03 00 59.9	
		Kirghiz-Sinkiang (h = 40 km).			
		Double P.			
"	3	Ki	iP	09 28 40.6	
"	3	Up	iPKP	09 50 28.1	
			i	09 50 31.6	
		Sk	iPKP	09 50 22.8	
		Um	iPKP	09 50 17.0	D
		Ud	iPKP	09 50 30.6	
		De	iPKP	09 50 38.7	
		Kermadec Islands (h = 320 km).			
"	3	Up	iP	11 02 24.3	
"	3	Up	iP	13 38 46.9	
"	3	Up	iSn	14 29 16.3	
			iSg	14 29 29.9	
		Ki	eSg	14 32 01	
		(cont.)			

1969 Apr.	3	(cont.)			
		Sk	iSg	14 31 22.1	
		Um	eSg	14 30 02	
		Ud	iLgl	14 30 30.8	
		Esthonia, 59.7°N, 25.6°E.			
		Origin time = 14 27 20.			
		Explosion?			
"	3	Um	iP	15 17 27.3	
"	3	Up	iSg	16 14 09.5	
		Ud	iSg	16 14 03.8	
		De	iSg	16 12 06.1	
"	3	Um	iP	16 55 59.9	
		Iceland (h = 25 km).			
"	3	Ud	iP	18 32 30.5	C
"	3	Ki	eP	19 33 50	
		Ud	iP	19 34 15.5	
		North of Halmahera			
		(h = 80 km).			
"	3	Up	iP	20 13 01.9	
		Ki	iP	20 13 56.6	
		Um	iP	20 13 26.2	
		Ud	iP	20 13 09.9	
		Red Sea (h = N).			
"	3	Up	iP	22 16 45.6	C
			i	22 16 48.1	
			iS	22 20 09	
			e	22 20 22	
				micr sec	
			P N	0.6 3	
			P Z	0.5 3	
			P Z'	0.1 0.5	
			Mx E	14 16	
			Mx N	11 20	
			Mx Z	9.2 18	
			D = 2100 km = 19°.		
		Ki	iP	22 18 04.6	C
			iS	22 22 39	
			iSa	22 23 01	
			iLg2	22 27 33	
				micr sec	
			P Z'	0.2 1.3	
			Mx E	13 12	
			Mx N	12 12	
			Mx Z	18 14	
			D = 3000 km = 27°.		
		Sk	iP	22 17 29.5	C
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	3	(cont.)			
		Um	iP	22 17 28.6	C
			i	22 17 33.5	
			iS	22 21 36	
			iLi	22 23 31	
		Ud	iP	22 16 51.3	C
			i	22 16 58.2	
		De	iP	22 16 13.4	
		Albania (h = N).			
		m = 5.4, M = 5.7 (Up, Ki).			
"	3	Up	iP	23 49 35.1	
		Sk	eP	23 50 17	
		Um	iP	23 50 16.4	
		Ud	iP	23 49 41.7	
		Albania (h = N).			
"	3	Um	iP	23 53 53.5	
		Ud	iP	23 54 13.2	
		Mindanao (h = N).			
"	4	Up	iP	00 02 28.0	
		Ki	eP	00 02 13	
		Ud	iP	00 02 36.4	
		Mindanao (h = N).			
"	4	Um	eP	04 25 57	
		Ud	iP	04 25 24.0	C
		Albania (h = N).			
"	4	Up	iP	06 35 59.3	
"	4	Up	iP	08 56 13.0	
			i	08 56 25.7	
				micr	sec
			P Z'	0.6	1.5
		Ki	iP	08 55 20.0	D
			iS	09 03 27	
				micr	sec
			P Z'	0.3	1.6
			S N	1.0	8
			Mx N	0.8	15
			Mx Z	2.0	18
			D = 6600 km = 59 1/2°.		
		Sk	eP	08 55 54	
			i	08 56 14.7	
		Um	eP	08 55 44	
		Ud	iP	08 56 14.7	D
		De	iP	08 56 36.5	D
		Aleutian Islands (h = N).			
		m = 6.1 (Up,Ki).			
"	4	Um	iP	11 56 12.5	

1969 Apr.	4	Up	iP	12 25 30.5	
			i	12 25 35.4	
			iPn	12 26 29.4	
		Ki	iP	12 26 28.5	
			i	12 26 34.2	
		Sk	iP	12 26 06.1	
			i	12 26 14.7	
		Um	iP	12 25 57.5	
			i	12 26 03.0	
		Ud	iP	12 25 40.2	
			i	12 25 46.8	
		Red Sea (h = N).			
		Double P.			
		Pn (Up) is remarkable for this path.			
"	4	Up	iP	14 07 49.3	
			ipP	14 07 59.4	
				micr	sec
			Mx N	3.8	23
		Ki	iP	14 07 26.3	
			ipP	14 07 37.8	
		Sk	ipP	14 08 01.2	
		Um	iP	14 07 34.6	D
			ipP	14 07 47.7	
		Ud	iP	14 07 59.2	
			ipP	14 08 08.0	
		Formosa. h = 40 km (Up,Ki, Um,Ud).			
"	4	Up	iP	16 28 52.9	
				micr	sec
			Mx E	2.0	21
			Mx N	1.6	20
			Mx Z	3.2	20
		Ki	iP	16 28 30.6	
				micr	sec
			Mx E	2.0	19
			Mx N	2.5	17
			Mx Z	4.6	18
		Sk	iP	16 28 34.5	
		Um	iP	16 28 44.4	
		Ud	iP	16 28 46.7	C
		De	iP	16 28 57.7	C
		Gulf of California (h = 30 km).			
		M = 5.7 (Up,Ki).			
"	4	Up	iP	17 06 33.1	
		Um	eP	17 07 03	
			i	17 07 18.1	
		Ud	iP	17 06 35.1	
		Albania.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	4	Up	iP		23 07 47.3	C
			eP'P'		23 36 37	
					micr	sec
			P	Z'	0.1	0.5
		Ki	iP		23 06 52.7	C
		Sk	iP		23 07 28.1	C
		Um	iP		23 07 18.8	C
			ipP		23 07 27.0	
		Ud	iP		23 07 49.3	C
		De	iP		23 08 11.6	C
		Komandorsky Islands.				
		h = 30 km (Um).				
"	5	Up	iP		02 27 30.4	C
			i		02 27 33.5	
			iS		02 34 49	
					micr	sec
			P	Z'	1.1	2.0
			S	N	8.3	10
			Mx	E	9.6	20
			Mx	N	14	20
			Mx	Z	12	18
			D = 5650 km = 51°.			
		Ki	eP		02 28 18	
					micr	sec
			Mx	E	7.8	15
			Mx	N	10	14
			Mx	Z	17	15
		Sk	iP		02 28 06.6	
		Um	iP		02 27 54.6	C
			iS		02 35 29	
		Ud	eP		02 27 38	
		De	iP		02 27 19.9	
		Ethiopia (h = 15 km).				
		m = 6.5, M = 6.1 (Up,Ki).				
		P(Z') exhibits relatively long periods; cf Mar. 29, 1969, 11 16.				
"	5	Um	iP		02 38 13.3	
"	5	Up	iP		03 57 44.8	
		Um	iP		03 57 36.7	
		Ud	iP		03 57 53.2	
		Talaud Islands (h = 150 km).				
"	5	Up	iP		04 17 37.5	C
		Ud	eP		04 17 46	
		North of Halmahera (h = 60 km).				
"	5	Up	iP		04 19 08.9	
		Ud	iP		04 19 17.2	
		(cont.)				

1969 Apr.	5	(cont.)				
		North of Halmahera.				
		Origin time = 04 05 42.				
"	5	Um	iP		06 09 48.2	
			i		06 09 52.2	
		Gulf of California (h = 30 km).				
"	5	Up	i(PKP)		07 13 38.8	
			iX		07 14 28.8	
		Ki	iX		07 14 22.1	
		Um	iPKP		07 13 27.0	
			i		07 13 34.4	
			iX		07 14 24.5	
		Ud	i(PKP)		07 13 49.3	
		De	iPKP		07 13 33.9	
			i		07 13 38.2	
			iX		07 14 29.7	
		West of Macquarie Islands (h = N).				
		X is probably PKP of another shock in the same area.				
"	5	Up	iP		17 57 55.0	
		Ki	iP		17 58 53.8	
		Ud	iP		17 58 05.9	
		Red Sea (h = N).				
"	5	Up	iPn		19 11 20.2	
			i		19 11 27.5	
			iSn		19 12 27.4	
			iSg		19 13 05	
					micr	sec
			Pn	Z'	0.3	0.5
			Sn	Z'	0.2	0.5
		Ki	i		19 15 26.5	
			i		19 16 03.5	
			iLgl		19 16 20.7	
		Sk	e(Pn)		19 11 39	
			iSn		19 12 46.9	
			iSg		19 13 28.3	
		Um	iPn		19 12 02.2	
			i		19 12 09.1	
			iSn		19 13 42.7	
			iSg		19 14 47.3	
		Ud	iPn		19 10 56.7	
			i		19 11 04.0	
			iSn		19 11 46.9	
			iLgl		19 12 00.3	
		De	iPn		19 10 47.9	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 5 (cont.)

De	i	19 10 55.5	
	iSn	19 11 41.1	

North Sea (h = N).
Pn is followed after 7.3 sec in average by another, larger phase, which could possibly be pPn.

" 5

Up	eP	20 23 35	
Um	iP	20 23 57.1	
	i	20 24 00.0	
Ud	iP	20 23 44.9	
De	eP	20 23 23	

Ethiopia (h = N).

" 5

Up	eP	23 39 34		
		micr	sec	
	Mx	E	7.4	25
	Mx	N	3.7	25
	Mx	Z	11	24
Ki		---		
		micr	sec	
	Mx	E	2.8	17
	Mx	N	3.7	21
	Mx	Z	5.9	17
Um	iP	23 39 33.5		
	i	23 39 39.0		

Off coast of Ecuador (h = 30 km).
M = 6.0 (Up,Ki).

" 6

Ud	iP	03 28 08.3

" 6

Up	iP	03 54 28.2 C		
	i	03 54 32.6		
	iPP	03 55 03.8		
	iS	03 58 29		
		micr	sec	
	P	N	1.2	4
	P	Z'	0.1	0.7
	PP	Z'	0.2	0.6
	S	E	1.9	6
	S	N	2.1	6
	Mx	E	18	13
	Mx	N	29	16
	Mx	Z	24	12

D = 2450 km = 22°.

Ki	iP	03 55 38.6		
	i	04 03 04		
		micr	sec	
	P	Z'	0.5	1.5
	Mx	E	16	12

(cont.)

1969
Apr. 6 (cont.)

Ki			micr	sec
	Mx	N	7.7	11
	Mx	Z	11	11
Sk	iP	03 55 11.6 C		
Um	iP	03 55 03.9 C		
	i	03 55 09.8		
	iS	03 59 27		
Ud	iP	03 54 38.9		
De	iP	03 54 05.2 C		

Aegean Sea (h = 15 km).
m = 5.9, M = 5.8 (Up,Ki).

" 6

De	iP	03 58 21.9

" 6

Up	iP	04 14 43.3
Um	eP	04 14 16
Ud	eP	04 14 45

Aleutian Islands (h = 50 km).

" 6

Up	iP	05 54 14.2

" 6

Up	iP	08 30 52.9

" 6

Up	iP	10 02 56.1
Um	iP	10 02 43.2
Ud	eP	10 03 01

Luzon (h = 20 km).

" 6

Um	iP	12 55 53.1
Ud	iP	12 55 29.1
De	iP	12 54 54.8

Aegean Sea (h = 70 km).

" 6

Um	iP	13 03 12.0
Ud	eP	13 02 46
De	eP	13 02 06

Crete (h = 30 km).

" 6

Up	iP	17 00 45.2
	iS	17 08 02

D = 5650 km = 51°.

Ki	eP	17 01 31
Sk	iP	17 01 18.7
Um	iP	17 01 06.5
	iS	17 08 45
Ud	iP	17 00 54.7
De	iP	17 00 32.6

Ethiopia (h = 20 km).

" 6

Up	iP	19 30 21.7 C
Ki	iP	19 30 00.0
Um	iP	19 30 01.0
Ud	iP	19 30 36.0 C
De	iP	19 30 47.1

USSR-Mongolia (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969				
Apr.	6	Up	iPKP	20 27 12.8
		Ki	ePKP	20 27 28 C
		Um	iPKP	20 27 21.4
		Ud	iPKP	20 27 11.4
		South Sandwich Islands (h = 90 km).		
"	6	Up	iPKP	23 38 07.4
		Ki	ePKP	23 38 00
		Um	iPKP	23 38 00.8
			i	23 38 04.4
		Ud	iPKP	23 38 08.7
		De	iPKP	23 38 19.5 D
			i	23 38 23.2
		Fiji Islands (h = 510 km).		
"	7	Up	iP	01 40 01.5 C
		Ud	iP	01 40 08.6
"	7	Up	iP	03 04 15.7
		Ud	iP	03 04 22.6
		Ionian Islands.		
"	7	Up	iP	03 53 07.9
			i	03 56 32.1
		Ki	eP	03 52 50
		Um	iP	03 52 56.5
			iPP	03 56 47.0
		Ud	iP	03 53 15.7 C
			i	03 53 27.1
			ePP	03 57 04
		De	eP	03 53 21
			ePP	03 57 26
		Talaud Islands (h = 70 km).		
"	7	Up	eP	04 10 52
		Ud	iP	04 10 52.1
		De	eP	04 11 03
"	7	Up	iP	04 49 04.9
"	7	Up	iP	06 32 52.4
		Um	iP	06 33 14.6 C
		Ud	iP	06 33 02.6
		Ethiopia (h = 30 km).		
"	7	Ud	iP	08 29 03.5
"	7	Up	iP	09 51 40.0
		Ki	iP	09 50 45.7
		Sk	iP	09 51 22.9
		Um	eP	09 51 11
		Ud	iP	09 51 42.9
		(cont.)		

1969				
Apr.	7	(cont.)		
		De	iP	09 52 05.5
		Kamchatka (h = 60 km).		
"	7	Um	eP	13 55 29
			i	13 55 34.1
"	7	Up	iP	18 51 19.7
		Ki	iP	18 50 37.4
		Sk	eP	18 51 13
		Um	iP	18 50 55.7 C
		Ud	iP	18 51 27.3
		De	eP	18 51 44
		Japan (h = N).		
"	7	Up	iP	20 33 41.5 D
			i	20 33 42.2
			iPn	20 35 04
			iS	20 39 28
				micr sec
			P Z'	0.4 1.5
			Mx E	2.2 17
			Mx N	4.1 17
			Mx Z	3.5 16
			D = 4150 km = 37 1/2°.	
		Ki	iP	20 32 33.8
			eS	20 37 28
				micr sec
			P Z'	0.5 1.8
			S N	0.7 10
			Mx E	6.4 18
			Mx N	7.0 16
			Mx Z	8.7 15
			D = 3300 km = 29 1/2°.	
		Sk	iP	20 33 20.1
		Um	iP	20 33 06.4
			iPn	20 34 01.8
			iS	20 38 22
		Ud	iP	20 33 45.9
			iPP	20 35 15.9
			i	20 38 21.4
		De	iP	20 34 13.7
			i	20 34 18.7
			iPP	20 35 54.3
		Laptev Sea (h = N). m = 5.7, M = 5.5 (Up,Ki). Note the existence of Pn, indicating a relatively homogeneous path.		
"	7	Up	iP	20 58 02.0
"	7	Up	iP	21 37 08.4
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 7 (cont.)

Up	i	21 37 23.6
Sk	eP	21 37 50
Um	iP	21 37 49.3
Ud	iP	21 37 14.9
	i	21 37 19.0

Greece.

" 8

Up	iP	02 22 58.4
Sk	iP	02 23 31.9
Um	iP	02 23 20.3
Ud	iP	02 23 08.0

Ethiopia (h = 35 km).

" 8

Up	iP		02 55 00.0	
			micr	sec
	P	Z'	0.1	0.6
Ki	iP		02 54 07.1	
Um	iP		02 54 33.6	
Ud	iP		02 55 01.0	C

Aleutian Islands (h = 35 km).

" 8

Um	iP	10 30 41.9
Ud	iP	10 31 12.8

Japan (h = 60 km).

" 8

Ki	eP	10 35 05
Sk	eP	10 35 27
Um	iP	10 35 10.2
Ud	iP	10 35 29.8

Molucca Passage (h = 70 km).

" 8

Up	iP	10 38 38.0
	iS	10 44 06
	D = 3850 km = 34 1/2°.	
Ki	iP	10 39 36.2
Sk	iP	10 39 16.1 C
	i	10 39 31.3
Um	iP	10 39 04.8 C
	iS	10 44 49
Ud	iP	10 38 47.7
De	iP	10 38 21.9

Egypt (h = 15 km).

" 8

Ki	iPn	11 21 12.2
	iSn	11 22 10.9
	iLgl	11 22 30.4
	D = 540 km = 4.9°.	
Sk	eSg	11 24 59
Um	iSg	11 23 26.1

Northwest Russia,
67.5°N, 33.2°E.
Origin time = 11 19 56.
Explosion?

1969
Apr. 8

Up	iP		15 53 14.5	
	i		15 53 16.4	
	i		15 53 57.0	
			micr	sec
	Mx	E	0.7	13
	Mx	Z	1.0	13
Ki	iP		15 54 33.7	
			micr	sec
	Mx	E	1.7	17
	Mx	N	1.0	15
Sk	iP		15 53 58.3	
	i		15 54 00.1	
Um	iP		15 53 56.4	
Ud	iP		15 53 20.6	
	i		15 53 26.2	

Albania (h = N).
M = 4.6 (Up,Ki).

" 8

Up	iP	19 12 30.3
Ki	iP	19 11 46.8
Um	iP	19 12 05.0
Ud	iP	19 12 37.5

Japan (h = 35 km).

" 8

Um	iP	19 48 33.0
Ud	iP	19 48 41.8

Off coast of Oregon (h = N).

" 8

Ki	eP	21 29 03

" 8

Ki	iP	22 41 01.3

" 9

Um	iP	01 11 29.8

Iran-USSR (h = 45 km).

" 9

Um	iP	02 52 34.4
Ud	iP	02 52 59.0

Bonin Islands (h = 400 km).

" 9

Ki	iP	06 57 24.5
Ud	iP	06 58 24.8

Alaska (h = 6 km).

" 9

Ki	iPKP	12 02 30.0	C
Um	iPKP	12 02 21.9	

South of Africa (h = 25 km).

" 9

Um	iSg	12 25 31.0

Probably Esthonia.
Explosion?

" 9

Up	iP	13 08 39.3
	ipP	13 09 06.3
	iPP	13 11 18.3

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 9 (cont.)

Up		micr	sec
	P Z'	0.2	0.7
Ki	iP	13 08 00.4	
	ipP	13 08 28.1	
	iPP	13 10 23.4	
		micr	sec
	P Z'	0.2	1.0
Sk	iP	13 08 33.6	
	ipP	13 09 01.0	
Um	iP	13 08 17.6 D	
	ipP	13 08 45.0	
Ud	iP	13 08 46.5 D	
	ipP	13 09 14.5	

Japan. h = 110 km (Up,Ki,Sk, Um,Ud).
m = 6.0 (Up,Ki).

" 9	Um	iPKP	15 20 29.8
	Ud	iPKP	15 20 30.8

Fiji Islands (h = 650 km).

" 9	Up	iP	16 32 42.1
		i	16 32 44.7
	Sk	iP	16 33 22.1 C
	Um	iP	16 33 20.8
		i	16 33 33.5
	Ud	iP	16 32 49.1
		i	16 32 52.8

Greece (h = N).

" 10	Um	iP	06 34 24.4
	Ud	eP	06 34 35
" 10	Up	iP	15 03 47.7 C
		i	15 03 59.3
		iPcP	15 04 15.1
		iS	15 11 41.7
		micr	sec
		P Z'	0.1 0.6
	Ki	iP	15 03 09.7 C
		iS	15 10 32.5
		micr	sec
		P Z'	0.3 0.8
	Sk	iP	15 03 43.7 C
		ipP	15 05 35.4
		iS	15 11 36.4
	Um	iP	15 03 25.8 C
		i	15 03 43.9
		iX	15 07 08.3
		iS	15 10 58.0
		i	15 18 32
	Ud	iP	15 03 56.1 C

(cont.)

1969
Apr. 10 (cont.)

	Ud	iX	15 07 29.7
		iS	15 11 57.0

Japan Sea. h = 560 km (Sk).
m = 5.6 (Up,Ki).

" 10	Um	iP	20 52 58.5
" 10	Up	iP	22 09 13.5
		ipP	22 09 53.0
		micr	sec
		P Z'	0.1 1.0
	Ki	iP	22 08 47.4
	Sk	iP	22 09 15.1
	Um	iP	22 08 56.3
		ipP	22 09 35.0
	Ud	iP	22 09 22.2 D
		ipP	22 10 04.5

Ryukyu Islands. h = 160 km (Up,Um,Ud).

" 10	Up	iP	22 10 26.1
	Ud	iP	22 10 37.0

Java (h = 60 km).

" 11	Um	iP	04 20 11.7
" 11	Up	iP	09 45 48.1
" 11	Up	iPKP	10 04 17.4
	Um	iPKP	10 04 00.5
	Ud	iPKP	10 04 20.9

Kermadec Islands (h = 45 km).

" 11	Ki	iPn	12 29 26.6
		iSn	12 30 26.1
		iLgl	12 30 48.9
		D = 560 km = 5.0°.	
	Sk	iSg	12 33 21.4
	Um	iSn	12 31 04.2
		iS^x	12 31 21.6
		iSg	12 31 38.8
	Ud	iLgl	12 34 09.6

Northwest Russia, 67.3°N, 33.5°E.
Origin time = 12 28 10.
Explosion?

" 11	Up	iSn	12 42 26.9
		iSg	12 42 41.7
	Ki	i(Sg)	12 45 15.9
	Sk	iSg	12 44 33.2
	Um	iSg	12 43 13.3
	Ud	i(Sn)	12 43 06.1

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 11 (cont.)
Ud iLgl 12 43 41.9
Esthonia, 59.7°N, 25.6°E.
Origin time = 12 40 31.
Explosion?

" 11 Ud iP 13 48 36.8

" 11 Ud iP 18 35 35.8

" 11 Up iPKP 19 46 33.3
Ud iPKP 19 46 42.2
Kermadec Islands (h = 45 km).

" 11 Um iP 20 36 11.3

" 11 Um iP 23 58 29.4
Molucca Passage (h = 50 km).

" 12 Up iP 10 03 51.6
Ud iP 10 03 58.3

" 12 Ki iSn 10 16 34.9
iLgl 10 17 00.2
Um iSn 10 17 44.3
iSg 10 18 23.7
Probably northwest Russia.
Explosion?

" 12 Up iP 10 58 19.9
Ki eP 10 57 56
Um iP 10 58 09.3
Ud iP 10 58 25.7
Philippine Islands
(h = 10 km).

" 12 Ki iPn 11 28 12.4
iSn 11 29 00.8
iLgl 11 29 16.1
D = 460 km = 4.1°.
Probably northwest Russia.
Origin time = 11 27 07.
Explosion?

" 12 Ki iPn 12 18 18.5
iSn 12 19 03.9
iSg 12 19 20.3
D = 410 km = 3.7°.
Um iSn 12 19 46.5
iSg 12 20 16.2
Northwest Russia-Finland
border region.
Origin time = 12 17 19.
Explosion?

1969
Apr. 12 Up eP 12 29 48
Ud iP 12 29 33.8

" 12 Up iP 14 34 11.4
i 14 34 15.0
" Ud iP 14 33 59.3

" 12 Up iP 14 38 42.7
Ud iP 14 38 30.7

" 12 Up iP 20 42 11.6 C
i 20 42 14.7
iS 20 45 06
iLg2 20 46 52

		micr	sec
P	N	0.5	3
P	Z'	0.4	1.5
Mx	E	3.8	4
Mx	N	3.0	5
Mx	Z	3.0	6

D = 1650 km = 15°.
Ki iP 20 43 42.6
i 20 43 47.8
iS 20 47 57
iSn 20 48 13.3
iLgl 20 50 38.7

		micr	sec
P	Z'	0.4	1.5
S	N	2.7	10
Mx	E	5.4	8
Mx	N	3.1	7
Mx	Z	4.0	7

D = 2500 km = 22 1/2°.
Sk iP 20 43 09.5
i 20 43 12.6
iS 20 46 57.8
iLi 20 48 22.7
Um iP 20 42 56.4
i 20 43 00.2
iS 20 46 09
i(Sn) 20 46 41.2
iSS 20 46 53
iLgl 20 48 33
Ud iP 20 42 28.3
i 20 42 32.9
Rumania (h = 8 km).
m = 5.5 (Up,Ki).
Double P, the first with
longer periods than the
second one.

" 12 Up iP 22 25 42.5
(cont.)

Up = Uppsala. Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr. 12 (cont.)

Um	iP	22 25 37.6	

Hindu Kush (h = 120 km).

"	12	Up	iP	23 12 44.7
		Um	iP	23 13 02.5
		Ud	eP	23 13 08

Turkey-USSR (h = N).

"	13	Um	iP	01 38 08.5
"	13	Ki	iP	05 51 19.0
		Sk	iP	05 50 40.1
		Um	iP	05 50 43.3
		Ud	iP	05 50 06.7

Tyrrhenian Sea (h = 270 km).

"	13	Up	iP	05 54 28.6
		Ki	iP	05 54 08.3
		Um	iP	05 54 15.6
		Ud	iP	05 54 38.6 C

Luzon (h = 35 km).

"	13	Um	iP	10 38 21.7
"	13	Ud	iP	12 06 06.5
"	13	Up	iP	15 35 07.9
			i	15 35 13.0
			iS	15 43 30
				micr sec
			P Z'	0.2 0.6
			Mx E	5.1 18
			Mx N	15 23
			Mx Z	5.4 17
			D = 6800 km = 61°.	
		Ki	iP	15 35 17.3
			i	15 35 21.5
			iS	15 43 49
			iSa	15 50 14
				micr sec
			P Z'	0.1 0.9
			S E	0.9 10
			S N	0.9 9
			Mx E	3.8 13
			Mx N	5.3 17
			Mx Z	6.1 16
			D = 6950 km = 62 1/2°.	
		Sk	iP	15 35 31.2
			i	15 35 35.3
			i(PP)	15 37 39.8
		Um	iP	15 35 08.2 C
			i	15 35 12.8
			iS	15 43 33

(cont.)

1969 Apr. 13 (cont.)

Ud	iP	15 35 21.7 C	
	i	15 35 25.6	

India (h = N).
m = 6.0, M = 5.8 (Up,Ki).
Double P, smaller and larger at an average interval of 4.4 sec, possibly indicating a double shock.

"	13	Up	iP	16 21 56.2
		Ki	iP	16 22 54.9
		Sk	iP	16 22 34.6 C
		Um	iP	16 22 22.8
		Ud	iP	16 22 06.6

Egypt (h = 15 km).

"	13	Up	iP	23 47 12.0
			i	23 47 22.7
			i	23 50 29.9
			iPP	23 51 37.0
				micr sec
			Mx E	1.6 17
			Mx N	4.5 22
			Mx Z	2.9 18
		Ki	iP	23 46 55.9
			ipP	23 47 37.9
			iPP	23 51 10.8
			ipPP	23 52 02
			iS	23 58 34
				micr sec
			P Z'	0.3 1.5
			PP Z'	0.8 2.2
			S E	2.8 7
			Mx E	2.2 17
			Mx N	3.3 20
			Mx Z	4.6 18
			D = 11450 km = 103°.	
		Sk	eP	23 47 20
			iPP	23 51 33.5
		Um	iP	23 47 01.4
			ipP	23 47 43.5
			iPP	23 51 22.3
			ipPP	23 52 14
			iS	23 58 38
			ipS	23 59 40
			iPKKP	00 02 50.3
		Ud	iP	23 47 19.3
			iPP	23 51 37.1

Banda Sea. h = 170 km (Ki,Um).
m = 6.8, M = 6.1 (Up,Ki).
M uncorrected for focal depth.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969						
Apr.	14	Up	iP		05 16 26.7	
					micr	sec
			P	Z'	0.1	0.5
		Ki	iP		05 17 42.7	
		Sk	iP		05 17 09.2	
		Um	eP		05 17 06	
			i		05 17 07.7	
		Ud	iP		05 16 35.0	
			i		05 16 37.6	
		Greece (h = N).				
"	14	Up	iP		07 13 02.8	
			ipP		07 13 25.6	
		Ki	iP		07 13 02.5	
			ipP		07 13 24.8	
		Um	iP		07 13 02.8	
			ipP		07 13 22.2	
		Ud	iP		07 13 13.2	
			ipP		07 13 35.1	
		Sumatra. h = 80 km (Up,Ki, Um,Ud).				
"	14	Ki	i(Sn)		11 56 52.6	
			i(Lgl)		11 57 11.5	
"	14	Um	iP		12 51 13.1	
"	14	Up	iP		13 20 59.8	
		Ki	iP		13 21 34.8 C	
					micr	sec
			P	Z'	0.1	1.0
			Mx	N	0.4	12
		Sk	iP		13 21 34.2	
		Um	iP		13 21 12.0	
			i		13 21 16.9	
			i		13 21 28.9	
			iPP		13 22 52.8	
		Ud	iP		13 21 14.8 C	
		Iran (h = 45 km).				
"	14	Up	iP		13 50 42.6	
		Ki	iP		13 51 40.8	
			i		13 51 49.5	
		Um	iP		13 51 08.9	
		Ud	iP		13 50 51.0	
		Egypt (h = 15 km).				
"	14	Up	iP		18 14 43.7	
		Ki	iP		18 14 51.3	
		Ud	iP		18 14 59.9	
		Hindu Kush (h = 150 km).				
"	14	Ki	iP		19 30 21.1	

1969						
Apr.	14	Um	iP		19 54 19.5	
"	14	Up	iP		20 09 10.7	
		Ki	iP		20 08 22.3	
		Sk	eP		20 08 58	
		Um	iP		20 08 44.5	
		Ud	iP		20 09 15.9 C	
		Kurile Islands (h = 60 km).				
"	15	Up	iP		01 00 59.1	
			i		01 01 05.2	
		Um	iP		01 01 43.2	
		Ud	iP		01 01 05.4	
		Tyrrhenian Sea (h = 300 km).				
"	15	Ud	iP		02 37 42.1	
"	15	Um	iP		06 33 21.0	
"	15	Up	iSg		12 45 08.2	
		Ki	i(Sg)		12 47 48.5	
		Sk	eSg		12 46 58	
		Um	iSg		12 45 39.2	
		Ud	iSn		12 45 40.0	
			iLgl		12 46 07.8	
		Esthonia, 59.7°N, 25.6°E.				
		Origin time = 12 42 57.				
		Explosion?				
"	15	Up	iP		17 42 13.4 C	
			i		17 42 19.0	
			iS		17 51 24	
					micr	sec
			P	Z'	0.4	1.5
			Mx	E	3.1	20
			Mx	N	3.1	19
			Mx	Z	2.7	17
			D = 7900 km = 71°.			
		Ki	iP		17 41 31.6 C	
			iPP		17 43 50	
			iS		17 50 10	
					micr	sec
			P	Z	0.5	7
			P	Z'	0.3	1.7
			PP	Z	0.5	5
			S	E	0.7	9
			S	N	0.6	9
			Mx	E	5.5	18
			Mx	N	4.4	18
			Mx	Z	8.3	15
			D = 7150 km = 64 1/2°.			
		Sk	iP		17 42 05.8	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr. 15 (cont.)

Um	iP	17 41 50.0	C
	ipP	17 41 59.3	
	iS	17 50 44	
Ud	iP	17 42 20.1	C
	ipP	17 42 29.7	

Japan. h = 35 km (Um,Ud).
m = 6.1, M = 5.8 (Up,Ki).

" 15	Up	iP	18 08 52.4	
	Um	iP	18 08 52.4	
	Ud	iP	18 09 06.2	C

India.

" 15	Up	iP		22 27 44.3	D
		i(sP)		22 31 00.0	
		iPP		22 31 48.7	
		i		22 31 57.9	
				micr	sec
		P	Z'	0.1	0.9
	Ki	iP		22 27 37.3	D
				22 27 48.5	
				micr	sec
		P	Z'	0.1	1.0
	Sk	iP		22 27 54.6	
	Um	iP		22 27 38.3	D
		ipP		22 29 46.0	
		i		22 34 30.1	
	Ud	iP		22 27 53.6	D
		ipP		22 30 02.3	

Java Sea. h = 590 km (Um,Ud).
m = 6.0 (Up,Ki).

" 16	Up	iPP		01 42 17.6	
		iPS		01 51 37	
				micr	sec
		PP	Z	0.6	4
		Mx	E	4.7	22
		Mx	N	8.1	22
		Mx	Z	8.7	24
	Ki	ePP		01 41 25	
				micr	sec
		PP	E	0.8	6
		PP	N	0.5	5
		PP	Z	1.4	5
		PP	Z'	0.6	2.3
		Mx	E	6.5	24
		Mx	N	4.0	20
		Mx	Z	16	23
	Um	e(P)		01 37 23	
		iPKP		01 41 09.9	
		i		01 41 29.5	
		iPP		01 41 49.9	
		iSKS		01 47 52	
		iPS		01 51 03	

(cont.)

1969 Apr. 16 (cont.)

Um	iSS	01 57 10	
Ud	ePP	01 42 26	

New Ireland (h = 40 km).
m = 6.8, M = 6.3 (Up,Ki).

" 16	Ud	iP	02 12 44.4

Dodecanese Islands (h = 60 km).

" 16	Up	iP		04 59 35.5	
		iS		05 04 05	
		iSa		05 04 20	
				micr	sec
		Mx	E	4.6	20
		Mx	N	2.8	14
		Mx	Z	2.6	14
		D = 2850 km = 25 1/2°.			
	Ki	iP		05 00 41.4	
		i		05 08 48	
		iLgl		05 10 49	
				micr	sec
		Mx	E	2.3	12
		Mx	N	1.4	13
		Mx	Z	1.6	14
	Sk	iP		05 00 14.6	
	Um	iP		05 00 07.3	
		i		05 00 11.8	
		i		05 01 26.1	
		iSa		05 05 20	
	Ud	iP		04 59 44.1	

Dodecanese Islands (h = 8 km).
M = 5.1 (Up,Ki).

" 16	Ud	iP	05 15 16.8	C
" 16	Ki	iPn	11 11 48.6	
		iSn	11 12 47.8	
		i(Lgl)	11 13 11.1	
		D = 560 km = 5.0°.		
	Um	iSg	11 13 56.4	

Probably northwest Russia.
Explosion?

" 16	Um	iP	11 45 21.4
" 16	Up	iPKP	12 38 28.9
	Ki	iPKP	12 38 15.8 C
			micr sec
		PKP Z'	0.2 1.2
	Sk	iPKP	12 38 26.6 C
	Um	iPKP	12 38 21.9 C
	Ud	iPKP	12 38 30.9
		iSKP	12 41 44.7

New Hebrides Islands
(h = 150 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	16	Ki	iPKP	12 38 48.8	
			ipPKP	12 39 19.4	
		Sk	iPKP	12 38 59.6	
		Um	iPKP	12 38 53.8	
		Ud	iPKP	12 39 03.0	

New Hebrides Islands.
h = 110 km (Ki).
The interpretation of this and the **preceding shock as** two separate events is in agreement with the USCGS. However, from our records there is no compelling reason for this interpretation, as the second phases could instead be pPKP to the first event.

"	16	Ki	iP	12 48 15.8	
"	16	Um	iP	13 20 06.8	
"	16	Ud	iP	15 24 12.8	
			i	15 25 12.7	
"	16	Up	iP	18 27 40.5	
"	16	Ki	eP	21 32 48	
"	16	Ud	iP	22 08 51.7	
"	16	Up	iP	23 01 03.2	
			iS	23 05 36	
				micr	sec
			P	Z' 0.1	0.6
			Mx	E 5.3	20
			Mx	N 4.4	14
			Mx	Z 4.8	14
			D = 2850 km = 25 1/2°.		
		Ki	iP	23 02 09.4	
			eS	23 07 28	
				micr	sec
			P	Z' 0.1	1.0
			Mx	E 1.7	12
			Mx	N 1.5	13
			Mx	Z 2.0	13
			D = 3650 km = 33°.		
		Sk	iP	23 01 41.9	
			i	23 01 52.5	
			iPn	23 02 22.8	
		Um	iP	23 01 34.3	
			eSa	23 06 56	

(cont.)

1969 Apr.	16	(cont.)			
		Ud	iP	23 01 11.3	
			i(Sn)	23 06 38.1	

Dodecanese Islands
(h = 25 km).
m = 5.7, M = 5.2 (Up,Ki).

"	16	Up	iP	23 04 35.8	
"	16	Up	iP	23 26 27.7	
			iS	23 30 58	
				micr	sec
			P	Z' 0.1	0.8
			S	N 0.6	4
			Mx	E 9.6	20
			Mx	N 5.3	14
			Mx	Z 5.3	14
			D = 2800 km = 25°.		
		Ki	iP	23 27 34.3	
			e	23 35 40	
				micr	sec
			Mx	E 4.4	12
			Mx	N 1.8	10
			Mx	Z 2.7	10
		Sk	iP	23 27 07.5	
		Um	iP	23 26 59.3 C	
			iS	23 31 47	
			iSa	23 32 25	
		Ud	iP	23 26 36.9	

Dodecanese Islands
(h = 45 km).
m = 5.6, M = 5.2 (Up,Ki).

"	16	Um	iP	23 33 50.5	
"	16	Ud	iP	23 41 13.3	
"	17	Up	iP	01 00 01.4	
			iS	01 04 30	
				micr	sec
			Mx	E 2.1	16
			Mx	N 2.5	14
			Mx	Z 3.1	14
			D = 2850 km = 25 1/2°.		
		Ki	iP	01 01 06.8	
			eLgl	01 11 13	
				micr	sec
			Mx	E 1.2	12
			Mx	N 0.7	13
			Mx	Z 1.0	14
		Sk	iP	01 00 40.0	
		Um	iP	01 00 32.9	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 17 (cont.)
Um i 01 00 36.9
eSa 01 05 52
Ud iP 01 00 08.7
Dodecanese Islands
(h = 50 km).
M = 5.0 (Up,Ki).

" 17 Ud iP 02 21 35.0 C

" 17 Up iP 05 07 33.9
iS 05 16 48
micr sec
Mx E 1.5 20
Mx N 1.4 17
Mx Z 1.3 20
D = 7950 km = 71 1/2°.
Ki eP 05 06 52
i 05 09 43.1
micr sec
Mx E 3.4 19
Mx N 2.1 19
Mx Z 4.5 17
Sk eP 05 07 29
Um iP 05 07 09.8
i 05 07 14.4
iPcP 05 07 38.2
iS 05 16 05
Ud iP 05 07 40.0 C
Japan (h = 30 km).
M = 5.6 (Up,Ki).

" 17 Ud iP 05 33 46.2

" 17 Up iP 08 07 47.6
i 08 07 52.1
Ki iP 08 08 46.3
i 08 08 50.7
Sk iP2 08 08 30.7 C
Um iP 08 08 13.8
i 08 08 19.2
Ud iP 08 07 57.9
i 08 08 02.6
Red Sea (h = N).
Double P, 4.8 sec apart in average.

" 17 Up i 08 33 26.5
iSg 08 33 30.7
Sk eSg 08 35 52
Um i 08 35 14.4
iSg 08 35 26.9
Ud e 08 33 53
(cont.)

1969
Apr. 17 (cont.)
Ud iSg 08 34 12.8
Near west coast of the Baltic States.
Explosion?
Cf May 31, 1968, 13 37, and Sep. 6, 1968, 15 43.

" 17 Um iP 09 17 37.3
Italy (h = 6 km).

" 17 Um iP 12 28 56.9
Turkey.

" 17 Up iP 12 44 01.3
Ki iP 12 45 07.9
Ud iP 12 44 08.9
Dodecanese Islands (h = N).

" 17 Sk iP 12 58 43.5
Ud iP 12 59 05.8
Komandorsky Islands (h = 30 km).

" 17 Ud iP 13 31 35.5
i 13 31 41.8

" 17 Up iP 16 18 24.7
i 16 18 32.3
Ki iP 16 18 46.1

" 17 Ud iP 18 28 19.7

" 17 Um iP 21 55 04.8 C
Japan (h = 350 km).

" 18 Ki iP 01 57 06.1
Um eP 01 58 00
Ud iP 01 58 49.3
Svalbard.

" 18 Um eP 02 27 17

" 18 Ki e(Pg) 07 12 10
iSg 07 13 08.9
Sk e(Sg) 07 13 05
Um i(Sg) 07 14 21.4
Probably Lofoten area.

" 18 Um iP 08 10 13.9
Ud iP 08 10 43.6
i 08 10 53.2
Japan (h = N).

" 18 Up iP 10 57 24.4

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969				
Apr.	18	Ki	iPn	12 13 25.5
			iSn	12 14 24.5
			iLgl	12 14 44.1
			D = 540 km = 4.9°.	
		Sk	iSg	12 17 12.2
		Um	iSg	12 15 33.4
		Northwest Russia, 67.2°N, 33.2°E. Origin time = 12 12 10. Explosion?		
"	18	Ud	iP	12 30 49.6
"	18	Ki	iP	12 46 08.9
		Um	iP	12 46 12.4 C
			iSS	13 05 13
		Ud	iP	12 46 31.3
		New Guinea (h = N). All three P phases show positive residuals, around 12 sec, in relation to the USCGS solution.		
"	18	Ud	iP	14 37 13.6
"	18	Up	iP	15 38 34.2
		Ki	iP	15 38 07.0
		Um	iP	15 38 17.3
		Ud	iP	15 38 43.3
		Ryukyu Islands (h = 90 km).		
"	18	Ud	i(P)	16 22 39.5
			i	16 22 45.9
		Tanzania (h = N).		
"	18	Up	iP	16 51 38.6
		Molucca Passage (h = 80 km).		
"	18	Up	iP	17 56 29.9
		Ki	eP	17 56 03
		Um	iP	17 56 20.8 C
		Ud	iP	17 56 22.6
		Gulf of California (h = N).		
"	18	Up	iP	19 00 47.9
			i	19 00 52.1
"	18	Ki	iP	21 25 14.4
"	18	Ki	iP	23 42 52.6
		Ud	iP	23 42 05.1
"	19	Um	iP	01 34 19.2 C
		(cont.)		

1969				
Apr.	19	(cont.)		
		Um	ipP	01 34 31.9
		Ud	iP	01 34 48.6
		Japan. h = 45 km (Um).		
"	19	Ud	iP	01 57 38.4
"	19	Up	e(P)	02 31 15
			i	02 31 27.7
"	19	Ki	e(SKP)	06 28 20
			iSKP	06 28 29.2
		Um	iSKP	06 28 41.3
		Fiji Islands (h = 610 km).		
"	19	Um	eP	07 31 29
		Japan (h = 40 km).		
"	19	Up	iP	08 25 44.8
		Ki	iP	08 25 59.7
		Sk	iP	08 25 32.1
		Um	iP	08 25 51.2
			i	08 25 56.4
		Ud	iP	08 25 25.9
			i	08 25 29.5
		De	iP	08 25 23.2 C
		North Atlantic Ocean (h = N). Complicated P phase, at least a double one, of which Um and Ud show both, De the first and Up, Ki and Sk only the second one.		
"	19	Up	iP	08 58 29.5
			i	08 58 39.2
			iPP	09 02 25.6
			iSKS	09 08 52
			iS	09 09 26
				micr sec
			Mx E	0.7 18
			Mx N	0.8 20
			Mx Z	1.4 21
			D = 10350 km = 93°.	
		Ki	iP	08 58 27.1
			ipP	08 58 42.5
			iPP	09 02 24.6
				micr sec
			Mx E	1.1 20
			Mx N	1.0 20
			Mx Z	2.0 22
		Sk	iP	08 58 45.1
			i	08 58 55.3
			i(PP)	09 02 27.4
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 19 (cont.)

Um	iP	08 58 25.0
	ipP	08 58 39.1
	i(PP)	09 02 12
	iPP	09 02 22.9
	iS	09 09 22
	iSS	09 15 41
Ud	iP	08 58 37.6
	ipP	08 58 51.4
	iPP	09 02 32.0
De	eP	08 58 37
	ipP	08 58 49.0
	i	09 02 59.7

Sumatra. h = 50 km (Ki,Um, Ud,De).
M = 5.4 (Up,Ki).

" 19

Ki	iPn	10 16 09.4
	iSn	10 16 57.4
	iLgl	10 17 10.8
	D = 440 km = 4.0°.	
Um	iSn	10 18 00.8
	iSg	10 18 37.0
	i	10 18 45.8

Probably northwest Russia.
Origin time = 10 15 05.
Explosion?

" 19 Um iP 10 57 52.2

" 19 Up iP 11 17 20.3

" 19

Ki	iPn	11 21 15.8
	iSn	11 22 04.7
	iLgl	11 22 18.3
	D = 460 km = 4.1°.	
Um	iSg	11 23 41.2

Probably northwest Russia.
Origin time = 11 20 10.
Explosion?

" 19

Up	iPcP	15 29 34.8
Ki	iP	15 28 32.2
Sk	iP	15 29 08.0
Um	iP	15 28 50.6 C
	ipP	15 29 04.6
	isP	15 29 11.2
Ud	iP	15 29 21.1
	iPcP	15 29 41.6

Japan. h = 50 km (Um).

" 19 Ki iP 19 35 23.7 C
(cont.)

1969
Apr. 19 (cont.)

			micr	sec
Ki	P	Z'	0.1	1.0
	Mx	N	0.6	22
	Mx	Z	1.1	21

Sk	iP	19 35 49.6 C
	ipP	19 35 54.8
Um	iP	19 35 52.5 C
	ipP	19 35 57.2
Ud	iP	19 36 14.8
De	iP	19 36 39.7 C
	ipP	19 36 43.7

Alaska. h = 20 km (Sk,Um,De).

" 19

Up	iP	19 49 06.6
Um	eP	19 49 20
Ud	iP	19 49 22.0 C
	i	19 49 27.2
De	iP	19 49 04.5
	i	19 49 17.3

" 19 Up iP 20 02 39.9

" 19

Up	iP	22 19 20.4
Ki	iP	22 19 01.7
Um	iP	22 19 10.9
Ud	iP	22 19 36.4

Ryukyu Islands (h = 60 km).

" 19

Um	eP	23 04 30
Ud	iP	23 03 49.7

Atlantic Ocean, off Portugal (h = N).

" 20 Ud iP 12 24 44.3
Greece.

" 20

Up	iP	13 16 00.6
Ud	iP	13 16 15.6

" 20

Up	iLgl	14 16 34.6
Ki	iPn	14 12 36.7 C
	iSn	14 13 27.9
	iLgl	14 13 45.2
	D = 480 km = 4.3°.	
Um	iPn	14 12 58.4
	iSn	14 14 07.1
	iSg	14 14 36.6
	D = 640 km = 5.8°.	
Ud	iLgl	14 17 09.4

Northwest Russia,
67.3°N, 31.7°E.
Origin time = 14 11 29.
Explosion?

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr. 20 Ki iPn 15 57 21.5
iSn 15 58 07.9
iLgl 15 58 21.8
D = 420 km = 3.8°.
Probably northwest Russia.
Origin time = 15 56 22.
Explosion?

" 20 Ki eP 16 19 06
Um iP 16 18 41.2
iX 16 18 55.5
Ud iP 16 17 57.1
iX 16 18 11.3
Atlantic Ocean, off Portugal
(h = 30 km).

" 20 Up iPKP 20 44 00.4
Ki ePKP 20 43 50
Um iSKP 20 46 44.7
Ud iPKP 20 44 03.1 C
De iPKP 20 44 13.5
Tonga-Kermadec Islands
(h = 370 km).

" 21 Up eP 02 31 44
ipP 02 31 58.3
iX 02 32 14.2
iSKS 02 42 02
iS 02 42 17
ipS 02 42 43

		micr	sec
S	E	1.2	8
S	N	0.6	5
Mx	E	4.2	24
Mx	N	2.3	22
Mx	Z	6.4	24

D = 9700 km = 87 1/2°.

Ki iP 02 31 33.8
ipP 02 31 51.0
iX 02 32 07.5
eSKS 02 41 49

		micr	sec
P	Z	0.5	8
P	Z'	0.1	1.5
SKS	E	2.1	12
SKS	N	0.8	12
Mx	E	7.0	24
Mx	N	2.9	21
Mx	Z	15	24

Sk iP 02 31 26.7
Um iP 02 31 41.8 C
ipP 02 31 58.0
iSKS 02 42 03
(cont.)

1969 Apr. 21 (cont.)
Ud iP 02 31 34.6 C
De iP 02 31 40.9 C
ipP 02 31 56.4
iX 02 32 20.5
Guatemala. h = 60 km (Ki,Um,De).
m = 5.9, M = 6.0 (Up,Ki).

" 21 Ud eP 04 12 32
Greece.

" 21 Up iP 07 30 56.4 C
iS 07 40 21
i 07 41 12
eLi 07 56 15
eLgl 07 57 44

		micr	sec
P	Z	0.8	2
P	Z'	1.1	1.8
S	E	1.2	6
Mx	E	33	15
Mx	N	41	14
Mx	Z	41	13

D = 8100 km = 73°.

Ki iP 07 30 23.3 C
iS 07 39 21

		micr	sec
P	E	1.1	7
P	N	0.9	12
P	Z	3.7	10
P	Z'	0.7	1.8
S	E	3.5	11
S	N	1.8	10
Mx	E	32	14
Mx	N	40	14
Mx	Z	66	15

D = 7500 km = 67 1/2°.

Sk iP 07 30 54.7 C
iPcP 07 31 14.9
iPP 07 33 34.7
Um iP 07 30 36.8 C
iPcP 07 30 59.3
iPP 07 33 13
iPa 07 35 00
iS 07 39 28
iSKS 07 40 23
iSS 07 44 19
Ud iP 07 31 04.3 C
De iP 07 31 17.2 C
Japan (h = 40 km).
m = 6.5, M = 7.0 (Up,Ki).

" 21 Up eP 17 23 17
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 21 (cont.)

Ki	eP	17 23 06	
Sk	eP	17 22 39	
Um	iP	17 23 17.3	
	iS	17 27 11	
Ud	eP	17 22 57	
De	iP	17 23 16.1	C

Iceland (h = N).

" 21

Up	iP	17 41 45.1	
Ki	eP	17 42 48	
Sk	iP	17 42 27.5	
Ud	iP	17 41 50.7	C
	i	17 41 57.1	
De	eP	17 41 20	

Dodecanese Islands.

" 21

Up	iP	18 11 21.0	
Um	iP	18 11 29.6	
	i	18 11 33.0	
Ud	iP	18 11 32.2	D
De	iP	18 11 20.5	

Indian Ocean (h = N).

" 21

Ki	iSg	18 35 20.7	
Sk	iSg	18 35 25.7	
Um	iSg	18 35 47.9	

Nordland, Norway,
66.4°N, 14.8°E.
Origin time = 18 33 52.
Explosion?

" 21

Ki	iP	18 37 53.4	
Um	iP	18 37 39.7	
De	iP	18 37 25.9	

" 21

Up	iP		20 41 27.2	C
	i		20 41 34.9	
	iS		20 45 12	
			micr	sec
	P	Z'	0.1	0.6
	Mx	E	1.4	13
	Mx	N	1.5	13
	Mx	Z	1.5	12

D = 2350 km = 21°.

Ki	eP		20 42 41	
			micr	sec
	Mx	E	1.0	10
	Mx	N	1.4	15
	Mx	Z	2.2	15
Sk	iP		20 42 09.2	
	iPP		20 42 41.7	

(cont.)

1969
Apr. 21 (cont.)

Um	iP	20 42 05.1	
	i	20 42 13.2	
	iS	20 46 17	
	iSa	20 46 28	
Ud	eP	20 41 34	
	i	20 41 36.5	
De	iP	20 40 57.7	

Aegean Sea (h = N).
M = 4.7 (Up,Ki).

" 21

Ki	iP	21 04 12.2	
De	eP	21 02 39	
	i	21 02 46.3	
	i	21 02 57.1	

Dodecanese Islands
(h = 35 km).

" 21

Up	iP	22 31 27.2	
	i	22 31 35.8	
	iS	22 33 52.1	
	iX	22 34 48.5	
		micr	sec
	Mx	E 1.0	21
	Mx	N 1.4	18
	Mx	Z 1.1	18

D = 1600 km = 14 1/2°.

Ki	iP	22 29 44.3	
	iS	22 31 14.2	
		micr	sec
	P	N 0.5	8
	P	Z 0.4	8
	P	Z' 0.3	1.3
	Mx	E 1.3	11
	Mx	N 0.8	15
	Mx	Z 1.7	13

D = 800 km = 7°.

Sk	iP	22 30 31.6	
	iS	22 32 23.7	
Um	iP	22 30 36.4	C
	i	22 30 38.4	
	i	22 31 06.5	
	iX	22 33 10.1	
	iT	22 38 11.9	
Ud	iP	22 31 19.4	C
	i	22 31 28.0	
	iX	22 34 29.0	
De	iP	22 32 07.5	
	i	22 32 28.5	

Norwegian Sea (h = N).

" 22 Ki eP 00 41 51

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 22 (cont.)

Sk	eP	00 41 43	
Um	eP	00 41 57	

Guatemala (h = 90 km).

" 22

Um	iP	01 26 08.1	
Ud	eP	01 26 57	

" 22

Ud	eP	01 51 18	

Alaska (h = 20 km).

" 22

Up		---	
		micr	sec
	Mx	E 1.1	23
	Mx	N 0.5	18
	Mx	Z 1.4	22
Ki		---	
		micr	sec
	Mx	E 0.8	18
	Mx	N 0.5	17
	Mx	Z 1.5	18
Um	iPP	04 59 44	
	i	05 11 39	

Easter Island (h = N).
M = 5.6 (Up,Ki).

" 22

Ki	iP	06 03 00.3	
Um	eP	06 03 13	
Ud	iP	06 03 40.5	

Formosa (h = 30 km).

" 22

Up	iPP	06 53 39	
	iPKS	06 54 52	
		micr	sec
	PP	Z 0.6	5
	PKS	E 0.7	6
	PKS	N 0.6	6
	Mx	E 3.8	24
	Mx	N 2.3	22
	Mx	Z 4.0	24
Ki	iPKP	06 51 10.1	
	iPP	06 53 27.9	
	iPKS	06 54 33	
	iPKS	06 54 44	
		micr	sec
	PP	Z 0.6	5
	PKS	E 1.1	6
	PKS	N 0.6	6
	PKS	Z 1.3	7
	Mx	E 3.3	24
	Mx	N 3.6	22
	Mx	Z 7.8	23

(cont.)

1969
Apr. 22 (cont.)

Um	iPKP	06 51 14.2	
	iPP	06 53 32	
	iPKS	06 54 39	
	iPPS	07 05 24	

Easter Island (h = N).
m = 6.1, M = 6.1 (Up,Ki).

" 22

Up	iP	08 22 36.9	C
	iS	08 31 48	
		micr	sec
	P	Z' 0.4	1.5
	Mx	E 3.1	18
	Mx	N 3.1	19
	Mx	Z 4.9	19
	D = 7900 km = 71°.		
Ki	iP	08 21 55.1	C
	ipP	08 22 05.5	
	eS	08 30 26	
		micr	sec
	P	Z 0.8	6
	P	Z' 0.3	1.5
	S	E 0.7	6
	S	N 0.5	9
	Mx	E 4.6	15
	Mx	N 2.9	15
	Mx	Z 7.2	15
	D = 7100 km = 64°.		
Sk	iP	08 22 29.2	C
	i	08 22 35.9	
	iPP	08 25 05.1	
Um	iP	08 22 13.4	C
	ipP	08 22 24.2	
Ud	iP	08 22 43.6	C
De	iP	08 22 59.0	
	iPP	08 25 56.2	

Japan. h = 40 km (Ki,Um).
m = 6.2, M = 5.9 (Up,Ki).

" 22

Ki	iP	09 17 17.0	
Sk	iP	09 17 37.9	
Um	iP	09 17 14.7	
Ud	iP	09 17 34.8	

India-East Pakistan
(h = 40 km).

" 22

Up	iP	09 36 45.0	
	i	09 37 00.6	

" 22

Sk	iP	10 20 33.3	
Um	iP	10 20 23.7	

Kodiak Island (h = 70 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	22	Ud	iP	10 46 18.2
"	22	Up	iSn	12 55 30.7
			iSg	12 55 45.6
		Ki	iSg	12 58 13.7
		Sk	iSg	12 57 32.9
		Um	iSg	12 56 17.2
		Ud	iSn	12 56 18.1
			iLgl	12 56 46.3
		Esthonia, 59.7°N, 25.6°E.		
		Origin time = 12 53 35.		
		Explosion?		
"	22	Ki	i	13 32 40.1
			i(Sg)	13 33 04.3
		Ud	i(P)	13 32 09.8
			i	13 32 56.4
			i	13 33 17.0
"	22	Ki	e	14 07 36
		Um	i(Sg)	14 05 37.3
			i	14 05 41.8
		Ud	i(Sg)	14 07 43.4
"	22	Up	iP	15 57 51.9
		Sk	eP	15 58 33
		Ud	iP	15 57 58.0
		Ionian Islands.		
"	22	Ud	iP	18 38 31.5
"	22	Up	iP	21 49 21.5
"	22	Ki	iP	22 09 58.0 D
		Sk	iP	22 09 37.9
		Um	iP	22 09 32.3
		Uganda (h = 30 km).		
"	22	Up	iP	22 44 11.6 D
			ipP	22 44 20.6
			iS	22 51 56
				micr sec
			P Z'	0.2 1.0
			Mx E	0.6 13
			Mx N	0.8 16
			Mx Z	0.9 15
			D = 6150 km = 55 1/2°.	
		Ki	iP	22 44 44.1 D
			ipP	22 44 52.8
			iS	22 52 57
				micr sec
			P Z	0.4 5
			P Z'	0.3 1.2
		(cont.)		

1969 Apr.	22	(cont.)		
		Ki		micr sec
			S E	0.3 8
			Mx E	1.1 15
			Mx N	0.9 13
			Mx Z	1.1 13
			D = 6650 km = 60°.	
		Sk	iP	22 44 41.5 D
			ipP	22 44 51.7
		Um	iP	22 44 24.1 D
			ipP	22 44 33.3
			iPP	22 46 32.4
			iS	22 52 21
		Ud	iP	22 44 23.9 D
			ipP	22 44 33.1
			iPP	22 46 28.7
		De	iP	22 44 08.8
		Arabian Sea. h = 35 km (Up, Ki,Sk,Um,Ud).		
		m = 5.9, M = 5.1 (Up,Ki).		
"	22	Um	iP	23 17 07.0
			i	23 17 19.2
		Leyte (h = 40 km).		
"	23	Up	iP	02 22 27.8
"	23	Um	iP	08 32 54.4
"	23	Ki	iPn	11 11 08.6
			iSn	11 12 08.1
			iLgl	11 12 27.2
			D = 560 km = 5.0°.	
		Sk	eSg	11 15 00
		Um	iSn	11 12 47.7
			i	11 13 16.5
			iSg	11 13 25.6
		Northwest Russia, 67.7°N, 33.6°E.		
		Origin time = 11 09 50.		
		Explosion?		
"	23	Up	iSg	13 05 53.1
		Ki	iSg	13 08 19.9
		Sk	eLgl	13 07 32
		Um	iPg	13 05 20.3
			iSg	13 06 24.1
		Ud	iSn	13 06 26.5
			iLgl	13 06 54.1
		Esthonia, 59.7°N, 25.6°E.		
		Origin time = 13 03 42.		
		Explosion?		
"	23	Up	iP	13 44 04.4
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	23	(cont.)			
		Up	i	13 44 19.5	
		Ki	iP	13 45 02.9	D
			ipP	13 45 08.8	
		Sk	iP	13 44 42.2	D
		Um	iP	13 44 30.9	D
			ipP	13 44 36.7	
			iPcP	13 46 50.4	
		Ud	iP	13 44 14.2	
			ipP	13 44 20.2	
		Egypt. h = 30 km (Ki,Um,Ud).			
"	23	Up	iP	16 04 09.8	
"	23	Ki	iSg	16 17 18.3	
		Sk	iSg	16 17 23.0	
		Um	iSg	16 17 45.8	
		Nordland, Norway, 66.4°N, 14.8°E. Origin time = 16 15 50. Explosion?			
"	23	Ki	iP	21 02 45.0	
			ipP	21 02 55.8	
		Sk	eP	21 03 15	
		Um	iP	21 03 11.5	C
			ipP	21 03 22.1	
		Ud	iP	21 03 37.0	
		Aleutian Islands. h = 40 km (Ki,Um).			
"	23	Um	eP	21 25 08	
		Turkey (h = N).			
"	23	Um	eP	21 54 31	
"	23	Ud	e(P)	22 49 39	
			i	22 49 45.4	
"	24	Up	eP	02 29 26	
			ipP	02 29 57.0	
		Ki	eP	02 28 33	
			ipP	02 29 03.3	
		Um	eP	02 28 57	
			ipP	02 29 30.1	
		Ud	iP	02 29 25.9	
			ipP	02 29 54.6	
		De	ipP	02 30 19.2	
		Aleutian Islands. h = 130 km (Up,Ki,Um,Ud). pP is bigger than P (on Z') at our stations.			

1969 Apr.	24	Up	iP	02 54 45.8	
		Um	iP	02 55 15.0	
		Ud	iP	02 54 56.9	
"	24	Up	iP	03 52 04.7	
		Ki	iP	03 51 11.9	C
		Um	iP	03 51 37.1	
		Ud	iP	03 52 09.1	
"	24	Um	iSKP	06 46 29.2	
		Ud	iPKP	06 43 59.7	
		De	iPKP	06 44 11.3	
		Fiji Islands (h = 540 km).			
"	24	Ki	iP	07 41 27.7	
"	24	Up	iPKP	07 45 12.4	
		Ki	iPKP	07 45 04.1	
			iSKP	07 48 10.6	
		Sk	iPKP	07 45 14.0	C
		Um	iPKP	07 45 11.1	
		Ud	iPKP	07 45 13.4	
		De	iPKP	07 45 24.1	C
		Fiji Islands (h = 250 km).			
"	24	Up	iP	08 57 04.3	
		Ki	iP	08 56 09.9	
		Sk	iP	08 56 36.5	
		Ud	iP	08 57 00.7	C
		Kodiak Island (h = 20 km).			
"	24	Ud	iPn	10 12 07.3	
			i	10 12 10.8	
			iSn	10 12 38.6	
			iSg	10 12 48.8	
		Skagerrak. Origin time = 10 11 25.			
"	24	Ud	iP	10 15 08.9	
"	24	Ud	iPn	10 21 21.0	
			iSg	10 21 55.9	
		Skagerrak. Origin time = 10 20 38.			
"	24	Ud	iPn	10 24 14.4	
			iSg	10 24 52.1	
		Skagerrak. Origin time = 10 23 35.			
"	24	Ud	iPn	10 30 48.9	
			iSg	10 31 20.7	
		Skagerrak. Origin time = 10 30 03.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969					
Apr.	24	Ud	iSg	10 31 54.8	
		Skagerrak.			
		Origin time = 10 30 39.			
		These and following events in the Skagerrak have all originated near 58.2°N, 10.0°E, as determined by combination with readings at Lillehammer and Kongsberg. They are probably underwater explosions.			
"	24	Um	iP	11 04 56.9	
"	24	Ud	iPn	11 18 42.5	
			iSg	11 19 15.0	
		Skagerrak.			
"	24	Ud	iSg	11 28 46.1	
		Skagerrak.			
"	24	Ud	i(P)	12 18 24.5	
"	24	Ki	i	14 06 27.2	
			iSg	14 06 32.9	
"	24	Up	iP	14 39 35.2	
			i	14 39 37.9	
"	24	Up	iP	14 51 05.8	
			iX	14 51 19.4	
				micr sec	
			Mx E	0.9 12	
			Mx N	0.5 12	
		Ki	iP	14 52 09.9	
				micr sec	
			Mx E	0.7 8	
			Mx N	0.3 9	
			Mx Z	2.0 12	
		Sk	eP	14 51 45	
			iX	14 52 03.3	
		Um	iP	14 51 35.5	
			iX	14 51 54.8	
			iS	14 56 07	
			iSa	14 56 49	
		Ud	iP	14 51 14.2 C	
			iX	14 51 29.0	
		De	e(P)	14 50 35	
			iX	14 50 48.3	
			i	14 50 58.5	
		Dodecanese Islands			
		(h = 50 km).			
		M = 4.7 (Up,Ki).			
		The phases marked X are more pronounced than P, and could be due to another shock.			

1969					
Apr.	24	Ud	iP	15 21 39.3	
"	24	Ud	iP	16 40 16.1	
"	24	Up	iP	20 46 20.8	
"	24	Ud	iP	22 54 57.9	
		Leyte (h = 80 km).			
"	25	Sk	iSKP	01 53 25.8	
		Um	iSKP	01 53 21.1	
		Ud	iPKP	01 50 44.7	
			iSKP	01 53 33.4	
		De	iPKP	01 50 55.8 C	
		Tonga-Kermadec Islands			
		(h = 540 km).			
"	25	Um	iP	03 14 55.6	
		Ud	iP	03 15 23.7	
		Japan (h = 350 km).			
"	25	Um	eP	03 30 53	
"	25	Up	iP	03 40 55.8	
		Ki	iP	03 40 17.6	
		Um	iP	03 40 34.2 C	
			ipP	03 40 48.7	
		Ud	iP	03 41 02.8	
		Japan. h = 50 km (Um).			
"	25	Up	iP	03 47 09.9	
			iS	03 57 52	
				micr sec	
			S E	0.4 8	
			S N	0.5 8	
			Mx E	1.9 24	
			Mx N	2.4 23	
			Mx Z	2.4 24	
			D = 9900 km = 89°.		
		Ki	iP	03 47 05.8	
			ipP	03 47 14.1	
			iSKS	03 57 31	
				micr sec	
			P Z	0.4 6	
			P Z'	0.1 1.5	
			SKS E	0.4 9	
			SKS N	0.6 9	
			Mx E	1.4 22	
			Mx N	1.3 20	
			Mx Z	2.3 22	
		Sk	iP	03 47 03.1 C	
			ipP	03 47 13.2	
		Um	iP	03 47 09.9	
			ipP	03 47 18.2	
			iPP	03 50 40.5	
			i	03 50 49.2	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr. 25 (cont.)

Um	iSKS	03 57 36
	iS	03 57 58
Ud	iP	03 46 58.1
	ipP	03 47 07.4
De	iP	03 47 02.8
	ipP	03 47 11.1

Panama. h = 30 km (Ki,Sk,Um, Ud,De).
m = 5.9, M = 5.6 (Up,Ki).

" 25

Um	iP	04 13 19.3
Ud	iP	04 13 07.7

Panama (h = 25 km).

" 25

Up	eP	05 05 09
Ki	iP	05 05 09.7
Sk	eP	05 05 25
Um	eP	05 05 06
Ud	iP	05 05 20.1

Sumatra (h = N).

" 25

Ki	iP		07 45 06.5	
	i		07 45 20.0	
			micr	sec
	Mx	E	0.5	13
	Mx	N	0.5	14
	Mx	Z	0.6	11
Sk	iP		07 45 19.6	C
	iPP		07 47 08.5	
Um	iP		07 44 53.6	
	iPP		07 46 43.2	
Ud	iP		07 45 08.5	
De	iP		07 45 03.5	

West Pakistan (h = 25 km).

" 25

Up	iP		09 24 06.0
	ipP		09 24 21.9
Ki	iP		09 23 11.7	C
	ipP		09 23 26.9
Sk	iP		09 23 40.2
Um	iP		09 23 39.9
	ipP		09 23 54.0
Ud	iP		09 24 03.8
	ipP		09 24 19.3

Alaska. h = 60 km (Up,Ki, Um,Ud).

" 25

Um	iP	10 40 44.2
Ud	iP	10 40 33.7

Costa Rica (h = 50 km).

" 25

Ki	iPn	11 22 12.5
	iSn	11 23 11.7

(cont.)

1969 Apr. 25 (cont.)

Ki	iLgl	11 23 30.6
	D = 560 km = 5.0°.	
Sk	iSg	11 25 59.1
Um	iS×	11 24 05.6
	iSg	11 24 25.1

Northwest Russia, 67.4°N, 33.4°E.
Origin time = 11 20 54.
Explosion?

" 25

Up	iPKP		13 35 35.7	D
			micr	sec
	PKP	Z'	0.1	0.5
Ki	iSKP		13 38 09.2	
	i		13 38 14.0	
Sk	iSKP		13 38 35.1	
Um	i		13 36 08.7	
	iSKP		13 38 19.6	
Ud	iPKP		13 35 37.6	D
	iSKP		13 38 38.3	
De	iPKP		13 35 47.7	

Tonga-Kermadec Islands (h = 460 km).

" 25

Ud	iP	14 29 57.8

" 25

Ki	iPn	14 34 52.9
	iSn	14 35 36.2
	iSg	14 35 49.4
	D = 390 km = 3.5°.	

" 25

Ki	eP	16 59 15
Ud	iP	16 59 18.5
De	iP	16 59 23.0

El Salvador (h = 70 km).

" 25

Up	iP	17 00 02.6
Ud	iP	16 59 40.3
	i	16 59 52.9

" 25

Ki	eSg	17 34 15
Sk	iSg	17 34 20.0
Um	iSg	17 34 42.6

Nordland, Norway, 66.4°N, 14.8°E.
Origin time = 17 32 47.
Explosion?

" 25

Um	ePKP	21 19 31
	e	21 19 36

Scotia Sea (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	25	Ki	iP	21 33 39.6		
		Um	iP	21 33 41.1		
		Ud	iP	21 33 59.2		
		Celebes (h = 25 km).				
"	25	Up	iP	21 46 37.9		
		Ki	iP	21 45 55.9		
		Um	iP	21 46 14.2	C	
			ipP	21 46 25.0		
		Ud	iP	21 46 44.0	C	
			ipP	21 46 55.1		
		Japan. h = 40 km (Um,Ud).				
"	25	Ud	eP	22 05 41		
			i	22 06 27.8		
"	26	Up	iP	04 02 38.3		
		Ki	iP	04 02 46.6		
		Um	iP	04 02 36.2	C	
		Ud	iP	04 02 54.1		
"	26	Up	iP	05 30 59.7		
		Ki	iP	05 30 31.7		
		Sk	eP	05 30 57		
		Um	eP	05 30 44		
		Ud	iP	05 31 07.0		
		Mariana Islands (h = 100 km).				
"	26	Up	iPP	06 18 24		
				micr	sec	
			PP	0.2	4	E
		Ki	iSKS	06 24 36		
				micr	sec	
			SKS	0.4	7	Z
		Um	iPKP	06 17 39.6		
			iPP	06 18 46		
		De	iPKP	06 17 27.9		
		Chile (h = 25 km).				
"	26	Up	iPP	06 22 23.6		
			eSKS	06 28 14		
			ePS	06 31 59		
				micr	sec	
			PP	0.2	5	E
			PP	0.7	7	Z
			SKS	2.0	18	E
			Mx	6.4	18	E
			Mx	6.2	18	N
			Mx	9.8	18	Z
		Ki	iPKP	06 21 34.6		
			e	06 22 35		
		(cont.)				

1969 Apr.	26	(cont.)				
		Ki	ePP	06 22 46		
			iPS	06 32 30		
				micr	sec	
			PP	0.5	8	E
			PP	1.0	7	Z
			Mx	4.5	21	E
			Mx	3.7	20	N
			Mx	8.0	19	Z
		Sk	ePKP	06 21 28		
		Um	iPKP	06 21 32.6		
			i	06 21 45.1		
			iPP	06 22 46		
			iSKS	06 28 24		
		Ud	iPKP	06 21 23.0		
			i(PP)	06 22 16.4		
		De	iPP	06 22 17.1		
		Chile (h = N).				
		m = 6.6, M = 6.3 (Up,Ki).				
"	26	Up	iP	06 35 50.3		
"	26	Sk	iPKP	07 24 10.2		
		Um	iPKP	07 24 05.1	C	
			i	07 24 12.8		
		Ud	iPKP	07 24 18.4		
			i	07 24 27.1		
"	26	Sk	iPKP	07 29 15.7		
		Um	iPKP	07 29 10.4	C	
			i	07 29 17.6		
		Ud	iPKP	07 29 23.5		
			i	07 29 31.6		
		De	iPKP	07 29 40.6		
			i	07 29 50.4		
		The similarity of the records in this and the preceding case suggests a common origin.				
"	26	Ki	iPn	10 45 29.6		
			iSn	10 46 06.6		
			iSg	10 46 21.1		
			D = 330 km = 3.0°.			
		Sk	iSg	10 48 47.8		
		Um	iSn	10 46 47.7		
			iSg	10 47 19.0		
		Northern Finland, 67.3°N, 28.4°E. Origin time = 10 44 41. Explosion?				
"	26	Ki	iP	10 52 21.3		
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	26	(cont.)		
		Ud	eP	10 52 50
		Idaho (h = 15 km).		
"	26	Ki	iPn	11 34 15.3
			iSn	11 35 11.6
			iLgl	11 35 33.4
			D = 530 km = 4.8°.	
		Sk	eSg	11 38 04
		Um	iSn	11 35 55.5
			iSg	11 36 33.3
		Northwest Russia, 67.7°N, 33.2°E. Origin time = 11 33 00. Explosion?		
"	26	Up	iP	11 36 35.7
		Ki	iP	11 36 35.7
		Sk	iP	11 36 49.3
		Ud	iP	11 36 44.7
		Sumatra (h = 110 km).		
"	26	Ud	eP	12 16 56
"	26	Ud	eP	13 24 51
"	26	Ki	e(P)	14 31 15
"	26	Um	iP	16 16 28.1
"	26	Up	iP	16 57 12.7
"	26	Ud	iP	18 15 21.0
"	26	Up	iP	19 19 41.4
		Um	iP	19 19 23.2 C
		Ud	iP	19 19 49.9
		Ryukyu Islands (h = 35 km).		
"	26	Up	iP	20 29 55.6
		Ki	iP	20 29 54.6 C
			ipP	20 30 21.9
		Sk	iP	20 30 08.5
		Um	iP	20 29 51.9 C
			ipP	20 30 19.6
		Ud	iP	20 30 04.4 C
			ipP	20 30 32.2
		Sumatra. h = 110 km (Ki,Um,Ud).		
"	26	Ud	iP	20 48 43.0
"	26	Um	eP	20 51 34

1969 Apr.	26	Up	iPKP	20 55 55.4
		Sk	iPKP	20 55 43.4
		Um	iPKP	20 55 38.7 D
		Ud	iPKP	20 55 51.4 D
			i	20 55 58.0
		De	iPKP	20 56 11.9
"	26	Ki	iPn	21 06 53.9
			iSn	21 07 31.2
			iSg	21 07 44.8
			D = 330 km = 3.0°.	
		Sk	iSg	21 10 41.6
		Um	iSx	21 09 14.0
			iSg	21 09 28.2
		Northern Finland. Explosion?		
"	26	Up	eP	22 22 06
		Ki	iP	22 21 12.1
		Um	iP	22 21 37.6
		Ud	iP	22 22 03.5
		Aleutian Islands (h = 30 km).		
"	26	Ud	iP	23 29 14.8
		Greece.		
"	27	Up		---
				micr sec
			Mx E	0.5 19
		Ki	iP	01 50 27.5 C
		Um	iP	01 50 30.7
			i	01 50 40.6
			i	01 54 36.1
			iSKS	02 01 00
		Ud	iP	01 50 48.1
			i	01 50 56.5
		Celebes (h = 10 km).		
"	27	Um	eP	02 34 07
		Alaska (h = N).		
"	27	Um	iP	05 07 12.0
		Hindu Kush.		
"	27	Ki	iPn	05 34 51.7 C
			iSn	05 35 51.6
			iSg	05 36 19.4
			D = 560 km = 5.0°	
		Sk	iSg	05 38 37.4
		Um	iSn	05 36 30.1
			iSg	05 37 06.3
		Ud	iLgl	05 39 32.5
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 27 (cont.)
Northwest Russia,
67.3°N, 33.4°E.
Origin time = 05 33 34.
Explosion?

" 27	Ki	iSn	08 12 10.7	
		iLgl	08 12 33.1	
	Um	iSg	08 13 23.6	

Probably northwest Russia.
Explosion?

" 27	Up	iP	11 03 42.8	C
		i	11 04 01.4	
		iS	11 08 06	
			micr sec	
		Mx E	0.4 12	
		Mx N	0.8 14	
		Mx Z	1.1 14	
		D = 2800 km = 25°.		
	Ki	iP	11 04 46.8	C
			micr sec	
		Mx E	0.4 13	
		Mx N	0.3 11	
	Um	iP	11 04 17.3	
		eS	11 09 08	
		iSa	11 09 24	
	Ud	iP	11 03 50.5	
	De	iP	11 03 17.6	

Dodecanese Islands
(h = 15 km).
M = 4.6 (Up,Ki).

" 27	Ud	iP	12 04 52.5	D
" 27	Up	iPKP	13 17 56.8	
		ipPKP	13 18 11.6	
	Ki	ePKP	13 18 10	
		ipPKP	13 18 24.1	
		iPKS	13 21 29.6	
			micr sec	
		PKP Z'	0.2 1.5	
		PKS Z'	0.1 1.5	
	Um	iPKP	13 18 04.6	C
		ipPKP	13 18 19.5	
	Ud	ePKP	13 17 55	

South Sandwich Islands.
h = 50 km (Up,Ki,Um).

" 27	Up	iP	13 27 55.6	
	Ud	iP	13 28 10.8	
" 28	Up	iP	00 59 47.7	

(cont.)

1969
Apr. 28 (cont.)

Up	iSKS		01 10 16	
Ki	iP		00 59 19.6	
	i		00 59 35.2	
			micr sec	
	Mx	E	0.5 18	
	Mx	N	0.6 17	
	Mx	Z	1.3 18	
Um	iP		00 59 30.6	
	i		00 59 38.6	
	eSKS		01 10 00	
Ud	eP		00 59 53	

Mariana Islands (h = 50 km).

" 28	Ki	i(PKP)	07 43 59.8	
		iPKP	07 44 10.3	
		iSKP	07 47 12.7	
			micr sec	
		PKP Z'	0.2 0.7	
		SKP Z'	0.7 1.5	
	Sk	i(PKP)	07 44 11.0	D
		iPKP	07 44 20.3	
		iSKP	07 47 28.7	
	Um	i(PKP)	07 44 06.5	
		iPKP	07 44 19.1	
		iSKP	07 47 24.0	
		iSS	08 04 42	
	Ud	i(PKP)	07 44 19.2	
		iPKP	07 44 27.4	
		iSKP	07 47 37.0	
	De	iSKP	07 47 45.7	

Tonga-Kermadec Islands
(h = 300 km).
(PKP) are precursors of smaller amplitude than PKP (except at Ud where they are of about equal amplitude).

" 28	Up	iP	13 00 30.2	D
		ipP	13 00 48.8	
			micr sec	
		P Z'	0.3 0.7	
	Ki	iP	13 00 22.1	
		ipP	13 00 41.7	
			micr sec	
		P Z'	0.1 1.0	
	Sk	iP	13 00 44.9	
		ipP	13 01 04.5	
	Um	iP	13 00 21.5	D
		ipP	13 00 40.6	
	Ud	iP	13 00 43.5	
		ipP	13 01 02.6	
	De	iP	13 00 45.2	D
		ipP	13 01 04.9	

Burma-India. h = 80 km (Up,Ki, Sk,Um,Ud,De).
m = 6.3 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Apr.	28	Up	iPKP	17 49 59.5	
		Um	iPKP	17 49 46.9	
		Ud	iPKP	17 50 00.9	
		De	iPKP	17 50 17.2	
		Kermadec Islands.			
		Origin time = 17 30 18.			
"	28	Up	iPKP	18 15 39.0	
		Sk	ePKP	18 15 32	
		Um	iPKP	18 15 25.2	
		Ud	iPKP	18 15 39.6	
		De	ePKP	18 15 48	
		Kermadec Islands.			
		Origin time = 17 55 57.			
"	28	Up	iPKP	18 17 32.4	
		Sk	iPKP	18 17 25.7	
		Um	iPKP	18 17 20.5	C
			i	18 17 28.1	
		Ud	iPKP	18 17 34.0	C
		De	iPKP	18 17 42.3	C
			i	18 17 49.9	
		Kermadec Islands (h = 50 km).			
"	28	Up	iPKP	19 57 48.8	
			ipPKP	19 58 07.4	
				micr sec	
			Mx N	0.7 22	
		Ki	iPKP	19 57 36.6	
			ipPKP	19 57 55.5	
		Sk	iPKP	19 57 46.4	
			ipPKP	19 58 06.6	
		Um	iPKP	19 57 41.1	
			ipPKP	19 58 00.6	
		Ud	iPKP	19 57 51.2	
			ipPKP	19 58 09.9	
		De	iPKP	19 57 56.8	D
			ipPKP	19 58 14.4	
		Solomon Islands. h = 70 km			
		(Up,Ki,Sk,Um,Ud,De).			
"	28	Up	eP	21 15 57	
"	28	Ki	iP	21 35 42.0	
"	28	Up	iP	23 32 55.3	C
			i	23 32 57.7	
			iS	23 42 44	
				micr sec	
			P Z'	0.1 0.8	
			Mx E	1.0 18	
			Mx N	3.2 22	
			Mx Z	1.8 19	
		(cont.)			

1969 Apr.	28	(cont.)			
		Ki	iP	23 32 23.2	C
			i	23 32 25.6	
				micr sec	
			P Z'	0.1 1.0	
			Mx E	1.3 16	
			Mx N	1.0 15	
			Mx Z	1.9 14	
		Sk	iP	23 32 29.9	
		Um	iP	23 32 41.6	
			iS	23 42 32	
		Ud	iP	23 32 47.5	
			i	23 32 49.9	
		De	iP	23 33 02.8	
			i	23 33 31.4	
		California (h = 20 km).			
		m = 5.8, M = 5.5 (Up,Ki).			
		Very clear double P phases, both of about the same amplitude, are recorded at Up, Ki, Ud; the interval between the two phases is 2.4 sec.			
"	29	Up	iP	04 44 54.9	C
			iPn	04 46 06.1	
				micr sec	
			P Z'	0.2 0.8	
			Mx E	1.2 16	
			Mx N	1.6 20	
			Mx Z	2.4 19	
		Ki	iP	04 45 33.3	C
				micr sec	
			P Z'	0.3 1.0	
			Mx E	0.9 12	
			Mx N	1.0 15	
			Mx Z	2.0 16	
		Sk	iP	04 45 30.2	C
		Um	iP	04 45 08.8	C
			iPP	04 46 36.6	
			iPcP	04 47 16.2	
			iS	04 51 09	
		Ud	iP	04 45 10.1	C
			iPn	04 46 33.3	
		De	iP	04 44 53.4	C
		Iran (h = 35 km).			
		m = 6.0, M = 5.0 (Up,Ki).			
		The existence of Pn (group velocity 8.25 km/sec) at Up and Ud is remarkable, considering the paths; alternatively, these phases could in this case possibly be explained as early PP.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969					
Apr.	29	Ki	iP	07 04 56.8	
"	29	Ud	iP	09 43 11.3	
		De	iP	09 43 08.3	
		Hindu Kush (h = 190 km).			
"	29	Up	iSg	11 15 22.0	
		Ki	iPn	11 11 05.7	
			iSn	11 12 04.4	
			iSg	11 12 29.2	
			D = 530 km = 4.8°.		
		Sk	eSg	11 14 48	
		Um	iSn	11 12 43.1	
			iSg	11 13 18.2	
		Ud	iLgl	11 15 53.0	
		Northwest Russia, 67.5°N, 33.1°E.			
		Origin time = 11 09 51.			
		Explosion?			
"	29	Ki	eSg	12 35 50	
		Sk	eSg	12 35 10	
		Um	iSg	12 33 53.0	
		Ud	iLgl	12 34 21.6	
		De	iLgl	12 34 45.9	
			i	12 34 49.9	
		Esthonia, 59.7°N, 25.6°E.			
		Origin time = 12 31 11.			
		Explosion?			
"	29	Um	iP	14 44 46.9	
		Ud	i(P)	14 43 27.8	
"	29	Um	iP	20 05 24.6	
		Uganda (h = N).			
"	29	Up	iP	21 29 04.8	
			ipP	21 29 14.5	
				micr	sec
			P Z'	0.1	0.6
			Mx E	0.7	16
			Mx N	1.0	16
			Mx Z	1.4	18
		Ki	iP	21 28 17.5	
				micr	sec
			Mx E	1.5	18
			Mx N	1.5	19
			Mx Z	2.8	19
		Sk	eP	21 28 52	
			i	21 29 05.6	
		Um	iP	21 28 39.3	
			ipP	21 28 48.3	
			iS	21 37 10	
		(cont.)			

1969					
Apr.	29	(cont.)			
		Ud	iP	21 29 09.9	
		De	iP	21 29 30.2	
		Kurile Islands. h = 35 km (Up,Um).			
		M = 5.3 (Up,Ki).			
"	29	Ud	eP	21 40 08	
"	29	Up	iP	22 02 01.1	
"	30	Um	iP	02 54 07.4	
			i	02 54 43.6	
"	30	De	iP	03 44 50.5	
		Tadzhik SSR (h = 220 km).			
"	30	Ud	iP	13 14 44.7	
"	30	Up	iP	15 15 04.9	
"	30	Ki	iP	15 17 04.8	
		Sk	iP	15 17 04.8	
		Um	eP	15 17 15	
			i	15 17 22.5	
		Mexico (h = 35 km).			
"	30	Up	iP	16 46 28.8	
			i	16 46 32.6	
		Um	iP	16 46 32.5	
		Ud	eP	16 46 41	
		Nicobar Islands (h = N).			
"	30	Up	iP	17 11 48.8 C	
		Ki	iP	17 11 14.7 C	
		Sk	iP	17 11 22.5	
		Um	iP	17 11 34.1 C	
			i	17 12 07.0	
		Ud	iP	17 11 40.7 C	
		Nevada. Underground explosion.			
"	30	Up	iP	20 25 25.6	
			i	20 25 29.6	
			iS	20 29 24	
			iLgl	20 32 02	
				micr	sec
			P Z'	0.1	1.0
			S E	1.4	7
			S N	1.5	6
			S Z	0.9	6
			Mx E	15	18
			Mx N	8.5	17
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Apr. 30 (cont.)

Up			micr	sec
	Mx	Z	4.8	12
	D = 2400 km = 21 1/2°.			
Ki	iP		20 26 34.0 C	
	iS		20 31 23	
	iLi		20 34 57	
	iLgl		20 35 24	
			micr	sec
	P	N	0.3	6
	P	Z	0.4	5
	P	Z'	0.1	1.0
	S	E	0.4	6
	S	N	0.9	14
	Mx	E	6.4	12
	Mx	N	3.6	12
	Mx	Z	5.0	11
	D = 3200 km = 29°.			
Sk	iP		20 26 09.5	
Um	iP		20 25 59.1	
	iPcP		20 29 31.0	
	iS		20 30 21	
	iLi		20 33 00	
Ud	iP		20 25 36.4	
	i		20 25 39.9	

Turkey (h = 9 km).
m = 5.5, M = 5.4 (Up,Ki).

" 30 Ud eP 21 44 42
Mindanao (h = 35 km).

" 30 Um iP 21 57 02.5

Markus Båth
January 26, 1970

Seismological Institute
Uppsala

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å, U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

M A Y 1 - 31, 1969

1969 May	1	Ki	iP	02 20 13.6
			i	02 20 15.5
"	1	Ki	ePKP2	03 05 13
		Um	iPKP	03 04 55.3
			iSS	03 28 14
		South Pacific Ocean (h = N).		
"	1	Up	iPKP	03 31 15.8
		Um	iPKP	03 31 12.3
		Ud	iPKP	03 31 17.5
		Tonga Islands (h = N).		
"	1	Up	iP	04 07 37.7
			i	04 08 17.8
			iLgl	04 20 29
		Ki	iP	04 07 23.2
			ipP	04 07 30.4
				micr sec
			Mx E	0.4 13
			Mx N	0.8 14
			Mx Z	1.1 17
		Um	iP	04 07 20.3
			ipP	04 07 28.2
		Ud	iP	04 07 47.3
			ipP	04 07 54.1
		Kazakh SSR. h = 35 km (Ki, Um,Ud).		
"	1	Ud	ePKP	05 25 17
		Tonga Islands (h = 30 km).		
"	1	Um	iP	06 17 38.2
"	1	Ki	ePn	07 03 23
		(cont.)		

1969 May	1	(cont.)		
		Ki	iSn	07 04 09.1
			iLgl	07 04 23.3
			D = 420 km = 3.8°.	
		Um	iSn	07 04 50.3
			eSg	07 05 22
		Probably northwest Russia. Origin time = 07 02 23. Explosion?		
"	1	Um	iP	07 21 54.0
"	1	Ki	iP	09 19 01.9
		Alaska (h = N).		
"	1	Up	iP	12 05 22.4
		Ki	iP	12 05 07.0
		Sk	iP	12 05 28.0
		Um	iP	12 05 11.8
		Ud	iP	12 05 31.4 C
		Mindanao (h = 230 km).		
"	1	Ki	eP	12 22 33
		Um	eP	12 22 39
		Ud	eP	12 22 19
"	1	Um	i(P)	16 29 16.8
"	1	Up	iP	18 07 37.9
			iPn	18 07 52.8
			eS	18 12 03
				micr sec
			P Z'	0.2 0.8
			S N	0.4 6
			Mx E	1.4 13
			Mx N	2.8 14
			Mx Z	2.2 14
			D = 2800 km = 25°.	
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
May 1 (cont.)

Ki	iP		18 08 44.7 D	
			micr	sec
	P	Z'	0.1	0.8
	Mx	E	1.0	13
	Mx	N	0.5	13
	Mx	Z	0.8	10
Sk	iP		18 08 17.6	
Um	iP		18 08 09.7	
	iPn		18 08 43.8	
	iPP		18 09 10.8	
	iS		18 13 04	
	iSa		18 13 23	
	iRg		18 19 31	
Ud	iP		18 07 47.1 D	

Dodecanese Islands (h = 35 km).
m = 5.6, M = 5.0 (Up,Ki).

" 1

Up	i(PKP)		19 24 14.7	
	iPKP		19 24 23.6	
	iPP		19 27 00.5	
	iSKP		19 27 37.9	
	iPKS		19 27 53	
			micr	sec
	PKP	Z'	0.1	0.8
	PP	Z'	0.3	1.7
	PKS	E	0.3	3
	PKS	N	0.6	3
Ki	iPKP		19 24 05.6	
	iPP		19 26 06.5	
	iPKS		19 27 18	
			micr	sec
	PKP	Z'	0.2	1.3
	PP	N	0.3	7
	PP	Z	0.6	6
	PP	Z'	0.3	1.8
	PKS	E	0.5	6
	PKS	N	0.6	6
Sk	iPKP		19 24 16.2	
	iPP		19 26 38.1	
	iSKP		19 27 28.4	
Um	i(PKP)		19 24 02.9	
	iPKP		19 24 14.6	
	i		19 24 44.7	
	i(PP)		19 26 19.6	
	iPP		19 26 29	
	iSKP		19 27 24.2	
	iPKS		19 27 40	
	ipPKS		19 28 50	
	iPS		19 37 39	
Ud	i(PKP)		19 24 09.1	
	iPKP		19 24 22.6	

(cont.)

1969
May 1 (cont.)

Ud	i(PP)	19 26 45.4
	iSKP	19 27 39.1

Tonga Islands (h = 210 km).
m = 5.9 (Up,Ki).
(PKP) are small-amplitude precursors. (PP) at Um,Ud are early PP arrivals.

" 1

Ki	iP	19 59 11.3

" 1

Up	iP		20 12 06.7	
	i		20 12 10.8	
	eS		20 16 30	
			micr	sec
	S	E	0.4	7
	S	N	0.5	6
	Mx	E	6.7	17
	Mx	N	4.5	20
	Mx	Z	2.2	14

D = 2850 km = 25 1/2°.

Ki	iP		20 13 11.1 C	
	i		20 13 21.4	
	i		20 17 36.1	
	iS		20 18 33	
			micr	sec
	S	E	0.4	6
	Mx	E	2.7	14
	Mx	N	1.4	13
	Mx	Z	2.0	13

D = 3600 km = 32 1/2°.

Sk	iP	20 12 45.7
	i	20 12 53.7
Um	iP	20 12 41.0
	i	20 12 49.0
	i	20 15 26.8
	iS	20 17 34
Ud	iP	20 12 13.8
	iS	20 16 38.6

Dodecanese Islands (h = 30 km).
M = 5.3 (Up,Ki).

" 1

Up	iP	20 49 43.3
Ki	eP	20 50 46
Sk	iP	20 50 20.3
Ud	iP	20 49 46.4
	i	20 49 51.8

Dodecanese Islands (h = N).

" 1

Up	iP	22 15 25.6

" 2

Ki	e(P)	01 31 13

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	2	Ki	iP	01 34 20.0
		Ud	iP	01 33 08.2
"	2	Ki	iP	03 26 45.3
		Um	i(P)	03 27 03.4
		Ud	iP	03 27 22.3
		Formosa (h = 50 km).		
"	2	Ki	iP	04 59 14.6
"	2	Um	iP	05 19 05.6
		Banda Sea (h = 130 km).		
"	2	Ki	eP	09 46 56
		Sk	iP	09 46 28.5
"	2	Ud	eP	15 58 24
"	2	Um	iP	16 16 21.6
"	2	Ki	iSg	17 35 00.5
		Sk	iSg	17 35 04.9
		Um	i(Sn)	17 35 15.6
			iSg	17 35 28.1
		Nordland, Norway, 66.4°N, 14.8°E.		
		Origin time = 17 33 32.		
		Explosion?		
"	2	Up	iP	18 43 46.5
			i	18 43 53.6
			iPP	18 44 28.0
		Ki	iP	18 44 53.0
		Sk	iP	18 44 25.3
		Um	eP	18 44 17
			i	18 44 24.6
		Ud	iP	18 43 54.3
		Crete (h = 20 km).		
"	2	Ki	eP	20 50 37
			ipP	20 50 50.0
				micr sec
			Mx E	0.8 19
			Mx N	0.7 18
			Mx Z	1.1 17
		Um	iP	20 50 53.7
			ipP	20 51 09.5
			iS	20 59 40
		Ud	iP	20 51 25.8
			ipP	20 51 38.9
		Japan. h = 50 km (Ki,Um,Ud).		
"	2	Up	iP	22 21 39.1
		(cont.)		

1969 May	2	(cont.)		
		Sk	iP	22 21 19.7
		Um	iP	22 21 14.7
		Ud	iP	22 21 41.0
"	2	Up	iP	22 56 53.1
			ipP	22 57 06.1
		Ki	iP	22 56 11.6 C
			ipP	22 56 24.8
			ePP	22 58 27
		Sk	iP	22 56 45.5
		Um	iP	22 56 30.1 C
			ipP	22 56 43.3
		Ud	iP	22 57 00.2
			ipP	22 57 12.1
		Japan. h = 50 km (Up,Ki, Um,Ud).		
"	3	Up	iP	03 30 57.7
			i	03 31 23.4
		Ki	iP	03 32 03.5
		Sk	iP	03 31 36.9 C
		Um	eP	03 31 30
		Ud	iP	03 31 06.3 C
		Dodecanese Islands (h = 45 km).		
"	3	Up	iP	10 13 51.6
		Ki	eP	10 14 15
		Um	iP	10 14 00.3
"	3	Ud	iPKP	13 11 52.0
		Tonga-Kermadec Islands (h = 540 km).		
"	3	Um	iP	16 13 26.4
		Turkey (h = 30 km).		
"	3	Ki	i	16 20 56.7
			i(Sg)	16 21 01.0
"	3	Up	iP	20 36 37.9
		Ki	iP	20 37 44.2
		Sk	iP	20 37 17.1
		Ud	iP	20 36 46.4 C
		Dodecanese Islands (h = 45 km).		
"	3	Ud	iP	21 31 59.6
		Aleutian Islands (h = 60 km).		
"	3	Um	iP	22 48 18.5
"	4	Up	iP	03 29 39.2
		Ki	eP	03 29 46
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	4	(cont.)		
		Um	iP	03 29 37.0
		Ud	iP	03 29 55.5
		Hindu Kush (h = 130 km).		
"	4	Up	iPKP	03 48 10.2
		Ud	ePKP	03 48 12
			i	03 48 22.4
		Tonga-Kermadec Islands (h = 70 km).		
"	4	Ki	iP	06 49 58.0
		Japan (h = 70 km).		
"	4	Ki	eP	07 12 37
"	4	Ki	ePKP	07 26 03
		Um	iPKP	07 26 10.3
			iSKP	07 28 45.7
		Ud	i(PKP)	07 26 10.8
			iPKP	07 26 20.8
		De	i(PKP)	07 26 18.6
		Fiji Islands (h = 580 km).		
"	4	Ki	eP	09 36 41
		Alaska (h = N).		
"	4	Um	iP	12 25 24.3
		Ud	iP	12 25 33.5
"	4	Up	iPKS	12 59 23.5
				micr sec
			Mx E	1.0 20
			Mx N	1.2 20
			Mx Z	1.6 20
		Ki	e(PKP)	12 55 36
			iPKP	12 55 40.9
				micr sec
			PKP Z'	0.2 1.7
			Mx E	0.9 18
			Mx N	1.5 21
			Mx Z	1.6 20
		Sk	iPKP	12 55 52.8
			i(PKS)	12 59 34.7
		Um	i(PKP)	12 55 39.1
			iPKP	12 55 47.2
			i	12 55 53.7
			i(PP)	12 57 29
			iPKS	12 59 01
		Ud	iPKP	12 55 55.0
		New Hebrides Islands (h = 10 km).		
		M = 5.7 (Up,Ki).		

1969 May	4	Up	iP	13 56 48.9
		Ki	iP	13 56 35.3
			ipP	13 56 46.5
		Sk	iP	13 57 04.5
		Um	iP	13 56 36.0
			isP	13 56 52.8
			iPP	13 58 13.4
		Ud	iP	13 57 05.1
			ipP	13 57 17.0
		Sinkiang. h = 55 km (Ki,Um, Ud).		
"	4	Ki	iP	17 31 41.1
				micr sec
			P Z'	0.1 1.2
		Sk	eP	17 32 01
		Um	iP	17 31 45.1
		Ud	iP	17 32 03.6
		Celebes (h = 170 km).		
"	4	Up	iPKP	18 02 43.5
		Sk	iPKP	18 02 37.0
		Um	iPKP	18 02 31.3
		Ud	iPKP	18 02 45.3
			i	18 02 49.7
		Kermadec Islands (h = 320 km).		
"	4	Um	iP	18 10 58.4 C
		Ud	iP	18 10 21.0
"	4	Sk	iP	21 33 04.1
"	5	Ki	ePKP	01 51 36
		Um	ePKP2	01 51 51
		West of Macquarie Islands (h = N).		
"	5	Ki	iPKP	02 29 03.1
			iPKP2	02 29 15.1
		Sk	iPKP2	02 29 33.6
		Um	iPKP	02 29 01.2
			iPKP2	02 29 18.1
			iPP	02 32 53.1
		West of Macquarie Islands (h = N).		
"	5	Up	iS	03 01 58
		Ki	iP	02 55 25.9
			ePa	02 58 52
			iS	03 03 24
				micr sec
			S E	0.3 6
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May 5 (cont.)

Ki			micr	sec	
	S	N	0.2	6	
	Mx	E	0.4	14	
	Mx	N	0.4	12	
	Mx	Z	0.6	12	
	D = 6400 km = 57 1/2°.				
Sk	iP		02 55 11.6		
Um	iP		02 54 59.5		
	iS		03 02 23		
	i		03 02 37		
Ud	iP		02 54 47.8		

Ethiopia (h = 35 km).

" 5

Ki	e	05 37 31
	iPKP2	05 37 36.1
Sk	ePKP2	05 37 49
Um	iPKP	05 37 18.9
	iPKP2	05 37 34.9
Ud	ePKP2	05 37 40

West of Macquarie Islands (h = N).

" 5

Up	iP		05 40 29.7 C		
	iPcP		05 43 31.2		
	ipPcP		05 43 50.9		
	iS		05 45 23		
			micr	sec	
	P	Z'	0.4	1.1	
	Mx	E	3.2	17	
	Mx	N	3.4	17	
	Mx	Z	5.4	17	
	D = 3350 km = 30°.				
Ki	iP		05 41 25.9 C		
	ipP		05 41 37.5		
	isP		05 41 46.1		
	iPcP		05 43 49.1		
	ipPcP		05 44 09.2		
	iS		05 47 02		
			micr	sec	
	P	E	0.4	5	
	P	N	0.3	5	
	P	Z	0.5	4	
	P	Z'	0.4	1.5	
	S	E	0.5	8	
	S	N	0.3	8	
	Mx	E	0.8	14	
	Mx	N	0.8	15	
	Mx	Z	1.1	13	
	D = 4000 km = 36°.				
Sk	iP		05 40 39.3 C		
	isP		05 40 59.7		

(cont.)

1969 May 5 (cont.)

Sk	iPcP	05 43 36.5
	ipPcP	05 43 53.8
Um	iP	05 41 01.4 C
	ipP	05 41 13.0
	iPcP	05 43 40.8
	ipPcP	05 44 00.5
	iS	05 46 13
Ud	iP	05 40 18.5 C
	ipP	05 40 33.3
	iPcP	05 43 28.0
	ipPcP	05 43 47.5
	iSn	05 45 52.8

Atlantic Ocean, off Portugal.
h = 70 km (Up,Ki,Sk,Um,Ud).
m = 5.8, M = 5.1 (Up,Ki).
PcP and especially pPcP are remarkably clear at our stations, a fact with interesting bearings on the focal mechanism in this area.

" 5

Up	iP	06 22 31.2

" 5

Um	iP	10 00 54.4
Ud	iP	10 01 20.6

Ryukyu Islands (h = 40 km).

" 5

Up	iP	12 21 29.7
Ud	eP	12 21 43
	i	12 21 46.7

" 5

Ki	i(Sg)	13 09 20.3

" 5

Up			---	
			micr	sec
	Mx	E	1.0	18
	Mx	N	0.9	18
	Mx	Z	1.4	18
Ki			---	
			micr	sec
	Mx	E	0.9	20
	Mx	N	0.7	18
	Mx	Z	1.4	19
Sk	ePP		14 12 29	
Um	iSKS		14 18 13	
	iSKKS		14 19 31	
	iPS		14 22 23	
	eSS		14 28 56	

Chile (h = 40 km).
M = 5.6 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	5	Up	iP	14 24 37.9
		Ki	eP	14 25 44
		Sk	eP	14 25 15
		Ud	iP	14 24 44.2
		Crete (h = 60 km).		
"	5	Sk	iPKP	14 34 52.6 C
			i	14 34 59.9
		Ud	iPKP	14 34 51.8
		De	iPKP	14 34 51.6
		South of Australia (h = 25 km).		
"	5	Sk	iP	15 10 32.9
		Um	iP	15 10 16.1
			i	15 10 33.0
		Ud	iP	15 10 46.5
		Japan (h = 100 km).		
"	5	Sk	eP	16 10 01 C
"	5	Up	iP	17 59 54.9
		Ki	iP	17 59 08.2
			i	17 59 16.1
		Um	iP	17 59 29.4
		Ud	iP	18 00 00.9 C
		Okhotsk Sea (h = 430 km).		
"	5	Ud	iP	18 35 13.5 C
"	5	Up	eP	21 36 45
"	5	Up	eP	21 51 30
			i	21 51 31.2
			iS	21 54 43.0
			iX	21 55 13.3
				micr sec
			P Z'	0.1 1.0
			S E	0.8 9
			S N	0.7 5
			Mx E	2.6 14
			Mx N	3.1 17
			Mx Z	2.3 18
			D = 1900 km = 17°.	
		Ki	iP	21 50 56.1 C
			i	21 50 59.0
			iPP	21 51 06.1
			i	21 51 18.5
			iS	21 53 44.0
			iX	21 54 03
				micr sec
			P E	1.2 8
			P N	0.4 10
		(cont.)		

1969 May	5	(cont.)		
		Ki		micr sec
			P Z	1.1 9
			P Z'	0.4 1.3
			PP Z'	0.6 1.0
			S Z'	0.1 1.0
			Mx E	8.0 15
			Mx N	6.4 14
			Mx Z	11 18
			D = 1600 km = 14 1/2°.	
		Sk	iP	21 50 36.5 C
			iPP	21 50 47.4
		Um	eP	21 51 15 C
			i	21 51 18.5
			i	21 51 20.5
			i	21 52 23.7
			iSa	21 53 41
			iS	21 54 04
			iX	21 54 30.3
			i	21 54 42.1
		Ud	iP	21 51 08.4
			i	21 51 15.1
			iS	21 53 58.0
		De	iP	21 51 43.1 C
			iPP	21 51 59.1
			iS	21 55 14.0
		Iceland (h = N).		
		Complicated beginning with a multiple P (Up,Ki,Um,Ud). The phase marked X is close to SS; it exhibits a constant group velocity of 4.10 km/sec, and could belong to higher-mode surface waves (Up,Ki,Um). This earthquake is close to the one for which R. Stefánsson made a mechanism solution (Tectonophysics, 3, 1966, pp. 209-243).		
"	5	Ki	eP	23 42 57
		Um	iP	23 43 18.4
		Ud	iP	23 43 12.9
		Iceland (h = N).		
		The small-amplitude precursors, recorded in the previous stronger shock, are not seen in this, weaker event.		
"	6	Ki	iPn	11 38 48.5
			iSn	11 39 47.1
			iLgl	11 40 06.4
			D = 530 km = 4.8°.	
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	6	(cont.)		
		Sk	iSg	11 42 35.3
		Um	iSn	11 40 26.5
			iS^x	11 40 41.6
			iSg	11 41 00.9
		Northwest Russia, 67.4°N, 33.0°E.		
		Origin time = 11 37 34.		
		Explosion?		
"	6	Sk	i(Sg)	13 03 26.0
		Um	i(Sg)	13 02 16.5
"	6	Sk	eP	13 35 31
"	6	Sk	eP	16 13 02
"	6	Um	iP	17 36 46.6
			i	17 36 53.0
"	6	Sk	i(PP)	19 51 34.0
		Yukon (h = N).		
"	6	Um	eP	22 11 04
			i	22 21 51
"	6	Up	iP	22 24 45.7
		Sk	eP	22 25 24
		Ud	iP	22 24 52.2
		De	iP	22 24 22.8
		Dodecanese Islands (h = 35 km).		
"	6	Um	iP	22 40 04.0
		Ud	eP	22 39 43
		Turkey (h = 25 km).		
"	7	Um	iP	00 00 21.8
		Iceland (h = 40 km).		
"	7	Up	iP	06 04 01.6 D
		Ud	iP	06 04 03.8
"	7	Up	iP	09 05 26.0
			ipP	09 05 59.6
			isP	09 06 19.6
				micr sec
			P Z'	0.1 1.0
		Ki	iP	09 05 07.3
			ipP	09 05 42.9
			isP	09 05 54.0
		Sk	iP	09 05 30.5
		(cont.)		

1969 May	7	(cont.)		
		Um	iP	09 05 14.1
			i	09 05 54.1
		Ud	iP	09 05 33.4
			ipP	09 06 07.0
		Samar. h = 140 km (Up,Ki,Ud).		
"	7	Up	e(PKP)	09 40 44
			iPKP	09 40 47.8
			i	09 41 03.1
			i	09 41 18.9
				micr sec
			PKP Z'	0.1 0.9
		Ki	iPKP	09 40 26.1
			i	09 40 33.4
		Sk	e(PKP)	09 40 40
			iPKP	09 40 41.8
		Um	iPKP	09 40 35.0 D
			ipPKP	09 41 17.5
		Ud	iPKP	09 40 48.3
			i	09 40 55.2
		De	iPKP	09 40 57.7
		Kermadec Islands. h = 160 km (Um).		
"	7	Ud	i(Sg)	09 47 30.3
"	7	Sk	iPg	13 04 39.8
			iSg	13 04 44.5
			iRg	13 04 46.2
		D = 40 km = 0.4°.		
		Origin time = 13 04 32.		
		Probably explosion.		
"	7	Up	iP	13 56 48.2 C
				micr sec
			P Z'	0.2 1.2
		Ki	iP	13 56 13.9 C
			i	13 56 23.1
			iPcP	13 56 34.6
				micr sec
			P Z'	0.1 1.2
			Mx E	0.3 13
			Mx N	0.3 15
			Mx Z	0.6 16
		Sk	iP	13 56 22.0 C
			i	13 57 04.3
		Um	iP	13 56 33.8 C
			iPP	13 59 17.1
		Ud	iP	13 56 40.3 C
		Nevada.		
		m = 6.0 (Up,Ki).		
		Underground explosion.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	7	Up	iP	15 24 17.0
"	7	Ud	iP	15 52 06.0 C
		Kurile Islands (h = N).		
"	7	Up	iPg	16 09 32.6
			iSn	16 09 50.9
			iSg	16 09 55.0
			iRg	16 10 00.0
			D = 190 km = 1.7°.	
		Ud	iPg	16 09 39.5
			iSg	16 10 06.1
			iRg	16 10 16.0
			D = 220 km = 2.0°.	
		De	iSn	16 10 03.3
			iSg	16 10 08.2
		Östergötland, Sweden, 58.4°N, 15.8°E.		
		Origin time = 16 09 00.		
		Probably explosion.		
"	7	Ki	iP	19 39 57.7
		Um	iP	19 40 26.5
		Ud	eP	19 40 48
			i	19 41 14.6
		Alaska (h = 25 km).		
"	7	Ki	iP	21 26 53.7
"	7	Ki	iP	21 30 25.1
"	7	Ud	eP	22 31 27
"	7	Um	ePKP	22 36 10
		New Britain (h = 50 km).		
"	8	Ki	eP	02 02 57
		Um	iP	02 03 07.2 C
		Mariana Islands (h = 50 km).		
"	8	Sk	iP	02 59 38.4
		Um	eP	02 59 12
			i	02 59 21.9
		Japan (h = 50 km).		
"	8	Sk	eSg	10 58 41
		Um	iSg	10 57 25.7
		Ud	eLgl	10 57 55
		Esthonia, 59.7°N, 25.6°E.		
		Origin time = 10 54 44.		
		Explosion?		
"	8	Ki	iPn	11 18 27.1
			iSn	11 19 26.0
			iLgl	11 19 45.4
			D = 540 km = 4.9°.	
		Sk	eSg	11 22 17
		(cont.)		

1969 May	8	(cont.)		
		Um	iSg	11 20 41.5
		Northwest Russia, 67.5°N, 33.3°E.		
		Origin time = 11 17 11.		
		Explosion?		
"	8	Up	i(P)	11 48 43.9
			i	11 48 59.6
			i	11 49 18.5
			i	11 50 06.6
		Um	i(Sg)	11 51 29.1
		Ud	i(P)	11 49 42.5
"	8	Ki	iPn	12 20 23.3
			iSn	12 21 10.7
			iLgl	12 21 24.3
			D = 440 km = 4.0°.	
		Origin time = 12 19 19.		
"	8	Ki	iPn	13 11 03.5
			iSn	13 11 52.5
			iLgl	13 12 05.6
			D = 460 km = 4.1°.	
		Origin time = 13 09 58.		
"	8	Um	iP	13 50 57.5
"	8	Up	iPg	15 01 16.5
			iSg	15 01 32.6
			iRg	15 01 41.0
			iX	15 05 47.2
			i	15 05 55.3
		Um	iLgl	15 03 35.0
			iSg	15 03 45.6
		Ud	iPg	15 01 40.3
			iSg	15 02 16.2
			iRg	15 02 32.9
		De	iRg	15 02 38.0
		Baltic Sea, 58.4°N, 17.9°E.		
		Origin time = 15 00 46.		
		Probably underwater explosion.		
"	8	Up	iPg	15 17 52.0
			iSg	15 18 13.2
			iX	15 22 28.4
		Um	iLgl	15 20 06.4
		Ud	iPg	15 18 18.2
			iSg	15 18 53.2
		De	iRg	15 19 21.7
		Baltic Sea, near location of previous event.		
		Origin time = 15 17 24.		
		Probably underwater explosion.		
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May 8 (cont.)
The phases marked X (Up) correspond to each other in the two cases; however, their travel times are very large (far too large even if they were T-phases), and therefore they may be due to separate events.

"	8	Up	iP	17 02 53.2
"	8	Ud	iP	17 57 44.1
			i	17 58 09.8
		Tadzhik SSR (h = N).		
"	8	Up	iP	18 26 34.6
"	8	Ki	iPg	18 49 04.1
			iSg	18 49 16.2
			iRg	18 49 18.8
			D = 110 km = 1.0°.	
		Sk	eSg	18 51 24
		Um	iSg	18 50 30.5
		Swedish Lapland, 67.0°N, 21.5°E.		
		Origin time = 18 48 44.		
		Probably explosion.		
"	8	Ud	iP	20 29 37.4 C
"	9	Ki	e(P)	02 06 16
"	9	Up	iP	02 42 25.9
"	9	Up	iP	07 14 33.3
			i	07 14 45.0
		Sk	iP	07 15 13.2
		Um	iP	07 15 13.3
			i	07 15 23.3
		Ud	iP	07 14 39.8
			i	07 14 52.7
		De	iP	07 14 03.2
			i	07 14 10.0
		Greece (h = 15 km).		
		If the second phases at Up, Um,Ud are interpreted as pP, the depth becomes 60 km.		
"	9	Ud	i(Sg)	12 58 06.4
"	9	Up	iP	13 05 03.3
"	9	Ud	iP	15 52 28.0
			i	15 52 36.9
"	9	Ud	iP	16 00 27.6

1969 May 9

	Up	iP	17 10 26.4
	Ki	iP	17 09 37.9
	Sk	iP	17 10 13.0
	Um	iP	17 10 00.9
	Ud	iP	17 10 31.6
	De	iP	17 10 52.0
	Kurile Islands (h = N).		
" 9	Um	i(P)	18 16 17.8
" 9	Ud	iP	19 37 43.6
	Aleutian Islands (h = 70 km).		
" 9	Up	iP	19 51 23.9
" 10	Um	iSKS	01 57 33
	Hawaii (h = 10 km).		
" 10	Ki	iP	02 17 10.5
	Um	eP	02 17 48
	Ud	iP	02 18 37.9
	De	iP	02 19 16.2
	Arctic Ocean.		
" 10	Ud	iP	04 05 19.1
		i	04 05 28.6
" 10	Ki	iPn	08 45 48.0
		iSn	08 46 42.1
		iLgl	08 47 00.7
		D = 500 km = 4.5°.	
	Sk	iSg	08 49 35.2
	Um	iSn	08 47 26.9
		i	08 47 43.8
		iSg	08 48 12.1
	Northwest Russia, 68.0°N, 32.4°E.		
	Origin time = 08 44 38.		
	Explosion?		
" 10	Up	iP	09 34 40.4
		i	09 34 48.4
		iS	09 40 06
		D = 3800 km = 34°.	
	Ki	iP	09 35 39.6
		i	09 35 41.9
		i	09 35 46.9
	Sk	iP	09 35 19.0
	Um	iP	09 35 07.2
	Ud	iP	09 34 50.2
	De	eP	09 34 25
		i	09 34 27.7
	Red Sea (h = N).		
" 10	Up	iPKP	12 25 44.1 D

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
May 10 (cont.)

Up		micr	sec
	PKP Z'	0.1	0.5
Ki	ePKP	12 25 27	
Sk	ePKP	12 25 36	
Um	iPKP	12 25 30.4	
Ud	iPKP	12 25 45.8 D	
De	iPKP	12 25 55.3 D	
	i	12 26 02.0	

Kermadec Islands (h = 200 km).

" 10	Up	iP	13 08 18.9
		i	13 08 36.3
		iS	13 16 54
		D = 7100 km = 64°.	
	Ki	iP	13 07 24.9 C
		i	13 07 31.7
		micr	sec
		P Z' 0.1	1.0
	Sk	iP	13 07 51.9 C
	Um	iP	13 07 52.9
		eS	13 16 09
	Ud	iP	13 08 15.7 C
	De	iP	13 08 39.8 C

Kodiak Island (h = N).

" 10	Up	iP	13 37 22.0
	Ki	iP	13 38 17.7
	Um	iP	13 37 53.8
	Ud	iP	13 37 10.5
	De	iP	13 36 49.6

Atlantic Ocean, off Portugal (h = N).

" 10	Up	iP	13 51 01.4
" 10	Ki	iP	17 00 59.6
" 10	Um	iP	17 20 47.6
		i	17 20 56.0
" 10	Up	iPKP	20 25 07.0
	Sk	iPKP	20 24 58.9
	Ud	iPKP	20 25 08.1
	De	iPKP	20 25 18.3 C
		i	20 25 24.5

Kermadec Islands (h = 35 km).

" 10	Ki	iP	20 34 27.7
" 10	Up	iP	21 14 53.0
	Ki	iP	21 16 12.4

(cont.)

1969
May 10 (cont.)

Sk	iP	21 15 38.1
Um	eP	21 15 34 C
	i	21 15 39.9
Ud	iP	21 15 00.1
De	iP	21 14 21.1
	i	21 14 24.9

Albania (h = 40 km).

" 11	Up	iP	00 28 02.0
		ipP	00 28 08.4
		eS	00 35 35
		micr	sec
		pP Z' 0.1	1.2
		D = 5950 km = 53 1/2°.	
	Ki	iP	00 28 35.3
	Sk	iP	00 28 39.7 C
	Um	iP	00 28 15.4
		ipP	00 28 22.0
		eS	00 36 00
	Ud	iP	00 28 13.8
		ipP	00 28 21.6
	De	iP	00 27 59.4 C
		ipP	00 28 05.5

Arabian Sea. h = 25 km (Up, Um,Ud,De).

" 11	Up	iP	00 47 52.9
	Sk	iP	00 48 32.2
	Ud	iP	00 48 01.5 C
	De	iP	00 47 30.4

Dodecanese Islands (h = 60 km).

" 11	Up	iPKP	00 58 53.4
		i	00 58 57.4
		i	00 59 01.1
	Ki	iPKP	00 58 37.0
	Sk	iPKP	00 58 46.0 C
		i	00 58 49.8
	Um	iPKP	00 58 41.2 C
	Ud	iPKP	00 58 54.6 C
		i	00 58 59.1
	De	iPKP	00 59 03.4
		i	00 59 07.8

Kermadec Islands (h = 35 km).

" 11	Um	eP	03 42 38

Talaud Islands (h = 60 km).

" 11	Ud	iP	10 04 13.2 C
" 11	Up	iP	10 53 35.1
	Ki	eP	10 52 49

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
May 11 (cont.)

Um	iP	10 53 09.3
Ud	iP	10 53 41.5

Kurile Islands (h = 110 km).

"	11	Up	iP	12 22 57.6
		Ki	iP	12 22 29.8
			i	12 22 35.1
		Sk	iP	12 22 54.9
		Um	iP	12 22 41.6
		Ud	iP	12 23 05.0

Mariana Islands (h = 140 km).

"	11	Um	eP	13 24 07
		Ud	iP	13 24 25.9

Hindu Kush (h = 110 km).

"	11	Ki	ePKP	13 28 45

South Sandwich Islands (h = 35 km).

"	11	Um	ePKP	14 36 33
			iPKS	14 40 08
		Ud	ePKP	14 36 35
		De	iPKP	14 36 45.0 C

Tonga Islands (h = N).

"	11	Ud	iP	15 32 37.1
"	11	Um	iP	15 36 57.9
		Ud	iP	15 36 22.7
"	11	Ud	iP	15 37 34.1
		De	iP	15 37 00.7

Dodecanese Islands (h = N).

"	11	Ud	iP	15 39 23.4
			i	15 39 28.9
"	11	Ud	iP	16 28 40.4

Dodecanese Islands (h = 30 km).

"	11	Sk	eP	16 52 54
"	11	Ud	iP	17 10 41.4
"	11	Um	iP	18 42 33.8
		Ud	iP	18 43 03.8
"	11	Up	iP	18 58 30.2
		Sk	iP	18 59 12.3
		Um	iP	18 59 10.7
			i	18 59 21.7

(cont.)

1969
May 11 (cont.)

Ud	iP	18 58 37.0
	i	18 58 41.5

USCGS reports an earthquake in Alaska, origin time 18 50 12.4, but these P-phases belong to a different earthquake.

"	11	Up	iP	20 12 20.4 C
		Ki	iP	20 11 48.5
		Um	iP	20 11 55.3
			i	20 12 03.7
		Ud	eP	20 12 15
"	12	Ud	iP	05 04 14.8 C
"	12	Ud	iP	14 51 15.3
"	12	Sk	e(Sg)	16 02 56
		Um	i(Sg)	16 01 41.4

Cf May 6, 13 02.

"	12	Up	iP	16 42 15.5
		Sk	iP	16 42 54.6
		Ud	iP	16 42 22.8
			i	16 42 30.5

Greece (h = 90 km).

"	12	Ud	iP	17 29 07.4

South Atlantic Ocean (h = N).

"	12	Um	iP	19 04 11.2 C
		Ud	iP	19 04 40.2

Japan (h = 50 km).

"	12	Up	iP	19 16 52.1
		Ki	iP	19 17 24.4
		Sk	iP	19 17 25.7
		Um	iP	19 17 03.4
		Ud	iP	19 17 07.7
		De	iP	19 16 53.2

Iran (h = 50 km).

"	12	Sk	iP	19 24 14.9
		Ud	iP	19 23 42.7
			i	19 24 13.9
		De	iP	19 23 13.0

Crete (h = 20 km).

"	12	Ud	iP	19 33 00.9
"	12	Ki	eP	21 32 22

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	12	Up	iP	22 01 45.6
"	13	Um	iP	04 05 57.0
		Japan (h = 70 km).		
"	13	Ud	iP	04 30 15.1
"	13	Ki	iP	05 26 02.2
"	13	Um	iP	06 13 28.6
			i	06 13 41.6
		Molucca Passage (h = 15 km).		
"	13	Up	iP	10 11 56.5
		Ki	iP	10 12 02.0
			ipP	10 12 08.1
		Sk	iP	10 12 21.3
			iPP	10 13 58.7
		Um	iP	10 11 52.8
			ipP	10 11 56.8
		Ud	iP	10 12 13.5
		De	iP	10 12 11.1
			ipP	10 12 16.6
		Tadzhik SSR. h = 25 km (Ki, Um,De).		
"	13	Ki	iP	10 12 58.8
		De	iP	10 14 03.5
		Alaska (h = N).		
"	13	Ud	iP	10 23 59.9
"	13	Up	iRg	11 03 39.4
		Ud	iRg	11 03 32.1
		Explosion of 2.5 ton explosives in the copper mine at Falun, Sweden.		
"	13	Sk	eP	11 23 46
		Ud	iP	11 23 14.2
		De	iP	11 22 38.5
"	13	Ki	iPn	12 06 11.6
			iSn	12 07 10.1
			iLgl	12 07 29.7
			D = 530 km = 4.8°.	
		Um	iSg	12 08 25.3
		Ud	iSg	12 10 56.2
		Northwest Russia, 67.5°N, 33.1°E. Origin time = 12 04 58. Explosion?		

1969 May	13	Ki	iPn	12 10 32.0
			iSn	12 11 31.3
			iLgl	12 11 50.5
			D = 540 km = 4.9°.	
		Um	iSg	12 12 46.3
		Ud	iSg	12 15 19.1
		Northwest Russia, 67.4°N, 33.3°E. Origin time = 12 09 16. Explosion? This and the preceding event have occurred at a mutual distance of about 10 km, and at a time interval of 4 min 18 sec; the second is somewhat bigger than the first one.		
"	13	Um	iP	12 50 23.0
"	13	Up	iP	12 58 47.1
				micr sec
			P Z'	0.2 0.5
"	13	Up	iP	14 29 31.4
			iPP	14 32 52
			eS	14 39 58
				micr sec
			PP Z	1.2 8
			Mx E	11 22
			Mx N	5.4 22
			Mx Z	15 23
			D = 9700 km = 87 1/2°.	
		Ki	iP	14 29 23.1 C
			iPP	14 32 45.4
			eS	14 40 01
				micr sec
			P Z'	0.2 1.5
			S E	3.0 16
			Mx E	18 17
			Mx N	10 17
			Mx Z	27 17
		Sk	iP	14 29 13.5
			iPP	14 32 21.9
		Um	iP	14 29 29.1 C
			iPP	14 32 52
			iS	14 39 57
			iScS	14 40 16
		Ud	iP	14 29 20.3
			i	14 29 37.8
			ipP	14 29 53.4

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May 13 (cont.)

De	iP		14 29 25.5	
	ipP		14 29 47.1	

Nicaragua. h = 80 km (Ud,De).
m = 6.2, M = 6.5 (Up,Ki).

" 13

Up	iP		14 31 08.0	
			micr	sec
	P	Z'	0.1	0.8
Ki	iP		14 30 29.3	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		14 31 02.3	
Um	iP		14 30 46.3	C
	i		14 30 57.6	
Ud	iP		14 31 15.7	C
De	iP		14 31 30.4	

Japan (h = 80 km).
m = 6.0 (Up,Ki).

" 13

Up	iP		14 43 13.3	
	iPP		14 47 39.2	
			micr	sec
	P	Z'	0.1	0.7
	PP	Z'	0.2	1.3
Ki	iP		14 43 02.7	
	ipP		14 45 19.8	
	iPP		14 47 15.2	
	iSKS		14 52 43.6	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		14 43 22.5	
	i(PP)		14 47 32.4	
	ePKKP		14 59 03	
Um	eP		14 43 05	
	i		14 43 26.8	
	iPP		14 47 21.4	
	i		14 51 23.1	
	iSKS		14 52 45.7	
Ud	iP		14 43 21.8	C
	ipP		14 45 38.9	
	iPP		14 47 48.3	
De	iP		14 43 25.4	
	ipP		14 45 43.2	
	i(PP)		14 47 34.8	
	iPP		14 47 53.1	

Flores Sea. h = 640 km (Ki, Ud,De).
m = 6.3 (Up,Ki).
(PP) at Sk,De denote early arrivals within the PP-group.

" 13

De	iP		16 48 11.6	

" 13

Up			---	
			micr	sec
	Mx	E	1.1	22
	Mx	N	0.8	20

(cont.)

1969 May 13 (cont.)

Up			micr	sec
	Mx	Z	1.4	22
Um	iP		17 51 08.7	

Nicaragua (h = 50 km).

" 13

Sk	iP		17 53 37.6	
Um	iP		17 53 26.1	
Ud	eP		17 53 03	

Turkey (h = 40 km).

" 14

Up	iP		00 50 23.0	
Um	iP		00 50 41.7	C

Iran-USSR (h = 35 km).

" 14

Up	i(Sg)		02 39 29.5	

" 14

Ud	i(Sg)		02 57 43.2	

" 14

Um	eP		05 23 10	

" 14

Up	iP		08 18 04.3	
Sk	iP		08 18 43.1	
Ud	iP		08 18 12.5	C
De	iP		08 17 42.4	C

Dodecanese Islands (h = 30 km).

" 14

Up	iP		10 10 40.0	D
	i		10 10 56.8	
	i		10 11 07.8	
	iPcP		10 14 13.4	
	iS		10 15 05	
			micr	sec
	P	Z'	0.1	0.6
	S	N	0.8	4
	Mx	E	4.2	20
	Mx	N	2.8	20
	Mx	Z	2.4	13
	D = 2800 km = 25°.			
Ki	iP		10 11 46.3	D
	i		10 11 51.6	
			micr	sec
	P	Z'	0.1	0.8
	Mx	E	1.9	12
	Mx	N	1.0	15
	Mx	Z	1.7	13
Sk	iP		10 11 19.5	D
Um	iP		10 11 10.6	
	iPcP		10 14 21.5	
	iS		10 16 10	
	iSa		10 16 31	
Ud	iP		10 10 48.8	D
De	iP		10 10 17.8	D
	iS		10 14 30.4	

Dodecanese Islands (h = 35 km).
m = 5.7, M = 5.1 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
May 14 Ud iP 10 24 40.3

" 14 Ki iPn 10 50 47.2
iSn 10 51 46.8
iLgl 10 52 05.5
D = 560 km = 5.0°.
Sk eSg 10 54 41
Um iSg 10 53 03.6
Northwest Russia,
67.5°N, 33.6°E.
Origin time = 10 49 29.
Explosion?

" 14 Ki iPn 12 35 49.0
iSn 12 36 27.6
iSg 12 36 40.7
D = 360 km = 3.2°.
Um iSg 12 38 06.3
Probably northwest Russia.
Origin time = 12 34 56.
Explosion?

" 14 De iPKP 12 42 08.9
South Sandwich Islands
(h = 170 km).

" 14 Um i(P) 13 50 46.4
South of Alaska (h = 20 km).

" 14 Up ---
micr sec
Mx E 0.7 19
Mx Z 1.1 23
Ki ---
Mx E 0.9 18
Mx N 0.8 18
Mx Z 1.5 18
Um iP 14 01 48.6
i 14 01 54.5
Nicaragua (h = 60 km).
M = 5.3 (Up,Ki).

" 14 Up iP 14 49 45.7
Ud iP 14 49 40.2
i 14 50 11.3

" 14 Up iP 19 43 54.2 C
iPa 19 48 07
iS 19 52 45
iP'P' 20 11 58.0
i 20 12 06.2
(cont.)

1969
May 14 (cont.)
Up micr sec
P N 2.6 1
P Z 4.7 1
P Z' 2.2 0.7
S E 1.4 6
S N 7.3 10
Mx E 47 19
Mx N 56 19
Mx Z 52 19
D = 7550 km = 68°.
Ki iP 19 43 01.5 C
iPP 19 45 14
iS 19 51 10
iP'P' 20 12 23.4
micr sec
P E 1.4 15
P N 4.4 10
P Z 9.3 10
P Z' 1.6 1.0
PP N 3.5 9
S E 4.6 15
S N 9.0 12
P'P' Z' 0.1 1.5
Mx E 39 17
Mx N 43 18
Mx Z 77 18
D = 6700 km = 60 1/2°.
Sk iP 19 43 34.2 C
iP'P' 20 12 14.6
Um iP 19 43 27.3 C
iPcP 19 44 00.1
i 19 44 37.0
iPcS 19 48 07.1
iS 19 51 57
iP'P' 20 12 11.0
i 20 12 20.5
Ud iP 19 43 54.9 C
iP'P' 20 12 02.6
i 20 12 10.5
De iP 19 44 17.1 C
i 19 45 27.5
Aleutian Islands (h = 20 km).
m = 7.2, M = 6.9 (Up,Ki).

" 14 Ud iP 19 57 22.3

" 14 Ud iP 20 18 39.9
Aleutian Islands (h = N).

" 14 Up iP 20 21 40.3
micr sec
P Z' 0.2 0.7
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May 14 (cont.)

Ki	iP	20 20 47.0	
		micr	sec
	P Z'	0.1	1.0
Sk	iP	20 21 20.0	
Um	iP	20 21 12.9	
Ud	iP	20 21 40.9	
De	iP	20 22 02.9	

Aleutian Islands (h = 15 km).
m = 6.2 (Up,Ki).

" 14	Ud	iP	20 23 18.5
" 14	Up	eP	20 45 12
	Ki	eP	20 44 28
	Sk	iP	20 45 02.7
	Um	iP	20 44 48.3
	Ud	iP	20 45 18.2

Kurile Islands (h = N).

" 14	Ud	iP	21 00 48.5
" 14	Ki	iP	21 23 40.0
" 14	Up	iP	22 57 29.8
	Ud	iP	22 57 30.5
		i	22 57 37.2

Aleutian Islands (h = 35 km).

" 14	Ud	iP	23 51 32.0
" 15	Sk	eP	00 03 08
	Um	iP	00 02 59.1
	Ud	eP	00 02 36

Turkey (h = 40 km).

" 15	Up	iP	02 07 41.0
		iScS	02 17 40
	Ki	iP	02 07 07.5
	Sk	iP	02 07 37.4
	Um	iP	02 07 18.6
		i	02 07 28.7
		iS	02 16 25
		iSS	02 20 55
	Ud	iP	02 07 48.3
	De	eP	02 08 05

Japan (h = 60 km).

" 15	Up	iP	02 32 38.8
	Ud	iP	02 32 39.9 C

Aleutian Islands (h = 30 km).

1969 May 15

Up	iP	02 33 47.8	
Ud	eP	02 33 48	

Aleutian Islands.
Origin time = 02 22 50.

" 15	Ki	iPn	02 52 43.3
		iP^x	02 52 52.8
		eSn	02 53 34
		iLgl	02 53 49.3
		D = 480 km = 4.3°.	
	Sk	iSg	02 56 47.2
	Um	iSn	02 54 57.5
		iS^x	02 55 28.2
		iSg	02 55 41.8

North Norway.
Origin time = 02 51 35.
Explosion?

" 15	Up	iP	03 40 32.8
	Ki	iP	03 39 45.5
	Sk	eP	03 40 21
	Um	iP	03 40 07.2
	Ud	eP	03 40 39

Kurile Islands (h = 35 km).

" 15	Up	iP	03 57 47.7

Aleutian Islands (h = 25 km).

" 15	Up	iP	08 05 24.4
	Ki	eP	08 05 05 C
	Sk	eP	08 05 29
	Um	iP	08 05 11.1 C
	Ud	iP	08 05 33.4 C

Luzon (h = 60 km).

" 15	Up	iP	09 46 53.6

Aleutian Islands (h = 40 km).

" 15	Up	iP	12 11 19.7	
		iPP	12 11 49.2	
		iS	12 15 52	
			micr	sec
		Mx E	1.6	17
		Mx N	1.0	16
		Mx Z	0.8	13
		D = 2800 km = 25°.		
	Ki	iP	12 12 25.5	
			micr	sec
		Mx E	0.9	12
		Mx N	0.4	10
		Mx Z	0.4	10

(cont.)

Up =Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
May 15 (cont.)

Sk	iP	12 11 59.1	
Um	iP	12 11 51.4	
	eS	12 16 39	
	eSa	12 17 16	
Ud	iP	12 11 28.0	
De	iP	12 10 57.6	
	i	12 11 13.5	

Dodecanese Islands
(h = 30 km).
M = 4.8 (Up,Ki).

" 15

Up	eP	13 13 33	
Ki	iP	13 14 30.6	
Um	iP	13 13 57.3	

Turkey (h = 40 km).

" 15

Up	iP	14 00 36.2	
	iPP	14 01 04.2	
Ki	iP	14 01 42.5	
Sk	eP	14 01 15	
Ud	iP	14 00 44.7	C

Dodecanese Islands
(h = 50 km).

" 15

Up	iP	20 47 39.5		
	iPP	20 49 15		
	iPcP	20 49 26.8		
	eS	20 54 08		
		micr	sec	
	P	Z' 0.2	1.0	
	D = 4700 km = 42 1/2°.			
Ki	iP	20 47 50.4		
		micr	sec	
	P	Z' 0.2	1.5	
Sk	iP	20 48 05.8		C
	iPP	20 49 56.2		
Um	iP	20 47 38.9		
	i	20 48 09.0		
	iPP	20 49 21		
	iS	20 54 16		
	iSS	20 56 59		
Ud	iP	20 47 56.2		C
De	iP	20 47 52.4		
	iPcP	20 49 39.4		

Afghanistan (h = 20 km).
m = 5.8 (Up,Ki).

" 15

Up	iP	20 54 42.5		C
	ipP	20 54 52.0		
	iS	21 03 48		
		micr	sec	
	pP	Z' 0.4	1.2	

(cont.)

1969
May 15 (cont.)

Up			micr	sec
	S	E	0.5	5
	S	N	0.8	5
	Mx	E	1.0	20
	Mx	N	1.2	20
	Mx	Z	1.4	18
	D = 7850 km = 70 1/2°.			
Ki	iP		20 54 50.2	C
	ipP		20 55 01.0	
	iS		21 04 06	
			micr	sec
	P	E	0.4	5
	P	Z	0.4	5
	P	Z'	0.1	1.0
	pP	Z'	1.0	1.6
	S	E	0.8	6
	Mx	E	1.6	21
	Mx	N	0.8	22
	Mx	Z	3.1	22
	D = 7950 km = 71 1/2°.			
Sk	iP		20 54 27.7	C
	ipP		20 54 38.4	
Um	iP		20 54 49.1	C
	ipP		20 54 59.3	
	iS		21 04 04	
Ud	iP		20 54 29.0	
	ipP		20 54 39.7	
De	iP		20 54 29.6	
	ipP		20 54 38.9	
	i		20 54 48.0	

Leeward Islands. h = 40 km
(Up,Ki,Sk,Um,Ud,De).
m = 6.4, M = 5.3 (Up,Ki).
pP is considerably bigger than P at all our stations (Z'). The alternative suggestion of a double shock does not seem to be corroborated by the S-phases.

" 15

Up	iSKS	23 01 27
Ki	e(pP)	22 52 56
	iPP	22 55 26.2
	eSKS	23 01 14
Sk	ePP	22 55 56
Um	iPP	22 55 41.2
	iSKS	23 01 18

Flores Sea (h = 460 km).

" 16

Up	iP	04 09 52.0		
	iPn	04 10 58.1		
		micr	sec	
	P	Z' 0.1	0.5	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May 16 (cont.)

Ki	iP		04 09 37.1	C
	iPn		04 10 37.2	
			micr	sec
	P	Z'	0.1	0.6
Sk	iP		04 10 08.3	
	iPP		04 11 30.7	
Um	iP		04 09 37.2	
	iPn		04 10 36.5	
	iPP		04 10 52.3	
Ud	iP		04 10 09.1	C
	iPn		04 11 22.0	
De	iP		04 10 16.0	
	i		04 10 26.8	
	iPn		04 11 30.6	

Kazakh SSR.
m = 6.0 (Up,Ki).
Underground explosion.

" 16

Up	eP		05 14 52	
Ki	iP		05 16 03.9	C
Sk	iP		05 15 34.5	
	i		05 15 45.9	
Um	iP		05 15 26.7	
Ud	iP		05 15 03.0	
De	iP		05 14 30.7	

Crete (h = 30 km).

" 16

Up	iP		07 07 36.5	
			micr	sec
	P	Z'	0.2	1.0
Ki	iP		07 07 02.2	D
			micr	sec
	P	Z'	0.1	0.8
Sk	iP		07 07 33.9	
Um	eP		07 07 16	
Ud	iP		07 07 43.8	
De	iP		07 07 57.1	

Japan (h = 410 km).
m = 5.6 (Up,Ki).

" 16

Up	iPKP		07 22 56.5	C
			micr	sec
	PKP	Z	0.5	5
	PKP	Z'	0.2	1.0
	Mx	E	0.6	22
	Mx	N	0.8	19
	Mx	Z	1.0	20
Ki	iPKP		07 22 42.5	
	ePKS		07 26 15	
			micr	sec
	PKS	N	0.4	9
	Mx	N	0.9	21
	Mx	Z	1.6	20
Sk	ePKP		07 22 46	
	e		07 22 59	
Um	iPKP		07 22 42	C

(cont.)

1969 May 16 (cont.)

Um	i		07 22 51.5	
	iPP		07 25 51	
Ud	iPKP		07 22 56.9	
De	iPKP		07 23 07.7	C
	i		07 23 19.6	

Kermadec Islands (h = 50 km).
M = 5.6 (Up,Ki).

" 16

Up	iP		07 31 39.3	
	i		07 31 40.6	
	iS		07 35 29	
			micr	sec
	P	N	0.5	6
	P	Z'	0.1	0.5
	S	E	0.4	8
	Mx	E	2.0	12
	Mx	N	3.0	10
	Mx	Z	2.2	10

D = 2350 km = 21°.

Ki	iP		07 32 55.1	
			micr	sec
	P	Z'	0.1	1.0
	Mx	E	1.2	10
	Mx	N	0.8	10
	Mx	Z	1.0	10
Sk	iP		07 32 22.3	
	i		07 32 23.3	
Um	iP		07 32 19.1	
	iPP		07 32 55.7	
	iS		07 36 33	
Ud	iP		07 31 46.5	
	i		07 31 51.2	
De	iP		07 30 09.5	
	i		07 31 10.7	
	i		07 31 15.1	

Greece (h = 20 km).
m = 5.3, M = 5.0 (Up,Ki).
Multiple P.

" 16

Up	iP		07 39 23.0	
Sk	iP		07 39 34.1	
Um	iP		07 39 32.6	

" 16

Sk	iSg		11 11 28.0	
	i		11 11 37.6	
Um	iSg		11 10 08.6	
Ud	iLgl		11 10 37.7	
	iSg		11 10 48.2	

Esthonia, 59.7°N, 25.6°E.
Origin time = 11 07 27.
Explosion?

" 16

Ki	iPn		11 29 14.1	
	iSn		11 30 13.1	
	iLgl		11 30 32.4	

D = 560 km = 5.0°.

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	16	(cont.)		
		Sk	iSg	11 33 01.0
		Um	iSg	11 31 27.0
		Northwest Russia, 67.4°N, 33.5°E. Origin time = 11 27 55. Explosion?		
"	16	Ki	e(Pn)	13 31 01
			iSn	13 31 44.2
			iSg	13 32 04.4
		Um	iSg	13 33 00.7
			i	13 33 12.6
		Probably northwest Russia. Explosion?		
"	16	Up	iP	16 31 25.1
			ipP	16 31 39.1
		Ki	iP	16 31 25.1
			ipP	16 31 40.6
		Um	iP	16 31 21.7
			ipP	16 31 36.2
		Ud	iP	16 31 34.6
			ipP	16 31 48.8
		De	iP	16 31 33.7
			ipP	16 31 48.5
		Sumatra. h = 55 km (Up,Ki, Um,Ud,De).		
"	16	Sk	iP	18 28 39.0
"	16	Ki	iP	19 16 07.8
"	16	Ud	iP	22 35 04.2
"	17	Up	iP	00 04 58.9
"	17	Ud	e(Sg)	03 47 11
"	17	Ki	iPn	12 34 46.2
			iP^x	12 34 55.3
			iSn	12 35 35.0
			iLgl	12 35 48.7
			D = 460 km = 4.1°.	
		Sk	eLgl	12 38 25
			iSg	12 38 40.6
		Um	eSg	12 37 17
		Northwest Russia, 68.8°N, 31.4°E. Origin time = 12 33 41. Explosion?		

1969 May	17	Up	iP	15 42 37.2
		Ki	eP	15 41 44
		Sk	eP	15 42 17
		Um	iP	15 42 09.9
		Ud	iP	15 42 38.3
		Aleutian Islands (h = 55 km).		
"	17	Ud	iP	19 24 38.2
			i	19 24 47.0
"	18	Ki	iPKP	00 34 11.4
		Um	iPKP	00 34 16.7
		De	iPKP	00 34 31.6
		Solomon Islands (h = 15 km).		
"	18	Up	iP	00 49 17.8
			i	00 49 33.8
		Ki	iP	00 48 24.0
		Um	iP	00 48 50.0
		Ud	iP	00 49 19.1
		Aleutian Islands (h = 35 km).		
"	18	Up	iP	03 17 10.1
		Ki	eP	03 17 48
		Um	iP	03 17 23.7
		Ud	iP	03 17 25.4
"	18	Up	iP	08 54 07.7 C
			ipP	08 54 12.4
			iS	09 02 15
				micr sec
			P Z'	0.1 1.2
			D = 6650 km = 60°.	
		Ki	iP	08 53 12.4 C
			ipP	08 53 17.3
				micr sec
			P Z'	0.2 1.0
			Mx E	0.5 15
			Mx N	0.8 18
			Mx Z	1.6 20
		Sk	iP	08 53 38.7 C
			ipP	08 53 43.2
			iX	08 54 06.1
		Um	iP	08 53 41.1 C
			ipP	08 53 46.1
			i	08 53 50.4
			iX	08 54 03.4
			iS	09 01 17
		Ud	iP	08 54 03.4 C
			ipP	08 54 08.9
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	18	(cont.)		
		De	iP	08 54 28.4 C
			ipP	08 54 33.6
			iX	08 54 51.3
		Alaska. h = 20 km (Up,Ki, Sk,Um,Ud,De).		
		m = 5.9 (Up,Ki).		
		The phases marked X may be P of a different earthquake.		
"	18	Ki	iP	09 58 42.6
		Ud	iP	09 59 07.3
		Halmahera (h = 110 km).		
"	18	Ki	iPn	10 48 08.1
			iP^X	10 48 16.1
			iSn	10 48 53.4
			iLgl	10 49 07.4
			D = 410 km = 3.7°.	
		Sk	iSg	10 51 35.2
		Um	iSn	10 49 33.6
			iSg	10 50 05.4
		Ud	iLgl	10 52 29.5
			i	10 52 35.1
		Northwest Russia, 67.4°N, 30.1°E.		
		Origin time = 10 47 09.		
		Explosion?		
"	18	Up	iP	10 57 19.0 D
		Um	iP	10 56 53.9
		Ud	iP	10 57 24.7
		Kurile Islands (h = 50 km).		
"	18	Ud	eP	13 42 52
		De	iP	13 42 34.7
		Indian Ocean (h = N).		
"	18	Ki	iPKP	14 03 16.8
		Um	iPKP	14 03 23.5
		Ud	iPKP	14 03 33.4
		New Hebrides Islands (h = 130 km).		
"	18	Up	iP	20 34 18.0
"	18	Up	iP	21 07 25.4
		Ki	iP	21 06 42.9 C
		Sk	iP	21 07 19.3
			i	21 07 39.7
		Um	iP	21 07 01.6
		Ud	iP	21 07 32.7 C
		Japan (h = 50 km).		
1969 May	18	Sk	iP	23 09 48.2
		Um	iP	23 09 31.1
		Japan (h = 40 km).		
"	19	Um	eP	02 42 03
"	19	De	iPKP	05 56 52.8
		Tonga Islands (h = N).		
"	19	Up	iP	10 09 22.0
		Ki	iP	10 09 29.9
		Sk	iP	10 09 47.4
		Um	iP	10 09 19.6
		Ud	iP	10 09 38.0
		Hindu Kush (h = 140 km).		
"	19	Sk	eP	10 13 49
			e	10 15 05
"	19	Um	iP	15 32 49.4
"	19	Up	eP	18 19 21
		Sk	iP	18 19 10.2
"	19	Up	iP	18 19 52.7
			iS	18 24 13
			D = 2850 km = 25 1/2°.	
		Ki	iP	18 20 41.0
		Um	iP	18 20 11.4
			i	18 20 36.1
			eS	18 25 01
		Ud	iP	18 20 10.5
			i	18 20 27.7
		De	iP	18 19 32.0
			i	18 19 37.7
		Turkey (h = 35 km).		
"	19	Sk	iP	18 27 37.4
"	20	Sk	eP	00 32 39
		Alaska (h = 80 km).		
"	20	Up	iPKP	01 21 02.0
			ipPKP	01 21 06.6
		Ki	ePKP	01 20 44
			ipPKP	01 21 48.1
		Sk	iPKP	01 20 55.6
		Um	iPKP	01 20 50.3 C
			ipPKP	01 20 55.1
			i	01 21 42.1
		Ud	iPKP	01 21 04.0
		De	iPKP	01 21 12.2
		Kermadec Islands. h = 15 km (Up,Ki,Um).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	20	Sk	ePKP	03 28 21
		Ud	i	03 28 55.4
		South Pacific Ocean (h = N).		
"	20	Up	iSg	10 50 25.1
		Ud	iSg	10 50 29.3
		De	iPg	10 48 26.8
			iSg	10 48 42.6
			D = 130 km = 1.2°.	
		Southern Baltic, 55.7°N, 15.4°E.		
		Origin time = 10 48 03.		
		Probably underwater explosion.		
		According to De record, this event was preceded by 43 sec by another event in the same place.		
"	20	Sk	iP	11 57 16.7
"	20	Ud	iP	12 11 23.7
"	20	Ud	eP	12 23 13
			i	12 23 21.9
"	20	Ki	iSg	13 15 49.2
		Um	iSg	13 13 50.8
		Esthonia.		
		Origin time = 13 11 10.		
		Explosion?		
"	20	Sk	eP	13 51 07
"	20	Ki	iP	14 32 09.6
		Um	iP	14 32 28.2
		Ud	iP	14 32 58.5
		Japan (h = 70 km).		
"	20	Up	iP	15 10 44.6
			ipP	15 10 53.3
		Ki	iP	15 09 58.8
				micr sec
			Mx E	0.4 14
			Mx Z	0.5 15
		Sk	iP	15 10 34.5
			ipP	15 10 44.5
		Um	iP	15 10 18.6
			ipP	15 10 28.3
		Ud	iP	15 10 50.5
			ipP	15 10 59.2
		De	iP	15 11 08.1
		Kurile Islands. h = 35 km (Up,Sk,Um,Ud).		

1969 May	20	Up	iP	16 13 28.9
"	20	Ki	iPg	17 32 53.7
			iSg	17 33 22.1
			i	17 33 31.6
		Sk	iSg	17 33 26.6
		Um	iSg	17 33 53.6
			i	17 33 56.6
		Ud	iSg	17 35 15.8
		Nordland, Norway.		
		Explosion?		
"	21	Ud	eP	01 43 15
"	21	Um	iPKP	02 29 31.7
		Ud	iPKP	02 29 44.0 C
		South of Kermadec Islands (h = 30 km).		
"	21	Up	iP	03 09 40
			iX	03 09 55.3
			iSKS	03 20 06
			iS	03 20 25
				micr sec
			S E	0.9 5
			S N	1.0 7
			Mx E	1.5 16
			Mx N	3.1 17
			Mx Z	2.2 17
			D = 9900 km = 89°.	
		Ki	eP	03 09 21
			iX	03 09 35.0
			iS	03 19 47
				micr sec
			P Z	0.5 8
			S E	1.8 10
			S N	2.2 10
			Mx E	1.9 14
			Mx N	1.4 16
			Mx Z	2.5 15
			D = 9450 km = 85°.	
		Um	eP	03 09 25
			iX	03 09 39.7
			iPP	03 12 45
			iSKS	03 19 49
			iS	03 19 58
			iSS	03 25 48
		Ud	iP	03 09 50.2
		Samar (h = 25 km).		
		m = 6.1, M = 5.9 (Up,Ki).		
		The phase X appears 14-15 sec after P.		
"	21	Ud	iP	09 02 28.3

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	21	Ki	iPn	11 04 37.5
			iSn	11 05 37.7
			iLgl	11 05 56.6
			D = 560 km = 5.0°.	
		Sk	iLgl	11 08 06.5
			iSg	11 08 28.8
		Um	iSn	11 06 16.2
			iSg	11 06 51.0
		Northwest Russia, 67.5°N, 33.6°E. Origin time = 11 03 20. Explosion?		
"	21	Ki	iPn	12 26 36.5
			iSn	12 27 24.3
			iLgl	12 27 38.0
			D = 430 km = 3.9°.	
"	21	Up	iP	15 39 18.9 C
				micr sec
			P Z'	0.2 0.5
		Ki	iP	15 39 28.5 C
				micr sec
			P Z'	0.1 1.0
		Sk	iP	15 39 44.9 C
			iPP	15 41 26.7
		Um	iP	15 39 17.7 C
			i	15 39 24.0
		Ud	iP	15 39 35.4 C
		De	iP	15 39 31.7
		Hindu Kush (h = 230 km). m = 5.5 (Up,Ki).		
"	21	Up	iP	21 56 22.3
			ipP	21 56 35.7
				micr sec
			P Z'	0.1 0.7
		Ki	iP	21 55 37.0
			ipP	21 55 49.3
		Sk	iP	21 56 12.2
			ipP	21 56 25.4
		Um	iP	21 55 57.7
			ipP	21 56 10.7
		Ud	iP	21 56 28.8
			ipP	21 56 41.3
		De	iP	21 56 47.6
			ipP	21 56 59.2
		Kurile Islands. h = 45 km (Up,Ki,Sk,Um,Ud,De).		
"	22	Up	iP	03 09 13.9
"	22	Ki	iP	05 21 20.3
		(cont.)		
1969 May	22	(cont.)		
		Ki	i	05 22 27.8
		Ud	iP	05 22 02.9
"	22	Ki	iP	09 47 25.5 C
		Sk	eP	09 48 00
		Um	iP	09 47 44.3
			ipP	09 47 52.4
		Ud	iP	09 48 14.0
			ipP	09 48 22.5
		Japan. h = 30 km (Um,Ud).		
"	22	Ki	iP	09 48 13.9
		Sk	iP	09 49 05.1
		Um	iP	09 49 10.8
		Ud	iP	09 49 48.7
		Svalbard.		
"	22	Up	iP	11 52 13.4
		Sk	eP	11 52 08
		Um	iP	11 51 51.6
		Ud	eP	11 52 20
		De	iP	11 52 35.3
		Japan (h = 70 km).		
"	22	Ud	iPKP	12 39 45.8
		De	iPKP	12 39 56.4
		Tonga-Kermadec Islands (h = 590 km).		
"	22	Up	iP	14 18 45.7
"	22	Ud	ePKP	16 29 20
		Santa Cruz Islands (h = 40 km).		
"	22	Um	iP	19 13 44.9
"	22	Ki	iP	21 03 50.4
		Um	iP	21 04 15.8
		Ud	iP	21 04 46.8
		Kamchatka (h = 50 km).		
"	22	Um	iP	21 26 55.9
		Lake Tanganyika (h = N).		
"	22	Up	iP	21 46 06.8
		Ki	iP	21 45 35.6
		Sk	iP	21 46 03.8
		Um	iP	21 45 49.2 D
		Ud	iP	21 46 14.1 D
		De	iP	21 46 25.9
		Bonin Islands (h = 400 km).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	22	Up	iP	22 43 35.7
		Ki	iP	22 43 35.0
		Sk	iP	22 43 48.8
		Um	iP	22 43 32.6 C
			ipP	22 43 48.5
		Ud	iP	22 43 45.0 C
		De	iP	22 43 44.3
		Sumatra. h = 60 km (Um).		
"	22	Ki	eP	22 52 07
"	23	Ki	iP	00 16 30.1
			i	00 16 37.0
		Sk	eP	00 15 58
		Ud	iP	00 15 55.9
		North Atlantic Ocean (h = N).		
"	23	Ki	eP	04 23 23
			i	04 23 26.3
"	23	Ki	eP	04 48 47
		Mindanao (h = 130 km).		
"	23	Up	e	11 04 11
			iSg	11 04 22.1
		Ki	iPg	11 01 35.6
			iSg	11 02 14.3
				micr sec
			Sg Z'	0.2 0.5
			D = 320 km = 2.9°.	
		Sk	ePg	11 01 40
			iSg	11 02 20.9
		Um	i(Pn)	11 01 45.4
			iPg	11 01 53.6
			iSn	11 02 27.7
			iSg	11 02 42.6
		Ud	iS^{x}	11 03 50.8
			iSg	11 04 07.0
		Nordland, Norway, 66.7°N, 13.9°E. Origin time = 11 00 39. Explosion? Agreement between stations not quite satisfactory.		
"	23	Ki	iPn	11 45 46.6
			iSn	11 46 45.3
			iLgl	11 47 04.4
			D = 530 km = 4.8°.	
		Sk	iSg	11 49 33.5
		Um	iS^{x}	11 47 41.5
			i	11 47 53.6
			iSg	11 47 58.9
		Northwest Russia, 67.5°N, 33.0°E. Origin time = 11 44 32. Explosion?		

1969 May	23	Up	i(P)	12 43 48.7
"	23	Up	iP	13 15 28.0 D
			ipP	13 15 37.7
			iS	13 24 23
				micr sec
			P N	0.4 3
			P Z	0.5 3
			P Z'	0.4 1.7
			Mx E	0.6 20
			Mx N	1.0 20
			Mx Z	1.2 19
			D = 7450 km = 67°.	
		Ki	iP	13 14 35.2 D
			eS	13 22 37
				micr sec
			P N	0.4 7
			P Z	0.6 5
			P Z'	0.3 1.8
			S N	0.4 9
			Mx E	0.6 15
			Mx N	0.7 21
			Mx Z	1.6 22
			D = 6550 km = 59°.	
		Sk	iP	13 15 03.0
			iPcP	13 15 40.1
		Um	iP	13 15 02.3 D
			ipP	13 15 11.5
			iPcP	13 15 38.3
			iS	13 23 35
		Ud	iP	13 15 26.0 D
			ipP	13 15 35.7
		De	iP	13 15 48.9 D
			ipP	13 15 58.4
		South of Alaska. h = 35 km (Up,Um,Ud,De). m = 6.0, M = 5.0 (Up,Ki).		
"	23	Up	iSn	13 36 07.3
			iSg	13 36 21.7
		Ki	iSg	13 38 46.2
			i	13 39 02.6
		Sk	iSg	13 38 15.0
		Um	iSg	13 36 54.5
		Ud	iLgl	13 37 23.3
		De	iLgl	13 37 50.3
		Esthonia, 59.7°N, 25.6°E. Origin time = 13 34 11. Explosion?		
"	23	Ki	iP	14 13 26.9
"	23	Ki	iPKP	14 49 20.4
		Um	iPKP	14 49 27.7
		New Zealand (h = 70 km).		
"	23	Ki	e(Sg)	15 53 07

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969				
May	23	Um	iP	16 02 29.7
		South of Japan (h = 45 km).		
"	23	Ki	iP	16 24 10.0
		Um	iP	16 24 14.8
		Ud	iP	16 24 36.0
			i	16 24 46.5
		Mindanao (h = 70 km).		
"	23	Um	iP	16 33 37.6
		South of Japan (h = N).		
"	23	Up	iP	17 19 52.0
			ipP	17 20 05.6
		Ki	iP	17 19 53.6
		Sk	iP	17 20 07.8
		Um	iP	17 19 49.2 C
		Ud	iP	17 20 02.8
			ipP	17 20 15.2
		De	iP	17 20 00.7
		Sumatra. h = 50 km (Up,Ud).		
"	23	Up	iLgl	18 44 17.9
		Ki	iPn	18 41 18.3 C
			iP^x	18 41 24.6
			iSn	18 41 56.2
			iSg	18 42 09.0
			D = 340 km = 3.1°.	
		Sk	eSn	18 43 21
			iSg	18 43 54.4
		Um	iPg	18 41 31.5
			iS^x	18 42 08.0
			iSg	18 42 15.4
		Ud	iSn	18 44 11.1
			iLgl	18 44 48.2
		De	iLgl	18 46 20.9
		Northern Finland, 65.9°N, 26.6°E. Origin time = 18 40 27. Solution checked with readings at Finnish stations.		
"	23	Ud	iP	21 23 28.3
"	23	Ki	iPKP	22 12 56.2
		Sk	iPKP	22 13 06.9
		Um	iPKP	22 13 01.7
		Ud	iPKP	22 13 12.0
		De	iPKP	22 13 18.7
		New Hebrides Islands (h = 180 km).		
"	24	Um	iP	02 37 00.9
		(cont.)		

1969				
May	24	(cont.)		
		Ud	iP	02 37 29.7
			ipP	02 37 40.1
		Aleutian Islands. h = 40 km (Ud).		
"	24	Ud	iP	04 17 54.5
"	24	Um	iP	05 16 40.5
		South of Japan (h = N).		
"	24	Ki	iP	06 06 54.0
		Sk	iP	06 06 33.7
		Um	iP	06 06 21.7
		Ud	iP	06 06 05.5
		Red Sea.		
"	24	Ki	e	08 23 15
			iLgl	08 23 23.6
		Um	iSg	08 24 47.4
		Probably northwest Russia. Explosion?		
"	24	Ki	iP	09 54 15.2
		Ud	iP	09 54 39.5
		Mindanao (h = 610 km).		
"	24	Up	iPKP	10 44 48.9
			i	10 44 51.2
		Ki	ePKP	10 44 30
		Sk	iPKP	10 44 42.1
		Um	iPKP	10 44 36.0
		Ud	iPKP	10 44 50.2
			i	10 44 54.6
		De	iPKP	10 44 59.2
			i	10 45 08.5
		Kermadec Islands (h = 290 km).		
"	24	Up	iP	11 34 29.8
		Ki	iP	11 34 26.0 C
		Sk	iP	11 34 46.1
		Um	iP	11 34 23.4
			ipP	11 34 35.9
		Ud	iP	11 34 42.9
			ipP	11 34 55.4
		Sumatra. Origin time = 11 22.3. h = 50 km (Um,Ud).		
"	24	Up	eP	11 55 02
			iPP	11 55 38.2
		Ki	iP	11 55 55.2
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	24	(cont.)			
		Um	eP	11 55 27	
		Ud	iP	11 55 17.7	
		De	iP	11 54 52.5	
		Turkey (h = 45 km).			
"	24	Ki	iPn	12 20 55.3	
			iSn	12 21 44.6	
			iLgl	12 21 59.2	
			D = 470 km = 4.2°.		
		Um	iSg	12 23 29.4	
		Probably northwest Russia.			
		Origin time = 12 19 48.			
		Explosion?			
"	24	Up	iP	14 08 37.1	
		Ud	iP	14 08 38.3	
		Aleutian Islands (h = 50 km).			
"	24	Sk	eP	14 35 47	
"	24	Ud	eP	18 21 23	
"	24	Um	iP	20 17 35.6	
		South of Japan (h = 45 km).			
"	25	Ud	iP	00 03 53.9	
"	25	Um	iP	00 57 13.3	
"	25	Ud	iP	04 46 17.8	
"	25	Up	iP	11 39 21.7	D
			i	11 39 40.9	
		Ki	iP	11 40 20.4	D
		Sk	iP	11 39 59.6	
		Um	iP	11 39 48.4	
		Ud	iP	11 39 31.9	
		Red Sea (h = N).			
"	25	Up	iP	13 53 19.7	
"	25	Up	iP	15 10 14.6	C
			i	15 10 19.5	
			i(PcP)	15 10 45.2	
		Ki	iP	15 09 21.6	C
				micr sec	
			P Z'	0.1 1.0	
		Um	iP	15 09 48.0	C
			i	15 09 59.6	
		Ud	iP	15 10 14.1	C
		Aleutian Islands (h = N).			
"	25	Ud	iP	19 57 48.6	

1969 May	25	Up	iPKP	20 38 10.8	C
				micr sec	
			PKP Z'	0.1 0.7	
		Ki	e(PKP)	20 37 48	
			iPKP	20 37 53.6	
		Sk	iPKP	20 38 05.4	C
			ipPKP	20 38 25.7	
		Um	iPKP	20 38 00.0	C
			ipPKP	20 38 19.4	
			iPKS	20 41 34.5	
		Ud	i(PKP)	20 38 07.2	
			iPKP	20 38 13.0	
		De	i(PKP)	20 38 13.0	
			iPKP	20 38 21.0	
			i	20 38 36.9	
		South of Kermadec Islands.			
		h = 70 km (Sk,Um).			
"	25	Up	iPKP	22 49 32.9	
			ipPKP	22 49 41.3	
		Ki	iPKP	22 49 48.1	C
			ePKS	22 53 07	
				micr sec	
			PKP Z'	0.1 1.0	
		Sk	iPKP	22 49 38.0	
		Um	ePKP	22 49 41	
		Ud	iPKP	22 49 31.0	
			ipPKP	22 49 38.5	
			iPKKP	22 59 34.4	
		South Sandwich Islands.			
		h = 30 km (Up,Ud).			
"	26	Ud	iP	01 01 58.5	
"	26	Um	eP	01 39 21	
		Banda Sea (h = 120 km).			
"	26	Up	eP	04 17 38	
"	26	Up	iP	06 07 01.2	
			ipP	06 07 14.9	
				micr sec	
			Mx E	0.9 22	
			Mx N	0.9 22	
			Mx Z	1.4 21	
		Ki	iP	06 06 49.4	
			ipP	06 07 02.6	
			eS	06 17 23	
				micr sec	
			P Z	0.4 5	
			pP Z'	0.1 1.2	
			S E	0.6 9	
			S N	0.5 9	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May 26 (cont.)

Ki			micr	sec
	Mx	E	1.1	22
	Mx	N	0.5	20
	Mx	Z	1.3	23
	D = 9450 km = 85°.			
Sk	eP		06 06 42	
Um	eP		06 06 57	
	ipP		06 07 10.1	
	iX		06 07 35.2	
	iS		06 17 34	
Ud	iP		06 06 54.3	
	iX		06 07 29.2	
De	ipP		06 07 08.4	

Mexico. h = 50 km (Up,Ki,Um).
m = 5.9, M = 5.3 (Up,Ki).

" 26	Up	eP	07 37 13
		i	07 37 17.4
		i(Sg)	07 37 58.3
" 26	Up	iP	11 07 01.3
	Ud	iP	11 07 15.2
" 26	Up	eSn	13 43 29
		iSg	13 43 44.5
	Ki	eSg	13 46 17
	Um	iSg	13 44 15.6
	Ud	iSg	13 45 01.6

Esthonia. Explosion?

" 26	Up	iP		15 50 09.8	
		ipP		15 50 20.2	
		iSKS		16 00 32	
		iS		16 00 51	
				micr	sec
		pP	Z'	0.1	1.0
		S	E	1.0	5
		S	N	0.6	5
		Mx	E	1.8	16
		Mx	N	3.6	18
		Mx	Z	3.0	16
		D = 9900 km = 89°.			
	Ki	iP		15 49 51.7 C	
		ipP		15 50 02.3	
		iSKS		16 00 08	
		iS		16 00 16	
				micr	sec
		P	E	0.4	9
		P	Z	0.7	8
		S	E	2.0	6
		S	N	2.5	10
		Mx	E	1.8	15

(cont.)

1969 May 26 (cont.)

Ki			micr	sec
	Mx	N	1.7	15
	Mx	Z	2.2	15
	D = 9500 km = 85 1/2°.			
Sk	iP		15 50 14.0	
	ipP		15 50 24.5	
Um	iP		15 49 59.4 C	
	ipP		15 50 08.4	
	iPP		15 53 19	
	iSKS		16 00 19	
	iS		16 00 25	
Ud	iP		15 50 17.8	
	ipP		15 50 28.4	
	i		15 50 41.0	
De	iP		15 50 25.5	
	ipP		15 50 35.8	

Samar. h = 40 km (Up,Ki,Sk, Um,Ud,De).
m = 6.1, M = 5.9 (Up,Ki).

" 26	Ki	iP	16 52 15.7
	Um	iP	16 52 22.4
	Ud	eP	16 52 37
		i	16 52 45.4

Samar (h = N).

" 26	Ud	iP	19 01 39.5

Samar (h = N).

" 27	Ud	iP	01 09 32.0
		i	01 09 57.4

Turkey.

" 27	Up	iP	04 14 05.5
" 27	Up	iP	09 40 39.8
	Ki	iP	09 40 25.1 C
	Sk	iP	09 40 47.4
	Um	iP	09 40 30.0 C
		i	09 40 34.6
	Ud	iP	09 40 48.1 C
		i	09 43 20.4
	De	iP	09 40 53.5

Molucca Sea (h = N).

" 27	Um	iP	11 58 41.5

Mariana Islands (h = 310 km).

" 27	Ud	iP	12 27 07.5
" 27	Up	ePKP	12 37 43
		ipPKP	12 37 53.3

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
May 27 (cont.)

Up		micr	sec
	Mx N	0.6	20
Ki	iPKP	12 37 57.0	
	ipPKP	12 38 08.3	
	iPKS	12 41 22	
		micr	sec
	PKS E	0.2	8
	PKS N	0.3	8
	Mx N	0.6	17
	Mx Z	0.8	18
Um	iPKP	12 37 50.7	
	ipPKP	12 38 01.2	
Ud	iPKP	12 37 40.8	
	ipPKP	12 37 51.6	
	i	12 38 00.9	

South Sandwich Islands.
h = 40 km (Up,Ki,Um,Ud).
M = 5.4 (Up,Ki).

" 27	Um	iP	13 02 02.1
" 27	Up	iP	14 26 49.1
	Ki	iP	14 26 15.0
	Um	iP	14 26 34.2
	Ud	iP	14 26 41.0

Nevada. Underground explosion.

" 27	Sk	iPKP	15 20 20.1 C
	Um	iPKP	15 20 15.4
	Ud	iPKP	15 20 25.2
	De	iPKP	15 20 31.7

Santa Cruz Islands (h = 8 km).

" 27	Up	iP	16 38 26.6
		ipP	16 38 36.4
	Ki	iP	16 37 32.3 C
		micr	sec
		P Z'	0.1 1.0
	Sk	iP	16 37 56.3 C
	Um	iP	16 38 00.8
		ipP	16 38 10.4
	Ud	iP	16 38 21.5
		i	16 38 22.8
	De	iP	16 38 46.4 C

Alaska. h = 35 km (Up,Um).

" 27	Up	iP	21 03 36.4
		ipP	21 03 46.2
	Ud	iP	21 03 42.1
		ipP	21 03 54.0

Kurile Islands. h = 40 km (Up,Ud).

1969

May 27	Um	iP	21 51 59.7
" 27	Ki	eP	21 52 07
	Um	iP	21 52 59.9
		i	21 53 05.4
	Ud	iP	21 53 37.5

Svalbard.

" 28	Up	iP	02 05 30.1
	Ki	iP	02 06 29.3 C
	Sk	iP	02 06 09.0 C
	Um	iP	02 05 57.2
		i	02 06 08.7
	Ud	iP	02 05 41.1
	De	iP	02 05 15.0
" 28	Ki	eP	03 27 17
	Um	iP	03 26 48.0
" 28	Ki	eP	03 31 17
		i	03 31 37.9
		eT	03 36 22
		i	03 36 47.0
	Sk	iP	03 32 07.1
		iS	03 33 53.4

Norwegian Sea.
Origin time = 03 29 44.

" 28	Up		---
			micr sec
		Mx N	0.6 19
		Mx Z	0.9 19
	Ki	iP	03 37 06.9
		iT	03 42 06.9
		i	03 42 13.2
		i	03 42 37.3
			micr sec
		Mx E	0.5 14
		Mx N	0.5 14
		Mx Z	0.8 14
	Sk	iP	03 37 58.0
		iS	03 39 43.9
	Um	iP	03 38 06.0
		iS	03 40 04.4
		iSS	03 40 28
		iT	03 44 46.1
	Ud	eP	03 38 46
		i	03 38 57.1
	De	eP	03 39 37

Norwegian Sea (h = N).

" 28	Up	iP	03 54 06.2
		i	03 54 28.4

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May 28 (cont.)

Up			micr	sec
	P	Z'	0.1	1.0
	Mx	E	0.8	17
	Mx	N	1.3	16
	Mx	Z	1.0	16
Ki	iP		03 53 48.7 C	
			micr	sec
	P	Z'	0.1	1.2
	Mx	E	0.6	15
	Mx	N	0.6	17
	Mx	Z	0.7	15
Sk	iP		03 54 10.5	
Um	e(P)		03 53 45	
	iP		03 53 53.9	
Ud	i(P)		03 54 04.5	
	iP		03 54 14.7	
De	iP		03 54 21.0	

Samar (h = 6 km).
m = 6.0, M = 5.3 (Up,Ki).
(P) at Um,Ud may be P of a foreshock.

" 28

Up	iP		04 00 45.5	
	i		04 01 15.9	
	iSn		04 03 03.9	
	eS		04 03 33	
	iSS		04 03 54.3	
	i		04 04 38	
	eT		04 08 12	
			micr	sec
	Mx	N	1.0	17
	Mx	Z	1.0	16
	D = 1600 km = 14 1/2°.			
Ki	iP		03 59 01.4	
	iS		04 00 29.4	
	iT		04 03 51.1	
	i		04 04 33.1	
			micr	sec
	P	Z'	0.1	1.3
	Mx	E	1.2	18
	Mx	N	0.8	14
	Mx	Z	1.4	17
	D = 800 km = 7°.			
Sk	iP		03 59 40.6	
	iS		04 01 27.0	
	eT		04 06 05	
	i		04 06 34.3	
	i		04 07 07.8	
Um	iP		03 59 47.7	
	i		03 59 50.6	
	iS		04 01 40.3	
	iSS		04 02 07	

(cont.)

1969 May 28 (cont.)

Um	i	04 05 09.5
	i	04 05 18.4
	iPcP	04 05 55.0
	iT	04 06 11.0
	i	04 06 46.3
Ud	eP	04 00 27
	iPP	04 00 39.9
	iSS	04 03 26.4
	iT	04 08 14.3
	i	04 08 45.4
De	iP	04 01 18.9

Norwegian Sea (h = N).
This is one of the rare cases where clear T-phases have been recorded over practically the whole Swedish network. The arrival times following T belong to the same group.

" 28 Ki iP 06 51 49.2

" 28

Ki	iPn	11 06 46.9
	iSn	11 07 45.6
	iSg	11 08 14.2
	D = 540 km = 4.9°.	
Sk	iSg	11 10 37.0
Um	iSg	11 08 59.3

Northwest Russia, 67.4°N, 33.2°E.
Origin time = 11 05 31.
Explosion?

" 28

Ki	eSg	13 30 22
Um	iSg	13 28 21.7
Ud	iSn	13 28 23.9
	iLgl	13 28 50.2
De	iLgl	13 29 17.5

Esthonia, 59.7°N, 25.6°E.
Origin time = 13 25 40.
Explosion?

" 28

Ki	iP	13 38 17.0
De	iP	13 39 23.4

" 28

Up	iP		13 43 10.3	
	iPP		13 46 53.1	
	i		13 47 00	
	iSKS		13 53 25	
			micr	sec
	PP	Z'	0.6	2.0
	SKS	E	0.7	6

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969				
May	28	(cont.)		
		Ki	eP	13 43 11
			iX	13 46 22.8
			iPP	13 46 59.6
			iSKS	13 53 31
				micr sec
			PP Z'	0.3 2.0
			SKS E	2.8 9
			SKS N	0.7 8
		Sk	eP	13 42 55
			iPP	13 46 32.8
		Um	iP	13 43 12.2 C
			ipP	13 43 51.0
			iX	13 46 16.4
			iPP	13 47 01.1
			i	13 47 09.9
			iSKS	13 53 31
			iS	13 54 10
		Ud	iP	13 42 58.5
			ipP	13 43 38.6
			iX	13 46 12.6
			iPP	13 46 39.3
		De	iP	13 43 00.4
			iPP	13 46 39.1
		Peru-Ecuador. h = 160 km (Um,Ud). m = 6.4 (Up,Ki). X (Ki,Um,Ud) belong to the group of early PP arrivals.		
"	28	Up	iP	19 38 05.9
"	28	Ud	iP	20 03 42.5 C
		South of Japan (h = 300 km).		
"	28	Ki	iPn	20 46 24.3
			iSn	20 47 11.1
			iLgl	20 47 26.1
			D = 430 km = 3.9°.	
		Um	eSg	20 48 50
			i	20 49 01.9
		Probably northwest Russia. Origin time = 20 45 22. Explosion?		
"	28	Ud	iP	21 58 49.8
		Greece.		
"	28	Um	iP	22 36 22.8
			i	22 36 44.6
		Ud	iP	22 36 53.1
		Japan (h = 20 km).		
"	29	Ki	iP	05 52 40.1

1969				
May	29	Sk	iP	08 50 20.0
		Ud	iP	08 50 51.0
"	29	Um	iP	10 32 52.7
"	29	Ud	e	11 04 35
			i(Sg)	11 04 56.2
"	29	Up	e(PKP)	13 10 03
		Sk	iPKP	13 09 54.5
		Um	iPKP	13 09 46.3
			i	13 09 49.6
		Ud	ePKP	13 09 58
			i	13 10 08.1
"	29	Ud	iP	13 27 42.3
		Japan (h = N).		
"	29	Ud	i(P)	13 29 15.3
"	29	Um	iP	13 31 01.4
"	29	Ud	iP	13 57 26.9
		Japan (h = 10 km).		
"	29	Ud	iP	15 06 23.5
"	29	Up	iP	16 30 06.7
"	29	Up	iPKP	16 36 41.1
			i	16 36 45.0
		Ki	iPKP	16 36 24.9
		Sk	iPKP	16 36 35.6
		Um	iPKP	16 36 29.7 C
			i	16 38 11.7
			iSKP	16 39 40.5
		Ud	iPKP	16 36 43.1
		De	iPKP	16 36 52.5
		Kermadec Islands (h = 310 km).		
"	29	Up	iP	20 38 13.8
			ipP	20 39 06.7
		Ki	ipP	20 38 56.6
			iPP	20 41 20.2
		Sk	iP	20 37 55.8
		Um	iP	20 38 11.6
			ipP	20 39 04.8
		Ud	iP	20 38 04.5
		De	ipP	20 39 03.5
		Guatemala. h = 220 km (Up,Um). pP is considerably bigger than P at Up,Ki,Um,De (Z'), but not at Sk,Ud, where P is most pronounced.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	30	Up	iP	01 10 03.5	
"	30	Ki	eP	01 23 39	
"	30	Ud	iP	09 00 59.1	
"	30	Um	iP	12 34 31.9	
"	30	Up	iP	14 00 54.7	
"	30	Ud	eP	14 50 12	
"	30	Ki	ePKP	15 34 18	
		Um	iPKP	15 34 25.1	
			iSKP	15 37 07.6	
		Ud	iPKP	15 34 27.1	
			i	15 34 36.6	
			iSKP	15 37 20.2	
		De	iPKP	15 34 37.2	
			i	15 34 38.9	
		Fiji Islands (h = 580 km).			
"	30	Up	i(P)	16 00 36.8	
		Ud	i(P)	15 59 16.1	
"	30	Up	iPKP	16 15 25.1	
			i	16 15 32.1	
				micr	sec
			PKP Z'	0.5	1.5
			Mx E	1.0	20
			Mx N	2.3	22
			Mx Z	2.2	22
		Ki	iPKP	16 15 07.4	
			i	16 15 15.8	
			eSKKS	16 25 03	
				micr	sec
			PKP Z	0.4	5
			Mx E	1.5	14
			Mx N	1.2	19
		Sk	iPKP	16 15 19.1	
			i	16 15 32.7	
		Um	iPKP	16 15 13.4 C	
			iPP	16 18 43.7	
			iSKKS	16 25 25	
			eSS	16 37 17	
		Ud	iPKP	16 15 25.6	
		De	iPKP	16 15 36.8 C	
			i	16 15 44.1	
		South of Kermadec Islands (h = 35 km).			
		M = 6.0 (Up,Ki).			

1969 May	30	Up	iPKP	16 42 34.5	
			i	16 42 43.1	
				micr	sec
			PKP N	0.5	5
			PKP Z	1.1	5
			PKP Z'	0.2	1.0
			Mx E	1.8	19
			Mx N	4.3	23
			Mx Z	3.9	20
		Ki	ePKP	16 42 14	
			iPP	16 45 23	
			eSKKS	16 52 15	
				micr	sec
			PKP Z	0.9	6
			PP Z	0.9	9
			Mx E	2.1	18
			Mx N	2.3	20
			Mx Z	3.4	19
		Sk	iPKP	16 42 30.2	
			i	16 42 33.8	
		Um	iPKP	16 42 24.0 C	
			iSKKS	16 52 35	
			iSS	17 04 36	
		Ud	iPKP	16 42 34.9	
			i	16 42 39.3	
		De	i(PKP)	16 42 37.1	
			iPKP	16 42 47.3	
			i	16 42 58.7	
			i	16 43 10.9	
		South of Kermadec Islands (h = N).			
		M = 6.2 (Up,Ki).			
		PKP(Z') shows a long-period component (around 5 sec period), which is not seen in the preceding case.			
"	30	Um	iP	17 01 21.1	
"	30	Um	eP	17 49 07	
"	30	Um	eP	20 45 54	
"	30	Um	iP	23 42 24.5	
			i	23 42 35.0	
		Ud	eP	23 42 37	
"	30	Sk	ePKP	23 53 06	
		Um	iPKP	23 52 59.5	
		Ud	ePKP	23 53 12	
		South of Kermadec Islands (h = N).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 May	31	Sk	ePKP	00 24 37
		Um	iPKP	00 24 30.2
		Ud	iPKP	00 24 42.8
		Kermadec Islands (h = 30 km).		
"	31	Um	iP	02 41 29.5
"	31	Um	iP	02 44 39.6
"	31	Ud	iP	03 32 07.7
"	31	Um	iP	04 43 16.2
"	31	Up	iP	05 08 48.9 C
			iPn	05 09 49.4
				micr sec
			P Z'	0.1 0.5
		Ki	iP	05 08 33.9 C
			iPP	05 09 47.8
				micr sec
			P Z'	0.2 0.5
		Sk	iP	05 09 05.1 C
			iPn	05 10 02.5
		Um	iP	05 08 34.0 C
			iPn	05 09 33.5
			i	05 17 05.0
			i	05 18 35.4
		Ud	iP	05 09 05.7 C
			iPn	05 10 15.6
			iPP	05 10 28.1
		De	iP	05 09 12.8
			ePn	05 10 21
		Kazakh SSR.		
		m = 6.2 (Up,Ki).		
		Underground explosion.		
		The two last phases at Um belong to the higher-mode surface-wave train.		
"	31	Um	iP	10 45 15.5
"	31	Um	iP	11 02 43.8
			i	11 02 55.6
		Ud	iP	11 02 55.7
"	31	Ud	iP	11 20 08.1
		Ecuador (h = 170 km).		
"	31	Ki	iPn	12 19 15.8
			iSn	12 20 15.7
			iLgl	12 20 39.3
			D = 560 km = 5.0°.	
		Sk	eLgl	12 22 58
			iSg	12 23 15.3
		(cont.)		

1969 May	31	(cont.)		
		Um	iPn	12 19 47.5
			iSn	12 21 01.1
			iSg	12 21 48.5
		Ud	iP	12 20 49.6
			iS	12 22 55.9
			i	12 24 03.6
			iLgl	12 24 09.4
		Northwest Russia, 68.4°N, 33.6°E.		
		Origin time = 12 17 59.		
		Explosion?		
"	31	Up	eLgl	14 06 12
		Ki	ePn	14 03 33
			iSg	14 04 13.0
		Sk	ePn	14 03 37
			iSg	14 04 16.6
		Um	iPn	14 03 43.8
			iP^{x}	14 03 51.0
			iSn	14 04 25.1
			iSg	14 04 39.1
			D = 370 km = 3.3°.	
		Ud	iLgl	14 06 06.4
		De	iLgl	14 08 00.0
		Norway-Sweden border region, 66.3°N, 15.2°E.		
		Origin time = 14 02 50.		
"	31	Um	eP	14 25 27
		(Greece).		
"	31	Up	eP	19 43 48
			i	19 44 12.1
			i	19 45 20.5
			i	19 45 54.6
"	31	Um	iP	21 46 40.4
			i	21 46 49.3
		Ud	iP	21 47 02.5
			i	21 47 14.4
"	31	Up	iP	22 07 13.1
			ipP	22 07 43.8
			iPP	22 08 53.7
		Ki	iP	22 07 22.1
			i	22 08 08.1
			iPn	22 09 25.4
		Sk	iPP	22 09 24.3
		Um	iP	22 07 12.0
			i	22 07 15.0
			ipP	22 07 42.7
			iPP	22 08 51.9
		Ud	iP	22 07 30.1
			ipP	22 08 00.3
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969					
May	31	(cont.)			
		Ud	iPP		22 09 10.8
		De	eP		22 07 27
			i		22 07 29.9
			i		22 08 38.8
			iPP		22 09 05.6
		Hindu Kush. h = 150 km (Up, Um,Ud).			
"	31	Up	ePKS		22 47 17
					micr sec
			Mx	E	0.5 17
			Mx	N	0.7 22
			Mx	Z	1.0 21
		Ki			---
					micr sec
			Mx	E	0.7 20
			Mx	N	0.7 21
			Mx	Z	1.4 21
		Um	iPP		22 46 03
			iPKS		22 47 06
			eSKSP		22 56 01
			eSS		23 03 31
		Samoa Islands (h = 15 km). M = 5.5 (Up,Ki).			
"	31	Um	iP		22 55 13.3
			i		22 55 24.4
		Ud	iP		22 55 24.0

Markus Båth
February 19, 1970

Seismological Institute
Uppsala

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

SEISMOLOGICAL BULLETIN

UPPSALA, KIRUNA, SKALSTUGAN, UMEÅ, UDDEHOLM and DELARY

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

JUNE 1 - 30, 1969

1969 June	1	Up	ePKP	00 14 16
			iPKKP	00 24 49.0
		Ki	ePKP	00 14 06
			iX	00 17 02.5
			eSP	00 23 28
		Um	iPKP	00 14 09.9
			iX	00 17 08.0
		Ud	ePKP	00 14 21
			iPKKP	00 24 44.9
		De	iPKP	00 14 24.9
			iX	00 17 23.1

Solomon Islands (h = 400 km).
The phase X (Ki,Um,De) could belong to an SKP-branch extended to distances short of the caustic (cf Gutenberg-Richter, BSSA, 1936, 26:341-390).

"	1	Up	iPKP	00 34 12.9
		Sk	ePKP	00 34 07
			e	00 34 36
		Um	iPKP	00 34 01.6
		Ud	iPKP	00 34 14.6
			i	00 34 22.3

"	1	Ki	iP	01 11 03.6
		Um	iP	01 11 23.5

Sea of Japan (h = 190 km).

"	1	Sk	iP	02 00 25.2
		Um	e(P)	02 00 16
			i	02 00 23.4
		Ud	iP	02 00 47.9
"	1	Um	iPKP	02 06 22.6
		Ud	ePKP	02 06 34

(cont.)

1969 June	1	(cont.)		
		Ud	i	02 06 42.8
		De	iPKP	02 06 28.8

South of Kermadec Islands (h = 170 km).

"	1	Up	iP	02 09 25.8
		Ki	iP	02 08 56.6
		Um	iP	02 09 08.0
		Ud	iP	02 09 32.5

Bonin Islands (h = 480 km).

"	1	Up	iP	02 18 46.6
		Um	iP	02 18 14.8
		Ud	iP	02 18 44.5
"	1	Up	eLgl	03 55 48
			iSg	03 56 06.6
		Ki	ePn	03 51 47
			iSn	03 52 34.7
			iSg	03 52 56.0
			D = 440 km = 4.0°.	
		Um	iSn	03 53 17.5
			iSg	03 53 54.8

Northwest Russia, 67.8°N, 31.0°E.
Origin time = 03 50 43.
Explosion?

"	1	De	iP	07 24 36.4
"	1	Up	iP	08 45 29.7 D
		Sk	iP	08 45 47.3
		Um	iP	08 45 22.9
		Ud	iP	08 45 43.7

India-East Pakistan (h = 20 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	1	Um	iP		10 12 40.7
"	1	Up	iP		12 44 34.5
			i		12 44 49.4
		Ki	iP		12 45 02.9
			iX		12 45 22.2
		Sk	eP		12 45 07
		Um	iP		12 44 44.1 C
		Ud	iP		12 44 50.4
			iX		12 45 10.9
		De	iP		12 44 38.5
		Iran (h = 50 km).			
"	1	Ki	eP		14 02 14
			i		14 02 32.7
					micr sec
			Mx	E	0.7 20
			Mx	N	0.6 22
			Mx	Z	1.2 22
		Um	eP		14 02 18
			i		14 02 21.0
			iS		14 13 30
			iPS		14 14 59
		Ud	iP		14 02 40.1
			i		14 02 56.9
		Talaud Islands (h = 45 km).			
"	1	Um	eP		18 07 30
"	1	Up			---
					micr sec
			Mx	E	0.6 20
			Mx	N	0.7 23
			Mx	Z	1.1 22
		Ki	e		19 22 14
					micr sec
			Mx	E	1.1 24
			Mx	N	0.8 25
			Mx	Z	1.9 24
		Off coast of Mexico (h = N).			
		M = 5.3 (Up,Ki).			
"	1	Up	iPKP		20 13 02.3
			i		20 13 17.4
					micr sec
			PKP	Z'	0.2 1.5
		Ki	ePKP		20 12 42
		Sk	ePKP		20 12 54
			i		20 13 04.7
		Um	iPKP		20 12 48.7
			i		20 12 50.9
		Ud	iPKP		20 13 02.1
		(cont.)			

1969 June	1	(cont.)		
		Ud	i	20 13 10.1
		De	i(PKP)	20 13 28.4
		Kermadec Islands (h = 15 km).		
"	1	Up	iS	23 26 04.7
			iX	23 26 17.0
			iY	23 27 21.9
		Ki	iP	23 25 13.9
		Um	iP	23 24 25.9
			iX	23 28 07.4
			iY	23 29 10.4
		Ud	iP	23 23 45.3
			iS	23 26 07.9
			iX	23 26 34.2
			iY	23 27 39.8
		De	iP	23 22 44.6
			iY	23 25 33.5
		Austria (h = N).		
		The phases X and Y with group velocities of 4.34 km/sec and 3.75 km/sec (Li), are probably integral parts of the higher-mode surface-wave train.		
"	2	Up	iS	04 03 06.7
			i(X)	04 03 31.2
			iY	04 04 16.9
		Um	iP	04 01 29.5
			iY	04 06 11.1
		Ud	i(X)	04 03 47.9
			iY	04 04 40.3
		De	iP	04 00 01.7
			iS	04 01 52.9
			iY	04 02 40.2
		Austria (h = 30 km).		
		Significance of X and Y, see preceding event; group velocities are (X) 4.14 km/sec, Y 3.73 km/sec (Li).		
"	2	Um	iP	04 10 46.5
			i	04 10 54.0
"	2	Ki	iP	07 38 35.1
		Ud	iP	07 39 31.0
		Aleutian Islands (h = N).		
"	2	Up	iP	09 58 07.8
			iS	10 06 22
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 2 (cont.)

Up			micr	sec
	S	N	0.7	11
	Mx	E	0.4	13
	Mx	N	0.7	17
	Mx	Z	0.9	19
	D = 6700 km = 60 1/2°.			
Ki	iP		09 57 12.0	
	iS		10 04 37	
			micr	sec
	P	N	0.3	7
	S	E	0.4	8
	S	N	0.6	9
	Mx	E	0.9	15
	Mx	N	0.9	19
	Mx	Z	1.3	20
	D = 5900 km = 53°.			
Sk	iP		09 57 39.8 C	
Um	iP		09 57 40.5	
	iS		10 05 29	
Ud	iP		09 58 00.8	
De	iP		09 58 26.0	
Alaska (h = N).				
m = 5.6, M = 5.1 (Up,Ki).				

" 2	Ud	iP	11 02 43.9	
" 2	Ud	iP	14 27 22.2	
" 2	Up	iP	18 00 28.6	
	Ki	iP	18 00 37.2	
	Sk	iP	18 00 53.5	
	Um	iP	18 00 26.8	
	Ud	iP	18 00 44.9	
	De	iP	18 00 42.2	
	Hindu Kush (h = 230 km).			
" 2	Up	iP	18 39 27.0 C	
		i	18 39 34.8	
	Ki	iP	18 39 26.0	
	Um	iP	18 39 24.0	
	Sumatra (h = 60 km).			
" 2	Ud	iP	21 32 41.1	
	Spain.			
" 2	Ki	iP	21 43 49.1	
" 2	Up	ipP	22 08 38.5	
	Um	iP	22 08 06.2	
		ipP	22 08 15.7	
	Japan. h = 35 km (Um).			

1969 June

2	Um	iPKP	22 46 51.0 C
	Ud	iPKP	22 47 02.7
	Kermadec Islands (h = N).		
" 2	Um	iPKP	22 50 19.0
	New Hebrides Islands (h = 130 km).		
" 3	Up	iP	00 36 50.8
	Sk	iP	00 36 41.5
	Um	iP	00 36 25.9
	Ud	iP	00 36 56.8 C
	Japan (h = 70 km).		
" 3	Up	iP	04 11 04.3
		iSKS	04 21 26
			micr sec
		Mx E	1.7 18
		Mx N	1.1 21
		Mx Z	1.5 19
	Ki	iP	04 10 36.8
		eS	04 21 04
			micr sec
		S E	0.7 8
		S N	0.4 9
		Mx E	2.4 19
		Mx N	1.9 18
		Mx Z	3.4 19
	D = 9500 km = 85 1/2°.		
	Sk	eP	04 10 37
	Um	iP	04 10 47.8
		eSKS	04 21 13
	Off coast of Mexico (h = N).		
	M = 5.7 (Up,Ki).		
" 3	Um	iP	09 50 19.5
" 3	Um	iP	10 30 55.5
	Ud	iP	10 31 09.0
	Nicobar Islands (h = 130 km).		
" 3	Ud	iP	10 34 29.0
		i	10 34 43.5
" 3	Ki	iP	13 38 36.2
		ipP	13 38 44.3
	Ud	iP	13 39 02.5
		ipP	13 39 10.7
	Samar. h = 30 km (Ki,Ud).		
" 3	Ud	iP	15 28 42.9
		i	15 28 49.0

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	3	Up	iP	22 04 20.7 C	
			eS	22 13 30	
			D = 7850 km = 70 1/2°.		
		Ki	iP	22 03 39.0 C	
				micr	sec
			Mx E	1.0	21
			Mx N	0.7	18
			Mx Z	0.8	18
		Um	iP	22 03 57.2 C	
			i(PcP)	22 04 33.3	
			iS	22 12 51	
		Ud	iP	22 04 27.4	
			ipP	22 04 37.6	
		Japan. h = 40 km (Ud).			
"	4	Up	iP	00 47 43.1 C	
			ipP	00 47 49.1	
				micr	sec
			pP Z'	0.1	0.6
		Ki	iP	00 47 37.2 C	
			ipP	00 47 42.9	
				micr	sec
			pP Z'	0.1	0.8
			Mx E	0.5	12
			Mx N	0.3	10
			Mx Z	0.7	11
		Sk	iP	00 48 02.7	
			ipP	00 48 08.4	
		Um	iP	00 47 34.1	
			ipP	00 47 39.6	
			iLgl	01 01 03	
			iRg	01 04 03	
		Ud	iP	00 47 59.6 C	
			ipP	00 48 03.7	
		De	iP	00 48 01.6 C	
			ipP	00 48 07.4	
		Kirghiz-Sinkiang. h = 25 km (Up,Ki,Sk,Um,Ud,De).			
"	4	Up	iPKP	03 00 54.3	
			i	03 00 59.6	
		Ki	ePKP	03 00 33	
		Sk	iPKP	03 00 48.0	
			i	03 00 51.1	
		Um	iPKP	03 00 42.5 C	
		Ud	iPKP	03 00 55.4	
			i	03 00 58.0	
		De	iPKP	03 01 10.7	
		South of Kermadec Islands (h = N).			
"	4	Up	iPKP	04 58 25.0	
		(cont.)			

1969 June	4	(cont.)			
		Up	i	04 58 28.7	
				micr	sec
			PKP Z'	0.1	0.5
		Ki	ePKP	04 58 04	
			i	04 58 24.2	
				micr	sec
			Mx E	0.6	20
			Mx N	0.4	18
		Sk	iPKP	04 58 21.4 C	
			i	04 58 24.7	
		Um	iPKP	04 58 13.5	
		Ud	iPKP	04 58 25.9 C	
		De	iPKP	04 58 38.4	
			i	04 58 48.0	
		South of Kermadec Islands (h = N).			
"	4	Ud	eP	05 09 50	
"	4	Um	i(Sg)	09 05 02.1	
"	4	Up	iP	10 10 53.0	
"	4	Ki	iPn	11 33 09.1	
			iSn	11 33 57.4	
			iLgl	11 34 12.9	
			D = 440 km = 4.0°.		
		Um	iSg	11 35 45.8	
		Northwest Russia. Origin time = 11 32 06. Explosion?			
"	4	Ki	iPn	11 35 44.9	
			iSn	11 36 44.9	
			iLgl	11 37 06.2	
			D = 560 km = 5.0°.		
		Sk	iLgl	11 39 31.7	
		Um	iSg	11 37 57.1	
		Northwest Russia, 67.2°N, 33.3°E. Origin time = 11 34 28. Explosion?			
"	4	Ud	iP	14 05 39.7	
		Japan (h = N).			
"	4	Ki	eP	14 44 30	
		Ud	eP	14 45 25	
"	4	Up	iP	16 29 51.3	
		Ki	iP	16 30 19.0	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 4 (cont.)

Ki			micr	sec
	Mx	E	0.8	17
	Mx	N	0.7	16
	Mx	Z	1.0	16
Sk	iP		16 30 24.1	
Um	eP		16 30 02	
Ud	iP		16 30 07.1	
	i		16 30 15.9	
De	iP		16 29 55.0	

Iran (h = N).

" 4 Um iP 16 55 12.9 C
Banda Sea (h = 90 km).

" 4 Ud iPKP 17 34 28.2
Tonga-Kermadec Islands
(h = 490 km).

" 4 Up iP 18 37 02.1
Sk eP 18 36 49
Ud iP 18 37 02.0

" 4 Up iP 19 50 22.3
i 19 50 34.0
Ki iP 19 49 48.6 C
Um iP 19 50 03.4
Ud iP 19 50 28.2
South of Japan (h = N).

" 4 Up iP 20 29 55.1
i 20 30 03.2
Ki eP 20 29 40
Um eP 20 29 47 C
Ud iP 20 30 03.9
i 20 30 12.0
Luzon (h = 30 km).

" 4 Ki iP 20 46 16.3
Sk iP 20 45 46.8
Ud iP 20 45 40.5
i 20 45 53.9
North Atlantic Ocean (h = N).

" 4 Um iP 21 00 20.1

" 4 Ud iP 21 50 49.8

" 5 Up iP 06 07 50.7
Ki iP 06 07 58.4
Sk eP 06 08 15
Um iP 06 07 48.5
i 06 08 11.5
(cont.)

1969 June 5 (cont.)

Ud iP 06 08 06.3
De iP 06 08 03.9
Hindu Kush (h = 230 km).

" 5 Up iP 10 57 50.5
i 10 57 59.1

			micr	sec
	Mx	E	0.7	19
	Mx	N	0.8	19
	Mx	Z	1.3	20

Ki iP 10 57 51.9

			micr	sec
	Mx	E	0.7	17
	Mx	N	0.6	18
	Mx	Z	0.9	17

Sk iP 10 58 07.7
Um iP 10 57 48.5
iX 10 58 15.1
Ud iP 10 58 01.0
iX 10 58 28.2
iPP 11 01 15.7
De iP 10 57 59.4
Sumatra (h = N).
M = 5.2 (Up,Ki).
If X is interpreted as pP, the focal depth becomes 100 km.

" 5 Ud iP 12 04 21.3

" 5 Sk eSg 13 38 37
Ud iPn 13 35 42.5
iPg 13 35 59.7
iSg 13 36 50.5
i 13 37 01.2
D = 470 km = 4.2°.
De iPn 13 35 10.9 C
iPg 13 35 15.7
iSg 13 35 41.6
D = 220 km = 2.0°.
Denmark, near Århus, 56.2°N, 10.3°E.
Origin time = 13 34 36.
Explosion?
Solution checked with Copenhagen (Pn), Moxa (Rg) and Pruhonice (Rg).

" 5 Ki iPg 16 24 34.2 C
iSg 16 24 45.1
D = 94 km = 0.85°.
Sk eSg 16 26 54
Um iSg 16 26 00.5
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 5 (cont.)

Ud eLgl 16 28 17
Swedish Lapland, near Gällivare, 67.0°N, 21.1°E.
Origin time = 16 24 17.
Probably explosion.

" 5 Ki iP 17 33 26.5
i 17 33 39.2
Ud eP 17 33 51
Halmahera (h = 100 km).

" 5 Ud i 18 12 12.9
i(Rg) 18 12 19.7

" 5 Ud eP 19 55 39

" 5 Up iP 20 50 38.7
i 20 50 40.6
i 20 50 46.2
eS 20 59 25
micr sec
Mx E 0.7 24
Mx N 0.9 22
Mx Z 0.9 18
D = 7200 km = 65°.
Ki eP 20 51 05
eS 21 00 16
micr sec
S N 0.3 9
Mx E 0.7 19
Mx N 0.5 20
Mx Z 1.1 19
D = 7700 km = 69 1/2°.
Sk iP 20 50 37.0 C
Um iP 20 50 57.7
iS 20 59 53
Ud iP 20 50 27.3 C
i 20 50 29.8
De iP 20 50 19.8
North Atlantic Ocean (h = N).
M = 5.1 (Up,Ki).

" 5 Ud iP 21 08 53.8
Mindanao (h = 40 km).

" 5 Ud e 23 18 22
i(Rg) 23 18 25.4

" 5 Up iP 23 20 45.4
i 23 20 52.0
(cont.)

1969 June 5 (cont.)

Um eP 23 21 04
Ud iP 23 21 03.4
De eP 23 20 47
Turkey-USSR (h = N).

" 6 Up iPKP 00 29 54.9 C
micr sec
PKP Z' 0.1 0.5
Ki iPKP 00 29 36.2
Sk iPKP 00 29 50.8 C
iX 00 30 05.3
Um iPKP 00 29 45.9 C
i 00 29 56.3
Ud iPKP 00 29 57.1
iX 00 30 11.5

" 6 Um eP 03 58 40

" 6 Ki iP 04 12 30.1 C
i 04 12 40.7
micr sec
Mx E 0.4 14
Mx N 0.4 17
Mx Z 0.8 16
Sk iP 04 12 37.2
iS 04 14 26.9
Um iP 04 13 05.4
iS 04 15 15.7
i 04 15 53.2
Ud eP 04 13 22
Jan Mayen (h = 10 km).

" 6 Up iP 04 29 45.8
ipP 04 29 52.6
iS 04 38 19
D = 7100 km = 64°.
Ki iP 04 28 51.9
micr sec
P Z' 0.1 1.3
Sk iP 04 29 18.8 C
ipP 04 29 25.8
Um iP 04 29 19.7 C
eS 04 37 28
Ud iP 04 29 42.7
ipP 04 29 49.0
De iP 04 30 06.4
ipP 04 30 12.9
Kodiak Island. h = 25 km
(Up,Sk,Ud,De).

" 6 Up iPKP 05 47 51.3
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	6	(cont.)			
		Sk	ePKP	05 47 40	
		Um	iPKP	05 47 34.0	C
			i(PKKS)	05 58 59.2	
		Ud	iPKP	05 47 46.3	
			i	05 47 50.3	
		South of Kermadec Islands (h = 20 km).			
"	6	Ki	iP	06 57 52.7	
			iSg	06 59 28.0	
			eT	07 03 08	
			i	07 03 35.2	
		Sk	iP	06 58 35.8	C
			eS	07 00 14	
		Um	iP	06 58 47.5	
		Ud	iP	06 59 27.8	
		Norwegian Sea.			
"	6	Up	iP	07 10 17.1	
		Ki	iP	07 09 31.7	C
		Sk	iP	07 10 07.6	
		Um	iP	07 09 53.4	
		Ud	iP	07 10 23.6	
		De	iP	07 10 43.1	
		Sakhalin (h = 330 km).			
"	6	Ki	iPn	11 43 09.0	
			iSn	11 44 07.7	
			iLgl	11 44 26.6	
			D = 540 km = 4.9°.		
		Sk	e(Lgl)	11 46 54	
		Um	iSg	11 45 16.5	
		Northwest Russia, 67.2°N, 33.1°E. Origin time = 11 41 53. Explosion?			
"	6	Um	iPKP	12 31 28.4	
		Ud	iPKP	12 31 18.7	
		South Sandwich Islands (h = N).			
"	6	Up	iSg	13 04 40.2	
		Um	iSg	13 05 08.7	
		Ud	iLgl	13 05 38.5	
		Esthonia, 59.7°N, 25.6°E. Origin time = 13 02 28. Explosion?			
"	6	Ud	iPg	13 33 11.1	
			iSn	13 33 29.8	
		(cont.)			

1969 June	6	(cont.)			
		Ud	iSg	13 33 32.8	
		De	i(Sg)	13 33 49.9	
		Västergötland, Sweden. Explosion?			
"	6	Up	iP	15 23 54.1	
"	6	Ud	iP	16 37 03.2	
			i	16 37 09.6	
"	6	Ud	iPP	22 43 53.0	
		Chile (h = 130 km).			
"	7	Ud	iP	02 37 36.8	
"	7	Ud	iPKP	04 22 16.4	
		Drake Passage (h = N).			
"	7	Up	iPKP	05 44 02.2	
			iPKP2	05 44 13.1	
				micr sec	
			PKP2 Z'	0.1 0.5	
		Ki	iPKP	05 43 42.8	
				micr sec	
			PKP Z'	0.2 1.2	
		Sk	iPKP	05 43 57.8	C
		Um	iPKP	05 43 53.1	C
		Ud	iPKP	05 44 04.0	C
			iPKP2	05 44 16.2	
		De	iPKP2	05 44 32.1	
			i	05 44 42.4	
		New Zealand (h = 45 km).			
"	7	Um	eP	07 13 07	
		Ud	eP	07 13 08	
		De	i(P)	07 12 46.1	
"	7	Up	iP	13 53 46.5	
"	7	Up	iP	14 09 02.7	
			ipP	14 09 13.5	
		Ki	iP	14 08 44.6	
			ipP	14 08 55.0	
				micr sec	
			P Z'	0.1 1.0	
		Sk	iP	14 08 58.5	
		Um	iP	14 08 53.2	
			i	14 08 57.5	
		Ud	iP	14 09 03.7	
		De	iP	14 09 31.3	
"	7	Up	iP	15 36 01.9	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 7 (cont.)

Up	i		15 36 12.9	
	iS		15 40 02	
			micr	sec
	P	N	0.2	4
	P	Z	0.3	4
	P	Z'	0.1	0.5
	S	E	0.7	6
	S	N	0.9	8
	Mx	E	2.0	10
	Mx	N	2.4	12
	Mx	Z	2.4	11
	D = 2450 km = 22°.			
Ki	eP		15 37 14	
	eS		15 42 15	
			micr	sec
	S	E	0.4	5
	Mx	E	3.7	15
	Mx	N	1.5	13
	Mx	Z	2.3	12
	D = 3300 km = 29 1/2°.			
Sk	iP		15 36 42.6	
Um	iP		15 36 42.0	
	i		15 36 48.3	
	iS		15 41 07	
Ud	iP		15 36 09.8	
	i		15 36 13.3	
De	iP		15 35 33.4	
	i		15 35 42.9	

Ionian Islands (h = 40 km).
m = 5.2, M = 5.1 (Up,Ki).
Multiple P, with a small first beginning, followed by later larger phases.

" 7	Up	iP	16 02 54.3	
	Sk	iP	16 03 42.5	
	Ud	iP	16 02 58.2	

Ionian Islands.

" 7	Up	iP	18 05 53.7	
	Ud	eP	18 06 00	

Ionian Islands.

" 7	Up	iP	22 58 09.7	C
		iPcP	22 58 35.9	
			micr	sec
		P Z'	0.1	1.0
	Ki	iP	22 57 16.7	C
		iPcP	22 58 03.2	
			micr	sec
		P Z'	0.1	1.0
		Mx E	0.5	18
		Mx N	0.4	17

(cont.)

1969 June 7 (cont.)

Sk	iP	22 57 47.0	
	iPcP	22 58 21.8	
Um	iP	22 57 43.5	C
	iPcP	22 58 19.8	
Ud	iP	22 58 09.1	C
De	iP	22 58 31.9	C
	i	22 58 44.5	

Aleutian Islands (h = 40 km).
m = 5.9 (Up,Ki).

" 7	Up	iP	23 08 52.8	C
		i	23 08 58.9	
" 8	Up	iP	03 31 43.2	
" 8	Up	iP	05 13 48.8	
	Um	iP	05 13 31.5	

Luzon (h = 100 km).

" 8	Up	iP	05 49 33.7	
" 8	Um	iP	05 58 25.9	
" 8	Up	iP	06 07 47.5	
	Um	iP	06 07 31.0	
" 8	Up	iP	06 19 46.8	
	Ki	iP	06 18 52.8	C
	Sk	iP	06 19 27.4	
	Um	iP	06 19 19.3	C
	Ud	iP	06 19 48.6	C
	De	iP	06 20 10.0	

Aleutian Islands (h = 50 km).

" 8	Up	e(Lgl)	07 10 47
		i	07 10 49.5
	Ki	iPn	07 06 33.1
		iSn	07 07 30.8
		iLgl	07 07 53.3
	D = 530 km = 4.8°.		
	Sk	eLgl	07 10 19
	Um	iSn	07 08 09.7
		iS^x	07 08 35.0
		iSg	07 08 47.1
	Ud	iLgl	07 11 18.5

Northwest Russia, 67.6°N, 33.2°E.
Origin time = 07 05 18.
Explosion?

" 8	Ud	eP	12 23 46

North of Halmahera (h = 80 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	8	Ud	iP	14 31 44.8
		Hindu Kush.		
"	8	Up	iP	14 59 54.0 C
			iS	15 08 13
				micr sec
			P Z'	0.2 0.5
			D = 6950 km = 62 1/2°.	
		Ki	iP	14 58 59.7 C
			iPcP	14 59 59.8
				micr sec
			P Z'	0.1 0.8
		Sk	iP	14 59 37.0 C
			i	14 59 57.3
		Um	iP	14 59 25.5 C
			iPcP	15 00 13.1
			iS	15 07 26
		Ud	iP	14 59 57.2 C
			iPcP	15 00 32.9
		De	iP	15 00 19.1 C
		Kamchatka (h = 60 km).		
		m = 6.3 (Up,Ki).		
"	8	Um	iP	17 03 52.4
		Lake Tanganyika (h = N).		
"	8	Up	iP	21 33 57.5 D
"	8	Up	iPKP	21 58 56.6 D
			i	21 59 01.1
			i	21 59 25.2
				micr sec
			PKP Z'	0.2 0.5
		Ki	e(PKP)	21 58 37
			iPKP	21 58 46.2
			iSKP	22 01 37.6
		Sk	ePKP	21 58 50
			iSKP	22 01 51.1
		Um	iPKP	21 58 44.8
			i	21 58 53.5
			isPKP	22 01 21.4
			iSKP	22 01 47.0
		Ud	iPKP	21 58 58.8 D
			iSKP	22 01 58.9
		De	iPKP	21 59 09.0
			ipPKP	22 00 53.9
		Tonga-Kermadec Islands.		
		h = 450 km (Um,De).		
"	9	Up	iP	00 39 42.9 D
		Um	iP	00 39 40.3
		Ud	iP	00 39 56.1
			i	00 40 14.5

1969 June	9	Ud	iP	00 44 40.2
		Greece.		
"	9	Up	eP	02 06 45
			i	02 06 50.9
		Ki	eP	02 06 22
			i	02 06 28.8
		Um	iP	02 06 30.1
			i	02 06 36.0
		Ud	iP	02 07 00.4 C
		Formosa (h = 45 km).		
"	9	Up	eP	02 33 49
		Ki	eP	02 33 12
				micr sec
			Mx E	0.3 15
			Mx N	0.3 14
		Sk	eP	02 33 44
		Um	iP	02 33 28.7 C
		Ud	iP	02 33 55.8 C
		South of Japan (h = 40 km).		
"	9	Up	iP	02 48 40.3
"	9	Up		---
				micr sec
			Mx E	0.9 22
			Mx N	1.0 20
			Mx Z	1.1 23
		Ki	eP	07 05 18
			eSKS	07 16 02
				micr sec
			Mx E	1.5 25
			Mx N	0.8 22
			Mx Z	1.4 21
		Um	iSKS	07 16 09
			iPS	07 19 12
			eSS	07 25 03
		New Guinea (h = 15 km).		
		M = 5.6 (Up,Ki).		
"	9	Um	iP	07 11 49.7
		Ud	iP	07 12 10.8
		Tien-Shan.		
"	9	Up	iP	09 46 59.4
		Ki	eP	09 47 37
		Sk	eP	09 47 07
		Um	iP	09 47 16.4
			i	09 47 24.0
		De	iP	09 46 35.2
			i	09 46 49.5
		Ascension Island (h = N).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	9	Up	iSg	13 51 39.5	
		Ud	iPg	13 50 49.9	
			iSn	13 51 08.8	
			iSg	13 51 11.3	
		De	i(Sg)	13 51 29.1	
		Västergötland, Sweden.			
		Explosion?			
"	9	Ud	iPg	14 00 20.0	
			iSn	14 00 39.9	
			iSg	14 00 42.4	
		De	i(Sg)	14 00 59.7	
		Västergötland, Sweden.			
		Explosion?			
"	9	Ud	iP	15 23 42.8	
"	9	Up	iP	19 00 29.6	D
		Sk	iP	19 00 46.2	
		Um	iP	19 00 17.8	
		Ud	iP	19 00 44.9	
		De	iP	19 00 50.4	
		Sinkiang (h = 35 km).			
"	9	Ki	ePKP	19 57 51	
		Um	iPKP	19 57 57.2	
		Ud	iPKP	19 58 06.9	
		Santa Cruz Islands (h = 50 km).			
"	9	Up	iPKP	22 12 27.3	
			iX	22 14 31.4	
				micr	sec
			Mx E	0.5	19
			Mx N	0.8	20
			Mx Z	0.9	19
		Ki	iPKP	22 12 18.5	
			iX	22 14 12.7	
			ePP	22 14 50	
			iPKS	22 15 50	
				micr	sec
			PP Z	0.4	6
			PKS N	0.4	4
			PKS Z	0.4	7
			Mx E	0.7	19
			Mx N	0.7	18
			Mx Z	1.1	19
		Sk	ePKP	22 12 24	
			iX	22 14 38.5	
		Um	iPKP	22 12 19.3	
			i	22 12 27.3	
			iX	22 14 19.0	
			iPP	22 15 09	
		(cont.)			

1969 June	9	(cont.)			
		Um	iPKS	22 15 55	
			iSKSP	22 25 19	
		Ud	iPKP	22 12 27.9	
			iX	22 14 40.0	
		De	iPKP	22 12 38.9	
		Tonga Islands (h = N).			
		M = 5.6 (Up,Ki).			
		The clear but unidentified phase X may belong to the group of early PP-arrivals, or else be due to an independent event.			
"	9	Up	iP	23 20 44.2	C
				micr	sec
			P Z'	0.1	0.8
		Ki	iP	23 20 00.4	
		Sk	iP	23 20 34.0	
		Um	iP	23 20 19.0	
		Ud	iP	23 20 50.1	C
		De	iP	23 21 08.0	C
			i	23 21 23.1	
		Kurile Islands (h = 50 km).			
"	10	Up	iLgl	06 25 46.0	
			i	06 26 25.8	
		Ud	iPg	06 24 19.4	
			iSg	06 24 53.5	
		De	iSg	06 25 01.9	
			i	06 25 38.3	
		Skagerrak, 58.4°N, 9.6°E.			
		Origin time = 06 23 27.			
"	10	Ud	iPg	06 57 33.2	
			iSg	06 58 07.3	
		De	iSg	06 58 18.2	
		Skagerrak, 58.4°N, 9.6°E.			
		Origin time = 06 56 41.			
"	10	Ud	iP	09 56 20.4	
		Kurile Islands (h = 100 km).			
"	10	Ud	iP	15 37 23.2	
		Aleutian Islands (h = 70 km).			
"	10	Up	iP	17 28 03.5	
			i	17 28 07.1	
				micr	sec
			Mx E	0.8	17
			Mx N	1.9	23
			Mx Z	1.3	16
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 10 (cont.)

Ki	iP		17 27 49.2	
			micr	sec
	Mx	E	2.0	19
	Mx	N	1.5	19
	Mx	Z	2.8	19
Sk	eP		17 28 13	
Um	iP		17 27 55.6	
	i		17 28 08.3	
Ud	iP		17 28 15.3	
	i		17 28 38.1	

Mindoro (h = 35 km).
M = 5.6 (Up,Ki).

" 10

Up	iP		22 59 35.9 C	
	i		23 02 11	
	iS		23 05 30	
			micr	sec
	P	Z'	0.4	0.6

D = 4500 km = 40 1/2°.

Ki	iP		22 59 45.4 C	
	i		22 59 54.3	
			micr	sec
	P	Z'	0.5	1.0
Sk	iP		23 00 01.6 C	
	iPP		23 01 46.1	
Um	iP		22 59 34.5 C	
	iS		23 05 27	
	isS		23 06 45	
Ud	iP		22 59 52.4 C	
	ipP		23 00 36.1	
	isP		23 00 57.9	
	iPP		23 01 37.1	
De	iP		22 59 48.7 C	
	iPP		23 01 28.0	

Hindu Kush. h = 220 km (Um,Ud).
m = 6.0 (Up,Ki).

" 10

Ki	eL		23 28	
			micr	sec
	Mx	E	1.2	21
	Mx	N	0.6	14
	Mx	Z	0.8	16

Japan (h = 30 km).

" 10

Up	iP		23 38 15.3 C	
	ipP		23 39 01.4	
	isP		23 39 25	
	iPP		23 40 03	
	iSa		23 46 47	
			micr	sec
	P	Z'	0.2	0.8

(cont.)

1969 June 10 (cont.)

Ki	iP		23 38 24.7	
	i		23 38 34.9	
			micr	sec
	P	Z'	0.3	1.0
Sk	iP		23 38 41.9 C	
	isP		23 39 51.6	
Um	iP		23 38 14.8	
	isP		23 39 23.4	
Ud	iP		23 38 32.2	
	ipP		23 39 17.5	
	isP		23 39 39.3	
De	iP		23 38 28.7 C	
	ipP		23 39 20.8	

Hindu Kush. h = 240 km (Up, Sk,Um,Ud,De).
m = 5.7 (Up,Ki).

" 10

Up	iP		23 38 41.2
Ud	iP		23 38 57.9
De	iP		23 38 55.3

Hindu Kush.
Origin time = 23 31 20.

" 11

Up	iP		01 08 19.2	
	i		01 08 35.8	
	eS		01 16 29	
			micr	sec
	P	Z'	0.1	1.0
	S	N	0.8	10
	Mx	E	0.6	15
	Mx	N	0.9	17
	Mx	Z	0.9	18

D = 6650 km = 60°.

Ki	iP		01 07 24.5 C	
	i		01 07 41.0	
	iS		01 14 51	
			micr	sec
	P	Z	0.5	6
	P	Z'	0.1	1.0
	S	N	0.6	9
	Mx	E	0.6	14
	Mx	N	0.6	15
	Mx	Z	0.9	15

D = 5800 km = 52°.

Sk	iP		01 07 50.3 C
	i		01 08 03.0
Um	iP		01 07 53.0
	iS		01 15 40
Ud	iP		01 08 14.5
De	iP		01 08 39.1

Alaska (h = 5 km).
m = 5.6, M = 5.1 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	11	Up	iP	01 15 08.5
			i	01 15 13.6
		Ki	eP	01 14 13
			i	01 14 17.5
		Sk	iP	01 14 40.1
		Um	iP	01 14 45.4
			i	01 14 57.4
		Ud	iP	01 15 05.1
		De	iP	01 15 29.1
		Alaska (h = 10 km).		
"	11	Ki	iPKP	03 55 25.2
		Um	iPKP	03 55 20.0
		South Sandwich Islands (h = 35 km).		
"	11	Up	iP	05 00 49.6
		Ki	iP	05 00 50.1
		Sk	iP	05 01 04.0
		Um	iP	05 00 46.6 D
		Ud	iP	05 00 59.7 D
		De	iP	05 00 58.2 D
			i	05 01 04.8
		Sumatra (h = 50 km).		
"	11	Sk	iP	07 02 10.7
		Um	iP	07 02 22.6
		Ud	iP	07 01 51.0
		Atlantic Ocean (h = N).		
"	11	Up	iPn	08 34 01.0
			iSn	08 35 04.4
		Sk	eSn	08 35 52
		Ud	iPn	08 33 37.3
			iSg	08 34 41.5
		De	iSg	08 33 46.0
		Denmark. Explosion? Cf June 5, 13 35.		
"	11	Sk	iP	09 02 35.2
		Um	eP	09 01 56
			i	09 02 07.9
"	11	Um	iSg	12 05 17.5
		Ud	iLgl	12 05 47.6
		De	iLgl	12 06 12.9
		Esthonia, 59.7°N, 25.6°E. Origin time = 12 02 36. Explosion ?		
"	11	Um	iP	12 30 23.7
		Ud	iP	12 30 42.0
			i	12 31 03.6
		Mindoro (h = 25 km).		

1969 June	11	Um	iP		13 56 52.6	
"	11	Up	iP		15 22 39.4	D
					micr	sec
			P	Z'	0.1	0.6
		Ki	iP		15 22 07.3	
			i		15 22 08.5	
					micr	sec
			P	Z'	0.1	1.0
		Sk	iP		15 22 37.0	
		Um	iP		15 22 21.8	
		Ud	iP		15 22 46.3	D
		De	iP		15 22 57.8	
		Bonin Islands (h = 500 km). m = 5.4 (Up,Ki).				
"	11	De	iP		15 33 15.9	
"	11	Ud	i(P)		20 33 23.0	
"	11	Um	i(Sg)		21 03 05.4	
"	12	De	ePKP		00 04 26	
		Tonga Islands (h = N).				
"	12	Up	iPKP		00 51 33.9	
			i		00 51 40.3	
		Ki	iPKP		00 51 06.2	
			i		00 51 10.4	
			i		00 51 20.9	
		Sk	iPKP		00 51 25.5	
		Um	iPKP		00 51 20.0	
			i		00 51 34.1	
		Ud	iPKP		00 51 31.1	
			i		00 51 43.7	
"	12	Up	iP		04 27 17.6	
		Ki	iP		04 26 43.9	
		Um	iP		04 26 58.7	
		Ud	iP		04 27 25.2	
		De	iP		04 27 38.4	
		South of Japan (h = 370 km).				
"	12	Up	iP		07 52 39.3	C
			ipP		07 52 48.2	
			iS		08 01 50	
					micr	sec
			P	Z'	0.2	1.5
			S	E	0.5	9
			Mx	E	2.0	21
			Mx	N	2.0	20
			Mx	Z	2.0	21
		D = 7850 km = 70 1/2°.				

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 12 (cont.)

Ki	iP		07 51 57.0	C
	ipP		07 52 05.6	
	iS		08 00 33	
	iScS		08 01 48	
			micr	sec
	S	E	0.8	8
	S	N	0.6	8
	Mx	E	6.8	22
	Mx	N	4.1	18
	Mx	Z	5.0	17
	D = 7100 km = 64°.			
Sk	eP		07 52 31	
Um	iP		07 52 15.6	C
	ipP		07 52 25.0	
	iPP		07 54 41	
	iS		08 01 07	
Ud	iP		07 52 46.0	C
	ipP		07 52 54.9	
De	iP		07 53 02.4	

Japan. h = 35 km (Up,Ki,Um,Ud).
m = 5.9, M = 5.7 (Up,Ki).

" 12 Up iP 09 59 35.1
Ud iP 09 59 38.1
Ionian Islands.

" 12 Ud iP 12 19 15.4

" 12 Ki iP 12 35 29.6
Ud iP 12 35 59.0
Luzon (h = 50 km).

" 12 Ki iP 13 04 36.6
Ud iP 13 05 02.3
Mindanao (h = 70 km).

" 12 Ud iP 14 11 41.6
Nevada. Underground explosion.

" 12 Up iP 15 19 00.6 C

	iPP		15 19 32.5	
	iPcP		15 22 31.6	
	iS		15 23 32	
			micr	sec
	P	E	0.4	3
	P	N	1.6	3
	P	Z	1.6	3
	P	Z'	1.2	1.5
	PP	Z'	0.4	0.5
	S	E	2.9	5
	S	N	7.2	7

(cont.)

1969 June 12 (cont.)

Up			micr	sec
	S	Z	4.1	11
	Mx	E	19	13
	Mx	N	27	15
	Mx	Z	25	15
	D = 2900 km = 26°.			
Ki	iP		15 20 08.6	C
	iPcP		15 22 51.9	
	iS		15 25 25	
	iSS		15 27 28	
			micr	sec
	P	N	1.0	9
	P	Z	1.4	10
	P	Z'	0.9	1.0
	S	E	1.1	4
	S	Z	1.0	7
	Mx	E	13	13
	Mx	N	45	13
	Mx	Z	69	13
	D = 3700 km = 33 1/2°.			
Sk	iP		15 19 39.8	
	i		15 19 48.5	
	iPcP		15 22 42.4	
Um	iP		15 19 33.4	C
	iPcP		15 22 41.0	
	iS		15 24 19	
	iSa		15 24 47	
Ud	iP		15 19 08.1	
	i		15 22 51.2	
De	iP		15 18 35.8	C
	iPcP		15 22 19.6	

Crete (h = 25 km).
m = 6.2, M = 6.2 (Up,Ki).
Very pronounced Airy phase, especially in the long-period N and Z records of Ki and Um. Very clear PcP-phases in the Z'-records.

" 12 Up iP 16 23 56.4 C

" 12 Sk iP 17 06 17.5

" 12 Sk eP 17 34 34

" 12 Up iP 18 06 00.0
Ki iP 18 07 07.2
Sk iP 18 06 39.7
Um iP 18 06 31.5
i 18 06 39.4
Ud iP 18 06 06.6
De iP 18 05 34.2
Crete (h = 60 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	12	Up	iP	18 20 20.5 C	
		Ud	iP	18 20 31.8	
		Indian Ocean (h = N).			
"	12	Up	iP	19 10 56.2	
			iS	19 20 36	
				micr	sec
			Mx E	1.7	18
			Mx N	1.6	20
			Mx Z	2.9	18
			D = 8500 km = 76 1/2°.		
		Ki	iP	19 10 31.5	
				micr	sec
			Mx E	1.0	14
			Mx N	1.0	15
			Mx Z	1.8	15
		Sk	eP	19 10 58	
		Um	iP	19 10 41.3	
			iS	19 19 55	
		Ud	iP	19 11 05.7	
		De	eP	19 11 14	
		Formosa (h = N).			
		M = 5.4 (Up,Ki).			
"	12	Ud	iP	19 35 10.0	
"	12	Up	iPKP	20 47 25.8	
				micr	sec
			Mx E	0.6	20
			Mx N	0.6	19
			Mx Z	0.9	19
		Ki	iPKP	20 47 38.8 C	
				micr	sec
			PKP Z'	0.2	1.6
			Mx N	0.6	19
			Mx Z	1.3	20
		Ud	ePKP	20 47 22	
			i	20 47 37.8	
		South Sandwich Islands (h = 9 km).			
		M = 5.5 (Up,Ki).			
"	13	Ki	iP	01 29 51.0	
		Sk	iP	01 29 21.6	
		Um	iP	01 29 16.3	
		Ud	iP	01 28 50.3 C	
			i	01 28 56.9	
		De	iP	01 28 18.0 C	
		Crete (h = 40 km).			
"	13	Ud	iP	04 07 56.7	
"	13	Um	iP	06 05 56.7	
1969 June	13	Ki	iP	07 36 04.7	
		Ud	iP	07 35 04.2	
		De	eP	07 34 33	
		Crete. Origin time = 07 29 27.			
"	13	Up	iP	08 59 07.9 C	
			ePa	09 03 19	
			iS	09 07 46	
			eP'P'	09 27 32	
				micr	sec
			P Z'	0.1	0.5
			Mx E	21	22
			Mx N	37	24
			Mx Z	41	24
			D = 7200 km = 65°.		
		Ki	iP	08 58 16.9 C	
			iPa	09 01 36.6	
			e	09 02 06	
			eP'P'	09 27 45	
				micr	sec
			P N	0.3	7
			P Z	1.0	7
			P Z'	0.2	1.0
			Mx E	21	23
			Mx N	19	22
			Mx Z	53	24
		Sk	iP	08 58 53.4	
			i	08 59 25.8	
		Um	iP	08 58 40.6 C	
			iPa	09 02 19	
			i	09 06 31	
			iS	09 06 58	
			eP'P'	09 27 34	
			i	09 27 47.0	
			i	09 27 56.8	
		Ud	iP	08 59 12.4 C	
			i	08 59 16.5	
			eP'P'	09 27 35	
		De	iP	08 59 32.3 C	
			eP'P'	09 27 37	
		Kurile Islands (h = 60 km).			
		m = 6.1, M = 6.5 (Up,Ki).			
"	13	Ki	iPn	11 42 21.7	
			iSn	11 43 20.7	
			iLgl	11 43 40.1	
			D = 540 km = 4.9°.		
		Sk	e(Lgl)	11 46 09	
		Um	eSg	11 44 30	
		Northwest Russia, 67.2°N, 33.2°E.			
		Origin time = 11 41 06.			
		Explosion?			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	13	Um	iP	15 33 03.4
		Ud	iP	15 33 34.6
		Sea of Japan (h = 260 km).		
"	13	Sk	iP	15 42 58.3
"	13	Um	i(P)	16 28 39.1
		Ud	iP	16 29 19.0
"	13	Up	iLgl	17 45 29.8
		Ki	ePn	17 42 51
			iSg	17 43 30.5
		Sk	ePn	17 42 54
			iSg	17 43 34.2
		Um	iPg	17 43 09.1
			iSg	17 43 56.5
		Nordland, Norway, 66.4°N, 14.8°E.		
		Origin time = 17 42 01.		
		Explosion?		
"	13	Ud	iP	18 13 05.2
		De	iP	18 12 33.2 C
		Crete.		
"	13	Ud	iPKP	18 52 44.7
		De	iPKP	18 52 55.4
		Fiji Islands (h = 600 km).		
"	13	Um	iP	19 48 03.2
		Ud	iP	19 47 18.1
		Ionian Islands.		
"	13	Ki	eP	22 16 50
		Ud	iP	22 17 14.9
			i	22 17 25.0
		Talaud Islands (h = 90 km).		
"	14	De	iP	00 13 31.2
"	14	Ud	iP	00 18 23.5
"	14	Up	iP	00 34 09.6
			ipP	00 34 19.3
				micr sec
			P Z'	0.1 0.6
		Ki	iP	00 33 16.1
		Um	iP	00 33 42.0
			ipP	00 33 53.4
		Ud	iP	00 34 10.0
		De	iP	00 34 31.8
		Aleutian Islands.		
		h = 40 km (Up,Um).		

1969 June	14	Up	iP	01 04 53.6
		Ki	iP	01 06 01.0
		Um	iP	01 05 25.7
		Ud	iP	01 05 00.1
		De	iP	01 04 28.2 D
		Crete (h = N).		
"	14	Up	iPg	02 24 27.7
			iSg	02 24 52.8
		D = 210 km = 1.9°.		
		Um	iPg	02 25 11.9
			iSg	02 26 04.9
		D = 460 km = 4.1°.		
		Ud	iSg	02 25 58.4
		De	iLgl	02 26 27.1
		Baltic Sea, 59.7°N, 21.4°E.		
		Origin time = 02 23 50.		
		Underwater explosion?		
"	14	Up	iP	03 38 11.6
		Ki	iP	03 37 59.8
		Sk	iP	03 38 25.8
		Um	iP	03 38 00.9
		Ud	iP	03 38 25.3
		De	eP	03 38 29
		Tibet (h = N).		
"	14	Up	iPKP	03 41 41.6
			ipPKP	03 41 57.7
				micr sec
			Mx E	1.3 23
			Mx N	2.3 22
			Mx Z	2.0 21
		Ki	iPKP	03 41 29.0
			ePS	03 52 16
				micr sec
			Mx E	1.1 22
			Mx N	1.3 20
			Mx Z	2.5 20
		Sk	iPKP	03 41 40.0
		Um	iPKP	03 41 34.0
			ipPKP	03 41 52.0
			iPP	03 42 46.6
			i	03 52 19
			iPS	03 52 37
		Ud	iPKP	03 41 43.7 C
			i	03 41 54.9
			ipPKP	03 42 00.9
		De	iPKP	03 41 49.9 C
			i	03 42 01.6
			ipPKP	03 42 06.0
		Solomon Islands. h = 60 km (Up,Um,Ud,De).		
		M = 5.8 (Up,Ki).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	14	Up	iP	03 52 52.1
		Ki	iP	03 52 35.4
		Um	iP	03 52 40.2
		Ud	iP	03 52 59.6
		Mindanao (h = N).		
"	14	Up	iP	04 44 16.7
"	14	Ud	iP	05 59 35.1
		Ionian Islands.		
"	14	Up	i(P)	06 07 32.5
			i	06 07 44.0
"	14	Up	iPg	07 53 15.2
			i	07 53 40.8
			iSg	07 53 43.2
		Ud	eSg	07 54 32
		De	eLgl	07 55 43
		Baltic Sea.		
		Underwater explosion?		
"	14	Up	eSg	08 01 36
		Um	iSg	08 03 10.4
		Ud	eSg	08 02 25
		De	iSg	08 02 30.3
		Baltic Sea. Underwater explosion?		
"	14	Up	i(Sg)	08 15 04.5
		Um	i(Sg)	08 16 30.3
"	14	Ki	ePn	08 16 26
			eSn	08 17 19
			iLgl	08 17 38.4
			D = 500 km = 4.5°.	
		Probably northwest Russia.		
		Origin time = 08 15 15.		
		Explosion?		
"	14	Um	iP	08 23 35.8
		Japan (h = 60 km).		
"	14	Up	iPKP	10 49 30.0
			i	10 49 37.2
		Sk	iPKP	10 49 24.9
		Um	iPKP	10 49 19.5
		Ud	iPKP	10 49 32.0
			i	10 49 40.3
		South of Kermadec Islands (h = 420 km).		

1969 June	14	Up	iP		13 52 57.3	C
			iS		13 57 27	
			iSa		13 57 44	
					micr	sec
			P	Z'	0.1	0.8
			S	N	0.3	4
			Mx	E	0.8	14
			Mx	N	1.4	14
			Mx	Z	1.3	14
			D = 2900 km = 26°.			
		Ki	iP		13 54 05.3	
			i		13 54 14.6	
					micr	sec
			P	Z'	0.2	1.0
			Mx	E	0.6	11
			Mx	N	1.9	14
			Mx	Z	3.1	13
		Sk	iP		13 53 35.8	C
		Um	iP		13 53 29.8	
		Ud	iP		13 53 04.3	
		De	iP		13 52 32.3	C
		Crete (h = 9 km).				
		m = 5.6, M = 4.9 (Up,Ki).				
"	14	Up	iP		13 58 37.4	
			i		13 58 40.0	
		Sk	i(P)		13 59 34.0	
		Um	iP		13 59 15.7	
			i		13 59 30.5	
		Ud	iP		13 58 44.3	
			iPP		13 59 12.5	
		De	iP		13 58 08.9	
		Greece.				
"	14	Up	iP		14 38 25.9	
		Ki	iP		14 39 34.2	
		Um	iP		14 38 58.4	
		Ud	iP		14 38 33.2	
		De	iP		14 38 01.0	
		Crete (h = 35 km).				
"	14	Up	iP		17 50 18.3	
			e(S)		17 54 47	
					micr	sec
			P	Z'	0.1	0.8
			Mx	E	0.8	18
			Mx	N	1.7	21
			Mx	Z	0.8	16
		Ki	e(P)		17 51 04	
			i		17 51 38.8	
					micr	sec
			Mx	E	1.0	13
			Mx	N	0.7	13

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	14	(cont.)		
		Sk	eP	17 51 06
		Um	iP	17 50 37.0
			iS	17 55 13
		Ud	iP	17 50 34.2
		De	iP	17 50 17.0
		Turkey-USSR (h = 25 km).		
		M = 4.7 (Up,Ki).		
"	14	Up	iP	19 40 01.4
"	14	Up	i(P)	21 32 22.3
			i	21 32 28.4
"	14	Up	eP	22 04 25
			ipP	22 04 43.6
		Ki	iP	22 03 50.5
		Um	iP	22 04 05.7
			ipP	22 04 26.0
		Ud	iP	22 04 31.5
			ipP	22 04 48.8
		De	iP	22 04 45.0
		South of Japan. h = 70 km (Up,Um,Ud).		
"	14	Up	ePKP	22 34 13
		Ki	iPKP	22 34 08.3
		Sk	ePKP	22 34 16
		Um	ePKP	22 34 09
		Ud	ePKP	22 34 17
		De	iPKP	22 34 14.1
"	14	Ud	iP	23 58 30.6
"	15	Um	iP	03 47 45.5
			i	03 48 01.4
		Mexico (h = 60 km).		
"	15	Up	iP	06 04 12.1
		Ki	iP	06 05 20.9
			i	06 05 27.2
		Sk	iP	06 04 51.2
		Um	iP	06 04 45.5
		Ud	iP	06 04 20.4
		De	iP	06 03 47.5
		Crete (h = 25 km).		
"	15	Up	iP	17 09 34.1
			ipP	17 09 47.6
			iPP	17 13 06.5
			iSKS	17 20 15
				micr sec
			Mx N	0.7 22
		(cont.)		

1969 June	15	(cont.)		
		Ki	iP	17 09 35.0 C
			ipP	17 09 48.6
			iPP	17 13 13.5
				micr sec
			P Z'	0.1 1.0
		Sk	iP	17 09 48.2 C
			ipP	17 10 02.4
		Um	iP	17 09 32.0 C
			ipP	17 09 45.6
			iS	17 20 25
			iSS	17 26 33
		Ud	iP	17 09 44.1 C
			ipP	17 09 58.0
			i(PP)	17 13 15.6
		Sumatra. h = 50 km (Up,Ki,Sk, Um,Ud).		
"	15	Um	iP	22 05 25.2
		Ud	eP	22 05 42
			i	22 05 47.1
		Alaska (h = 30 km).		
"	16	Up	iP	04 58 17.4
				micr sec
			Mx E	0.4 10
			Mx N	0.4 15
			Mx Z	0.8 16
		Ki		---
				micr sec
			Mx E	0.7 15
		Um	iP	04 59 04.1
		Ud	iP	04 58 24.3
		Ionian Islands.		
"	16	Up	iP	07 54 54.8
		Sk	eP	07 55 33
		Ud	iP	07 55 01.2
		Ionian Islands.		
"	16	Up	iSg	12 00 34.1
		Ki	iSg	12 03 07.8
		Sk	eSg	12 02 20
		Um	iSg	12 01 05.5
		Ud	iLgl	12 01 35.1
		Esthonia, 59.7°N, 25.6°E.		
		Origin time = 11 58 24.		
		Explosion?		
"	16	Up	iP	15 20 18.8
		Ud	iP	15 20 26.9
		Ionian Islands.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	16	Ki	iP		15 59 43.6
		Um	iP		15 59 46.6
			eS		16 11 27
		Ud	iP		16 00 04.4
		Banda Sea (h = 40 km).			
"	16	Up	iP		16 11 13.7
			i		16 11 20.3
			iS		16 15 12
					micr sec
			P	Z'	0.3 1.5
			S	E	0.4 5
			S	N	0.7 7
			Mx	E	1.8 11
			Mx	N	2.1 13
			Mx	Z	3.1 14
			D = 2400 km = 21 1/2°.		
		Ki	e(P)		16 12 38
					micr sec
			Mx	E	2.9 13
			Mx	N	1.5 14
			Mx	Z	2.3 13
		Sk	iP		16 11 53.2
			i		16 11 56.9
		Um	iP		16 11 54.1
			iS		16 16 22
		Ud	iP		16 11 20.5
		Ionian Islands (h = 40 km).			
		m = 5.4, M = 5.0 (Up,Ki).			
"	16	Um	iP		21 09 07.0
"	17	Up	iPKP		01 07 42.8 C
			i		01 07 47.5
		Sk	iPKP		01 07 36.0 C
		Um	iPKP		01 07 31.3 C
			i		01 07 35.5
		Ud	iPKP		01 07 44.5
			i		01 07 53.6
		Kermadec Islands (h = 25 km).			
"	17	On June 17, 19, 24 and 26, underwater explosions were performed in Scandinavian waters for seismic profiling of crustal and upper-mantle structure. These explosions were all recorded by our network. The readings will not be reported here, as they are planned to appear in a special paper.			

1969 June	17	Ud	iP		03 46 15.4
		Ionian Islands.			
"	17	Up	iP		05 23 34.8
			iS		05 27 34
					micr sec
			S	E	0.2 4
			S	N	0.3 6
			Mx	E	0.7 10
			Mx	N	0.9 12
			Mx	Z	1.1 12
			D = 2400 km = 21 1/2°.		
		Ki	eP		05 24 49
			ePP		05 25 41
					micr sec
			Mx	E	1.1 13
			Mx	N	0.8 14
			Mx	Z	1.1 13
		Sk	iP		05 24 14.8
		Um	iP		05 24 13.7
			i		05 24 18.4
			eS		05 28 40
		Ud	iP		05 23 41.6
		Ionian Islands (h = N).			
		M = 4.6 (Up,Ki).			
"	17	Ki	iSn		05 32 29.3
			iSg		05 32 57.0
		Sk	i(Lgl)		05 35 51.0
		Um	iSg		05 34 14.1
		Northwest Russia. Explosion?			
"	17	Ki	eP		05 44 15
			i		05 44 52.0
		Puerto Rico (h = 50 km).			
"	17	Up	iP		05 54 06.0
"	17	Um	iP		07 13 23.6
"	17	Sk	iP		09 49 36.2
			iSg		09 50 56.6
		Ud	iSg		09 52 40.0
		Probably Norwegian Sea.			
"	17	Ud	iP		10 39 55.6
		Ionian Islands.			
"	17	Ud	iP		11 47 52.3
		Mexico (h = N).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	17	Sk	iSg	13 02 39.8	
		Um	iSg	13 01 32.8	
		Ud	iSg	13 01 47.9	
		Southwest Finland. Explosion?			
"	17	Up	i(P)	16 10 29.9	
			i	16 10 49.2	
"	17	Up	iP	19 33 13.6	C
"	17	Up	iP	19 39 07.2	C
			ipP	19 39 56	
			ipPP	19 43 29	
			iSKS	19 49 14	
			iS	19 49 36	
			iPKKP	19 56 32.6	
				micr	sec
			P Z'	0.9	0.6
			pP Z	0.8	5
			SKS E	2.6	9
			SKS N	2.3	9
			Mx E	2.1	22
			Mx N	4.3	23
			Mx Z	3.5	16
			D = 10050 km = 90 1/2°.		
		Ki	iP	19 38 39.4	C
			ipP	19 39 28.6	
			iSKS	19 48 38	
			iS	19 48 44.8	
			ipS	19 49 43	
			iPKKP	19 56 47.6	
				micr	sec
			P E	0.5	7
			P N	0.3	7
			P Z	1.8	7
			P Z'	0.6	0.6
			pP Z	2.3	6
			SKS E	6.7	8
			SKS N	4.6	13
			SKS Z	1.4	8
			Mx E	5.2	20
			Mx N	4.0	20
			Mx Z	4.6	19
			D = 9400 km = 84 1/2°.		
		Sk	iP	19 39 04.9	
			ipP	19 39 54.0	
			iPKKP	19 56 33.8	
		Um	iP	19 38 51.1	C
			ipP	19 39 41.3	
			iSKS	19 48 50.4	
			iS	19 49 07.9	
			ipS	19 50 00	
		(cont.)			

1969 June	17	(cont.)			
		Um	iPKKP	19 56 41.2	
		Ud	iP	19 39 13.5	
			ipP	19 40 03.7	
			iPKKP	19 56 29.3	
		Mariana Islands. h = 200 km (Up,Ki,Sk,Um,Ud). m = 6.4, M = 6.0 (Up,Ki). M uncorrected for focal depth.			
"	17	Up	i(P)	19 46 35.3	
"	17	Up	iP	23 29 53.9	C
			iPn	23 29 58.8	
			iS	23 34 11	
			iLgl	23 37 18	
				micr	sec
			P Z'	0.1	0.6
			S E	0.7	10
			S N	0.4	4
			Mx E	3.2	11
			Mx N	5.6	14
			Mx Z	4.5	12
			D = 2650 km = 24°.		
		Ki	iP	23 30 34.0	
			iPn	23 30 55.0	
			i	23 31 06.1	
			e	23 35 47	
			iSn	23 36 23.3	
			iLgl	23 39 29	
			iLg2	23 39 52	
				micr	sec
			Mx E	4.0	11
			Mx N	4.7	12
			Mx Z	6.2	11
		Sk	iP	23 30 32.4	
			iPn	23 30 48.7	
			i(Sn)	23 36 55.2	
		Um	iP	23 30 07.9	
			iPn	23 30 17.4	
			i	23 30 31	
			iS	23 34 22	
			iLgl	23 37 45	
		Ud	iP	23 30 12.0	C
			iPn	23 30 21.2	
		Caucasus (h = 6 km). m = 5.5, M = 5.4 (Up,Ki). The average group velocity of Pn is 8.38 km/sec for this case.			
"	18	Up	iP	00 01 37.3	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	18	(cont.)				
		Ud	iP		00 01 41.2	
		Greece.				
"	18	Up	ePKP		00 18 03	C
			iPKP2		00 18 39.7	
			iPP		00 22 39	
					micr	sec
			PP	E	0.2	4
			Mx	E	7.2	22
			Mx	N	13	23
			Mx	Z	13	23
		Ki	iPKP		00 17 58	
			i		00 18 05.9	
			ePKP2		00 18 36	
					micr	sec
			PKP	Z	0.8	10
			PKP	Z'	0.2	1.5
			Mx	E	4.9	21
			Mx	N	6.6	23
			Mx	Z	14	22
		Sk	ePKP		00 18 14	
			iPKP2		00 18 50.1	
		Um	iPKP		00 17 59	
			iPKP2		00 18 38.1	
			iPP		00 22 18	
		Ud	i(PKP2)		00 18 35.6	
			iPKP2		00 18 47.2	
			i		00 19 08.2	
		Macquarie Islands (h = N).				
		M = 6.7 (Up,Ki).				
"	18	Up	iP		00 41 45.0	
		Um	iP		00 41 22.4	
		Ud	iP		00 41 52.9	
		Japan (h = 30 km).				
"	18	Up	iP1		01 48 51.7	
			iP2		01 48 53.9	
			ipP		01 49 02.1	
					micr	sec
			P2	Z'	0.1	1.0
		Ki	iP1		01 47 57.2	
			iP2		01 47 59.4	
			ipP		01 48 07.6	
					micr	sec
			P2	Z'	0.1	1.0
		Sk	iP1		01 48 22.9	
			iP2		01 48 25.1	
			ipP		01 48 33.5	
		Um	iP1		01 48 25.6	C
			iP2		01 48 27.9	
		(cont.)				

1969 June	18	(cont.)		
		Um	ipP	01 48 35.5
		Ud	iP1	01 48 48.0
			iP2	01 48 50.0
			ipP	01 48 57.9
		Alaska. h = 30 km (Up,Ki, Sk,Um,Ud).		
		m = 5.8 (Up,Ki).		
		Double P; in average P2 - P1 = 2.2 sec. The depth is computed from the difference pP - P2.		
"	18	Up	iP	02 33 57.9
			i	02 34 04.9
			i	02 34 12.1
"	18	Ud	iP	04 18 19.3
		Ionian Islands.		
"	18	Ud	iP	07 03 50.6
"	18	Ki	iP	08 32 38.7
		Um	iP	08 32 54.1
		Ud	iP	08 33 22.1
"	18	Up	iLgl	10 20 13.1
		Sk	iLgl	10 20 13.1
		Um	iLgl	10 21 34.7
		Ud	iP^x	10 18 08.2
			iPg	10 18 19.8
			iLgl	10 19 08.1
			iSg	10 19 15.6
			D = 480 km = 4.3°.	
		Off southwest coast of Norway, 58.1°N, 6.2°E. Origin time = 10 16 54. Solution checked with readings at Bergen and Kongsberg.		
"	18	Ud	iP	12 33 25.4
"	18	Ud	iP	14 28 44.6
"	18	Up	iP	17 22 53.6
			ipP	17 23 00.9
		Ki	eP	17 23 18
		Um	iP	17 23 03.2
			ipP	17 23 10.2
		Ud	iP	17 23 04.8
			ipP	17 23 11.9
		Indian Ocean. h = 25 km (Up,Um,Ud).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	18	Ud	iP	18 35 43.0
"	18	Up	i(Sg)	19 06 45.1
		Sk	i(Sg)	19 06 30.0
		Ud	iPg	19 05 19.9
			iSg	19 05 43.7
		South Norway.		
"	18	Up	iP	20 20 30.3
			ipP	20 20 50.6
		Ki	iP	20 20 32.1 C
		Um	iP	20 20 27.8
			ipP	20 20 50.2
		Ud	iP	20 20 41.2
			ipP	20 21 02.5
		Sumatra. h = 80 km (Up,Um,Ud).		
"	18	Ki	iP	20 56 44.7
		Sk	eP	20 57 09
		Um	iP	20 56 49.4
			iSKS	21 07 15
			eS	21 08 01
			iPS	21 09 20
		Ud	iP	20 57 08.1
		Molucca Passage (h = 5 km).		
"	18 - 19	Up	iP	23 55 08.0 C
			iS	00 04 02
				micr sec
			P Z'	0.2 1.0
			Mx E	1.3 17
			Mx N	2.2 18
			Mx Z	2.3 18
			D = 7550 km = 68°.	
		Ki	iP	23 54 14.7 C
			i	23 55 15.7
			eS	00 02 20
				micr sec
			P N	0.3 6
			P Z	0.5 7
			P Z'	0.3 1.3
			S N	0.3 10
			Mx E	1.8 18
			Mx N	1.8 21
			Mx Z	1.5 18
			D = 6650 km = 60°.	
		Sk	iP	23 54 44.6
			ipP	23 54 56.9
		Um	iP	23 54 41.6 C
			ipP	23 54 53.6
			iS	00 03 15
			iP'P'	00 23 50.0
		(cont.)		

1969 June	18 - 19	(cont.)		
		Ud	iP	23 55 07.1 C
			ipP	23 55 20.0
		Aleutian Islands. h = 45 km. (Sk,Um,Ud).		
		m = 5.8, M = 5.5 (Up,Ki).		
"	19	Ud	iP	04 50 40.9 C
"	19	Up	iP	04 57 27.1
		Ki	iP	04 56 33.4
		Um	iP	04 57 00.1
		Ud	iP	04 57 26.0
		Aleutian Islands (h = 7 km).		
"	19	Um	iP	05 35 24.0
		Ud	iP	05 35 43.9
		Pamir.		
"	19	Up	eP	05 45 38
		Ki	iP	05 45 21.8
		Um	iP	05 45 29.0
		Ud	iP	05 45 48.5
"	19	Up	e	06 24 39
			i(Sg)	06 24 44.4
"	19	Ki	iP	06 59 13.7
		Um	iP	06 58 35.7
		Crete (h = 15 km).		
"	19	Up		---
				micr sec
			Mx E	0.8 17
			Mx N	0.8 19
			Mx Z	1.1 17
		Ki	iP	07 14 19.0
			ipP	07 14 33.9
				micr sec
			P Z'	0.1 1.3
			pP Z'	0.3 2.0
			Mx E	0.7 20
			Mx N	0.8 22
			Mx Z	1.8 21
		Sk	iP	07 14 49.2
			ipP	07 15 03.0
		Um	iP	07 14 31.5 C
			ipP	07 14 43.8
			iS	07 23 52
			iPS	07 24 32
		Ud	iP	07 14 58.1 C
			ipP	07 15 10.7
		Ryukyu Islands. h = 50 km (Ki,Sk,Um,Ud).		
		M = 5.2 (Up,Ki).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	19	Ud	i(PP)	11 36 49.4

Alaska (h = 100 km).

"	19	Up	iSg	11 50 21.8
		Sk	eLgl	11 51 41
		Ud	iPg	11 49 32.9
			iSn	11 49 52.0
			iSg	11 49 54.7

D = 190 km = 1.7°.

Västergötland, Sweden.
Explosion?
Cf June 6, 13 33, June 9, 13 51 and 14 00. All these events are probably located at the same place, possibly blasts in the Kinnekulle area.

"	19	Up	iPKP	13 54 58.4
		Ki	iPKP	13 54 50.6
		Sk	ePKP	13 55 00
		Um	iPKP	13 54 53.8
			i	13 54 57.5
			iSKP	13 57 38.0
		Ud	iPKP	13 54 56.9
			i	13 55 08.3

Fiji Islands (h = 550 km).

"	19	Sk	iP	15 30 57.3
		Ud	iP	15 30 23.6

Ionian Islands.

"	19	Sk	ePP	18 28 27
		Um	iP	18 26 15.1
		Ud	iP	18 26 34.5 C
			i	18 26 39.0
			iPP	18 28 09.7

Afghanistan-USSR (h = 120 km).

"	19	Up	iP	19 07 11.8 C		
			iPcP	19 07 48.2		
				micr	sec	
			P Z'	0.1	0.5	
		Ki	iP	19 06 17.9 C		
			iPcP	19 07 18.1		
		Sk	iP	19 06 55.3		
			iPcP	19 07 39.1		
		Um	iP	19 06 43.5		
			iPcP	19 07 31.9		
		Ud	iP	19 07 15.8 C		
			iPcP	19 07 51.1		
		De	iP	19 07 35.2 C		
			iPcP	19 08 02.5		

Kamchatka (h = 40 km).

1969 June	19	Up	iP	20 35 46.5
		Ki	iP	20 34 52.9
			iPcP	20 35 44.0
		Sk	iP	20 35 21.8
			iPcP	20 36 00.8
		Um	iP	20 35 20.1 C
			iPcP	20 36 00.2
		Ud	iP	20 35 45.2 C
		De	iP	20 36 06.3

Unimak Island (h = 25 km).

"	19	Up	iPg	20 35 18.7
			iSg	20 35 30.1
			iRg	20 35 34.9

D = 120 km = 1.1°.

		Sk	eSg	20 36 53
		Ud	iPg	20 35 28.5
			iSn	20 35 47.6
			iSg	20 35 50.8

Gästrikland, Sweden, 60.8°N, 16.5°E.
Origin time = 20 34 57.
Explosion?

"	19	Up	iP	20 38 38.8
		Ki	iP	20 38 39.9
			i	20 38 47.3
		Um	iP	20 38 36.3
		Ud	eP	20 38 48
		De	iP	20 38 44.8

Sumatra.

"	19	Up	iP	21 44 14.2
		Ki	iP	21 43 21.1
			i	21 43 25.3
		Um	iP	21 43 47.6 D
			i	21 43 56.6
		Ud	iP	21 44 13.2 D
		De	iP	21 44 34.0 D

Aleutian Islands (h = 15 km).

"	19 - 20	Ki	iPg	23 59 17.3
			iSg	23 59 22.1

D = 40 km = 0.4°.

		Sk	eSg	00 01 52
		Um	iSg	00 01 10.2

Swedish Lapland, 67.5°N, 19.8°E.
Origin time = 23 59 09.

"	20	Up	iP	02 48 42.0
			ipP	02 48 54.6
			iS	02 57 32

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
June 20 (cont.)

Up	iP'P'		03 17 00.9	
			micr	sec
	P	N	0.4	5
	P	Z'	0.3	1.5
	pP	Z'	0.4	1.3
	S	E	0.4	8
	S	N	0.8	5
	Mx	E	0.8	18
	Mx	N	1.4	22
	Mx	Z	1.5	23
	D = 7450 km = 67°.			
Ki	iP		02 47 48.9	D
	i		02 47 53.0	
	ipP		02 48 01.0	
	iS		02 55 55	
	eP'P'		03 17 22	
			micr	sec
	P	N	0.5	5
	P	Z	0.9	5
	P	Z'	0.5	1.3
	pP	Z'	0.7	1.1
	S	N	0.7	6
	Mx	E	0.7	17
	Mx	N	0.5	15
	Mx	Z	0.9	17
	D = 6550 km = 59°.			
Sk	iP		02 48 17.2	
	ipP		02 48 30.6	
Um	iP		02 48 15.9	D
	ipP		02 48 28.4	
	iPcP		02 49 05.4	
	iS		02 56 47	
	iP'P'		03 17 09.9	
Ud	iP		02 48 40.8	D
	i		02 48 45.3	
	ipP		02 48 52.4	
	iS		02 57 34.9	
	eP'P'		03 17 04	
De	iP		02 49 02.4	
	i		02 49 05.9	
	ipP		02 49 14.3	

South of Alaska. h = 45 km (Up,Ki,Sk,Um,Ud,De).
m = 6.1, M = 5.1 (Up,Ki).

" 20 Um iP 03 11 33.4
Virgin Islands (h = N).

" 20 Up eP 06 10 51

" 20 Up iP 06 52 20.0
(cont.)

1969
June 20 (cont.)

Up	ipP		06 52 40.0	
	iS		07 01 33	
			micr	sec
	P	Z'	0.1	0.9
	D = 7850 km = 70 1/2°.			
Ki	iP		06 51 39.8	C
	ipP		06 52 00.2	
	iPP		06 54 00.8	
	iS		07 00 18	
			micr	sec
	P	Z'	0.1	0.9
	S	E	0.6	10
	D = 7200 km = 65°.			
Sk	iP		06 52 13.4	
	ipP		06 52 34.5	
	i(PP)		06 54 35.7	
Um	iP		06 51 57.5	C
	ipP		06 52 18.0	
	iS		07 00 50	
Ud	iP		06 52 27.3	C
	ipP		06 52 47.8	
De	iP		06 52 41.8	
	ipP		06 53 02.0	

Japan. h = 80 km (Up,Ki,Sk, Um,Ud,De).
m = 5.9 (Up,Ki).

" 20 Ki iP 06 57 10.6
Ud iP 06 57 35.7
Halmahera (h = 80 km).

" 20 Um iP 11 48 06.4 C

" 20

Up	iSn	12 14 58.9
	iSg	12 15 12.1
Ki	eSg	12 17 44
	i	12 17 54.7
Sk	eSg	12 17 06
Um	iSg	12 15 47.0
Ud	iLgl	12 16 16.6
De	iLgl	12 16 42.4

Esthonia, 59.7°N, 25.6°E.
Origin time = 12 13 05.
Explosion?

" 20 Up eP 14 22 24

" 20 Up iP 15 48 54.6 C
ipP 15 49 09.9
isP 15 49 14.1
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	20	(cont.)				
		Up	e(S)		15 58 11	
					micr	sec
			P	Z'	0.1	1.0
			Mx	E	0.6	22
			Mx	N	1.0	20
			Mx	Z	1.4	21
		Ki	iP		15 48 12.6	C
			ipP		15 48 26.2	
			iPP		15 50 31.6	
					micr	sec
			P	Z'	0.2	0.9
		Sk	iP		15 48 47.0	
			ipP		15 49 01.5	
			isP		15 49 06.8	
			iPP		15 51 11.7	
		Um	iP		15 48 30.9	C
			ipP		15 48 45.7	
			isP		15 48 51.7	
			i		15 52 35.0	
		Ud	iP		15 49 01.4	C
			ipP		15 49 16.5	
			isP		15 49 21.4	
		De	iP		15 49 21.2	C
			ipP		15 49 36.2	
			isP		15 49 41.1	
			iPP		15 52 04.9	
		Japan. h = 55 km (Up,Ki,Sk, Um,Ud,De).				
		m = 6.1 (Up,Ki).				
"	20	Ud	iP		16 32 23.3	
"	20	Up	iP		17 32 50.9	
		Ki	iP		17 32 45.4	
		Um	iP		17 32 44.1	
		Ud	iP		17 33 04.2	
		De	iP		17 33 10.9	
"	20	Up	iP		17 34 52.3	
		Ki	iP		17 35 28.1	
		Ud	iP		17 35 02.7	
"	20	Up	i		17 52 31.9	
		Ki	iP		17 51 43.7	
		Virgin Islands (h = 50 km).				
"	20	Um	iP		18 53 06.8	
		Ud	eP		18 52 46	
"	20	Up	e		19 45 27	
			i(Sg)		19 45 36.0	

1969 June	20	Up	iLgl	20 33 56.6
		Sk	eLgl	20 33 55
		Ud	iPg	20 32 07.2
			iLgl	20 32 54.8
			iSg	20 32 59.9
		D = 480 km = 4.3°.		
		Off southwest coast of Norway, 58.1°N, 6.2°E.		
		Origin time = 20 30 40.		
		Solution checked with readings at Kongsberg.		
		Cf June 18, 10 20.		
"	20	Up	iPKP	21 12 41.1
			iPKP2	21 12 57.8
		Ki	ePKP	21 12 20
		Um	iPKP	21 12 30.1
		Ud	iPKP2	21 12 58.2
		New Zealand (h = 40 km).		
"	20	Um	iP	21 30 27.5
		Ud	iP	21 30 57.1
		Japan (h = 70 km).		
"	20	Up	iP	21 55 18.5
		Sk	iP	21 56 02.8
		Ud	iP	21 55 26.5
		Greece.		
"	21	Up	iP	04 35 37.5
		Ki	eP	04 35 20
		Ud	iP	04 35 46.0
		Talaud Islands (h = 80 km).		
"	21	Ki	iP	05 42 27.2
			iS	05 44 22.0
		Sk	eP	05 42 36
			e	05 44 27
			iS	05 44 31.3
		Um	iS	05 45 49.3
		Ud	iS	05 46 09.2
		Jan Mayen.		
		Origin time = 05 40.0		
"	21	Up	iP	06 49 29.5
			i	06 49 56.5
		Ki	iP	06 49 11.1
		Um	iP	06 49 17.8
		Ud	iP	06 49 38.1 C
		Samar (h = 70 km).		
"	21	Up	iP	07 02 39.0
			ipP	07 02 55.6
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 21 (cont.)

Ki	iP		07 02 32.3
	ipP		07 02 49.7
Um	iP		07 02 30.8
	ipP		07 02 47.5
Ud	iP		07 02 51.9
	ipP		07 03 09.5

" 21

Up	eL		07 42
			micr sec
	Mx	E	0.7 23
	Mx	N	0.9 23
	Mx	Z	1.6 24
Ki	eL		07 42
			micr sec
	Mx	E	0.7 22
	Mx	N	0.5 21
	Mx	Z	1.1 21

South Pacific Ocean (h = N).
M = 5.8 (Up,Ki).

" 21

Up	eP1		08 00 01
	iP2		08 00 06.3
			micr sec
	P2	Z'	0.1 1.0
	Mx	E	1.7 18
	Mx	N	1.6 20
	Mx	Z	2.2 22
Ki	iP1		07 59 43.3
	iP2		07 59 48.4
	eS		08 10 03
			micr sec
	P2	Z'	0.2 1.1
	S	N	0.2 8
	Mx	E	0.8 17
	Mx	N	1.1 18
	Mx	Z	1.3 20
	D = 9200 km = 83°.		
Sk	eP2		08 00 11
Um	iP1		07 59 50.0
	iP2		07 59 54.4
Ud	iP1		08 00 10.8
	iP2		08 00 14.6

Luzon (h = 25 km).
m = 5.9, M = 5.5 (Up,Ki).
Double P; in average P2 - P1 = 4.6 sec. P2 is larger than P1.

" 21

Ki	iPn	12 20 54.9
	iSn	12 21 50.9
	iLgl	12 22 08.6
	D = 520 km = 4.7°.	

(cont.)

1969 June 21 (cont.)

Um	iSg	12 23 11.9

Northwest Russia.
Origin time = 12 19 41.
Explosion?

" 21

Up	e(Sg)	12 59 37
Ki	iPn	12 54 59.0
	iSn	12 55 47.2
	iLgl	12 56 01.0
	D = 440 km = 4.0°.	

Northwest Russia.
Origin time = 12 53 55.
Explosion?

" 21

Up	iP		15 24 36.1
	ipP		15 26 40.0
	iPP		15 28 32.9
			micr sec
	P	Z'	0.2 0.7
Ki	iP		15 24 31.3
	ipP		15 26 35.8
	isP		15 27 44.3
			micr sec
	P	Z'	0.1 1.2
Sk	iP		15 24 48.2 C
	ipP		15 26 50.5
	iPP		15 28 57.9
Um	iP		15 24 30.9
	i		15 24 32.3
	ipP		15 26 34.6
	iPP		15 28 33.2
	eS		15 34 47
	esS		15 38 31
Ud	iP		15 24 45.8
	ipP		15 26 49.7
	iPP		15 28 53.2
De	iP		15 24 48.0
	isP		15 28 03.0
	iPP		15 28 51.0

Java Sea. h = 570 km (Up, Ki,Sk,Um,Ud,De).
m = 6.2 (Up,Ki).

" 21

Up	iP	15 44 51.1
Ki	eP	15 46 09
	i	15 46 24.0
Sk	iP	15 45 39.1
Um	iP	15 45 27.8
	i	15 45 35.6
Ud	iP	15 45 04.0

Bulgaria.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	21	Up	iP		16 22 32.8
		Sk	iP		16 23 13.6
		Um	iP		16 23 13.4
		Ud	eP		16 22 38
			i		16 22 41.6
		Albania.			
"	21	Up	iP		16 42 56.7
			ipP		16 43 14.7
			iX		16 44 52.2
			iS		16 49 11
			D = 4700 km = 42 1/2°.		
		Ki	iP		16 43 27.5
			iX		16 45 33.8
			iS		16 50 06
			eSS		16 53 15
					micr sec
			P	Z'	0.1 1.0
			S	E	0.4 5
			S	N	0.4 7
			Mx	E	0.4 17
			Mx	N	0.6 15
			Mx	Z	0.5 12
			D = 5100 km = 46°.		
		Sk	iP		16 43 30.2
		Um	iP		16 43 07.4
			iX		16 45 07
			iS		16 49 30
			iSS		16 52 37
		Ud	iP		16 43 12.3
			ipP		16 43 29.1
		De	iP		16 43 00.9
			ipP		16 43 18.1
		Iran. h = 80 km (Up,Ud,De).			
		m = 5.7 (Ki).			
		The phase X (Up,Ki,Um) is about 10 sec late, compared to PP.			
"	21	Up	iP		17 17 41.9
			ipP		17 17 54.8
		Ki	iP		17 17 20.6
		Ud	iP		17 17 50.8
		Luzon. h = 50 km (Up).			
"	21	Up	iP		17 41 27.7
		Ki	iP		17 41 24.4
					micr sec
			Mx	N	0.5 17
		Sk	iP		17 41 47.3
		Ud	iP		17 41 43.5
		Sinkiang (h = N).			

1969 June	21	Ki	iP		22 44 32.3
		Um	eP		22 44 33
		Virgin Islands (h = 50 km).			
"	21	Um	iP		23 37 10.4
		Ud	eP		23 37 24
"	22	Up	iP		01 42 17.4 C
			iS		01 49 26
					micr sec
			P	Z'	0.1 0.7
			Mx	E	1.0 14
			Mx	N	0.7 11
			Mx	Z	1.3 14
			D = 5550 km = 50°.		
		Ki	iP		01 42 21.7 C
			iX		01 42 31.3
			eS		01 49 32
			eSa		01 53 25
					micr sec
			P	Z'	0.1 1.0
			Mx	E	1.0 14
			Mx	N	0.7 11
			Mx	Z	1.6 16
			D = 5600 km = 50 1/2°.		
		Sk	iP		01 42 40.3 C
			iX		01 42 50.6
		Um	iP		01 42 14.4 C
			iS		01 49 19
			iScS		01 52 05
			iSa		01 53 07
		Ud	iP		01 42 33.5 C
		De	iP		01 42 34.7
			i		01 42 39.9
		Tibet-India (h = 20 km).			
		m = 5.9, M = 5.0 (Up,Ki).			
"	22	Up	iP		02 44 41.7 D
			eS		02 53 29
					micr sec
			P	Z'	0.2 1.0
			S	E	0.6 8
			S	N	0.8 7
			Mx	E	1.9 20
			Mx	N	1.1 19
			Mx	Z	2.5 16
			D = 7400 km = 66 1/2°.		
		Ki	iP		02 43 50.8 D
			ipP		02 43 55.0
			i		02 44 03.4
			iS		02 51 55
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 22 (cont.)

Ki			micr	sec	
	P	N	0.4	7	
	P	Z	0.5	8	
	P	Z'	0.2	1.2	
	S	E	0.8	8	
	S	N	1.0	7	
	S	Z	0.6	11	
	Mx	E	1.7	17	
	Mx	N	1.8	16	
	Mx	Z	3.2	15	
	D = 6550 km = 59°.				
Sk	iP		02 44 26.1		
	ipP		02 44 31.5		
Um	iP		02 44 14.6		D
	iPP		02 46 33		
	iS		02 52 33		
	i(P'P')		03 13 03.4		
Ud	iP		02 44 45.5		D
	ipP		02 44 50.8		
De	iP		02 45 10.8		
	i		02 46 06.7		

Kurile Islands. h = 20 km (Ki,Sk,Ud).
m = 6.0, M = 5.4 (Up,Ki).

" 22 Ud e(P) 05 12 24
e 05 12 40
North Atlantic Ocean (h = N).

" 22 Ud eP 05 23 54

" 22 Up iS^x 05 56 30.7
iLgl 05 56 53.2
Ki iPn 05 52 44.3
iSn 05 53 42.4
iLgl 05 53 57.5
D = 530 km = 4.8°.
Sk eLgl 05 56 28
Um iSn 05 54 22.6
iSg 05 54 56.7
Ud iLgl 05 57 28.3
De eLgl 05 58 53
Northwest Russia, 67.7°N, 33.0°E.
Origin time = 05 51 29.
Explosion?
This is one of the very few events in this series which has been recorded all over our network.

" 22 Up iPKP 06 32 10.8
(cont.)

1969 June 22 (cont.)

Sk iPKP 06 32 04.9
Um iPKP 06 32 00.3
Ud iPKP 06 32 13.5
South of Kermadec Islands (h = N).

" 22 Ki iP 08 02 24.8
Alaska (h = N).

" 22 Um iP 10 31 28.1 D
Ud iP 10 31 53.6

" 22 Up iP 10 56 18.7 C
iS 11 05 12
iP'P' 11 24 27.2

			micr	sec
	P	N	1.9	1
	P	Z	3.8	1
	P	Z'	1.4	0.6
	S	N	0.6	6
	Mx	E	1.9	20
	Mx	N	2.6	21
	Mx	Z	3.0	23

D = 7500 km = 67 1/2°.

Ki iP 10 55 26.0 C
iPa 10 59 21
iPcS 11 00 10.3
eS 11 03 37
iPS 11 03 52
eP'P' 11 24 49

			micr	sec
	P	N	0.3	7
	P	Z	0.6	7
	P	Z'	1.3	0.8
	S	N	0.7	10
	Mx	E	1.8	18
	Mx	N	1.4	18
	Mx	Z	3.6	18

D = 6600 km = 59 1/2°.

Sk iP 10 55 58.6 C
i 10 56 05.8
iP'P' 11 24 39.3
Um iP 10 55 51.8 C
i 10 56 06.8
iS 11 04 19
iPS 11 04 39
eP'P' 11 24 37
i 11 24 46.1
Ud iP 10 56 19.7 C
i 10 56 38.6
iP'P' 11 24 32.3
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 22 (cont.)

De iP 10 56 43.3 C
Aleutian Islands (h = 60 km).
M = 5.4 (Up,Ki). m shows large variations.
The time intervals P'P' - P are on the average 17 sec shorter than those given by Gutenberg (Trans. Amer. Geophys. Union, 32: 373-390, 1951).

" 22 Ki iPKP 11 06 55.0
South Sandwich Islands (h = 35 km).

" 22 Up iP 14 42 33.4
ipP 14 43 11.3
iSKS 14 52 43
micr sec
P Z' 0.1 0.8
Ki iP 14 42 21.2 C
ipP 14 42 58.5
micr sec
P Z' 0.1 1.0
Sk iP 14 42 14.9 C
ipP 14 42 50.9
Um iP 14 42 30.0
ipP 14 43 06.6
eSKS 14 52 39
Ud iP 14 42 24.1 C
ipP 14 43 00.6
De iP 14 42 28.9
ipP 14 43 05.2
Mexico. h = 150 km (Up,Ki, Sk,Um,Ud,De).
m = 5.7 (Up,Ki).

" 22 Up iP 16 09 11.8 C
micr sec
P Z' 0.1 0.8
Ki iP 16 08 19.2
Sk eP 16 08 51
Um iP 16 08 44.9 C
Ud iP 16 09 13.0 C
De iP 16 09 (31.5) C
Aleutian Islands (h = 60 km).

" 22 Up iP 17 01 19.3

" 22 Ki eP 18 52 32
Mariana Islands (h = 130 km).

1969 June 23 Ud eP 00 04 19
North Atlantic Ocean (h = N).

" 23 Up iPKP2 00 38 24.9
Ki i(PKP) 00 37 53.9 C
iPKP2 00 38 07.5
Um iPKP 00 37 47 C
iPKP2 00 38 13.5
iPP 00 41 48
iSS 01 01 43
Ud iPKP2 00 38 33.2
De iPKP2 00 38 (30.8)
Auckland Islands (h = 25 km).

" 23 Ud iP 01 32 46.3
California (h = N).

" 23 Up iP 02 05 44.7
Um iP 02 05 27.8
i 02 05 35.9
Ud eP 02 05 48

" 23 Up iP 02 06 43.0
Ki iP 02 06 47.9 C
Um iP 02 06 38.0
Ud iP 02 06 59.7
De iP 02 06 53.2
Pamir.

" 23 Um iP 03 25 13.9
South of Japan (h = 20 km).

" 23 Up iP 06 08 31.6
ipP 06 08 40.3
isP 06 08 43.9
Ki iP 06 07 52.4 C
ipP 06 08 00.4
isP 06 08 04.2
Sk iP 06 08 25.6
Um iP 06 08 09.5
ipP 06 08 17.0
isP 06 08 21.7
Ud iP 06 08 39.1 C
isP 06 08 50.9
De iP 06 08 49.7
isP 06 09 02.8
Japan. h = 30 km (Up,Ki, Um,Ud,De).

" 23 Ud iP 07 04 23.5 C

" 23 Up iP 07 21 19
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 23 (cont.)

Up	iPP		07 24 51
	iSKS		07 31 49
			micr sec
	Mx	E	0.6 17
	Mx	N	0.8 16
	Mx	Z	1.3 16
Ki	iP		07 21 03.0
	i		07 21 07.0
	iSKS		07 31 26
			micr sec
	P	E	0.2 6
	P	Z	0.4 4
	P	Z'	0.1 1.0
	SKS	E	0.8 7
	SKS	N	0.6 9
	Mx	E	1.1 20
	Mx	N	1.0 20
	Mx	Z	1.8 21
	D = 9500 km = 85 1/2°.		
Sk	iP		07 21 00.7
	i		07 21 04.1
Um	iP		07 21 12.8
	i		07 21 16.2
	iSKS		07 31 40
Ud	iP		07 21 11.4
De	iP		07 21 20.4 C

Mexico (h = 35 km).
m = 6.0, M = 5.3 (Up,Ki).
Double P, especially clear at Ki,Sk,Um.

" 23	Sk	iP	08 05 44.1
	Ud	iP	08 05 26.7 C

Atlantic Ocean (h = N).

" 23	Up	iP	11 18 38.6
	Ki	iP	11 18 22.6
	Sk	eP	11 18 47
	Um	iP	11 18 29.0
	Ud	iP	11 18 50.7

Luzon (h = 200 km).

" 23	Um	iP	13 43 49.3
" 23	Ud	iPg	14 15 55.7
		eSg	14 16 16
" 23	Ud	iP	21 32 14.5
" 24	Up	iP	00 47 37.2
		iPP	00 51 03.1

(cont.)

1969 June 24 (cont.)

Ki	iP		00 47 31.7
Sk	eP		00 47 21
	iPP		00 50 37.9
Ud	iP		00 47 28.0

Nicaragua (h = 100 km).

" 24	Ud	iP	01 31 34.0

Japan (h = 20 km).

" 24	Up	iP	01 32 23.5
	Ki	iP	01 31 50.3 D
	Sk	iP	01 32 20.6
	Ud	iP	01 32 31.0

South of Japan (h = 390 km).

" 24	Up	ePKP		03 47 40
		iPKKP		03 58 28.1
				micr sec
		Mx	E	0.8 18
		Mx	N	1.5 19
		Mx	Z	0.9 19
	Ki	iP		03 43 27.3
		iPKP		03 47 32.0
		ePP		03 47 50
		eS		03 55 17
		ePS		03 57 21
		ePKKP		03 58 43
		eSS		04 03 06
				micr sec
		PP	Z	0.3 7
		Mx	E	0.7 20
		Mx	N	0.9 23
		Mx	Z	1.8 21
		D = 12000 km = 108°.		
	Sk	ePKKP		03 58 27
	Ud	iPKP		03 47 46.2
		iPKKP		03 58 20.5

New Guinea (h = 110 km).
M = 5.6 (Up,Ki).
M uncorrected for focal depth.

" 24	Ud	iP	08 52 38.1
" 24	Up	iP	11 10 47.3
		iSKS	11 21 15
		eS	11 21 22
			micr sec
		P	Z' 0.1 0.9
		SKS	E 0.2 5
		S	N 0.3 8

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 24 (cont.)

Up			micr	sec
	Mx	E	1.5	20
	Mx	N	2.8	20
	Mx	Z	2.6	20
	D = 9600 km = 86 1/2°.			
Ki	eP		11 10 26	
	i		11 10 30.3	
	i		11 10 35.9	
	iS		11 20 40	
			micr	sec
	P	Z	0.4	4
	P	Z'	0.1	1.0
	S	E	0.3	6
	S	N	0.3	8
	Mx	E	1.9	17
	Mx	N	1.8	17
	Mx	Z	1.5	18
	D = 9100 km = 82°.			
Sk	iP		11 10 53.0	
	i		11 14 42.2	
Ud	iP		11 10 55.4 C	

Luzon (h = 40 km).
m = 5.8, M = 5.8 (Up,Ki).

" 24	Up	iP	11 27 36.1
" 24	Up	iP	13 29 04.2
	Ki	iP	13 30 37.1
	Sk	iP	13 29 39.9
	Ud	iP	13 29 01.0

Italy (h = 45 km).

" 25	Up	iP	00 21 24.0	
		ipP	00 21 34.7	
		iS	00 31 46	
			micr	sec
		P Z'	0.1	0.7
		S E	0.4	8
		Mx E	1.1	15
		Mx N	3.2	22
		Mx Z	1.4	15
		D = 9350 km = 84°.		
	Ki	iP	00 21 07.0	
		eS	00 31 14	
			micr	sec
		P Z	0.4	7
		S E	0.5	11
		Mx E	1.8	18
		Mx N	2.1	19
		Mx Z	3.1	18
		D = 9000 km = 81°.		

(cont.)

1969 June 25 (cont.)

	Sk	iP	00 21 30.4
		ipP	00 21 40.2
	Um	iP	00 21 13.7 C
		eS	00 31 23
	Ud	iP	00 21 32.7
		ipP	00 21 43.8

Mindoro. h = 40 km (Up,Sk, Ud).
m = 5.7, M = 5.7 (Up,Ki).

" 25	Ki	iP	02 57 34.2	
		eS	02 59 28	
	Sk	eP	02 57 41	
		i	02 59 33.4	
		iS	02 59 38.5	
	Um	iP	02 58 10.4	
		i	03 00 23.1	
		iS	03 00 41.3	
	Ud	iS	03 01 18.0	

Jan Mayen.
Origin time = 02 55.1.

" 25	Up	i(P)	04 48 05.4
" 25	Up	iP	04 50 25.2
	Ki	iP	04 50 19.6 C
		i	04 50 24.6
	Sk	iP	04 50 45.3
	Um	iP	04 50 17.1
		i	04 50 49.3
		iLgl	05 03 41
		iRg	05 06 47
	Ud	iP	04 50 42.3
		i	04 50 47.4

Kirghiz-Sinkiang (h = 35 km).

" 25	Up	iP	06 17 09.7
	Ki	iP	06 18 16.1
	Sk	iP	06 17 48.5
	Um	iP	06 17 40.5
	De	iP	06 16 45.5

Dodecanese Islands (h = 40 km).

" 25	Up	iP	07 37 02.1	
		iS	07 46 59	
			micr	sec
		Mx E	1.4	19
		Mx N	1.6	20
		Mx Z	2.4	19
		D = 9000 km = 81°.		
	Ki	iP	07 37 01.4	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	25	(cont.)				
		Ki	eS		07 47 04	
					micr	sec
			Mx	E	2.0	19
			Mx	N	1.0	20
			Mx	Z	2.8	19
		Sk	eP		07 37 15	
		Um	iP		07 36 58.9	
			iS		07 46 55	
		Ud	iP		07 37 12.0	
		Sumatra (h = N).				
		M = 5.6 (Up,Ki).				
"	25	Ki	iPn		11 13 39.5	
			iSn		11 14 37.3	
			iLgl		11 14 57.9	
			D = 530 km = 4.8°.			
		Sk	eSg		11 17 29	
		Um	iSg		11 15 47.1	
		Northwest Russia,				
		67.2°N, 33.0°E.				
		Origin time = 11 12 25.				
		Explosion?				
"	25	Up	i(Sg)		11 26 47.2	
"	25	Ki	iPn		13 18 15.3	
			iP^x		13 18 23.4	
			iSn		13 18 57.4	
			iSg		13 19 12.0	
			D = 380 km = 3.4°.			
		Sk	iLgl		13 21 40.0	
		Um	iSn		13 19 42.7	
			iSg		13 20 12.9	
		Northwest Russia-Finland				
		border region, 67.7°N,				
		29.5°E.				
		Origin time = 13 17 20.				
		Explosion?				
"	25	Sk	i(Sg)		13 45 27.1	
"	25	Sk	iP		17 34 49.4	
			i		17 34 55.7	
"	25	Up	iP		19 56 44.5	
			i		19 56 56.3	
"	25	Up	eL		22 32	
					micr	sec
			Mx	E	0.7	23
			Mx	Z	1.1	22
		(cont.)				

1969 June	25	(cont.)				
		Ki	eL		22 32	
					micr	sec
			Mx	E	0.5	19
			Mx	N	0.4	18
			Mx	Z	1.0	20
		Galapagos Islands (h = N).				
		M = 5.2 (Up,Ki).				
"	26	Up	iSKS		02 55 07	
					micr	sec
			Mx	E	0.9	23
			Mx	N	0.7	23
			Mx	Z	1.1	22
		Ki	eSKS		02 55 02	
					micr	sec
			SKS	E	0.2	10
			Mx	E	0.9	20
			Mx	N	0.5	20
			Mx	Z	1.3	18
		Um	iPP		02 48 38	
			iSKS		02 55 08	
			iPS		02 57 22	
			iSS		03 02 39	
		Galapagos Islands (h = N).				
		M = 5.4 (Up,Ki).				
"	26	Um	iP		08 44 47.7	
"	26	Ki	i(P)		11 44 24.5	
		Panay (h = 40 km).				
"	26	Up	iSn		13 21 14.3	
			iSg		13 21 29.3	
		Sk	iSg		13 23 19.2	
		Um	iSg		13 22 00.8	
		Ud	eLgl		13 22 29	
		De	iLgl		13 22 56.2	
		Esthonia, 59.7°N, 25.6°E.				
		Origin time = 13 19 18.				
		Explosion?				
"	26	Up	iP		15 56 17.3	
		Sk	eP		15 56 14	
		Um	iP		15 55 55.2	
		Ud	iP		15 56 25.7	
		Near Vladivostok (h = 500 km).				
"	26	Um	iP		18 37 10.7	
"	26	Up	iLgl		19 01 25.2	
		Sk	eSg		19 00 57	
		Um	i(Lgl)		19 02 29.9	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June 26 (cont.)

Ud	iPg	18 59 40.8	
	iSg	19 00 26.3	
	D = 390 km = 3.5°.		

Southwest coast of Norway, 60.2°N, 6.6°E.
Origin time = 18 58 31.
Solution checked with readings at Kongsberg.

" 26	Up	iP	20 12 00.0
		i	20 12 10.8

" 26	Up	iLgl	21 01 31.7
	Ki	iSg	21 04 11.5
	Sk	eSg	21 01 17
	Um	iSg	21 02 47.7
	Ud	iPg	20 59 34.3
		iSg	21 00 32.2
		D = 490 km = 4.4°.	
	De	iSn	21 00 28.9
		iSg	21 01 00.4

Off southwest coast of Norway, 59.0°N, 5.2°E.
Origin time = 20 58 06.
Solution checked with readings at Kongsberg.

" 26	Ud	iPg	21 44 16.6
		iSg	21 45 00.5

Southwest Norway.

" 27	Up	iP	01 39 19.6

" 27	Up	iP	02 26 46.9 C	
		ipP	02 27 08.8	
		iS	02 35 41	
			micr	sec
		P	Z'	0.1 1.0
		Mx	E	0.9 23
		Mx	N	1.0 24
		Mx	Z	1.2 24
		D = 7700 km = 69 1/2°.		
	Ki	iP	02 26 03.4 C	
		eS	02 34 23	
			micr	sec
		P	Z'	0.1 1.0
		S	E	0.3 7
		S	N	0.4 9
		Mx	E	1.1 20
		Mx	N	0.8 20
		Mx	Z	0.9 17
		D = 7000 km = 63°.		

(cont.)

1969 June 27 (cont.)

Sk	iP	02 26 38.9 C	
	ipP	02 27 00.6	
Um	iP	02 26 22.9 C	
	ipP	02 26 44.6	
	iS	02 34 57	
Ud	iP	02 26 53.8 C	
	ipP	02 27 15.4	
De	iP	02 27 10.2	

Japan. h = 80 km (Up,Sk,Um, Ud).
m = 5.8, M = 5.1 (Up,Ki).

" 27	Um	eP	04 55 41
	Ud	eP	04 55 33
	De	eP	04 55 03

" 27	Ki	iP	06 50 11.0
	Um	eP	06 50 22

" 27	Ki	iP	07 28 14.8

Indian Ocean (h = N).

" 27	Ki	iPKP	08 00 14.0
		i	08 00 20.8
	Sk	iPKP	08 00 24.2
	Um	iPKP	08 00 20.1
	Ud	iPKP	08 00 29.5
		iPKS	08 03 55.8
	De	iPKP	08 00 36.1

New Hebrides Islands (h = 40 km).

" 27	Ki	iP	08 07 47.3
	Ud	iP	08 08 12.0

Talaud Islands (h = N).

" 27	Um	iP	09 13 22.9
		i	09 13 28.6
	Ud	iP	09 12 57.9

South Atlantic Ocean (h = N).

" 27	Ki	iPn	12 24 52.9
		iSn	12 25 52.1
		iLgl	12 26 11.2
		D = 540 km = 4.9°.	
	Sk	iLgl	12 28 43.7
	Um	i	12 27 00.6
		iSg	12 27 11.0
	Ud	iLgl	12 29 37.0

Northwest Russia, 67.7°N, 33.4°E.
Origin time = 12 23 37.
Explosion?

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	27	Um	iP	12 47 24.8
"	27	Up	i(Sg)	13 25 35.2
"	27	Um	iP	14 01 26.9
			i	14 01 34.5
"	27	Ki	iPKP	15 30 42.1 C
		Sk	ePKP	15 30 55
		Um	iPKP	15 30 45.7
			i	15 30 51.1
		South of Australia (h = 40 km).		
"	27	Up	iPKP	15 49 21.6
		Um	iPKP	15 49 12.5
			i	15 49 23.1
		Ud	iPKP	15 49 23.7
			i	15 49 32.6
			i(PKS)	15 53 16.2
		De	iPKP	15 49 33.5
		Fiji Islands (h = 560 km).		
"	27	Up	iRg	16 15 56.9
		Ud	iPg	16 15 25.6
			iSg	16 15 53.9
			D = 240 km = 2.2°.	
		De	iPg	16 15 18.3
			iSg	16 15 41.7
			iRg	16 15 51.3
			D = 200 km = 1.8°.	
		Östergötland, Sweden, 58.1°N, 15.6°E.		
		Origin time = 16 14 42.		
		Possibly explosion.		
"	27	Up	iP	16 19 50.8
		Ki	iP	16 18 51.5
		Um	eP	16 19 19
		Ud	iP	16 19 43.8
"	27	Um	iP	20 15 24.3
		Ud	iP	20 15 34.2
"	27	Um	iSg	20 34 48.7
		Ud	iLgl	20 33 24.9
			i	20 34 11.0
		De	iSn	20 32 17.3
			iSg	20 32 37.1
		Southeast Baltic Sea.		
		Explosion?		
"	27	Ki	iPn	20 45 34.2
			iSn	20 46 11.6
		(cont.)		

1969 June	27	(cont.)		
		Ki	iSg	20 46 27.5
			D = 360 km = 3.2°.	
		Um	iSn	20 47 21.9
			iSg	20 47 58.8
		Northwest Russia-Finland border region.		
		Origin time = 20 44 41.		
		Explosion?		
"	27	Up	iP	21 40 51.7
		Ki	iP	21 40 12.5
		Sk	iP	21 40 44.8
		Um	iP	21 40 30.1
		Ud	iP	21 40 59.0
		De	iP	21 41 14.0
		Kurile Islands.		
		Origin time = 21 29 55.		
"	28	Up	iP	04 47 29.6
			i	04 47 38.2
			iSKS	04 57 49
		Ki	eP	04 47 14
			eS	04 57 39
				micr sec
			S E	0.4 7
			S N	0.5 9
			Mx E	0.6 18
			Mx N	0.6 18
			Mx Z	1.0 16
			D = 9450 km = 85°.	
		Sk	iP	04 47 05.0
		Um	iP	04 47 22.5
			iS	04 57 49
		Ud	eP	04 47 12
		De	eP	04 47 21
			i	04 47 26.4
		El Salvador (h = 70 km).		
"	28	Up	iP	08 32 31.8
		Ki	iP	08 32 30.6 C
		Um	iP	08 32 28.9
		Ud	iP	08 32 41.4
		Sumatra (h = 90 km).		
"	28	Up	iSg	11 14 50.8
		Ud	iSg	11 13 49.1
		Southwest coast of Norway.		
		Origin time = 11 11 52.		
		Probably same location (60.2°N, 6.6°E) as for June 26, 19 01, by comparison with Kongsberg readings.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	28	Up	iLgl	11 22 16.0
		Ki	iPn	11 18 00.3
			iSn	11 18 55.3
			iSg	11 19 18.5
			D = 510 km = 4.6°.	
		Sk	eLgl	11 21 46
		Um	iSn	11 19 40.9
			i	11 19 57.8
			iSg	11 20 21.5
		Ud	iLgl	11 22 48.6
		Northwest Russia, 68.0°N, 32.7°E.		
		Origin time = 11 16 48.		
		Explosion?		
"	28	Up	iP	14 35 17.9
		Ki	iP	14 35 00.9
			ipP	14 35 33.1
				micr sec
			P Z'	0.1 1.0
		Um	iP	14 35 07.0
		Ud	iP	14 35 26.7 C
			i	14 35 31.2
		Mindanao. h = 120 km (Ki).		
"	28	Up	iP	17 54 47.1
		Ki	eP	17 54 17
		Sk	iP	17 54 47.2
		Um	iP	17 54 29.1
		Ud	iP	17 54 55.5
			i	17 55 04.7
		South of Japan. Note that these readings do not fit the USCGS solution for Southern Alaska, 17 45 43.2.		
"	28	Ki	ePKP	21 43 51
		Sk	iPKP	21 44 10.3
		Um	ePKP	21 44 03
		Ud	iPKP	21 44 11.3
		Loyalty Islands (h = 30 km).		
"	28	Up	iP	22 39 28.0
		Ki	iP	22 39 58.8
		Um	iP	22 39 38.4
			iPP	22 41 03.5
		Ud	iP	22 39 44.1
		Iran (h = N).		
"	29	Ki	iPn	01 22 37.1
			iPx	01 22 45.5
		(cont.)		

1969 June	29	(cont.)		
		Ki	iSn	01 23 23.5
			iSg	01 23 41.2
			D = 430 km = 3.9°.	
		Sk	iSg	01 26 34.0
		Um	iSn	01 24 26.8
			i	01 24 52.4
			iSg	01 25 11.0
			i	01 25 17.1
		Northwest Russia, 68.8°N, 30.8°E.		
		Origin time = 01 21 34.		
		Explosion?		
"	29	Um	iP	03 02 57.9
"	29	Ki	eP	03 47 44
		Um	iRg	04 03 23
		Kirghiz SSR (h = 40 km).		
"	29	Up	iLgl	06 56 22.9
		Ki	iPn	06 52 11.9
			iSn	06 53 09.6
			iLgl	06 53 27.5
			iSg	06 53 38.1
			D = 530 km = 4.8°.	
		Sk	eLgl	06 55 57
		Um	iSn	06 53 51.1
			iSg	06 54 26.4
		Ud	iLgl	06 56 51.0
		Northwest Russia, 67.6°N, 33.1°E.		
		Origin time = 06 50 58.		
		Explosion?		
"	29	Up	iPKP	06 52 34.1
			i	06 52 46.0
		Sk	ePKP	06 52 28
		Um	iPKP	06 52 23.6 C
		Ud	iPKP	06 52 35.4
"	29	Ki	ePKP	08 15 12
			iSKP	08 17 40.4
		Sk	iSKP	08 17 58.7
		Um	iPKP	08 15 18.6
			iSKP	08 17 53.7
		Ud	ePKP	08 15 22
			iSKP	08 18 07.5
		De	iPKP	08 15 27.9
		Fiji Islands (h = 590 km).		
"	29	Up	iLgl	10 20 52.0
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	29	(cont.)			
		Ki	iPn	10 16 35.5	
			iSn	10 17 32.9	
			iLgl	10 17 51.3	
			i	10 18 03.3	
			D = 520 km = 4.7°.		
		Sk	eSn	10 19 23	
			iLgl	10 20 19.3	
			iSg	10 20 27.6	
		Um	iSn	10 18 14.1	
			iSg	10 18 47.3	
		Ud	iLgl	10 21 21.0	
		Northwest Russia, 67.6°N, 32.8°E. Origin time = 10 15 23. Explosion?			
"	29	Um	iP	10 29 15.3	
"	29	Up	i(PKP)	10 53 45.4	C
			iPKP	10 53 48.7	
				micr	sec
			PKP Z	0.6	4
			PKP Z'	0.3	0.5
			Mx E	1.1	23
			Mx N	2.8	23
			Mx Z	3.0	23
		Ki	iPKP	10 53 25.7	
			i	10 53 50.0	
			iPP	10 56 31	
			iPKS	10 57 04	
				micr	sec
			PKP Z	0.5	6
			PP Z	0.4	6
			PKS E	0.3	7
			PKS N	0.4	7
			Mx E	2.1	21
			Mx N	1.6	22
			Mx Z	3.9	22
		Sk	iPKP	10 53 41.1	
		Um	iPKP	10 53 35.6	C
			iSKSP	11 06 59	
			iSS	11 16 01	
		Ud	iPKP	10 53 49.6	C
		De	iPKP	10 53 58.9	
			i	10 54 11.4	
		Kermadec Islands (h = 45 km). M = 6.1 (Up,Ki).			
"	29	Up	iPKP	11 41 36.4	
		Ki	iPKP	11 41 27.5	
		Um	iSKP	11 44 17.8	
		(cont.)			

1969 June	29	(cont.)			
		Ud	iPKP	11 41 38.6	
		De	iPKP	11 41 49.6	
		Tonga-Kermadec Islands (h = 560 km).			
"	29	Ud	ipP	12 52 29.1	
		Hindu Kush (h = 220 km).			
"	29	Um	iP	14 42 16.9	
			i	14 42 20.2	
"	29	Up	ePKP	17 29 14	
				micr	sec
			Mx E	2.7	23
			Mx N	3.6	22
			Mx Z	5.8	22
		Ki	iPKP2	17 30 10.6	
			i	17 30 17	
			iPP	17 34 07	
				micr	sec
			PKP2 Z	0.6	7
			PKP2 Z'	0.1	1.5
			PP E	0.4	5
			PP Z	0.6	5
			Mx E	4.1	21
			Mx N	2.8	22
			Mx Z	9.2	21
		Um	iPKP	17 29 16	
			iPKP2	17 30 10.9	
			i	17 30 15	
		Ud	iPKP2	17 30 20.1	
		Balleny Islands (h = N). m = 6.1, M = 6.4 (Up,Ki).			
"	29	Ud	iP	20 51 40.3	
"	30	Up	iP	02 56 18.5	
		Ud	iP	02 56 07.0	C
"	30	Up	iP	09 01 55.7	C
			ipP	09 02 10.2	
				micr	sec
			P Z'	0.1	0.8
		Ki	iP	09 01 49.2	
		Sk	iP	09 02 11.7	C
			ipP	09 02 26.8	
		Um	iP	09 01 47.7	C
		Ud	iP	09 02 09.5	C
			ipP	09 02 25.0	
		De	iP	09 02 11.3	
		India. h = 60 km (Up,Sk,Ud).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 June	30	Ki	iP	09 49 35.6
		Ud	iP	09 50 28.4 D
		Kurile Islands (h = 50 km).		
"	30	Ud	iPg	11 57 17.5
			iSg	11 57 49.9
		Opland, Norway.		
"	30	Ud	iSg	12 02 08.4
		Opland, Norway.		
"	30	Sk	eSg	12 06 50
		Ud	iPg	12 06 07.6
			iSg	12 06 39.3
		Opland, Norway, 61.4°N, 9.8°E. Origin time = 12 05 24. The location is the same or nearly so for the two preceding and the two following events (by combination with Kongsberg readings).		
"	30	Ud	iPg	12 14 17.8
			iSg	12 14 49.7
		Opland, Norway.		
"	30	Ud	iPg	12 18 56.8
			iSg	12 19 31.0
		Opland, Norway.		
"	30	Ki	iP	16 33 49.4
		Um	iP	16 33 38.6
		Ud	iP	16 33 57.0
		Hindu Kush (h = 220 km).		
"	30	Ki	iP	18 47 34.1
			ipP	18 47 43.1
		Sk	iP	18 47 13.2
		Um	iP	18 47 35.1
			ipP	18 47 44.1
		Ud	iP	18 47 16.6
		Virgin Islands. h = 35 km (Ki,Um).		
"	30	Up	iP	20 11 05.8
"	30	Up	iLgl	21 43 01.3
			i	21 43 04.2
		Sk	eLgl	21 43 21
		Ud	iPn	21 41 39.2 C
		(cont.)		

1969 June	30	(cont.)		
		Ud	iPg	21 41 41.9
			iSg	21 42 02.0
		D = 180 km = 1.6°.		
		Oslo Fjord, 59.4°N, 10.6°E. Origin time = 21 41 10. Solution checked with Kongsberg readings.		

Markus Båth
March 9, 1970

Seismological Institute
Uppsala

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

SEISMOLOGICAL BULLETIN

UPPSALA, KIRUNA, SKALSTUGAN, UMEÅ, UDDEHOLM and DELARY

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

JULY 1 - 31, 1969

1969 July	1	Up	iP	06 08 24.6
		Ki	iP	06 09 00.0
		Sk	iP	06 09 00.5
		De	iP	06 08 28.3 C
		Iran (h = 100 km).		
"	1	Ud	iP	12 12 20.3
		California (h = 25 km).		
"	1	Ki	iP	16 29 28.4
"	2	Up	iP	00 16 51.8
		De	i(P)	00 18 23.4
"	2	Up	iP	00 21 45.2
		Ki	eP	00 22 24
			e	00 22 30
		Sk	iP	00 21 58.6
		Um	iP	00 22 04.1
			i	00 22 10.7
			i(PP)	00 24 38.2
		Ud	iP	00 21 40.8
		De	iP	00 21 19.1
		Ascension Island (h = N).		
"	2	Ki	e(P)	00 40 22
		Um	iP	00 39 52.0
		Ud	iP	00 39 24.2
		Ascension Island (h = N).		
"	2	Up	iP	00 55 50.8
"	2	Up	iP	02 55 17.5
"	2	Sk	iP	08 00 32.8
		Italy (h = N).		
"	2	Sk	eP	08 07 43
		Italy (h = N).		

1969 July	2	Up	iP		10 10 54.0	
					micr	sec
			Mx	E	0.4	15
			Mx	N	1.8	18
		Ki	iP		10 10 42.2	
					micr	sec
			Mx	E	0.7	19
			Mx	N	0.9	16
			Mx	Z	0.9	17
		Sk	eP		10 11 04	
		Um	iP		10 10 45.3	
			iS		10 19 39	
		Ud	iP		10 11 04.5	
			i		10 11 06.8	
		Burma (h = N).				
		M = 5.3 (Up,Ki).				
"	2	Up	eP		10 35 57	
		Ki	eP		10 37 05	
		Sk	iP		10 36 38.4	
		Um	iP		10 36 38.7	
		Ud	iP		10 36 00.7	
		De	iP		10 35 27.3	
		Italy (h = N).				
"	2	Ki	iPn		10 57 09.5	
			iSn		10 58 08.4	
			iSg		10 58 32.6	
			D = 540 km = 4.9°.			
		Sk	eLgl		11 00 55	
		Um	iSg		10 59 26.1	
		Northwest Russia,				
		67.6°N, 33.4°E.				
		Origin time = 10 55 52.				
		Explosion?				
"	2	Ud	iP		12 24 44.3 C	
		Japan (h = 100 km).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	2	Ki	iP	12 39 53.5	
"	2	Ud	iP	12 52 09.1	
"	2	Um	i(P)	13 35 51.2	
		Ud	i(P)	13 35 48.5	
			i	13 36 16.1	
"	2	Up	iPKP	17 46 59.4	
		Sk	iPKP	17 46 50.5	
		Um	ePKP	17 46 50	
			i	17 47 03.5	
		Ud	iPKP	17 47 00.3	
		De	iPKP2	17 47 21.3	
		Kermadec Islands (h = 8 km).			
"	3	Up	i(P)	01 12 47.7	
"	3	Um	iP	05 50 34.7	
"	3	Ki	iP	06 47 32.6	C
		Um	iP	06 47 43.2	
		Ud	iP	06 47 58.2	
		Mindanao (h = 100 km).			
"	3	Ud	iP	09 11 13.6	
"	3	Up	iP	09 46 50.1	C
			iS	09 50 49	
				micr sec	
			Mx E	0.6 17	
			Mx N	0.6 12	
			Mx Z	0.9 12	
			D = 2400 km = 21 1/2°.		
		Ki	iP	09 48 04.4	
				micr sec	
			Mx E	0.4 9	
			Mx N	0.4 9	
			Mx Z	0.5 9	
		Sk	iP	09 47 31.1	
		Um	eP	09 47 26	
			i	09 47 29.3	
			iS	09 52 02	
		Ud	eP	09 46 57	
			i	09 46 59.9	
		Greece (h = 25 km).			
		M = 4.5 (Up,Ki).			
"	3	Ud	eP	14 24 14	
			i	14 24 17.7	
"	3	Sk	iP	17 11 37.1	
		(cont.)			

1969 July	3	(cont.)			
		Sk	i	17 11 44.7	
		Um	iP	17 11 50.1	
			i	17 11 57.2	
		Ud	iP	17 11 49.0	
		Mexico (h = 25 km).			
"	3	Up	iP	18 12 36.6	
			i	18 13 18.7	
				micr sec	
			P Z'	0.2 0.9	
		Ki	iP	18 11 43.7	
			i	18 11 56.7	
				micr sec	
			P Z'	0.1 1.0	
		Sk	iP	18 12 17.8	
		Um	iP	18 12 10.7	
		Ud	iP	18 12 39.3	C
		Aleutian Islands (h = 80 km).			
		m = 6.1 (Up,Ki).			
"	3	Up	iPKP	19 40 50.7	C
			i	19 40 58.9	
		Sk	ePKP	19 40 43	
		Um	iPKP	19 40 38.9	
		Ud	iPKP	19 40 52.2	
		De	iPKP	19 41 02.8	
		Kermadec Islands (h = N).			
"	3	Ud	i(Sg)	19 43 56.8	
"	3	Up	i(P)	21 38 12.7	
				micr sec	
			(P) Z'	0.1 0.5	
"	3	Up	iP	23 38 30.4	
"	4	Up	iP	01 43 11.1	
"	4	Up	iP	02 53 52.6	C
			iPn	02 54 58.4	
			iPP	02 55 11.5	
				micr sec	
			P Z'	0.1 0.5	
			PP Z'	0.1 0.9	
		Ki	iP	02 53 37.3	C
			i	02 53 44.5	
				micr sec	
			P Z'	0.2 0.7	
		Sk	iP	02 54 08.3	C
			i	02 55 05.0	
			iPn	02 55 22.1	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 4 (cont.)

Um	iP	02 53 37.5	C
	iPn	02 54 39.0	
	iPP	02 54 52.5	
Ud	iP	02 54 09.1	C
	iPn	02 55 23.0	
De	iP	02 54 16.2	C
	iPn	02 55 31.3	
	iPP	02 55 43.6	

Kazakh SSR.
m = 6.0 (Up,Ki).
Underground explosion.

" 4

Sk	iP	07 02 22.0	

" 4

Ud	iPKP	07 07 43.7	
	i	07 07 51.3	
De	iPKP	07 07 53.2	

Fiji Islands (h = 650 km).

" 4

Ud	iP	10 19 25.4	

Dodecanese Islands (h = N).

" 4

Up	iSg	10 28 30.9	
Sk	e	10 27 28	
	iLgl	10 27 40.6	
Um	iLgl	10 29 19.5	
Ud	iP^x	10 26 25.2	
	iS^x	10 27 16.6	
	iSg	10 27 28.8	

Southwest coast of Norway, 60.0°N, 5.7°E.
Origin time = 10 25 12.
Solution checked with Kongsberg readings.

" 4

Up	iP	11 28 52.1	
Ki	iP	11 28 48.7	
Sk	iP	11 28 37.8	
Um	iP	11 28 53.8	
Ud	iP	11 28 43.0	C
De	iP	11 28 46.5	

Panama (h = N).

" 4

Up	iPKP	12 31 30.4	
	i	12 31 40.6	
Um	iPKP	12 31 20.8	
Ud	iPKP	12 31 35.3	

Kermadec Islands (h = 70 km).

" 4

Ki	iPn	18 09 43.8	
	iSn	18 10 29.9	

(cont.)

1969 July 4 (cont.)

Ki	iLgl	18 10 41.8	

D = 420 km = 3.8°.
Probably northwest Russia.
Origin time = 18 08 43.
Explosion?

" 4

Um	iPKP	18 23 25.5	
Ud	ePKP2	18 23 57	

South of Kermadec Islands (h = 90 km).

" 4

Up	iLgl	22 32 56.3	
Ki	iPg	22 29 01.1	D
	iSg	22 29 07.0	
		micr sec	
	Sg Z'	0.6 0.5	

D = 50 km = 0.5°.

Sk	iLgl	22 31 29.5	
Um	$i(P^x)$	22 30 03.0	
	iSn	22 30 41.1	
	i	22 30 51.6	
	iLgl	22 30 54.6	
Ud	eLgl	22 32 59	

Swedish Lapland, 67.7°N, 19.2°E.
Origin time = 22 28 52.
Solution checked with Tromsö readings.

" 4

Up	iPKP2	23 14 28.6	
		micr sec	
	Mx N	1.7 27	
Ki	iPKP	23 14 15.5	
		micr sec	
	Mx E	0.8 19	
	Mx N	0.8 19	
	Mx Z	1.4 19	
Um	iPKP	23 14 11.4	
	i	23 14 19.7	
Ud	iPKP2	23 14 37.4	

West of Macquarie Islands (h = N).
M = 5.8 (Up,Ki).

" 5

Ud	iP	00 26 13.6	

" 5

Up	ePKP	01 51 42	
Ki	iPKP	01 51 38.8	
Ud	iPKP	01 51 45.0	
De	iPKP	01 51 55.4	

Tonga Islands (h = 190 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	5	Ki	eP		01 57 42
			i		01 57 48.6
					micr sec
			Mx	E	1.0 21
			Mx	N	0.6 19
			Mx	Z	1.4 19
		Ud	iP		01 58 15.9
		New Guinea (h = N).			
"	5	Up	iPKP		06 27 04.7
		Ki	iPKP		06 26 58.2
		Um	iPKP		06 26 59.0
		Ud	iPKP		06 27 06.0
		De	iPKP		06 27 18.0 D
		Fiji Islands (h = 500 km).			
"	5	Up	iP		11 25 43.8
			iS		11 36 35
			D = 10100 km = 91°.		
		Ki	iP		11 25 18.4 C
			i		11 25 49.9
					micr sec
			P	Z'	0.1 1.1
		Um	iP		11 25 25.7
			i		11 25 31.1
			iS		11 35 55
		Ud	iP		11 25 57.7
		De	iP		11 26 08.9
		Mariana Islands (h = 60 km).			
"	5	Ki	iP		11 43 57.8
			ipP		11 44 09.1
		Um	iP		11 44 25.0
			ipP		11 44 37.8
		Ud	iP		11 44 49.8
			ipP		11 45 00.7
		Alaska. h = 45 km (Ki,Um,Ud).			
"	5	Up	iP		15 33 05.8
		Sk	iP		15 32 49.0
		Ud	iP		15 33 09.1
		Kamchatka (h = 50 km).			
"	5	Ki	iP		17 09 01.7
		Java (h = 100 km).			
"	6	Up	iPKP		11 09 02.2 D
					micr sec
			PKP	Z'	0.1 0.6
		Ki	iSKP		11 11 35.3
		Um	iSKP		11 11 45.0
		Ud	iPKP		11 09 04.4 D
		(cont.)			

1969 July	6	(cont.)		
		De	iPKP	11 09 14.2
		Tonga-Kermadec Islands (h = 520 km).		
"	6	Up	iP	11 15 41.1
"	6	Up	iP	11 47 43.4
		Ki	iP	11 47 14.9 C
		Um	iP	11 47 25.6
		Ud	iP	11 47 52.3
		Ryukyu Islands (h = 35 km).		
"	6	Ki	iPKP	14 50 17.5
			iX	14 50 37.1
		Um	iPKP	14 50 24.9
			iX	14 50 46.0
		Ud	iPKP	14 50 33.2
			i	14 50 45.8
		Tonga Islands (h = N). If X (Ki,Um) is interpreted as pP, the focal depth becomes 70 km.		
"	6	Up	iPKP	21 04 37.8
			i	21 04 42.2
		Um	iPKP	21 04 26.5
			i	21 04 39.6
		Ud	iPKP	21 04 39.4
			i	21 04 49.3
		South of Kermadec Islands (h = N).		
"	6	Up	iP	21 20 33.2
		Ki	e(P)	21 21 41
"	7	Up	iP	01 47 56.3
		Um	iP	01 47 37.8 C
			i	01 47 49.2
		Ud	iP	01 48 03.1
"	7	Ud	iP	03 51 11.7
"	7	Up	iP	03 51 25.0
		Ki	iP	03 51 09.9
		Um	iP	03 51 14.5
		Molucca Passage (h = 40 km).		
"	7	Up	iP	04 56 28.5 C
			i	04 56 44.1
			iPP	05 00 20.5
			iSKS	05 06 49
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 7 (cont.)

Up			micr	sec
	P	Z'	0.1	1.0
	Mx	E	1.3	17
	Mx	N	1.4	18
	Mx	Z	1.4	18
Ki	iP		04 56 00.2	
	iS		05 06 37	
			micr	sec
	P	Z'	0.2	1.2
	S	E	1.3	7
	S	N	0.7	8
	Mx	E	1.8	18
	Mx	N	1.4	18
	Mx	Z	2.3	17
	D = 9700 km = 87 1/2°.			
Sk	iP		04 56 24.3	
Um	iP		04 56 12.1	
	iSKS		05 06 36	
	iPS		05 08 11	
Ud	iP		04 56 34.1	
	iPP		05 00 25.1	
De	iP		04 56 47.1	
	iPP		05 00 45.0	

Mariana Islands (h = 40 km).
m = 6.2, M = 5.7 (Up,Ki).

"	7	Up	iP	06 07 07.0

Sea of Okhotsk (h = 420 km).

"	7	Up	iP	09 08 21.6
		Um	iP	09 08 01.5
		Ud	eP	09 08 15
"	7	Ki	eP	09 33 23
"	7	Sk	iSg	09 55 00.7
		Ud	iPg	09 53 16.1
			iSg	09 54 01.8
			D = 360 km = 3.2°.	

South Norway, 58.7°N, 7.8°E.
Origin time = 09 52 17.
Solution obtained by combination with Kongsberg readings.

"	7	Up	iP	09 56 26.1
		Sk	eP	09 56 10
		Um	iP	09 56 09.1
		Ud	iP	09 56 22.4
			i	09 56 29.2
		De	iP	09 56 41.9

1969 July 7

Up	iP	18 16 51.9	
Sk	iP	18 17 35.5	
Um	iP	18 17 34.0	
	i	18 17 43.6	
Ud	eP	18 16 58	
	i	18 17 02.5	

Albania (h = 2 km).

"	7	Up	iP	20 08 38.3
"	7	Ud	iP	21 57 46.2
"	8	Ki	iP	02 40 46.3

Arctic Ocean (h = N).

"	8	Up	iP	04 20 14.0
			i	04 20 25.3
			iSKS	04 30 47
		Ki	iP	04 19 57.2 C
			i	04 20 22.9
		Sk	eP	04 20 19
		Um	iP	04 20 02.4
			iSKS	04 30 35
			iS	04 31 11
		Ud	iP	04 20 21.5

Molucca Passage (h = 15 km).

"	8	Up	iPKP	07 30 15.9
		Ki	iPKP	07 29 55.7
			i	07 31 12.8
				micr sec
			PKP Z'	0.1 1.3
		Sk	iPKP	07 30 11.3
			i	07 30 26.9
		Um	iPKP	07 30 05.1
		Ud	iPKP	07 30 17.7

South of Kermadec Islands (h = 110 km).

"	8	Sk	eP	08 08 19
		Um	iP	08 08 02.6
		Ud	iP	08 08 14.0
"	8	Up	iP	08 14 12.9
			iS	08 18 14
				micr sec
			P N	3.1 5
			P Z	3.1 5
			P Z'	1.3 1.5
			S E	11 12
			S N	3.7 7
			Mx E	17 21
			Mx N	23 13

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 8 (cont.)

Up			micr	sec
	Mx	Z	26	13
	D = 2500 km = 22 1/2°.			
" 8 Ki	iP		08 15 26.4 C	
	eS		08 20 21	
			micr	sec
	P	N	0.9	6
	P	Z	1.1	6
	P	Z'	0.4	1.5
	S	E	1.5	8
	S	N	1.3	11
	Mx	E	16	15
	Mx	N	20	14
	Mx	Z	32	14
	D = 3350 km = 30°.			
Sk	iP		08 14 52.2 C	
Um	iP		08 14 50.4 C	
	i		08 14 54.8	
	iS		08 19 19	
Ud	iP		08 14 18.7 C	
	iS		08 18 27.3	
De	iP		08 13 42.0 C	
Ionian Sea (h = N).				
m = 6.0, M = 6.0 (Up,Ki).				
Relatively long-period PZ' at all our stations.				
" 8 Ki	iPKP		11 38 32.5	
New Zealand (h = 170 km).				
" 8 Ki	iP		16 54 15.6	
Ud	iP		16 55 08.2	
Unimak Island (h = 50 km).				
" 8 Ki	iSg		17 38 48.7	
Sk	iSg		17 38 53.0	
Um	iSg		17 39 14.7	
Nordland, Norway, 66.4°N, 14.8°E.				
Origin time = 17 37 20.				
Explosion?				
" 8 Ki	iP		19 42 20.7	
Sk	iP		19 42 43.5	
Ud	iP		19 42 35.8	
Tadzhik SSR (h = 220 km).				
" 9 Up	iP		02 06 33.9 C	
	i		02 06 40.2	
	iS		02 15 27	
			micr	sec
	P	Z'	0.2	0.9
	Mx	E	0.5	18
	Mx	N	0.7	18
	Mx	Z	0.8	16
	D = 7500 km = 67 1/2°.			

(cont.)

1969 July 9 (cont.)

Ki	iP		02 05 40.9 C	
	eS		02 13 45	
	eScS		02 15 32	
			micr	sec
	P	Z'	0.1	1.0
	S	E	0.3	11
	Mx	E	0.5	13
	Mx	N	0.5	14
	Mx	Z	0.9	15
	D = 6600 km = 59 1/2°.			
Sk	iP		02 06 14.6	
Um	iP		02 06 06.6 C	
	iS		02 14 34	
Ud	iP		02 06 35.3 C	
	i		02 06 46.4	
	iPcP		02 07 04.0	
De	iP		02 06 56.8	
	i		02 07 26.8	
Aleutian Islands (h = 20 km).				
m = 5.8, M = 5.0 (Up,Ki).				
" 9 Ki	iP		02 41 22.2	
	i		02 41 26.4	
Um	eP		02 41 39	
Ud	eP		02 41 55	
" 9 Up	iPKP		03 22 48.6	
	i		03 22 57.9	
Ki	iPKP		03 22 28.1 C	
	i		03 22 49.0	
			micr	sec
	PKP	Z'	0.1	1.5
Sk	iPKP		03 22 43.8	
	i		03 22 57.4	
Um	iPKP		03 22 38.7 C	
Ud	ePKP		03 22 51	
	i		03 22 55.4	
De	iPKP2		03 23 14.0	
South of Kermadec Islands (h = 35 km).				
" 9 Up	iP		04 36 12.3	
Um	iP		04 36 02.6	
Ud	iP		04 36 13.6	
" 9 Up	iPKP		05 49 36.7	
	i		05 49 47.3	
Ki	iPKP		05 49 16.9	
Sk	iPKP		05 49 31.9	
Um	iPKP		05 49 27.2	
Ud	iPKP		05 49 38.5	
	i		05 49 56.2	
De	iPKP2		05 50 09.7	
South of Kermadec Islands (h = N).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	9	Um	iP	06 29 10.4
		Ud	iP	06 29 41.9
		Japan (h = 150 km).		
"	9	Ud	eP	08 23 29
		Kurile Islands (h = 35 km).		
"	9	Ud	iSg	12 48 06.5
		South Norway, probably near Oslo Fjord.		
"	9	Ki	iP	15 57 33.4
		Ud	iP	15 58 07.5
			i	15 58 23.0
		Formosa (h = 210 km).		
"	9	Sk	eP	17 33 04
		Um	iP	17 33 06.8
			i	17 33 14.2
		Ud	iP	17 32 27.4
		Albania (h = N).		
"	9	Ki	eSg	17 36 19
			i	17 36 26.4
		Sk	iSg	17 36 26.2
			i	17 36 36.4
		Um	iSg	17 36 52.3
		Ud	iSg	17 38 17.1
		Nordland, Norway, 66.4°N, 14.8°E.		
		Origin time = 17 34 52.		
		Explosion?		
"	9	Up	iPP	23 10 12.8
		Ki	iPP	23 10 04.8
		Sk	iPP	23 10 28.6
		Um	iPP	23 10 02.5
		Ud	iPP	23 10 29.4
		De	iPP	23 10 31.3
		Timor (h = 35 km).		
		All these PP are early arrivals (residuals around -30 sec in relation to Jeffreys-Bullen's tables), probably due to reflections at mantle discontinuities.		
"	9	Um	iP	23 20 56.9
"	10	Um	iP	02 30 30.9
"	10	Up	iP	19 24 03.3
		Ki	iP	19 23 12.8
		(cont.)		

1969 July	10	(cont.)		
		Ud	iP	19 24 07.5
			i	19 24 11.6
		Kurile Islands (h = 30 km).		
"	10	Sk	eLgl	21 18 49
		Ud	iPg	21 17 08.9
			iSg	21 17 55.2
			D = 370 km = 3.4°.	
		South Norway, 58.5°N, 7.8°E.		
		Origin time = 21 16 03.		
		Solution obtained by combination with Kongsberg readings.		
"	10	Sk	iP	22 32 29.8
		Um	iP	22 32 19.5
		Ud	iP	22 31 52.6
		De	iP	22 31 21.2
"	11	Up	eP	01 19 19
		Ki	e(P)	01 19 20
		Um	i(P)	01 19 23.5
		Ud	eP	01 19 31
"	11	Sk	iP	01 51 27.4
		Ud	iP	01 50 56.9
		De	iP	01 50 26.4
		Dodecanese Islands (h = N).		
"	11	Ud	iP	02 29 28.4
"	11	Up	iP	06 10 01.7
		Ki		---
				micr sec
			Mx E	0.6 18
			Mx N	0.4 18
			Mx Z	1.1 19
		Costa Rica (h = 30 km).		
"	11	Up	iP	08 08 38.6
"	11	Ud	iP	09 06 53.1
		Japan (h = 90 km).		
"	11	Up	iP	09 59 14.9
			i	09 59 41.1
"	11	Up	iLgl	11 52 52.1
		Ki	iPn	11 48 41.5
			iSn	11 49 40.0
			iLgl	11 49 59.5
			iSg	11 50 04.2
			D = 530 km = 4.8°.	
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	11	(cont.)			
		Sk	iLgl	11 52 27.7	
		Um	iSn	11 50 18.6	
			i	11 50 34.4	
			iSg	11 50 54.1	
			iRg	11 51 39.2	
		Ud	eSn	11 52 16	
			iLgl	11 53 28.8	
		De	iLgl	11 54 49.9	
		Northwest Russia, 67.5°N, 33.1°E. Origin time = 11 47 27. Explosion?			
"	11	Ud	i(Sg)	13 11 42.0	
"	11	Um	iP	14 12 21.4	
		Ud	iP	14 12 42.5	
"	11	Ud	iP	21 45 35.4	C
"	12	Up	iP	00 24 19.5	
		Sk	eP	00 25 01	
		Um	iP	00 25 01.4	
		Ud	eP	00 24 29	
		Greece (h = 45 km).			
"	12	Up	iP	03 10 01.3	
			iPP	03 10 13.7	
			iS	03 13 18.7	
		Ki	iP	03 11 02.7	
			i	03 11 10.6	
				micr	sec
			P Z'	0.1	0.9
			Mx E	0.5	13
			Mx N	0.5	12
			Mx Z	0.7	13
		Sk	iP	03 10 54.1	
			iPP	03 11 21.8	
		Um	iP	03 10 27.1	
			i	03 15 11.5	
		Ud	iP	03 10 21.1	
			iS	03 14 16.1	
		De	iP	03 09 55.2	
			i	03 09 59.5	
			iLg2	03 15 45.0	
		Caucasus (h = 40 km).			
"	12	Ki	iP	05 25 57.2	C
		Ud	iP	05 26 22.2	C
		Mindanao (h = 140 km).			
"	12	Up	iP	06 08 19.7	
			i	06 08 47.2	
		Mariana Islands (h = 200 km).			

1969 July	12	Up	ipP	06 09 14.1	
			iS	06 18 59	
		Ki	iP	06 09 28.3	
			ipP	06 09 38.0	
				micr	sec
			P Z'	0.1	1.2
		Sk	iP	06 09 30.3	
			ipP	06 09 39.5	
		Um	iP	06 09 14.6	
			ipP	06 09 24.6	
		De	iP	06 09 06.8	
			ipP	06 09 16.1	
		Chagos Islands. h = 35 km (Ki,Sk,Um,De).			
"	12	Up	iPKP	06 11 09.9	
		Ud	iPKP	06 11 11.5	
		De	iPKP	06 11 22.7	
		Tonga-Kermadec Islands (h = 560 km).			
"	12	Ud	iP	07 22 28.2	
"	12	Ud	iP	07 59 07.4	
			i	07 59 10.3	
		Ionian Islands.			
"	12	Ki	iPn	09 06 51.3	
			iSn	09 07 47.7	
			iLgl	09 08 08.0	
			D = 530 km = 4.8°.		
		Sk	iSg	09 10 48.4	
			i	09 11 49.9	
		Um	iSn	09 08 31.7	
			iSg	09 09 09.6	
		Northwest Russia, 67.7°N, 33.3°E. Origin time = 09 05 36. Explosion?			
"	12	Ki	ePn	11 14 11	
			iSn	11 15 06.1	
			iLgl	11 15 20.8	
			D = 510 km = 4.6°.		
		Northwest Russia. Origin time = 11 12 58. Explosion?			
"	12	Ki	iPn	12 51 25.5	
			iSn	12 52 13.9	
			iLgl	12 52 27.5	
			D = 440 km = 4.0°.		
		Northwest Russia. Origin time = 12 50 22. Explosion?			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	12	Ki	iPn	12 52 09.8	
			iSn	12 52 58.1	
			iLgl	12 53 11.9	
			D = 440 km = 4.0°.		
		Northwest Russia.			
		Origin time = 12 51 06.			
		Explosion?			
"	12	Up	iP	13 11 36.7	C
			eS	13 20 34	
				micr sec	
			P Z'	0.7 1.0	
			Mx E	2.4 16	
			Mx N	3.4 19	
			Mx Z	2.3 18	
			D = 7600 km = 68 1/2°.		
		Ki	iP	13 10 48.6	C
			ePa	13 14 31	
			iS	13 19 05	
				micr sec	
			P N	0.5 7	
			P Z	1.1 7	
			P Z'	0.3 0.8	
			S E	0.7 10	
			S N	0.7 8	
			Mx E	4.5 22	
			Mx N	4.1 18	
			Mx Z	11 18	
			D = 6800 km = 61°.		
		Sk	iP	13 11 25.2	
			i	13 11 36.3	
		Um	iP	13 11 10.1	C
			iPa	13 15 19	
			iS	13 19 41	
		Ud	iP	13 11 42.0	
			i	13 11 43.5	
		De	iP	13 12 00.3	
		Kurile Islands (h = 10 km).			
		m = 6.2, M = 5.8 (Up,Ki).			
"	12	Ki	iPn	13 17 04.0	
			iSn	13 17 51.7	
			iLgl	13 18 04.8	
			D = 440 km = 4.0°.		
		Um	iSg	13 19 32.1	
		Northwest Russia.			
		Origin time = 13 16 00.			
		Explosion?			
"	12	Up	iPKP	13 35 20.9	D
			iX	13 35 29.7	
			iY	13 35 33.3	
		(cont.)			

1969 July	12	(cont.)			
		Up	iSKP	13 38 19.3	
			i	13 38 37.5	
				micr sec	
			PKP Z'	0.3 0.5	
		Ki	e(PKP)	13 35 02	
			iPKP	13 35 07.9	
			iX	13 35 18.5	
			i(SKP)	13 37 47.2	
			iSKP	13 37 59.2	
		Sk	ePKP	13 35 16	
			iSKP	13 38 14.6	
		Um	iPKP	13 35 08.6	
			i	13 35 15.0	
			iSKP	13 38 06.1	
			i	13 38 09.6	
			i	13 38 20.9	
		Ud	iPKP	13 35 23.2	D
			iX	13 35 32.0	
			iY	13 35 35.7	
			iSKP	13 38 21.2	
		De	iPKP	13 35 32.9	D
			iX	13 35 41.6	
			iY	13 35 45.1	
			ipPKP	13 37 53.8	
		Tonga-Kermadec Islands (h = 600 km).			
		PKP, X and Y constitute a series of three phases with increasing amplitudes; the average time intervals are X - PKP = 9.2 sec, and Y - PKP = 12.4 sec.			
"	12	Up	iP	13 43 29.8	C
"	12	Up	iP	15 21 44.0	
		Ki	eP	15 20 55	
		Um	iP	15 21 18.6	
		Ud	iP	15 21 49.3	C
		Kurile Islands (h = N).			
"	12	Up	iP	19 27 48.3	C
			ipP	19 27 57.8	
			iPP	19 30 25.3	
			iS	19 37 02	
				micr sec	
			P Z'	0.1 1.0	
			PP Z	0.7 7	
			S E	0.6 7	
			S N	1.1 9	
			Mx E	5.3 21	
			Mx N	5.7 20	
			Mx Z	4.0 18	
			D = 7900 km = 71°.		
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 12 (cont.)

Ki	iP		19 27 06.8	C
	ipP		19 27 16.4	
	iPP		19 29 29	
	iS		19 35 45	
			micr sec	
	P	E	0.4 7	
	P	N	0.4 7	
	P	Z	0.9 8	
	P	Z'	0.1 1.2	
	PP	E	0.5 6	
	PP	Z	0.5 6	
	S	E	1.6 10	
	S	N	1.0 10	
	Mx	E	14 18	
	Mx	N	7.3 17	
	Mx	Z	8.5 19	
	D = 7150 km = 64 1/2°.			
Sk	iP		19 27 41.4	
	ipP		19 27 49.6	
Um	iP		19 27 25.2	C
	ipP		19 27 34.2	
	iS		19 36 20	
Ud	iP		19 27 55.2	C
	ipP		19 28 04.0	
De	eP		19 28 12	
	ipP		19 28 21.2	

Japan. h = 35 km (Up,Ki,Sk, Um,Ud,De).
m = 6.2, M = 6.0 (Up,Ki).

" 13	Um	iP	00 22 01.6	
	Ud	iP	00 22 27.3	

Aleutian Islands (h = 35 km).

" 13	Up	iP	03 15 41.2	
	Um	iP	03 15 17.0	
	Ud	iP	03 15 46.9	

Japan (h = 60 km).

" 13	Up	iP	05 52 30.2	
	Ki	iP	05 51 44.9	
	Ud	iP	05 52 36.6	

Kurile Islands (h = N).

" 13	Ud	iP	17 10 15.1	
" 13	Ki	eP	23 39 37	
	Ud	iP	23 40 04.0	

Mindanao (h = 60 km).

" 14	Ud	iP	02 19 44.1	
" 14	De	iP	05 56 51.7	

Colombia (h = 160 km).

1969 July

14	Ud	iP	11 44 10.1	

Kurile Islands (h = 90 km).

" 14	Up	i(P)	13 56 39.6	
" 14	Ud	iP	14 26 48.4	

Kurile Islands (h = 35 km).

" 14	Ki	eP	16 06 26	
			micr sec	
	Mx	E	0.7 19	
	Mx	N	0.6 18	
	Mx	Z	0.9 15	
	Um	iP	16 06 46.3	
	Ud	iP	16 07 18.1	

Japan (h = 45 km).

" 14	Ud	iP	19 13 21.7	

Aleutian Islands (h = N).

" 14	Up	iP	20 12 46.8	
	Ki	eP	20 12 05	
	Um	iP	20 12 23.2	
	Ud	iP	20 12 54.0	

Japan (h = 45 km).

" 15	Ud	iP	01 03 28.8	C

Kodiak Island (h = 70 km).

" 15	Up	iP	01 10 03.5	
			micr sec	
	Mx	N	1.0 19	
	Sk	iP	01 10 21.3	
	Um	iP	01 09 56.1	
	Ud	iP	01 10 18.5	
		i	01 10 21.0	
" 15	Ud	iP	03 25 54.6	

Colombia (h = 170 km).

" 15	Ud	iPKP	04 29 56.2	C

Fiji Islands (h = 650 km).

" 15	Ud	iP	20 40 23.2	

North Atlantic Ocean (h = N).

" 15	Up	ePKP	21 32 13	
		i	21 32 20.9	
	Sk	iPKP	21 32 07.5	
	Um	iPKP	21 32 02.3	
	Ud	iPKP	21 32 15.6	C
	De	iPKP	21 32 23.8	

Kermadec Islands (h = 40 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 15 Ud iP 21 46 06.5
North Atlantic Ocean (h = N).

" 16 Ud iP 02 39 47.5

" 16 Ki iP 05 00 35.7
iX 05 00 47.5
Um eP 05 00 44
i(SKS) 05 11 05
Ud iP 05 00 59.5
iX 05 01 11.5
Mindanao (h = 80 km).

" 16 Um e 05 54 22
i(Sg) 05 54 30.0

" 16 Up iP 08 27 20.9 C
iS 08 35 48

		micr	sec
P	N	0.9	2
P	Z	1.5	2
P	Z'	0.9	1.0
S	E	0.8	4
S	N	1.3	3
Mx	E	9.4	22
Mx	N	11	22
Mx	Z	7.5	25

D = 7100 km = 64°.

Ki iP 08 26 28.2 C
ipP 08 26 48
iS 08 34 10

		micr	sec
P	Z	0.6	7
P	Z'	0.7	1.5
S	E	1.0	13
S	N	0.9	8
Mx	E	11	23
Mx	N	7.5	23
Mx	Z	6.3	20

D = 6200 km = 56°.

Sk iP 08 27 04.2
Um iP 08 26 52.6 C
iS 08 34 57
Ud iP 08 27 23.5 C
De iP 08 27 45.4
iS 08 36 41.3
Kamchatka. h = 80 km (Ki).
m = 6.5, M = 6.1 (Up,Ki).

" 16 Ud iP 08 56 12.9

" 16 Um iSKS 13 04 29
Ud iPKP 12 58 03.0
De iPKP 12 58 07.1
New Ireland (h = 90 km).

1969 July 16 Up ---

		micr	sec
Mx	E	0.9	22
Mx	N	0.9	22
Mx	Z	1.1	22

Ki iP 13 07 07.2 C

		micr	sec
Mx	E	1.4	24
Mx	N	0.7	20
Mx	Z	1.6	22

Um iP 13 07 17.9
Mariana Islands (h = 90 km).
M = 5.4 (Up,Ki).

" 16 Up iP 13 14 21.3
Ud iP 13 14 11.0
Nevada.
Underground explosion.

" 16 Up i 13 18 00.3
i(Sg) 13 18 25.5
Ud iPn 13 17 29.9
iPg 13 17 32.8
iSn 13 17 55.6
iSg 13 17 57.7
D = 210 km = 1.9°.
Origin time = 13 16 55.

" 16 Up iSg 13 40 24.4
Ki iSg 13 42 57.9
Sk iSg 13 42 15.0
Um iSg 13 40 55.9
Ud iSn 13 41 00.4
iLgl 13 41 25.2
Esthonia, 59.7°N, 25.6°E.
Origin time = 13 38 15.
Explosion?

" 16 Up iP 15 06 48.5

		micr	sec
P	Z'	0.1	1.0

Ki iP 15 06 13.7 C

		micr	sec
P	Z'	0.1	1.0

Sk iP 15 06 22.7 C
Um iP 15 06 34.0 C
Ud iP 15 06 40.5 C
De iP 15 06 57.2 C
Nevada.
m = 5.9 (Up,Ki).
Underground explosion.

" 16 Up iSg 21 13 31.9
Sk eLgl 21 13 19
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 16 (cont.)

Ud	iPg	21 11 38.0	
	i	21 11 40.2	
	iSg	21 12 23.8	

D = 380 km = 3.4°.
South Norway, 58.8°N, 7.3°E.
Origin time = 21 10 33.
Solution obtained by combination with Kongsberg readings.

" 16	Up	iPKP	23 18 01.7
	Ki	ePKP	23 18 14
	Um	iPKP	23 18 08.8
		i	23 18 17.4
	Ud	ePKP	23 17 58

South Sandwich Islands (h = N).

" 17	Up	iP	01 15 44.7
	Ki	iP	01 15 05.2
	Um	iP	01 15 17.2
	Ud	iP	01 15 46.0
" 17	Up	iP	04 14 34.6 C
		i	04 14 49.0
			micr sec
		P Z'	0.1 0.7
	Ki	iP	04 13 42.0 C
			micr sec
		P Z'	0.1 0.8
	Sk	iP	04 14 21.4
	Um	iP	04 14 07.5 C
	Ud	iP	04 14 35.4 C
	De	iP	04 14 57.2 C

Aleutian Islands (h = 35 km).
m = 6.1 (Up,Ki).

" 17	Ud	iPKP	09 37 11.0
	De	iPKP	09 37 22.7 D

Fiji Islands (h = 190 km).

" 17	Um	iP	10 57 11.9
	Ud	iP	10 57 23.8
" 17	Um	iP	14 10 45.7
	Ud	iP	14 10 57.4
" 17	Sk	iP	14 42 21.2
" 17	Ud	iP	17 47 15.2

Kamchatka (h = 70 km).

" 17	Up	iPcP	21 02 10.7

(cont.)

1969 July 17 (cont.)

Ki	iP	21 00 15.5	
Sk	iP	21 00 43.7	
Um	iP	21 00 44.9	
Ud	iP	21 01 10.1	
	iPcP	21 02 08.4	

Alaska (h = 30 km).

" 17	Ud	iPcP	21 05 35.6

Alaska (h = 20 km).

" 17	Ki	eP	22 12 19

Alaska (h = 10 km).

" 17	Up	iPKP	22 43 10.7
		i	22 43 14.3
			micr sec
		PKP Z'	0.1 0.5
	Ki	ePKP	22 42 55
	Sk	iPKP	22 43 03.6
	Um	iPKP	22 42 58.2
	Ud	iPKP	22 43 12.6
	De	iPKP	22 43 21.7
		i	22 43 30.4

Kermadec Islands (h = 230 km).

" 17	Up	iP	23 06 06.5
	Sk	iP	23 06 49.6
	Ud	iP	23 06 13.6

Aegean Sea.

" 18	Up	eP	00 09 39
		e	00 09 46
	Ki	iP	00 10 00.0
	Sk	iP	00 09 28.1
	Um	iP	00 09 54.3
	Ud	iP	00 09 25.6
		i	00 09 31.3
	De	iP	00 09 23.4

North Atlantic Ocean (h = N).

" 18	Up	eP	04 53 47
	Ud	iP	04 54 16.6 C

Hindu Kush.

" 18	Up	iP1	05 35 13.3 C
		iP2	05 35 17.3
		iP3	05 35 22.9
		iS	05 43 44
			micr sec
		P1 Z'	0.3 1.0
		P2 Z'	0.9 1.0
		P3 E	0.8 3

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 18 (cont.)

			micr	sec
Up	P3	N	0.6	3
	P3	Z	3.0	3
	P3	Z'	1.5	1.2
	S	E	11	10
	S	N	12	11
	Mx	E	410	19
	Mx	N	590	20
	Mx	Z	460	17

D = 7050 km = 63 1/2°.

Ki	iP1	05 34 41.1 C
	iP2	05 34 46.2
	iP3	05 34 52.0
	iPa	05 38 06
	iS	05 42 46

		micr	sec
P1	Z'	0.3	1.1
P2	Z'	1.0	1.0
P3	E	2.2	7
P3	N	0.9	9
P3	Z	5.0	7
P3	Z'	1.2	1.1
S	E	15	10
S	N	7.4	8
Mx	E	280	16
Mx	N	280	14
Mx	Z	390	15

D = 6550 km = 59°.

Sk	iP1	05 35 14.6
	iP2	05 35 19.1
	iP3	05 35 23.9
Um	iP1	05 34 52.9 C
	iP2	05 34 57.2
	iP3	05 35 02.9
	iPP	05 37 04
	iPa	05 38 31
	iS	05 43 08
Ud	iP1	05 35 23.4 C
	iP2	05 35 27.8
	iP3	05 35 32.5
De	iP1	05 35 35.8 C
	iP2	05 35 40.9
	iP3	05 35 45.8

China (h = N).
m = 6.9, M = 7.8 (Up,Ki).
Unusual location for such a large earthquake.
Multiple P: three distinct onsets can be distinguished; in average P2 - P1 = 4.6 sec and P3 - P1 = 9.8 sec. S corresponds to P2.
Long waves (SL) follow S.

1969 July 18

Ki	eP	07 51 13
Sk	eP	07 51 45
	i	07 51 50.9
	i	07 52 04.9
Ud	iP	07 51 55.2

China (h = N).

" 18

Ki	i(Pg)	08 24 23.3
	i(Sg)	08 24 36.6
	i	08 24 48.9
Sk	i(Rg)	08 27 19.3

" 18

Ki	ePn	10 30 22
	iSn	10 31 08.6
	iSg	10 31 27.1

D = 430 km = 3.9°.
Probably northwest Russia.
Origin time = 10 29 19.
Explosion?

" 18

Up	iSg	11 32 05.3
Ki	eLgl	11 34 12
	i(Rg)	11 34 47.2
Sk	iSg	11 33 50.0
Um	iSg	11 32 32.9

Esthonia, 59.7°N, 25.6°E.
Origin time = 11 29 51.
Explosion?

" 18

Ud	i(Sg)	12 44 37.6

" 18

Ki	eP	13 18 51
Sk	iP	13 19 24.1
Um	iP	13 18 57.5 D
Ud	iP	13 19 28.3
De	eP	13 19 37

Mongolia (h = N).

" 18

Ki	iP	13 43 42.9
Um	iP	13 43 54.4
Ud	iP	13 44 24.8

China (h = 30 km).

" 18

Up	iP	13 44 22.3 C
	i	13 44 31.6
Ki	iP	13 43 49.4
	i	13 44 09.6

		micr	sec
Mx	E	1.1	17
Mx	N	1.3	17
Mx	Z	1.0	16

Sk	iP	13 44 23.6 C
Um	iP	13 44 03.8

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 18 (cont.)

Ud	iP	13 44 33.9	

China. Origin time = 13 33 58. Alternatively, these could be interpreted as pP to the preceding event, although this interpretation is less likely.

" 18	Up	iPKP	14 32 49.6 C
		ipPKP	14 33 04.6
	Ki	iPKP	14 33 03.6
		ipPKP	14 33 18.7
		iPKS	14 36 28.5
	Sk	iPKP	14 32 55.0 C
	Um	iPKP	14 32 57.4
		ipPKP	14 33 11.5
	Ud	iPKP	14 32 48.4
		ipPKP	14 33 02.4

South Sandwich Islands.
h = 50 km (Up,Ki,Um,Ud).

" 18	Sk	iP	18 45 39.0
" 18	Ki	e(Sg)	20 26 57
" 18	Sk	iP	20 46 32.9
" 18	Up	iP	21 05 41.8
	Ki	eP	21 06 55
	Sk	eP	21 06 21
	Um	iP	21 06 20.2
	Ud	eP	21 05 42
		i	21 05 47.6

Ionian Islands.

" 19	Ki	eL	00 10	
			micr	sec
		Mx E	0.8	18
		Mx Z	1.8	21

Bolivia (h = 20 km).

" 19	Up	eP	02 02 33 C
	Ki	iP	02 02 00.5
	Sk	eP	02 02 34
	Um	iP	02 02 12.7
	Ud	iP	02 02 43.0
	De	iP	02 02 56.0

China (h = N).

" 19	Up	iP	05 08 51
		i	05 12 45
		iPP	05 13 01.8

(cont.)

1969 July 19 (cont.)

Up	iSKS	05 19 30	
	iS	05 20 42	
	iPS	05 22 19	

D = 11650 km = 105°.

Ki	e(P)	05 09 10	
	i	05 12 43.3	
	iPP	05 13 18.0	
	iSKS	05 19 43	
	iS	05 21 06	
		micr	sec
	PP E	0.7	9
	PP Z	1.4	10
	SKS E	1.9	14
	S N	1.3	9
	Mx E	9.3	20
	Mx N	4.8	21
	Mx Z	14	20
Sk	iP	05 08 47.9	
	ePP	05 12 49	
Um	iP	05 09 01	
	i	05 12 41	
	iPP	05 13 18	
	iSKS	05 19 40	
	iS	05 20 58	
	iPS	05 22 36	
Ud	iP	05 08 49.0	
	i	05 09 07.1	
	i(PP)	05 12 36.5	
De	iP	05 08 44	
	iPP	05 12 52	

Peru (h = 50 km).
m = 6.5 (Ki).
All the PP-phases, given here, belong to the group of early PP-arrivals.

" 19	Up	iPKP	05 29 51.3
	Ki	i(PKP)	05 29 43.8
	Sk	iPKP	05 29 44.1
	Um	iPKP	05 29 39.9
	Ud	iPKP	05 29 53.3
	De	iPKP	05 30 05.1

Fiji Islands (h = 660 km).

" 19	Ud	iP	06 10 35.4
		i	06 11 12.5
" 19	Ud	iPKP	09 22 09.6

South Sandwich Islands (h = N).

" 19	Ki	iP	09 35 11.1

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
July 19 (cont.)

Um		iP	09 35 29.8	
Ud		iP	09 35 59.6	C

" 19

Ki		iP	11 06 32.4	
			micr	sec
	Mx	E	0.3	15
	Mx	N	0.3	13
Um		iP	11 06 45.1	

China (h = N).

" 19

Up		iP	11 37 05.7	C
		i	11 37 09.7	
		i	11 37 14.8	
			micr	sec
	P	Z'	0.1	0.6
Ki		iP	11 36 48.4	
Um		iP	11 36 53.9	
Ud		iP	11 37 13.6	

" 19

Ki	ePn	12 05 17	
	iSn	12 06 13.1	
	iLgl	12 06 30.7	
	D = 520 km = 4.7°.		
Um	iSn	12 06 59.2	
	iSg	12 07 31.5	

Northwest Russia.
Origin time = 12 04 03.
Explosion?

" 19

Ki	iPn	12 59 48.4	
	iSn	13 00 34.8	
	iSg	13 00 50.6	
	D = 430 km = 3.9°.		
Sk	iSg	13 03 42.2	
Um	eSg	13 02 14	

Northwest Russia,
68.7°N, 30.9°E.
Origin time = 12 58 45.
Explosion?

" 19

Ud	eP	15 03 45	

" 19

Up	iP	17 01 00.0	
Ki	eP	17 00 43	
Um	iP	17 00 48.3	
Ud	iP	17 01 09.1	

" 19

Up	iPKP	18 16 00.6	
	i	18 16 13.8	
Ud	iPKP	18 16 02.3	C
De	iPKP	18 16 11.8	C
	i	18 16 21.9	

Kermadec Islands (h = N).

1969
July 19

Ud	iP	19 29 45.1	

Aleutian Islands (h = N).

" 19

Um	iP	20 01 26.1	

Mexico (h = 100 km).

" 20

Um	iP	02 20 18.1	
Ud	iP	02 19 34.2	

Ionian Islands.

" 20

Um	iP	02 31 09.7	

" 20

Up	eP	04 42 05	
Ki	iP	04 42 01.0	
		micr	sec
	Mx	E	1.3	16
	Mx	N	0.8	15
	Mx	Z	1.8	15
Sk	iP	04 42 25.6	
Um	iP	04 41 56.0	

Sinkiang (h = N).

" 20

Up	iLgl	07 04 41.1	
	i	07 04 57.9	
Ki	iPg	07 01 17.2	C
	iSg	07 01 34.7	
	D = 140 km = 1.3°.		
Sk	iSg	07 03 51.5	
Um	iPg	07 01 53.4	
	iSn	07 02 22.0	
	iSg	07 02 34.6	
	i	07 02 41.2	
	D = 350 km = 3.2°.		

North Sweden, 66.9°N, 22.8°E.
Origin time = 07 00 51.

" 20

Up	iP	07 15 14.5	
		micr	sec
	P	Z'	0.1	0.6
Ki	iP	07 15 22.7	C
		micr	sec
	P	Z'	0.1	1.0
Sk	iP	07 15 40.0	
Um	iP	07 15 12.2	
Ud	iP	07 15 30.8	C
De	iP	07 15 27.4	

Hindu Kush (h = 220 km).
m = 5.4 (Up,Ki).

" 20

Um	iP	08 36 58.1	

" 20

Up	eS	11 05 33	
		micr	sec
	Mx	E	0.6	20

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	20	(cont.)				
		Up			micr	sec
			Mx	N	0.9	22
			Mx	Z	1.1	22
		Ki	iP		10 57 33.9	
					micr	sec
			Mx	E	0.4	17
			Mx	N	0.4	18
			Mx	Z	1.2	22
		Um	iS		11 06 14	
		Atlantic Ocean (h = N).				
		M = 5.0 (Up,Ki).				
"	20	Ud	iP		13 34 51.3	
"	20	Up	iP		15 56 47.7 C	
			i		15 56 51.2	
			iS		16 00 43	
					micr	sec
			P	Z'	0.1	0.6
			Mx	N	0.8	14
			Mx	Z	1.0	13
			D = 2450 km = 22°.			
		Ki	eP		15 58 08	
			i		15 58 36.9	
		Sk	iP		15 57 27.6	
		Um	iP		15 57 26.0	
			i		15 57 38.2	
		Ud	iP		15 56 53.6	
		De	iP		15 56 18.1	
		Ionian Sea (h = 20 km).				
"	20	Um	iP		16 18 17.9	
		Ud	iP		16 18 48.5	
"	20	Up	iP		19 09 23.7	
"	20	Up	i(Sg)		19 56 14.4	
"	20	Ki	ePKP		20 08 58	
		Um	iPKP		20 09 05.7	
			iPKS		20 12 22	
		Ud	ePKP		20 09 13	
		De	iPKP		20 09 15.9	
			i		20 09 28.5	
		Fiji Islands (h = 20 km).				
"	20	Up	iPKP		20 23 34.7 C	
			iSKP		20 26 40.6	
			iPKS		20 26 58	
					micr	sec
			SKP	Z'	0.4	1.0
			Mx	E	0.6	22
		(cont.)				

1969 July	20	(cont.)				
		Up			micr	sec
			Mx	N	0.9	22
			Mx	Z	1.4	22
		Ki	iPKP		20 23 20.7	
			ipPKP		20 24 17.6	
					micr	sec
			Mx	E	0.6	20
			Mx	N	0.7	20
		Sk	iPKP		20 23 31.8 C	
			ipPKP		20 24 28.0	
			iSKP		20 26 34.9	
		Um	i(PKP)		20 23 19.0	
			iPKP		20 23 27.0	
			ipPKP		20 24 22.0	
		Ud	iPKP		20 23 38.0	
		De	iPKP		20 23 43.8	
			iSKP		20 26 52.9	
		New Hebrides Islands.				
		h = 220 km (Ki,Sk,Um).				
		M = 5.6 (Up,Ki).				
		M uncorrected for focal depth.				
"	20	Up	eP		22 45 12	
		Ki	iP		22 45 47.1	
		Sk	eP		22 45 45	
		Um	iP		22 45 23.7	
			i		22 45 33.2	
		Iran (h = 60 km).				
"	20	Up	iP		23 53 35.2	
			i		23 53 41.1	
		Ki	iP		23 53 19.4	
		Sk	iP		23 53 51.4	
		Um	iP		23 53 22.7	
		Ud	eP		23 53 47	
			e		23 53 53	
"	21	Up	eP		00 04 54	
		Ki	eP		00 04 26	
					micr	sec
			Mx	N	0.4	14
		Sk	iP		00 04 57.5	
		Um	eP		00 04 36	
		China (h = N).				
"	21	Ud	iP		01 39 45.0	
"	21	Ud	eP		02 13 49	
"	21	Sk	iP		04 43 51.8	
"	21	Up	iP		05 01 58.8	
		Um	iP		05 01 48.9	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	21	Up	iPKP	06 25 08.3	
			i	06 25 13.9	
				micr	sec
			PKP Z'	0.1	0.6
		Ki	ePKP	06 24 46	
		Sk	iPKP	06 25 02.5	
		Um	iPKP	06 24 57.4	
		Ud	iPKP	06 25 09.9	
			i	06 25 16.6	
		De	iPKP	06 25 17.6	
"	21	Um	iP	07 20 29.6	
		Ud	eP	07 20 06	
		North Atlantic Ocean (h = 20 km).			
"	21	Sk	eP	10 02 33	
		Um	iP	10 03 16.5	
		Ud	eP	10 02 59	
"	21	Up	eP	17 46 16	
			i	17 46 25.8	
			eS	17 52 36	
				micr	sec
			Mx E	0.9	22
			Mx N	1.0	17
			Mx Z	1.5	19
			D = 4650 km = 42°.		
		Ki	eP	17 46 44	
			i	17 46 51.1	
			eS	17 53 23	
				micr	sec
			P Z'	0.1	1.3
			Mx E	0.5	14
			Mx N	1.1	21
			Mx Z	1.0	16
			D = 5000 km = 45°.		
		Sk	eP	17 46 12	
		Um	iP	17 46 34.9	
			i	17 46 41.8	
			iS	17 53 08	
			iSS	17 56 19	
		North Atlantic Ocean (h = N).			
		M = 4.8 (Up,Ki).			
		Double P.			
"	21	Up	iP	19 55 31.3	
			ipP	19 55 41.7	
				micr	sec
			P Z'	0.1	1.0
		Ki	iP	19 54 49.9 C	
			ipP	19 54 57.5	
				micr	sec
			P Z'	0.1	1.0
		(cont.)			

1969 July	21	(cont.)			
		Ki		micr	sec
			Mx E	0.6	15
			Mx N	0.6	16
			Mx Z	1.2	16
		Sk	iP	19 55 23.7	
		Um	iP	19 55 08.1 C	
			ipP	19 55 15.8	
		Ud	iP	19 55 38.0 C	
			ipP	19 55 46.1	
			i	19 56 04.0	
		De	ipP	19 56 07.2	
		Japan. h = 30 km (Up,Ki,Um, Ud).			
		m = 6.0 (Up,Ki).			
"	21	Up	iP	22 19 58.2	
			iPP	22 23 57.5	
			iSKS	22 30 09	
				micr	sec
			P Z'	0.1	1.1
		Ki	iP	22 19 43.8 D	
			iPP	22 23 30.7	
				micr	sec
			P Z'	0.2	1.1
			PP Z'	0.1	1.5
			Mx E	0.4	16
			Mx N	0.4	17
			Mx Z	0.9	19
		Sk	iP	22 20 03.7	
			ePP	22 24 06	
		Um	iP	22 19 47.9	
			i	22 19 55.3	
			i(pP)	22 21 37.8	
			iPP	22 23 43.3	
		Ud	iP	22 20 06.7	
			iPP	22 24 19.2	
		De	iP	22 20 12.3	
			iPP	22 24 19.9	
		Celebes Sea (h = 220 km).			
		m = 5.9 (Up,Ki).			
		The travel times for P fit better a focal depth of 500 km.			
		All the PP are early PP-arrivals.			
"	22	Ki	iPKP	11 10 43.3 C	
		Um	iPKP	11 10 48.9	
		Ud	iPKP	11 10 49.9	
		De	iPKP	11 10 59.6	
		Fiji Islands (h = 580 km).			
"	22	Ud	iPg	12 37 20.8	
			iSg	12 37 41.0	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	22	Up	iPKP	13 21 03.9
		Sk	ePKP	13 20 58
		Um	iPKP	13 20 52.9
		Ud	iPKP	13 21 05.7
"	22	Ud	iP	15 56 56.6
"	22	Um	iP	16 04 15.3
		Guatemala (h = 150 km).		
"	22	Ud	iP	17 02 26.0
"	22	Up	iPKP	17 32 59.1
		Ki	iPKP	17 32 46.1 C
		Sk	iPKP	17 32 56.3
		Um	iPKP	17 32 51.8 C
		Ud	iPKP	17 33 01.2
		De	iPKP	17 33 07.4
			iSKP	17 36 20.5
		Santa Cruz Islands (h = 140 km).		
"	22	Ki	iSg	17 33 21.6
		Sk	iSg	17 33 25.4
		Um	iSg	17 33 47.8
		Nordland, Norway,		
		66.4°N, 14.8°E.		
		Origin time = 17 31 52.		
		Explosion?		
"	22	Up	iPKP	20 14 49.9 C
			ipPKP	20 15 32.5
				micr sec
			PKP Z'	0.2 0.6
		Ki	ePKP	20 14 36
		Um	iPKP	20 14 38.8
			i	20 14 46.3
		Ud	iPKP	20 14 52.1 C
			ipPKP	20 15 34.6
		De	iPKP	20 15 02.2
			ipPKP	20 15 44.8
		Tonga-Kermadec Islands.		
		h = 160 km (Up,Ud,De).		
"	22	Ud	iP	20 41 48.9
"	22	Up	iPKP	23 40 34.6
		Um	ePKP	23 40 28
			i	23 40 35.3
		Ud	iPKP	23 40 35.8
		De	iPKP	23 40 46.4
		Fiji Islands (h = 560 km).		
"	23	Up	iP	01 28 11.4
		Ki	iP	01 27 35.3
		(cont.)		

1969 July	23	(cont.)		
		Um	iP	01 27 50.8
			i	01 28 03.2
		Ud	iP	01 28 18.1 C
			i	01 28 25.2
		South of Japan (h = 30 km).		
"	23	Up	iP	02 53 52.9 C
			iPn	02 54 56.4
			iPP	02 55 08.3
				micr sec
			P Z'	0.1 0.5
			PP Z'	0.1 0.6
		Ki	iP	02 53 37.5 C
			iPP	02 54 49.7
				micr sec
			P Z'	0.2 0.7
		Sk	iP	02 54 08.7 C
			iPP	02 55 30.1
		Um	iP	02 53 37.8 C
			iPn	02 54 28.7
			i	02 55 13.5
		Ud	iP	02 54 09.1 C
			iPn	02 55 24.7
		De	iP	02 54 16.4
			i	02 54 30.1
			iPP	02 55 43.9
		Kazakh SSR.		
		m = 6.1 (Up,Ki).		
		Underground explosion.		
"	23	Up	iPKP	08 20 14.5
			i	08 20 21.3
		Ki	iPKP	08 20 00.5
			iSKP	08 22 44.8
		Sk	ePKP	08 20 09
		Um	iPKP	08 20 03.1
			i	08 20 11.7
			iSKP	08 22 55.5
		Ud	iPKP	08 20 16.6
			iSKP	08 23 08.4
		De	iPKP	08 20 26.8 C
			iSKP	08 23 17.1
		Tonga-Kermadec Islands		
		(h = 550 km).		
"	23	Ki	iPn	13 19 00.2
			iSn	13 19 47.3
			iSg	13 20 03.5
			D = 430 km = 3.9°.	
		Northwest Russia.		
		Origin time = 13 17 57.		
		Explosion?		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	23	Up	iP	13 25 58.4	C
			ipP	13 26 07.0	
			isP	13 26 11.1	
			iS	13 35 13	
				micr sec	
			P Z'	0.2 1.2	
			Mx E	0.6 22	
			Mx N	1.1 21	
			Mx Z	1.4 21	
			D = 8000 km = 72°.		
		Ki	iP	13 25 18.9	C
			ipP	13 25 27.0	
			isP	13 25 30.5	
			iPP	13 27 43.4	
			eS	13 34 05	
				micr sec	
			P Z'	0.1 1.1	
			Mx E	1.3 16	
			Mx N	1.0 22	
			Mx Z	1.5 18	
			D = 7350 km = 66°.		
		Sk	iP	13 25 52.3	C
			ipP	13 26 00.4	
			isP	13 26 04.3	
		Um	iP	13 25 36.3	C
			ipP	13 25 44.4	
			isP	13 25 48.5	
			iS	13 34 37	
			iPS	13 35 02	
		Ud	iP	13 26 05.5	C
			isP	13 26 18.1	
		De	iP	13 26 20.8	C
			ipP	13 26 29.3	
			isP	13 26 32.8	

Japan. h = 30 km (Up,Ki,Sk,Um, Ud,De).
m = 6.1, M = 5.2 (Up,Ki).
The phases, identified as pP and sP, appear quite consistently in the records. However, the amplitude of sP is larger than that of pP, and therefore sP might be mistaken for pP, which would give a focal depth of 45 km. The relative weakness of pP could be explained by the focal mechanism, especially the orientation of the fault plane and the direction of motion in relation to the free surface.

"	23	Up	iP	16 38 33.2	
		(cont.)			
		Ki	iP	16 38 00.9	
		Um	iP	16 38 14.6	D
		Ud	iP	16 38 40.8	D
		De	iP	16 38 53.5	

South of Japan (h = 490 km).

"	23	Up	iP	17 47 01.7	
			i	17 47 06.4	
		Sk	eP	17 47 41	
		Um	iP	17 47 15.7	
		Ud	iP	17 47 17.1	
			i	17 47 21.8	
		De	iP	17 47 00.3	
"	23	Ud	iP	22 39 47.2	

Ionian Islands.

"	23	Um	iP	23 47 03.7	
		Ud	eP	23 47 16	
		De	eP	23 47 44	
"	24	Up	iP	00 46 15.7	
		Sk	iP	00 46 58.2	
		Ud	eP	00 46 19	
		De	iP	00 45 52.5	

Greece.

"	24	Um	iP	01 07 15.8	

Aleutian Islands (h = 45 km).

"	24	Up	iP	01 36 59.7	
			i	01 37 33.2	
		Ki	iP	01 36 13.0	
		Um	iP	01 36 34.4	
		Ud	iP	01 37 06.1	

Kurile Islands (h = 30 km).

"	24	Up	iPKP	02 46 53.9	
			i	02 47 01.7	
		Um	iPKP	02 46 44.1	C
		Ud	iPKP	02 46 56.2	C

South of Kermadec Islands (h = 220 km).

"	24	Up	iP	03 13 15.2	
			ePP	03 17 21	
			iS	03 24 59	
				micr sec	
			Mx E	1.6 21	
			Mx N	1.5 19	
			Mx Z	3.4 21	
		Ki	eP	03 13 22	
			iPP	03 17 34.1	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	24	(cont.)				
		Ki	eSKS		03 24 03	
					micr	sec
			P	Z'	0.1	1.6
			SKS	E	0.4	10
			Mx	E	2.5	21
			Mx	N	1.5	19
			Mx	Z	3.2	20
		Sk	iP		03 13 06.9	
		Um	iP		03 13 23.3	
			iPP		03 17 36	
			iSKS		03 24 00	
			iS		03 25 12	
			iPS		03 26 40	
		Ud	iP		03 13 08.1	
			ePP		03 17 09	
		De	iP		03 13 06.8	
		Peru (h = 1 km).				
		M = 5.7 (Up,Ki).				
"	24	Ki	iP		05 16 42.3	
		Um	eP		05 16 52	
		Ud	eP		05 17 09	
			i		05 17 21.9	
			i		05 17 43.8	
		Molucca Passage (h = 40 km).				
"	24	Up	iP		11 51 07.3	
"	24	Up	iPP		13 00 17	
			eSKS		13 06 27	
			iPS		13 09 37	
					micr	sec
			SKS	N	0.6	12
			Mx	E	2.2	23
			Mx	N	3.7	20
			Mx	Z	2.6	20
		Ki	ePS		13 10 48	
			eSS		13 17 04	
					micr	sec
			Mx	E	2.1	18
			Mx	N	1.5	19
			Mx	Z	2.5	18
		Um	iPP		13 00 45	
			iSKS		13 06 50	
			iPS		13 10 11	
			iSS		13 16 10	
		Prince Edward Island (h = N).				
		M = 6.0 (Up,Ki).				
"	24	Up	i(P)		13 42 15.3	
"	24	Ki	eP		15 07 24	
		Japan (h = 70 km).				

1969 July	24	Ki	iP	15 24 32.7
		Halmahera (h = 50 km).		
"	24	Up	iP	16 29 49.4
			iPcP	16 30 20.9
		Ki	eP	16 28 58
		Um	iP	16 29 22.7
		Kurile Islands (h = N).		
"	24	Up	eP	23 26 38
			i	23 26 56.9
		Ki	iP	23 27 48.5 C
		Sk	iP	23 27 22.2
		De	iP	23 26 18.1
		Crete (h = 40 km).		
"	24	Ki	iP	23 40 45.8
		Crete.		
"	25	Up	iP	01 11 09.2
				micr sec
			P Z'	0.1 0.5
		Ki	iP	01 10 37.7 D
		Sk	iP	01 11 06.2
		Um	iP	01 10 51.0
		De	iP	01 11 28.3
		Bonin Islands (h = 460 km).		
"	25	Ki	eP	04 42 36
		Kodiak Island (h = 60 km).		
"	25	Ki	eP	04 50 52
		Um	eP	04 51 04
		Molucca Sea (h = 80 km).		
"	25	Up	iPP	06 24 32.0
			iSKS	06 29 40
			iSKKS	06 30 32
			e(PKKP)	06 35 17
			iPKKP	06 35 36.3
				micr sec
			SKS E	0.5 5
			Mx Z	1.4 22
		Ki	ePKP	06 24 01
			iPP	06 24 58
			ipPP	06 26 49
			iSKS	06 29 57
			iSP	06 33 30
			iPS	06 34 43
			ePKKP	06 35 20
				micr sec
			PP E	0.5 6
			PP Z	0.8 6
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 25 (cont.)

Ki			micr	sec
	PP	Z'	0.3	2.0
	SKS	E	1.2	6
	PKKP	Z'	0.2	1.5
Sk	iPP		06 24 27.0	
	iPKKP		06 35 41.6	
Um	iPP		06 24 47	
	ipPP		06 26 39	
	iSKS		06 29 52	
	iSKKS		06 30 49	
	iSP		06 33 14	
	iPKKP		06 35 25.1	
De	iPP		06 24 05.5	
	ipPP		06 25 52.4	
	iPKKP		06 35 51.1	

Argentina (h = 580 km).
m = 6.3 (Ki).

" 25 Ki iP 09 16 34.5
Kamchatka (h = N).

" 25

Ki	iPn		11 11 15.5	
	iSn		11 12 14.0	
	iLgl		11 12 33.5	
	D = 530 km = 4.8°.			
Sk	iLgl		11 15 01.2	
Um	iSn		11 12 54.9	
	iSg		11 13 29.3	

Northwest Russia,
67.5°N, 33.1°E.
Origin time = 11 10 02.
Explosion?

" 25

Up	iP		13 05 26.6	
	i		13 05 40.2	
	iPcP		13 05 58.5	
			micr	sec
	Mx	E	1.0	20
	Mx	N	1.7	21
	Mx	Z	1.7	21
Ki	iP		13 04 25.1 C	
	i		13 04 42.0	
	iPcP		13 05 12.0	
	iPa		13 07 55	
			micr	sec
	Mx	E	1.4	19
	Mx	N	1.2	19
	Mx	Z	2.8	19
Sk	eP		13 05 01	
	i		13 05 24.7	
	iPcP		13 05 31.9	
Um	iP		13 04 50 C	

(cont.)

1969 July 25 (cont.)

Um	i	13 05 15.5
	iS	13 13 18
De	iP	13 05 35.4
	iPcP	13 05 53.5
	i	13 07 04.0

Aleutian Islands (h = 40 km).
M = 5.4 (Up,Ki).
Remarkably weak P(Z')-phases.

" 25 Up iP 13 10 08.1
Um iP 13 09 54.8
Luzon (h = 30 km).

" 25

Up	iP		13 47 37.3	
	i		13 47 49.0	
			micr	sec
	Mx	E	1.0	25
	Mx	N	1.2	23
	Mx	Z	1.9	28
Ki	iP		13 47 22.9	
	i		13 47 41.2	
			micr	sec
	P	Z'	0.2	1.5
	Mx	E	0.9	20
	Mx	N	0.6	22
	Mx	Z	2.2	23
Sk	iP		13 47 44.3	
Um	iP		13 47 28.1	

Molucca Passage (h = N).
M = 5.4 (Up,Ki).

" 25 Ki eP 21 20 12

" 25

Ki	iP	21 41 33.8
Sk	iP	21 41 02.8
Um	iP	21 41 23.8
	i	21 41 31.9

North Atlantic Ocean
(h = 9 km).

" 25

Up	iP		23 01 10.8	
	i		23 01 13.5	
	eS		23 10 34	
			micr	sec
	P	E	0.2	2
	P	N	0.2	3
	P	Z	0.5	2
	P	Z'	0.2	1.0
	S	E	0.3	9
	Mx	E	4.4	18
	Mx	N	16	18

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 25 (cont.)

Up			micr	sec
	Mx	Z	7.1	15
	D = 8150 km = 73 1/2°.			
Ki	iP		23 00	54.7
	eS		23 10	02
			micr	sec
	P	Z'	0.3	1.3
	S	E	0.5	8
	S	N	0.4	7
	Mx	E	6.7	18
	Mx	N	18	18
	Mx	Z	7.7	16
	D = 7850 km = 70 1/2°.			
Sk	iP		23 01	20.4
Um	iP		23 00	57.8
	i		23 01	01.2
	iPa		23 05	22
	iS		23 10	15
De	iP		23 01	30.1

China (h = N).
m = 6.1, M = 6.1 (Up,Ki).
Double P (Up,Um).

" 25	Up	iP	23 09 31.6
	Ki	iP	23 08 37.5
	Sk	iP	23 09 15.1
	Um	iP	23 09 02.7
	De	iP	23 09 57.0

Kamchatka (h = N).

" 26	Up	iPKP	05 32 31.6
	Sk	iPKP	05 32 24.6
	Um	iPKP	05 32 19.2
	De	iPKP	05 32 42.9

" 26	Ki	ipP	07 33 47.8
	Sk	e(P)	07 33 27
		ipP	07 33 41.0
	Um	iP	07 33 32.9
		ipP	07 33 56.9
	Ud	ipP	07 33 51.6

Nicaragua. h = 90 km (Um).

" 26	Ki	iSn	09 08 30.3
		iSg	09 08 47.8
	Um	iSg	09 09 41.0

Northwest Russia-Finland
border region. Explosion?

" 26	Ki	iPn	11 04 17.5
		iP^x	11 04 25.8
		iSn	11 05 02.5

(cont.)

1969 July 26 (cont.)

Ki	iSg	11 05 19.0	
	D = 410 km = 3.7°.		
Sk	iLgl	11 07 44.5	
Um	iSn	11 05 45.3	
	iSg	11 06 15.1	
Ud	iLgl	11 08 44.4	

Northwest Russia-Finland
border region,
67.5°N, 30.1°E.
Origin time = 11 03 18.
Explosion?

" 26	Ki	iSn	12 08 00.5
		iSg	12 08 23.1
	Um	iSn	12 08 46.5
		iSg	12 09 25.9

Northwest Russia.
Explosion?

" 26	Up	iP	12 29 55.4
		i	12 30 03.6
		eS	12 34 19
	D = 2850 km = 25 1/2°.		
	Ki	iP	12 30 48.3
	Sk	iP	12 30 02.9
	Um	iP	12 30 29.4
	Ud	iP	12 29 44.3
		iPP	12 30 20.4
		i	12 32 12.4
	De	iP	12 29 31.3
		i	12 29 52.7

North Atlantic Ocean (h = N).

" 26	Sk	iPg	12 53 49.3
		iSg	12 53 57.8
		iRg	12 54 01.3
	D = 70 km = 0.65°.		

Origin time = 12 53 36.
A number of such events,
probably explosions, have
been recorded the last
month at Sk; as a rule,
they are left out from the
bulletin.

" 26	Um	iPKP	15 04 40.3
	Ud	iPKP	15 04 49.6

Santa Cruz Islands
(h = 35 km).

" 26	Up	iP	15 24 34.9 C
		i	15 24 56.5

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	26	(cont.)		
		Ki	iP	15 23 42.1
		Um	iP	15 24 07.4
		Ud	iP	15 24 36.5
		Aleutian Islands (h = 35 km).		
"	26	Ki	eP	15 42 01
			iPcP	15 42 54.9
		Um	iP	15 42 30.7
			i	15 42 53.9
		Ud	iP	15 42 55.6
		Aleutian Islands (h = 70 km).		
"	26	Up	iPKP	17 36 06.6
		Ki	iPKP	17 36 18.5 C
		Um	iPKP	17 36 12.7
		Ud	iPKP	17 36 09.3
		South Sandwich Islands (h = 40 km).		
"	26	Ud	iP	17 46 09.8
"	26	Up	iPKP	21 08 08.7
		Ki	iPKP	21 07 42.3
			i	21 07 48.2
		Sk	iPKP	21 08 04.3
		Um	iPKP	21 07 59.5
			i	21 08 11.0
		Ud	iPKP	21 08 10.6
		De	i(PKP)	21 08 23.4
"	26	Up	iP	21 40 45.0
"	27	Up	iPKP	02 33 39.6
			iPKS	02 37 11.0
		Ki	iPKP	02 33 25.1
			i	02 33 31.2
			ePKS	02 36 45
		Sk	i(PKP)	02 33 31.9
			iPKP	02 33 36.2
		Um	iPKP	02 33 31.5
			i	02 33 32.4
			iPKS	02 36 56.3
		Ud	i(PKP)	02 33 34.3
			iPKP	02 33 42.1
			iPKS	02 37 11.4
		De	i(PKP)	02 33 34.3
			iPKP	02 33 47.4
			iPKS	02 37 23.1
		New Hebrides Islands (h = 70 km).		
"	27	Up	iP	06 32 06.7

1969 July	27	Ud	eP	07 52 58
"	27	Um	iP	09 02 09.2
"	27	Up	iP	09 04 52.2
			iX	09 05 06.7
				micr sec
			P Z'	0.1 0.6
		Ki	iLgl	09 13 25.4
		Sk	iP	09 05 47.5
			iX	09 06 05.5
			iLgl	09 11 40.1
		Um	iP	09 05 34.1
			iX	09 05 50.6
			i	09 06 00.1
			i	09 10 33.5
		Ud	iP	09 05 06.6
		De	iP	09 04 29.4
		Rumania (h = 160 km).		
"	27	Up	iP	10 34 07.6
			ipP	10 34 19.0
		Ki	iP	10 33 21.6
		Um	iP	10 33 42.4
		Ud	iP	10 34 13.0
			ipP	10 34 25.0
		Kurile Islands. h = 45 km (Up,Ud).		
"	27	Ud	iP	11 13 42.0
		Japan (h = 45 km).		
"	27	Sk	iP	13 49 25.2
		Um	iP	13 49 39.6
"	27	Sk	eP	17 23 52
		Ud	iP	17 23 21.3
		De	iP	17 22 56.7
		East of Crete.		
"	27	Up	iP	19 37 23.9
			ipP	19 37 35.1
		Ki	iP	19 36 29.2
				micr sec
			P Z'	0.1 1.1
		Sk	iP	19 36 56.9
			ipP	19 37 08.0
		Um	iP	19 36 55.0
			i	19 37 15.1
		Ud	iP	19 37 20.8 D
			ipP	19 37 31.5
		De	iP	19 37 45.3
			ipP	19 37 56.5
		Kodiak Island. h = 40 km (Up,Sk,Ud,De).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	27	Up	iP		21 31 46.1	
			iS		21 39 58	
					micr	sec
			P	Z'	0.2	1.5
			S	N	1.2	10
			Mx	E	0.6	16
			Mx	N	1.2	20
			Mx	Z	1.4	18
			D = 6650 km = 60°.			
		Ki	iP		21 30 52.1	
			iS		21 38 21	
					micr	sec
			P	Z'	0.2	1.5
			S	N	1.1	10
			Mx	E	1.2	14
			Mx	N	1.3	17
			Mx	Z	3.2	20
			D = 5850 km = 52 1/2°.			
		Sk	iP		21 31 17.9	
		Um	iP		21 31 20.9	
			iPcP		21 32 19.8	
			iS		21 39 08	
		Ud	iP		21 31 42.1	
		De	iP		21 32 06.8	
		Gulf of Alaska (h = N).				
		m = 5.9, M = 5.2 (Up,Ki).				
"	27	Up	iP		22 38 29.8 D	
			ipP		22 38 57.1	
					micr	sec
			P	Z'	0.1	0.6
		Ki	iP		22 38 05.2 D	
			ipP		22 38 34.2	
					micr	sec
			P	Z'	0.1	1.2
		Sk	iP		22 38 33.3 D	
			ipP		22 39 01.8	
		Um	iP		22 38 13.9 D	
			ipP		22 38 43.0	
		Ud	iP		22 38 39.1	
			ipP		22 39 07.3	
			iPP		22 41 39.1	
		De	iP		22 38 48.2	
		Formosa. h = 110 km (Up,Ki, Sk,Um,Ud).				
		m = 5.7 (Up,Ki).				
		The dilatational P-motion is preceded by a small compression, as evidenced by UmZ'.				
"	28	Ki	iP		00 00 57.8	
		Sk	iP		00 00 37.8	
		(cont.)				

1969 July	28	(cont.)				
		Um	iP		00 00 59.3	
		Ud	iP		00 00 40.8	
		Virgin Islands (h = N).				
"	28	Up	iP		06 40 18.0	
			ipP		06 40 29.4	
			iS		06 48 44	
					micr	sec
			pP	Z'	0.1	0.6
			D = 7000 km = 63°.			
		Ki	iP		06 39 23.1	
			ipP		06 39 34.1	
					micr	sec
			P	Z'	0.1	1.0
		Sk	iP		06 39 50.4	
			ipP		06 40 02.2	
		Um	iP		06 39 51.6	
			ipP		06 40 02.4	
		Ud	iP		06 40 15.8	
			i		06 40 16.3	
			ipP		06 40 26.2	
		Kodiak Island. h = 40 km (Up,Ki,Sk,Um,Ud).				
"	28	Ki	iP		07 22 18.9	
		Sk	iP		07 22 46.9	
		Um	iP		07 22 49.0	
			ipP		07 23 01.9	
		Ud	iP		07 23 10.8	
			ipP		07 23 22.1	
		De	iP		07 23 34.8	
			ipP		07 23 47.7	
		Kodiak Island. h = 45 km (Um,Ud,De).				
"	28	Up	iP		10 29 49.1	
		Ki	iP		10 29 05.7	
		Um	iP		10 29 25.2	
		Ud	iP		10 29 56.3	
		Japan (h = 170 km).				
"	28	Ud	iP		13 03 16.0	
"	28	Up	iP		13 14 58.3 D	
					micr	sec
			P	Z'	0.1	1.3
			Mx	E	1.0	18
			Mx	N	1.0	16
			Mx	Z	1.1	18
		Ki	iP		13 14 25.0	
					micr	sec
			Mx	E	1.1	15
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	28	(cont.)				
		Ki			micr	sec
			Mx	N	1.4	16
			Mx	Z	1.6	16
		Sk	iP		13 14 56.4	
			i		13 15 28.6	
		Um	iP		13 14 38.9	D
		Ud	iP		13 15 06.5	
		De	iP		13 15 19.6	
		Japan (h = 25 km).				
		M = 5.3 (Up,Ki).				
"	28	Ud	iPKP		14 23 04.1	
		De	iPKP		14 23 15.4	
		Fiji Islands (h = 610 km).				
"	28	Um	iP		15 06 08.6	
"	28	Up	eP		15 50 30	
		Ki	iP		15 49 58.8	
		Sk	iP		15 50 26.5	
		Um	iP		15 50 11.9	
			i		15 50 28.4	
		Ud	iP		15 50 35.5	
		Volcano Islands (h = N).				
"	29	Up	iP		00 45 51.4	
			ipP		00 45 58.3	
		Ki	iP		00 45 48.0	
		Sk	eP		00 45 37	
			ipP		00 45 44.4	
		Um	iP		00 45 52.7	
			ipP		00 46 00.3	
		Ud	iP		00 45 41.8	
			ipP		00 45 49.2	
		Panama-Costa Rica.				
		h = 25 km (Up,Sk,Um,Ud).				
"	29	Ki	iP		00 51 50.5	
		Sk	iP		00 51 30.1	
			epP		00 51 39	
		Um	iP		00 51 50.7	
		Ud	iP		00 51 33.1	
			ipP		00 51 41.6	
		Virgin Islands.				
		h = 30 km (Sk,Ud).				
"	29	Um	eSS		02 29 17	
		New Guinea (h = 6 km).				
"	29	Sk	i(P)		02 29 19.3	
"	29	Um	iP		03 34 04.1	
		Ud	iP		03 34 31.9	

1969 July	29	Sk	i(P)		04 08 19.3	
"	29	Up	iP		04 47 31.5	
"	29	Up	iPKP		06 43 17.1	
			iPKS		06 46 28.3	
		Ki	iPKP		06 43 02.6	C
					micr	sec
			PKP	Z'	0.1	0.6
		Sk	iPKP		06 43 13.7	C
		Um	iPKP		06 43 08.7	C
			ipPKP		06 43 43.7	
		Ud	iPKP		06 43 18.2	
			iPKS		06 46 32.7	
		De	i(PKP)		06 43 13.3	
			i		06 43 25.6	
		New Hebrides Islands.				
		h = 130 km (Um).				
"	29	Up	iP		09 33 48.1	
"	29	Ud	iP		11 13 24.9	
"	29	Ki	iP		16 57 26.9	
		Sk	iP		16 57 53.6	
		Ud	iP		16 58 01.9	
"	29	Up	iP		19 06 13.4	
			i		19 06 40.9	
"	30	Sk	e(P)		01 27 00	
"	30	Up	iP		03 36 18.5	
			ipP		03 36 28.2	
		Ki	iP		03 35 50.0	D
			ipP		03 35 57.8	
					micr	sec
			P	Z'	0.1	1.0
		Sk	iP		03 36 16.8	
			ipP		03 36 25.0	
		Um	iP		03 36 02.5	
			ipP		03 36 11.2	
		Ud	iP		03 36 25.8	
			ipP		03 36 33.8	
		De	iP		03 36 36.6	
		Volcano Islands. h = 30 km				
		(Up,Ki,Sk,Um,Ud).				
"	30	Up	iP		04 30 57.6	
			ipP		04 31 09.4	
			eS		04 41 02	
					micr	sec
			pP	Z'	0.1	0.7
			D = 9000 km = 81°.			
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July 30 (cont.)

Ki	iP		04 30 24.1	C	
	ipP		04 30 36.6		
	eS		04 40 01		
			micr	sec	
	S	E	0.3	7	
	Mx	E	0.4	14	
	Mx	N	0.7	20	
	D = 8350 km = 75°.				
Sk	eP		04 30 53		
Um	iP		04 30 39.0		
	ipP		04 30 50.9		
	iS		04 40 27		
Ud	iP		04 31 04.5		
	ipP		04 31 16.3		
De	iP		04 31 17.3		
	ipP		04 31 30.0		

Bonin Islands. h = 45 km (Up,Ki,Um,Ud,De).

" 30	Ki	eP	10 14 18	
	Ud	iP	10 15 09	

Aleutian Islands (h = 35 km).

" 30	Up	iP	10 25 04.2
" 30	Up	iSn	11 28 21.4
		iSg	11 28 37.3
	Um	iSg	11 29 07.6
	Ud	iLgl	11 29 35.9

Esthonia, 59.7°N, 25.6°E.
Origin time = 11 26 25.
Explosion?

" 30	Ud	i(Sg)	11 50 50.7
" 30	Ud	i(Sg)	11 51 59.3
" 30	Up	iP	12 58 27.0
	Ud	iP	12 58 33.5

Japan (h = 30 km).

" 30	Ud	iP	15 27 13.2

Aleutian Islands (h = 60 km).

" 30	Up	iP	17 20 09.3
		i	17 20 25.2
	Ki	ipP	17 19 30.8
	Ud	iP	17 20 11.6
		i	17 20 27.9

Komandorsky Islands.
h = 60 km (Up,Ud).

" 30	Ki	iPn	23 13 28.8

(cont.)

1969 July 30 (cont.)

Ki	iP[x]	23 13 37.6
	iSn	23 14 15.4
	iSg	23 14 32.6
	D = 420 km = 3.8°.	
Sk	eSg	23 17 22
Um	iSg	23 16 03.8

Northwest Russia,
69.1°N, 30.3°E.
Origin time = 23 12 28.
Explosion?

" 31	Up	iPKP	00 11 43.8
	Ud	iPKP	00 11 44.7
	De	iPKP	00 11 56.1

Tonga-Kermadec Islands
(h = 140 km).

" 31	Up	iP	02 48 40.1
	Ki	iP	02 48 24.6
	Ud	iP	02 48 48.1

Halmahera (h = N).

" 31	Ud	iP	11 04 27.9

Gulf of California
(h = 30 km).

" 31	Up	iP		11 33 52.9	
				micr	sec
		Mx	E	1.0	20
		Mx	N	1.9	19
		Mx	Z	1.9	20
	Ki	iP		11 32 59.4	
		iX		11 33 22.0	
				micr	sec
		P	Z'	0.2	1.4
		Mx	E	2.6	20
		Mx	N	1.9	18
		Mx	Z	3.1	18
	Sk	eP		11 33 41	
	Um	iP		11 33 26.4	D
		iX		11 33 49.0	
		iP'P'		12 02 28.4	
	Ud	iP		11 33 51.1	
	De	iP		11 34 14.9	
		i		11 34 34.2	

Aleutian Islands (h = 35 km).
M = 5.5 (Up,Ki).

" 31	Ki	eP	12 15 14
	Sk	iP	12 15 45.8
	Ud	iP	12 16 11.3
	De	iP	12 16 38.0

Alaska (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 July	31	Up	iPKP	13	46	13.4
				micr		sec
			PKP Z'	0.1		0.6
		Um	iSKP	13	48	55.1
		Ud	iPKP	13	46	15.3 C
		De	iPKP	13	46	25.4 C
		Tonga-Kermadec Islands (h = 550 km).				
"	31	Um	iP	14	00	34.1
		Ud	iP	14	00	54.9
			i	14	01	03.3
"	31	Um	iPKP	20	38	35.9
		New Hebrides Islands (h = 50 km).				

Markus Båth
March 23, 1970

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

Seismological Institute
Uppsala

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å, U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

A U G U S T 1 - 31, 1969

1969 Aug.	1	Up	iP	01 17 46.7
"	1	Up	iP	01 19 27.0
		Ud	eP	01 19 51
"	1	Up	iP	02 19 06.8
"	1	Sk	iPKP	03 29 02.8
		Um	iPKP	03 28 57.6
		Santa Cruz Islands (h = 250 km).		
"	1	Um	iP	03 31 34.3
		Aleutian Islands (h = N).		
"	1	Up	iP	05 18 06.3
			i	05 18 17.6
		Um	iP	05 18 01.8
		Ud	iP	05 18 14.4
"	1	Ki	iP	06 31 13.4
			e	06 32 12
			eT	06 36 19
		Um	iP	06 31 58.7
		Ud	iP	06 32 48.5
		Northeast of Jan Mayen.		
"	1	Ud	iP	08 34 01.4
"	1	Um	iP	10 34 08.5
		Ud	iP	10 34 16.9
"	1	Up	iPKP	12 24 39.1
			i	12 24 45.8
				micr sec
			PKP Z'	0.1 0.7
		Ki	iPKP	12 24 30.4 C
			i	12 24 36.2
		(cont.)		

1969 Aug.	1	(cont.)		
		Ki	iPKS	12 27 54.1
		Sk	e(PKP)	12 24 32
		Um	iPKP	12 24 38.3
			i	12 24 44.0
		Ud	iPKP	12 24 40.5 C
			i	12 24 46.1
		De	iPKP	12 24 51.6 C
			ipPKP	12 25 41.6
		Tonga-Kermadec Islands.		
		h = 200 km (De).		
"	1	Sk	eP	13 17 43
		Um	iP	13 18 04.1
		Ud	iP	13 17 45.7
		Virgin Islands (h = 50 km).		
"	1	Up	iS^x	16 55 52.4
			iSg	16 56 05.1
		Ud	iSg	16 55 01.5
		South Norway, 58.6°N, 7.5°E.		
		Origin time = 16 53 10.		
		Solution obtained by combination with Kongsberg readings.		
"	1	Ki	iP	21 33 37.8
			i	21 34 04.4
"	1	Ud	iP	23 29 01.9
		Iran-Iraq (h = 70 km).		
"	1	Up	iP	23 54 41.1 C
			i	23 54 42.9
			eS	00 03 36
				micr sec
			P Z'	0.2 0.8
			Mx E	5.2 24
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 1 (cont.)

Up			micr	sec
	Mx	N	15	20
	Mx	Z	14	20
	D = 7500 km = 67 1/2°.			
Ki	iP		23 53 55.2	
	e(Pa)		23 57 59	
	i(S)		00 02 20	
			micr	sec
	P	Z	0.7	8
	P	Z'	0.2	1.2
	(S)	E	1.5	18
	Mx	E	11	23
	Mx	N	6.4	22
	Mx	Z	11	20
	D = 6700 km = 60 1/2°.			
Sk	iP		23 54 31.3	
Um	iP		23 54 17.2 C	
	iPa		23 58 23	
	iS		00 02 58	
Ud	iP		23 54 46.9	
De	iP		23 55 06.9	
Kurile Islands (h = 40 km).				
m = 6.1, M = 6.2 (Up,Ki).				

" 1

Up	iP		23 55 54.8	
	iS		00 04 54	
			micr	sec
	P	Z'	0.1	0.7
	S	N	1.7	7
Sk	iP		23 55 44.0	
Ud	iP		23 56 00.5	
De	iP		23 56 18.9	
Kurile Islands.				
Origin time = 23 44 58.				

" 2

Ud	i(P)		00 01 56.5	

" 2

Up	iP		00 45 17.7	
	i		00 45 20.4	
			micr	sec
	P	Z'	0.1	0.6
Ki	iP		00 44 31.8	
	iPcP		00 45 11.7	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		00 45 07.0	
Um	iP		00 44 53.0	
Ud	iP		00 45 23.1 C	
	iPcP		00 45 56.9	
De	iP		00 45 42.4	
	i		00 45 49.0	
Kurile Islands (h = 20 km).				
m = 6.1 (Up,Ki).				

1969
Aug. 2

Ki	iP	00 49 31.0
Ud	iP	00 49 56.8
Mindanao (h = 220 km).		

" 2

Up	iP	00 54 26.2

" 2

Ud	iP	01 02 59.9 C

" 2

Up	eP	01 24 33
Ki	iP	01 23 48.5
Ud	iP	01 24 39.6
Kurile Islands (h = N).		

" 2

Up	iP	02 51 04.4
Ki	iP	02 50 18.1
Sk	eP	02 50 54
Ud	iP	02 51 10.4 D
	i	02 51 24.0
Kurile Islands (h = N).		

" 2

Up	iP		04 56 57.8	
	ipP		04 57 12.4	
	i		04 57 16.9	
			micr	sec
	Mx	E	0.5	19
	Mx	N	0.7	18
	Mx	Z	1.0	20
Ki	iP		04 56 56.2	
			micr	sec
	Mx	E	0.8	19
	Mx	N	0.7	20
	Mx	Z	1.6	20
Sk	iP		04 57 11.4	
Um	iP		04 56 55.7	
	ipP		04 57 09.8	
Ud	iP		04 57 07.3	
	iPP		05 00 54.6	
De	iP		04 57 09.0	
Sumatra. h = 50 km (Up,Um).				
M = 5.3 (Up,Ki).				

" 2

Um	iSS	05 05 21
New Guinea (h = 15 km).		

" 2

Ki	iP	05 09 16.7
Sk	iP	05 08 44.6
Um	iP	05 08 49.0
Ud	iP	05 08 19.5 C

" 2

Ud	eP	05 11 59

" 2

Sk	eP	05 13 24
Ud	iP	05 12 51.9
De	iP	05 12 22.5
Crete.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	2	Up	iP	06 15 08.5
		Ki	iP	06 14 22.6
		Ud	iP	06 15 14.1
		Kurile Islands (h = N).		
"	2	Ud	iP	08 13 12.0
"	2	Up	iP	10 28 52.2
		Ki	iP	10 28 06.1
		Sk	iP	10 28 41.2
		Um	iP	10 28 27.4
		Ud	iP	10 28 57.4 C
		Kurile Islands (h = 40 km).		
"	2	Up	iLgl	12 08 17.5
		Ki	iPn	12 03 57.8
			iSn	12 04 52.9
			iSg	12 05 16.5
			D = 510 km = 4.6°.	
		Sk	i	12 07 23.4
			iLgl	12 07 44.0
		Um	i(Sn)	12 05 38.4
			iSg	12 06 26.2
		Ud	iLgl	12 08 51.3
		Northwest Russia, 68.4°N, 32.8°E.		
		Origin time = 12 02 46.		
		Explosion?		
"	2	Ki	iPn	12 41 15.0
			iSn	12 42 02.8
			iLgl	12 42 17.3
			D = 440 km = 4.0°.	
		Um	iSg	12 43 47.2
		Northwest Russia.		
		Origin time = 12 40 11.		
		Explosion?		
"	2	Ki	iPn	12 43 01.8
			iSn	12 43 46.7
			iLgl	12 44 01.4
			D = 410 km = 3.7°.	
		Northwest Russia.		
		Origin time = 12 42 02.		
		Explosion?		
"	2	Ki	eP	13 14 55
		Ud	iP	13 13 56.7
"	2	Up	iP	15 02 52.5
			i	15 03 10.7
			i	15 03 23.0

1969 Aug.	2	Up	iP	17 49 33.0
			i	17 49 40.6
			iPcP	17 50 15.1
		Ki	iP	17 48 37.6
			iPcP	17 49 45.2
		Sk	iP	17 49 15.7
			iPcP	17 50 05.3
		Um	eP	17 49 05
			iPcP	17 49 59.3
		Ud	iP	17 49 36.4
			iPcP	17 50 17.4
		Kamchatka (h = N).		
"	2	Ud	iP	19 11 47.6
"	2	Ki	iP	20 26 18.9
			ipP	20 26 30.3
		Um	iP	20 26 22.0
			ipP	20 26 34.0
		Ud	iP	20 26 52.2
		Ceram Sea. h = 45 km (Ki,Um).		
"	2	Up	i(P)	20 43 11.7
			i	20 43 33.8
"	3	Up	iX	00 40 38.5
			iPKP	00 41 06.0
			iPP	00 42 05.6
			iSKS	00 47 50
				micr sec
			SKS E	0.2 4
			SKS N	0.2 4
			Mx E	0.8 21
			Mx N	1.3 21
			Mx Z	1.4 21
		Ki	iP	00 36 49.1
			iX	00 39 51.6
			iPKP	00 40 55.8
			iSKS	00 47 26
				micr sec
			SKS E	0.4 9
			SKS N	0.4 6
			Mx E	1.4 22
			Mx N	1.0 22
			Mx Z	3.1 22
		Sk	iX	00 40 26.1
			iPKP	00 41 06.6
		Um	iX	00 40 13.4
			iPKP	00 41 00.3
			iPP	00 41 38
			iSKS	00 47 37
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 3 (cont.)

Um	i	00 51 05
	iSS	00 57 31
Ud	iX	00 40 44.5
	iPKP	00 41 09.8
	i	00 42 01.3
	iPP	00 42 15.2
De	iPKP	00 41 14.0
	i	00 41 32.1

New Ireland (h = 70 km).
M = 5.6 (Up,Ki).
The unidentified phase X has the following arrival time differences, relative to PKP and to PP:

Station	D	PKP - X	PP - X
Ki	108 1/2°	1 04	
Um	112	0 47	1 25
Sk	114	0 41	
Up	114 1/2°	0 27	1 27
Ud	116	0 25	1 30

Thus, X runs almost parallel to PP.

" 3

Up	iP		04 31 24.2	C
			micr	sec
	P	Z'	0.1	0.7
Ki	iP		04 30 58.9	C
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		04 31 26.7	C
Um	iP		04 31 07.8	C
Ud	iP		04 31 33.3	C
De	iP		04 31 42.2	C

Ryukyu Islands (h = 60 km).
m = 6.0 (Up,Ki).

" 3

Up	iP		07 59 14.5	
	ipP		07 59 27.3	
	iS		08 08 17	
			micr	sec
	P	Z'	0.2	0.8
	Mx	E	0.6	17
	Mx	N	1.0	16
	Mx	Z	1.1	17

D = 7650 km = 69°.

Ki	iP		07 58 26.6	C
	ipP		07 58 40.2	
			micr	sec
	P	Z'	0.3	0.8
	Mx	E	1.8	18
	Mx	N	1.1	18
	Mx	Z	1.9	20

(cont.)

1969
Aug. 3 (cont.)

Sk	iP	07 59 02.8	
	ipP	07 59 15.0	
Um	iP	07 58 48.5	C
	ipP	07 59 01.6	
	iS	08 07 25	
	iScS	08 08 41	
	iSS	08 11 51	
Ud	iP	07 59 20.2	
	ipP	07 59 32.4	
De	iP	07 59 38.3	
	ipP	07 59 50.8	

Kurile Islands. h = 45 km (Up,Ki,Sk,Um,Ud,De).
m = 6.4, M = 5.2 (Up,Ki).

" 3

Sk	iP	09 36 01.6
Ud	iP	09 35 26.9

Greece.

" 3

Ki	iP	11 06 08.1

Alaska (h = 140 km).

" 3

Up	iP	23 57 53.4
Ki	iP	23 58 52.0
	i	23 58 57.6
Sk	iP	23 58 31.8
Um	iP	23 58 20.0
	i	23 58 25.9
Ud	iP	23 58 03.3

Red Sea (h = N).

" 4

Ki	iP	00 32 23.3

" 4

Up	iPKP	01 37 09.9
Um	ePKP	01 37 03
Ud	iPKP	01 37 12.4 C
De	iPKP	01 37 22.4

Tonga-Kermadec Islands (h = 590 km).

" 4

Ki	iP	02 11 48.8	C
Um	iP	02 11 45.3	
Ud	iP	02 11 58.3	

Sumatra (h = 70 km).

" 4

Up	iP	03 05 47.8
Ki	iP	03 05 39.3
Ud	iP	03 05 56.8

Bali Sea (h = 600 km).

" 4

Ud	iPKP	03 15 12.0

Tonga-Kermadec Islands (h = 260 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	4	Ud	eP		04 16 34
"	4	Up	iP		04 56 56.2
"	4	Ki	eP		10 25 41
			i		10 26 06.9
		Local.			
"	4	Up	iP		10 34 25.9 C
			iS		10 43 15
					micr sec
			P	Z'	0.4 1.0
			Mx	E	1.0 21
			Mx	N	2.0 20
			Mx	Z	1.5 19
			D = 7550 km = 68°.		
		Ki	iP		10 33 32.8 C
			ipP		10 33 50.6
			iPa		10 37 28
			eS		10 41 35
					micr sec
			P	Z	0.4 5
			P	Z'	0.1 1.1
			S	E	0.3 8
			S	N	0.3 7
			Mx	E	1.5 18
			Mx	N	0.8 19
			Mx	Z	2.5 18
			D = 6650 km = 60°.		
		Sk	eP		10 34 03
			i		10 34 06.4
		Um	iP		10 33 58.9
			ipP		10 34 18.9
			iS		10 42 30
			iP'P'		11 02 51.4
		Ud	iP		10 34 26.5 C
			i		10 34 36.8
			ipP		10 34 45.6
			i		10 36 19.1
		De	iP		10 34 48.8 C
		Aleutian Islands. h = 70 km (Ki,Um,Ud).			
		m = 5.9, M = 5.4 (Up,Ki).			
"	4	Ki	eP		13 55 10
			i		13 55 16.5
		North Atlantic Ocean (h = N).			
"	4	Sk	ipPKP		15 16 10.6
		Ud	iPKP		15 15 23.0
			ipPKP		15 16 19.0
		Kermadec Islands.			
		h = 220 km (Ud).			

1969 Aug.	4	Up	iP		17 32 24.4 C
			iX		17 35 37.9
			iPKP		17 36 28.1
			iPP		17 36 39.1
			i(PP)		17 36 52
			iSKS		17 42 07
			iS		17 43 21
			iSP		17 44 49
					micr sec
			PP	Z'	0.1 0.8
			SKS	E	0.5 3
			S	N	0.7 5
			Mx	E	0.6 22
			Mx	N	1.9 19
			Mx	Z	1.1 18
		Ki	iP		17 32 11.8 C
			i		17 32 20.6
			ipP		17 34 07.6
			iX		17 35 24.0
			iSKS		17 41 57
			iS		17 42 55
			eSP		17 44 35
			iPKKP		17 48 22.0
			iSS		17 50 09
					micr sec
			P	Z'	0.5 1.1
			SKS	E	1.6 6
			SKS	N	0.5 5
			S	E	1.4 5
			S	N	1.8 10
			Mx	E	0.9 18
			Mx	N	1.1 18
			Mx	Z	1.5 18
		Sk	iP		17 32 31.4 C
			i		17 32 58.7
			iPKP		17 36 42.9
			iPP		17 36 56.5
		Um	iP		17 32 15.6 C
			i		17 32 24.2
			ipP		17 34 09
			iX		17 35 29.5
			iPP		17 36 26.3
			iSKS		17 42 03
			iS		17 43 03
			iSP		17 44 29
			isS		17 46 30
			iPKKP		17 48 19.8
		Ud	iP		17 32 33.1 C
			i		17 32 58.1
			iX		17 35 57.6
			iPKP		17 36 39.9
			iPP		17 37 06.7
		De	iP		17 32 38.2 C
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 4 (cont.)

De	iPKP		17 36 45.8	
	iPP		17 37 07.1	
	iSP		17 45 33.1	

Banda Sea. h = 520 km (Ki,Um).
m = 6.1, M = 5.6 (Up,Ki).
M not corrected for focal depth.
The phase X probably belongs to the group of early PP-arrivals.

" 4	Up	i(PP)	22 09 18	
			micr	sec
		Mx E	0.3	17
		Mx N	0.4	18
		Mx Z	0.6	18
	Um	e(PP)	22 09 27	
		eS	22 17 20	
		iPS	22 19 15	

Chile (h = N).

" 4	Ud	iP	22 23 48.0	
" 4	Ud	iP	23 17 45.6	
		i	23 18 08.5	
" 5	Up	iP1	02 26 42.9	C
		iP2	02 26 50.6	
		iP3	02 26 57.1	
		iSKS	02 37 23	
		iS	02 38 13	
		iPS	02 39 38	
			micr	sec
		P3 Z	0.8	4
		P3 Z'	0.3	0.8
		SKS E	2.3	8
		S E	4.1	8
		S N	2.8	7
		Mx E	34	24
		Mx N	63	23
		Mx Z	48	21
		D = 10950 km = 98 1/2°.		
	Ki	iP1	02 26 27.6	C
		iP2	02 26 35.4	
		iP3	02 26 42.2	
		iPP	02 30 34	
		i	02 30 56	
		iSKS	02 37 07	
		iS	02 37 45	
		ePKKP	02 43 29	
			micr	sec
		P3 E	2.3	14
		P3 Z	6.3	13
		P3 Z'	1.1	1.2
		PP E	1.9	12

(cont.)

1969
Aug. 5 (cont.)

Ki			micr	sec
	SKS	E	8.8	9
	SKS	N	1.8	9
	S	N	4.3	8
	S	Z	4.0	7
	Mx	E	47	16
	Mx	N	32	16
	Mx	Z	77	16
	D = 10550 km = 95°.			
Sk	iP1		02 26 48.3	C
	iP2		02 26 55.8	
	iP3		02 27 02.5	
	iPKKP		02 43 20.3	
Um	iP1		02 26 32.8	C
	iP2		02 26 39.4	
	iP3		02 26 47.4	
	i		02 29 57	
	iPP		02 30 37	
	iSKS		02 37 13	
	iS		02 37 55	
	iPS		02 39 15	
	iPKKP		02 43 26.4	
Ud	iP1		02 26 51.0	C
	iP2		02 26 59.0	
	iP3		02 27 05.7	
	iPKKP		02 43 12.3	
	i		02 43 20.9	
De	iP1		02 26 56.5	C
	iP2		02 27 03.7	
	iP3		02 27 11.0	
	iPP		02 31 18.4	

Molucca Passage (h = 35 km).
m = 7.0, M = 7.0 (Up,Ki).
A triple P-phase with successively increasing amplitudes; in average P2 - P1 = 7.5 sec and P3 - P1 = 14.5 sec.

" 5	Up	iP	03 34 23.4	
	Ki	iP	03 34 08.9	C
	Sk	eP	03 34 29	
	Um	iP	03 34 14.0	
	Ud	iP	03 34 32.5	
		i	03 34 39.2	

Molucca Passage (h = 45 km).

" 5	Ki	iP	07 04 50.2	
			micr	sec
		Mx E	0.7	17
		Mx N	0.3	15
		Mx Z	0.8	16
	Um	iP	07 04 57.0	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 5 (cont.)

Ud	eP	07 05 17	
Molucca Passage (h = 35 km).			
" 5 Ki	iP	09 33 37.3	
Um	eP	09 33 42	
Ud	i(P)	09 34 02.6	
Molucca Passage (h = N).			
" 5 Ki	iPn	11 21 59.3	
	iSn	11 22 59.3	
	iLgl	11 23 17.5	
	D = 560 km = 5.0°.		
Sk	eS^x	11 25 23	
	iLgl	11 25 46.7	
	iSg	11 26 00.7	
Um	iS^x	11 24 06.8	
	iLgl	11 24 11.8	
	iRg	11 24 42.6	
Northwest Russia.			
Origin time = 11 20 41.			
Explosion?			
" 5 Up	iSKS	13 27 35	
	iS	13 28 27	
		micr	sec
	Mx	E 1.0	21
	Mx	N 1.2	20
	Mx	Z 1.9	23
Ki	iP	13 16 44.5	
	eSKS	13 27 10	
		micr	sec
	Mx	E 1.0	21
	Mx	N 1.3	20
	Mx	Z 1.9	20
Sk	eP	13 17 05	
Um	iP	13 16 48.9	
	iSKS	13 27 21	
	iS	13 28 03	
Ud	iP	13 17 07.9	
	i	13 19 48.0	
De	iP	13 17 19.4	
Molucca Passage (h = 20 km).			
M = 5.4 (Up,Ki).			
" 5 Ud	iP	16 35 26.8	
" 5 Up	iPKP	16 51 08.1	
	iX	16 51 52	
	iPP	16 52 05	
	iPKKP	17 01 34.6	
		micr	sec
	PP	N 0.4	6
(cont.)			

1969
Aug. 5 (cont.)

Up		micr	sec
	PP	Z 0.7	7
	Mx	E 1.6	21
	Mx	N 4.1	22
	Mx	Z 3.6	22
Ki	eP	16 46 51	
	iPP	16 51 25	
	iPS	17 00 46	
		micr	sec
	PP	E 0.3	8
	PP	Z 0.5	7
	Mx	E 3.0	23
	Mx	N 4.3	24
	Mx	Z 6.3	22
Sk	eP	16 47 19	
	iPKP	16 51 03.5	
	iX	16 51 46.2	
	ePKKP	17 01 54	
Um	iP	16 46 57	
	iPKP	16 50 52.5	
	iPP	16 51 34	
	iSKS	16 57 31	
	ePKKP	17 01 58	
	iSS	17 07 24	
Ud	iPKP	16 51 10.2	
	iX	16 51 47.8	
	i	16 52 45.7	
	iPKKP	17 01 46.0	
De	i(PKP)	16 51 08.4	
	iPKP	16 51 15.3	
	iX	16 52 10.6	
New Ireland (h = 70 km).			
m = 6.4, M = 6.1 (Up,Ki).			
The phase X belongs to the group of early PP-arrivals.			
" 5 Up	iP	17 04 19.3	
" 5 Ki	iPKP	18 03 00.6	
Sk	iPKP	18 03 10.7	
Um	iPKP	18 03 06.3	
Ud	ePKP	18 03 11	
De	iPKP	18 03 14.1	
New Hebrides Islands (h = 70 km).			
" 5 Up	iP	18 30 11.0	
		micr	sec
	P	Z' 0.1	0.8
Ki	iP	18 29 36.9	C
	i	18 29 41.6	
Sk	iP	18 30 06.2	
Um	iP	18 29 51.4	C
(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 5 (cont.)
Ud iP 18 30 17.7 C
De iP 18 30 31.0
South of Japan (h = 120 km).

" 5 Ki iP 18 45 05.4
Sk eP 18 45 39
Um iP 18 45 22.9
i 18 45 29.9
ipP 18 45 50.9
Ud iP 18 45 52.6
ipP 18 46 20.7
Japan. h = 110 km (Um,Ud).

" 5 Ki iP 21 41 52.0
Molucca Passage (h = 20 km).

" 5 Ud iP 23 46 33.4

" 6 Ud iP 00 20 11.9

" 6 Up iPKP 00 22 26.8
Ki ePKP 00 22 13
Sk ePKP 00 22 27
Um iPKP 00 22 20.9
Ud iPKP 00 22 33.3

" 6 Ki eP 00 47 51
Sk eP 00 48 17
i 00 48 24.5
Um eP 00 48 13
Ud eP 00 48 36
De eP 00 49 05
Alaska (h = 50 km).

" 6 Sk eP 01 52 13
i 01 52 17.4

" 6 Sk iP 05 07 18.4
i 05 07 22.1

" 6 Ud iP 07 03 40.1 D

" 6 Up iP 08 52 17.6
Sk iP 08 52 12.9
Um iP 08 51 56.5
Ud iP 08 52 24.2
i 08 52 27.3
i 08 52 42.1
De eP 08 52 42
South of Japan (h = 70 km).

" 6 Ud iP 09 02 46.9
South of Japan (h = 70 km).

1969
Aug. 6 Up iPKP 12 48 26.7
New Guinea (h = 110 km).

" 6 Sk iPKP 15 18 05.7
South Sandwich Islands
(h = 70 km).

" 6 Up iP 15 52 36.3
i 15 52 39.2
iS 16 01 23
micr sec
Mx E 0.4 19
Mx N 1.4 22
Mx Z 0.9 19
D = 7350 km = 66°.
Ki iP 15 53 01.3
i 15 53 04.5
iS 16 02 18
micr sec
S N 0.3 8
Mx E 0.7 17
Mx N 0.6 18
Mx Z 1.1 19
D = 7800 km = 70°.
Sk iP 15 52 30.3
Um eP 15 52 52
eS 16 01 45
Ud iP 15 52 24.5 C
i 15 52 28.0
De iP 15 52 16.1
North Atlantic Ocean (h = N).
M = 5.2 (Up,Ki).

" 6 Um iP 18 11 49.5

" 6 Up iP 20 31 51.7

" 7 Up iP 02 02 27.8
iLgl 02 09 04
Ki iP 02 03 37.5
Sk i(P) 02 03 29.7
Um iP 02 02 49.0
iS 02 07 13
Ud eP 02 02 46
iS 02 07 16.2
De iP 02 02 19.0
Turkey (h = N).

" 7 Um iPP 02 08 45
eSKS 02 14 22
isS 02 17 41
iSS 02 24 17
Solomon Islands (h = 120 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	7	Up	iP		06 56 35.6
					micr sec
			P	Z'	0.3 1.0
		Ki	iP		06 55 42.8
					micr sec
			P	Z'	0.1 1.0
		Sk	iP		06 56 19.2
		Um	iP		06 56 07.0
		Ud	iP		06 56 39.4 C
		De	iP		06 57 00.5 C
			i		06 57 40.8
		Kamchatka (h = 70 km).			
		m = 6.2 (Up,Ki).			
"	7	Ud	iPKP		09 51 20.1
		De	iPKP		09 51 31.1 D
		Fiji Islands (h = 630 km).			
"	7	Ud	iP		11 35 25.4
		Hindu Kush.			
"	7	Up	iP		15 19 38.3
"	7	De	iP		15 22 58.9 C
"	7	Ki	iP		15 41 55.5
		Ud	iP		15 42 49.3
			i		15 42 59.6
		Kurile Islands (h = 150 km).			
"	7	Ki	iP^x		20 57 46.8
			iPg		20 57 56.8
			iSn		20 58 29.9
			iSg		20 58 53.7
		Um	iSg		21 00 35.9
		Ud	i(Lgl)		21 03 07.5
		Northwest Russia-Norway border region.			
		Origin time = 20 56 29.			
		Explosion?			
"	8	Ki	iP		05 14 49.8
		Ud	iP		05 15 14.9
		Mindanao (h = 50 km).			
"	8	Up	iP		06 38 21.8 C
			ipP		06 39 03.3
			isP		06 39 24
			iPP		06 39 55
			iS		06 44 18
			iSS		06 47 37
					micr sec
			P	Z'	0.4 0.6
			pP	Z'	1.0 1.1
		(cont.)			

1969 Aug.	8	(cont.)			
		Up			micr sec
			S	E	1.4 3
			S	N	1.3 3
			S	Z	1.3 4
			Mx	E	1.7 15
			Mx	N	2.0 17
			Mx	Z	2.6 14
			D = 4550 km = 41°.		
		Ki	iP		06 38 30.7 C
			i		06 38 57.7
			ipP		06 39 12.5
			ipPP		06 41 02
			iS		06 44 34
			isS		06 45 50
					micr sec
			P	E	0.8 4
			P	N	0.4 4
			P	Z	0.8 4
			P	Z'	0.8 0.7
			pP	Z'	0.9 1.3
			S	E	4.1 6
			S	N	1.6 5
			S	Z	2.2 7
			Mx	E	6.7 9
			Mx	N	3.1 13
			Mx	Z	3.1 12
			D = 4700 km = 42 1/2°.		
		Um	iP		06 38 19.9 C
			ipP		06 39 00.6
			isP		06 39 23.4
			iPP		06 40 00
			ipPP		06 40 47
			iS		06 44 09
			isS		06 45 25
			iSS		06 47 14
		Ud	iP		06 38 38.0 C
			ipP		06 39 20.5
			isP		06 39 41.5
			iPP		06 40 22.8
		De	iS		06 44 44.5
		Hindu Kush. h = 200 km (Up, Ki,Um,Ud).			
		m = 6.1, M = 5.6 (Up,Ki).			
		M not corrected for focal depth.			
"	8	Ud	iPg		10 26 09.8
			iSg		10 26 27.4
"	8	Ki	iPn		10 46 52.4
			iSn		10 47 52.3
			iLgl		10 48 11.3
			D = 560 km = 5.0°.		
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug. 8 (cont.)

Um	iSg		10 49 04.5
Ud	i(Lgl)		10 51 40.1

Northwest Russia.
Origin time = 10 45 34.
Explosion?

" 8	Ki	eP		11 11 46
		i		11 11 54.7
	Um	iP		11 12 29.4
	Ud	iP		11 12 57.2
" 8	Up	eSKS		11 34 04
				micr sec
		Mx	E	0.9 19
		Mx	N	1.7 21
		Mx	Z	1.7 18
	Ki	iPKP		11 26 59.9
		iPP		11 28 09.8
		ePS		11 38 06
		eSKKS		11 35 10
				micr sec
		PP	N	0.2 6
		PP	Z	0.5 5
		Mx	E	2.0 23
		Mx	N	1.1 18
		Mx	Z	2.0 18
	Um	ePP		11 27 50
		iPS		11 37 31
		iSS		11 43 41
	Ud	iPP		11 27 10.7
		iPKKP		11 37 58.9

South Atlantic Ocean (h = N).
m = 6.4, M = 5.9 (Up,Ki).

" 8	Up	iSg		12 20 15.0
	Um	iSg		12 20 45.5
	Ud	iLgl		12 21 10.7

Esthonia. Explosion?

" 8	Um	iP		13 07 52.9
	Ud	iP		13 08 21.9

Japan (h = 310 km).

" 8	Um	i(P)		14 24 11.4
		i		14 24 27.3
	Ud	iP		14 24 25.9
		i		14 24 39.1
" 8	Um	iPS		16 40 11

Chile (h = 35 km).

" 8	Um	iP		20 09 28.4
	Ud	iP		20 08 33.3

Atlantic Ocean, off Portugal.

1969 Aug. 8

Up	iP		20 58 11.1	C
	iX		21 01 41.4	
	iPP		21 02 37.3	
	iSKS		21 08 29	
	iS		21 09 45	
	i		21 11 30	
			micr sec	
	P	Z'	0.1 0.7	
	PP	Z'	0.1 1.3	
	SKS	E	0.8 5	
	SKS	N	0.6 4	
	Mx	E	2.2 19	
	Mx	N	4.1 20	
	Mx	Z	4.5 20	

D = 11800 km = 106°.

Ki	iP		20 57 56.4	C
	i		20 58 00.6	
	ipP		20 58 44	
	iX		21 01 07.1	
	iPP		21 02 08.4	
	iSKS		21 08 15	
	iS		21 09 18	
	iPKKP		21 13 51.1	
			micr sec	
	P	Z'	0.2 1.0	
	pP	E	0.3 6	
	pP	Z	0.5 7	
	PP	E	0.8 7	
	PP	Z	1.7 8	
	PP	Z'	0.7 2.2	
	SKS	E	5.1 8	
	SKS	N	1.5 7	
	S	N	1.0 4	
	Mx	E	4.5 21	
	Mx	N	2.4 19	
	Mx	Z	7.1 18	

D = 11450 km = 103°.

Um	iP		20 58 01.3	C
	i		20 58 05.7	
	ipP		20 58 47.1	
	iX		21 00 47.2	
	iPP		21 02 18.3	
	i		21 02 23	
	iSKS		21 08 16	
	isS		21 10 59	
	iPKKP		21 13 50.6	
Ud	iP		20 58 19.6	C
	i		20 58 24.2	
	i(pP)		20 59 13.8	
	iX		21 01 24.3	
	iPP		21 02 38.1	
	iPKKP		21 13 38.1	
De	iP		20 58 24.6	
	iPKP		21 02 17.0	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug. 8 (cont.)

De iPP 21 02 53.0
Banda Sea. h = 190 km (Ki,Um).
m = 6.4, M = 6.1 (Up,Ki).
The phases denoted X belong to the group of early PP-arrivals.

" 8 Up iP 21 43 17.6

" 9 Ud iP 00 21 23.6
i 00 21 35.8

" 9 Ki eP 04 36 28
i 04 40 45.2
Um iP 04 37 16.5
i 04 37 22.1
Ud iP 04 38 04.6
i 04 38 11.4
Arctic Ocean.

" 9 Um iPg 04 50 47.8 C
iSg 04 50 51.8
Explosion?

" 9 Up iPKP 05 35 50.0
Ki iSKP 05 38 14.9
Um eSKP 05 38 27
Ud iPKP 05 35 52.6
Fiji Islands (h = 570 km).

" 9 Up eP 09 24 57
Ki iP 09 26 26.9
Um iP 09 25 48.5
Ud iP 09 24 53.5
Italy (h = N).

" 9 Ud iPKP 10 23 10.2
De iPKP 10 23 22.5
Tonga-Kermadec Islands (h = 390 km).

" 9 Ki iPn 12 04 40.9
iSn 12 05 35.9
iLgl 12 05 53.7
D = 510 km = 4.6°.
Um iSn 12 06 21.4
i 12 06 37.9
iSg 12 07 05.1
(cont.)

1969 Aug. 9 (cont.)

Ud iLgl 12 09 29.9
Northwest Russia, 68.1°N, 32.7°E.
Origin time = 12 03 29.
Explosion?

" 9 Up iP 12 20 57.7
Um iP 12 21 47.7

" 9 Ki iPn 12 52 49.4
iSn 12 53 38.5
iLgl 12 53 53.0
D = 470 km = 4.2°.
Um iSg 12 55 20.1
Northwest Russia.
Origin time = 12 51 42.
Explosion?

" 9 Up iP 13 35 15.6
Ki iP 13 36 13.9
Um iP 13 35 42.4
Ud iP 13 35 25.4
Red Sea (h = N).

" 9 Up iP 13 50 37.6
Ki iP 13 51 05.8
ipP 13 51 14.8
micr sec
P Z' 0.1 1.4
Um eP 13 50 48
ipP 13 50 56.0
Ud iP 13 50 48.7
ipP 13 50 57.8
Indian Ocean. h = 30 km (Ki,Um,Ud).

" 9 Up iP 16 29 39.1
iS 16 32 55
iL(3.21) 16 35 43
micr sec
P Z' 0.1 1.7
Mx E 0.6 13
Mx N 1.5 15
Mx Z 2.0 16
D = 1950 km = 17 1/2°.
Ki iP 16 31 05.9
micr sec
Mx E 1.0 13
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 9 (cont.)

Ki			micr	sec
	Mx	N	0.9	12
	Mx	Z	1.7	13
Um	iP		16 30 23.0	
	iS		16 34 15	
Ud	iP		16 29 46.5	
	i		16 29 57.8	
	i		16 30 06.3	
De	iP		16 29 08.4	

Yugoslavia (h = 25 km).
M = 4.7 (Up,Ki).

" 9

Up	iP	17 05 10.3
Ki	eP	17 06 37
	i	17 06 54.4
Um	iP	17 05 50.0
	i	17 06 02.4
Ud	iP	17 05 13.5
	i	17 05 19.3

Yugoslavia (h = 20 km).

" 9 Ki iPKP 18 47 10.0
South Sandwich Islands
(h = 15 km).

" 9

Ki	iPn	20 02 25.6
	iSn	20 03 19.9
	iLgl	20 03 35.5
	D = 500 km = 4.5°.	
Sk	eLgl	20 06 21
	i	20 06 25.9
Um	iSg	20 05 10.6
Ud	i(Lgl)	20 07 45.4

Northwest Russia.
Origin time = 20 01 15.
Explosion?

" 10

Up	iP	05 12 37.2
	i	05 12 48.1
	iX	05 13 00.3
Ki	eP	05 12 33
	iX	05 12 56.4
Um	iX	05 12 54.8
Ud	iP	05 12 50.4
	iX	05 13 13.3

Burma (h = N).
The phase X is larger than P and arrives 23 sec after P. Either it is pP, suggesting a focal depth of 90 km, or it is the P of another shock in the same place.

1969
Aug. 10

Up	iP	15 51 49.3
Ki	iP	15 52 21.4
Sk	iP	15 52 17.7
Um	iP	15 52 03.9
Ud	iP	15 52 01.7

Indian Ocean (h = N).

" 10 Ud iP 18 38 01.3

" 10

Up	iP	18 50 43.4
Ki	iP	18 49 50.1
Sk	iP	18 50 24.2
Um	eP	18 50 16
Ud	iP	18 50 45.0
De	iP	18 51 06.7

Aleutian Islands (h = N).

" 10

Up	iP	21 20 31.8
Ki	iP	21 19 46.5
Um	iP	21 20 07.3
Ud	iP	21 20 37.6

Kurile Islands (h = 20 km).

" 10 Up iP 21 20 16.1
Italy (h = 30 km).

" 10 Ki iP 21 46 25.9
Mariana Islands (h = 120 km).

" 11

Up	eP	01 26 37
Ki	iP	01 25 46.7
Ud	iP	01 26 40.5

Aleutian Islands (h = N).

" 11

Ki	eP	03 41 52
Um	iP	03 42 08.7

Japan (h = 70 km).

" 11 Um iP 07 31 18.8

" 11

Up	iP		13 44 04.9	
Ki	eP		13 44 42	
Sk	eP		13 44 10	
Um	iP		13 44 27.0	
	eS		13 53 46	
Ud	eP		13 43 57	

Atlantic Ocean (h = N).

" 11

Up	iP		13 59 08.7	
	i		13 59 12.3	
	iPP		13 59 25.4	
			micr	sec
	P	Z'	0.1	0.8

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 11 (cont.)

Up			micr	sec
	Mx	E	0.6	15
	Mx	N	0.7	12
	Mx	Z	0.9	12
Ki	iP		14 00 36.0	
			micr	sec
	P	Z'	0.1	1.2
	Mx	E	0.6	15
	Mx	N	0.4	12
	Mx	Z	0.6	11
Sk	iP		13 59 49.6	
	i		13 59 53.0	
Um	iP		13 59 57.8	
Ud	iP		13 59 08.4	
De	iP		13 58 23.4	
	iPP		13 58 34.7	
	i		13 58 48.4	

Italy (h = N).
m = 5.2, M = 4.3 (Up,Ki).

" 11

Up	iPg	15 50 40.6
	iSg	15 51 11.7
	D = 270 km = 2.4°.	
Sk	eLgl	15 52 33
	iSg	15 52 42.6
Um	iSg	15 53 10.8
Ud	iPg	15 50 27.4
	iSg	15 50 50.0
	iRg	15 51 00.7
	D = 190 km = 1.7°.	
De	iPg	15 50 32.7
	iSg	15 50 58.6
	iRg	15 51 09.7
	D = 220 km = 2.0°.	

Västergötland, Sweden,
58.4°N, 14.2°E.
Origin time = 15 49 53.
The clear Rg recorded at Ud and De may suggest that this is an explosion.

" 11 Up iP 18 34 28.2 C

" 11

Up	i	19 30 14.2
	iPg	19 30 55.2
	i	19 31 13.9
	iSg	19 31 54.9
Ki	eLgl	19 35 44
	iSg	19 36 13.8
Sk	i	19 33 40.8
	iLgl	19 33 59.1

(cont.)

1969
Aug. 11 (cont.)

Um	iS[x]	19 33 38.3
	iSg	19 34 03.7
Ud	iLgl	19 32 15.2
	iRg	19 32 56.1
De	iPg	19 30 10.6
	iSg	19 30 52.5

Southern Baltic Sea.
Explosion?

" 11

Ki	iP	20 27 43.6 C
Sk	iP	20 27 21.9
Um	iP	20 27 44.0
	i	20 27 52.7
Ud	iP	20 27 26.1

Virgin Islands (h = N).

" 11 Um iSS 20 36 17
South Atlantic Ocean (h = N).

" 11

Ud	eP	20 38 15
	i	20 38 26.0
	e	20 41 16

" 11

Ki	eP	20 57 54
Sk	iP	20 57 32.4
Um	eP	20 57 54
	i	20 58 10.2
Ud	iP	20 57 36.0

Virgin Islands (h = 10 km).

" 11

Up	iP	21 09 56.4
Ki	iP	21 09 10.7
Um	iP	21 09 31.1
Ud	iP	21 10 02.1

Kurile Islands (h = 25 km).

" 11

Ki	eP	21 12 32
Um	iP	21 12 53.2
Ud	iP	21 13 24.0

Kurile Islands (h = 20 km).

" 11

Up	iP	21 19 01.8
Ki	iP	21 18 16.3
Um	iP	21 18 37.1
	i	21 18 43.6
Ud	iP	21 19 07.8

Kurile Islands (h = 20 km).

" 11

Up	iP	21 32 52.1
Ki	iP	21 32 06.1
Um	iP	21 32 27.2

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 11 (cont.)

Ud	iP		21 32 58.2	
De	iP		21 33 15.7	

Kurile Islands (h = 20 km).

" 11 Up	iP		21 37 40.0	C
	i		21 37 47.6	
			micr	sec
	P	N	0.4	3
	P	Z	0.7	3
	P	Z'	0.4	1.0
Ki	iP		21 36 54.1	C
			micr	sec
	P	E	0.5	4
	P	N	0.4	5
	P	Z	1.1	4
	P	Z'	0.3	1.0
Sk	iP		21 37 29.8	C
Um	iP		21 37 14.8	C
Ud	iP		21 37 45.9	C
De	iP		21 38 04.0	C

Kurile Islands (h = 45 km).
m = 6.5 (Up,Ki).

" 11 Up	iP1		21 38 30.9	C
	iP2		21 38 39	
	iPP		21 41 28	
	iPa		21 43 28	
	iS		21 47 35	
	iPS		21 48 03	
			micr	sec
	P(3)	E	38	18
	P(3)	N	64	18
	P(3)	Z'	2.7	0.7
	S	E	88	16
	S	N	120	18
	Mx	E	860	16
	Mx	N	1060	18

D = 7650 km = 69°.

Ki	iP1		21 37 45.3	
	iP3		21 37 59.2	
	iPa		21 41 49	
	iS		21 46 19	
			micr	sec
	P1	Z'	0.5	1.0
	P3	E	18	8
	P3	N	21	9
	P3	Z	50	8
	P3	Z'	3.8	1.0
	Mx	E	340	15
	Mx	N	410	18
	Mx	Z	1100	22

D = 6900 km = 62°.
(cont.)

1969
Aug. 11 (cont.)

Sk	iP1		21 38 22.3	
	iP2		21 38 32.1	
	iP3		21 38 36.7	
Um	iP1		21 38 06.4	C
Ud	iP1		21 38 36.8	C
	iP2		21 38 46.3	
	iP3		21 38 50.5	
De	iP1		21 38 56.0	
	iP2		21 39 05.6	

Kurile Islands (h_1 = 15 km, h_2 = 45 km, h_3 = 30 km).
m = 7.8, M = 8.1 (Up,Ki).
m and M refer to shock 3.
Three successive onsets of P (P1, P2, P3) with amplitudes increasing in this order. - The E- and N-amplitudes at Up have been measured on Wiechert records in this case (otherwise on long-period Benioff).

" 11 Up	iP		21 47 10.2	
			micr	sec
	P	Z'	0.5	1.0
Ki	iP		21 46 21.4	
Sk	iP		21 47 00.0	
Um	iP		21 46 46.5	
Ud	iP		21 47 16.9	C
De	iP		21 47 34.5	

Kurile Islands.
Origin time = 21 36 08.
Approximate origin times are given for those aftershocks, which have not been reported by the USCGS.

" 11 Up	iP		21 49 26.4	
			micr	sec
	P	Z'	0.3	0.6
Um	iP		21 49 01.7	
Ud	iP		21 49 31.8	
De	iP		21 49 49.9	

Kurile Islands.
Origin time = 21 38 24.

" 11 Um	iP		21 50 17.0	
" 11 Up	iP		21 51 56.3	
			micr	sec
	P	Z'	0.8	1.0
Ki	iP		21 51 11.1	
			micr	sec
	P	Z'	0.6	1.0

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 11 (cont.)
Sk iP 21 51 45.8
Um iP 21 51 31.2 C
i 21 51 34.1
Ud iP 21 52 02.4
De iP 21 52 20.5
Kurile Islands (h = N).
m = 6.8 (Up,Ki).

" 11 Up iP 21 52 24.5
micr sec
P Z' 0.2 0.8

" 11 Up iP 21 54 24.8
micr sec
P Z' 0.1 0.5
Ki iP 21 53 39.5
ipP 21 53 50.7
micr sec
P Z' 0.2 1.1
Ud iP 21 54 30.3
De iP 21 54 48.4
Kurile Islands. h = 40 km (Ki).
Origin time = 21 43 23.
m = 6.3 (Up,Ki).

" 11 Um iP 21 58 30.8
Kurile Islands.
Origin time = 21 47 54.

" 11 Ki iP 21 59 34.8
Kurile Islands.
Origin time = 21 49 19.

" 11 Um iP 22 00 46.6

" 11 Ki iP 22 02 03.0
micr sec
P Z' 0.1 1.1
Um iP 22 02 24.0 C
Kurile Islands.
Origin time = 21 51 47.

" 11 Ud iP 22 03 06.1

" 11 Up iP 22 05 01.0
micr sec
P Z' 0.1 0.5
Ki iP 22 04 14.5
micr sec
P Z' 0.2 1.5
Sk iP 22 04 50.6
Um iP 22 04 35.1
(cont.)

1969
Aug. 11 (cont.)
Ud iP 22 05 06.6
Kurile Islands.
Origin time = 21 53 59.
m = 6.2 (Up,Ki).

" 11 Up iP 22 06 29.8
i 22 06 47.1
iPP 22 08 54.3
micr sec
P Z' 0.2 1.0
PP Z' 0.1 0.8
Ki iP 22 05 44.2
ipP 22 05 54.9
micr sec
pP Z' 0.2 1.1
Sk iP 22 06 19.4 C
Um iP 22 06 03.9
ipP 22 06 15.0
Ud iP 22 06 35.8
ipP 22 06 46.6
Japan. h = 40 km (Ki,Um,Ud).
m = 6.2 (Up,Ki).

" 11 De iP 22 09 25.0

" 11 Up iP 22 10 04.4
micr sec
P Z' 0.1 0.8
Ud iP 22 10 10.9
ipP 22 10 22.0
Kurile Islands. h = 40 km (Ud).
Origin time = 21 59 02.

" 11 Up iP 22 12 19.9
micr sec
P Z' 0.1 1.0
Ki iP 22 11 34.0
ipP 22 11 46.6
micr sec
P Z' 0.1 1.0
Ud iP 22 12 26.3
Kurile Islands. h = 45 km (Ki).
m = 6.0 (Up,Ki).

" 11 Um iP 22 14 48.2
i 22 14 54.8
Kurile Islands.
Origin time = 22 04 11.

" 11 Up iP 22 18 07.9
micr sec
P Z' 0.1 0.8

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	11	Up	iP		22 21 15.8
		Ki	iP		22 20 30.5
		Um	iP		22 20 51.1
		Ud	iP		22 21 21.5
		Kurile Islands.			
		Origin time = 22 10 14.			
"	11	Um	iP		22 21 30.6
		Kurile Islands (h = N).			
"	11	Up	iP		22 26 45.9
		Ud	iP		22 26 51.3
		Kurile Islands (h = N).			
"	11	Um	iP		22 29 25.9 C
"	11	Up	iP		22 38 51.0 C
			ipP		22 39 02.3
			iPP		22 41 23.0
					micr sec
			P	Z'	0.1 0.6
		Ki	iP		22 38 06.5
			ipP		22 38 17.7
					micr sec
			P	Z'	0.1 1.0
		Sk	iP		22 38 41.3 C
			ipP		22 38 52.1
		Um	iP		22 38 26.6 C
			ipP		22 38 37.5
		Ud	iP		22 38 55.6
			ipP		22 39 08.4
		Japan. h = 40 km (Up,Ki,Sk, Um,Ud).			
		m = 6.1 (Up,Ki).			
"	11	Up	iP		22 44 51.3
		Ud	iP		22 44 56.8 C
		Kurile Islands.			
		Origin time = 22 33 49.			
"	11	Up	iP		22 46 02.7
		Ki	iP		22 45 14.6
		Um	iP		22 45 37.7
		Ud	iP		22 46 08.6 C
		Kurile Islands.			
		Origin time = 22 35 01.			
"	11	Up	iP		22 47 36.8
		Um	iP		22 47 12.0
		Kurile Islands.			
		Origin time = 22 36 35.			
"	11	Up	iP		22 53 06.6 C
		(cont.)			

1969 Aug.	11	(cont.)			
		Ki	iP		22 52 21.9
					micr sec
			P	Z'	0.1 1.0
		Sk	iP		22 52 56.7 C
		Um	iP		22 52 41.7
		Ud	iP		22 53 13.1
		De	iP		22 53 29.9
		Japan (h = N).			
"	11	Um	iP		22 54 20.0
"	11	Ud	iP		22 58 43.6
"	11	Up	iP		23 00 37.2 C
			ipP		23 00 48.6
					micr sec
			P	Z'	0.1 1.0
		Ki	iP		22 59 51.8
			ipP		23 00 02.3
					micr sec
			P	Z'	0.1 1.0
		Sk	eP		23 00 27
		Um	iP		23 00 12.4 C
		Ud	iP		23 00 43.1 C
			ipP		23 00 54.4
		De	iP		23 01 00.9
			ipP		23 01 10.1
		Kurile Islands. h = 40 km (Up,Ki,Ud,De).			
		Origin time = 22 49 35.			
		m = 6.0 (Up,Ki).			
"	11	Um	iP		23 01 40.0
		Ud	iP		23 02 10.2
		De	iP		23 02 31.9
		Kurile Islands.			
		Origin time = 22 51 03.			
"	11	De	iP		23 01 57.1
"	11	Up	iP		23 03 21.7
		Ki	iP		23 02 35.8
		Um	iP		23 02 56.8
		Ud	iP		23 03 27.8
		Kurile Islands.			
		Origin time = 22 52 20.			
"	11	Up	iP		23 04 58.5 C
					micr sec
			P	Z'	0.1 0.6
		Ki	iP		23 04 11.9
		Sk	iP		23 04 48.4
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 11 (cont.)

Um	iP	23 04 32.7	
Ud	iP	23 05 04.6	C
De	iP	23 05 22.7	

Kurile Islands (h = 60 km).

" 11

Up	iP	23 05 23.3	
Um	iP	23 05 06.9	
De	iP	23 05 53.8	

" 11

Up	iP	23 08 10.3	
	ipP	23 08 19.9	
Ki	eP	23 07 26	
	ipP	23 07 36.7	
Um	ipP	23 07 56.2	
Ud	eP	23 08 16	
	ipP	23 08 25.6	

Kurile Islands. h = 35 km (Up,Ki,Ud).
Origin time = 22 57 09.

" 11

Up	iP	23 08 32.9	
Ki	iP	23 07 48.1	C
Sk	iP	23 08 23.3	
Um	iP	23 08 08.1	
Ud	iP	23 08 38.9	
De	iP	23 08 56.5	

Kurile Islands.
Origin time = 22 57 31.

" 11

Up	iP		23 10 02.1	C
			micr	sec
	P	Z'	0.1	0.6
Ki	iP		23 09 17.4	C
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		23 09 52.6	C
Um	iP		23 09 37.6	
	ipP		23 09 49.1	
Ud	iP		23 10 08.5	
De	iP		23 10 25.9	C
	ipP		23 10 37.9	

Kurile Islands. h = 45 km (Um,De).
Origin time = 22 59 00.
m = 6.1 (Up,Ki).

" 11

Up	iP	23 10 57.9	
	i	23 11 01.8	
Ud	iP	23 11 07.6	
De	iP	23 11 24.5	
	ipP	23 11 34.4	

Kurile Islands. h = 35 km (De).
Origin time = 22 59 58.

1969
Aug. 11

Up	iP	23 12 02.2	
Um	iP	23 11 36.6	
Ud	iP	23 12 08.0	
De	iP	23 12 29.4	

Kurile Islands.
Origin time = 23 01 00.

" 11

De	iP	23 13 19.3	

" 11

Up	iP		23 13 59.3	C
	ipP		23 14 12.0	
			micr	sec
	P	Z'	0.2	0.7
Ki	iP		23 13 13.1	
			micr	sec
	P	Z'	0.2	0.9
Sk	iP		23 13 49.3	C
	ipP		23 14 00.4	
Um	iP		23 13 35.1	
Ud	iP		23 14 05.1	C
De	iP		23 14 23.3	C

Kurile Islands. h = 45 km (Up,Sk).
m = 6.4 (Up,Ki).

" 11

De	iP	23 15 22.2	
	i(pP)	23 15 32.4	

" 11

De	iP	23 16 34.3	

" 11

De	iP	23 17 16.7	

" 11

Ud	iP	23 17 27.8	C
	i(pP)	23 17 39.3	

" 11

Um	iP	23 19 32.1	C

" 11

Um	iP	23 21 34.6	C
De	iP	23 22 28.8	
	i	23 22 34.3	

Kurile Islands.
Origin time = 23 11.0.

" 11

De	iP	23 21 42.9	

" 11

Up	iP	23 23 17.4	
	ipP	23 23 27.5	
Sk	eP	23 23 07	
Um	iP	23 22 52.7	
	ipP	23 23 03.3	
Ud	eP	23 23 22	
	ipP	23 23 33.9	
De	iP	23 23 40.5	
	i	23 23 55.0	

Kurile Islands. h = 40 km (Up,Um,Ud).
Origin time = 23 12 15.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 11 Up iP 23 25 55.2 C
Ki iP 23 25 10.3
ipP 23 25 21.4
micr sec
P Z' 0.1 1.0
Sk iP 23 25 45.5
Um iP 23 25 31.1
Ud iP 23 26 01.4 C
De iP 23 26 19.2
Kurile Islands. h = 40 km (Ki).

" 11 Up iP 23 27 50.5
ipP 23 28 02.1
Ki iP 23 27 05.5
Um iP 23 27 25.6
ipP 23 27 37.1
Ud iP 23 27 56.5
ipP 23 28 07.8
Kurile Islands. h = 40 km
(Up,Um,Ud).

" 11 Up iP 23 28 26.2
Um iP 23 28 01.9
Ud iP 23 28 32.9
Kurile Islands.
Origin time = 23 17 25.

" 11 Up iP 23 30 05.3 C
ipP 23 30 16.9
micr sec
P Z' 0.1 1.0
Ki iP 23 29 19.9
ipP 23 29 31.7
micr sec
P Z' 0.1 1.0
Sk iP 23 29 55.3
ipP 23 30 06.9
Um iP 23 29 40.9
ipP 23 29 52.0
Ud iP 23 30 11.2 C
ipP 23 30 22.8
De iP 23 30 28.9
ipP 23 30 40.2
Kurile Islands. h = 40 km
(Up,Ki,Sk,Um,Ud,De).
m = 6.0 (Up,Ki).

" 11 Up iP 23 32 47.1
ipP 23 32 58.5
Ki iP 23 32 02.4
ipP 23 32 13.5
micr sec
P Z' 0.1 1.0
(cont.)

1969
Aug. 11 (cont.)
Sk iP 23 32 38.2
Um iP 23 32 23.1
ipP 23 32 33.6
Ud iP 23 32 52.9 C
ipP 23 33 04.6
De iP 23 33 11.1
ipP 23 33 21.2
Kurile Islands. h = 40 km
(Up,Ki,Um,Ud,De).

" 11 Ki iP 23 32 29.8
ipP 23 32 41.0
Ud iP 23 33 21.3
ipP 23 33 31.1
Kurile Islands. h = 40 km
(Ki,Ud).
Origin time = 23 22 13.

" 11 Up iP 23 35 38.6
ipP 23 35 47.9
micr sec
pP Z' 0.1 0.7
Ki iP 23 34 54.6
ipP 23 35 02.9
Sk ipP 23 35 38.1
Um iP 23 35 13.0
ipP 23 35 23.2
Ud iP 23 35 45.2
ipP 23 35 53.8
De ipP 23 36 15.2
Kurile Islands. h = 35 km
(Up,Ki,Um,Ud).
For several of the after-
shocks, pP has larger
amplitudes than P.

" 11 Up iP 23 39 11.3
Ud iP 23 39 17.0
Kurile Islands.
Origin time = 23 28 09.

" 11 Up iP 23 41 07.7
ipP 23 41 19.5
Ki iP 23 40 22.7
Sk eP 23 40 59
Um iP 23 40 42.9
Ud iP 23 41 13.9
De iP 23 41 31.3
Kurile Islands. h = 45 km
(Up).
Origin time = 23 30 06.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	11	Up	iP		23 45 12.7 C
			ipP		23 45 24.1
			isP		23 45 29.4
					micr sec
			P	Z'	0.1 0.8
		Ki	iP		23 44 27.1
			ipP		23 44 38.4
			i		23 44 54.0
					micr sec
			P	Z'	0.2 1.0
		Sk	iP		23 45 02.9
			ipP		23 45 14.2
		Um	iP		23 44 48.1
			ipP		23 44 59.4
		Ud	iP		23 45 19.3 C
		De	iP		23 45 37.1 C
			ipP		23 45 48.1
		Kurile Islands. h = 40 km (Up,Ki,Sk,Um,De). m = 6.2 (Up,Ki).			
"	11	Up	iP		23 47 12.7
			ipP		23 47 21.8
			iPcP		23 47 34.8
		Ki	iP		23 46 27.4
			ipP		23 46 37.2
		Sk	iP		23 47 02.3
		Um	iP		23 46 48.1 C
			ipP		23 46 57.1
		Ud	iP		23 47 18.9 C
		De	iP		23 47 38.4
			ipP		23 47 48.1
		Kurile Islands. h = 35 km (Up,Ki,Um,De).			
"	11	Ki	iP		23 47 09.1
		Um	iP		23 47 08.5
"	11	Up	iP		23 47 58.4
			ipP		23 48 09.1
		Um	iP		23 47 33.9
		Ud	iP		23 48 04.9
		Kurile Islands. h = 40 km (Up). Origin time = 23 36 57.			
"	11	Up	iP		23 50 33.8
			i		23 50 49.4
					micr sec
			P	Z'	0.1 0.8
		Ki	iP		23 49 49.9
			i		23 49 56.2
		Sk	iP		23 50 24.5
		Um	iP		23 50 09.8
		(cont.)			

1969 Aug.	11	(cont.)			
		Ud	iP		23 50 39.9 C
			i		23 50 45.2
		De	iP		23 50 58.3
			i		23 51 08.4
		Japan (h = N).			
"	11	Ud	iP		23 52 09.5
"	11	Up	iP		23 53 03.8
					micr sec
			P	Z'	0.1 0.6
		Ki	iP		23 52 18.6
					micr sec
			P	Z'	0.2 1.1
		Sk	iP		23 52 55.0
			ipP		23 53 06.3
		Um	iP		23 52 39.6
		Ud	iP		23 53 10.4
		De	iP		23 53 28.3
		Kurile Islands. h = 40 km (Sk). m = 6.2 (Up,Ki).			
"	11	Up	iP		23 59 12.7
		Ki	eP		23 58 27
		Um	iP		23 58 47.2
		Ud	iP		23 59 19.3 C
		De	iP		23 59 37.1
		Kurile Islands. Origin time = 23 48 11.			
"	11 -12	Up	iP		23 59 51.8
		Ki	eP		23 59 06
		Sk	iP		23 59 41.5
		Um	iP		23 59 26.8
		Ud	iP		23 59 57.7 C
		De	iP		00 00 15.6 C
		Kurile Islands (h = N).			
"	11 -12	Up	iP		00 00 11.2
			ipP		00 00 22.4
		Ki	iP		23 59 26.4
			ipP		23 59 37.7
					micr sec
			P	Z'	0.1 1.2
		Sk	iP		00 00 01.2
			ipP		00 00 12.4
		Um	iP		23 59 46.6
			ipP		23 59 56.9
		Ud	ipP		00 00 29.1
		Kurile Islands. h = 40 km (Up,Ki,Sk,Um). Origin time = 23 49 10.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	12	Up	iP		00 03 05.9
		Um	iP		00 02 40.7
		Ud	iP		00 03 11.8
		Kurile Islands.			
		Origin time = 23 52 04			
		(Aug. 11).			
"	12	Up	iP		00 04 05.4
		Ki	iP		00 03 20.2
		Sk	iP		00 03 55.3
		Um	iP		00 03 40.1
		Ud	iP		00 04 11.3 C
		Kurile Islands.			
		Origin time = 23 53 03			
		(Aug. 11).			
"	12	Up	iP		00 06 28.1
			i		00 06 39.4
			iSKS		00 17 04
					micr sec
			P	Z'	0.1 0.8
			SKS	E	1.8 3
		Ki	iP		00 06 13.0
			i		00 06 50.3
					micr sec
			P	Z'	0.6 1.0
		Sk	iP		00 06 33.6
			iSKS		00 17 13.8
		Um	iP		00 06 16.6
		Ud	iP		00 06 36.7
			eSKS		00 17 15
		De	iP		00 06 42.2
			i		00 06 47.3
		Molucca Passage (h = 35 km).			
		m = 6.8 (Up,Ki).			
"	12	Um	iP		00 08 19.0
		De	iP		00 09 24.0
			i		00 09 36.8
"	12	Ud	iP		00 18 11.8
"	12	Up	iP		00 18 53.9
		Um	iP		00 18 29.1
		Ud	iP		00 19 00.3
		De	iP		00 19 18.4
			i		00 19 44.4
		Kurile Islands.			
		Origin time = 00 07 52.			
"	12	De	i(P)		00 20 40.2
"	12	Up	iP		00 22 25.7
		(cont.)			

1969 Aug.	12	(cont.)			
		Um	iP		00 22 01.4
		Ud	iP		00 22 32.5
		Kurile Islands.			
		Origin time = 00 11 25.			
"	12	Ki	iP		00 23 13.7
		Sk	iP		00 23 06.4
		Um	iP		00 23 18.5
"	12	Up	iP		00 26 31.2
		Ki	iP		00 25 45.5
					micr sec
			P	Z'	0.1 1.0
		Um	iP		00 26 06.0
		Ud	iP		00 26 37.2
		De	iP		00 26 54.8
		Kurile Islands (h = 30 km).			
"	12	Up	iP		00 26 27.2
		Ud	iP		00 26 33.5
		De	iP		00 26 51.2
		Kurile Islands.			
		Origin time = 00 15 24.6			
"	12	Up	iP		00 29 02.0
			ipP		00 29 12.5
		Ud	iP		00 29 08.4
			ipP		00 29 19.1
		De	iP		00 29 25.8
		Kurile Islands. h = 40 km			
		(Up,Ud).			
		Origin time = 00 18 00.			
"	12	Up	iP		00 30 10.3
		Ki	iP		00 29 25.1
		Um	iP		00 29 45.4
		Ud	iP		00 30 16.5 C
		Kurile Islands (h = 60 km).			
"	12	Up	iP		00 31 30.6
		Ud	iP		00 31 36.4
		De	iP		00 31 53.4
		Kurile Islands.			
		Origin time = 00 20 28.			
"	12	Up	iP		00 36 45.6
			ipP		00 36 58.0
					micr sec
			P	Z'	0.1 0.6
		Ki	iP		00 35 59.7
					micr sec
			P	Z'	0.1 1.0
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 (cont.)

Sk	iP	00 36 35.4	
	ipP	00 36 46.6	
Um	iP	00 36 20.1	
	ipP	00 36 32.6	
Ud	iP	00 36 51.6	C
	ipP	00 37 03.7	
De	iP	00 37 09.1	C
	ipP	00 37 22.8	

Kurile Islands. h = 45 km
(Up,Sk,Um,Ud,De).
m = 6.1 (Up,Ki).

" 12

Up	iP	00 40 31.7	
	ipP	00 40 43.4	
Ki	iP	00 39 47.3	
Um	iP	00 40 07.1	
	ipP	00 40 18.8	
Ud	iP	00 40 37.7	

Kurile Islands. h = 45 km
(Up,Um).

" 12 Ud iP 00 43 13.6

" 12 Ud iP 00 47 39.0

" 12

Up	iP	00 48 45.3	
Ud	iP	00 48 51.3	
	ipP	00 49 01.9	

Kurile Islands. h = 40 km
(Ud).
Origin time = 00 37 43.

" 12

Up	iP	00 50 28.1	
Ki	eP	00 49 40	
Um	iP	00 50 02.4	
Ud	iP	00 50 33.4	

Kurile Islands.
Origin time = 00 39 25.

" 12

Up	iP	00 52 09.3	
Ki	iP	00 51 24.0	
Um	iP	00 51 44.2	
Ud	iP	00 52 15.2	C

Kurile Islands.
Origin time = 00 41 07.

" 12

Up	eP	01 01 03	
Ki	iP	01 00 43.7	
Um	iP	01 00 48.2	
	i	01 00 53.6	
Ud	iP	01 01 08.0	

Molucca Passage (h = 50 km).

1969
Aug. 12

Up	iP	01 02 39.6	
	i	01 02 46.4	
Ki	iP	01 02 38.4	
	i	01 02 45.3	
Sk	iP	01 03 00.2	
	i	01 03 11.7	
Um	iP	01 02 33.6	
Ud	iP	01 02 55.1	
De	i(P)	01 02 58.1	

Tibet (h = 40 km).

" 12

Up	iP		01 04 40.1	
			micr	sec
	P	Z'	0.1	0.5
Ki	iP		01 03 55.3	
	ipP		01 04 06.3	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		01 04 30.5	C
	ipP		01 04 41.5	
Um	iP		01 04 15.3	
	ipP		01 04 26.6	
Ud	iP		01 04 46.1	
	ipP		01 04 57.2	
De	iP		01 05 03.5	C

Kurile Islands. h = 40 km
(Ki,Sk,Um,Ud).
m = 6.1 (Up,Ki).

" 12

Up	iP	01 06 34.3	
	ipP	01 06 44.2	
Ki	iP	01 05 50.2	
	ipP	01 05 58.6	
Um	iP	01 06 10.5	
	ipP	01 06 19.5	
Ud	iP	01 06 40.6	C
	ipP	01 06 50.5	
De	iP	01 06 58.8	

Kurile Islands. h = 35 km
(Up,Ki,Um,Ud).
Origin time = 00 55 33.

" 12 Up iP 01 09 07.9
Ud iP 01 09 15.3
Kurile Islands.
Origin time = 00 58 06.

" 12

Up	iP	01 12 43.9
Um	iP	01 12 19.9
Ud	iP	01 12 49.9
	ipP	01 13 01.2

Kurile Islands. h = 40 km
(Ud).
Origin time = 01 01 42.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 Up iP 01 14 09.8 C
ipP 01 14 20.6
Ki iP 01 13 25.0
micr sec
P Z' 0.1 1.2
Sk iP 01 14 00.2
Um iP 01 13 45.1 C
ipP 01 13 55.7
Ud iP 01 14 16.1 C
ipP 01 14 26.9
De eP 01 14 33
ipP 01 14 43.9
Kurile Islands. h = 40 km
(Up,Um,Ud,De).

" 12 Up iP 01 14 29.7
ipP 01 14 40.3
micr sec
P Z' 0.1 0.6
Ki iP 01 13 44.3
micr sec
P Z' 0.1 1.0
Sk iP 01 14 19.7 C
Um iP 01 14 04.4 C
ipP 01 14 15.5
Ud iP 01 14 36.2
ipP 01 14 46.7
De iP 01 14 53.5
ipP 01 15 05.3
Kurile Islands. h = 40 km
(Up,Um,Ud,De).
Origin time = 01 03 27.
m = 6.1 (Up,Ki).

" 12 Um iP 01 15 41.6

" 12 Up iP 01 21 18.0
Ki iP 01 20 31.8
Um iP 01 20 52.3
Ud iP 01 21 23.4
Kurile Islands.
Origin time = 01 10 15.

" 12 Um iP 01 20 36.1

" 12 Up iP 01 23 26.8
Ki iP 01 22 40.6
Um iP 01 23 02.0
Ud iP 01 23 33.0
ipP 01 23 42.5
Kurile Islands. h = 35 km (Ud).

" 12 Up iP 01 23 53.8
(cont.)

1969
Aug. 12 (cont.)
Ki iP 01 23 08.5
Um iP 01 23 29.0
ipP 01 23 40.6
Ud iP 01 23 59.3
Kurile Islands. h = 45 km
(Um).
Origin time = 01 12 52.

" 12 Ud iP 01 25 27.1

" 12 Up iP 01 28 33.5

" 12 Um iP 01 29 06.6
Ud iP 01 29 37.6
Kurile Islands.
Origin time = 01 18 30.

" 12 Up iP 01 39 28.8 C
micr sec
P Z' 0.1 0.6
Ki iP 01 38 43.5
micr sec
P Z' 0.1 1.0
Sk iP 01 39 18.5
Um iP 01 39 04.7
Ud iP 01 39 34.9 C
ipP 01 39 45.2
De iP 01 39 53.2
Kurile Islands. h = 40 km
(Ud).
m = 6.1 (Up,Ki).

" 12 Up iP 01 46 00.4
Ki iP 01 45 15.7
Sk eP 01 45 51
Um iP 01 45 35.1
Ud iP 01 46 06.7
Kurile Islands (h = N).

" 12 Up i(P) 01 49 54.1

" 12 Up iP 01 53 51.9 C
Ki iP 01 53 05.9
Sk iP 01 53 42.3
Um iP 01 53 26.7
Ud iP 01 53 57.9 C
Kurile Islands.
Origin time = 01 42 50.

" 12 Up iP 01 55 29.6 C
Ki iP 01 55 31.4 C
Sk iP 01 55 45.1 C
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 (cont.)

Um	iP	01 55 26.7	C
	ipP	01 55 36.0	
Ud	iP	01 55 40.4	C
	ipP	01 55 51.2	
De	iP	01 55 37.9	C
	ipP	01 55 49.2	

Central Asia (Tibet).

" 12

Up	iP	01 57 04.8	
	i(pP)	01 57 15.9	
Um	iP	01 57 16.5	
Ud	iP	01 57 47.8	

" 12

Up	iP	02 05 40.5	
	ipP	02 05 52.4	
Ki	iP	02 04 55.4	
Um	iP	02 05 15.5	
	ipP	02 05 27.3	
Ud	iP	02 05 46.5	C
	ipP	02 05 58.2	

Kurile Islands. h = 45 km (Up,Um,Ud).

" 12

Up	iP	02 07 00.2	
Ki	iP	02 06 14.5	
Um	iP	02 06 35.5	
Ud	iP	02 07 05.7	

Kurile Islands (h = N).

" 12

Up	iP	02 17 46.8	C
Ki	iP	02 17 01.1	
Sk	eP	02 17 38	
Um	iP	02 17 22.3	
	ipP	02 17 32.7	
Ud	iP	02 17 52.8	C

Kurile Islands. h = 40 km (Um).

" 12

Up	iP	02 30 24.9	
Um	iP	02 29 59.9	
Ud	iP	02 30 30.6	
De	iP	02 30 49.0	C

Kurile Islands (h = 40 km).

" 12

Up	eP		02 35 21	
Ki	iP		02 35 04.4	
	i		02 35 15.6	
			micr	sec
	P	Z'	0.1	1.5
Sk	eP		02 35 29	
	i		02 35 38.4	
Um	iP		02 35 10.7	
Ud	iP		02 35 29.1	

Molucca Passage (h = 70 km).

1969
Aug. 12

Up	iP	02 42 20.1	C
Ki	iP	02 41 33.2	
Sk	iP	02 42 09.4	
Um	iP	02 41 54.0	
Ud	iP	02 42 25.1	
De	iP	02 42 44.6	

Kurile Islands.
Origin time = 02 31 17.

" 12

Up	iP	02 44 16.0

" 12

Up	iP	02 45 47.1
	ipP	02 45 56.2
Um	iP	02 45 22.6
Ud	iP	02 45 53.6
	ipP	02 46 02.4

Kurile Islands. h = 35 km (Up,Ud).

" 12

Up	iP		02 47 53.7	
	ipP		02 48 05.9	
			micr	sec
	P	Z'	0.1	0.6
	Mx	E	0.7	16
	Mx	N	1.0	17
	Mx	Z	1.6	17
Ki	iP		02 47 08.7	
			micr	sec
	P	Z'	0.1	1.0
	Mx	E	1.4	19
	Mx	N	1.0	17
	Mx	Z	2.0	18
Sk	iP		02 47 44.9	
Um	iP		02 47 29.6	
	ipP		02 47 40.1	
Ud	iP		02 47 59.8	
	ipP		02 48 11.0	
De	iP		02 48 18.7	
	ipP		02 48 29.1	

Kurile Islands. h = 40 km (Up,Um,Ud,De).
m = 6.1, M = 5.2 (Up,Ki).
In nearly all the aftershocks in this series, m(Up) is greater than m(Ki), whereas M(Up) is less than M(Ki), in both cases generally by 0.2-0.3 units.

" 12

Up	iP	02 50 01.6

" 12

Up	iP	02 51 37.6

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 Up iP 02 55 56.6
ipP 02 56 05.5
Ud iP 02 56 02.1
ipP 02 56 12.0
Japan. h = 35 km (Up,Ud).

" 12 Up iP 03 02 03.8
Ud iP 03 02 09.4
Kurile Islands.
Origin time = 02 51 01.

" 12 Up iP 03 04 39.2 C
Ki iP 03 03 54.6
Um iP 03 04 14.8
Ud iP 03 04 45.6
Kurile Islands.
Origin time = 02 53 38.

" 12 Ud iP 03 08 57.6

" 12 Up eP 03 10 34
Um iP 03 10 11.6
Ud iP 03 10 41.9
Kurile Islands.
Origin time = 02 59 34.

" 12 Up iP 03 16 33.6
Ud iP 03 16 39.9
Kurile Islands.
Origin time = 03 05 32.

" 12 Up iP 03 20 08.1
Ki iP 03 19 23.0
Um iP 03 19 43.0
Ud iP 03 20 14.4
ipP 03 20 24.3
Kurile Islands. h = 35 km (Ud).

" 12 Up iP 03 29 44.0
Ki ipP 03 29 09.4
Ud iP 03 29 49.8
Kurile Islands (h = N).

" 12 Up iP 03 30 16.1
Ki iP 03 29 30.5
Um iP 03 29 51.0
ipP 03 29 59.4
Ud iP 03 30 21.9
Kurile Islands. h = 30 km (Um).
Origin time = 03 19 16.

" 12 Ud iP 03 34 46.3

" 12 Up iP 03 41 26.4
(cont.)

1969
Aug. 12 (cont.)
Ud iP 03 41 32.3
Kurile Islands (h = N).

" 12 Up iP 03 42 35.8
Um iP 03 42 10.2
Ud iP 03 42 41.2
Kurile Islands.
Origin time = 03 31 33.

" 12 Up iP 03 44 43.6 C
ipP 03 44 53.2
iPcP 03 45 11.7
iS 03 53 50

		micr	sec
P	N	0.3	3
P	Z	0.7	3
P	Z'	0.1	0.8
pP	Z'	0.2	0.8
S	N	0.7	7
Mx	E	1.4	18
Mx	N	3.9	15
Mx	Z	4.4	14

D = 7700 km = 69 1/2°.

Ki iP 03 43 57.9
ipP 03 44 08.2
eS 03 52 25

		micr	sec
P	Z'	0.3	1.5
pP	E	0.3	4
pP	N	0.3	5
pP	Z	0.8	4
S	E	0.8	11
S	N	0.6	8
Mx	E	6.1	19
Mx	N	2.8	18
Mx	Z	7.6	18

D = 6900 km = 62°.

Sk iP 03 44 32.6
ipP 03 44 43.8
Um iP 03 44 18.5 C
ipP 03 44 28.6
Ud iP 03 44 49.5 C
ipP 03 44 59.4
De iP 03 45 07.0 C
ipP 03 45 18.7
Kurile Islands. h = 40 km
(Up,Ki,Sk,Um,Ud,De).
m = 6.2, M = 5.7 (Up,Ki).

" 12 Ud eP 03 59 27

" 12 Up iP 04 00 13.4
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 (cont.)

Um	iP	03 59 49.2
Ud	iP	04 00 17.8
	i	04 00 20.3
De	iP	04 00 37.3

Kurile Islands (h = N).

" 12

Up	iP	04 02 13.6
Um	iP	04 01 48.1
Ud	iP	04 02 19.1

Kurile Islands.
Origin time = 03 51 11.

" 12

Ud	iP	04 07 25.5

" 12

Up	iP	04 09 29.7
	i	04 09 32.5
Ki	iP	04 08 43.7
	i	04 08 46.6
Sk	eP	04 09 18
Um	iP	04 09 04.1
	i	04 09 07.3
Ud	iP	04 09 35.0
	i	04 09 37.9
	i(pP)	04 09 49.4

Kurile Islands (h = N).
Double P; average interval 3.0 sec.

" 12

Ud	iP	04 10 08.2

" 12

Up	iP	04 11 21.0

" 12

Ki	iPn	04 11 35.9
	iSn	04 12 22.1
	iSg	04 12 39.5
	D = 420 km = 3.8°.	
Sk	iLgl	04 15 25.2
Um	iSn	04 13 32.1
	iSg	04 14 12.5

Northwest Russia, 69.3°N, 30.0°E.
Origin time = 04 10 35.
Explosion?

" 12

Up	iP	04 12 10.5
Um	iP	04 11 45.6
Ud	iP	04 12 16.6

Kurile Islands.
Origin time = 04 01 09.

" 12

Up	iP	04 12 48.9
Um	iP	04 12 24.4
Ud	iP	04 12 55.1

Kurile Islands.
Origin time = 04 01 47.

1969
Aug. 12

Up	iP	04 23 48.7
Ki	iP	04 23 02.5
Sk	iP	04 23 38.9
Um	iP	04 23 24.0
Ud	iP	04 23 54.9 C
	ipP	04 24 06.6
De	iP	04 24 12.1

Kurile Islands. h = 45 km (Ud).

" 12

Up	iP	04 24 13.1
Ud	iP	04 24 20.3

Kurile Islands.
Origin time = 04 13 11.

" 12

Up	iP1	04 32 11.0
	iP2	04 32 18.5
Um	iP1	04 31 45.3
	iP2	04 31 53.6
Ud	iP1	04 32 17.0
	iP2	04 32 24.0
De	iP2	04 32 43.4

Kurile Islands.
Origin times = 04 21 09 for 1 and 04 21 16 for 2.
Alternatively, P2 is pP to P1, corresponding to a focal depth of 30 km. P2 is larger than P1.

" 12

Up	iP	04 37 54.7
Ki	iP	04 37 09.2
Um	iP	04 37 30.0 C
Ud	iP	04 38 00.7
	ipP	04 38 12.3

Kurile Islands. h = 45 km (Ud).

" 12

Up	iP	04 40 11.7
	ipP	04 40 23.9
Um	iP	04 39 46.6
	ipP	04 39 58.1
Ud	iP	04 40 18.1
	ipP	04 40 29.8

Kurile Islands. h = 45 km (Up,Um,Ud).

" 12

Up	ipP	04 43 42.4
Um	iP	04 43 07.5
	ipP	04 43 17.5
Ud	iP	04 43 38.6
	ipP	04 43 48.4

Kurile Islands. h = 35 km (Um,Ud).
Origin time = 04 32 31.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 Up iP 04 59 32.3 C
ipP 04 59 45.8
micr sec
P Z' 0.1 0.8
Ki iP 04 58 47.5
micr sec
P Z' 0.1 1.0
Sk iP 04 59 22.5 C
Um iP 04 59 07.5 C
Ud iP 04 59 38.1 C
ipP 04 59 50.4
Kurile Islands. h = 50 km
(Up,Ud).
m = 6.0 (Up,Ki).

" 12 Up iP 05 00 43.9

" 12 Up iP 05 04 41.2 D
ipP 05 04 53.0
iS 05 13 44
micr sec
P Z' 0.2 0.7
D = 7650 km = 69°.
Ki iP 05 03 55.8
ipP 05 04 07.1
micr sec
P Z' 0.2 1.0
Sk iP 05 04 31.1
ipP 05 04 42.5
Um iP 05 04 16.0
ipP 05 04 27.8
Ud iP 05 04 47.2 D
ipP 05 04 59.1
De iP 05 05 04.7
ipP 05 05 15.7
Kurile Islands. h = 45 km
(Up,Ki,Sk,Um,Ud,De).
m = 6.4 (Up,Ki).

" 12 Up iP 05 14 30.9 C
iS 05 23 32
iP'P' 05 42 49.3
micr sec
P E 0.7 4
P N 2.1 4
P Z 3.8 4
P Z' 1.5 1.1
S E 4.8 13
S N 4.9 10
Mx E 21 17
Mx N 39 16
Mx Z 57 18
D = 7650 km = 69°.
(cont.)

1969
Aug. 12 (cont.)
Ki iP 05 13 44.9 C
iS 05 22 06
micr sec
P E 1.7 7
P N 2.3 9
P Z 7.2 10
P Z' 1.2 1.0
S E 9.4 14
S N 5.4 12
Mx E 90 18
Mx N 61 19
Mx Z 71 16
D = 6900 km = 62°.
Sk iP 05 14 20.4 C
ipP 05 14 32.0
Um iP 05 14 05.4 C
ipP 05 14 17.0
Ud iP 05 14 36.8 C
ipP 05 14 47.7
De iP 05 14 55.0 C
Kurile Islands. h = 40 km
(Sk,Um,Ud).
m = 6.9, M = 6.9 (Up,Ki).

" 12 Up iP 05 20 02.8 C
ipP 05 20 14.5
micr sec
P Z' 0.1 0.5
Ki iP 05 19 18.3
micr sec
P Z' 0.1 1.0
Sk iP 05 19 53.7
ipP 05 20 04.1
Um iP 05 19 38.7 C
ipP 05 19 48.7
Ud iP 05 20 09.1
De iP 05 20 26.9
ipP 05 20 37.2
Kurile Islands. h = 40 km
(Up,Sk,Um,De).
m = 6.1 (Up,Ki).

" 12 Up iP 05 25 30.8
Um iP 05 25 06.0
Ud iP 05 25 37.3
Kurile Islands.
Origin time = 05 14 29.

" 12 Up eP 05 28 57

" 12 Up iP 05 30 51.1
Um iP 05 30 26.0
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 (cont.)
Ud iP 05 30 56.9
Kurile Islands.
Origin time = 05 19 49.

" 12 Ki iP 05 57 30.7
ipP 05 57 42.9
Um ipP 05 58 08.4
Ud iP 05 58 28.5
ipP 05 58 38.1
Kurile Islands. h = 40 km (Ki,Ud).

" 12 Up iP 06 04 32.0 C
i 06 04 34.3
ipP 06 04 45.9
iS 06 13 35
micr sec
P N 0.8 4
P Z' 0.3 0.7
Mx E 19 19
Mx N 21 17
Mx Z 20 18
D = 7650 km = 69°.
Ki iP 06 03 46.5
i 06 03 49.0
ipP 06 03 59.9
micr sec
P Z' 0.3 0.9
Mx E 49 18
Mx N 37 19
Mx Z 44 18
Sk iP 06 04 21.6 C
i 06 04 24.2
ipP 06 04 35.6
Um iP 06 04 07.4
i 06 04 09.5
Ud iP 06 04 37.4 C
i 06 04 40.4
ipP 06 04 52.3
De iP 06 04 55.9 C
i 06 04 58.4
ipP 06 05 09.6
Kurile Islands. h = 50 km (Up,Ki,Sk,Ud,De).
m = 6.6, M = 6.7 (Up,Ki).
Double P; average interval 2.5 sec; cf Aug. 12, 04 09.
If this means a double shock, and if pP belongs to the second, larger one, then its focal depth is 40 km.

1969
Aug. 12 Up iP 06 11 20.4
Ud iP 06 11 26.7
ipP 06 11 38.1
Kurile Islands. h = 40 km (Ud).

" 12 Up iP 06 29 49.1

" 12 Ki iP 06 41 17.8
Ud iP 06 42 08.8
Japan (h = 15 km).

" 12 Up iP 06 49 54.4 D
micr sec
P Z' 0.2 0.6
Ki iP 06 49 09.1
micr sec
P Z' 0.1 1.0
Sk iP 06 49 45.1
Um iP 06 49 30.1
Ud iP 06 50 00.8 D
i 06 50 06.4
De iP 06 50 17.6
Kurile Islands (h = N).
m = 6.2 (Up,Ki).
Nearly all the aftershocks show clear compressional P. However, this shock, as well as the one at 05 04, Aug. 12, exhibit clear dilatational P at Up and Ud.

" 12 Um iP 06 53 32.3
Ud iP 06 54 07.2
Kurile Islands (h = N).

" 12 Ki iP 06 59 50.3
Sk iP 07 00 25.4
Um iP 07 00 10.5
Ud iP 07 00 41.6
ipP 07 00 50.8
Japan. h = 35 km (Ud).

" 12 Ud iP 07 08 46.2
Kurile Islands.
Origin time = 06 57 38.

" 12 Um iP 07 13 28.2
Kurile Islands.
Origin time = 07 02 51.

" 12 Up iP 07 14 51.1
Ki iP 07 14 05.5
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 (cont.)

Ki	ipP		07 14 18.8		
			micr	sec	
	P	Z'	0.1	1.0	
Sk	iP		07 14 40.6		
Um	iP		07 14 26.1		
Ud	iP		07 14 56.8		C

Kurile Islands. h = 50 km (Ki).

" 12

Up	iP		07 17 59.7		
	ipP		07 18 10.8		
Ki	iP		07 17 14.8		
	ipP		07 17 26.5		
Sk	iP		07 17 50.0		
	ipP		07 18 01.5		
Um	iP		07 17 34.9		
	ipP		07 17 46.7		
Ud	iP		07 18 05.7		C
	ipP		07 18 17.4		

Kurile Islands. h = 45 km (Up,Ki,Sk,Um,Ud).
Origin time = 07 06 58.

" 12

Um	iP		07 20 09.6		

" 12

Up	iP		07 21 45.5		
	ipP		07 21 56.8		
			micr	sec	
	P	Z'	0.1	0.5	
Ki	iP		07 20 57.6		
Sk	iP		07 21 34.5		
Um	iP		07 21 19.6		
Ud	iP		07 21 50.8		
	i(pP)		07 22 05.2		

Kurile Islands. h = 40 km (Up).

" 12

Ud	iP		07 32 34.1		

" 12

Up	iP		07 49 13.0		
Ki	iP		07 48 26.5		
Um	iP		07 48 47.1		
Ud	iP		07 49 18.7		C
	ipP		07 49 29.0		
De	iP		07 49 36.5		

Kurile Islands. h = 40 km (Ud).

" 12

Up	iP		07 52 06.6		
Ud	iP		07 52 13.3		
	ipP		07 52 23.7		

Japan. h = 40 km (Ud).

" 12

Um	iP		08 02 02.6		
Ud	iP		08 02 32.9		

Kurile Islands.
Origin time = 07 51 25.

1969
Aug. 12

Up	iP		08 05 54.4		C
	ipP		08 06 07.9		
	iPcP		08 06 23.2		
			micr	sec	
	Mx	E	0.7	15	
	Mx	N	1.0	16	
	Mx	Z	1.3	17	
Ki	iP		08 05 10.0		
Sk	iP		08 05 45.0		
Um	iP		08 05 29.8		
	ipP		08 05 40.1		
Ud	iP		08 05 59.8		
	ipP		08 06 11.5		
De	iP		08 06 17.9		

Japan. h = 45 km (Up,Um,Ud).

" 12

Up	iP		08 13 59.0		
Ki	iP		08 13 13.2		
Um	iP		08 13 34.1		
Ud	iP		08 14 05.0		

Kurile Islands.
Origin time = 08 02 57.

" 12

Ud	iP		08 14 45.9		
	i(pP)		08 14 54.0		

" 12

Up	iP		08 15 58.4		
Ki	iP		08 15 14.2		
Sk	iP		08 15 49.3		
Um	iP		08 15 34.6		
Ud	iP		08 16 05.7		

Kurile Islands (h = 50 km).

" 12

Ud	iP		08 31 46.8		

" 12

Ud	iP		08 52 59.8		C

Kurile Islands (h = 30 km).

" 12

Ki	iP		09 20 57.3		
Sk	iP		09 21 18.9		
Um	iP		09 20 56.3		
Ud	iP		09 21 17.4		
	i		09 21 36.3		

" 12

Um	iP		09 24 54.2		
Ud	iP		09 25 26.2		
	ipP		09 25 37.9		

Kurile Islands. h = 45 km (Ud).
Origin time = 09 14 18.

" 12

Ki	iP		09 26 09.3		
Ud	iP		09 27 00.3		

Kurile Islands.
Origin time = 09 15 52.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 Up iP 09 32 13.8
Ki eP 09 31 28
Um iP 09 31 49.0
Ud iP 09 32 19.9
ipP 09 32 31.2
Kurile Islands. h = 40 km (Ud).

" 12 Um iP 09 34 15.5
i 09 34 18.7
Ud iP 09 34 46.2
i 09 34 50.2
Kurile Islands.
Origin time = 09 23 38.
Double P; cf Aug. 12, 04 09 and 06 04.

" 12 Up iP 09 36 44.3 C
ipP 09 36 56.1
iS 09 45 46
micr sec
P Z' 0.3 0.9
Mx E 2.6 17
Mx N 3.1 17
Mx Z 3.8 15
D = 7650 km = 69°.
Ki iP 09 35 57.9 C
ipP 09 36 09.7
eS 09 44 18
iScS 09 45 50
micr sec
P E 0.3 9
P N 0.3 9
P Z 0.8 10
P Z' 0.2 1.0
S E 0.9 12
S N 0.7 11
Mx E 7.8 19
Mx N 5.7 20
Mx Z 10 18
D = 6900 km = 62°.
Sk iP 09 36 34.0 C
Um iP 09 36 19.5 C
iS 09 44 59
Ud iP 09 36 50.2 C
ipP 09 37 01.4
De iP 09 37 08.1 C
ipP 09 37 19.3
Kurile Islands. h = 45 km (Up,Ki,Ud,De).
m = 6.1, M = 5.9 (Up,Ki).

" 12 Up iP 09 44 46.5
ipP 09 44 57.0
(cont.)

1969
Aug. 12 (cont.)
Up micr sec
P Z' 0.3 1.0
Ki iP 09 44 00.1
ipP 09 44 10.5
micr sec
P Z' 0.2 1.0
Sk iP 09 44 36.2
ipP 09 44 49.1
Um iP 09 44 20.8 C
Ud iP 09 44 51.7
ipP 09 45 02.1
De iP 09 45 10.1
i(PcP) 09 45 32.3
Kurile Islands. h = 40 km (Up,Ki,Sk,Ud).
m = 6.4 (Up,Ki).

" 12 Up iP 09 49 36.3
Ki iP 09 48 50.5
Ud iP 09 49 42.2
Kurile Islands.
Origin time = 09 38 34.

" 12 Um iP 10 01 25.2

" 12 Up iP 10 02 47.5
Ki iP 10 02 02.0
Ud iP 10 02 53.5
Kurile Islands (h = N).

" 12 Up iP 10 05 41.0
Ki iP 10 04 55.8
Ud iP 10 05 46.8
Kurile Islands (h = N).

" 12 Ud iP 10 23 37.2

" 12 Ki iP 10 33 03.1
Um iP 10 33 23.6
Ud iP 10 33 54.3
Kurile Islands (h = N).

" 12 Up eP 10 34 28
Ki iP 10 33 43.5
Um iP 10 34 06.4
Ud iP 10 34 34.2
De iP 10 34 54.5
Kurile Islands.
Origin time = 10 23 27.

" 12 Up iP 10 50 53.0
Ki iP 10 50 09.0
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 (cont.)
Ud iP 10 50 59.8
Kurile Islands.
Origin time = 10 39 52.

" 12 Ud iP 10 58 56.1

" 12 Up iPKP 11 15 44.6
i 11 15 51.3
New Britain (h = 270 km).

" 12 Ki iP 11 22 12.3
Um iP 11 22 32.8
Ud iP 11 23 03.2
ipP 11 23 13.9
Kurile Islands. h = 40 km (Ud).
Origin time = 11 11 56.

" 12 Up iP 11 32 24.5 C
eS 11 41 25
micr sec
P Z' 0.6 1.0
Mx E 20 15
Mx N 26 17
Mx Z 24 18
D = 7650 km = 69°.
Ki iP 11 31 38.4 C
ipP 11 31 49.8
iS 11 40 03
micr sec
P E 0.8 8
P N 1.1 10
P Z 3.1 10
P Z' 0.3 1.1
S E 5.4 14
S N 2.4 12
Mx E 49 18
Mx N 42 19
Mx Z 56 17
D = 6850 km = 61 1/2°.
Sk iP 11 32 13.8
i 11 32 15.7
Um iP 11 31 59.2 C
iS 11 40 37
iSS 11 45 09
Ud iP 11 32 30.5 C
De iP 11 32 47.8
Kurile Islands. h = 40 km (Ki).
m = 6.5, M = 6.8 (Up,Ki).

" 12 Up iP 11 39 16.1
Um iP 11 38 51.2
Ud iP 11 39 22.1
(cont.)

1969
Aug. 12 (cont.)
De iP 11 39 39.9
Kurile Islands.
Origin time = 11 28 14.

" 12 Up iP 11 43 33.7 C
ipP 11 43 43.7
micr sec
P Z' 0.1 0.9
Ki iP 11 42 48.8 C
micr sec
P Z' 0.1 1.0
Sk iP 11 43 23.7
Um iP 11 43 08.9
ipP 11 43 19.0
Ud iP 11 43 39.8 C
ipP 11 43 49.6
De iP 11 43 57.1 C
ipP 11 44 07.2
Kurile Islands. h = 35 km
(Up,Um,Ud,De).
m = 6.0 (Up,Ki).

" 12 Up iP 11 45 05.4
ipP 11 45 17.8
Ki iP 11 44 19.5
Um iP 11 44 40.6
ipP 11 44 52.5
Ud iP 11 45 11.8 D
i 11 45 17.2
ipP 11 45 23.7
De iP 11 45 29.8
Kurile Islands. h = 45 km
(Up,Um,Ud).

" 12 Ud iP 11 49 33.3
Kurile Islands (h = N).

" 12 Um iP 12 02 38.5

" 12 Ud iP 12 04 59.6
Kurile Islands (h = N).

" 12 Um iP 12 07 30.1
ipP 12 07 42.3
Ud iP 12 08 02.9
Kurile Islands. h = 45 km
(Um).

" 12 Ud iP 12 14 25.4
ipP 12 14 36.3
Japan. h = 40 km (Ud).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 Um iP 12 17 45.0
Ud iP 12 18 16.1
ipP 12 18 27.3
Kurile Islands. h = 40 km (Ud).
Origin time = 12 07 08.

" 12 Up iP 12 34 51.2
Ki iP 12 34 35.9 C
i 12 34 43.2
micr sec
P Z' 0.3 1.5
Sk iP 12 34 56.6 C
Um iP 12 34 40.7 C
Ud iP 12 34 59.5 C
ipP 12 35 09.9
De iP 12 35 09.3
Molucca Passage. h = 40 km (Ud).

" 12 Up iP 12 38 31.8
Sk iP 12 37 34.0
Um iP 12 37 26.2
De iP 12 38 53.6

" 12 Up iP 12 42 53.9 C
ipP 12 43 05.3
micr sec
P Z' 0.1 0.9
Mx E 3.1 23
Mx N 4.3 23
Mx Z 6.1 23
Ki iP 12 42 09.9
ipP 12 42 20.2
micr sec
P Z' 0.1 1.0
Mx E 4.0 18
Mx N 1.5 19
Mx Z 5.1 20
Sk iP 12 42 45.0
ipP 12 42 55.3
Um iP 12 42 29.6
Ud iP 12 43 00.7
ipP 12 43 10.8
De iP 12 43 18.3 C
ipP 12 43 28.1
Japan. h = 40 km (Up,Ki,Sk, Ud,De).
m = 6.0, M = 5.8 (Up,Ki).

" 12 Up iP 12 49 57.1
Ud iP 12 50 02.7
Kurile Islands.
Origin time = 12 38 55.

" 12 Ud iP 12 55 47.1 C
Kurile Islands (h = N).

1969
Aug. 12 Ki iP 13 06 57.6

" 12 Ki iP 13 08 52.8
Um iP 13 08 57.8
Ud iP 13 09 16.9
Molucca Passage (h = 70 km).

" 12 Ud iP 13 13 31.7
Kurile Islands.
Origin time = 13 02 24.

" 12 Ki iP 13 22 46.7
Ud iP 13 23 37.9 C
Kurile Islands (h = N).

" 12 Up iP 13 27 40.8
micr sec
P Z' 0.1 0.8
Ki iP 13 26 56.0 C
micr sec
P Z' 0.1 1.0
Sk iP 13 27 31.2
Um iP 13 27 16.5
Ud iP 13 27 47.5 C
ipP 13 27 58.5
Kurile Islands. h = 40 km (Ud).
m = 6.0 (Up,Ki).

" 12 Up iP 13 29 11.9 C
iS 13 38 12
iScS 13 39 08
micr sec
P Z' 0.1 0.6
Mx E 0.9 16
Mx N 1.9 16
Mx Z 1.9 15
D = 7650 km = 69°.
Ki iP 13 28 26.0
ipP 13 28 37.6
micr sec
P Z' 0.2 1.3
Mx N 1.8 16
Mx Z 4.6 18
Sk iP 13 29 02.3
ipP 13 29 13.9
Um iP 13 28 46.4
Ud iP 13 29 18.9
ipP 13 29 30.3
De iP 13 29 36.4 C
ipP 13 29 47.5
Kurile Islands. h = 40 km (Ki,Sk,Ud,De).
m = 6.2, M = 5.5 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	12	Ud	iP	13 34 25.0	
			ipP	13 34 35.6	
		Kurile Islands. h = 40 km (Ud).			
		Origin time = 13 23 17.			
"	12	Ud	iP	13 36 14.3	
			ipP	13 36 25.9	
		Kurile Islands. h = 45 km (Ud).			
		Origin time = 13 25 06.			
"	12	Up	iP	13 37 33.0	
		Ki	iP	13 36 47.9	C
		Sk	iP	13 37 23.6	
		Ud	iP	13 37 39.2	
			ipP	13 37 51.9	
		Kurile Islands. h = 45 km (Ud).			
		Origin time = 13 26 31.			
"	12	Up	iP	13 55 44.7	
		Ud	iP	13 55 51.0	
		Kurile Islands (h = N).			
"	12	Ud	iP	14 30 48.2	
		Kurile Islands (h = N).			
"	12	Ud	iP	14 31 29.2	
"	12	Ki	iP	14 38 10.9	
		Um	iP	14 38 31.5	
		Ud	iP	14 39 02.5	
			ipP	14 39 12.8	
		Kurile Islands. h = 40 km (Ud).			
		Origin time = 14 27 55.			
"	12	Um	iP	14 43 42.1	
		Ud	iP	14 44 13.0	
			ipP	14 44 24.3	
		De	iP	14 44 30.9	
		Kurile Islands. h = 40 km (Ud).			
"	12	Ud	iP	14 45 08.2	
			i(pP)	14 45 18.0	
"	12	Up	iP	14 49 46.7	
		Kurile Islands (h = N).			
"	12	Um	iP	14 50 20.3	
"	12	Ki	iP	15 10 45.0	
		Um	iP	15 11 05.7	
		Ud	iP	15 11 36.9	
			ipP	15 11 48.2	
		Kurile Islands. h = 40 km (Ud).			

1969 Aug.	12	Up	iP	15 23 28.1	
			ipP	15 23 40.2	
		Ki	eP	15 22 41	
		Sk	eP	15 23 19	
			ipP	15 23 31.1	
		Um	eP	15 23 02	
			ipP	15 23 14.9	
		Ud	iP	15 23 33.3	C
			ipP	15 23 46.9	
		De	iP	15 23 49.8	
			ipP	15 24 04.3	
		Kurile Islands. h = 50 km (Up,Sk,Um,Ud,De).			
"	12	Up	iP	15 36 58.3	
			ipP	15 37 10.8	
		Ki	iP	15 36 12.6	
		Sk	iP	15 36 49.5	
		Um	iP	15 36 32.3	
		Ud	iP	15 37 04.7	
		Kurile Islands. h = 45 km (Up).			
"	12	Up	iP	15 39 02.2	
			ipP	15 39 15.6	
				micr sec	
			P Z'	0.1 0.7	
		Ki	iP	15 38 15.5	
			ipP	15 38 29.4	
				micr sec	
			P Z'	0.1 1.0	
			Mx E	0.3 15	
			Mx N	0.4 18	
			Mx Z	0.7 17	
		Sk	iP	15 38 51.6	C
		Um	iP	15 38 37.0	
			ipP	15 38 49.5	
		Ud	iP	15 39 08.2	
			ipP	15 39 20.5	
		De	iP	15 39 25.9	C
			ipP	15 39 39.2	
		Kurile Islands. h = 50 km (Up,Ki,Um,Ud,De).			
		m = 6.1 (Up,Ki).			
"	12	Um	iP	15 39 35.5	
"	12	Ud	iP	15 52 50.7	
		Kurile Islands.			
		Origin time = 15 41 43.			
"	12	Up	iP	16 00 29.2	
		Ki	iP	15 59 43.9	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 (cont.)
Ud iP 16 00 35.3 C
Kurile Islands.
Origin time = 15 49 27.

" 12 Up iP 16 00 57.9 C
i 16 01 04.4
ipP 16 01 10.0
micr sec
P Z' 0.1 0.7
Ki iP 16 00 12.2 C
micr sec
P Z' 0.1 1.0
Mx E 0.5 18
Sk iP 16 00 47.3
ipP 16 00 59.0
Um iP 16 00 33.1 C
ipP 16 00 45.2
Ud iP 16 01 04.4
ipP 16 01 16.3
De iP 16 01 21.8
Kurile Islands. h = 45 km
(Up,Sk,Um,Ud).
Origin time = 15 49 56.
m = 6.1 (Up,Ki).

" 12 Up iP 16 05 21.0

" 12 Um iP 16 40 49.9
Ud iP 16 41 20.9
Kurile Islands (h = N).

" 12 Up iP 16 54 41.1
Ki iP 16 53 51.8
Um iP 16 54 16.2 C
Ud iP 16 54 48.1 C
Kurile Islands (h = 25 km).

" 12 Ud iP 17 01 10.1
Kurile Islands.
Origin time = 16 50 02.

" 12 Ud iP 17 11 35.6
Kurile Islands (h = N).

" 12 Up iP 17 19 41.4
ipP 17 19 54.5
Ki iP 17 18 56.9
micr sec
Mx E 0.5 15
Mx N 0.3 16
Mx Z 0.6 16
Sk eP 17 19 33
(cont.)

1969
Aug. 12 (cont.)
Um iP 17 19 17.5
ipP 17 19 27.2
Ud iP 17 19 48.0
ipP 17 19 59.3
De iP 17 20 06.1
ipP 17 20 16.3
Kurile Islands. h = 40 km
(Up,Um,Ud,De).

" 12 Up iP 17 46 09.7
Um iP 17 45 45.1
Ud iP 17 46 16.0
Kurile Islands (h = N).

" 12 Ud iP 17 55 39.7
ipP 17 55 49.1
Kurile Islands. h = 35 km
(Ud).
Origin time = 17 44 32.

" 12 Um iP 17 57 58.0

" 12 De iP 18 28 33.4

" 12 Ud iP 18 35 31.5

" 12 Up iP 19 00 56.0
ipP 19 01 06.4
Ki eP 19 00 11
Um iP 19 00 31.2
Ud iP 19 01 02.2
ipP 19 01 13.0
Kurile Islands. h = 40 km
(Up,Ud).
Origin time = 18 49 54.

" 12 Up iP 19 29 13.5
Ki iP 19 28 27.8
Sk iP 19 29 02.8
Um iP 19 28 48.3 C
Ud iP 19 29 19.4
De iP 19 29 39.0
Kurile Islands (h = N).

" 12 Ud iP 19 31 50.7
Kurile Islands (h = 25 km).

" 12 Ud iP 19 32 22.0

" 12 Ud iP 19 34 11.0

" 12 Ud iP 19 53 48.9

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	12	Ud	iP		20 24 42.6	
			ipP		20 24 52.7	
		Kurile Islands. h = 35 km (Ud).				
		Origin time = 20 13 35.				
"	12	Up	iP		20 29 47.5	
		Um	iP		20 29 23.1	
		Ud	iP		20 29 53.6	
		Kurile Islands (h = N).				
"	12	Ud	iP		20 38 39.2	
			ipP		20 38 50.7	
		Kurile Islands. h = 45 km (Ud).				
		Origin time = 20 27 31.				
"	12	Up	eP		20 55 47	
			i		20 56 31.1	
"	12	Up	iP		21 15 30.0	C
		Ud	iP		21 15 36.3	
		Kurile Islands.				
		Origin time = 21 04 28.				
"	12	Up	iP		21 27 16.3	C
			iS		21 36 14	
					micr	sec
			P	Z'	0.3	0.8
			Mx	E	0.6	16
			Mx	N	1.4	17
			Mx	Z	1.3	17
			D = 7650 km = 69°.			
		Ki	iP		21 26 30.8	C
					micr	sec
			P	Z'	0.2	1.0
			Mx	E	1.2	21
			Mx	N	1.3	17
			Mx	Z	2.7	17
		Sk	iP		21 27 06.6	C
		Um	iP		21 26 51.7	C
			iS		21 35 31	
		Ud	iP		21 27 22.8	C
			ipP		21 27 35.0	
		De	iP		21 27 40.0	C
		Japan. h = 45 km (Ud).				
		m = 6.4, M = 5.4 (Up,Ki).				
"	12	Up	eP		21 34 41	
"	12	Up	iP		21 36 36.0	
"	12	Up	iP		21 39 22.4	
			i(pP)		21 39 31.9	
"	12	Up	iP		21 40 54.0	

1969 Aug.	12	Up	iP		21 56 24.2	
"	12	Ud	iP		22 06 14.5	
"	12	Up	iP		22 07 38.1	
					micr	sec
			P	Z'	0.1	0.6
			Mx	E	0.6	15
			Mx	N	0.7	15
		Ki	iP		22 06 52.0	
					micr	sec
			Mx	E	1.2	18
			Mx	N	1.0	17
			Mx	Z	1.6	16
		Um	iP		22 07 14.4	C
		Ud	iP		22 07 44.2	C
		Kurile Islands (h = 15 km).				
		M = 5.1 (Up,Ki).				
"	12	Up	iP		22 09 07.7	
		Ud	iP		22 09 13.5	
		Kurile Islands.				
		Origin time = 21 58 06.				
"	12	Up	iP		22 11 28.0	
"	12	Up	iP		22 15 37.5	
			i		22 15 57.8	
"	12	Up	iP		22 18 57.0	
"	12	Up	iP		22 32 53.2	C
			ipP		22 33 07.1	
		Ki	iP		22 32 00.9	
		Sk	eP		22 32 38	
		Um	iP		22 32 25.5	C
			ipP		22 32 37.8	
		Ud	iP		22 32 56.9	C
		Kamchatka. h = 50 km (Up,Um).				
"	12	Up	iP		22 35 27.2	
			i(pP)		22 35 36.6	
"	12	Ud	iP		22 38 01.4	C
"	12	Up	e(P)		22 40 46	
			i(pP)		22 40 54.6	
"	12	Up	eP		22 43 13	
"	12	Up	iP		22 44 58.3	
"	12	Ud	iP		22 56 20.1	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 12 Up iP 23 17 01.3 C
i 23 17 03.8
iS 23 26 06
micr sec
P Z' 0.1 0.7
Mx E 1.3 17
Mx N 2.0 20
Mx Z 2.3 18
D = 7650 km = 69°.
Ki iP 23 16 15.6
i 23 16 18.6
eS 23 24 43
micr sec
P Z' 0.2 1.0
S N 0.4 12
Mx E 4.1 19
Mx N 3.3 20
Mx Z 4.6 18
D = 6900 km = 62°.
Sk iP 23 16 51.5
i 23 16 54.1
Um iP 23 16 36.7
i 23 16 39.4
eS 23 25 17
Ud iP 23 17 07.3 C
i 23 17 10.2
De iP 23 17 25.3 C
i 23 17 27.8
Kurile Islands (h = N).
m = 6.2, M = 5.6 (Up,Ki).
Double P, average interval 2.7 sec; cf Aug. 12, 04 09, 06 04 and 09 34.

" 12 Up iP 23 26 54.6 C
micr sec
P Z' 0.1 0.9
Ki iP 23 26 08.9
micr sec
P Z' 0.1 1.0
Sk iP 23 26 44.5 C
Um iP 23 26 29.8
ipP 23 26 43.1
Ud iP 23 27 00.7 C
De iP 23 27 19.8
ipP 23 27 32.0
Kurile Islands. h = 45 km (Um,De).
m = 6.0 (Up,Ki).

" 12 Up iP 23 51 43.6
Ki iP 23 50 58.2
Sk eP 23 51 34
Ud iP 23 51 49.7
Kurile Islands (h = N).

1969
Aug. 12 Ud iP 23 54 41.1

" 12 Up iP 00 00 30.3
-13 Ki iP 23 59 45.5
Sk eP 00 00 20
Um iP 00 00 05.4
Ud iP 00 00 34.6
i 00 00 36.6
Kurile Islands (h = N).

" 13 Up iP 00 04 03.1 C
Ki iP 00 03 18.5
Sk iP 00 03 53.7
Um iP 00 03 38.4 C
Ud iP 00 04 09.5 C
ipP 00 04 19.9
Japan. h = 40 km (Ud).

" 13 Up iP 00 05 28.3
Ud iP 00 05 44.2

" 13 Up iP 00 18 08.0
Ud iP 00 18 14.1
Kurile Islands.
Origin time = 00 07 06.

" 13 Ud iP 00 29 42.7
Japan (h = 60 km).

" 13 Up eP 00 38 43

" 13 Ud iP 01 04 13.9
Kurile Islands.
Origin time = 00 53 06.

" 13 Ud iP 01 08 06.9
ipP 01 08 17.2
Kurile Islands. h = 40 km (Ud).
Origin time = 00 56 59.

" 13 Up iP 01 13 19.0
Sk eP 01 13 09
Um iP 01 12 53.5
Ud iP 01 13 24.5
ipP 01 13 37.4
Kurile Islands. h = 50 km (Ud).

" 13 Up i(P) 01 31 44.3

" 13 Up iP 01 48 33.6
Um iP 01 48 09.2
Ud iP 01 48 40.6 C
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 13 (cont.)

Ud	ipP		01 48 52.6	

Kurile Islands. h = 45 km (Ud).

" 13

Up	iP		02 06 29.8	

" 13

Ud	eP		02 08 59	
	epP		02 09 08	

Kurile Islands. h = 35 km (Ud).

" 13

Up	iP		02 18 10.5	
	ipP		02 18 24.7	
			micr sec	
	P	Z'	0.1 0.8	
	Mx	E	0.8 15	
	Mx	N	1.3 16	
	Mx	Z	1.1 18	
Ki	iP		02 17 24.6	
	eScS		02 27 27	
			micr sec	
	P	Z'	0.1 1.2	
	Mx	E	1.5 18	
	Mx	N	0.8 19	
	Mx	Z	2.0 18	
Sk	iP		02 18 01.1	
Um	iP		02 17 45.2	
Ud	iP		02 18 16.6	C
	ipP		02 18 30.7	
De	iP		02 18 34.3	
	iPcP		02 18 54.8	

Kurile Islands. h = 50 km (Up,Ud).
m = 6.0, M = 5.3 (Up,Ki).

" 13

Ud	iP		02 25 08.8	

" 13

Up	iP		02 39 09.6	
Um	iP		02 38 44.6	
Ud	iP		02 39 15.6	

Kurile Islands (h = N).

" 13

Ud	iP		02 40 55.1	

Molucca Passage (h = N).

" 13

Up	iP		03 15 01.3	

" 13

Up	iP		03 18 16.7	

" 13

Up	iP		03 40 17.5	D
	iS		03 49 17	
			micr sec	
	P	Z'	0.1 0.9	
	Mx	E	0.7 15	
	Mx	N	0.7 15	
	Mx	Z	1.2 15	

D = 7650 km = 69°.
(cont.)

1969
Aug. 13 (cont.)

Ki	iP		03 39 31.3	
	ipP		03 39 41.8	
			micr sec	
	Mx	E	1.7 19	
	Mx	N	1.2 19	
	Mx	Z	3.4 19	
Sk	iP		03 40 06.9	
Um	iP		03 39 52.1	
	iS		03 48 29	
Ud	iP		03 40 23.6	D
	ipP		03 40 34.6	
De	iP		03 40 41.1	D
	i(pP)		03 40 48.6	

Kurile Islands. h = 40 km (Ki,Ud).
M = 5.3 (Up,Ki).

" 13

Up	iP		03 58 17.8	
Ki	eP		03 57 32	
Sk	iP		03 58 07.0	
Um	iP		03 57 52.5	C
	ipP		03 58 04.5	
Ud	iP		03 58 23.6	C
	ipP		03 58 38.3	
De	iP		03 58 41.5	

Kurile Islands. h = 50 km (Um,Ud).

" 13

Up	eP		04 01 59	
Um	iP		04 01 35.4	
Ud	iP		04 02 06.5	
	ipP		04 02 19.4	

Kurile Islands. h = 50 km (Ud).

" 13

Up	iP		04 04 05.7	
Um	iP		04 03 41.1	
	ipP		04 03 52.4	
Ud	iP		04 04 12.1	
	ipP		04 04 22.7	

Kurile Islands. h = 40 km (Um,Ud).
Origin time = 03 53 04.

" 13

Up	iP		04 10 50.4	
			micr sec	
	P	Z'	0.1 0.7	
Ki	iP		04 12 05.9	
Sk	iP		04 11 31.9	
Um	iP		04 11 30.1	
	i		04 11 41.1	
Ud	iP		04 10 57.7	
De	iP		04 10 24.6	

Greece (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	13	Up	iP		04 23 57.8	
		Ud	iP		04 24 04.4	
			ipP		04 24 16.0	
		Japan. h = 45 km (Ud).				
"	13	Up	iP		04 39 22.5	C
			ipP		04 39 33.7	
					micr	sec
			P	Z'	0.1	0.6
			Mx	E	0.6	15
			Mx	N	0.8	16
			Mx	Z	1.3	16
		Ki	iP		04 38 36.5	
			i		04 38 44.6	
			ipP		04 38 48.3	
					micr	sec
			P	Z'	0.1	1.3
			Mx	E	1.3	16
			Mx	N	1.1	16
			Mx	Z	1.8	15
		Sk	iP		04 39 12.2	
		Um	iP		04 38 57.1	
			ipP		04 39 09.1	
		Ud	iP		04 39 28.2	
		De	iP		04 39 45.7	
			i		04 39 54.3	
			ipP		04 39 57.7	
		Kurile Islands. h = 45 km (Up,Ki,Um,De).				
		m = 6.0, M = 5.2 (Up,Ki).				
"	13	Ud	iP		04 48 55.4	
"	13	Up	iPKP		05 02 36.8	
		Ud	i(PKP)		05 02 32.4	
			iPKP		05 02 42.2	
		De	iPKP		05 02 49.6	
		Tonga-Kermadec Islands (h = 380 km).				
"	13	Up	e(P)		05 12 53	
"	13	Ud	iP		05 54 58.5	
"	13	Ud	iP		05 58 38.5	
"	13	Ud	iP		06 06 00.5	
		Kurile Islands (h = 35 km).				
"	13	Up	iP		06 09 31.0	
"	13	Um	iP		06 15 51.5	
		Ud	iP		06 16 24.4	
		Kurile Islands.				
		Origin time = 06 05 15.				

1969 Aug.	13	Up	iP		06 21 25.1	
		Ki	eP		06 20 40	
		Sk	eP		06 21 15	
		Um	iP		06 21 01.4	
		Ud	iP		06 21 31.8	
		De	iP		06 21 49.8	
		Kurile Islands (h = 60 km).				
"	13	Up	iP		07 35 09.8	C
			i		07 35 14.2	
					micr	sec
			P	Z'	0.1	0.7
		Ki	iP		07 34 24.8	
			ipP		07 34 35.4	
		Sk	iP		07 35 01.1	
		Um	iP		07 34 46.0	
			ipP		07 34 54.6	
		Ud	iP		07 35 16.1	
		De	iP		07 35 34.3	
			ipP		07 35 43.6	
		Kurile Islands. h = 35 km (Ki,Um,De).				
"	13	Up	iP		08 42 32.2	
			i		08 42 35.3	
			i		08 42 37.7	
			eS		08 51 28	
					micr	sec
			P	Z'	0.2	0.6
			Mx	E	2.4	18
			Mx	N	4.0	18
			Mx	Z	4.5	20
		D = 7600 km = 68 1/2°.				
		Ki	iP		08 41 47.3	
			eS		08 50 04	
					micr	sec
			P	Z	0.8	7
			P	Z'	0.1	1.2
			S	E	1.0	13
			S	N	0.5	10
			Mx	E	4.4	19
			Mx	N	3.3	20
			Mx	Z	2.3	14
		D = 6850 km = 61 1/2°.				
		Sk	iP		08 42 23.0	
		Um	iP		08 42 06.8	C
			i		08 42 08.4	
			iPa		08 46 01	
		Ud	iP		08 42 39.5	
			i		08 42 41.1	
		De	iP		08 42 57.2	
		Kurile Islands (h = N).				
		m = 6.3, M = 5.8 (Up,Ki).				
		Multiple P.				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 13 Up iP 09 31 38.2
Ki iP 09 30 51.5
Sk iP 09 31 27.2
Um iP 09 31 12.0
Ud iP 09 31 43.9
De iP 09 32 02.1
Kurile Islands (h = N).

" 13 Ud iP 09 39 19.1 C
Kurile Islands (h = N).

" 13 Ud eP 10 18 24
Kurile Islands (h = N).

" 13 Up iP 12 24 14.7
Ki iP 12 23 29.4
ipP 12 23 42.0
micr sec
P Z' 0.1 1.0
Sk iP 12 24 05.1
Um iP 12 23 50.5
Ud iP 12 24 20.6 C
ipP 12 24 32.4
De iP 12 24 38.1
ipP 12 24 49.0
Kurile Islands. h = 45 km
(Ki,Ud,De).

" 13 Ud iP 12 39 54.0
Kurile Islands.
Origin time = 12 28 46.

" 13 Up iP 12 41 53.5
micr sec
P Z' 0.1 0.6
Ki iP 12 41 07.3
ipP 12 41 19.0
micr sec
P Z' 0.1 1.0
Mx E 0.8 18
Mx N 0.6 18
Mx Z 0.9 17
Sk iP 12 41 44.1
Um iP 12 41 28.5
ipP 12 41 40.2
Ud iP 12 41 59.2 C
De iP 12 42 17.0
Kurile Islands. h = 45 km
(Ki,Um).
m = 6.1 (Up,Ki).

" 13 Up iP 12 42 28.5
Ki iP 12 41 42.6
Um iP 12 42 03.9
(cont.)

1969
Aug. 13 (cont.)
Ud iP 12 42 34.9 C
ipP 12 42 48.2
De iP 12 42 53.0
Kurile Islands. h = 50 km
(Ud).
Origin time = 12 31 27.

" 13 Ki ePn 13 10 48
iSn 13 11 34.3
iSg 13 11 53.0
D = 420 km = 3.8°.
Sk i(Sg) 13 14 16.1
Um i(Sg) 13 12 42.6
Northwest Russia.
Origin time = 13 09 47.
Explosion?

" 13 Ki iP 13 47 35.1
ipP 13 47 46.0
Ud iP 13 48 26.4
ipP 13 48 36.6
Kurile Islands. h = 40 km
(Ki,Ud).
Origin time = 13 37 18.

" 13 Ud iP 13 49 44.6
i(pP) 13 49 54.1

" 13 Ki iP 14 39 16.6
Sk iP 14 39 44.1
Ud iP 14 40 08.7
De iP 14 40 34.0 C
Alaska (h = 70 km).

" 13 Up iP 14 39 49.0 C
Sk iP 14 39 38.3
Um iP 14 39 24.1
Ud iP 14 39 54.2
De iP 14 40 13.8
Kurile Islands (h = N).

" 13 Up iP 15 09 49.5
Ud iP 15 09 53.5
Kurile Islands (h = N).

" 13 Ki iP 15 22 51.8

" 13 Ud eP 15 24 36
Kurile Islands.
Origin time = 15 13 28.

" 13 Up iP 16 23 15.6 C
Ki iP 16 22 31.2
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 13 (cont.)

Sk	iP	16 22 46.7	
Um	iP	16 22 55.1	
	i	16 22 59.4	
Ud	iP	16 23 08.5	C

Vancouver Island (h = N).

" 13

Up	i(P^x)	17 14 01.6	
	iPg	17 14 10.0	
	iLgl	17 15 12.3	
Sk	eLgl	17 17 36	
	eSg	17 17 54	
Ud	iLgl	17 16 02.4	
	iSg	17 16 11.3	
De	iPn	17 13 40.6	
	iP^x	17 13 49.3	
	iSn	17 14 39.5	
	iLgl	17 14 58.3	

D = 540 km = 4.9°.
Lithuania.
Origin time = 17 12 24.
Explosion?

" 13

Ud	iP	17 15 04.9	

Japan (h = N).

" 13

Up	iP		17 18 19.3	
	ipP		17 18 31.0	
	iS		17 27 22	
			micr	sec
	P	Z'	0.1	1.0
	Mx	E	0.6	17
	Mx	N	1.3	16
	Mx	Z	1.2	15
	D = 7650 km = 69°.			
Ki	iP		17 17 34.9	
			micr	sec
	P	Z'	0.1	1.1
	Mx	E	0.7	15
	Mx	N	1.3	17
	Mx	Z	2.0	16
Sk	iP		17 18 09.9	
Um	iP		17 17 54.5	
	i		17 18 03.9	
	eS		17 26 35	
Ud	iP		17 18 25.6	C
	ipP		17 18 37.5	
De	iP		17 18 43.1	

Japan. h = 45 km (Up,Ud).
m = 6.0, M = 5.2 (Up,Ki).

" 13

Up	iP	17 27 06.2	
Ud	iP	17 27 12.3	

(cont.)

1969
Aug. 13 (cont.)

Ud	ipP	17 27 21.5	
De	iP	17 27 30.1	

Kurile Islands. h = 35 km (Ud).

" 13

Up	iPg	18 04 38.7	
	iSg	18 06 03.1	
Sk	eSg	18 08 23	
Um	iLgl	18 07 51.0	
Ud	iSg	18 06 39.3	
De	iPg	18 04 18.1	
	iSg	18 05 17.2	

Lithuania-Poland border region. Explosion?

" 13

Up	iP	18 20 02.8	C
Ki	iP	18 19 16.9	
Sk	iP	18 19 52.2	
Um	iP	18 19 37.7	
Ud	iP	18 20 08.7	C
	ipP	18 20 18.3	
De	iP	18 20 26.5	C

Kurile Islands. h = 35 km (Ud).

" 13

Ud	eP	18 59 21	
	i	18 59 28.6	

" 13

Up	iP	19 44 38.2	
Ki	iP	19 43 52.0	
Sk	iP	19 44 27.8	
Um	iP	19 44 12.8	
Ud	iP	19 44 44.4	C
De	iP	19 45 02.2	C

Kurile Islands (h = 70 km).

" 13

Up	iP	20 20 20.7	C
Ud	iP	20 20 26.6	C
De	iP	20 20 43.7	

Kurile Islands (h = 35 km).

" 13

Up	iP	21 23 56.0	
	ipP	21 24 04.7	
Ki	iP	21 23 11.4	
Um	eP	21 23 32	
Ud	iP	21 24 01.5	
	ipP	21 24 11.0	
De	iP	21 24 19.3	

Kurile Islands. h = 35 km (Up,Ud).

" 13

Ud	iP	21 28 13.9	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	13	Up	iP		22 53 10.6	C
		Sk	iP		22 52 59.7	
		Um	iP		22 52 45.1	
		Ud	iP		22 53 16.5	C
		De	iP		22 53 34.3	C
		Kurile Islands (h = 30 km).				
"	13	Up	iP		23 08 08.7	C
			iPP		23 10 36.6	
			iS		23 17 08	
					micr sec	
			P	Z	0.5 3	
			P	Z'	0.1 0.5	
			Mx	E	7.9 19	
			Mx	N	11 22	
			Mx	Z	16 20	
			D = 7600 km = 68 1/2°.			
		Ki	iP		23 07 23.9	C
			ipP		23 07 32.4	
			iPa		23 10 54	
			eS		23 15 38	
					micr sec	
			pP	Z'	0.1 1.0	
			S	N	2.0 20	
			Mx	E	12 18	
			Mx	N	8.2 19	
			Mx	Z	12 22	
			D = 6850 km = 61 1/2°.			
		Sk	iP		23 07 58.4	
			i		23 08 14.9	
		Um	iP		23 07 43.5	C
			iPa		23 11 50	
			iS		23 16 15	
		Ud	iP		23 08 14.9	C
		De	iP		23 08 32.9	C
			ipP		23 08 41.0	
		Kurile Islands. h = 30 km (Ki,De).				
		m = 6.2, M = 6.1 (Up,Ki).				
"	13	De	iP		23 24 22.5	
		Kurile Islands (h = 40 km).				
"	13	Ud	iP		23 58 25.2	
		Kurile Islands (h = N).				
"	14	Up	eP		00 09 41	
"	14	Up	iP		00 23 39.7	
			ipP		00 23 51.2	
		Ki	iP		00 22 54.8	
		Sk	iP		00 23 29.7	
		Ud	iP		00 23 45.5	
		(cont.)				

1969 Aug.	14	(cont.)				
		Ud	ipP		00 23 57.1	
		Japan. h = 45 km (Up,Ud).				
"	14	Up	iP		00 29 16.2	
		Sk	iP		00 29 13.9	C
		Um	iP		00 29 00.1	C
		Ud	iP		00 29 22.9	
		Volcano Islands (h = 230 km).				
"	14	Up	eP		00 43 06	
			i		00 43 17.9	
			i		00 43 29.9	
					micr sec	
			Mx	E	0.5 17	
			Mx	N	1.0 19	
			Mx	Z	1.1 17	
		Ki	iP		00 42 49.8	
			i		00 42 56.4	
					micr sec	
			Mx	E	0.9 20	
			Mx	N	0.8 19	
			Mx	Z	1.4 21	
		Sk	eP		00 43 10	
		Um	eP		00 42 55	
			i		00 43 00.9	
		Ud	eP		00 43 15	
			i		00 43 21.1	
		Molucca Passage (h = N).				
		M = 5.4 (Up,Ki).				
		Double P; average interval about 6 sec.				
"	14	Ud	iP		01 55 29.4	
			ipP		01 55 40.5	
		Kurile Islands. h = 40 km (Ud).				
"	14	Up	iP		01 58 31.7	
		Ud	iP		01 58 35.5	
		Kurile Islands (h = N).				
"	14	Ud	iP		02 00 51.9	
"	14	Up	iP		03 18 35.7	
			ipP		03 18 47.9	
					micr sec	
			P	Z'	0.1 0.7	
		Ki	iP		03 17 49.8	
			ipP		03 18 00.9	
		Sk	eP		03 18 26	
		Um	iP		03 18 10.5	
			ipP		03 18 22.7	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 14 (cont.)

Ud	iP	03 18 41.8	C
	i	03 18 49.9	
	ipP	03 18 53.6	
De	eP	03 19 01	
	ipP	03 19 10.7	

Kurile Islands. h = 45 km (Up,Ki,Um,Ud).

" 14

Up	iP	03 33 52.2	
Um	iP	03 33 27.5	
Ud	iP	03 33 57.9	C

Kurile Islands (h = N).

" 14

Up	iP	03 48 49.6	
Ud	iP	03 48 55.5	

Kurile Islands (h = N).

" 14

Ud	iP	04 22 01.1	

Kurile Islands (h = N).

" 14

Up	iP	04 58 57.5	
	i	04 59 05.7	
	ipP	04 59 08.8	
Ki	iP	04 58 11.9	C
	ipP	04 58 23.0	
		micr sec	
	P Z'	0.1 1.0	
Sk	iP	04 58 47.1	
Um	iP	04 58 32.0	
Ud	iP	04 59 03.6	
	i	04 59 11.2	
De	iP	04 59 20.7	

Kurile Islands. h = 40 km (Up,Ki).
There is some uncertainty in the interpretation of the depth phases in this case. The phase arriving 7.9 sec in average after P (Up,Ud) may be pP and the one arriving 11.2 sec in average after P (Up,Ki) may be sP. This would give a depth of 30 km. The same remark applies to Aug. 13, 04 39, and to Aug. 14, 03 18, and possibly to Aug. 12, 12 34. A decision on this point would need a focal mechanism study.

" 14

Ud	iP	05 21 02.0	

Kurile Islands (h = N).

1969
Aug. 14

Ki	iP	05 51 49.0	
Sk	iP	05 52 24.0	
Um	i(pP)	05 52 20.0	
Ud	iP	05 52 40.1	

Kurile Islands (h = N).

" 14

Up	iP	06 17 45.3	
	ipP	06 17 59.0	
Ki	iP	06 16 59.4	C
		micr sec	
	P Z'	0.1 1.0	
Sk	iP	06 17 34.6	
Um	iP	06 17 19.8	
Ud	iP	06 17 50.7	C
	ipP	06 18 03.3	

Kurile Islands. h = 50 km (Up,Ud).

" 14

Up	i(P)	07 04 11.7	

" 14

Up	iPg	07 17 48.8	
	iSg	07 18 15.1	
		micr sec	
	Sg Z'	0.1 0.5	
	D = 220 km = 2.0°.		
Sk	iSg	07 19 36.4	
Um	iPg	07 18 01.9	
	iSg	07 18 37.3	
	D = 300 km = 2.7°.		
Ud	iPg	07 18 20.5	
	iSg	07 19 01.7	
	D = 390 km = 3.5°.		

Baltic Sea, 61.2°N, 20.5°E.
Origin time = 07 17 09.
Probably underwater explosion.

" 14

Up	iP	09 10 55.2	
	ipP	09 11 07.0	
		micr sec	
	P Z'	0.1 0.7	
Ki	iP	09 10 10.3	
		micr sec	
	Mx E	0.4 16	
	Mx N	0.4 17	
	Mx Z	0.7 17	
Sk	iP	09 10 45.4	
Um	iP	09 10 30.6	
Ud	iP	09 11 01.4	C

Kurile Islands. h = 45 km (Up).

" 14

Up	iP	10 40 39.2	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 14 Ud iP 11 15 37.3
ipP 11 15 48.7
Kurile Islands. h = 40 km (Ud).
Origin time = 11 04 29.

" 14 Up eL 11 58
micr sec
Mx E 0.5 19
Mx N 0.7 18
Mx Z 0.9 18
Ki eL 11 57
micr sec
Mx E 0.7 19
Mx N 0.4 18
Mx Z 0.7 17
New Britain (h = N).
M = 5.4 (Up,Ki).

" 14 Up iP 12 02 17.6 C
ipP 12 02 31.5
Ki ipP 12 01 44.3
Sk eP 12 02 07
Ud iP 12 02 23.4
ipP 12 02 37.3
Kurile Islands. h = 50 km
(Up,Ud).

" 14 Up iP 12 14 02.0

" 14 Ki iPg 12 16 34.9
iLgl 12 17 04.5
D = 290 km = 2.6°.
Origin time = 12 15 43.
Explosion?

" 14 Ud iP 12 27 24.9 C
ipP 12 27 35.1
Kurile Islands. h = 40 km (Ud).

" 14 Ud iP 12 44 31.5 C

" 14 Up i(P) 12 51 53.2

" 14 Up iP 13 13 22.1
i 13 13 56.7

" 14 Ud iP 13 28 37.1
ipP 13 28 47.6
Kurile Islands. h = 40 km (Ud).
Origin time = 13 17 29.

" 14 Up iP 13 42 50.5
ipP 13 43 01.4
(cont.)

1969
Aug. 14 (cont.)
Up micr sec
P Z' 0.1 0.5
Ki iP 13 42 05.3 C
Sk iP 13 42 40.2
Um iP 13 42 25.7
Ud iP 13 42 56.4 C
ipP 13 43 07.5
De iP 13 43 14.3
Japan. h = 40 km (Up,Ud).

" 14 Up iP 14 02 16.4
Ud iP 14 01 51.0

" 14 Up iP 14 30 07.5 C
iS 14 39 10
micr sec
P E 0.6 4
P N 1.6 4
P Z 3.7 6
P Z' 1.1 0.6
S E 2.6 7
S N 6.2 7
Mx E 23 16
Mx N 42 16
Mx Z 47 16
D = 7650 km = 69°.
Ki iP 14 29 21.6 C
ipP 14 29 28.8
iS 14 37 48
micr sec
P E 1.3 6
P N 1.2 6
P Z 3.2 6
P Z' 0.3 1.0
pP Z' 1.3 0.8
S E 7.4 11
S N 4.5 9
S Z 7.2 13
Mx E 78 16
Mx N 55 17
Mx Z 120 16
D = 6900 km = 62°.
Sk iP 14 29 57.2 C
ipP 14 30 03.1
Um iP 14 29 42.1 C
ipP 14 29 49.1
iS 14 38 25
Ud iP 14 30 13.4 C
ipP 14 30 19.0
iS 14 39 21.9
iP'P' 14 58 08.9
De iP 14 30 31.1C
iPcP 14 30 50.7
iS 14 39 57.8
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 14 (cont.)
Kurile Islands. h = 25 km (Ki,Sk,Um,Ud).
m = 7.0, M = 6.9 (Up,Ki).
This shock and the one at 05 14, Aug. 12, are the two largest aftershocks, both with M = 6.9, i.e. 1.2 units less than for the main shock.

"	14	Up	iP	14 30 53.7	
				micr	sec
			P	Z' 1.1	1.0
		Ki	iP	14 30 07.1	
				micr	sec
			P	Z' 0.6	0.9
		Sk	iP	14 30 42.4	
		Um	iP	14 30 27.5	
		Ud	iP	14 30 59.1	

Kurile Islands.
Origin time = 14 19 47.
m = 6.9 (Up,Ki).

"	14	Ki	iP	14 48 39.8	
		Ud	iP	14 49 30.9	C
			ipP	14 49 43.8	

Kurile Islands. h = 50 km (Ud).

"	14	Up	iP	15 02 34.5	
				micr	sec
			P	Z' 0.1	0.7
"	14	Up	iP	15 08 49.4	
"	14	Up	iP	15 10 43.4	D
		Ki	iP	15 09 57.9	
		Um	iP	15 10 17.5	
		Ud	iP	15 10 49.1	

Kurile Islands.
Origin time = 14 59 41.

"	14	Up	iP	15 18 55.4	
			ipP	15 19 07.8	
		Ud	iP	15 19 01.4	

Kurile Islands. h = 45 km (Up).
Origin time = 15 07 53.

"	14	Up	iP	15 22 29.2	
		Ki	iP	15 21 43.6	
		Ud	iP	15 22 35.5	C
			ipP	15 22 48.7	

Kurile Islands. h = 50 km (Ud).
Origin time = 15 11 27.

1969
Aug. 14

		Up	iP	15 24 55.8	
		Ki	iP	15 24 10.8	C
		Um	iP	15 24 30.9	
		Ud	iP	15 25 01.7	C

Kurile Islands (h = N).

"	14	Up	iP	15 30 35.3	
		Ki	iP	15 29 50.3	
		Sk	eP	15 30 25	
		Um	iP	15 30 10.8	
		Ud	iP	15 30 41.5	C
			ipP	15 30 53.5	

Kurile Islands. h = 45 km (Ud).

"	14	Ud	iP	15 35 00.7	
"	14	Up	iP	15 38 48.1	
			ipP	15 38 58.2	
		Ki	iP	15 38 02.5	
		Um	iP	15 38 23.4	
		Ud	iP	15 38 53.8	C
			ipP	15 39 07.6	

Kurile Islands. h = 45 km (Up,Ud).

"	14	Up	iP	15 49 23.8	
		Ki	iP	15 48 39.2	C
		Sk	eP	15 49 14	
		Um	iP	15 48 59.4	
			ipP	15 49 09.1	
		Ud	iP	15 49 30.4	C
			ipP	15 49 40.1	
		De	iP	15 49 47.5	

Kurile Islands. h = 35 km (Um,Ud).

"	14	Up	i(P)	15 54 12.4	
			i	15 54 19.3	
"	14	Up	iP	15 55 10.1	
		Um	iP	15 54 45.6	
		Ud	iP	15 55 16.3	
			ipP	15 55 26.5	
		De	iP	15 55 36.0	

Kurile Islands. h = 40 km (Ud).
Origin time = 15 44 08.

"	14	Ud	iP	15 56 41.1	C
"	14	Up	iP	15 57 32.1	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	14	Up	iP	16 38 40.8	
		Ki	iP	16 37 54.8	
		Sk	eP	16 38 30	
		Um	iP	16 38 15.4	
		Ud	iP	16 38 46.3	
		De	iP	16 39 03.8	
		Kurile Islands (h = N).			
"	14	Up	iP	17 09 46.1	
			ipP	17 09 59.9	
				micr sec	
			P Z'	0.1 0.6	
		Ki	iP	17 09 00.5	
		Sk	iP	17 09 36.0	
		Um	iP	17 09 21.4	
			ipP	17 09 33.4	
		Ud	iP	17 09 52.4	C
			ipP	17 10 05.7	
		De	iP	17 10 11.5	
			ipP	17 10 23.4	
		Kurile Islands. h = 45 km (Up,Um,Ud,De).			
"	14	Up	iP	17 16 57.5	
			iPcP	17 17 23.3	
				micr sec	
			P Z'	0.1 0.7	
		Ki	iP	17 16 11.7	
			iPcP	17 16 54.7	
		Sk	iP	17 16 47.3	
		Um	iP	17 16 32.5	
		Ud	iP	17 17 03.4	C
		De	iP	17 17 20.8	
		Kurile Islands (h = N).			
"	14	Ud	iP	17 24 04.8	
		Kurile Islands (h = N).			
"	14	Ud	iP	17 33 38.8	
"	14	Up	iP	18 02 25.3	
		Ki	iP	18 01 39.6	
		Sk	iP	18 02 14.8	
		Um	iP	18 02 00.2	
		Ud	iP	18 02 31.2	C
		De	iP	18 02 49.0	
		Japan (h = N).			
"	14	Up	iP	18 11 37.8	
"	14	Up	iP	18 32 42.3	
			ipP	18 32 53.4	
				micr sec	
			P Z'	0.1 0.7	
		(cont.)			

1969 Aug.	14	(cont.)			
		Ki	iP	18 31 57.2	C
		Sk	eP	18 32 31	
		Um	iP	18 32 17.6	C
		Ud	iP	18 32 48.0	
			i	18 32 56.5	
			ipP	18 33 01.2	
		De	iP	18 33 06.1	
		Kurile Islands. h = 45 km (Up,Ud).			
"	14	Up	i(P)	18 36 43.0	
			i	18 37 26.5	
"	14	Up	iP	18 39 57.4	
"	14	Ud	iP	18 48 57.0	
"	14	Up	iP	18 57 45.5	
		Ud	iP	18 57 52.4	
		Kurile Islands (h = N).			
"	14	Ud	iP	19 03 05.0	
			i(pP)	19 03 16.2	
"	14	Up	iP	19 05 34.2	
		Ki	iP	19 04 50.7	
		Um	iP	19 05 11.4	
		Ud	iP	19 05 42.4	
		Kurile Islands. Origin time = 18 54 34.			
"	14	Sk	iP	19 15 01.3	
"	14	Ki	iPg	19 17 13.7	
			iLgl	19 17 44.0	
			iSg	19 17 48.0	
			D = 290 km = 2.6°.		
		Origin time = 19 16 22. Explosion?			
"	14	Ud	iPg	19 26 00.5	
			iSg	19 26 25.4	
			iRg	19 26 32.5	
			D = 210 km = 1.9°.		
		Probably explosion.			
"	14	Ki	iPg	19 36 40.5	
			iLgl	19 37 11.3	
			D = 290 km = 2.6°.		
		Origin time = 19 35 49. Explosion?			
"	14	Ki	iPg	19 56 15.6	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 14 (cont.)

Ki	iLgl		19 56 45.7	
	iSg		19 56 50.0	
	D = 290 km = 2.6°.			
Origin time = 19 55 24.				
Explosion?				
" 14 Up	eP		20 09 45	
	i		20 10 18.0	
" 14 Ki	iPg		20 18 44.2	
	iLgl		20 19 14.2	
	iSg		20 19 18.1	
	D = 290 km = 2.6°.			
Origin time = 20 17 52.				
Explosion?				
" 14 Up	iP		20 26 46.5	C
	ipP		20 26 56.7	
			micr	sec
	P	Z'	0.1	0.6
Ki	iP		20 26 01.5	C
Sk	iP		20 26 37.4	
Um	iP		20 26 21.8	
Ud	iP		20 26 52.7	C
	ipP		20 27 05.7	
De	iP		20 27 10.2	
Japan. h = 45 km (Up,Ud).				
" 14 Up	i(P)		20 53 50.5	
" 14 Um	iP		21 21 35.0	
Ud	iP		21 22 06.5	
	ipP		21 22 16.1	
De	iP		21 22 24.3	
Kurile Islands. h = 35 km (Ud).				
" 14 Ki	iP		21 27 37.3	
" 14 Ud	iP		21 46 14.3	
Kurile Islands.				
Origin time = 21 35 06.				
" 14 Up	iP		21 55 54.2	
	i		21 56 11.3	
	iPP		21 56 22.6	
	eS		21 59 40	
			micr	sec
	Mx	E	1.6	17
	Mx	N	1.4	18
	Mx	Z	0.7	12
	D = 2400 km = 21 1/2°.			

(cont.)

1969
Aug. 14 (cont.)

Ki	eP		21 57 02	
			micr	sec
	Mx	E	1.0	14
	Mx	N	0.4	12
	Mx	Z	0.5	10
Sk	eP		21 56 37	
Um	iP		21 56 26.5	
	iS		22 00 53	
Ud	iP		21 56 02.7	
	i		21 56 13.8	
De	iP		21 55 30.2	
	i		21 56 26.7	
Turkey (h = 20 km).				
M = 4.7 (Up,Ki).				
" 14 Ud	iP		22 03 55.1	
Kurile Islands.				
Origin time = 21 52 47.				
" 14 Up	iP		22 20 56.7	
	i		22 21 03.8	
" 14 Up	iP		22 23 24.7	
	i		22 23 31.5	
			micr	sec
	P	Z'	0.1	0.5
	Mx	E	0.4	16
	Mx	N	0.5	18
	Mx	Z	0.9	14
Ki	iP		22 22 38.6	
			micr	sec
	Mx	E	0.8	18
	Mx	N	0.8	19
	Mx	Z	1.3	18
Sk	iP		22 23 14.5	C
Um	iP		22 22 59.6	
Ud	iP		22 23 30.8	
De	iP		22 23 49.2	C
Kurile Islands (h = N).				
M = 4.9 (Up,Ki).				
" 14 Ud	iP		23 08 31.2	
	i		23 08 39.3	
(Kurile Islands).				
" 14 Up	iP		23 17 10.6	
Um	iP		23 16 45.4	
Ud	iP		23 17 16.3	
Kurile Islands.				
Origin time = 23 06 08.				
" 14 Up	iP		23 44 25.9	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	14	Up	iP		23 59 10.0	C
			ipP		23 59 20.7	
					micr	sec
			P	Z'	0.1	0.8
			Mx	E	0.6	20
			Mx	N	0.6	20
		Ki	iP		23 58 16.6	C
			ipP		23 58 28.9	
					micr	sec
			P	Z'	0.1	1.0
			Mx	E	0.5	14
			Mx	N	0.6	18
			Mx	Z	0.6	14
		Sk	iP		23 58 53.2	C
		Um	iP		23 58 41.7	
			ipP		23 58 51.7	
		Ud	iP		23 59 12.8	
		De	iP		23 59 35.0	C
			ipP		23 59 47.6	
		Kamchatka. h = 40 km (Up,Ki,Um,De). m = 6.0, M = 5.0 (Up,Ki).				
"	15	Up	i(P)		00 11 37.7	
"	15	Ud	eP		00 14 42	
"	15	Up	iP		00 23 48.2	
"	15	Ud	eP		00 49 24	
"	15	Ud	iP		00 54 30.1	
		Kurile Islands. Origin time = 00 43 22.				
"	15	Up	iP		01 12 36.3	
			i		01 13 09.4	
			i		01 13 14.6	
"	15	Um	iP		01 17 56.9	
		Ud	iP		01 18 27.8	C
		Kurile Islands (h = N).				
"	15	Up	iP		01 48 45.9	
"	15	Up	eP		01 52 09	
"	15	Sk	iP		01 55 47.9	
		Ud	eP		01 55 49	
		De	iP		01 55 58.3	
		Costa Rica (h = 10 km).				
"	15	Up	eP		02 41 22	

1969 Aug.	15	Up			---	
					micr	sec
			Mx	E	0.5	19
			Mx	N	0.7	18
		Ki			---	
					micr	sec
			Mx	E	1.0	23
			Mx	N	1.0	22
			Mx	Z	1.7	23
		Um	ePP		03 56 41	
			iPS		04 05 59	
			eSS		04 11 47	
		New Guinea (h = 20 km). M = 5.3 (Up,Ki).				
"	15	Up	iP		04 43 07.0	C
			ipP		04 43 17.9	
			iS		04 52 09	
					micr	sec
			P	Z'	0.8	1.0
			S	E	1.0	13
			S	N	1.4	12
			Mx	E	4.1	17
			Mx	N	2.5	18
			Mx	Z	3.0	19
			D = 7700 km = 69 1/2°.			
		Ki	iP		04 42 20.9	C
			ipP		04 42 33.3	
			eS		04 50 40	
					micr	sec
			P	E	0.3	6
			P	N	0.4	7
			P	Z	1.6	11
			P	Z'	0.5	1.0
			S	E	1.7	13
			S	N	0.9	12
			Mx	E	9.8	18
			Mx	N	7.3	19
			Mx	Z	13	18
			D = 6900 km = 62°.			
		Sk	iP		04 42 56.6	C
			ipP		04 43 08.6	
		Um	iP		04 42 41.8	C
			ipP		04 42 54.2	
			iS		04 51 27	
		Ud	iP		04 43 13.0	C
			ipP		04 43 24.5	
		De	iP		04 43 30.6	C
			ipP		04 43 42.1	
		Kurile Islands. h = 45 km (Up,Ki,Sk,Um,Ud,De). m = 6.3, M = 5.9 (Up,Ki).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	15	Up	iP	04 51 21.4	
			ipP	04 51 33.2	
		Ki	iP	04 50 36.8	
		Sk	iP	04 51 10.7	
		Um	iP	04 50 55.9	
			ipP	04 51 07.9	
		Ud	iP	04 51 27.0	
			ipP	04 51 39.3	
		Kurile Islands. h = 45 km (Up,Um,Ud).			
		Origin time = 04 40 15.			
"	15	Um	iP	05 14 14.5	
		Ud	iP	05 14 45.4	
			ipP	05 14 56.6	
		Kurile Islands. h = 40 km (Ud).			
		Origin time = 05 03 38.			
"	15	Ud	iP	05 33 12.3	
		Kurile Islands.			
		Origin time = 05 22 04.			
"	15	Up	iP	05 46 22.2	
			i	05 46 38.7	
"	15	Up	iP	06 29 40.5	
				micr	sec
			P	Z' 0.1	0.9
			Mx	E 0.4	15
			Mx	N 0.5	17
			Mx	Z 0.5	16
		Ki	iP	06 28 54.4	
				micr	sec
			P	Z' 0.1	1.0
			Mx	E 0.6	16
			Mx	N 0.5	16
			Mx	Z 1.0	16
		Sk	iP	06 29 31.3	
		Um	iP	06 29 15.5	
			ipP	06 29 26.5	
		Ud	iP	06 29 46.7 C	
			ipP	06 30 00.5	
		De	iP	06 30 04.1	
		Kurile Islands. h = 45 km (Um,Ud).			
		m = 6.0, M = 5.0 (Up,Ki).			
"	15	Sk	iP	07 25 42.8 C	
		Um	iP	07 25 18.5	
		Ud	iP	07 25 43.2	
		Tibet (h = N).			
"	15	Up	iP	07 32 53.2	
		(cont.)			

1969 Aug.	15	(cont.)			
		Sk	iP	07 32 42.2	
		Um	iP	07 32 27.5	
		Ud	iP	07 32 58.4 C	
		De	iP	07 33 16.3 C	
		Kurile Islands (h = 20 km).			
"	15	Up	iP	08 54 06.4 C	
			ipP	08 55 16.5	
			iSKS	09 04 02	
			iS	09 04 15	
			iSP	09 05 21	
				micr	sec
			P	Z 1.3	2
			P	Z' 1.3	1.2
			SKS	E 0.4	3
			SKS	N 0.4	3
			S	E 0.6	4
			S	N 1.2	4
			Mx	E 0.8	18
			Mx	N 2.0	20
			Mx	Z 2.6	20
			D = 9800 km = 88°.		
		Ki	iP	08 53 37.6 C	
			ipP	08 54 48	
			isP	08 55 17	
			iS	09 03 19	
			iP'P'	09 20 07.1	
				micr	sec
			P	E 0.7	6
			P	N 0.4	6
			P	Z 2.0	6
			P	Z' 1.4	1.1
			S	E 4.8	6
			S	N 3.4	6
			S	Z 1.8	6
			S	Z' 0.4	1.8
			P'P'	Z' 0.1	1.7
			Mx	E 2.0	19
			Mx	N 1.2	15
			Mx	Z 2.3	19
			D = 9050 km = 81 1/2°.		
		Sk	iP	08 54 03.4 C	
			i	08 54 15.0	
		Um	iP	08 53 49.6 C	
			ipP	08 54 57	
			iS	09 03 38	
		Ud	iP	08 54 12.5 C	
			iPP	08 57 46.7	
			eSKS	09 04 08	
		De	iP	08 54 23.8 C	
			ipP	08 55 36.5	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 15 (cont.)
Mariana Islands. h = 300 km
(Up,Ki,Um,De).
m = 6.4, M = 5.6 (Up,Ki).
M not corrected for focal depth.

"	15	Um	iP	09 12 04.3	
"	15	Up	iP	09 59 01.2	
				micr	sec
			P Z'	0.1	1.0
		Ki	iP	09 58 15.0	
				micr	sec
			P Z'	0.1	1.0
		Sk	iP	09 58 50.7	
		Um	iP	09 58 35.9	
			ipP	09 58 51.9	
		Ud	iP	09 59 06.7	C
			ipP	09 59 18.9	
		De	iP	09 59 24.7	

Kurile Islands. h = 50 km
(Um,Ud).
m = 6.0 (Up,Ki).

"	15	Up	iP	10 13 24.9	
			ipP	10 13 37.6	
			eS	10 22 29	
				micr	sec
			pP Z'	0.2	1.3
			S N	1.3	11
			Mx E	1.2	16
			Mx N	2.4	15
			Mx Z	3.8	15
			D = 7700 km = 69 1/2°.		
		Ki	iP	10 12 39.8	
			ipP	10 12 54.5	
			eS	10 21 04	
				micr	sec
			P E	0.3	6
			P N	0.3	10
			P Z	0.7	8
			P Z'	0.1	1.1
			S E	1.1	11
			S N	1.0	10
			Mx E	3.4	15
			Mx N	5.4	15
			Mx Z	9.3	16
			D = 6950 km = 62 1/2°.		
		Sk	iP	10 13 15.3	
			ipP	10 13 28.0	
		Um	iP	10 12 59.9	
			ipP	10 13 14.0	
			iX	10 13 24.9	

(cont.)

1969
Aug. 15 (cont.)

Um	iS	10 21 41	
Ud	iP	10 13 30.7	
	ipP	10 13 45.4	
	iX	10 13 56.0	
De	iP	10 13 48.1	
	ipP	10 14 03.0	

Kurile Islands. h = 50 km
(Up,Ki,Sk,Um,Ud,De).
m = 6.0, M = 5.8 (Up,Ki).
This earthquake exhibits
longer periods of PZ' than
the other aftershocks.

"	15	Up	iP	10 22 30.3 C
		Ki	iP	10 21 45.5
		Ud	iP	10 22 36.4

Kurile Islands.
Origin time = 10 11 29.

"	15	Ud	iP	10 45 10.1

Kurile Islands (h = 110 km).

"	15	Up	iSg	10 56 30.4
		Ki	iPn	10 52 15.2
			iSn	10 53 13.2
			iLgl	10 53 33.3
			iSg	10 53 40.9
			D = 530 km = 4.9°.	
		Sk	eSn	10 55 10
			iLgl	10 56 01.3
		Um	iSn	10 53 54.0
			iSg	10 54 26.5

Northwest Russia,
67.5°N, 33.1°E.
Origin time = 10 51 01.
Explosion?

"	15	Up	iP	11 40 57.2	
				micr	sec
			P Z'	0.1	0.5
		Ki	iP	11 40 10.8	
				micr	sec
			P Z'	0.1	1.0
			Mx E	0.5	15
			Mx N	0.4	15
			Mx Z	0.7	15
		Sk	iP	11 40 46.7	
		Um	iP	11 40 32.0	
		Ud	iP	11 41 02.7	C
			ipP	11 41 11.3	
		De	iP	11 41 21.8	

Kurile Islands. h = 30 km
(Ud).
m = 6.1 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug. 15 Up iP 11 58 41.9
Ud iP 11 58 47.9
Kurile Islands (h = N).

" 15 Up iPKP 12 38 47.3
i 12 38 56.9
Ki iPKP 12 38 28.3
micr sec
PKP Z' 0.1 1.2
Sk iPKP 12 38 42.5 C
Um iPKP 12 38 37.7 C
Ud iPKP 12 38 48.8
i 12 39 00.7
New Zealand (h = 45 km).

" 15 Up iP 14 20 59.6
Ki iP 14 20 14.1 C
Um iP 14 20 34.5
Ud iP 14 21 05.2 C
Kurile Islands (h = 25 km).

" 15 Sk iP 14 30 34.5

" 15 Ud i(P) 14 35 54.6

" 15 Ud iP 14 56 49.5

" 15 Ki iPg 15 55 45.9
iSg 15 56 19.7
D = 290 km = 2.6°.
Origin time = 15 54 54.
Explosion?
Cf Aug. 14, 19 17 - 20 18.

" 15 Up iP 17 07 24.6
Ki iP 17 06 39.8
Ud iP 17 07 30.8
Kurile Islands (h = N).

" 15 Up iP 17 11 52.4
i 17 12 04.3
Ki iP 17 11 07.1
Sk iP 17 11 42.2
Um iP 17 11 27.7
Ud iP 17 11 58.2 C
Kurile Islands (h = 150 km).
If the second phase at Up is interpreted as pP, the depth becomes 45 km, i.e. the same as for the majority of the aftershocks.

" 15 Um eP 18 08 33

1969 Aug. 15 Sk eSKP 19 25 19
Um iSKP 19 25 17.1
Ud iPKP 19 22 38.2
iSKP 19 25 30.3
De iPKP 19 22 49.1
iSKP 19 25 38.7
Tonga-Kermadec Islands
(h = 520 km).

" 15 Ki iPg 19 22 43.5
iLgl 19 23 13.6
D = 290 km = 2.6°.
Origin time = 19 21 52.
Explosion?

" 15 Ki iP[x] 19 45 30.3
iPg 19 45 33.9
iLgl 19 46 04.1
iSg 19 46 06.2
D = 270 km = 2.4°.
Ud eLgl 19 47 47
Probably Swedish Lapland.
Origin time = 19 44 47.
Explosion?

" 15 Ud iP 19 46 23.9

" 15 Up iP 20 17 21.8
ipP 20 17 31.2
Ki iP 20 16 35.8
Um iP 20 16 56.8
ipP 20 17 08.5
Ud iP 20 17 27.5
ipP 20 17 35.9
Kurile Islands. h = 35 km
(Up,Um,Ud).
Agreement among pP not quite satisfactory.

" 15 Up iP 20 58 48.2
micr sec
P Z' 0.1 0.7
Ki iP 20 58 03.2
Sk iP 20 58 38.3 C
Um iP 20 58 23.4 C
Ud iP 20 58 54.6 C
ipP 20 59 03.2
De iP 20 59 11.7
ipP 20 59 25.1
Kurile Islands. h = 40 km
(Ud,De).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 15 Up iP 20 59 08.7
Ki iP 20 58 23.9
Sk iP 20 58 58.4
Um iP 20 58 43.2
Ud iP 20 59 15.0
Kurile Islands.
Origin time = 20 48 07.

" 15 Ki iP 21 02 01.9
Um iP 21 02 23.2
Ud iP 21 02 53.7
ipP 21 03 05.4
Kurile Islands. h = 45 km (Ud).
Origin time = 20 51 46.

" 15 Up iP 21 04 17.2
Ki iP 21 03 31.0
Um iP 21 03 51.2
Ud iP 21 04 23.0
Kurile Islands (h = N).

" 15 Up iP 22 29 09.2

" 15 Up iP 22 54 51.0 C
i 22 55 00.0
iS 23 03 52
micr sec
P Z' 0.1 0.6
Mx E 0.6 16
Mx N 0.7 17
Mx Z 0.8 17
D = 7650 km = 69°.
Ki iP 22 54 07.0
micr sec
P Z' 0.1 1.0
Mx E 1.0 19
Mx N 0.8 17
Mx Z 1.2 16
Sk iP 22 54 41.8 C
ipP 22 54 55.5
Um iP 22 54 27.2
iS 23 03 03
Ud iP 22 54 57.8 C
ipP 22 55 10.7
De iP 22 55 15.5
Japan. h = 50 km (Sk,Ud).
m = 6.1, M = 5.1 (Up,Ki).

" 15 Ud iP 23 08 17.7
ipP 23 08 29.4
Kurile Islands. h = 45 km (Ud).

" 15 Ki ipP 23 23 49.3
(cont.)

1969
Aug. 15 (cont.)
Ud iP 23 24 29.4 C
ipP 23 24 40.3
Kurile Islands. h = 40 km (Ud).
Origin time = 23 13 21.

" 16 Up eP 01 27 14
Ki iP 01 26 47.1
Um eP 01 26 58
Ud iP 01 27 21.6
Mariana Islands (h = 35 km).

" 16 Up iP 01 38 08.0
Ud iP 01 38 14.5 C
i 01 38 22.7
De iP 01 38 32.7
Kurile Islands (h = 45 km).

" 16 Ki eP 02 53 34
Ud eP 02 54 25
Kurile Islands.
Origin time = 02 43 17.

" 16 Up iP 03 25 38.8
Ki iP 03 24 52.9
Ud iP 03 25 44.7 C
Kurile Islands.
Origin time = 03 14 37.

" 16 Up iP 03 39 08.8
ipP 03 39 20.5
Ki iP 03 38 23.8 C
Sk iP 03 39 00.0
Um iP 03 38 44.3
Ud iP 03 39 15.1 C
ipP 03 39 26.8
Kurile Islands. h = 45 km (Up,Ud).

" 16 Ki iPg 04 10 16.7
iSg 04 10 55.5
D = 320 km = 2.9°.
Sk ePg 04 10 22
iSg 04 11 02.2
D = 340 km = 3.1°.
Um iSn 04 11 08.7
iLgl 04 11 22.8
Ud iLgl 04 12 50.2
Nordland, Norway,
66.7°N, 13.6°E.
Origin time = 04 09 20.

" 16 Ki iP 06 20 11.6
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969					
Aug.	16	(cont.)			
		Ki	i		06 20 20.2
			iS		06 22 13.1
		Sk	iP		06 20 17.4
			iS		06 22 07.2
		Um	iP		06 20 47.1
			i		06 20 55.2
			iS		06 23 15.5
			i		06 23 30.0
		Jan Mayen.			
"	16	Up	iP		06 35 34.4
		Ki	iP		06 34 47.8
		Ud	iP		06 35 40.0 C
		Kurile Islands.			
		Origin time = 06 24 32.			
"	16	Ud	iP		07 31 07.3
		Tadzhik SSR.			
"	16	Up	iP		08 46 32.9
"	16	Ud	iP		08 50 21.4
"	16	Up	iP		08 58 53.7 C
					micr sec
			P	Z'	0.1 0.6
		Ki	iP		08 58 07.8
					micr sec
			P	Z'	0.1 1.0
		Sk	iP		08 58 43.9 C
		Um	iP		08 58 29.1 C
		Ud	iP		08 58 59.8 C
			i		08 59 05.8
		De	iP		08 59 17.1 C
		Kurile Islands (h = 50 km).			
		m = 6.1 (Up,Ki).			
"	16	Up	iP		09 14 14.6
					micr sec
			Mx	E	0.4 15
			Mx	N	0.9 18
			Mx	Z	1.0 16
		Ki	iP		09 13 29.8
					micr sec
			Mx	E	1.2 18
			Mx	N	0.7 18
			Mx	Z	1.3 18
		Sk	iP		09 14 04.6
		Um	iP		09 13 50.1
			iScS		09 23 33
		Ud	iP		09 14 21.0
			i		09 14 29.8
		De	iP		09 14 39.5
		Kurile Islands (h = 40 km).			
		M = 5.1 (Up,Ki).			

1969					
Aug.	16	Up	iP		09 35 28.9
"	16	Up	iP		10 13 56.8 C
		Ki	iP		10 13 11.3
		Ud	iP		10 14 02.7
		Kurile Islands (h = 60 km).			
"	16	Up	iP		10 45 02.4
"	16	Ki	iPn		12 11 01.6
			iPg		12 11 28.2
			iLgl		12 12 19.6
		Sk	eLgl		12 13 56
			iSg		12 14 10.7
		Probably northwest Russia.			
		Explosion?			
"	16	Ki	iPg		12 51 23.7
			iSn		12 51 52.4
			iSg		12 52 01.2
			D = 320 km = 2.9°.		
"	16	Um	iP		12 54 42.2
		Ud	iP		12 55 13.4
		Kurile Islands (h = 45 km).			
"	16	Ki	iPg		13 00 38.9
			iSn		13 01 06.2
			eSg		13 01 17
			D = 320 km = 2.9°.		
		Sk	e(Sg)		13 04 09
"	16	Up	eP		13 09 02
"	16	Ud	iP		13 23 50.8
"	16	Ud	iP		14 01 04.0
			i		14 01 12.5
"	16	Up	iP		14 22 54.1
"	16	Up	iP		14 51 30.4
"	16	Up	iP		15 02 56.3
"	16	Up	iP		15 26 34.3 C
			ipP		15 26 48.4
			iS		15 35 34
					micr sec
			P	N	0.4 3
			P	Z	0.8 2
			P	Z'	0.8 0.8
			S	E	0.2 4
			Mx	E	0.8 18
			Mx	N	2.4 17
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 16 (cont.)

Up			micr	sec
	Mx	Z	1.7	18
	D = 7600 km = 68 1/2°.			
Ki	iP		15 25 48.6	C
	i		15 25 58.8	
	i		15 26 16.8	
	iS		15 34 12	
			micr	sec
	P	Z	0.8	6
	P	Z'	0.7	1.0
	S	E	0.4	9
	S	N	0.3	7
	Mx	E	3.1	18
	Mx	N	2.5	17
	Mx	Z	4.1	18
	D = 6850 km = 61 1/2°.			
Sk	iP		15 26 24.4	C
Um	iP		15 26 08.7	C
	ipP		15 26 21.7	
	iS		15 34 47	
Ud	iP		15 26 40.4	C
	i		15 26 49.7	
	ipP		15 26 55.0	
De	iP		15 26 57.9	C

Kurile Islands. h = 50 km (Up,Um,Ud).
m = 6.3, M = 5.6 (Up,Ki).

" 16	Up	iP	16 19 42.4
" 16	Up	iP	17 24 46.6 C
		ipP	17 25 00.4
		iS	17 33 44
			micr sec
		P Z'	0.3 0.8
		Mx E	0.5 17
		Mx N	0.8 19
		Mx Z	0.9 18
		D = 7650 km = 69°.	
	Ki	iP	17 24 01.6
		ipP	17 24 15.6
			micr sec
		P Z'	0.4 1.0
		Mx E	1.1 17
		Mx N	0.8 17
		Mx Z	1.4 17
	Sk	iP	17 24 36.7 C
		i(pP)	17 24 53.7
	Um	iP	17 24 22.3 C
		ipP	17 24 36.1
		iS	17 33 02
	Ud	iP	17 24 53.0 C
		ipP	17 25 06.5

(cont.)

1969
Aug. 16 (cont.)

	De	iP	17 25 10.8
		ipP	17 25 24.5

Kurile Islands. h = 50 km (Up,Ki,Um,Ud,De).
m = 6.5, M = 5.1 (Up,Ki).

" 16	Up	iP	18 06 30.9
" 16	Up	iP	18 36 38.2
" 16	Ud	iP	19 02 14.9
" 16	Ud	iP	21 11 53.2
" 16	Up	iP	21 26 19.6
" 16	Up	iP	21 36 34.4
" 16	Up	iP	21 45 23.5
	Ud	iP	21 45 29.3
		ipP	21 45 41.6

Kurile Islands. h = 45 km (Ud).
Origin time = 21 34 21.

" 16	Up	iP	22 12 54.6
" 16	Up	iP	22 32 00.2
	Ki	iP	22 31 14.0
	Ud	iP	22 32 06.0

Kurile Islands.
Origin time = 22 20 58.

" 16	Up	e(P)	23 11 20
" 16	Ud	iP	23 16 51.6
		i	23 17 02.3

Tien-Shan.

" 16	Up	iP	23 36 29.1
	Ud	iP	23 36 34.5

Kurile Islands.
Origin time = 23 25 27.

" 17	Up	iP	00 44 08.6
	Ud	iP	00 44 10.7
" 17	Ud	iP	01 17 18.6
		i	01 17 33.8
" 17	Up	iP	01 48 58.9
	Ud	iP	01 49 04.4

Kurile Islands.
Origin time = 01 37 56.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	17	Up	iP	04 46 22.5
			i	04 46 32.5
		Sk	eP	04 47 03
		Ud	iP	04 46 30.6
			i	04 46 39.7
		De	iP	04 45 58.8
		Crete.		
"	17	Up	iP	06 03 23.9
			ipP	06 03 35.0
		Ki	iP	06 02 39.0
			ipP	06 02 49.8
		Sk	eP	06 03 14
		Um	iP	06 02 58.7
		Ud	iP	06 03 30.0 C
			ipP	06 03 41.3
		Kurile Islands. h = 40 km (Up,Ki,Ud).		
"	17	Up	iP	07 35 28.4
"	17	Up	iP	08 35 52.7
		Ki	iP	08 34 58.8
		Sk	iP	08 35 29.0
		Ud	iP	08 35 51.0 C
		De	iP	08 36 14.3
		Unimak Island (h = 50 km).		
"	17	Ki	iPg	09 19 12.0
			iSg	09 19 48.0
			D = 310 km = 2.8°.	
		Origin time = 09 18 17.		
		Explosion?		
"	17	Ki	iPg	09 40 05.1
			iSg	09 40 41.3
			D = 310 km = 2.8°.	
		Origin time = 09 39 10.		
		Explosion?		
"	17	Ki	iPg	09 56 02.2
			iSg	09 56 38.3
			D = 310 km = 2.8°.	
		Origin time = 09 55 07.		
		Explosion?		
"	17	Ki	iPg	10 13 22.7
			iSg	10 13 58.7
			D = 310 km = 2.8°.	
		Origin time = 10 12 28.		
		Explosion?		
"	17	Up	iPKP	10 29 10.1
		(cont.)		

1969 Aug.	17	(cont.)		
		Sk	iPKP	10 29 09.1
		Um	iPKP	10 29 04.0
		Ud	iPKP	10 29 12.3
		De	iPKP	10 29 18.4
		Solomon Islands (h = 70 km).		
"	17	Up	iP	11 47 48.5 C
			ipP	11 48 00.6
				micr sec
			P Z'	0.1 0.8
		Ki	iP	11 47 03.5
			ipP	11 47 16.4
		Sk	iP	11 47 38.6
			ipP	11 47 51.2
		Um	iP	11 47 23.8 C
			ipP	11 47 36.7
		Ud	iP	11 47 54.6 C
			ipP	11 48 06.5
		Kurile Islands. h = 45 km (Up,Ki,Sk,Um,Ud).		
"	17	Up	iP	11 50 41.5
		Ki	iP	11 49 56.1
		Ud	iP	11 50 47.4
		Kurile Islands.		
		Origin time = 11 39 39.		
"	17	Up	iP	12 05 39.7 C
			ipP	12 06 11
			iS	12 14 24
			isS	12 15 21
				micr sec
			P Z'	0.6 1.0
			S E	0.3 5
			S N	0.3 5
			Mx E	0.6 17
			Mx N	0.7 14
			Mx Z	0.9 19
			D = 7500 km = 67 1/2°.	
		Ki	iP	12 04 56.4 C
			iS	12 12 52
			i	12 13 03
				micr sec
			P Z'	0.5 0.9
			Mx E	0.6 15
			Mx N	0.6 16
			Mx Z	1.0 18
			D = 6800 km = 61°.	
		Sk	iP	12 05 31.9 C
			i	12 05 41.1
			iPP	12 07 56.9
		Um	iP	12 05 15.6 C
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 17 (cont.)

Um	iS	12 13 40	
Ud	iP	12 05 46.8	C
	iS	12 14 39.2	
De	iP	12 06 03.4	C
	i	12 08 27.4	
	iPP	12 08 42.1	

Japan. h = 130 km (Up).
m = 6.1, M = 5.1 (Up,Ki).
M not corrected for focal depth.

"	17	Up	iP	12 11 04.6
"	17	Ud	iP	12 19 34.4
"	17	Ud	iP	12 33 48.7
"	17	Ki	iP	12 44 58.8
		Ud	iP	12 45 23.5
			i	12 45 29.2

Molucca Passage (h = 40 km).

"	17	Up	iP	13 23 38.0
		Ud	iP	13 23 48.1
"	17	Ki	iPg	14 02 33.8
			iSg	14 03 08.0

D = 290 km = 2.6°.
Origin time = 14 01 42.
Explosion?

"	17	Ki	iPKP	14 16 45.8
		Sk	iPKP	14 16 57.3

New Hebrides Islands (h = 210 km).

"	17	Up	iP	15 00 11.6
		Ud	iP	15 00 17.4

Kurile Islands.
Origin time = 14 49 09.

"	17	Sk	eP	15 31 15
		Ud	iP	15 31 17.9

Mindanao (h = 80 km).

"	17	Ud	ePKP	16 25 47
		De	iPKP	16 25 58.5

Fiji Islands (h = 610 km).

"	17	Up	iP	18 17 01.1	
			i	18 17 05.5	
				micr	sec
			P Z'	0.1	0.7

(cont.)

1969
Aug. 17 (cont.)

Sk	iP	18 17 40.9	
Um	i(P)	18 17 52.6	
Ud	iP	18 17 07.9	
	i	18 17 13.2	
De	iP	18 16 33.2	

Ionian Islands.

"	17	Up	iP	18 20 13.2
			ipP	18 20 26.3
		Ki	iP	18 19 27.7
			ipP	18 19 40.7
		Um	iP	18 19 48.2
		Ud	iP	18 20 19.2
			ipP	18 20 32.8
		De	iP	18 20 41.7

Kurile Islands. h = 50 km (Up,Ki,Ud).

"	17	De	iPKP	18 46 03.1

Loyalty Islands (h = 30 km).

"	17	Up	iP	20 25 40.9	
			i	20 25 51.7	
			eS	20 36 04	
				micr	sec
			P E	0.3	6
			P N	0.6	7
			P Z	1.3	7
			P Z'	0.1	1.0
			S E	1.0	7
			S N	2.2	7

D = 9450 km = 85°.

		Ki	iP	20 25 20.3	C
			i	20 25 33.1	
			iS	20 35 23	
				micr	sec
			P E	0.8	7
			P N	0.6	8
			P Z	2.2	7
			P Z'	0.3	1.5
			S E	1.3	8

D = 9000 km = 81°.

		Sk	iP	20 25 19.1	C
		Um	iP	20 25 29.7	
			i	20 25 35.3	
			iS	20 35 42	
		Ud	iP	20 25 31.6	
			i	20 25 36.4	
		De	iP	20 25 47.3	C
			i	20 25 54.3	

Gulf of California (h = N).
m = 6.2 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 17 Up eP 20 27 30
iPP 20 30 50
iS 20 37 57
micr sec
P E 0.4 6
P N 1.1 6
P Z 2.4 6
S E 1.7 6
S N 16 14
Mx E 40 23
Mx N 65 18
Mx Z 76 23
D = 9450 km = 85°.
Ki iP 20 27 08.3
i 20 27 22.1
iS 20 37 14
micr sec
P E 1.6 6
P N 1.1 6
P Z 4.0 6
P Z' 0.5 1.6
S E 4.8 11
S N 7.7 14
Mx E 52 14
Mx N 48 17
Mx Z 74 15
D = 9000 km = 81°.
Sk iP 20 27 09.3 C
i 20 27 16.4
Um iP 20 27 21.9
iS 20 37 34
Ud iP 20 27 23.1
i 20 27 37.3
De iP 20 27 35.6
i 20 27 43.1
Gulf of California (h = N).
m = 6.6, M = 7.2 (Up,Ki).
Multiple P: in average of this and the preceding case, P is followed by later onsets after 6.4 sec and 12.9 sec.

" 17 Up iP 20 39 58.5 C
ipP 20 40 06.5
Ki iP 20 39 34.7 C
ipP 20 39 42.0
micr sec
P Z' 0.1 1.2
Sk iP 20 39 36.8 C
ipP 20 39 45.0
Um iP 20 39 49.4
ipP 20 39 56.7
Ud iP 20 39 50.3
ipP 20 39 57.3
(cont.)

1969
Aug. 17 (cont.)
De iP 20 40 01.9
Gulf of California.
h = 30 km (Up,Ki,Sk,Um,Ud).

" 17 Ki iP 20 57 55.2
Molucca Passage (h = 25 km).

" 17 Ki iP 22 32 50.8
Um iP 22 33 05.5 C
ipP 22 33 15.4
Ud iP 22 33 06.5
ipP 22 33 16.4
Gulf of California.
h = 35 km (Um,Ud).

" 18 Up iP 00 19 49.2
Ki iP 00 19 03.3
Um iP 00 19 24.2
Ud iP 00 19 54.9 C
ipP 00 20 01.8
Kurile Islands. h = 25 km (Ud).
Origin time = 00 08 47.

" 18 Up iP 00 21 32.4
Ki iP 00 20 47.3
Um iP 00 21 08.1
Ud iP 00 20 38.9
ipP 00 20 50.4
Kurile Islands. h = 45 km (Ud).

" 18 Up ePKP2 01 24 31
ePP 01 28 21
micr sec
Mx E 1.4 19
Mx N 2.7 19
Mx Z 2.6 20
Ki ePKP 01 24 01
iSS 01 48 38
micr sec
Mx E 1.9 17
Mx N 2.4 19
Mx Z 3.2 20
Sk iPKP 01 24 01.4
Um ePKP2 01 24 34
iSKKS 01 35 10
iSS 01 48 36
Ud iPKP2 01 24 28.3
De ePKP2 01 24 25
South Pacific Ocean (h = N).
M = 6.2 (Up,Ki).

" 18 Ud iP 01 40 32.6

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	18	Ki	iP	01 51 34.2	
		Sk	eP	01 51 36	
		Um	iP	01 51 48.7	
		Ud	iP	01 51 49.9 C	
		Gulf of California (h = N).			
"	18	Ud	iP	02 32 42.2	
"	18	Ki	eP	02 41 36	
			e	02 41 42	
		Sk	eP	02 41 38	
			i	02 41 44.4	
		Um	iP	02 41 50.6	
			i	02 41 56.2	
		Gulf of California (h = 30 km).			
		Double P; cf Aug. 17, 20 27.			
"	18	Sk	eP	03 09 58	
		Ud	iP	03 10 14.7	
		De	iP	03 10 25.7	
		Gulf of California (h = N).			
"	18	Up	iPKP2	03 16 01.6	
		Um	iPKP2	03 16 06.5	
		Ud	iPKP2	03 15 53.2	
		South Pacific Ocean (h = N).			
"	18	Up	iP	03 34 29.7	
			i	03 34 44.7	
			ePP	03 37 44	
			iS	03 45 01	
				micr	sec
			P	Z 0.5	6
			PP	Z 0.4	5
			Mx	E 1.4	19
			Mx	N 3.3	18
			Mx	Z 2.9	18
			D = 9500 km = 85 1/2°.		
		Ki	iP	03 34 05.3 C	
			eS	03 44 14	
				micr	sec
			P	E 0.4	5
			P	Z 0.8	7
			P	Z' 0.5	2.2
			S	N 0.5	9
			Mx	E 2.4	18
			Mx	N 3.0	18
			Mx	Z 4.5	17
			D = 9000 km = 81°.		
		Sk	iP	03 34 08.2	
		Um	iP	03 34 18.3	
		Ud	iP	03 34 20.4	
		De	eP	03 34 34	
		Gulf of California (h = 20 km).			
		m = 6.0, M = 5.8 (Up,Ki).			

1969 Aug.	18	Ki	eP	03 57 55	
		Um	iP	03 58 09.8	
		Ud	eP	03 58 12	
		Gulf of California (h = N).			
"	18	Up	iP	04 07 22.7	
			i	04 07 30.3	
			iPP	04 10 45.3	
				micr	sec
			Mx	E 0.8	18
			Mx	N 1.8	18
			Mx	Z 1.7	18
		Ki	iP	04 06 59.7	
			i	04 07 07.8	
				micr	sec
			P	Z' 0.2	1.6
			Mx	E 2.2	17
			Mx	N 1.9	18
			Mx	Z 2.8	16
		Sk	eP	04 07 02	
			i	04 07 08.8	
		Um	iP	04 07 12.3	
			i	04 07 14.4	
			i	04 07 22.6	
		Ud	eP	04 07 15	
			i	04 07 23.6	
		De	i(P)	04 07 34.5	
		Gulf of California (h = N).			
		M = 5.7 (Up,Ki).			
		Multiple P.			
"	18	Up	iP	04 17 25.4	
		Sk	iP	04 17 09.2	
		Um	eP	04 17 24	
		Ud	iP	04 17 11.4	
			i	04 17 14.3	
		Panama (h = 30 km).			
"	18	Ki	eP	04 44 46	
		Sk	eP	04 44 51	
		Um	iP	04 45 02.8	
		Ud	eP	04 45 04	
		Gulf of California (h = N).			
"	18	Up	iP	05 37 27.4	
		Ki	iP	05 36 50.3	
		Sk	iP	05 37 22.6	
			i	05 37 28.8	
		Um	iP	05 37 06.0	
		Ud	iP	05 37 34.0	
		Japan (h = 45 km).			
"	18	Ki	eP	05 47 03	
		Um	iP	05 47 25.0	
		Ud	iP	05 47 55.8	
		Kurile Islands.			
		Origin time = 05 36 48.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	18	Ud	eP	07 02 23	
			i	07 02 41.2	
		Kurile Islands (h = 60 km).			
"	18	Ki	iPKP	07 56 20.6	
			ipPKP	07 56 56.9	
		Sk	iPKP	07 56 32.0	
			ipPKP	07 57 08.4	
		Um	iPKP	07 56 27.1	
			ipPKP	07 57 03.2	
		Ud	iPKP	07 56 36.8	
			ipPKP	07 57 13.3	
		De	iPKP	07 56 43.2	
			ipPKP	07 57 19.4	
		New Hebrides Islands.			
		h = 140 km (Ki,Sk,Um,Ud,De).			
"	18	Up	iP	07 59 45.2	
			i	07 59 55.5	
		Ki	iP	07 58 57.9	
		Um	iP	07 59 22.1	
		Ud	iP	07 59 51.7	
		(Kurile Islands).			
"	18	Up	iP	08 01 00.8	
"	18	Up	iP	08 03 44.8	
			iS	08 14 13	
				micr	sec
			S N	0.4	9
			Mx E	0.5	18
			Mx N	0.9	18
			Mx Z	0.8	16
			D = 9550 km = 86°.		
		Ki	iP	08 03 21.1	
				micr	sec
			Mx E	1.0	16
			Mx N	0.8	17
			Mx Z	1.0	16
		Sk	eP	08 03 20	
		Um	iP	08 03 31.2	
		Ud	eP	08 03 33	
			i	08 03 52.2	
		Gulf of California			
		(h = 30 km).			
		M = 5.3 (Up,Ki).			
"	18	Ud	iP	09 39 18.8	
		Kurile Islands.			
		Origin time = 09 28 11.			
"	18	Ki	iPg	10 14 28.1	
			iSg	10 15 02.9	
			D = 300 km = 2.7°.		
		Origin time = 10 13 34.			
		Explosion?			

1969 Aug.	18	Up	iP	11 00 46.9	
			i	11 01 36.9	
		Ki	iP	11 00 01.9	
		Um	iP	11 00 22.9	
		Ud	iP	11 00 53.4	C
		Kurile Islands (h = N).			
"	18	Up	iP	11 54 33.1	C
			iS	12 03 33	
				micr	sec
			P Z'	0.2	1.0
			Mx E	0.9	19
			Mx N	0.9	18
			Mx Z	1.2	15
			D = 7600 km = 68 1/2°.		
		Ki	iP	11 53 46.5	
			ipP	11 53 56.9	
				micr	sec
			P Z'	0.1	1.1
			Mx E	1.4	17
			Mx N	1.1	18
			Mx Z	2.0	16
		Sk	iP	11 54 22.5	
		Um	iP	11 54 07.2	C
			eS	12 02 48	
		Ud	iP	11 54 38.7	
		De	iP	11 54 56.6	C
			ipP	11 55 06.1	
		Kurile Islands. h = 35 km			
		(Ki,De).			
		m = 6.1, M = 5.1 (Up,Ki).			
"	18	Up	iP	12 16 13.6	
		Ud	iP	12 16 19.6	
		Kurile Islands.			
		Origin time = 12 05 12.			
"	18	Up	iSg	12 28 23.2	
		Sk	eSg	12 30 12	
		Um	iSg	12 28 55.4	
		Ud	iLgl	12 29 24.4	
		Esthonia, 59.7°N, 25.6°E.			
		Origin time = 12 26 12.			
		Explosion?			
"	18	Ki	iPg	13 10 37.6	
			iSg	13 11 11.8	
			D = 290 km = 2.6°.		
		Origin time = 13 09 46.			
		Explosion?			
"	18	Ki	iPg	13 26 54.1	
			iSg	13 27 28.1	
			D = 290 km = 2.6°.		
		Origin time = 13 26 02.			
		Explosion?			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.					
	18	Ud	iP		13 58 39.1
			ipP		13 58 48.8
		Kurile Islands. h = 35 km (Ud).			
"	18	Up	iPKP		14 29 22.9 C
					micr sec
			PKP	Z'	0.2 0.8
		Ki	ePKP		14 28 58
			i		14 29 05.5
		Sk	iPKP		14 29 17.1 C
			i		14 29 26.9
		Um	iPKP		14 29 09.1
		Ud	iPKP		14 29 24.3 C
		De	iPKP		14 29 33.4 C
		Kermadec Islands (h = 60 km).			
"	18	Ud	i(P)		14 59 22.3
			i		14 59 29.4
		Possibly local.			
"	18	Up	iP		15 06 10.1
			ipP		15 06 18.2
		Ki	iP		15 06 28.2
			ipP		15 06 35.4
					micr sec
			Mx	E	0.6 16
			Mx	N	0.3 16
			Mx	Z	0.9 17
		Sk	iP		15 06 38.4
			ipP		15 06 45.9
		Um	iP		15 06 13.5
			ipP		15 06 21.2
			iSS		15 16 28
		Ud	iP		15 06 25.7 C
			ipP		15 06 33.6
		De	eP		15 06 18
		West Pakistan. h = 30 km (Up,Ki,Sk,Um,Ud).			
"	18	Up	iP		16 00 58.7
"	18	Ki	iSg		16 23 05.8
		Sk	iSg		16 23 10.2
		Um	iSg		16 23 35.6
		Nordland, Norway. Explosion?			
"	18	Up	iP		16 40 34.3
		Kurile Islands (h = N).			
"	18	Up	iSg		17 06 26.2
		Sk	eSg		17 06 17
		Ud	iSg		17 05 22.8
		South Norway.			

1969 Aug.				
	18	Sk	eP	17 15 46
		Ud	iP	17 15 14.9
		De	iP	17 14 42.0
			i	17 15 03.2
		Crete.		
"	18	Up	iP	17 28 04.9
		Ki	iP	17 28 03.7 D
		Sk	iP	17 28 17.9 D
		Um	iP	17 28 01.5
		Ud	iP	17 28 14.6 D
		De	iP	17 28 13.3
		Sumatra (h = 140 km).		
"	18	Ud	iP	18 40 33.0
		Kurile Islands (h = 50 km).		
"	18	Ud	iP	18 54 10.3
"	18	Ud	i(P)	21 28 33.0
"	18	Ud	iP	23 38 49.0
"	18	Up	iP	23 47 38.0
"	19	Ud	iP	00 09 26.8
		Kurile Islands. Origin time = 23 58 19, Aug. 18.		
"	19	Up	iP	00 12 33.5
		Ki	eP	00 11 48
		Ud	iP	00 12 39.6
		Kurile Islands. Origin time = 00 01 32.		
"	19	Um	iSKP	01 26 15.6
		Ud	iPKP	01 23 41.8
		De	iPKP	01 23 53.3
		Fiji Islands (h = 650 km).		
"	19	Up	iP	01 52 23.4
			i	01 52 30.4
			i	01 52 35.1
			iS	02 03 27
				micr sec
			Mx E	0.9 19
			Mx N	1.5 19
			Mx Z	1.1 18
			D = 10450 km = 94°.	
		Ki	iP	01 52 21.7
			i	01 52 28.6
			eSKS	02 02 53
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 19 (cont.)

Ki			micr	sec
	P	Z'	0.1	0.9
	Mx	E	1.7	19
	Mx	N	3.3	21
	Mx	Z	3.5	21
Sk	eP		01 52 36	
	i		01 52 43.2	
Um	iP		01 52 21.1	
	i		01 52 26.6	
	iSKS		02 02 43	
	iS		02 03 25	
Ud	iP		01 52 32.6 C	
	i		01 52 39.7	
De	iP		01 52 38.9	
	i		01 52 43.7	

Sunda Strait (h = 50 km).
M = 5.8 (Up,Ki).
Multiple P.

" 19

Up	iP	02 30 26.3
Ki	eP	02 28 42
	iT	02 33 50.9
Sk	eP	02 29 25
	iS	02 31 16.5
Um	iP	02 29 34.1
Ud	eP	02 30 13
	i	02 30 22.0
	i	02 30 27.1
De	iP	02 31 01.2

Norwegian Sea (h = N).

" 19

Ud	iP	02 34 28.7
	i	02 35 12.2

" 19

Ud	i(P)	02 39 22.8
	i	02 39 32.8

" 19

Up	iP	04 08 08.3
Ud	iP	04 08 14.1

Kurile Islands.
Origin time = 03 57 06.

" 19

Ud	iP	04 21 26.2

" 19

Ud	iP	07 14 57.4

Kurile Islands.
Origin time = 07 03 49.

" 19

Up	iP	07 21 53.4
Ki	iP	07 21 07.8
Ud	iP	07 21 58.9 C
	ipP	07 22 14.1

Kurile Islands. h = 55 km (Ud).
Origin time = 07 10 51.

1969
Aug. 19

Ud	iSKP	08 15 13.7
De	iPKP	08 12 28.6 C
	i	08 12 43.6

Fiji Islands (h = 550 km).

" 19

Ud	iP	08 44 16.8

" 19

Ud	iP	09 00 06.1 C

" 19

Up	iP		09 00 56.9 D	
	iS		09 09 59	
			micr	sec
	P	N	0.6	5
	P	Z	0.9	5
	P	Z'	0.2	0.6
	Mx	E	3.4	18
	Mx	N	13	15
	Mx	Z	17	15

D = 7600 km = 68 1/2°.

Ki	iP		09 00 10.7	
	iS		09 08 36	
			micr	sec
	P	Z'	0.3	1.0
	S	N	0.6	7
	Mx	E	18	16
	Mx	N	13	16
	Mx	Z	26	15

D = 6850 km = 61 1/2°.

Sk	iP	09 00 46.9
Um	iP	09 00 31.0 D
	ipP	09 00 44.0
	iS	09 09 08
Ud	iP	09 01 02.7 D
De	iP	09 01 20.9 D

Kurile Islands. h = 50 km (Um).
m = 6.3, M = 6.4 (Up,Ki).
The P-waves show clear dilatations in this case, contrary to the majority of the aftershocks in this series.

" 19

Up	iP	09 05 36.1
Ki	iP	09 04 51.0
Um	iP	09 05 11.5
Ud	iP	09 05 42.5 C
De	iP	09 06 00.2 C

Kurile Islands.
Origin time = 08 54 34.

" 19

Ud	iP	09 16 38.4

" 19

Up	iP	09 41 16.6
Ki	eP	09 40 31

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	19	(cont.)			
		Ud	iP	09 41 22.0	C
			ipP	09 41 38.2	
		De	iP	09 41 40.2	
		Kurile Islands. h = 60 km (Ud).			
"	19	Ud	eP	10 13 41	
		Kurile Islands.			
		Origin time = 10 02 33.			
"	19	Up	iP	10 29 52.0	
		Ud	iP	10 29 57.9	
			iPcP	10 30 20.4	
		Kurile Islands (h = 45 km).			
"	19	Ud	iP	10 59 59.4	
"	19	Up	iSg	12 03 43.0	
		Ki	iSg	12 06 12.5	
		Um	iSg	12 04 13.9	
		Ud	iLgl	12 04 42.3	
		Esthonia, 59.7°N, 25.6°E.			
		Origin time = 12 01 32.			
		Explosion?			
"	19	Up	iP	12 18 00.7	
		Ki	iP	12 17 15.3	
		Ud	iP	12 18 06.4	C
		De	iP	12 18 24.1	
		Kurile Islands (h = 45 km).			
"	19	Ud	iP	12 59 55.8	
"	19	Ki	ipP	15 10 43.2	
		Ud	iP	15 11 22.9	
			ipP	15 11 34.6	
		Kurile Islands. h = 45 km (Ud).			
"	19	Up	iP	16 38 57.0	
"	19	Up		---	
				micr	sec
			Mx E	0.8	21
			Mx N	1.4	23
			Mx Z	1.2	19
		Ki		---	
				micr	sec
			Mx E	0.6	20
			Mx N	0.7	21
			Mx Z	2.0	22
		Um	iPP	17 51 28	
			iSKKS	17 58 00	
			eSS	18 12 16	
		South Pacific Ocean (h = N).			
		M = 5.8 (Up,Ki).			

1969 Aug.	19	Ud	iP	19 44 13.6	
"	19	Up	iP	23 47 37.3	
			ipP	23 47 47.3	
		Ki	iP	23 46 52.4	
		Sk	iP	23 47 27.4	
		Um	iP	23 47 12.8	
		Ud	iP	23 47 43.5	
			ipP	23 47 53.9	
		Kurile Islands. h = 40 km (Up,Ud).			
"	20	Up	iP	00 17 33.3	
			i	00 17 54.8	
"	20	Up	iP	01 38 51.4	
		Ud	iP	01 38 56.8	C
		Kurile Islands (h = 45 km).			
"	20	Ud	iP	01 59 17.4	
			i	01 59 29.1	
"	20	Up	iP	05 45 25.6	
		Ki	iP	05 44 39.8	
		Ud	iP	05 45 31.2	
			ipP	05 45 45.3	
		Kurile Islands. h = 50 km (Ud).			
"	20	Ud	iP	06 49 20.7	
"	20	Up	iP	08 00 49.3	C
			eS	08 09 29	
			iScS	08 10 35	
				micr	sec
			P E	0.8	2
			P N	2.4	2
			P Z	4.9	2
			P Z'	3.3	1.0
			S E	1.5	8
			S N	0.5	4
			Mx E	4.6	28
			Mx N	4.7	25
			Mx Z	5.2	30
			D = 7300 km = 65 1/2°.		
		Ki	iP	07 59 59.9	C
			iPP	08 02 04.0	
			iPa	08 03 35	
			iS	08 08 04	
				micr	sec
			P Z	1.8	5
			P Z'	0.6	1.0
			PP Z'	0.1	1.2
			S E	1.5	8
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug. 20 (cont.)

Ki			micr	sec
	Mx	E	2.3	14
	Mx	N	2.2	18
	Mx	Z	3.1	18
	D = 6500 km = 58 1/2°.			
Sk	iP		08 00 36.3 C	
	i		08 00 48.1	
Um	iP		08 00 23.2 C	
	iPP		08 02 40	
	iPa		08 04 10	
	iS		08 08 39	
Ud	iP		08 00 54.6 C	
	iS		08 09 44.1	
De	iP		08 01 13.9 C	
	iS		08 10 19.4	

Kurile Islands (h = 70 km).
m = 6.7, M = 5.7 (Up,Ki).
The three m-values for P at Up average 7.5, i.e. considerably above the total average.

" 20 Ud iP 08 21 35.7
Unimak Island (h = 25 km).

" 20 Ud iP 08 46 57.4
ipP 08 47 08.7
Kurile Islands. h = 40 km (Ud).
Origin time = 08 35 49.

" 20 Sk iP 09 28 20.6
Um iP 09 28 08.6
Ud iP 09 28 28.8

" 20 Ud iP 09 34 15.3

" 20 Ud iP 09 40 16.8

" 20 Up iP 10 23 06.1
Ki iP 10 22 20.7
Ud iP 10 23 12.1 C
i 10 23 18.5
ipP 10 23 26.6
Kurile Islands. h = 55 km (Ud).

" 20 Ki iPn 10 54 34.1
iSn 10 55 32.6
iLgl 10 55 51.8
D = 540 km = 4.9°.
Sk iLgl 10 58 20.6
Um iSg 10 56 50.1
Ud iLgl 10 59 18.0
Northwest Russia, 67.5°N, 33.4°E.
Origin time = 10 53 18.
Explosion?

1969 Aug. 20 Sk eP 11 09 33

" 20 Up eSg 11 22 47
Sk iSg 11 24 37.3
Um iSg 11 23 15.8
Ud iLgl 11 23 48.3
Esthonia, 59.7°N, 25.6°E.
Origin time = 11 20 36.
Explosion?

" 20 Ki iP 11 35 25.5
Sk eP 11 35 54
i 11 36 28.9
Um iP 11 35 36.0
Ud iP 11 36 02.8
Volcano Islands (h = 100 km).

" 20 Ud i(P) 11 56 10.1

" 20 Up iP 11 59 01.0
Ud iP 11 59 18.0
Hindu Kush.

" 20 Um iP 12 57 04.0

" 20 Ki iPg 15 48 15.0
iSg 15 48 49.7
D = 290 km = 2.6°.
Origin time = 15 47 23.
Explosion?

" 20 Ki iPg 16 04 06.5
iSg 16 04 41.4
D = 290 km = 2.6°.
Origin time = 16 03 15.
Explosion?

" 20 Ki iPg 16 25 43.3
iSg 16 26 17.6
D = 290 km = 2.6°.
Origin time = 16 24 51.
Explosion?

" 20 Up iP 16 45 05.1
ipP 16 45 13.8
Ki ipP 16 44 31.6
Ud iP 16 45 11.4
ipP 16 45 20.7
Japan. h = 35 km (Up,Ud).

" 20 Ki iPg 16 46 50.0
iSg 16 47 25.6
D = 300 km = 2.7°.
Origin time = 16 45 56.
Explosion?

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	20	Ud	iP	17 53 34.2		
"	20	Up		---		
				micr	sec	
			Mx	N	1.1	19
			Mx	Z	0.6	18
		Ki		---		
				micr	sec	
			Mx	E	1.1	24
			Mx	N	0.9	23
			Mx	Z	1.7	23
		Um	eSS	17 57 00		
		New Britain (h = 25 km).				
		M = 5.5 (Up,Ki).				
"	20	Up	iP	18 11 11.4		
		Hindu Kush.				
"	20	Ki	iPg	19 44 30.2		
			iSn	19 44 58.9		
			iSg	19 45 07.5		
			D = 320 km = 2.9°.			
		Origin time = 19 43 33.				
		Explosion?				
"	20	Ud	iP	22 58 47.8		
"	20	Ud	iP	23 00 33.1		
"	21	Up	iP	00 03 02.3	D	
				micr	sec	
			P	Z'	0.1	0.6
		Ud	iP	00 03 04.4		
		De	iP	00 03 13.9		
"	21	Up	iP	00 39 40.5	C	
			ipP	00 39 51.3		
			iS	00 48 42		
				micr	sec	
			P	Z'	0.1	1.0
			Mx	E	0.6	17
			Mx	N	0.7	14
			Mx	Z	1.0	16
			D = 7650 km = 69°.			
		Ki	iP	00 38 55.8	C	
			ipP	00 39 06.0		
				micr	sec	
			P	Z'	0.1	1.0
			Mx	E	1.7	19
			Mx	N	0.8	17
			Mx	Z	1.0	16
		Sk	iP	00 39 30.5	C	
			ipP	00 39 42.2		
		(cont.)				

1969 Aug.	21	(cont.)				
		Um	iP	00 39 15.3	C	
			ipP	00 39 26.2		
			iS	00 48 04		
		Ud	iP	00 39 46.6	C	
			ipP	00 39 57.4		
		De	iP	00 40 04.0	C	
			ipP	00 40 14.7		
			i	00 40 37.4		
		Kurile Islands. h = 40 km				
		(Up,Ki,Sk,Um,Ud,De).				
		m = 6.0, M = 5.2 (Up,Ki).				
"	21	Ki	iPn	01 27 56.5		
			iSn	01 28 42.9		
			iLgl	01 28 58.0		
			D = 420 km = 3.8°.			
		Sk	eLgl	01 31 39		
		Um	iSn	01 29 43.8		
			iSg	01 30 26.7		
		Ud	i(Sg)	01 33 00.5		
		Northwest Russia,				
		68.7°N, 30.5°E.				
		Origin time = 01 26 57.				
		Explosion?				
"	21	Up	iP	02 09 17.3		
		Ki	iP	02 10 23.3		
		Sk	eP	02 09 59		
		Ud	iP	02 09 28.0		
		De	iP	02 08 55.7		
		Crete (h = 55 km).				
"	21	Ud	iP	02 53 57.6		
			ipP	02 54 10.1		
		Kurile Islands. h = 45 km				
		(Ud).				
		Origin time = 02 42 50.				
"	21	Up	iP	02 55 06.5	C	
			ipP	02 55 17.3		
				micr	sec	
			P	Z'	0.1	0.6
			Mx	N	0.9	18
			Mx	Z	0.9	19
		Ki	iP	02 54 20.9		
			ipP	02 54 31.9		
				micr	sec	
			P	Z'	0.1	1.0
			Mx	E	1.1	17
			Mx	N	1.0	17
			Mx	Z	1.8	17
		Sk	iP	02 54 56.7	C	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 21 (cont.)

Um	iP		02 54 42.0	
	ipP		02 54 52.4	
Ud	iP		02 55 12.5	C
	ipP		02 55 22.6	
De	iP		02 55 30.2	

Kurile Islands. h = 40 km (Up,Ki,Um,Ud).
m = 6.1, M = 5.1 (Up,Ki).

" 21

Up	iP		03 43 16.3	C
	i		03 43 21.9	
	ipP		03 43 27.0	
			micr sec	
	P	Z'	0.1 1.0	
	Mx	E	0.9 22	
	Mx	N	2.2 16	
	Mx	Z	1.6 17	
Ki	iP		03 42 31.3	
	i		03 42 37.0	
	ipP		03 42 42.1	
			micr sec	
	P	Z'	0.2 1.0	
	Mx	E	2.7 19	
	Mx	N	1.8 17	
	Mx	Z	5.0 17	
Sk	iP		03 43 05.6	
	i		03 43 11.9	
Um	iP		03 42 51.1	
	i		03 42 56.4	
	iS		03 51 33	
Ud	iP		03 43 21.6	C
	i		03 43 24.5	
	i		03 43 28.5	
	ipP		03 43 34.7	
De	iP		03 43 39.8	

Kurile Islands. h = 45 km (Up,Ki,Ud).
m = 6.1, M = 5.5 (Up,Ki).
Multiple P; especially there is a phase arriving in average 6.0 sec after P.

" 21

Up	iP		04 58 32.8	
Ki	iP		04 57 47.9	C
			micr sec	
	P	Z'	0.1 1.0	
Sk	iP		04 58 22.8	C
	ipP		04 58 34.1	
Um	iP		04 58 08.1	
	ipP		04 58 18.4	
Ud	iP		04 58 38.6	C
	ipP		04 58 50.6	
De	iP		04 58 58.0	

Japan. h = 40 km (Sk,Um,Ud).

1969
Aug. 21

Up	iP		05 21 38.5	
Ki	iP		05 20 53.5	
Sk	iP		05 21 29.5	
Um	iP		05 21 13.8	C
Ud	iP		05 21 44.7	
	ipP		05 21 55.4	

Kurile Islands. h = 40 km (Ud).

" 21

Up	iP		07 32 08.8	
Ki	iP		07 31 15.9	
Sk	iP		07 31 49.3	
Um	iP		07 31 41.4	
	ipP		07 31 51.9	
Ud	iP		07 32 10.4	C
	ipP		07 32 21.0	

Aleutian Islands. h = 40 km (Um,Ud).

" 21

Up	iP		08 02 30.9	
	iPcP		08 02 54.8	
Ki	iP		08 01 45.7	
Um	iP		08 02 05.7	
Ud	iP		08 02 36.6	D
De	iP		08 02 53.8	

Kurile Islands (h = 40 km).

" 21 Ud iP 09 10 51.2

" 21

Up	e(P)		09 27 09	
	i		09 27 21.6	

" 21

Ud	iP		09 56 40.8	
	ipP		09 56 52.9	

Kurile Islands. h = 45 km (Ud).
Origin time = 09 45 33.

" 21 Um iP 10 16 09.4

" 21 Um iP 12 00 57.1

" 21

Sk	eP		13 23 25	
	i		13 23 29.6	

Mexico (h = N).

" 21

Up	iP		13 26 54.4	
			micr sec	
	P	Z'	0.1 0.5	

" 21

Um	iP		13 33 02.3	
	i		13 33 14.4	
Ud	iP		13 33 34.6	

Japan (h = 70 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969						
Aug.	21	Up	iP		13 35 03.8	
			ipP		13 35 15.2	
					micr	sec
			P	Z'	0.1	0.6
			Mx	E	0.6	15
			Mx	N	1.3	16
			Mx	Z	1.5	16
		Ki	iP		13 34 17.6	C
			ipP		13 34 28.1	
					micr	sec
			pP	Z'	0.1	1.1
			Mx	E	1.5	16
			Mx	N	1.5	17
			Mx	Z	2.4	16
		Sk	iP		13 34 53.9	
		Um	iP		13 34 38.7	
			ipP		13 34 49.3	
		Ud	iP		13 35 10.1	
			ipP		13 35 21.5	
		De	iP		13 35 27.6	
			ipP		13 35 39.1	
		Kurile Islands. h = 40 km (Up,Ki,Um,Ud,De).				
		m = 6.1, M = 5.3 (Up,Ki).				
"	21	Sk	eP		13 57 36	
		Ud	iP		13 57 54.7	
			i		13 58 49.9	
		De	iP		13 58 17.7	
			iPcP		13 58 43.8	
			i		13 59 03.3	
		Kamchatka (h = 80 km).				
"	21	Up	iS		14 49 16	
					micr	sec
			Mx	E	1.4	18
			Mx	N	2.2	18
			Mx	Z	3.0	19
		Ki	iP		14 38 13.4	
					micr	sec
			P	Z'	0.1	1.5
			Mx	E	1.9	17
			Mx	N	2.3	17
			Mx	Z	2.4	16
		Sk	iP		14 38 16.1	
		Um	iP		14 38 27.7	
			iS		14 48 54	
		Ud	eP		14 38 31	
		Baja California (h = 15 km).				
		M = 5.8 (Up,Ki).				
"	21	Ud	iP		15 58 45.4	
"	21	Up	iP		17 15 34.8	

1969						
Aug.	21	Sk	iP		17 22 16.0	
"	21	Ud	iP		17 26 06.7	
			i		17 26 22.8	
		Japan (h = N).				
"	21	Ki	iP		20 36 55.1	
		Um	iP		20 37 22.3	
		Aleutian Islands (h = 45 km).				
"	21	Ki	iP		21 22 09.2	
		Sk	iP		21 22 08.4	
		Um	eP		21 22 21	
		Baja California (h = N).				
"	21	Up	iP		21 28 54.0	
"	22	Up	i(P)		01 28 46.8	
"	22	Up	iP		04 51 29.9	
			epP		04 51 42	
			iS		05 00 34	
					micr	sec
			Mx	E	0.7	15
			Mx	N	1.4	14
			Mx	Z	1.2	15
			D = 7650 km = 69°.			
		Ki	iP		04 50 45.4	C
			ipP		04 50 57.8	
			iS		04 59 12	
					micr	sec
			P	Z'	0.1	1.0
			S	N	0.4	12
			Mx	E	1.5	16
			Mx	N	1.7	15
			Mx	Z	2.4	16
			D = 6900 km = 62°.			
		Um	iP		04 51 05.6	
			iS		04 59 50	
		Ud	iP		04 51 36.1	C
			ipP		04 51 49.1	
		Kurile Islands. h = 45 km (Up,Ki,Ud).				
		M = 5.3 (Up,Ki).				
"	22	Ki	eP		05 40 36	
		Um	iP		05 40 57.3	
		Ud	iP		05 41 26.3	
			i		05 41 45.3	
		Kurile Islands (h = 50 km).				
"	22	Sk	iP		06 41 32.7	
"	22	Up	iP		07 23 28.7	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 22 (cont.)

Up			micr	sec
	P	Z'	0.1	0.6
Ki	iP		07 22 43.4	
Um	iP		07 23 03.6	
Ud	iP		07 23 34.6	
	ipP		07 23 49.7	

Kurile Islands. h = 55 km (Ud).

" 22

Um	iSKP	08 02 07.9
Ud	iPKP	07 59 30.8
De	iPKP	07 59 42.8

Fiji Islands (h = 590 km).

" 22

Up	iP		10 17 26.6	
	iS		10 28 06	
			micr	sec
	S	N	0.7	5
	Mx	E	2.0	18
	Mx	N	3.3	18
	Mx	Z	4.3	19
	D = 9900 km = 89°.			
Ki	iP		10 16 58.7	
	iS		10 27 19	
			micr	sec
	S	N	0.4	12
	Mx	E	2.5	17
	Mx	N	2.2	18
	Mx	Z	2.4	16
	D = 9200 km = 83°.			
Sk	iP		10 17 01.3	
Um	eP		10 17 14	
	iS		10 27 46	
Ud	iP		10 17 13.7	

Baja California (h = 10 km).
M = 5.8 (Up,Ki).

" 22

Up	iP	10 34 27.4
	i	10 34 35.2
Ki	iP	10 35 13.8
	i	10 35 20.6
Um	iP	10 34 50.3
	i	10 34 57.4
Ud	iP	10 34 21.2
	i	10 34 27.9
	i	10 34 38.7

Ascension Island (h = N).
Multiple P; average difference 7.1 sec between the first two arrivals.

" 22

Ud	iP	13 13 29.3

Peru (h = 30 km).

1969
Aug. 22

Ki	iPKP	17 53 07.6
Um	iPKP	17 53 15.2
Ud	iPKP	17 53 22.7

Tonga Islands (h = 150 km).

" 22

Ud	iP	19 48 10.4

Laptev Sea (h = N).

" 22

Up	iP	23 40 48.3	D
Um	iP	23 40 23.2	
Ud	iP	23 40 54.6	D

Kurile Islands.
Origin time = 23 29 46.

" 23

Ud	iPKP	00 13 26.0

New Hebrides Islands (h = 40 km).

" 23

Ki	iP	00 23 16.8
Ud	iP	00 24 55.9

Arctic Ocean.

" 23

Up	iP	02 13 08.9	
Ki	iP	02 12 24.0	
Ud	iP	02 13 15.0	D

Kurile Islands (h = N).

" 23

Ki	iP	02 48 10.8
Ud	eP	02 49 02

Kurile Islands.
Origin time = 02 37 54.

" 23

Up	iP	03 05 37.5
	ipP	03 05 48.6
Ki	iP	03 04 55.9
Ud	iP	03 05 44.5 C

Japan. h = 40 km (Up).

" 23

Up	iP	03 18 52.5
Ud	iP	03 18 58.2

Kurile Islands.
Origin time = 03 07 50.

" 23

Up	iP		06 50 42.7	D
	ipP		06 50 54.2	
			micr	sec
	P	Z'	0.1	0.8
Ki	iP		06 50 00.4	
	ipP		06 50 12.6	
			micr	sec
	Mx	E	1.1	22
	Mx	N	1.0	22
Sk	iP		06 50 33.7	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 23 (cont.)

Um	iP	06 50 19.4 D	
	ipP	06 50 31.0	
Ud	iP	06 50 49.7	
	ipP	06 51 01.0	
De	iP	06 51 04.4	

Japan. h = 45 km (Up,Ki,Um,Ud).

" 23

Up	iP	06 58 52.2
	ipP	06 59 03.4
Ki	iP	06 58 05.6
	ipP	06 58 16.6
Um	iP	06 58 27.4
	ipP	06 58 37.5
	i	06 58 46.1
Ud	iP	06 58 57.8 D
	ipP	06 59 09.2
De	iP	06 59 16.0
	ipP	06 59 26.5

Kurile Islands. h = 40 km (Up,Ki,Um,Ud,De).

" 23 Up iP 08 11 40.9 D

" 23 Ud iP 09 36 45.1

Japan (h = 35 km).

" 23

Ki	iPn	10 59 19.3
	iSn	11 00 07.8
	iSg	11 00 26.2
	D = 460 km = 4.1°.	
Sk	iLgl	11 02 49.8
Um	iSg	11 01 20.7

Northwest Russia, 67.5°N, 31.2°E.
Origin time = 10 58 13.
Explosion?

" 23

Ki	iPn	12 08 18.7
	iSn	12 09 03.8
	iLgl	12 09 14.6
	D = 410 km = 3.7°.	
Sk	e(Lgl)	12 12 01

Northwest Russia.
Origin time = 12 07 19.
Explosion?

" 23

Up	iP	13 38 42.7
Ki	iP	13 37 57.3
Um	iP	13 38 17.7
Ud	iP	13 38 48.4 C
	ipP	13 39 01.6

Kurile Islands. h = 50 km (Ud).

1969
Aug. 23

Up	iP	15 04 03.5
Ki	iP	15 03 18.1
Ud	iP	15 04 09.6

Kurile Islands (h = 60 km).

" 23

Up	iP	19 00 06.5
Ud	iP	19 00 17.0

Greece.

" 23

Up			---	
			micr	sec
	Mx	N	0.5	16
Ki	iP		19 23 54.0	
			micr	sec
	P	Z'	0.1	1.0
	Mx	E	0.4	13
	Mx	N	0.5	12
	Mx	Z	0.5	12
Ud	iP		19 23 44.0	

Iran (h = 30 km).
M = 4.6 (Up,Ki).

" 23

Up	iP	20 08 06.4
	ipP	20 08 16.4
Um	iP	20 07 42.2
Ud	iP	20 08 12.4
	ipP	20 08 23.7
De	eP	20 08 29

Japan. h = 40 km (Up,Ud).

" 23

Up	iP	21 29 43.6
Ki	eP	21 28 59
Ud	iP	21 29 49.8

Kurile Islands (h = N).

" 24

Up	iP		03 44 59.6 C	
			micr	sec
	P	Z'	0.1	0.8
Ki	iP		03 44 14.8 C	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		03 44 49.9	
Um	iP		03 44 35.0	
Ud	iP		03 45 05.9 C	
	ipP		03 45 19.3	
De	eP		03 45 25	

Kurile Islands. h = 50 km (Ud).
m = 6.0 (Up,Ki).

" 24

Up	iP	09 57 28.3
Ud	iP	09 57 33.8

(Kurile Islands).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.					
	24	Sk	iP	10 20 50.5	
"	24	Up	iP	11 01 36.2	
		Ud	iP	11 01 42.6	
		Japan (h = N).			
"	24	Ki	eP	13 00 33	
		Ud	iP	13 01 23.6	C
			ipP	13 01 34.2	
		Kurile Islands. h = 40 km (Ud).			
		Origin time = 12 50 16.			
"	24	Up	iP	14 19 47.0	
		Ki	iP	14 19 01.7	
		Sk	iP	14 19 38.4	
		Ud	iP	14 19 53.3	C
			ipP	14 20 04.7	
		Kurile Islands. h = 40 km (Ud).			
"	24	Ki	iP	15 13 04.4	
		Ud	iP	15 14 02.6	
		Komandorsky Islands (h = N).			
"	24	Ki	i	15 57 05.0	
		Sk	e	15 59 52	
		Um	i	15 58 16.1	
		Ud	i	16 00 47.3	
		Probably northwest Russia.			
		Explosion?			
		The phases read are			
		probably Sg or Lgl.			
"	24	Ud	iP	20 38 56.5	
		Hindu Kush.			
"	24	Up	iP	22.14 21.5	
			iS	22 23 39	
				micr sec	
			P Z	0.3 3	
			P Z'	0.1 1.0	
			Mx E	0.5 17	
			Mx N	0.7 15	
			Mx Z	0.8 17	
			D = 7950 km = 71 1/2°.		
		Ki	iP	22 13 40.3	
			iS	22 22 22	
				micr sec	
			P Z'	0.2 1.8	
			S E	0.3 8	
			S N	0.3 5	
			Mx E	1.6 21	
			Mx N	0.9 21	
			Mx Z	1.1 17	
			D = 7150 km = 64 1/2°.		
		(cont.)			

1969 Aug.					
	24	(cont.)			
		Sk	iP	22 14 14.4	
		Um	iP	22 13 58.5	
			ipP	22 14 13.8	
			iS	22 22 52	
		Ud	iP	22 14 28.5	D
			ipP	22 14 40.8	
		De	iP	22 14 44.6	D
		Japan. h = 50 km (Um,Ud).			
		m = 5.9, M = 5.2 (Up,Ki).			
"	24	Ki	iP	23 12 04.8	
		Japan (h = N).			
"	24	Ki	ipP	23 53 24.2	
		Ud	ipP	23 54 13.5	
		Japan (h = N).			
"	25	Ud	iP	00 14 17.4	
"	25	Up	ipP	01 17 49.5	
				micr sec	
			pP Z'	0.1 0.9	
		Ki	ipP	01 17 07.4	
		Sk	epP	01 17 40	
		Um	iP	01 17 15.6	
			epP	01 17 25	
		Ud	iP	01 17 45.8	
			ipP	01 17 56.4	
		De	epP	01 18 13	
		Japan. h = 35 km (Um,Ud).			
		pP is considerably larger			
		than P on Z'.			
"	25	Up	iP	01 23 25.1	
			ipP	01 23 35.1	
		Ki	iP	01 22 43.1	
			ipP	01 22 52.2	
		Um	ipP	01 23 11.8	
		Ud	iP	01 23 32.5	
			ipP	01 23 41.5	
		De	ipP	01 23 57.7	
		Japan. h = 35 km (Up,Ki,Ud).			
"	25	Ud	iP	12 48 03.3	
"	25	Up	ipP	14 15 23.3	
		Ki	eP	14 14 26	
		Sk	ipP	14 15 17.0	
		Ud	iP	14 15 18.4	C
			ipP	14 15 28.7	
		Kurile Islands. h = 40 km			
		(Ud).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 25 Um iP 15 28 28.2
Ud iP 15 28 59.2
Kurile Islands.
Origin time = 15 17 51.

" 25 Ki eP 17 14 12
Sk iP 17 13 45.2
i 17 13 55.0
Ud eP 17 13 50
Leeward Islands (h = 70 km).

" 25 Um iP 17 24 01.7
Japan (h = 35 km).

" 25 Ud iP 18 18 36.0 C
De iP 18 18 54.0
Kurile Islands (h = 70 km).

" 25 Ud iP 18 35 04.9
Japan (h = 35 km).

" 25 Ki eP 20 34 19
Ud iP 20 35 09.1
ipP 20 35 20.6
Japan. h = 45 km (Ud).

" 25 Up iP 20 52 46.5
Ki iP 20 52 04.4
Um iP 20 52 23.1
iPcP 20 52 52.5
Ud iP 20 52 52.7
Japan (h = N).

" 25 Up iP 20 54 01.9
Ud iP 20 54 09.8
i(pP) 20 54 20.1
(Kurile Islands).

" 25 Ki iP 21 45 34.7
Um iP 21 45 39.3
iSKS 21 56 06
Ud iP 21 45 58.3
Molucca Passage (h = N).

" 26 Up iP 02 19 48.1
i 02 19 50.9
iLg2 02 25 30

		micr	sec
P	Z'	0.1	0.5
Mx	E	0.3	8
Mx	N	0.4	9
Mx	Z	0.6	9

Ki iP 02 21 09.0
(cont.)

1969
Aug. 26 (cont.)
Ki

		micr	sec
Mx	E	0.8	17
Mx	N	0.9	13
Mx	Z	1.1	13

Sk iP 02 20 33.0
Um iP 02 20 30.6
i 02 20 36.3
iPP 02 20 55
iS 02 24 28
iSS 02 24 50
Ud iP 02 19 55.1 C
De iP 02 19 17.2 C
Albania (h = 40 km).
M = 4.4 (Up,Ki).

" 26 Up iP 03 31 02.6
Ki iP 03 31 05.8
Sk iP 03 31 29.3
Um iP 03 30 56.8
Ud iP 03 31 16.3
i 03 31 19.7
Tadzhik SSR (h = 70 km).

" 26 Sk ePg 10 56 49
iSn 10 57 17.6
iSg 10 57 31.6
D = 360 km = 3.2°.
Um iSn 10 58 35.0
iLgl 10 59 07.2
iSg 10 59 19.3
Ud eSn 10 58 39
iSg 10 59 10.5
Off coast of Norway,
65.3°N, 5.9°E.
Origin time = 10 55 46.

" 26 Ud iP 16 41 03.7

" 26 Up iPKP 17 16 38.0
iPKKP 17 27 11.2

		micr	sec
Mx	N	1.0	20
Mx	Z	1.5	19

Ki iPKP 17 16 27.6

		micr	sec
Mx	E	0.8	17
Mx	N	0.7	18
Mx	Z	0.9	17

Sk iPKP 17 16 37.6
Um iPKP 17 16 30.9
iPP 17 17 28.8
iPKKP 17 27 22.9
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 26 (cont.)

Um	i	17 27 31.9	
Ud	iPKP	17 16 40.6	
	iPKKP	17 27 06.5	
De	iPKP	17 16 45.9	

New Britain (h = 60 km).
M = 5.4 (Up,Ki).

" 26

Up	iP	20 54 10.4	
	ipP	20 54 16.7	
Ki	iP	20 53 24.7	
Um	iP	20 53 45.6	
Ud	iP	20 54 16.5	
	ipP	20 54 22.3	

Kurile Islands. h = 20 km (Up,Ud).

" 26

Ki	eP	22 44 17	
	i	22 44 25.1	
Sk	eP	22 43 54	
	e	22 44 03	
Um	eP	22 44 31	
	i	22 44 39.4	
Ud	eP	22 44 27	
	i	22 44 36.2	

Iceland (h = 3 km).
Double P, typical for this region, in this case with an interval of 8-9 sec between the first very weak onset and the second clearer one.

" 26

Up	eP		22 51 23	
			micr	sec
	Mx	E	0.4	12
	Mx	N	0.8	16
	Mx	Z	0.7	14
Ki	iP		22 50 50.8	
	i		22 50 57.9	
	iS		22 53 34.1	
	iSS		22 53 51.9	
			micr	sec
	P	Z'	0.1	1.2
	Mx	E	1.4	17
	Mx	N	1.3	14
	Mx	Z	0.9	13
Sk	iP		22 50 29.2	
Um	iP		22 51 08.2	
	i		22 51 11.8	
Ud	iP		22 51 05.1	C

D = 1600 km = 14 1/2°.
Iceland (h = N).
M = 4.2 (Up,Ki).

1969
Aug. 26

Ki	eP	23 49 43	
Sk	ipP	23 50 26.8	
Um	iP	23 50 01.9	
	ipP	23 50 13.0	
Ud	iP	23 50 31.8	
	ipP	23 50 42.9	

Japan. h = 40 km (Um,Ud).

" 26

Ki	eP		23 52 35	
	i		23 52 41.3	
			micr	sec
	Mx	N	0.6	14
Um	iP		23 52 51.5	
Ud	iP		23 52 47.6	

Iceland (h = N).

" 27

Up	iP	00 21 20.8	
Ki	iP	00 20 35.2	
Sk	iP	00 21 11.0	
Um	iP	00 20 55.6	C
Ud	iP	00 21 26.3	
	i	00 21 43.5	

Kurile Islands (h = N).

" 27

Up	iP	00 48 24.1	

" 27

Up	iP		01 21 30.7	
	iS		01 30 37	
			micr	sec
	P	Z'	0.1	0.6
	Mx	E	0.6	14
	Mx	N	1.2	15
	Mx	Z	1.0	13

D = 7650 km = 69°.

Ki	iP		01 20 45.3		D
			micr	sec	
	P	Z'	0.1	0.9	
	Mx	E	2.1	18	
	Mx	N	1.7	20	
	Mx	Z	1.8	15	
Sk	iP		01 21 22.4		
Um	iP		01 21 05.8		
	iS		01 29 46		
Ud	iP		01 21 37.1		
De	eP		01 21 55		

Kurile Islands (h = 60 km).
m = 6.1, M = 5.3 (Up,Ki).

" 27

Ud	iP	01 22 40.6	

" 27

Up	iP	01 23 56.5	
	i	01 24 04.2	
Ki	iP	01 23 10.5	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 27 (cont.)

Ki			micr	sec
	P	Z'	0.1	1.0
Sk	iP		01 23 46.9	
Um	iP		01 23 31.4	
Ud	iP		01 24 02.1 C	

Kurile Islands (h = 60 km).

" 27

Ki	iP	01 27 29.7
Um	iP	01 27 49.9
Ud	iP	01 28 21.0 C

Kurile Islands.
Origin time = 01 17 13.

" 27

Ki	iP	01 28 08.5
Um	eP	01 28 28
Ud	iP	01 28 59.5

Kurile Islands.
Origin time = 01 17 52.

" 27

Up	iP	01 39 37.7
Ki	iP	01 38 51.8
Sk	iP	01 39 27.5
Um	iP	01 39 12.7
Ud	iP	01 39 43.5
	i	01 39 49.9
De	iP	01 40 03.0

Kurile Islands (h = N).

" 27

Up	iP	02 40 54.2
Ki	iP	02 40 08.7
Um	iP	02 40 28.8
Ud	iP	02 40 58.9

Kurile Islands.
Origin time = 02 29 52.

" 27

Up	iP		02 42 22.7	
Ki	iP		02 41 37.5	
			micr	sec
	Mx	E	0.7	17
	Mx	N	0.4	14
Um	iP		02 41 58.5	
Ud	iP		02 42 27.3	
	ipP		02 42 40.8	

Kurile Islands. h = 50 km (Ud).

" 27

Up	iP		03 37 17.0 C	
			micr	sec
	P	Z'	0.1	0.6
	Mx	E	0.6	14
	Mx	N	1.4	17
	Mx	Z	1.0	13

(cont.)

1969
Aug. 27 (cont.)

Ki	iP		03 36 31.5	
	ipP		03 36 43.3	
			micr	sec
	P	Z'	0.1	1.0
	Mx	E	1.8	18
	Mx	N	1.3	17
	Mx	Z	2.3	17
Sk	iP		03 37 06.9 C	
Um	iP		03 36 51.6	
Ud	iP		03 37 23.0	
	ipP		03 37 34.9	

Kurile Islands. h = 45 km (Ki,Ud).
m = 6.1, M = 5.2 (Up,Ki).

" 27

Up	iP	03 37 57.9
Um	iP	03 37 32.9
Ud	iP	03 38 03.8
De	iP	03 38 23.4
	ipP	03 38 36.0

Kurile Islands. h = 45 km (De).
Origin time = 03 26 56.

" 27

Up	iP		03 43 39.1	
			micr	sec
	P	Z'	0.1	0.6
Ki	iP		03 42 53.4	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		03 43 29.2	
Um	iP		03 43 13.7	
Ud	iP		03 43 45.3 C	

Kurile Islands (h = 50 km).
m = 6.1 (Up,Ki).

" 27

Ki	iPKP	04 16 56.8

South Sandwich Islands (h = 100 km).

" 27

Up	iP	10 56 45.5
Ud	iP	10 56 51.4 C

Kurile Islands.
Origin time = 10 45 43.

" 27

Ki	iP	12 16 10.2
	i	12 16 14.3
Sk	iP	12 15 46.6
Um	iP	12 16 28.8
Ud	iP	12 16 21.8 C

Iceland (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	27	Ki	iP	13 35 59.1	C
		Ud	iP	13 36 10.9	C
		Sumatra (h = 190 km).			
"	27	Up	iP	19 35 27.4	
			i	19 35 38.1	
		Ki	iP	19 34 52.0	D
				micr sec	
			P Z'	0.1 1.0	
		Sk	iP	19 35 21.4	
		Um	iP	19 35 07.2	
		Ud	iP	19 35 33.5	
		Bonin Islands (h = 20 km).			
"	27	Ud	iP	19 54 05.0	
"	27	Ki	iP	20 01 58.6	
		Sk	iP	20 02 29.1	
		Um	iP	20 02 15.2	
		Ud	iP	20 02 44.3	
		Japan (h = 70 km).			
"	27	Ki	iPn	20 52 47.8	
			iP^x	20 52 55.9	
			iSn	20 53 34.2	
			iLgl	20 53 46.4	
			D = 420 km = 3.8°.		
		Sk	iLgl	20 56 35.0	
		Um	iSg	20 55 30.6	
		Northwest Russia - Norway border region.			
		Origin time = 20 51 47.			
		Explosion?			
"	27	Up	iP	22 43 40.3	
		Ud	iP	22 43 56.6	
		Hindu Kush (h = 60 km).			
"	28	Up	iP1	04 06 13.6	
			iP3	04 06 20.2	
			iPP	04 07 50.0	
			iS	04 12 24	
			iSS	04 15 09	
				micr sec	
			P3 Z'	0.1 0.5	
			Mx E	1.7 13	
			Mx N	14 18	
			Mx Z	2.4 15	
			D = 4500 km = 40 1/2°.		
		Ki	iP1	04 06 15.2	
			iP2	04 06 18.1	
			iP3	04 06 22.4	
		(cont.)			

1969 Aug.	28	(cont.)			
		Ki	eS	04 12 26	
			eSS	04 15 08	
				micr sec	
			P3 Z'	0.2 0.8	
			S N	0.6 7	
			Mx E	3.7 14	
			Mx N	12 14	
			D = 4550 km = 41°.		
		Sk	iP1	04 06 36.8	C
			iP2	04 06 39.0	
			iP3	04 06 43.1	
			iPP	04 08 27.4	
		Um	iP1	04 06 08.2	
			iP2	04 06 11.2	
			iP3	04 06 14.8	
			iS	04 12 14	
		Ud	iP1	04 06 28.4	
			iP3	04 06 34.7	
			i	04 06 42.3	
			iPP	04 08 07.7	
		De	iP1	04 06 28.1	
			iP3	04 06 35.6	
			i(PP)	04 08 17.0	
		Tadzhik-Sinkiang (h = 20 km).			
		m = 5.8, M = 5.3 (Up,Ki).			
		Multiple P; in average,			
		P2 - P1 = 2.7 sec and			
		P3 - P1 = 6.8 sec.			
"	28	Up	iP	04 13 57.6	
		Ki	iP	04 14 00.3	
		Sk	eP	04 14 20	
		Um	iP	04 13 53.4	
			iS	04 20 02	
		Ud	iP	04 14 14.0	C
			i	04 14 19.2	
			iPP	04 15 43.5	
		De	eP	04 14 13	
		Tadzhik-Sinkiang (h = 25 km).			
"	28	Up	iP	04 55 21.1	D
			ipP	04 55 33.1	
		Ki	iP	04 54 34.9	
		Sk	eP	04 55 10	
		Um	iP	04 54 56.4	D
			ipP	04 55 07.7	
		Ud	iP	04 55 27.1	
			ipP	04 55 39.0	
		Kurile Islands. h = 45 km (Up,Um,Ud).			
		Origin time = 04 44 19.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	28	Ki	iP		11 28 56.4	
		Um	iP		11 28 38.5	
		Ud	iP		11 28 38.6	
			i		11 28 45.3	
		Caucasus.				
"	28	Um	iP		12 12 08.1	
"	28	Up	iPKP2		14 14 16	C
					micr	sec
			PKP2	Z	0.6	3
			Mx	E	1.8	19
			Mx	N	2.0	20
			Mx	Z	3.0	19
		Ki	iPKP		14 13 47.5	
			i		14 14 05.2	
					micr	sec
			Mx	E	2.4	19
			Mx	N	1.2	19
			Mx	Z	4.1	17
		Sk	ePKP		14 13 55	
		Um	iPKP		14 13 46.4	C
			iPKP2		14 13 55.8	
			i		14 14 16	
		Ud	iPKP		14 14 00.2	
			iPKP2		14 14 11.2	
		De	iPKP		14 13 57.7	
			i		14 14 11.8	
			iPKP2		14 14 26.8	
		Kermadec Islands (h = 30 km).				
		M = 6.1 (Up,Ki).				
"	28	Ud	iP		15 04 58.4	
		Kurile Islands.				
		Origin time = 14 53 50.				
"	28	Up	iP		15 36 53.9	C
			i		15 37 06.6	
					micr	sec
			P	Z'	0.1	0.6
"	28	Ki	iP		15 55 01.9	
		Ud	iP		15 55 56.8	
		Kurile Islands.				
		Origin time = 15 44 47.				
"	28	Ki	iP		16 26 02.3	
			i		16 26 17.1	
		Ud	iP		16 26 56.7	
		Kurile Islands (h = N).				
"	28	Up	iPKP2		17 09 51.6	
			i		17 10 10.5	
		(cont.)				

1969 Aug.	28	(cont.)				
		Sk	iPKP		17 09 38.5	
			i		17 09 49.5	
		Um	iPKP		17 09 33.7	C
			i		17 09 43.9	
		Ud	iPKP		17 09 46.9	
		De	iPKP		17 09 55.2	
		Kermadec Islands				
		(h = 25 km).				
"	28	Up	eP		18 25 31	
"	28	Ud	iP		18 53 14.4	
		Kurile Islands.				
		Origin time = 18 42 06.				
"	28	Ud	iP		19 57 35.8	
"	28	Ud	iP		21 29 49.4	
"	28	Up	iP		21 46 25.9	
			iS		21 55 30	
					micr	sec
			P	Z'	0.1	0.9
			Mx	E	1.6	17
			Mx	N	2.3	19
			Mx	Z	1.5	16
			D = 7650 km = 69°.			
		Ki	iP		21 45 40.5	
			ipP		21 45 53.9	
			eS		21 54 05	
					micr	sec
			P	Z'	0.1	1.0
			S	E	0.6	13
			S	N	0.3	10
			Mx	E	4.0	18
			Mx	N	2.0	17
			Mx	Z	4.6	18
			D = 6900 km = 62°.			
		Sk	iP		21 46 15.2	C
		Um	iP		21 46 01.2	
			iS		21 54 38	
			iScS		21 55 54	
		Ud	iP		21 46 31.9	
			ipP		21 46 44.8	
		Kurile Islands. h = 50 km				
		(Ki,Ud).				
		m = 5.9, M = 5.6 (Up,Ki).				
"	28	Ud	iP		22 19 57.8	C
"	28	Ki	iP		23 13 36.5	
		Sk	eP		23 14 12	
		Um	iP		23 13 56.0	
		Ud	iP		23 14 24.2	
		(Kurile Islands).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	29	Up	iP		01 13 06.1
		Ki	iP		01 12 20.1
		Ud	iP		01 13 12.1 C
			i		01 13 32.0
		Kurile Islands (h = 35 km).			
"	29	Up	iP		01 53 22.9
		Ud	iP		01 53 30.9 C
		De	iP		01 53 00.2
		Rhodes Island.			
"	29	Up	iP		03 20 11.4 C
					micr sec
			P	Z'	0.1 0.9
		Ki	iP		03 19 25.6
					micr sec
			P	Z'	0.1 1.0
			Mx	E	0.8 19
			Mx	N	0.5 17
			Mx	Z	0.9 17
		Sk	iP		03 20 00.7
			ipP		03 20 14.7
		Um	iP		03 19 47.4
			iS		03 28 34
		Ud	iP		03 20 17.3 C
			ipP		03 20 30.4
		Kurile Islands. h = 50 km (Sk,Ud). m = 6.0 (Up,Ki).			
"	29	Sk	iPKP		07 04 49.4
		Um	iPKP		07 04 41.8
		Ud	ePKP		07 04 54
			i		07 05 07.4
		Kermadec Islands (h = N).			
"	29	Ud	iP		09 09 06.0
"	29	Up	iP		10 13 02.9
			ipP		10 13 27.1
					micr sec
			P	Z'	0.1 0.5
		Ki	iP		10 12 53.9 C
			ipP		10 13 14.2
			iPcP		10 13 37.5
		Sk	iP		10 13 17.2 C
		Um	iP		10 12 54.0
			iPcP		10 13 37.4
		Ud	iP		10 13 16.2 C
			i		10 13 24.1
		De	iP		10 13 18.4
		Burma. h = 90 km (Up,Ki).			

1969 Aug.	29	Ki	iPn	11 02 20.5
			iSn	11 03 18.9
			iSg	11 03 44.0
			D = 530 km = 4.8°.	
		Sk	eS^{x}	11 05 47
			iSg	11 06 15.8
		Um	eSg	11 04 33
		Northwest Russia, 67.5°N, 33.0°E. Origin time = 11 01 06. Explosion?		
"	29	Ud	eP	19 01 56
"	29	Ud	iP	22 03 25.9
"	30	Um	eSKS	01 50 56
		Galapagos Islands (h = 30 km).		
"	30	Um	iP	03 15 36.5
"	30	Ki	iP	04 34 47.7
		Ud	iP	04 35 44.5
		Komandorsky Islands (h = N).		
"	30	Ki	iP	05 59 38.8
			i	05 59 56.6
		Um	iP	05 59 58.6
			i	06 00 18.1
		Ud	iP	06 00 33.2
		(Kurile Islands).		
"	30	Up	iP	07 03 38.2
			ipP	07 03 44.3
				micr sec
			P	Z' 0.1 0.5
		Ki	iP	07 02 52.1
				micr sec
			P	Z' 0.1 1.0
		Sk	eP	07 03 28
		Um	iP	07 03 13.0
		Ud	iP	07 03 43.9 C
			ipP	07 03 49.8
		Kurile Islands. h = 20 km (Up,Ud). m = 6.1 (Up,Ki).		
"	30	Up	iP	07 22 43.2 C
			ipP	07 22 54.5
			iS	07 31 47
			eScS	07 32 36
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 30 (cont.)

Up			micr	sec
	P	Z	1.3	5
	P	Z'	0.6	0.8
	Mx	E	4.7	19
	Mx	N	8.8	17
	Mx	Z	11	20
	D = 7650 km = 69°.			
Ki	iP		07 21 56.7	
	iS		07 30 20	
			micr	sec
	P	E	0.4	6
	P	N	0.5	9
	P	Z	1.2	8
	P	Z'	0.5	0.9
	S	E	1.9	13
	S	N	0.9	12
	Mx	E	15	16
	Mx	N	9.3	16
	Mx	Z	20	16
	D = 6850 km = 61 1/2°.			
Sk	iP		07 22 33.1	
Um	iP		07 22 17.6 C	
	i		07 22 19.4	
	ipP		07 22 32.5	
	iS		07 30 50	
Ud	iP		07 22 48.4 C	
De	iP		07 23 06.7	
	ipP		07 23 20.4	

Kurile Islands. h = 50 km (Up,Um,De).
m = 6.4, M = 6.2 (Up,Ki).

" 30

Up	iP	07 33 13.8
Ki	iP	07 32 27.8 C
Ud	iP	07 33 18.7

Kurile Islands (h = 45 km).

" 30

Up	iP	07 39 07.6
Ud	iP	07 39 15.4

Kurile Islands.
Origin time = 07 28 07.

" 30

Up	iP		07 52 46.5	
			micr	sec
	P	Z'	0.1	0.5
Ki	iP		07 52 00.4	
	ipP		07 52 12.0	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		07 52 36.7	
Um	iP		07 52 21.5	
	ipP		07 52 32.8	

(cont.)

1969
Aug. 30 (cont.)

Ud	iP	07 52 52.9 C
	i	07 53 00.1
De	iP	07 53 10.4

Kurile Islands. h = 40 km (Ki,Um).
m = 6.1 (Up,Ki).

" 30

Up	iP	07 53 45.9
Ki	iP	07 52 59.5
Um	iP	07 53 20.9 C
Ud	iP	07 53 51.3 C

Kurile Islands.
Origin time = 07 42 44.

" 30

Up	iP		08 05 30.2	
	iPcP		08 05 54.2	
			micr	sec
	P	Z'	0.1	0.5
Ki	iP		08 04 45.5	
	iPcP		08 05 26.1	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		08 05 20.7 C	
Um	iP		08 05 05.8	
Ud	iP		08 05 36.6	
	i		08 05 49.1	
De	iP		08 05 54.0	
	i		08 05 58.7	

Kurile Islands (h = 45 km).
m = 6.1 (Up,Ki).

" 30

Up	iP		08 39 10.4 C	
			micr	sec
	P	Z'	0.1	0.5
	Mx	E	3.0	16
	Mx	N	6.1	20
	Mx	Z	6.1	19
Ki	iP		08 38 23.6	
	ipP		08 38 33.2	
	iS		08 46 47	
			micr	sec
	P	Z	0.7	9
	P	Z'	0.2	0.9
	S	N	0.9	11
	Mx	E	11	19
	Mx	N	7.3	20
	Mx	Z	11	16
	D = 6850 km = 61 1/2°.			
Sk	iP		08 38 59.3	
Um	iP		08 38 45.0	
	ipP		08 38 56.1	
Ud	iP		08 39 15.7 C	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Aug. 30 (cont.)
Ud ipP 08 39 28.1
De iP 08 39 33.1
Kurile Islands. h = 40 km (Ki,Um,Ud).
m = 6.1, M = 6.1 (Up,Ki).

" 30 Ud iP 08 41 03.6
i 08 41 13.2

" 30 Ki iP 08 41 28.4
Ud iP 08 42 22.3
Kurile Islands.
Origin time = 08 31 13.

" 30 Up iP 08 48 23.9 C
Ki iP 08 47 38.2
Ud iP 08 48 29.0
Kurile Islands (h = N).

" 30 Up iP 08 56 07.5
Um iP 08 55 42.5
Ud iP 08 56 12.9
Kurile Islands.
Origin time = 08 45 05.

" 30 Up iP 08 59 08.7
micr sec
P Z' 0.1 0.5
Ki iP 08 58 23.2
Um iP 08 58 44.0
ipP 08 58 54.5
Ud iP 08 59 14.9 C
i 08 59 20.5
Kurile Islands. h = 40 km (Um).

" 30 Up iP 08 59 39.7
Ki iP 08 58 53.4
Um iP 08 59 14.7
Ud iP 08 59 45.6
Kurile Islands.
Origin time = 08 48 39.

" 30 Up iP 10 13 03.4
Ki iP 10 12 18.1
Um iP 10 12 38.9 D
Ud iP 10 13 08.7
Kurile Islands (h = 40 km).

" 30 Up iP 10 22 43.9
Ki iP 10 21 58.1
Um iP 10 22 18.9
(cont.)

1969
Aug. 30 (cont.)
Ud iP 10 22 49.8
Kurile Islands.
Origin time = 10 11 42.

" 30 Ki iP 11 36 21.5
i 11 36 37.0
Ud iP 11 37 12.7
Kurile Islands.
Origin time = 11 26 06.

" 30 Ud iP 11 47 21.0

" 30 Ki iPn 12 30 33.5
iSn 12 31 21.6
iLgl 12 31 35.7
D = 440 km = 4.0°.
Um iSg 12 33 07.9
Probably northwest Russia.
Origin time = 12 29 30.
Explosion?

" 30 Ki iPn 12 43 06.4
iSn 12 44 01.6
iLgl 12 44 18.6
D = 520 km = 4.7°.
Sk eSn 12 45 57
iSg 12 46 57.1
Um iSg 12 45 19.4
Northwest Russia,
67.6°N, 32.8°E.
Origin time = 12 41 52.
Explosion?

" 30 Ki iSg 13 26 10.5
Sk iSg 13 26 16.2
Um iSg 13 26 31.5
Nordland, Norway.

" 30 Up iP 18 51 56.0
Ki iP 18 51 09.7
Sk eP 18 51 46
Um iP 18 51 30.9 C
Ud iP 18 52 01.3 C
Kurile Islands (h = 25 km).

" 31 Up iP 01 11 22.9
Ud iP 01 11 29.0
Kurile Islands.
Origin time = 01 00 21.

" 31 Ki eP 04 21 08
Molucca Passage (h = 20 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Aug.	31	Up	iSKP	11 15 01.2	
		Um	iSKP	11 14 44.2	
		New Hebrides Islands (h = 210 km).			
"	31	Up	iP	11 53 18.8	
		Ki	iP	11 53 20.8	
		Ud	iP	11 53 33.3	
"	31	Ud	iP	11 55 38.1	C
		Samar (h = 50 km).			
"	31	Ud	iP	12 19 29.4	C
"	31	Up	iP	13 18 07.5	C
			ipP	13 18 23.9	
			iSKS	13 28 32	
		Ki	iP	13 18 07.2	C
				micr sec	
			P Z'	0.1 1.0	
		Sk	iP	13 18 20.6	C
		Um	iP	13 18 04.3	C
			iS	13 28 52	
		Ud	iP	13 18 16.8	C
		De	iP	13 18 15.5	
		Sumatra. h = 60 km (Up).			
"	31	Um	eP	17 05 23	
		Kurile Islands. Origin time = 16 54 46.			
"	31	Up	iP	20 01 21.4	
"	31	Ki	iPKP	20 17 15.8	
		Ud	iPKP	20 17 32.3	
		New Hebrides Islands (h = 30 km).			
"	31	Ki	iSKP	21 09 34.3	
		Sk	iPKS	21 10 37.3	
		Fiji Islands (h = 400 km).			
"	31	Up	iP	22 28 03.8	
		Ki	iP	22 27 18.9	
		Ud	iP	22 28 10.4	
		(cont.)			

1969 Aug.	31	(cont.)			
		De	iP	22 28 27.6	C
		Kurile Islands (h = 60 km).			
"	31	Um	iP	23 59 11.9	
		Mexico (h = 70 km).			

Markus Båth
September 18, 1970

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

Seismological Institute
Uppsala

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å, U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

S E P T E M B E R 1 - 30, 1969

1969					
Sep.	1	Ud	iP	03 38 55.5	
		Samar (h = 60 km).			
"	1	Up	iP	03 46 51.2	
		Ki	iP	03 46 07.4	
		Ud	iP	03 46 57.7	
		Kurile Islands (h = N).			
"	1	Ud	iP	09 57 17.7	
		Japan (h = N).			
"	1	Up	iP	10 00 57.2	
				micr sec	
			P Z'	0.2 0.6	
		Ki	iP	10 00 12.4	C
				micr sec	
			P Z'	0.2 1.0	
		Sk	iP	10 00 47.5	C
		Um	iP	10 00 32.9	
		Ud	iP	10 01 03.6	C
		De	iP	10 01 21.0	C
		Kurile Islands (h = N).			
		m = 6.4 (Up,Ki).			
"	1	Um	iP	10 17 04.5	
			i	10 17 12.0	
		Ud	iP	10 17 25.9	
"	1	Up	iPKP	10 52 05.6	
			i	10 52 13.6	
		Sk	ePKP	10 51 59	C
		Um	iPKP	10 51 53.3	
		Ud	iPKP	10 52 06.8	
		De	ePKP	10 52 15	
		Kermadec Islands (h = N).			
"	1	Ud	iP	11 33 07.0	D

1969					
Sep.	1	Sk	iPKP	12 29 05.2	
		Um	iPKP	12 28 56.2	
		Ud	iPKP	12 29 11.6	
		Kermadec Islands (h = N).			
"	1	Um	i(P)	12 50 09.0	
"	1	Um	iP	14 50 24.3	
"	1	Ud	iP	23 23 25.0	
		Iran (h = 30 km).			
"	2	Up	iPKP	02 26 05.0	
			i	02 26 10.9	
		Sk	iPKP	02 25 58.8	
		Um	iPKP	02 25 53.1	C
			i	02 26 02.6	
		Ud	iPKP	02 26 06.5	C
			i	02 26 13.2	
		De	iPKP	02 26 12.4	
		Kermadec Islands (h = 25 km).			
"	2	Up	iPKKP	04 16 30.4	
		Ki	iPP	04 06 26.3	
			iPKKP	04 16 14.5	
		Um	iSP	04 15 38	
			iPKKP	04 16 19.9	
			i	04 16 47	
		Ud	iPKP	04 05 06.1	
			iPKKP	04 16 38.3	
		Argentina (h = 170 km).			
		Our observations of PKKP derive from the distance range 110°-115°, close to the focal point of PKKP.			
"	2	Up	iP	05 04 23.0	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 2 (cont.)

Up	i		05 04 25.0		
			micr	sec	
	P	Z'	0.2	0.5	
Ki	eP		05 04 18		
	i		05 04 19.8		
	i		05 05 02.4		
Sk	iP		05 04 49.9		
	i		05 04 53.1		
Um	iP		05 04 07.2		
	i		05 04 12.2		
Ud	iP		05 04 46.6		
De	iP		05 04 54.8		
	i		05 04 58.8		
	i		05 05 09.2		

Ural Mountains.
Underground explosion.

" 2 Ud iP 05 21 24.1

" 2

Up	iP	07 34 30.7
Ki	iP	07 33 58.7
Sk	iP	07 34 30.1
Um	iP	07 34 11.5
Ud	iP	07 34 39.4

Japan (h = 15 km).

" 2 Ud iP 08 47 21.5
Aleutian Islands (h = 60 km).

" 2

Ki	iP	11 53 45.7
Um	iP	11 53 23.4
	i	11 53 26.9
Ud	iP	11 52 57.7

Ascension Island (h = 30 km).

" 2 Ud iP 12 18 53.5
Japan (h = 10 km).

" 2

Um	iP	12 47 51.2
Ud	iP	12 48 18.0

South of Japan (h = 490 km).

" 2

Ki	iP	12 51 45.6
Um	iP	12 52 07.2
Ud	eP	12 52 12

Molucca Passage (h = 45 km).

" 2

Ki	iP		13 38 02.5	
			micr	sec
	Mx	E	0.8	14
	Mx	N	1.5	17
Um	iP		13 37 46.4	
	i		13 37 52.1	
Ud	iP		13 37 53.1	

Iran (h = 20 km).

1969
Sep. 2 Ud iP 14 27 42.0

" 2

Up	iP	15 31 07.9	
Ki	eP	15 30 22	
Um	iP	15 30 42.4	
Ud	iP	15 31 13.1	C

Kurile Islands (h = N).

" 2 Sk iP 17 08 03.6

" 2

Up	iPKP	18 12 08.7	
	i	18 12 16.4	
Sk	iPKP	18 12 03.6	
Um	iPKP	18 11 58.3	D
Ud	iPKP	18 12 10.0	

South of Kermadec Islands
(h = 160 km).

" 2

Sk	ePKP	19 35 55
Um	ePKP	19 35 48
	i	19 35 55.0

(Kermadec Islands).

" 2

Ki	iPKP	20 46 29.7
Sk	i(PKP)	20 46 49.3
Um	iPKP	20 46 34.4
	i	20 46 41.9
Ud	iPKP	20 46 48.2
De	i(PKP)	20 47 04.1

Kermadec Islands (h = 15 km).

" 2 Ki ePKP 20 58 42
South Sandwich Islands
(h = N).

" 3

Ki	iP	01 45 05.4
Ud	iP	01 45 30.8

North of Halmahera
(h = 60 km).

" 3 Ud iP 04 30 34.3
Kurile Islands (h = N).

" 3

Up	iP	05 08 54.3	
Ki	iP	05 08 55.1	C
Sk	iP	05 09 09.0	
Um	iP	05 08 51.5	C
Ud	iP	05 09 04.6	
	i	05 09 32.6	
De	iP	05 09 02.9	

Sumatra (h = 20 km).

" 3

Up	iPKP	05 33 16.9
	i	05 33 36.1
Sk	ePKP	05 33 15

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 3 (cont.)

Sk	i	05 33 32.9	
Um	iPKP	05 33 11.8	
Ud	i	05 33 37.2	

Kermadec Islands
(h = 140 km).

" 3	Ki	eP	06 45 38
" 3	Ki	iP	07 06 55.4
	Um	iP	07 07 16.4
	Ud	iP	07 07 47.1

Kurile Islands (h = N).

" 3	Ud	iPg	12 04 00.1
		iSg	12 04 18.8
		iRg	12 04 23.8
		D = 170 km = 1.5°.	
	De	e	12 04 38

Origin time = 12 03 30.
Probably explosion.

" 3	Up	iP	16 32 17.8	
		iS	16 42 02	
			micr	sec
		P	Z' 0.1	1.2
		S	N 0.7	5
		Mx	E 1.1	20
		Mx	N 2.6	21
		Mx	Z 2.9	22
		D = 8650 km = 78°.		
	Ki	eP	16 31 41	
		i	16 31 43.4	
		iS	16 41 01	
			micr	sec
		P	Z' 0.2	1.4
		S	E 1.1	7
		S	N 1.2	7
		Mx	E 2.4	19
		Mx	N 1.9	15
		Mx	Z 5.6	21
		D = 7950 km = 71 1/2°.		
	Sk	iP	16 32 14.0	
	Um	iP	16 31 55.8	
		i	16 31 58.4	
		i	16 32 03.8	
		iS	16 41 27	
		iSS	16 46 15	
	Ud	iP	16 32 24.8	
	De	iP	16 32 39.3	

South of Japan (h = 15 km).
m = 6.1, M = 5.6 (Up,Ki).
The first phases read at Ki and Um are small precursors to the following bigger phases.

1969
Sep. 3

Ud	i(Sg)	21 11 54.1	
" 3 Ki	iP	21 45 33.8	
Ud	iP	21 46 24.3	

Japan (h = 70 km).

" 3 Up	iP	22 12 37.1	
Um	iP	22 12 11.1	
Ud	iP	22 12 43.0	

Kurile Islands (h = N).

" 3 Up	iP	22 20 40.4	
Sk	eP	22 20 37	
Um	iP	22 20 20.5	C
Ud	iP	22 20 48.6	C

Japan (h = 100 km).

" 3 Up	iP	23 46 12.0		
Ki	iP	23 46 34.6		
		micr	sec	
	Mx	E	0.5	13
	Mx	N	0.5	16
Um	iP	23 46 17.9		
Ud	iP	23 46 24.9		

Iran (h = N).

" 4 Up	iP	03 04 40.8		C
Ki	iP	03 04 49.7		C
Sk	iP	03 05 06.5		
	i(pP)	03 05 58.6		
Um	iP	03 04 39.4		C
Ud	iP	03 04 57.4		C
	ipP	03 05 45.5		
	isP	03 06 10.1		

Hindu Kush. h = 240 km (Ud).

" 4 Up	iP	03 19 48.3		C
	ipP	03 19 59.9		
	iS	03 28 42		
		micr	sec	
	P	N	0.7	5
	P	Z	1.6	5
	P	Z'	0.5	1.0
	S	E	0.7	9
	S	N	1.0	7
	Mx	E	3.2	17
	Mx	N	5.4	16
	Mx	Z	5.2	18
	D = 7500 km = 67 1/2°.			
Ki	iP	03 18 59.8		C
	iPa	03 22 42		
	iS	03 27 17		
		micr	sec	
	P	E	0.7	6
	P	N	1.0	6

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 4 (cont.)

			micr	sec
Ki	P	Z'	0.4	1.2
	S	E	1.5	9
	S	N	1.4	8
	Mx	E	6.4	23
	Mx	N	5.0	17

D = 6700 km = 60 1/2°.

Sk	iP	03 19 35.8 C
	ipP	03 19 47.7
Um	iP	03 19 22.5 C
	ipP	03 19 34.0
	iPa	03 23 16
	iS	03 27 56
	iSS	03 32 15
Ud	iP	03 19 53.2 C
	ipP	03 20 03.9
De	iP	03 20 14.0 C
	ipP	03 20 24.7

Kurile Islands. h = 40 km (Up,Sk,Um,Ud,De).
m = 6.4, M = 5.9 (Up,Ki).

"	4	Up	iP 04 41 24.8
			ipP 04 41 35.8
		Ki	iP 04 40 39.1
		Um	iP 04 41 00.3
			ipP 04 41 10.7
		Ud	iP 04 41 31.1
			ipP 04 41 41.6
		De	iP 04 41 48.9

Kurile Islands. h = 40 km (Up,Um,Ud).

"	4	Um	iP 04 45 20.3
		Ud	iP 04 45 51.9
			ipP 04 46 04.0

Kurile Islands. h = 45 km (Ud).

"	4	Ki	iP 05 49 02.4
		Um	iP 05 49 24.4
		Ud	iP 05 49 56.0

Kurile Islands (h = N).

"	4	Ki	e(P) 06 38 13
		Um	i(P) 06 38 29.3

El Salvador (h = 50 km).

"	4	Up	iP 11 44 58.4
		Ud	iP 11 45 04.6

Kurile Islands (h = N).

"	4	Ud	eP 12 13 33
			i 12 13 37.4

1969
Sep. 4

Up	iPg	13 29 18.2
	iSg	13 29 46.0
Sk	eSg	13 32 10
Ud	iSg	13 30 33.3
De	iPg	13 29 37.3
	iSg	13 30 24.1
	iRg	13 30 38.6

North Gotland, 57.9°N, 19.0°E.
Origin time = 13 28 36.
Probably explosion.

"	4	Ud	iP 14 34 09.0
"	4	Sk	iP 16 26 57.1
"	4	Sk	iP 16 55 26.3
"	4	Ki	iP 17 25 33.6

		micr	sec
Mx	E	0.4	14
Mx	N	0.3	15

Um	iP	17 25 02.2
	i	17 25 06.4
De	iP	17 24 30.6

Jordan-Syria (h = N).

"	4	Ki	iPn 17 58 03.7
			iSn 17 58 50.3
			iLgl 17 59 04.1

D = 430 km = 3.9°.

Sk	iSg	18 02 00.0
Um	iSg	18 00 37.5

Northwest Russia, 68.9°N, 30.8°E.
Origin time = 17 57 02.
Explosion?

"	4	Ki	iPg 18 09 29.6
			iSg 18 09 51.8

D = 190 km = 1.7°.

Sk	iSg	18 11 34.3
Um	eLgl	18 11 24
Ud	iSg	18 13 21.7

Northwest coast of Norway, 68.2°N, 16.0°E.
Origin time = 18 08 56.

"	4	Up	i(P) 18 24 33.0
"	4	Up	iPg 19 13 48.8
			iSg 19 14 09.5
			iRg 19 14 13.7
		Sk	eLgl 19 16 24
		Um	iLgl 19 16 05.3

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 4 (cont.)

Ud	ePg	19 14 12	
	iLgl	19 14 43.1	
De	i	19 15 07.2	

Baltic Sea, northwest of Gotland.
Origin time = 19 13 17.
Probably underwater explosion.

" 4

Up	iPg	19 28 21.6	
	iSg	19 28 42.4	
	iRg	19 28 47.0	
Um	iLgl	19 30 43.1	
Ud	iLgl	19 29 15.4	
De	i	19 29 44.9	

Baltic Sea, northwest of Gotland.
Origin time = 19 27 50.
Probably underwater explosion. According to Up record, there is another similar event 13-14 sec later.

" 4

Up	iP	19 30 49.8	
	i	19 31 07.9	
		micr	sec
	Mx E	0.6	15
	Mx N	0.7	12
	Mx Z	0.9	12
Ki	iP	19 31 56.3	C
		micr	sec
	Mx E	0.6	15
	Mx N	0.4	15
Sk	eP	19 31 32	
Um	iP	19 31 28.8	
Ud	iP	19 30 58.1	
De	iP	19 30 31.0	
	i	19 30 35.2	

Dodecanese Islands (h = N).
M = 4.6 (Up,Ki).

" 4

Up	iP	21 23 37.4	
	iS	21 32 31	
		micr	sec
	P Z'	0.2	0.6
	Mx E	0.9	19
	Mx N	0.9	18
	Mx Z	1.2	15

D = 7550 km = 68°.

Ki	iP	21 22 51.4	

(cont.)

1969
Sep. 4 (cont.)

Ki		micr	sec
	P Z'	0.1	0.7
	Mx E	1.1	15
	Mx N	1.5	19
	Mx Z	2.7	17
Sk	iP	21 23 28.2	
Um	iP	21 23 12.3	
	iPa	21 27 09	
	eS	21 31 47	
Ud	iP	21 23 43.5	
De	iP	21 24 01.2	
	i	21 24 27.3	

Kurile Islands (h = 60 km).
m = 6.3, M = 5.2 (Up,Ki).

" 4 Um iP 23 41 15.8

" 4

Up	iP	23 57 47.5
Ki	iP	23 56 57.8
Um	iP	23 57 22.1
Ud	iP	23 57 53.2

Kurile Islands (h = 90 km).

" 5

Ki	iP	00 23 29.6
Ud	iP	00 23 18.8

" 5 Um eP 01 04 14

" 5

Ki	iP	07 25 31.5
Um	iP	07 25 53.7
	ipP	07 26 05.1
Ud	iP	07 26 25.8
	ipP	07 26 36.4

Kurile Islands. h = 40 km (Um,Ud).

" 5 Ki iP 07 48 30.5 C

" 5

Ki	iPKP	09 45 55.0
Um	iPKP	09 46 03.0

New Zealand (h = 60 km).

" 5

Up	ipP	11 26 13.7
Ud	iP	11 26 09.1
	ipP	11 26 19.3

Kurile Islands. h = 40 km (Ud).

" 5

Ki	iPn	11 31 30.5
	iSn	11 32 29.1
	iLgl	11 32 48.7

D = 530 km = 4.8°.

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 5 (cont.)
Sk iSg 11 35 17.5
Um iSg 11 33 38.1
Ud e(Lgl) 11 36 10
iSg 11 36 18.6
Northwest Russia,
67.2°N, 32.9°E.
Origin time = 11 30 17.
Explosion?

" 5 Up iP 11 54 05.9 C
iS 12 03 52
micr sec
P Z' 0.1 0.5
Mx E 2.1 22
Mx N 6.8 22
Mx Z 2.8 15
D = 8550 km = 77°.
Ki iP 11 53 42.7 C
micr sec
P Z' 0.1 1.0
Mx E 1.4 17
Mx N 2.3 16
Mx Z 2.9 14
Sk iP 11 54 09.7
i 11 54 21.1
Um iP 11 53 50.9 C
iS 12 03 24
Ud iP 11 54 15.4 C
iPP 11 57 14.4
De iP 11 54 24.1
Formosa (h = 30 km).
m = 6.1, M = 5.6 (Up,Ki).

" 5 Ud i(Pg) 12 08 55.5
iSg 12 09 27.9

" 5 Ki eSg 12 26 23
Sk iSg 12 25 44.8
Um iSg 12 24 25.0
Ud eLgl 12 24 58
Esthonia. Explosion?

" 5 Um iP 15 56 20.6
Ud iP 15 56 51.5
i 15 57 13.3
South of Japan (h = 140 km).

" 5 Up iP 17 59 04.7
eS 18 03 23
D = 2700 km = 24 1/2°.
Ki iP 17 59 58.0
Um eS 18 04 23
Ud eP 17 59 15
Turkey (h = 50 km).

1969
Sep. 5 Ud iP 20 23 11.5
Kurile Islands (h = N).

" 5 Up iPKP 21 20 30.4
Ki ePKP 21 20 14
Sk iPKP 21 20 23.8
Um iPKP 21 20 18.7 D
Ud iPKP 21 20 31.8
Kermadec Islands (h = 100 km).

" 5 Ud iP 21 29 37.7

" 5 Up iP 22 17 48.0
Ki iP 22 17 18.5 C
i 22 17 38.6
Sk iP 22 17 48.2
Um iP 22 17 29.9
Ud iP 22 17 56.2
De iP 22 18 05.0
East China Sea (h = 110 km).

" 6 Up iP 02 29 29.7
Alaska (h = 25 km).

" 6 Up iP 07 54 31.5
iS 08 03 29
micr sec
P Z' 0.1 0.5
Mx E 0.7 18
Mx N 1.3 21
Mx Z 1.3 16
D = 7600 km = 68 1/2°.
Ki iP 07 53 46.6 C
ipP 07 53 58.7
micr sec
Mx E 1.5 16
Mx N 1.3 20
Mx Z 2.3 17
Sk iP 07 54 21.7
Um iP 07 54 06.3 C
iPa 07 58 15
iS 08 02 44
Ud iP 07 54 37.7 C
De iP 07 54 54.9 C
Kurile Islands. h = 45 km
(Ki).
M = 5.3 (Up,Ki).

" 6 Up iP 11 52 14.8
i 11 52 45.8
Ki iP 11 51 24.9 C
micr sec
P Z' 0.1 0.9
Sk iP 11 52 02.1
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 6 (cont.)

Um	iP		11 51 47.6	
Ud	iP		11 52 19.3	
De	iP		11 52 39.4	

Kurile Islands (h = 170 km).

" 6	Up	iP	14 36 43.3	C
		iS	14 41 37	
			micr	sec
		P E	0.3	2
		P N	0.6	2
		P Z	1.1	2
		P Z'	0.9	1.1
		Mx E	3.1	15
		Mx N	10	18
		Mx Z	4.6	18
		D = 3300 km = 29 1/2°.		
	Ki	iP	14 37 37.6	C
		i	14 38 02.3	
		iPP	14 38 56	
		iS	14 43 06	
			micr	sec
		P N	0.9	4
		P Z	1.6	4
		P Z'	1.5	1.3
		PP E	1.7	4
		PP N	1.2	3
		PP Z	1.9	4
		S E	2.1	14
		S N	1.1	10
		Mx E	10	19
		Mx N	11	21
		Mx Z	4.5	17
		D = 4000 km = 36°.		
	Sk	iP	14 36 51.6	C
	Um	iP	14 37 14.2	C
		i	14 37 32.2	
		iPP	14 38 17	
		iS	14 42 21	
	Ud	iP	14 36 31.4	C
		i	14 36 52.0	
	De	iP	14 36 11.4	C

Atlantic Ocean, off Portugal (h = N).
m = 6.4, M = 5.6 (Up,Ki).

" 6	Up	iPKP	15 08 48.7	
			micr	sec
		Mx E	2.3	20
		Mx N	4.5	22
		Mx Z	3.4	21
	Ki	iPKP	15 08 36.1	

(cont.)

1969
Sep. 6 (cont.)

Ki	eSS		15 25 33	
			micr	sec
	Mx	E	3.7	20
	Mx	N	2.3	16
	Mx	Z	3.1	18
Ud	iPKP		15 08 50.6	
	i		15 08 58.1	
De	iPKP		15 08 56.5	
	i		15 09 04.1	

Solomon Islands (h = 15 km).
M = 6.2 (Up,Ki).

" 6	Up	iP	16 29 10.3	
			micr	sec
		Mx E	0.9	19
		Mx N	0.9	18
		Mx Z	1.6	20
	Ki	iP	16 28 35.7	
			micr	sec
		P Z'	0.1	1.0
	Sk	iP	16 29 05.6	
	Um	iP	16 28 50.5	
	Ud	iP	16 29 17.8	
	De	iP	16 29 30.9	C

South of Japan (h = 90 km).

" 6	Up		---	
			micr	sec
		Mx E	0.6	15
		Mx N	1.8	18
		Mx Z	1.6	20
	Ki	iPKP	17 26 43.8	
		i	17 26 52.7	
			micr	sec
		Mx E	2.4	19
		Mx N	1.7	15
		Mx Z	2.0	16
	Ud	iPKP	17 26 57.6	
	De	iPKP	17 27 04.5	C

Solomon Islands (h = 10 km).
M = 5.9 (Up,Ki).

" 6	Ud	iP	19 09 48.9

Kurile Islands (h = N).

" 6	Ud	iP	20 23 17.4
" 6	Up	iP	20 35 49.9
		iPP	20 36 16.8
	Ki	iP	20 36 55.9 C
		i	20 37 25.5

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 6 (cont.)

Ki			micr	sec	
	P	Z'	0.1	0.9	
Sk	iP		20 36 30.8		
Um	eP		20 36 29		
	i		20 36 38.4		
Ud	iP		20 35 59.2		C
De	iP		20 35 27.6		C
	i(PP)		20 35 43.9		

Dodecanese Islands
(h = 70 km).

" 6	Up	iPKP	22 28 20.4		
	Ki	iPKP	22 28 06.2		
	Um	iPKP	22 28 13.1		
	Ud	iPKP	22 28 23.1		
	De	iPKP	22 28 29.1		

New Hebrides Islands
(h = 230 km).

" 7	Up	iP	00 35 00.0		C
	Ki	iP	00 34 26.3		C
			micr	sec	
		P Z'	0.1	1.0	
	Sk	iP	00 34 58.3		C
	Um	iP	00 34 40.3		C
	Ud	iP	00 35 08.6		C

Japan (h = 90 km).

" 7	Ki	iP	05 13 40.1		
	Ud	iP	05 14 04.6		

Halmahera (h = 220 km).

" 7	Up	iP	06 51 44.6		
		ipP	06 51 56.5		
	Ud	iP	06 51 51.1		C
		ipP	06 52 02.2		

Kurile Islands. h = 45 km
(Up,Ud).

" 7	Ud	iP	07 28 35.8		

Alaska (h = 50 km).

" 7	Up	iPKP	08 59 00.5		
	Ud	iPKP	08 59 03.3		
	De	iPKP	08 59 08.8		

Solomon Islands (h = 170 km).

" 7	Ud	iP	12 45 02.2		

Kurile Islands (h = N).

" 7	Ud	iP	15 29 44.4		

1969
Sep. 7

Up	iP		18 54 42.8		
			micr	sec	
	P	Z'	0.1	0.6	
Ki	iP		18 53 57.3		
Sk	iP		18 54 32.6		
Um	eP		18 54 18		
Ud	iP		18 54 49.0		D
De	iP		18 55 06.4		

Kurile Islands (h = N).

" 7	Up	iP	20 15 10.3		
	Ki	iP	20 14 24.5		
	Ud	iP	20 15 16.0		C

Kurile Islands (h = 80 km).

" 8	Up	iP	02 49 04.7		
	Ki	iP	02 48 19.3		
	Um	iP	02 48 39.6		
	Ud	iP	02 49 10.2		C

Kurile Islands (h = N).

" 8	Up	iP	05 04 22.9		
		i	05 04 25.1		
			micr	sec	
		P Z'	0.2	0.5	
	Ki	eP	05 04 18		
	Sk	iP	05 04 50.0		
	Um	iP	05 04 07.8		
		i	05 04 12.4		
		iS	05 07 30.0		
	Ud	iP	05 04 47.1		
	De	iP	05 04 55.3		
		i	05 04 58.3		
		i	05 05 09.4		

Ural Mountains.
Underground explosion.
Compare the similar event
on Sep. 2, 05 04.

" 8	Up	iP	07 21 17.7		D
" 8	Up		---		
			micr	sec	
		Mx E	0.8	20	
		Mx N	0.6	20	
		Mx Z	1.4	22	
	Ki		---		
			micr	sec	
		Mx E	0.7	19	
		Mx N	0.8	19	
		Mx Z	1.0	20	
	Sk	iPKP	13 04 13.3		

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 8 (cont.)

Um	iPKP	13 04 06.9	
Ud	iPKP	13 04 16.6	
De	iPKP	13 04 20.7	C

New Ireland (h = 45 km).
M = 5.5 (Up,Ki).

"	8	Ud	iP	17 08 47.4
"	8	Up	iP	21 08 41.2
			ipP	21 08 52.7
		Ki	iP	21 07 55.6
			ipP	21 08 06.0
		Um	iP	21 08 16.1
		Ud	iP	21 08 46.9 D
			ipP	21 08 58.3

Kurile Islands. h = 40 km (Up,Ki,Ud).

"	9	Ki	iP	02 01 24.0
			i	02 01 36.0
"	9	Ud	iP	03 35 55.1

Kurile Islands (h = 80 km).

"	9	Up	iP	05 27 03.5	
			i	05 27 07.6	
			i(PcP)	05 27 19.5	
			iS	05 36 24	
				micr	sec
			P	Z' 0.4	1.0
			S	E 0.6	7
			S	N 0.8	7
			Mx	E 19	18
			Mx	N 33	17
			Mx	Z 11	16

D = 8050 km = 72 1/2°.

	Ki	iP	05 26 24.7
		i	05 26 30.0
		i	05 26 44.1
		iS	05 35 14
			micr sec
		P	Z 1.4 5
		P	Z' 0.2 1.0
		S	E 1.1 6
		S	N 1.4 8
		Mx	E 57 13
		Mx	N 62 13
		Mx	Z 45 16

D = 7400 km = 66 1/2°.

	Sk	iP	05 26 58.8
		i	05 27 03.7

(cont.)

1969
Sep. 9 (cont.)

Um	iP	05 26 40.2	
	i	05 26 46.2	
	i	05 27 17.9	
	iS	05 35 35	
	iSS	05 40 00	
Ud	iP	05 27 09.3	C
	i	05 27 15.3	
	i(PcP)	05 27 27.4	
De	iP	05 27 23.5	
	i	05 27 29.2	

Japan (h = 30 km).
m = 6.3, M = 7.0 (Up,Ki).
Double P, small and large, average interval 5.3 sec.

"	9	Up	iP☆	06 53 47.8
			iSg	06 54 49.8
		Um	iSg	06 56 45.5
		Ud	iLgl	06 55 24.8
			iSg	06 55 33.9
		De	iPn	06 53 44.0
			iP☆	06 53 52.2
			iS☆	06 54 45.5
			iSg	06 54 53.4

Coast of Baltic States.
Origin time = 06 52 37.
Explosion?

"	9	Ki	iP	07 50 04.2
			ipP	07 50 17.7
		Ud	iP	07 50 26.3
			ipP	07 50 39.0

Luzon. h = 50 km (Ki,Ud).

"	9	Ki	iPn	13 02 00.2
			iSn	13 02 39.0
			iSg	13 02 54.2

D = 360 km = 3.2°.

	Sk	eLgl	13 05 40
	Um	iLgl	13 04 31.4
		iSg	13 04 39.6

North Finland, 69.6°N, 28.0°E.
Origin time = 13 01 07.
Explosion?

"	9	Um	iP	16 57 42.2

Congo (h = N).

"	9	Up	i(P)	18 25 38.0
"	9	Up	i(P)	21 24 42.2
"	9	Up	i(P)	21 26 01.9

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 10 Up iP 00 03 38.2
Um iP 00 03 14.4
Ud iP 00 03 44.5
i 00 03 51.8
Japan (h = N).

" 10 Ud iP 02 44 48.5 C

" 10 Up iP 07 57 56.9
Um iP 07 57 34.0
Ud iP 07 58 05.1
De iP 07 58 23.0
Kurile Islands (h = 50 km).

" 10 Up iPg 10 41 03.6
iSg 10 41 19.4
iRg 10 41 26.8
D = 130 km = 1.2°.
Sk iLgl 10 43 37.8
Um iLgl 10 43 18.6
Ud iSg 10 42 08.5
De iSg 10 42 25.8
Baltic Sea, 58.6°N, 18.2°E.
Origin time = 10 40 40.
Probably underwater explosion.

" 10 Ki iSg 11 36 56.2
Sk iSg 11 36 12.3
Um iSg 11 34 54.0
Ud iSn 11 34 56.4
iLgl 11 35 23.1
iSg 11 35 30.9
De iLgl 11 35 48.8
Esthonia. Explosion?

" 10 Up iP 12 19 25.1 C
iS 12 24 09

		micr	sec
P	Z'	0.2	1.0
S	E	0.4	4
S	N	1.2	6
Mx	E	1.3	14
Mx	N	2.8	14
Mx	Z	3.5	14

D = 2900 km = 26°.
Ki iP 12 20 13.3 C
iPP 12 21 03.7

		micr	sec
P	Z'	0.2	1.2
Mx	E	3.3	14
Mx	N	4.5	14
Mx	Z	6.8	14

(cont.)

1969
Sep. 10 (cont.)
Sk iP 12 20 15.7
i 12 20 53.5
Um iP 12 19 44.0 C
iS 12 24 40
Ud iP 12 19 40.5
i 12 19 50.1
De iP 12 19 20.8 C
Turkey (h = 50 km).
m = 5.7, M = 5.2 (Up,Ki).

" 10 Up iP 21 11 23.4
Ki iP 21 10 49.1
Colorado.
Underground explosion.

" 11 Up iP 03 28 54.3 C
iS 03 38 44

		micr	sec
P	Z'	0.1	0.8
Mx	E	1.0	14
Mx	N	1.2	20
Mx	Z	1.9	12

D = 8600 km = 77 1/2°.
Ki iP 03 28 25.9 C

		micr	sec
P	Z'	0.1	1.0
Mx	E	0.8	13
Mx	N	0.8	17

Sk iP 03 28 55.0 C
Um iP 03 28 37.0 C
i 03 28 45.7
iS 03 38 16
Ud iP 03 29 02.9 C
De iP 03 29 13.4 C
Ryukyu Islands (h = 25 km).
m = 6.0, M = 5.3 (Up,Ki).

" 11 Up iP 04 08 52.9
Ki iP 04 08 37.3 C
Sk iP 04 09 08.2
Um iP 04 08 37.7
Ud iP 04 09 09.0 C
De iP 04 09 16.8
Kazakh SSR.
Underground explosion.

" 11 Sk e 06 32 08
Um iP 06 31 30.5
i 06 31 51.9
Ud iP 06 31 59.3
i 06 32 21.5
Japan (h = 100 km).
The second phases (Um,Ud) probably correspond to the reading at Sk; these may be P of another event.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Sep.	11	Ki	iP	11 36 34.5 D	
"	11	Ud	e(Sg)	15 18 36	
		De	i(Sg)	15 16 48.0	
"	11	Up	iP	21 26 45.8	
"	12	Up	iP	00 56 23.9	
"	12	Up	iP	02 26 30.4	
			iPcP	02 26 54.2	
		Um	iP	02 26 05.8	
		Ud	iP	02 26 36.9	
		De	iP	02 26 54.6	
		Kurile Islands (h = 60 km).			
"	12	Up	iPKP	03 33 44.5	
		Ki	iPKP	03 33 39.5	
		Um	iPKP	03 33 42.0	
			i	03 33 45.5	
		Ud	iPKP	03 33 44.1	
			i	03 33 56.2	
		De	iPKP	03 33 54.8	
		Tonga Islands (h = 130 km).			
"	12	Up	iP	05 15 27.4	
			ipP	05 16 08.5	
			iPP	05 16 58.2	
		Ki	iP	05 15 35.3	
		Sk	iP	05 15 52.5	
			ipP	05 16 34.7	
			iPP	05 17 36.7	
		Um	iP	05 15 24.9	
			isP	05 16 36.1	
			iPP	05 16 59.8	
		Ud	iP	05 15 43.3	
			ipP	05 16 25.6	
			isP	05 16 48.8	
			iPP	05 17 26.4	
		De	iP	05 15 39.4	
			ipP	05 16 22.3	
			iPP	05 17 22.8	
		Hindu Kush. h = 210 km (Up,Sk,Um,Ud,De).			
"	12	Up	iP	07 26 48.9	
				micr sec	
			P Z'	0.3 1.0	
		Ki	iP	07 25 55.5	C
				micr sec	
			P Z'	0.1 0.9	
		Sk	iP	07 26 26.9	
		Um	iP	07 26 20.4	
		(cont.)			

1969 Sep.	12	(cont.)			
		Ud	iP	07 26 49.0	C
		De	iP	07 27 11.0	C
		Aleutian Islands (h = 45 km). m = 6.2 (Up,Ki).			
"	12	Up	iP	07 53 42.4	
				micr sec	
			P Z'	0.1 0.8	
		Ki	iP	07 52 48.6	
		Um	iP	07 53 14.7	
		Ud	iP	07 53 42.4	
		De	iP	07 54 04.3	
		Aleutian Islands (h = 50 km).			
"	12	Up	iP	08 11 15.1	C
				micr sec	
			P Z'	0.4 0.8	
			Mx E	0.8 20	
			Mx N	1.1 18	
			Mx Z	1.4 21	
		Ki	iP	08 10 21.9	C
				micr sec	
			P Z'	0.1 0.8	
			Mx E	1.2 18	
			Mx N	1.1 18	
		Sk	iP	08 10 54.2	
		Um	iP	08 10 47.5	
		Ud	iP	08 11 15.4	C
		De	iP	08 11 37.8	
		Aleutian Islands (h = 50 km). m = 6.4, M = 5.1 (Up,Ki).			
"	12	Up	iP	08 17 06.6	
				micr sec	
			P Z'	0.1 1.0	
		Ki	iP	08 16 13.3	C
		Um	iP	08 16 39.4	
		Ud	iP	08 17 07.4	
		De	iP	08 17 29.3	
		Aleutian Islands (h = 55 km).			
"	12	Up	iP	08 18 40.4	
"	12	Up	iP	08 20 22.7	C
				micr sec	
			P Z'	0.3 0.8	
		Ki	iP	08 19 29.8	
				micr sec	
			P Z'	0.1 0.9	
		Sk	iP	08 20 01.8	
		Um	iP	08 19 55.7	C
		Ud	iP	08 20 23.3	C
		Aleutian Islands (h = 45 km). m = 6.2 (Up,Ki).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Sep.	12	Um	iP	08 55 13.0		
		Aleutian Islands (h = 50 km).				
"	12	Up	iP	09 08 05.3	C	
			iPP	09 10 33		
			iS	09 17 01		
			iP'P'	09 36 18.0		
				micr	sec	
			P	Z'	3.1	0.8
			S	E	0.9	6
			S	N	5.0	11
			Mx	E	18	20
			Mx	N	33	20
			Mx	Z	27	19
			D = 7550 km = 68°.			
		Ki	iP	09 07 12.2	C	
			i	09 07 13.9		
			iS	09 15 20		
			eP'P'	09 36 33		
				micr	sec	
			P	Z'	0.5	0.7
			S	E	3.8	13
			S	N	4.7	10
			Mx	E	28	16
			Mx	N	22	19
			D = 6650 km = 60°.			
		Sk	iP	09 07 43.4		
			i	09 07 49.8		
		Um	iP	09 07 38.3	C	
			iPP	09 09 56		
			iPa	09 11 30		
			iS	09 16 12		
			iP'P'	09 36 25.3		
		Ud	iP	09 08 05.1	C	
		De	iP	09 08 27.5	C	
		Aleutian Islands (h = 50 km).				
		m = 6.8, M = 6.6 (Up,Ki).				
"	12	Ki	iP	09 11 59.0		
"	12	Up	iP	09 19 45.4		
				micr	sec	
			P	Z'	0.1	0.6
		Ki	iP	09 18 51.8		
		Um	iP	09 19 18.1		
		Ud	iP	09 19 45.5		
		De	iP	09 20 07.3		
		Aleutian Islands (h = 20 km).				
"	12	Up	iP	09 39 08.2		
		Um	iP	09 38 39.9		
		Ud	iP	09 39 08.1		
		Aleutian Islands (h = 50 km).				

1969 Sep.	12	Up	iP	09 40 42.5		
"	12	Ud	iP	10 15 02.3		
		Aleutian Islands (h = 45 km).				
"	12	Ki	iPg	10 55 35.9		
			iSg	10 56 03.4		
		Sk	iSg	10 56 49.9		
		Um	iSg	10 56 41.2		
		Sweden-Norway border region.				
"	12	Ki	i	11 13 20.4		
			i(Sg)	11 13 42.1		
		Um	i(Sg)	11 14 25.3		
"	12	Ud	iP	11 50 25.6		
		Aleutian Islands (h = 50 km).				
"	12	Um	iP	11 53 49.3		
"	12	Um	iP	11 58 20.2		
		Ud	iP	11 58 51.2		
		Kurile Islands (h = N).				
"	12	Ud	iP	12 39 44.6		
		Aleutian Islands (h = 45 km).				
"	12	Ki	iPg	12 49 31.1		
			iSg	12 50 01.2		
"	12	Um	iP	13 28 44.6		
"	12	Ud	iP	13 32 42.1		
		Aleutian Islands (h = 50 km).				
"	12	Up	iP	15 11 15.3	C	
				micr	sec	
			P	Z'	0.5	0.6
			Mx	E	0.6	20
			Mx	N	1.2	20
			Mx	Z	0.9	18
		Ki	iP	15 10 22.3	C	
				micr	sec	
			P	Z'	0.2	0.8
			Mx	E	0.8	17
			Mx	N	0.6	17
		Sk	iP	15 10 53.9		
		Um	iP	15 10 48.0		
		Ud	iP	15 11 16.0	C	
		De	iP	15 11 37.9	C	
		Aleutian Islands (h = 50 km).				
		m = 6.5, M = 5.1 (Up,Ki).				
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 12 (cont.)
In this series of Aleutian Islands earthquakes, the amplitudes of PZ' at Up are considerably larger than those at Ki, resulting in an m-difference of 0.7 in average.

" 12 Up iP 15 11 50.5
Ki iP 15 11 30.6
Sk iP 15 11 38.8
Um iP 15 11 44.4

" 12 Up iP 15 18 07.8
Ki eP 15 17 13
Ud iP 15 18 07.5
Aleutian Islands (h = 50 km).

" 12 Up iP 18 00 21.0
Aleutian Islands (h = 45 km).

" 13 Up iP 00 43 34.3
Ki iP 00 42 41.6
Ud iP 00 43 35.0
Aleutian Islands (h = 40 km).

" 13 Up iPKP 00 53 03.8
iSKP 00 55 58.0
micr sec
PKP Z' 0.2 0.6
Ki iPKP 00 52 52.6
iSKP 00 55 37.0
Sk iPKP 00 52 58.0
eSKP 00 55 52
Um i(PKP) 00 52 51.8
iPKP 00 52 56.6
iSKP 00 55 47.5
Ud iPKP 00 53 05.0
iSKP 00 55 59.1
De iPKP 00 53 15.7
iSKP 00 56 08.1
Tonga-Kermadec Islands (h = 580 km).

" 13 Up iP 02 21 57.0
Ud iP 02 21 57.5
Aleutian Islands (h = 30 km).

" 13 Up iP 04 48 33.3
i 04 48 45.6

" 13 Up iP 11 30 46.8
Ki eP 11 30 10
i 11 30 14.7
(cont.)

1969
Sep. 13 (cont.)
Sk iP 11 30 41.9
Um iP 11 30 26.1
i 11 30 29.3
Ud iP 11 30 53.6
De iP 11 31 08.2
Japan (h = 35 km).

" 13 Up iP 12 03 16.8 C
micr sec
P Z' 0.4 0.8
Mx E 0.6 17
Mx N 0.9 18
Mx Z 1.1 17
Ki iP 12 02 31.3 C
ipP 12 02 44.3
micr sec
P Z' 0.3 1.0
Sk iP 12 03 06.5 C
Um iP 12 02 52.7
ipP 12 03 06.1
Ud iP 12 03 22.9 C
ipP 12 03 36.7
iP'P' 12 31 32.4
De iP 12 03 40.6 C
ipP 12 03 54.1
Kurile Islands. h = 50 km (Ki,Um,Ud,De).
m = 6.6 (Up,Ki).

" 13 Ki iP 20 10 49.2
ipP 20 10 59.6
Um iP 20 11 07.6
ipP 20 11 17.7
Ud iP 20 11 39.4 C
ipP 20 11 49.5
Japan. h = 40 km (Ki,Um,Ud).

" 13 Up iP 20 38 23.0 C

" 13 Up iP 23 12 24.6 C
Ki iP 23 11 31.4
Ud iP 23 12 24.6
Aleutian Islands (h = 35 km).

" 14 Up iP 00 20 08.1
Ud iP 00 20 08.4
Aleutian Islands (h = N).

" 14 Up iP 01 26 15.9 C
Ki iP 01 25 27.3
Sk iP 01 26 03.5
Um iP 01 25 49.5
Ud iP 01 26 20.3 C
De iP 01 26 40.0
Kurile Islands (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 14 Up iP 06 23 00.1
ipP 06 23 13.3
iS 06 32 09
micr sec
Mx E 0.5 17
Mx N 0.9 15
Mx Z 1.1 17
D = 7650 km = 69°.
Ki iP 06 22 15.3
Um iP 06 22 35.5 C
i 06 22 51.7
iS 06 31 23
Ud iP 06 23 05.5
ipP 06 23 19.5
Kurile Islands. h = 50 km (Up,Ud).

" 14 Up iP 08 57 56.2

" 14 Up iP 11 00 44.1
micr sec
P Z' 0.1 0.7
Ki iP 10 59 52.0
Um iP 11 00 17.7
Ud iP 11 00 45.6
De iP 11 01 07.3 C
Aleutian Islands (h = 40 km).

" 14 Up iP 12 27 39.3
Um eP 12 27 13
Ud iP 12 27 50.1
Lake Baikal.

" 14 Up iP 13 00 14.0 C
micr sec
P Z' 0.2 0.6
Ki iP 12 59 28.8
micr sec
P Z' 0.1 0.9
Sk iP 13 00 04.2 C
Um iP 12 59 50.8
Ud iP 13 00 20.5 C
De iP 13 00 38.0 C
ipP 13 00 50.0
Kurile Islands. h = 45 km (De).
m = 6.2 (Up,Ki).

" 14 Ki iPn 14 01 17.5
iSn 14 02 15.5
iLgl 14 02 35.7
D = 530 km = 4.8°.
Sk iSg 14 05 11.6
(cont.)

1969
Sep. 14 (cont.)
Um iSg 14 03 28.9
Northwest Russia, 67.3°N, 32.9°E.
Origin time = 14 00 04.
Explosion?

" 14 Ud iPKP 14 46 12.2
De iPKP 14 46 23.8
Tonga-Kermadec Islands (h = 600 km).

" 14 Up iP 14 53 58.8
ipP 14 54 08.7
iS 15 00 12
iSS 15 02 52
iLgl 15 07 50
micr sec
pP Z' 0.1 1.0
Mx E 1.2 13
Mx N 5.1 17
Mx Z 1.6 13
D = 4500 km = 40 1/2°.
Ki iP 14 53 58.7 C
ipP 14 54 10.4
e 15 03 18
micr sec
pP Z' 0.2 0.9
Mx E 3.5 11
Mx N 7.9 12
Mx Z 2.6 12
Sk iP 14 54 21.6
ipP 14 54 34.0
i 14 56 38.9
Um iP 14 53 51.9 C
ipP 14 54 04.4
ePP 14 55 23
iS 15 00 03
i 15 02 55
Ud iP 14 54 14.6 C
ipP 14 54 25.6
De iP 14 54 14.1
ipP 14 54 24.8
Sinkiang. h = 50 km (Up,Ki, Sk,Um,Ud,De).
M = 5.3 (Up,Ki).
Well developed higher-mode surface waves.

" 14 Up iP 16 23 01.1
iPP 16 24 36
iS 16 29 09
iSa 16 31 39
i 16 32 12
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 14 (cont.)

Up	eLgl		16 36 46	
			micr	sec
	P	Z'	0.1	0.7
	PP	E	0.5	4
	PP	Z	0.6	4
	Mx	E	4.8	17
	Mx	N	15	17
	Mx	Z	7.6	16
	D = 4500 km = 40 1/2°.			
Ki	iP		16 23 02.3	C
	ePP		16 24 33	
	eSa		16 31 38	
	i		16 32 12	
	iLgl		16 37 04	
			micr	sec
	P	Z'	0.4	0.8
	PP	E	1.1	9
	Mx	E	6.1	12
	Mx	N	15	13
	Mx	Z	5.1	13
Sk	iP		16 23 24.0	C
	iPP		16 25 07.3	
Um	iP		16 22 55.6	C
	iPP		16 24 34.3	
	iS		16 28 57	
	iSa		16 31 08	
	iSS		16 31 29	
	iLgl		16 36 34	
Ud	iP		16 23 18.1	C
	iPP		16 25 05.0	
De	iP		16 23 17.5	
	iPP		16 25 03.3	

Sinkiang (h = N).
m = 5.8, M = 5.7 (Up,Ki).
Well developed higher-mode surface waves.

" 14 Um eP 18 38 25
Gulf of California (h = N).

" 14

Up	eP	23 14 44
Ki	iP	23 13 58.7
Um	iP	23 14 18.9
Ud	iP	23 14 47.6

Japan (h = N).

" 15 Ki iP 00 29 31.5

" 15 Ki iP 03 35 26.2
Sumatra (h = N).

" 15 Ud iP 03 38 31.9

1969
Sep. 15

Ud	iP		06 51 52.5
	i		06 52 17.7

Unimak Island (h = 60 km).

" 15

Ki	iP		07 07 51.5
Ud	iP		07 08 44.8 C

Aleutian Islands (h = 30 km).

" 15

Ki	eP		12 59 59
Sk	eP		12 59 58
Um	eP		13 00 03

Mexico (h = N).

" 15

Ki	iP		14 39 55.4
	ipP		14 40 09.6
Um	iP		14 40 16.6
Ud	iP		14 40 48.1
	ipP		14 41 02.5

Kurile Islands. h = 50 km (Ki,Ud).

" 15

Up	iP		14 56 31.6	C
	ipP		14 56 40.7	
			micr	sec
	P	Z'	0.1	0.7
	Mx	E	0.6	20
	Mx	N	1.1	22
	Mx	Z	1.9	23
Ki	iP		14 55 38.3	C
	ipP		14 55 48.2	
			micr	sec
	P	Z'	0.2	1.0
	Mx	E	0.9	20
	Mx	N	0.8	18
	Mx	Z	1.6	20
Sk	iP		14 56 11.6	C
	ipP		14 56 21.2	
Um	iP		14 56 03.8	C
	ipP		14 56 12.0	
Ud	iP		14 56 32.9	C
	ipP		14 56 43.0	
De	iP		14 56 54.8	C
	ipP		14 57 04.7	

Aleutian Islands. h = 35 km (Up,Ki,Sk,Um,Ud,De).
m = 6.2, M = 5.1 (Up,Ki).

" 15

Up	iP		17 11 33.6
Ki	eP		17 10 59
Sk	iP		17 11 29.8
Um	iP		17 11 14.3	C
Ud	iP		17 11 40.5	C
De	eP		17 11 53
	i		17 11 55.2

South of Japan (h = 100 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Sep.	15	Up	iP		18 58 39.3		C
			i		18 58 55.1		
					micr	sec	
			P	Z'	0.1	0.9	
			Mx	E	0.4	20	
			Mx	N	0.7	18	
			Mx	Z	0.9	18	
		Ki	iP		18 57 51.6		
					micr	sec	
			P	Z'	0.1	1.0	
			Mx	E	0.8	16	
			Mx	N	0.8	18	
			Mx	Z	1.3	20	
		Sk	iP		18 58 27.6		
		Um	iP		18 58 13.7		
			ePa		19 02 03		
		Ud	iP		18 58 44.8		
		De	iP		18 59 03.1		C
		Kurile Islands (h = 45 km).					
		m = 6.0, M = 5.0 (Up,Ki).					
"	16	Up	iP		00 29 10.7		
		Ki	iP		00 30 15.7		
		Sk	iP		00 29 49.5		
		Ud	iP		00 29 19.0		
		De	iP		00 28 48.5		
		Eastern Mediterranean Sea (h = 6 km).					
"	16	De	iPKP		00 53 19.3		
		Tonga-Kermadec Islands (h = 250 km).					
"	16	Up	iP		01 28 10.0		
			eS		01 37 08		
					micr	sec	
			P	Z'	0.1	1.0	
			Mx	E	0.8	18	
			Mx	N	1.1	21	
			Mx	Z	1.2	19	
			D = 7500 km = 67 1/2°.				
		Ki	iP		01 27 22.7		
					micr	sec	
			P	Z'	0.1	1.1	
			Mx	E	1.0	16	
			Mx	N	0.9	19	
			Mx	Z	1.6	20	
		Sk	iP		01 27 59.1		
		Um	iP		01 27 44.3		
			ePa		01 31 42		
			eS		01 36 18		
		Ud	iP		01 28 15.2		C
		Kurile Islands (h = 60 km).					
		m = 6.0, M = 5.1 (Up,Ki).					
1969 Sep.	16	Ki	iP		02 32 47.6		
		Um	iP		02 33 09.3		
		Ud	iP		02 33 40.4		
		Kurile Islands (h = N).					
"	16	Up	iP		08 12 13.0		
					micr	sec	
			P	Z'	0.1	0.5	
		Ki	iP		08 11 44.5		
		Sk	iP		08 12 13.5		
		Um	iP		08 11 55.6		
		Ud	iP		08 12 21.7		C
			i		08 12 25.7		
		De	iP		08 12 33.1		
		Ryukyu Islands (h = 90 km).					
"	16	Ud	iP		13 49 09.1		
		Venezuela (h = 10 km).					
"	16	Um	iP		14 11 54.0		
"	16	Sk	eP		14 37 58		
			ipP		14 38 31.2		
		Um	iP		14 38 13.3		
			isP		14 38 54.5		
		Mexico. h = 120 km (Sk,Um).					
"	16	Up	iP		14 41 48.1		C
			iPP		14 44 37.2		
					micr	sec	
			P	Z'	0.5	1.0	
			Mx	E	0.6	14	
			Mx	N	2.0	17	
			Mx	Z	1.6	17	
		Ki	iP		14 41 13.6		C
			iPP		14 43 47.2		
			iP'P'		15 09 11.6		
					micr	sec	
			P	Z'	0.6	1.5	
			PP	Z'	0.4	1.7	
			P'P'	Z'	0.4	2.0	
			Mx	E	2.1	15	
			Mx	N	1.3	17	
			Mx	Z	3.6	17	
		Sk	iP		14 41 21.9		C
			i		14 43 53.2		
			iPP		14 43 58.7		
		Um	iP		14 41 33.4		C
			i		14 44 08.8		
			iPP		14 44 16.3		
			eS		14 51 04		
		Ud	iP		14 41 39.9		C
			i		14 44 16.1		

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 16 (cont.)

Ud	iPP	14 44 21.2	
De	iP	14 41 56.5	C

Nevada. m = 6.5, M = 5.5 (Up,Ki). Underground explosion. Some of the stations (Sk,Um,Ud) show precursors to PP, arriving 5-8 sec ahead of PP.

" 16

Ki	iP		21 27 06.5		C
			micr	sec	
	P	Z'	0.1	0.7	
Sk	iP		21 27 28.4		
	i		21 27 30.5		
Um	iP		21 26 59.8		
Ud	iP		21 27 22.2		
	i		21 27 24.6		
	i		21 27 32.2		
De	iP		21 27 21.9		

Sinkiang (h = 20 km).

" 17 Up iP 01 49 45.7

" 17

Up	iP	02 25 48.3	
Ki	iP	02 24 54.7	
Sk	iP	02 25 32.4	
Ud	iP	02 25 52.1	
De	iP	02 26 13.9	

Kamchatka (h = 20 km).

" 17 Um i(P) 12 09 31.0

" 17

Up	iP		18 52 23.8		C
	iS		19 01 52		
	iSKS		19 02 27		
			micr	sec	
	P	Z	0.8	2	
	P	Z'	0.3	0.7	
	S	N	0.4	3	
	SKS	N	0.7	4	
	Mx	E	19	18	
	Mx	N	26	15	
	Mx	Z	47	18	

D = 8300 km = 74 1/2°.

Ki	iP		18 51 51.5		C
	iS		19 00 53		
			micr	sec	
	P	Z	1.1	6	
	P	Z'	1.2	2.0	
	S	E	1.3	8	
	S	N	0.5	7	

(cont.)

1969
Sep. 17 (cont.)

Ki			micr	sec	
	Mx	E	36	20	
	Mx	N	25	16	
	Mx	Z	68	17	

D = 7700 km = 69 1/2°.

Sk	iP		18 52 22.7		C
Um	iP		18 52 03.3		C
	i		18 52 05.7		
	iPP		18 54 41		
	iPa		18 56 30		
	iS		19 01 17		
Ud	iP		18 52 32.3		C
De	iP		18 52 44.7		C
	i		18 52 55.7		

Japan (h = 8 km).
m = 6.3, M = 6.7 (Up,Ki).
The existence of well developed higher-mode surface waves is quite remarkable; in their propagation they make use of the continental structure represented by the Korean Peninsula.

" 17

Up	iP		19 02 44.8		
	ipP		19 02 54.3		
			micr	sec	
	P	Z'	0.1	0.8	
	pP	Z'	0.2	1.0	
Ki	iP		19 02 11.2		
	ipP		19 02 21.4		
			micr	sec	
	pP	Z'	0.1	1.0	
Sk	iP		19 02 42.1		C
	ipP		19 02 53.3		
Um	iP		19 02 24.3		
	ipP		19 02 34.9		
Ud	iP		19 02 52.3		
	ipP		19 03 02.8		

Japan. h = 40 km (Up,Ki,Sk, Um,Ud). Well developed higher-mode surface waves as in the previous case.

" 17

Up	i(P)		21 48 41.0		
	i		21 48 46.6		
			micr	sec	
	(P)	Z'	0.1	0.6	

" 18 Ud iP 03 19 24.2

Portugal (h = 25 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Sep.	18	Up	iPKP	05 26 07.2	D
				micr	sec
			PKP Z'	0.2	0.5
		Um	iPKP	05 25 55.2	
			iSKP	05 28 49.2	
		Ud	iPKP	05 26 09.6	D
		De	iPKP	05 26 19.5	D
		Tonga-Kermadec Islands (h = 530 km).			
"	18	Um	iP	11 49 08.8	
"	18	Up	iP	12 03 38.9	
			ipP	12 03 48.8	
		Ki	iP	12 02 54.1	
				micr	sec
			Mx E	0.6	20
			Mx N	0.7	18
			Mx Z	1.3	18
		Sk	iP	12 03 29.5	
		Um	iP	12 03 13.1	
			ipP	12 03 22.8	
		Ud	iP	12 03 45.4	
			ipP	12 03 55.0	
		Kurile Islands. h = 35 km (Up,Um,Ud).			
"	19	Up	ipP	01 43 03.4	
			eSKS	01 53 02	
			iS	01 53 35	
			esS	01 54 22	
				micr	sec
			Mx E	1.6	21
			Mx N	2.6	21
			Mx Z	2.9	22
		Ki	iP	01 42 25.2	
			ipP	01 42 51.9	
			iSKS	01 52 43	
			iS	01 53 05	
				micr	sec
			pP Z'	0.1	1.0
			SKS E	0.7	10
			S N	1.0	10
			Mx E	3.6	22
			Mx N	2.7	19
			Mx Z	4.0	19
		Sk	eP	01 42 47	
			isP	01 43 22.9	
		Um	iP	01 42 33.0	
			ipP	01 42 58.1	
			iSKS	01 52 48	
			iS	01 53 15	
		Ud	iP	01 42 49.4	C
		(cont.)			

1969 Sep.	19	(cont.)		
		Ud	ipP	01 43 19.1
		Mindanao. h = 100 km (Up, Ki,Sk,Um,Ud). M = 5.8 (Up,Ki). M uncorrected for focal depth.		
"	19	Ud	iP	12 22 47.9
			ipP	12 22 59.3
		Kurile Islands. h = 40 km (Ud).		
"	19	Ki	ePKP	14 47 42
			i	14 47 53.2
		Sk	iPKP	14 47 57.3
		Um	iPKP	14 47 54.0
		Ud	iPKP	14 48 06.0
			i	14 48 16.4
		South of Kermadec Islands (h = 45 km).		
"	19	Sk	e(Sg)	17 34 16
"	19	Up	iP	20 51 08.7
		Ki	iP	20 50 20.1
		Sk	iP	20 50 56.1
		Um	iP	20 50 42.4
		Ud	iP	20 51 14.1
		De	iP	20 51 33.5
		Kurile Islands (h = 140 km).		
"	19	Sk	iP	20 59 06.0
		Ud	eP	20 59 18
		North Atlantic Ocean (h = N).		
"	19	Ud	iP	21 05 17.2
		Mindanao (h = 600 km).		
"	19	Up	iP	21 29 13.7
		Ki	iP	21 29 10.6
		Sk	iP	21 28 42.0
			i	21 28 47.9
		Ud	iP	21 28 55.4
		North Atlantic Ocean. Origin time = 21 23 49.		
"	19	Sk	iP	23 26 50.8
		North Atlantic Ocean (h = N).		
"	20	Sk	iP	00 03 04.5
		Ud	iP	00 03 17.2
		North Atlantic Ocean. Origin time = 23 58 12 (Sep. 19).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 20 Sk iP 00 25 41.8
i 00 25 46.7
Ud iP 00 25 56.1
North Atlantic Ocean (h = N).

" 20 Sk iP 00 48 04.3

" 20 Up iP 01 02 15.9
eS 01 06 49
micr sec
P Z' 0.1 1.0
D = 2850 km = 25 1/2°.
Ki iP 01 02 12.9
Sk iP 01 01 42.7
i 01 01 45.9
Um iP 01 02 13.4
i 01 02 18.5
eS 01 06 49
Ud iP 01 01 56.4 D
North Atlantic Ocean (h = N).

" 20 Up iP 01 13 01.1
iS 01 17 36
micr sec
P Z' 0.3 1.5
S N 0.4 4
Mx E 0.9 19
Mx N 1.0 16
Mx Z 1.9 20
D = 2800 km = 25°.
Ki iP 01 13 01.1
micr sec
P Z' 0.1 1.3
Mx E 1.8 18
Mx N 0.8 17
Mx Z 2.0 18
Sk iP 01 12 30.0
Um iP 01 13 02.4
i 01 13 07.7
Ud iP 01 12 43.6
De eP 01 12 59
North Atlantic Ocean (h = N).
m = 5.5, M = 4.5 (Up,Ki).

" 20 Ki iP 01 15 50.8
Sk iP 01 15 22.5
i 01 15 26.0
Ud iP 01 15 34.9
North Atlantic Ocean.
Origin time = 01 10 30.

" 20 Up iP 01 18 26.3
(cont.)

1969
Sep. 20 (cont.)
Up i 01 18 36.4
Ki iP 01 18 24.8
Sk iP 01 17 55.5
Um iP 01 18 23.6
i 01 18 28.9
Ud iP 01 18 07.9
i 01 18 10.1
North Atlantic Ocean (h = N).

" 20 Sk iP 03 29 20.3
Ud iP 03 29 32.8
i 03 29 41.7
North Atlantic Ocean (h = N).

" 20 Ud iP 04 57 22.8
West Pakistan (h = 40 km).

" 20 Up iP 05 14 20.1 C
i 05 14 23.7
iS 05 18 48
Δ = 25° micr sec
5.52 P E 3.0 6
0.02 P N 3.2 6
5.54 P Z 6.5 6
P Z' 1.0 1.3
S E 2.2 8
S N 9.8 7
Mx E 9.2 20
Mx N 22 22
Mx Z 23 22
D = 2800 km = 25°.
Ki iP 05 14 19.4 C
iPP 05 14 46.8
iS 05 18 45
micr sec
P E 7.4 7
P N 0.7 7
P Z 8.0 7
P Z' 3.0 2.4
S E 4.8 10
S N 5.9 9
S Z 6.6 10
Mx E 16 18
Mx N 11 13
Mx Z 41 20
D = 2800 km = 25°.
Sk iP 05 13 48.1 C
i 05 13 52.7
Um iP 05 14 21.7 C
i 05 14 25.3
iS 05 18 49
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 20 (cont.)

Ud	iP	05 14 01.0	C
	i	05 14 03.5	
De	iP	05 14 14.3	C
	i	05 14 24.0	

North Atlantic Ocean (h = N).
m = 6.5, M = 5.7 (Up,Ki).

" 20

Ki	iPKP	10 37 49.4
Um	iPKP	10 37 52.7
	i	10 38 00.4
Ud	iPKP2	10 38 23.6

Kermadec Islands-New Zealand
(h = N).

" 20

Ki	iPn	12 15 56.3
	iSn	12 16 51.4
	iLgl	12 17 10.0
	D = 510 km = 4.6°.	
Sk	i(Sg)	12 19 45.7
Um	iSg	12 18 11.9

Northwest Russia,
67.8°N, 32.6°E.
Origin time = 12 14 45.
Explosion?

" 20

Ki	iPn	12 16 31.2
	iSn	12 17 27.7
	iSg	12 17 49.8
	D = 520 km = 4.7°.	
Sk	iSg	12 20 26.5
Um	iSg	12 18 52.7

Northwest Russia,
68.0°N, 32.9°E.
Origin time = 12 15 17.
Explosion?

" 20

Sk	ePKP	12 58 47
Um	iPKP	12 58 43.1

Kermadec Islands-New Zealand
(h = 35 km).

" 20

Up	iP		14 15 18.9	
	i		14 15 25.5	
	iPP		14 16 45.1	
Ki	iP		14 15 27.2	
			micr	sec
	P	Z'	0.1	1.4
	Mx	E	1.2	10
	Mx	N	0.7	10
	Mx	Z	1.4	10
Sk	iP		14 15 45.3	

(cont.)

1969
Sep. 20 (cont.)

Um	iP	14 15 17.0	C
Ud	iP	14 15 35.8	
	i	14 15 39.3	
De	iP	14 15 32.7	

Tadzhik SSR (h = 50 km).

" 20

Up	iPP		15 44 50.6	
			micr	sec
	Mx	E	0.7	19
	Mx	N	0.8	19
	Mx	Z	1.2	19
Ki			---	
			micr	sec
	Mx	E	1.9	20
	Mx	N	0.8	19
	Mx	Z	2.8	21
Sk	iP		15 40 25.0	C
Um	ePP		15 44 37	
	ePS		15 53 44	

Pacific Ocean, off Central
America (h = N).
M = 5.5 (Up,Ki).

" 20

Up	iP	18 23 15.9
Ud	iP	18 23 21.4

(Kurile Islands).

" 20

Ki	i(P)	21 51 54.4
Ud	iP	21 52 16.2

" 21

Ki	ePn	03 15 20
	iSn	03 16 09.0
	iSg	03 16 29.6
	D = 460 km = 4.1°.	
Sk	i(Lgl)	03 18 58.0
Um	iSg	03 17 26.6

Northwest Russia,
67.6°N, 31.3°E.
Origin time = 03 14 15.
Explosion?

" 21

Ki	iPn	05 43 34.3
	iSn	05 44 31.4
	iSg	05 44 58.5
	D = 520 km = 4.7°.	
Um	iSg	05 45 46.2

Northwest Russia.
Origin time = 05 42 21.
Explosion?

" 21

Ki	iPKP	07 30 33.7
Um	iPKP	07 30 41.6

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 21 (cont.)

Ud	iPKP	07 30 38.5	
	i	07 30 48.7	

Tonga Islands (h = 240 km).

" 21	Up	iP	19 17 28.1
		i	19 17 35.7
	Ud	iP	19 17 44.8

Hindu Kush (h = 70 km).

" 21	Ud	iP	20 30 21.0
" 21	Up	iPKP	21 35 14.9
		i	21 35 35.4
	Sk	ePKP	21 35 10
		i	21 35 16.8
	Um	iPKP	21 35 03.0 C
	Ud	iPKP	21 35 15.6
	De	iPKP2	21 35 52.5

Kermadec Islands (h = 120 km).

" 21	Up	iP	21 41 38.5
	Ki	iP	21 41 40.3
	Um	iP	21 41 36.0
	Ud	i(P)	21 41 57.3

Sumatra (h = N).

" 21	Up	iP	21 46 22.3
	Ki	iP	21 46 24.8
	Ud	iP	21 46 33.8
		i	21 46 41.2

Sumatra (h = N).

" 22	Up	iP	01 52 10.0 C
		i	01 52 16.9
	Ki	iP	01 52 33.1
	Ud	iP	01 52 20.2
		i	01 52 28.2

Chagos Islands (h = 15 km).

" 22	Up	iP	01 58 28.8	
		iS	02 08 35	
			micr	sec
		Mx	E 2.2	19
		Mx	N 5.6	21
		Mx	Z 3.9	20

D = 9050 km = 81 1/2°.

	Ki	iP	01 58 30.7 C	
		iS	02 08 39	
			micr	sec
		P	Z' 0.5	1.8
		S	E 1.3	8
		S	N 1.8	9

(cont.)

1969
Sep. 22 (cont.)

Ki			micr	sec
	Mx	E	4.8	20
	Mx	N	4.7	20
	Mx	Z	7.6	20

D = 9100 km = 82°.

Sk	iP	01 58 44.9	
Um	iP	01 58 26.0 C	
	iPP	02 01 33	
	iS	02 08 30	
Ud	iP	01 58 39.9	
De	iP	01 58 36.6	

Sumatra (h = N).
m = 6.3, M = 6.0 (Up,Ki).

" 22	Up	iP	02 46 46.6	
			micr	sec
		P	Z' 0.1	1.2
	Ki	iP	02 46 01.5	
			micr	sec
		P	Z' 0.1	1.3
	Um	iP	02 46 22.6	
	Ud	iP	02 46 52.7	
		ipP	02 47 05.5	

Kurile Islands. h = 45 km (Ud).
m = 5.9 (Up,Ki).

" 22	Ud	iP	02 51 36.3

Kurile Islands (h = 40 km).

" 22	Up	iP	04 04 53.4	
		i	04 05 00.4	
		iS	04 15 00	
			micr	sec
		Mx	N 2.1	21
		Mx	Z 1.6	17

D = 9050 km = 81 1/2°.

	Ki	iP	04 04 54.7	
		iS	04 15 06	
			micr	sec
		P	Z' 0.2	1.6
		S	E 0.8	7
		S	N 1.1	8
		Mx	E 1.6	15
		Mx	N 2.3	20
		Mx	Z 2.7	17

D = 9100 km = 82°.

	Um	iP	04 04 50.6 C
		iS	04 14 57
	Ud	iP	04 05 03.1

Sumatra (h = N).
m = 6.1, M = 5.7 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 22 Ki iP 04 14 37.6
i 04 14 43.1
Um iP 04 14 32.7
i 04 14 38.9
Sumatra (h = N).

" 22 Um eP 12 46 33

" 22 Um iP 13 54 38.7

" 22 Up iP 13 58 49.4
Ki iP 13 59 13.5 C
micr sec
P Z' 0.3 1.7
Mx E 1.1 20
Mx N 0.8 17
Sk eP 13 58 42
Um iP 13 59 04.3
Atlantic Ocean (h = N).

" 22 Up iP 16 23 25.4
i 16 23 46.8
micr sec
P Z' 0.1 0.5
Ki iP 16 23 10.8
Sk iP 16 23 40.0
Um iP 16 23 13.2
i 16 23 32.7
Ud iP 16 23 40.3 C
i 16 24 01.1
Sinkiang. Underground explosion. A remarkable fact is that P is followed by a very clear phase after 20.6 sec in average (Up,Um, Ud), also found at other widely separated stations according to bulletins.

" 22 Ki eL 22 35
micr sec
Mx E 0.8 16
Mx N 1.0 20
Mx Z 1.4 19
Atlantic Ocean (h = N).

" 23 Ki eL 02 29
micr sec
Mx E 0.9 20
Mx N 0.6 16
Mx Z 1.3 18
Easter Island (h = N).

1969
Sep. 23 Up iP 02 34 37.8
Ki iP 02 33 50.3
Um iP 02 34 12.7
Ud iP 02 34 43.8
Kurile Islands (h = 45 km).

" 23 Up eP 02 51 02

" 23 Up iP 04 54 45.4
Um iP 04 54 18.2
Ud iP 04 54 51.8
Kurile Islands (h = N).

" 23 Ki iPn 09 39 04.4
iSn 09 40 03.2
iLgl 09 40 24.2
D = 540 km = 4.9°.
Sk i(Sg) 09 43 14.2
Northwest Russia.
Origin time = 09 37 48.
Explosion?

" 23 Ki iPn 12 43 32.1
iSn 12 44 30.6
iLgl 12 44 50.2
D = 540 km = 4.9°.
Sk e(Lgl) 12 47 22
Um iSg 12 45 45.9
Northwest Russia,
67.4°N, 33.3°E.
Origin time = 12 42 16.
Explosion?

" 23 Ki iSg 13 28 01.9
Sk iPg 13 25 54.1
iSg 13 26 10.5
D = 140 km = 1.3°.
Um iSg 13 27 42.5
West coast of Norway,
64.9°N, 11.4°E.
Origin time = 13 25 29.

" 23 Up i(P) 20 12 42.8
i 20 12 48.7

" 23 Up ---
micr sec
Mx E 2.2 23
Mx N 4.3 23
Mx Z 2.7 21
Ki iS 23 00 34
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 23 (cont.)

Ki			micr	sec
	S	E	0.7	7
	S	N	0.4	6
	Mx	E	4.1	19
	Mx	N	3.2	22
	Mx	Z	6.3	20
Um	iS		23 01 01	
	eSS		23 06 43	

Mexico (h = N).
M = 5.9 (Up,Ki).

" 24	Ki	iP	00 16 07.0	
" 24	Up	iP	04 04 47.6	C
		i	04 04 51.2	
		eS	04 09 28	
		iSS	04 11 04	
			micr	sec
		P Z'	0.2	0.9
		S E	0.2	4
		Mx E	2.4	21
		Mx N	4.7	18
		Mx Z	4.1	21
		D = 3100 km = 28°.		
	Ki	iP	04 04 54.5	
		i	04 04 57.9	
		iS	04 09 48	
			micr	sec
		P Z'	0.1	1.0
		S E	1.1	9
		S N	0.4	10
		Mx E	5.3	21
		Mx N	3.1	15
		Mx Z	7.8	21
		D = 3200 km = 29°.		
	Sk	iP	04 04 20.5	
		i	04 04 24.9	
	Um	iP	04 04 55.1	C
		i	04 04 58.6	
		i	04 05 01.8	
		iS	04 09 47	
	Ud	iP	04 04 25.9	
		i	04 04 29.7	

North Atlantic Ocean (h = N).
m = 5.5, M = 5.2 (Up,Ki).
Double P, 3.7 sec apart in average, typical for North Atlantic earthquakes recorded at our stations. The second P has shorter periods than the first one.

1969
Sep. 24

Up	iP		04 06 47.8	
Ud	iP		04 06 25.6	

North Atlantic Ocean.
Origin time = 04 00 57.

" 24	Up	iP	04 26 39.9	
		i	04 26 43.5	
			micr	sec
		P Z'	0.1	0.9
	Ki	iP	04 26 50.5	C
		i	04 28 37.0	
			micr	sec
		P Z'	0.1	1.5
	Sk	iP	04 26 17.3	C
	Um	iP	04 26 48.6	C
		i	04 26 54.1	
	Ud	iP	04 26 22.0	C

North Atlantic Ocean (h = N).
m = 5.5 (Up,Ki).

" 24	Um	iP	10 46 31.2	
" 24	Up	iP	18 13 48.4	C
		iS	18 22 20	
			micr	sec
		P E	0.3	3
		P Z	1.1	3
		P Z'	0.2	1.0
		S E	2.2	10
		S N	7.4	9
		Mx E	17	22
		Mx N	19	18
		Mx Z	31	22
		D = 7050 km = 63 1/2°.		
	Ki	iP	18 14 11.3	
		i	18 14 14.9	
		iS	18 23 06	
			micr	sec
		P E	1.1	6
		P Z	1.4	5
		P Z'	1.1	2.0
		S E	8.0	12
		S N	8.1	12
		S Z	5.9	11
		Mx E	45	22
		Mx N	17	18
		Mx Z	94	22
		D = 7450 km = 67°.		
	Sk	iP	18 13 46.0	
	Um	iP	18 14 02.7	C
		i	18 14 07.8	
		iPP	18 16 26	
		iPa	18 18 39	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 24 (cont.)

Um	iS	18 22 53	
Ud	iP	18 13 36.7	C

North Atlantic Ocean (h = N).
m = 6.5, M = 6.5 (Up,Ki).

" 24

Ud	iP	19 11 12.8	C

North Atlantic Ocean (h = N).

" 24

Up	iPKP	21 47 35.4		
	i	21 47 42.1		
		micr	sec	
	PKP	Z' 0.1	0.5	
Sk	ePKP	21 47 30		
Um	iPKP	21 47 25.3		
Ud	iPKP	21 47 37.7		C
	i	21 47 45.6		

" 25

Ud	iP	00 54 47.3	

North Atlantic Ocean (h = N).

" 25

Ud	iP	04 50 25.7	C

North Atlantic Ocean (h = N).

" 25

Ud	iLgl	06 02 07.9
	i	06 02 16.6

Explosion east of Jutland, Denmark.

" 25

Ud	iLgl	07 32 04.1
	i	07 32 14.7

Explosion east of Jutland, Denmark.

" 25

Ud	iP	08 09 27.0

" 25

Up	iP	11 50 32.1
Sk	eP	11 51 11
	i	11 51 18.4
Ud	iP	11 50 38.5
	i	11 50 45.8

Ionian Sea (h = N).

" 25

Sk	ePKP	12 20 27
Um	i(PKP)	12 20 35.1

New Zealand (h = N).

" 25

Up	iP☆	13 10 18.0
	iSg	13 11 18.7
Ud	iPg	13 09 55.1
	iSg	13 10 27.3
De	iPg	13 10 01.3

(cont.)

1969
Sep. 25 (cont.)

De	iSg	13 10 35.2

Skagerrak, 58.4°N, 10.5°E.
Origin time = 13 09 08.

" 25

Up	iP☆	13 10 44.7
	iSg	13 11 45.5
Ud	iPg	13 10 22.0
	iSg	13 10 54.2
De	iPg	13 10 28.6
	iSg	13 11 01.6

Skagerrak, 58.4°N, 10.5°E.
Origin time = 13 09 35.

" 25

Ud	iP	13 29 41.4

" 25

Ud	iP	15 32 22.1

Iran (h = 30 km).

" 25

Up	iP	15 42 16.7
Sk	eP	15 42 55
Um	iP	15 42 35.4
Ud	iP	15 42 34.7

" 25

Ki	iP	21 43 25.5
Ud	iP	21 44 17.6

Aleutian Islands (h = 5 km).

" 25

Ki	iP	23 20 22.9

Szechwan, China (h = N).

" 26

Ki	iP	01 19 47.7	D
Um	iP	01 20 14.5	D
Ud	iP	01 20 40.3	

Aleutian Islands (h = 8 km).

" 26

Up	eP	05 03 04	
	iS	05 09 48	
		micr	sec
	Mx	E 0.8	18
	Mx	N 1.1	18
	Mx	Z 1.4	18
	D = 5150 km = 46 1/2°.		
Ki	iP	05 03 53.4	
		micr	sec
	P	Z' 0.1	1.0
	Mx	E 1.9	20
	Mx	N 1.0	13
Sk	iP	05 03 38.5	
Um	iP	05 03 25.7	
	iS	05 10 35	
Ud	iP	05 03 14.0	

Red Sea (h = 25 km).
M = 5.1 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Sep.	26	Up	iP	07 04 32.5 C	
			iPP	07 04 51	
			iS	07 08 10.3	
			iSS	07 08 26	
			iX	07 08 47	
			iLg1	07 10 06	
			iLg2	07 10 36	
				micr	sec
			P	Z' 0.6	0.9
		Ki	iP	07 05 20.0 C	
			i	07 05 29.1	
			iX	07 11 02.3	
				micr	sec
			P	Z' 0.9	1.3
		Sk	iP	07 05 18.2	
			iX	07 10 43.8	
			i(Lg1)	07 12 56.5	
		Um	iP	07 04 50.3 C	
		Ud	iP	07 04 54.0 C	
		De	iP	07 04 37.6	
			iLg2	07 10 56.2	

West of the Caspian Sea.
m = 6.1 (Up,Ki).
Underground explosion.
The phase X (Up,Ki,Sk) has a group velocity of 4.12 km/sec, probably an integral part of the higher-mode surface-wave train.

"	26	Um	iP	07 55 05.6
"	26	Ud	iP	08 39 45.5

Celebes (h = 260 km).

"	26	Up	iLg1	12 30 18.4
		Sk	iLg1	12 30 19.7
		Ud	ePn	12 28 20
			iS*	12 29 12.1
			iSg	12 29 20.6

South Norway, 58.5°N, 7.1°E.
Origin time = 12 27 22.

"	26	Ki	i(Sn)	12 40 36.7
			i(Lg1)	12 41 03.3
"	26	Up	iPg	13 27 42.3
			iSg	13 28 05.6
			iRg	13 28 11.8

D = 200 km = 1.8°.

		Ud	iPg	13 27 46.6
			iSg	13 28 16.5
			iRg	13 28 29.1

D = 240 km = 2.2°.
Origin time = 13 27 05.
Probably explosion.

1969 Sep.	26	Up	iP	22 49 13.7	
			i	22 49 22.2	
"	27	Up	iP	04 13 14.2	
				micr	sec
			P	Z' 0.1	0.6
		Ki	iP	04 12 30.1	
				micr	sec
			P	Z' 0.1	1.0
		Sk	eP	04 13 05	
		Um	iP	04 12 50.4	
		Ud	iP	04 13 21.0	

Kurile Islands (h = 45 km).
m = 6.1 (Up,Ki).

"	27	Ki	iP	05 57 34.0
"	27	Ud	iP	09 01 24.0

Kurile Islands (h = 50 km).

"	27	Up	iPKP	09 23 17.5	
			iPKS	09 26 39.7	
				micr	sec
			PKS	Z' 0.2	1.4
			Mx	E 1.7	22
			Mx	N 2.7	22
			Mx	Z 2.9	22
		Ki	iPKP	09 23 28.7	
			i	09 24 06.5	
			iSS	09 45 00	
				micr	sec
			PKP	Z' 0.3	1.7
			Mx	E 2.0	23
			Mx	N 1.8	21
			Mx	Z 4.3	23
		Sk	iPKP	09 23 20.7	
			iPKS	09 26 43.9	
		Um	iPKP	09 23 25.9	
			iPP	09 26 25	
			iPKS	09 26 51.1	
		Ud	iPKP	09 23 16.5	
			i	09 23 23.1	
			iPKS	09 26 33.3	

South Shetland Islands (h = N).
M = 6.1 (Up,Ki).

"	27	Um	iP	11 28 48.3
"	27	Ki	ePn	12 08 32
			iPg	12 08 50.8
			iSn	12 09 27.3
			iLg1	12 09 45.3

D = 510 km = 4.6°.

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Sep. 27 (cont.)
Um i(Sg) 12 11 13.3
Probably northwest Russia.
Explosion?

" 27 Up iP 16 57 25.6

" 27 Up iP 17 03 08.2
Ki iP 17 04 00.4
micr sec
P Z' 0.1 1.0
Um iP 17 03 38.5
Ud iP 17 03 30.2
Turkey.

" 27 Ki iP 17 04 11.1
Ud iP 17 04 25.7
Sinkiang (h = N).

" 27 Ki iP 19 27 21.1
i 19 27 31.8
micr sec
P Z' 0.1 1.0
Java (h = N).

" 28 Ki eP 07 31 56
i 07 32 02.4
Volcano Islands (h = 180 km).

" 28 Up iPKP 10 36 25.1
Ud iPKP 10 36 30.2
Tonga-Kermadec Islands
(h = 80 km).

" 28 Up iP 14 09 26.3
Ki iP 14 08 32.5
Um iP 14 08 59.8
Ud iP 14 09 25.2
Aleutian Islands (h = 20 km).

" 28 Ki iP 18 11 57.0
Um iP 18 12 02.3
Ud iP 18 12 21.4
Molucca Passage (h = N).

" 28 Up iP 19 00 58.9
iPP 19 02 23.5
Ki iP 19 01 02.7
micr sec
P Z' 0.1 0.7
Sk iP 19 01 24.8
Um iP 19 00 59.1
iPP 19 02 23.1
(cont.)

1969
Sep. 28 (cont.)
Ud iP 19 01 16.6
Tadzhik-Sinkiang (h = 60 km).

" 28 Up iP 22 59 39.0 C
i 22 59 51.7
iPcP 23 03 10.4
iS 23 04 15
micr sec
Mx E 4.5 17
Mx N 11 16
Mx Z 8.1 17
D = 2900 km = 26°.
Ki iP 23 00 46.2 C
micr sec
P Z' 0.3 1.2
Mx E 9.2 18
Mx N 16 14
Mx Z 25 14
Sk iP 23 00 18.2
Um iP 23 00 11.2
Ud iP 22 59 45.7
De iP 22 59 13.4
Crete (h = 20 km).
M = 5.6 (Up,Ki).

" 29 Surface waves were recorded by our long-period equipment from the Chinese atmospheric nuclear explosion of 3 megaton, origin time 08 40.

" 29 Up iP 10 29 40.2
iS 10 30 58
iLgl 10 31 37
iSg 10 31 47
micr sec
P Z' 0.1 0.5
Sg E 4.0 2
Sg N 5.0 2
Sk iP 10 28 39.4
iSg 10 29 30.3
Um iP 10 29 21.9
i 10 29 25.9
Ud iP 10 29 20.3
Norwegian Sea (h = 6 km).

" 29 Up iP 18 09 43.0 C
micr sec
P Z' 0.3 1.0
Mx E 0.8 18
Mx N 1.4 17
Ud iP 18 09 49.2 C
Kurile Islands (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Sep.	29	Up	iP	18 14 44.0	
		Ud	iP	18 14 49.3	C
		Kurile Islands (h = N).			
"	29	Up	iP	20 08 04.4	C
				micr	sec
			P Z'	0.1	0.5
		Sk	iP	20 08 19.7	
		Um	iP	20 07 56.5	
		Ud	iP	20 08 17.7	C
		Burma (h = 120 km).			
"	29	Up	iP	20 16 42.0	
			iS	20 27 50	
				micr	sec
			P Z'	0.5	1.7
			S N	3.0	6
			Mx E	7.6	20
			Mx N	13	23
			Mx Z	10	19
			D = 10350 km = 93°.		
		Um	iS	20 28 24	
		South Africa (h = N).			
		m = 6.7 (Up).			
"	29	Up	iP	23 54 49.7	
		Sk	iP	23 55 27.1	
		Ud	iP	23 54 55.6	
		Crete.			
"	30	Ud	iP	02 45 25.2	
		De	iP	02 44 52.9	
		Crete (h = 15 km).			
"	30	Um	iPKP	03 30 51.1	
		Kermadec Islands			
		(h = 210 km).			
"	30	Up	iPKP	04 31 02.8	
			i	04 31 09.3	
				micr	sec
			PKP Z'	0.1	0.7
		Sk	iPKP	04 30 57.6	
		Um	iPKP	04 30 50.5	
		Ud	iPKP	04 31 05.1	
			i	04 31 24.5	
		Kermadec Islands (h = N).			
"	30	Um	iPKP	05 36 33.9	
		Ud	ePKP	05 36 46	
		Kermadec Islands (h = N).			
"	30	Up	iP	15 15 39.2	

1969 Sep.	30	Up	ePKP	18 11 29	
			i	18 11 34.3	
				micr	sec
			PKP Z'	0.2	0.8
			Mx E	1.9	20
			Mx N	4.3	21
			Mx Z	3.2	20
		Ki		---	
				micr	sec
			Mx E	3.0	20
			Mx N	2.7	20
			Mx Z	3.4	19
		Sk	iPKP	18 11 23.4	
		Um	iPKP	18 11 17.9	C
			i	18 11 30.0	
			eSS	18 33 30	
		Ud	iPKP	18 11 29.5	C
		De	iPKP	18 11 39.7	
		Kermadec Islands (h = N).			
		M = 6.3 (Up,Ki).			
"	30	Um	iP	19 17 43.0	
"	30	Up	iP	23 24 01.4	
		Ki	iP	23 23 54.8	
		Sk	eP	23 24 17	
		Um	eP	23 23 53	
		Ud	iP	23 24 15.0	
		Burma-India (h = 20 km).			

Markus Båth
October 8, 1970

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

Seismological Institute
Uppsala

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å, U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.3'N,	13°52.1'E;	h = 150 m

Remark. On October 25, 1969, the Delary station moved into a new house, built specially for this purpose and located 160 m in a southeasterly direction from the earlier, temporary housing. The coordinates for the new site are: latitude 56°28.2' N, longitude 13°52.2' E, height above mean sea level = 150 m. The bedrock consists of gneiss. In this connection a new quartz clock was installed. Otherwise the instrumentation is the same, i.e. a short-period vertical-component seismograph of type Grenet-Coulomb (T_0 = 1.4 sec, T_g = 0.7 sec, max. dynamic magnification = 12990, critical damping of both seismometer and galvanometer).

O C T O B E R 1 - 31, 1969

1969					
Oct.	1	Up	iPKP	00 17 21.7	
		Ki	ePKP	00 17 07	
		Sk	ePKP	00 17 15	
			i	00 17 40.0	
		Um	iPKP	00 17 11.3	
			i	00 17 26.3	
		Ud	iPKP	00 17 25.0	
		South of Kermadec Islands (h = 35 km).			
"	1	Up	iP	04 09 52.9	C
			iPn	04 10 58.2	
			iPP	04 11 11.5	
				micr	sec
			P Z'	0.1	0.5
		Ki	iP	04 09 37.3	C
			iPP	04 10 42.5	
				micr	sec
			P Z'	0.2	2.0
		Sk	iP	04 10 08.0	C
			i	04 11 01.8	
			iPn	04 11 25.2	
		Um	iP	04 09 37.9	
			iPn	04 10 37.3	
		Ud	iP	04 10 09.1	
		(cont.)			

1969					
Oct.	1	(cont.)			
		Ud	i	04 11 13.7	
			iPn	04 11 22.0	
		Kazakh SSR. m = 5.9 (Up,Ki). Underground explosion.			
"	1	Um	iPKP	04 41 40.1	
		Kermadec Islands (h = 70 km).			
"	1	Up	iSKS	05 30 19	
			iS	05 31 22	
				micr	sec
			SKS E	1.0	8
			S N	2.7	8
			Mx E	3.8	20
			Mx N	3.6	22
			Mx Z	10	22
		Ki	iP	05 19 45.2	
			iSKS	05 30 26	
			e(S)	05 31 35	
				micr	sec
			SKS E	2.1	9
			S N	1.0	9
			Mx E	10	21
			Mx N	2.8	18
			Mx Z	20	22
			D = 11450 km = 103°.		
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 1 (cont.)

Um	iPP		05 24 05.8
	iSKS		05 30 30
	iS		05 31 32
	iPS		05 33 08
Ud	iP		05 19 30.5

Peru (h = 4 km).
m = 6.6, M = 6.2 (Up,Ki).

" 1 Up ---

		micr	sec
Mx	E	0.9	19
Mx	N	2.0	20

Ki iP 06 12 12.9

		micr	sec
Mx	E	1.5	18
Mx	N	1.4	18
Mx	Z	2.0	18

Peru (h = 5 km).
M = 5.6 (Up,Ki).

" 1 Ki iP 08 42 15.7
Peru (h = 3 km).

" 1 Ud iP 17 20 04.0

" 1

Up	iP	17 22 11.3
Ki	iP	17 21 26.1
Sk	iP	17 21 42.7
Ud	iP	17 22 04.3

Vancouver Island (h = 25 km).

" 1

Up	iP		17 24 20
	iPP		17 28 08
	iS		17 35 35
	iPS		17 36 57
		micr	sec
	Mx	E 5.2	26
	Mx	N 5.7	27
	Mx	Z 11	25

D = 10650 km = 96°.

Ki	iP		17 24 16.9
	iSKS		17 34 50
		micr	sec
	SKS	E 1.7	7
	SKS	N 0.7	10
	Mx	E 5.9	25
	Mx	N 2.9	21
	Mx	Z 13	26
Um	iP		17 24 25.7
	eSKS		17 34 56
	iS		17 35 44

Off coast of Ecuador (h = N).
M = 6.1 (Up,Ki).

1969
Oct. 1

Up	iP	17 57 12.2
Ki	iP	17 57 54.9 C
Um	iP	17 57 36.1
Ud	iP	17 57 04.3

North of Ascension Island (h = N).

" 1

Um	iPKP	18 57 48.3
Ud	iPKP	18 57 58.3

South of Kermadec Islands (h = 140 km).

" 1 Up ---

		micr	sec
Mx	E	1.7	22
Mx	N	5.0	24
Mx	Z	3.7	27

Ki iPKP 20 12 38.3

		micr	sec
Mx	E	3.0	19
Mx	N	2.7	19
Mx	Z	8.5	19

Sk	ePKP	20 12 18
Um	ePKP	20 12 20
	iPS	20 24 29
	iSS	20 31 34
Ud	ePKP	20 12 19

South Atlantic Ocean (h = N).
M = 6.3 (Up,Ki).

" 1

Up	iP	20 38 59.2
	iPP	20 39 30.4
Ki	iP	20 39 51.9
Um	iP	20 39 22.2
Ud	i(P)	20 39 22.9
	iPP	20 39 47.4

Turkey (h = 40 km).

" 1

Up	iPKP	20 49 58.4
	i	20 50 08.9
Ki	iPKP	20 49 46.0
Um	iPKP	20 49 47.5
Ud	iPKP	20 50 00.0 C
De	iPKP	20 50 09.5

Kermadec Islands (h = N).

" 1 Um iP 20 58 40.4
South of Japan (h = 25 km).

" 1 Up iP 22 55 34.3 C

		micr	sec
P	Z'	0.1	0.6

Ki iP 22 55 43.3 C

		micr	sec
P	Z'	0.1	0.5

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 1 (cont.)

Sk	iP	22 56 00.0	
	iPP	22 57 51.1	
Um	iP	22 55 32.9	C
	iPP	22 57 00.3	
Ud	iP	22 55 50.8	C
De	iP	22 55 47.9	

Hindu Kush (h = 230 km).
m = 5.5 (Up,Ki).

" 1

Sk	iP	23 37 10.7	
Ud	iP	23 36 32.3	

Greece (h = N).

" 2

Ki	eP	01 06 03	

" 2

Up	iPKP	04 18 31.4	
Ki	iPKP	04 18 24.9	
Um	iPKP	04 18 25.9	
Ud	iPKP	04 18 33.5	
De	iPKP	04 18 45.3	D

Fiji Islands (h = 600 km).

" 2

Ki	iP	05 08 03.9	
Sk	iP	05 08 15.1	
Ud	iP	05 08 33.6	

California (h = 2 km).

" 2

Ki	iP	06 31 12.7	
Ud	iP	06 31 42.4	
	i	06 31 57.3	

California (h = 2 km).

" 2

Up	iP	12 01 22.5	

" 2

Sk	eSg	12 38 07	
Um	iSg	12 36 49.2	
Ud	iLgl	12 37 19.0	

Esthonia. Explosion?

" 2

Up	iP	14 23 22.2	
	i	14 25 32.1	
Um	e(P)	14 23 51	

" 2

Ki	iPn	15 22 29.5	
	iSn	15 23 29.2	
	iSg	15 23 53.2	

D = 560 km = 5.0°.
Origin time = 15 21 10.

" 2

Up	iP	21 33 23.3	

" 2

Up	iP	22 16 57.3	C
	iPcP	22 17 20.6	

(cont.)

1969
Oct. 2 (cont.)

Up	iP'P'		22 45 07.2	
			micr	sec
	P	Z	1.6	1
	P	Z'	2.3	1.2
	P'P'	Z'	0.4	1.3
	Mx	E	0.8	20
	Mx	N	1.6	20
	Mx	Z	1.9	20
Ki	iP		22 16 04.5	C
	iP'P'		22 45 28.8	
			micr	sec
	P	Z'	0.7	1.2
	P'P'	Z'	0.3	1.4
	Mx	E	1.2	18
	Mx	N	1.4	18
	Mx	Z	2.3	19
Sk	iP		22 16 36.8	C
	i		22 16 45.8	
	iPcP		22 17 08.6	
	iP'P'		22 45 18.0	
Um	iP		22 16 30.4	C
	iPcP		22 17 06.0	
	iP'P'		22 45 15.8	
Ud	iP		22 16 58.2	C
	iPcP		22 17 16.9	
	iP'P'		22 45 10.0	
De	iP		22 17 21.2	C

Aleutian Islands.
m = 7.0, M = 5.4 (Up,Ki).
Underground explosion.
The intervals P'P' - P are on the average 16 sec less than according to Gutenberg's table (Trans. Amer. Geophys. Union, 32, 1951, pp. 373-390).

" 2

Up	iP	23 18 26.3	
Sk	iP	23 19 07.3	
Um	iP	23 19 05.3	
	i	23 19 15.5	
Ud	iP	23 18 33.1	

Greece (h = 60 km).

" 3

Up	iPKP		01 53 10.2	
	iX		01 53 19.5	
			micr	sec
	PKP	Z'	0.1	0.5
Ki	ePKP		01 52 49	
	i		01 52 50.4	
Sk	iPKP		01 53 04.3	
	iX		01 53 13.7	
	iY		01 53 29.9	
Um	iPKP		01 53 00.2	C
	iX		01 53 08.8	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 3 (cont.)

Um	iY	01 53 24.4	
Ud	iPKP	01 53 11.9	C
	iX	01 53 20.9	
De	iPKP	01 53 23.4	
	i	01 53 36.6	

South of Kermadec Islands (h = 25 km).
In average, X - PKP = 9.1 sec and Y - PKP = 24.9 sec.

" 3

Up	iP	02 02 20.6	C
	iPcP	02 02 54.2	
Ki	iP	02 01 28.4	
Sk	iP	02 02 04.5	
Um	iP	02 01 52.6	
Ud	iP	02 02 25.0	C
De	iP	02 02 45.8	C

Kamchatka (h = 90 km).

" 3

Sk	iP	05 34 28.1	
Um	iP	05 34 22.8	C
Ud	iP	05 34 36.5	
De	iP	05 34 45.1	

These P are probably PKP.

" 3

Ki	iPn	10 51 33.3	
	iSn	10 52 32.8	
	iLgl	10 52 54.3	
	D = 560 km = 5.0°.		
Sk	i(Lgl)	10 55 23.1	
Um	iSg	10 53 45.9	

Northwest Russia.
Origin time = 10 50 16.
Explosion?

" 3

Up	iP	15 12 01.4		
	i	15 12 14.0		
Ki	iP	15 11 07.3		
		micr	sec	
	P	Z' 0.1	1.0	
Sk	iP	15 11 34.2		
Um	iP	15 11 35.0		
Ud	iP	15 11 59.0		
De	iP	15 12 21.0		

Kodiak Island (h = N).

" 3

Um	i(P)	15 13 23.4	C

" 3

Up	iP	15 52 34.7		C
		micr	sec	
	P	Z' 0.1	0.5	
Ki	iP	15 52 34.9		C
		micr	sec	
	P	Z' 0.2	0.7	

(cont.)

1969
Oct. 3 (cont.)

Sk	iP	15 52 48.3	C
Um	iP	15 52 32.0	C
	ipP	15 52 48.4	
Ud	iP	15 52 44.4	C
	ipP	15 53 00.3	
De	iP	15 52 42.9	

Sumatra. h = 60 km (Um,Ud).
m = 6.4 (Up,Ki).

" 3

Ki	iPg	16 30 42.2	C
	iSg	16 30 53.0	
	iRg	16 30 58.0	
	D = 90 km = 0.8°.		
Sk	eSg	16 33 03	
Um	iSg	16 32 08.6	

Swedish Lapland,
67.0°N, 20.4°E.
Origin time = 16 30 26.
Explosion.

" 3

Up	eL	18 30		
		micr	sec	
	Mx	E 0.9	22	
	Mx	N 0.9	23	
	Mx	Z 1.2	19	

South Pacific Ocean (h = N).

" 4

Up	iP	00 04 50.1	

" 4

Ki	iP	01 40 11.9	C
Ud	i(P)	01 40 13.8	

" 4

Up	iP	04 08 10.9	
Ki	iP	04 07 21.3	C
Sk	iP	04 07 55.6	
Um	iP	04 07 44.3	C
Ud	iP	04 08 15.8	C

Kurile Islands (h = N).

" 4

Up	iP	10 18 45.7	
Um	iP	10 18 25.2	C
Ud	iP	10 18 52.8	C

South of Japan (h = 40 km).

" 4

Up	eP	14 27 40	
Um	iP	14 27 36.9	
Ud	iP	14 27 49.3	C

Sumatra (h = 170 km).

" 4

Up	iP	14 31 24.4	
Um	iP	14 31 20.7	C
Ud	iP	14 31 33.0	

Sumatra (h = 90 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Oct.	4	Up	iP	16 03 22.2
		Um	iP	16 03 20.4
		Ud	iP	16 03 38.9
		Hindu Kush (h = 200 km).		
"	5	Ki	iP	01 03 54.3
		Um	iP	01 03 51.4
"	5	Um	iP	06 22 36.8
"	5	Ud	iP	07 45 45.7
"	5	Up	iPg	10 32 29.4
			iSg	10 33 21.2
		Ud	iPg	10 32 05.8
			iS*	10 32 36.4
			iSg	10 32 41.7
		De	iPg	10 31 54.3
			iSg	10 32 18.8
		Off west coast of Sweden, 57.7°N, 11.2°E.		
		Origin time = 10 31 13.		
"	5	Up	iPg	10 33 43.1
			iSg	10 34 34.9
		Ud	iPg	10 33 18.3
			iSg	10 33 53.2
		De	iPg	10 33 06.7
			iSg	10 33 31.7
		Off west coast of Sweden, 57.7°N, 11.2°E.		
		Origin time = 10 32 25.		
"	5	Ud	iPKP	13 29 01.4 C
		De	iPKP	13 29 12.2
		Fiji Islands (h = 550 km).		
"	5	Up	iPg	14 57 15.8
			iSg	14 57 27.8
			iRg	14 57 31.7
		Sk	iSg	14 59 04.5
		Um	i(Sg)	14 58 36.1
		Ud	ePg	14 57 40
			iSg	14 58 10.5
		Gulf of Bothnia, 60.8°N, 17.8°E.		
		Origin time = 14 ~~56~~ 58.		
		Explosion.		
"	5	Up	iP	16 47 21.3
		Ki	iP	16 47 05.1
				micr sec
			P Z'	0.1 1.3
		Sk	iP	16 47 26.4
		(cont.)		

1969 Oct.	5	(cont.)		
		Sk	i	16 47 36.4
		Um	iP	16 47 10.5
		Ud	iP	16 47 29.1
		Mindanao (h = 30 km).		
"	5	Up	iP	18 01 16.4
		Ki	iP	18 00 31.9
		Sk	eP	18 01 05
		Um	iP	18 00 52.1
		Ud	iP	18 01 22.9 C
		De	iP	18 01 40.2
		Japan (h = 140 km).		
"	5	Up	iPKP	21 05 40.0
		Ki	iPKP	21 05 30.0
		Um	iPKP	21 05 35.9
		Ud	iPKP	21 05 41.5
		De	iPKP	21 05 45.7
		Loyalty Islands (h = 110 km).		
"	5	Up	iP	23 17 16.1
		Ki	eP	23 16 31
		Sk	eP	23 17 11
		Um	iP	23 16 55.6 C
		Ud	iP	23 17 23.1
		De	iP	23 17 36.7
		South of Japan (h = 45 km).		
"	6	Ud	iP	00 58 07.7
		Atlantic Ocean (h = N).		
"	6	Ud	iP	04 56 27.9
"	6	Ud	iP	09 37 01.9
"	6	Ud	iP	09 41 42.2
"	6	Up	iPKP	10 21 25.9
			iX	10 21 29.8
		Sk	ePKP	10 21 16
			iY	10 21 30.7
		Um	iPKP	10 21 09.8
			iX	10 21 13.9
			iY	10 21 25.8
		Ud	iPKP	10 21 23.4
			iX	10 21 28.2
			iY	10 21 39.1
		De	iPKP	10 21 31.5
			iX	10 21 36.8
			iY	10 21 46.5
		Kermadec Islands (h = 35 km).		
		In average, X - PKP = 4.5 sec and Y - PKP = 15.3 sec; cf Oct. 3, 01 53.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969					
Oct.	6	Up	iP		13 00 26.1 C
					micr sec
			P	Z'	0.4 0.9
			Mx	E	1.0 18
			Mx	N	1.1 18
			Mx	Z	1.4 18
		Ki	iP		13 00 07.9 C
			ipP		13 00 19.7
					micr sec
			P	Z'	0.2 1.0
			Mx	E	2.0 19
			Mx	N	0.6 16
			Mx	Z	2.3 19
		Sk	iP		13 00 31.5 C
			ipP		13 00 42.8
		Um	iP		13 00 14.1 C
			ipP		13 00 25.3
			iS		13 10 16
		Ud	iP		13 00 35.4 C
		De	iP		13 00 41.0 C
		Luzon. h = 40 km (Ki,Sk,Um).			
		m = 6.4, M = 5.5 (Up,Ki).			
"	6	Ki	i		17 31 42.0
			iSg		17 31 47.6
		Sk	iSg		17 31 46.1
		Um	eSg		17 32 19
		Nordland, Norway. Explosion?			
"	6	Ud	eP		20 31 46
		Kurile Islands (h = N).			
"	6	Ki	eP		21 23 05
"	6	Up	iP		21 59 38.4
		Ki	iP		21 59 22.6
					micr sec
			P	Z'	0.1 1.5
		Ud	iP		21 59 46.0 C
			ipP		21 59 55.1
		Mindanao. h = 35 km (Ud).			
"	6	Up	iP		22 03 37.5
"	7	Up	iP		04 01 08.1
		Ki	iP		04 01 05.7
			ipP		04 01 21.7
		Um	iP		04 01 05.0
			ipP		04 01 19.9
		Ud	iP		04 01 17.3
			ipP		04 01 31.1
		Sunda Strait. h = 55 km (Ki,Um,Ud).			

1969					
Oct.	7	Up	iP		05 14 03.3
			i		05 14 18.1
			iPP		05 14 34.0
			iS		05 18 01
					micr sec
			P	Z'	0.1 0.6
			S	N	0.6 6
			Mx	E	5.1 18
			Mx	N	3.4 17
			Mx	Z	3.2 13
		D = 2450 km = 22°.			
		Ki	iP		05 15 12.2
					micr sec
			P	Z'	0.1 1.0
			Mx	E	1.9 11
			Mx	N	1.9 11
			Mx	Z	2.7 11
		Sk	eP		05 14 47
		Um	iP		05 14 36.6
			i		05 14 42.4
			iS		05 18 55
		Ud	iP		05 14 13.8
			i		05 14 20.8
			iPP		05 14 38.0
		De	iP		05 13 42.0
			i		05 13 47.7
		Turkey (h = 15 km).			
		m = 5.4, M = 5.1 (Up,Ki).			
"	7	Ud	i(Sg)		12 36 50.8
"	7	Up	iSg		13 33 21.6
		Ki	iSg		13 33 54.9
		Sk	e(Sg)		13 34 27
		Um	iSg		13 32 41.8
		Ud	eSg		13 34 24
		Lake Ladoga.			
		Origin time = 13 29 25.			
		Explosion?			
"	7	Ud	iP		13 44 31.2
		Japan (h = 120 km).			
"	7	Ki	iP		14 46 07.1
		Iraq-Turkey (h = 45 km).			
"	7	Ki	iP		18 54 58.3
		Turkey (h = 40 km).			
"	7	Up	iP		22 23 36.5
					micr sec
			P	Z'	0.1 0.8
		Ki	iP		22 22 43.6
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 7 (cont.)
Ud iP 22 23 37.5
De iP 22 23 59.5
Aleutian Islands (h = 45 km).

" 8 Ud iP 04 19 45.8
South of Japan (h = 15 km).

" 8 Ki iPn 11 38 49.4
iSn 11 39 36.0
iLgl 11 39 50.9
D = 430 km = 3.9°.
Origin time = 11 37 47.

" 8 Up iP 14 41 48.4
micr sec
P Z' 0.1 1.1
Ki iP 14 41 13.3
Sk iP 14 41 22.6
iPcP 14 41 42.4
Um iP 14 41 33.8
Ud iP 14 41 40.7 C
De iP 14 41 57.0
Nevada.
Underground explosion.

" 8 Ud iPKP 15 59 45.3
De iPKP 15 59 56.5 C
Fiji Islands (h = 640 km).

" 8 Um iP 18 13 07.9

" 8 Ud eP 18 43 59
Pamir.

" 8 Ud iP 21 26 52.6

" 8 Up iPKP2 22 18 00.3
i 22 18 03.7
Ki iPKP 22 17 45.5
micr sec
PKP Z' 0.1 1.3
Um iPKP 22 17 45.9
Ud iPKP2 22 18 09.3
De iPKP 22 17 47.9
West of Macquarie Islands
(h = N).

" 9 Ud iP 00 40 11.7

" 9 Up eP 01 07 31

" 9 Um iP 07 56 29.9
Ud eP 07 56 41
Oregon (h = 10 km).

1969
Oct. 9 Up iP 08 10 40.3
i 08 11 18.9
Ki iP 08 09 47.0 C
micr sec
P Z' 0.1 0.8
Sk iP 08 10 19.0
Um iP 08 10 14.1
i 08 10 27.3
Ud iP 08 10 39.6 C
De iP 08 11 02.4
Aleutian Islands (h = 20 km).

" 9 Ud iP 08 18 45.3

" 9 Up eSg 12 31 54
Um iSg 12 32 24.7
Ud iLgl 12 32 54.5
Esthonia. Origin time = 12 29 43.
Explosion?

" 9 Up iSn 13 13 02.3
iLgl 13 13 35.3
Ki iSn 13 13 31.6
iLgl 13 14 10.7
Sk i(Pn) 13 12 20.7
iLgl 13 14 43.7
Um eLgl 13 12 50
Ud iPn 13 12 14.6
iSn 13 13 47.4
iS* 13 14 19.4
De iPn 13 12 34.3
eLgl 13 15 15
Lake Ladoga.
Origin time = 13 10 00.
Explosion?

" 9 Up iP 14 18 44.8
micr sec
P Z' 0.1 1.0
Ki iP 14 17 58.9
micr sec
P Z' 0.1 1.0
Um iP 14 18 20.2
Ud iP 14 18 51.0 C
ipP 14 19 02.2
De ipP 14 19 20.0
Kurile Islands. h = 40 km (Ud).
m = 5.9 (Up,Ki).

" 9 Up iPKP 15 49 16.2
Ud iPKP 15 49 13.1
Kermadec Islands (h = 35 km).

" 9 Ud iP 16 09 45.5

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969				
Oct.	9	Ud	iP	17 27 12.8 C
		Mindanao (h = 60 km).		
"	9	Ud	iP	20 49 40.0 C
"	10	Up	iP	00 08 13.4 C
		Ud	iP	00 08 19.8
			ipP	00 08 33.9
		De	iP	00 08 37.6
		Kurile Islands. h = 50 km (Ud).		
"	10	Up	iP	00 24 44.7 C
			ipP	00 24 55.6
		Um	iP	00 24 19.7 C
			ipP	00 24 31.4
		Ud	iP	00 24 50.2
		Kurile Islands. h = 40 km (Up,Um).		
"	10	Up	iP	02 32 38.7
			i	02 33 03.5
"	10	Ud	iPKP	02 55 51.1
		Southeast Indian Ocean (h = N).		
"	10	Ud	iP	06 49 48.6
		Japan (h = 10 km).		
"	10	Up	iSg	10 53 52.2
		Ud	iPn	10 52 35.9
			iSn	10 53 03.7
			iSg	10 53 08.9
			D = 230 km = 2.1°	
		De	iPn	10 52 31.3
			iSg	10 52 57.1
			D = 190 km = 1.7°.	
		Västergötland, Sweden, 58.0°N, 12.1°E.		
		Origin time = 10 52 00.		
"	10	Up	iP	17 21 42.3
		Ryukyu Islands (h = 15 km).		
"	10	Ud	iP	17 56 59.1
		Japan (h = 60 km).		
"	11	Up	iP	00 06 00.9
			i	00 06 32.3
"	11	Up	iPKP	11 32 03.9
			i	11 32 11.5
		Ud	iPKP	11 32 06.3
		De	ePKP	11 32 18
		Kermadec Islands (h = 80 km).		

1969				
Oct.	11	Up	i(P)	18 52 50.8
			i	18 53 01.8
"	11	Up	iPKP	20 57 04.1
		Ud	iPKP	20 57 06.1
		Kermadec Islands. Origin time = 20 37 34.		
"	11	Up	i(P)	22 31 22.8
"	12	Up	iP	03 44 29.6
		Ki	iP	03 44 18.9
		Um	iP	03 44 20.2
		Ud	iP	03 44 38.4
		De	iP	03 44 43.2
		Celebes (h = 170 km).		
"	12	Up	iPn	05 20 55.4
			iSn	05 22 15.1
			iSg	05 22 55.4
				micr sec
			Sg Z'	0.1 0.6
		Ki	iPn	05 20 41.9
			iSn	05 21 51.9
			i	05 22 38.5
		Sk	iPn	05 19 56.5
			i	05 20 14.0
			iSn	05 20 29.2
			iSg	05 20 42.2
			i	05 20 50.2
		Um	iPn	05 20 38.5
			iSn	05 21 45.2
			iSg	05 22 23.4
		Ud	iPn	05 20 35.9
			i	05 21 54.0
			iSg	05 22 16.6
			i	05 22 27.8
		De	e	05 23 29
			iSg	05 23 59.1
		Norwegian Sea, 65.0°N, 7.5°E. Origin time = 05 19 11.		
"	12	De	iPKP	06 03 26.2 C
		Tonga Islands (h = N).		
"	12	Ud	iP	06 25 53.6
"	12	Up	iP	13 38 51.4 C
			i	13 40 24.8
			eS	13 42 42
				micr sec
			P Z'	0.4 0.6
			Mx E	1.1 12
			Mx N	3.3 11
			Mx Z	3.4 11
			D = 2300 km = 20 1/2°.	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 12 (cont.)

Ki	iP		13 40 09.2	
			micr	sec
	Mx	E	1.1	15
	Mx	N	2.7	15
	Mx	Z	3.6	15
Sk	iP		13 39 34.5	
Um	iP		13 39 31.9	
	i		13 39 39.6	
Ud	iP		13 38 57.6	C
De	iP		13 38 18.4	C
	i(PP)		13 38 37.0	

Greece-Albania (h = 15 km).
M = 5.1 (Up,Ki).

" 12

Ki	iP		14 31 28.4	
Ud	iP		14 32 26.4	

Kamchatka (h = 70 km).

" 12

Up	iP		16 18 08.4	C
Ud	iP		16 18 17.8	C
De	iP		16 18 18.3	C

Java Sea (h = 600 km).

" 12

Ud	iP		18 58 45.9	
De	iP		18 58 09.6	

Italy (h = 290 km).

" 13

Up	iP		01 07 03.9	C
	iS		01 10 45.0	
			micr	sec
	P	N	1.7	2
	P	Z	2.5	2
	P	Z'	0.7	0.6
	S	N	0.8	4
	Mx	E	4.9	10
	Mx	N	24	13
	Mx	Z	23	12
	D = 2200 km = 20°.			
Ki	iP		01 08 20.7	
	eS		01 13 05	
	iSS		01 14 11	
			micr	sec
	P	Z'	0.5	1.5
	Mx	E	8.3	11
	Mx	N	12	12
	Mx	Z	14	11
	D = 3100 km = 28°.			
Sk	iP		01 07 46.4	
	i		01 07 48.0	
Um	iP		01 07 44.6	
	i		01 07 53.3	
	iS		01 11 54	
Ud	iP		01 07 10.1	C

(cont.)

1969
Oct. 13 (cont.)

De	iP		01 06 31.7	C

Greece-Albania (h = 8 km).
m = 6.0, M = 5.8 (Up,Ki).

" 13

Up	iP		01 46 34.4	
Ud	iP		01 46 41.3	
	i		01 46 52.6	

Greece-Albania.
Origin time = 01 42 00.

" 13

Up	iP		01 54 24.7	
Um	i(P)		01 55 12.4	
Ud	iP		01 54 30.2	C
De	iP		01 53 54.9	
	i		01 54 05.5	

Greece-Albania.
Origin time = 01 49 50.

" 13

Up	i(PKP)		07 14 47.6	
	iPKP		07 14 53.9	
	iPP		07 17 31	
	iSKP		07 17 55.5	
	iPKS		07 18 23	
	isPKS		07 19 39	
	e		07 26 47	
			micr	sec
	PKP	Z'	0.1	0.5
	SKP	Z'	0.1	0.8
	Mx	E	2.1	22
	Mx	N	4.5	20
	Mx	Z	3.2	20
	D = 14800 km = 133°.			
Ki	i(PKP)		07 14 34.2	
	iPKP		07 14 38.7	
	iSKP		07 17 32.4	
	e		07 24 33	
	eSS		07 33 35	
			micr	sec
	PKP	Z'	0.3	1.0
	SKP	Z'	0.1	1.2
	Mx	E	3.7	20
	Mx	N	4.4	23
	Mx	Z	3.9	22
	D = 14000 km = 126°.			
Sk	i(PKP)		07 14 46.2	
	iPKP		07 14 50.4	
	i(SKP)		07 17 50.5	
	iSKP		07 17 52.8	
Um	i(PKP)		07 14 41.3	
	iPKP		07 14 45.6	
	ePP		07 17 00	
	i(SKP)		07 17 42.1	
	iSKP		07 17 45.3	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 13 (cont.)

Um	iPKS	07 18 08
	ipPKS	07 19 12
	i	07 24 54
	i	07 26 05.9
	iSKKP	07 27 33.1
	iSS	07 34 10
Ud	i(PKP)	07 14 41.7
	iPKP	07 14 48.4
	iPP	07 17 29.3
	iSKP	07 18 00.1
	iSKKP	07 27 08.2
De	e(PKP)	07 14 47
	iPKP	07 14 52.7
	iSKP	07 18 10.4

New Hebrides Islands
(h = 250 km).
M = 6.2 (Up,Ki).
M uncorrected for focal depth. (PKP) and (SKP) are small-amplitude precursors.

" 13

Up	iPKP	09 30 40.7
Sk	iPKP	09 30 33.9
Ud	iPKP	09 30 42.4
De	iPKP	09 30 52.0

Tonga-Kermadec Islands
(h = 550 km).

" 13

Up	iP	12 22 14.9
Um	iP	12 23 02.8
Ud	iP	12 22 20.8

Greece-Albania.

" 13

Ud	iP	12 54 33.9

North Atlantic Ocean (h = N).

" 13

Um	iP	13 22 35.3

" 13

Ud	iP	22 23 47.9

Venezuela (h = 60 km).

" 14

Um	iPKP	00 52 07.0
Ud	iPKP	00 52 15.6
De	iPKP	00 52 18.1

Loyalty Islands (h = 80 km).

" 14

Um	iP	02 40 13.1
	i	02 40 21.4
Ud	iP	02 40 43.9
De	eP	02 41 02

Japan (h = 50 km).

" 14

Up	iPKP	04 23 19.5

(cont.)

1969
Oct. 14 (cont.)

Up	ipPKP	04 23 59.2
Ud	iPKP	04 23 20.8
	i	04 23 32.7
	ipPKP	04 24 01.0
De	iPKP	04 23 30.5
	i	04 23 42.7
	ipPKP	04 24 10.6

Tonga-Kermadec Islands.
h = 150 km (Up,Ud,De).

" 14

Up	iPKP	04 27 27.8
Ud	iPKP	04 27 28.9 C
De	iPKP	04 27 37.7

Tonga-Kermadec Islands.
Origin time = 04 08 03.

" 14

Ud	iP	06 00 54.9

" 14

Up	iP	07 04 33.9 C
	iSa	07 07 56
	iS	07 08 11
	iLi	07 09 22
	iLg2	07 10 44

		micr	sec
P	N	1.7	1
P	Z	2.7	1
P	Z'	2.3	0.6
Mx	E	1.9	7
Mx	N	3.5	8
Mx	Z	2.4	7

D = 2150 km = 19 1/2°.

Ki	iP	07 03 03.1 C
	iPP	07 03 15
	iS	07 05 16
	iSS	07 05 33
	i(Li)	07 05 49

		micr	sec
P	E	2.1	2
P	N	2.0	2
P	Z	2.4	2
P	Z'	2.8	0.8
S	E	14	2
S	N	13	2
Mx	E	2.8	9
Mx	N	3.1	8
Mx	Z	3.5	7

D = 1350 km = 12°.

Sk	iP	07 04 12.2 C
	iS	07 07 24.1
Um	iP	07 03 41.3 C
	iS	07 06 22
	iSS	07 06 48
	iLg2	07 08 16

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 14 (cont.)

Ud	iP	07 04 44.0	C
	iS	07 08 18.7	
De	iP	07 05 16.8	C
	iS	07 09 29.9	

Novaya Zemlya.
m = 6.4, M = 5.0 (Up,Ki).
Underground explosion.

" 14 Ud iPKP 11 51 53.5
Tonga-Kermadec Islands
(h = 60 km).

" 14

Up	iPn	11 53 31.9	
	iSn	11 54 43.5	
	iSg	11 55 18.2	
Ki	iPn	11 53 49.5	
	i	11 55 29.4	
	iLgl	11 55 50.5	
Sk	iPn	11 54 02.1	
	iSg	11 56 24.8	
Um	ePn	11 53 20	
	i	11 54 30.7	
	iSg	11 54 34.7	
	iRg	11 55 03.2	
Ud	iPn	11 53 56.1	
	iSn	11 55 29.1	
	iSg	11 56 18.0	
De	iPn	11 54 15.8	
	iSn	11 56 01.1	
	iSg	11 57 03.6	

Russia-Finland border
region, 61.7°N, 29.3°E.
Origin time = 11 52 00.
Probably explosion.

" 14 Up iP 12 54 19.0

" 14

Up	i(Sg)	13 08 40.9	
Sk	iSg	13 08 43.7	
Ud	iPg	13 06 48.0	
	eSn	13 07 23	
	iSg	13 07 44.4	
	D = 440 km = 4.0°.		
De	iPn	13 06 42.0	
	iPg	13 06 58.2	
	iSn	13 07 32.4	
	iSg	13 07 54.6	
	D = 490 km = 4.4°.		

Southwest coast of Norway,
58.3°N, 6.6°E.
Origin time = 13 05 30.
Solution confirmed by
Kongsberg readings.

1969
Oct. 14

Ki	e(P)	13 26 47	
Ud	iP	13 27 43.5	C

" 14 Um iP 18 03 13.8

" 14

Up	iPKP	19 16 20.9	
	i	19 16 24.7	
Sk	iPKP	19 16 13.8	
Um	iPKP	19 16 08.6	C
	i	19 16 13.0	
Ud	iPKP	19 16 22.2	C
	i	19 16 26.7	
De	iPKP	19 16 30.5	
	i	19 16 35.1	

Kermadec Islands (h = 45 km).

" 14

Up	iP	20 49 43.6	C
Ki	iP	20 48 57.6	
	i	20 49 06.1	
Sk	iP	20 49 39.3	C
Um	iP	20 49 21.6	
Ud	iP	20 49 51.7	C
De	iP	20 50 05.7	

Sea of Japan (h = 370 km).

" 14 De iP 21 35 35.1

" 14

Up	iP	22 57 02.7	
	ipP	22 57 11.6	
Ki	iP	22 56 10.2	D
	ipP	22 56 19.8	
Sk	iP	22 56 39.2	
	ipP	22 56 48.6	
Um	iP	22 56 37.0	
	ipP	22 56 46.7	
Ud	iP	22 57 01.5	D
	ipP	22 57 10.7	
De	iP	22 57 23.9	
	ipP	22 57 33.4	

South of Alaska. h = 35 km
(Up,Ki,Sk,Um,Ud,De).

" 14 Ud iP 23 08 19.2

" 14

Ki	eP	23 15 54	
Um	iP	23 16 20.2	
Ud	iP	23 16 46.5	

Aleutian Islands (h = 80 km).

" 15

Up	iPKP	00 18 57.9	
	i	00 19 05.1	
Um	iPKP	00 18 47.8	
Ud	iPKP	00 18 59.2	C
De	iPKP	00 19 09.1	C

Tonga-Kermadec Islands
(h = 60 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 15 Up iPKP 01 27 47.4 C
i 01 27 54.2
micr sec
PKP Z' 0.1 0.7
Ki ePKP 01 27 26
Sk ePKP 01 27 39
Um iPKP 01 27 35.2
Ud iPKP 01 27 49.0
i 01 28 00.5
De iPKP 01 27 58.8
i 01 28 09.7
Tonga-Kermadec Islands
(h = 60 km).

" 15 Ki iP 05 54 32.7
Ud iP 05 54 57.3
Talaud Islands (h = 20 km).

" 15 Ud iSKP 07 18 41.3
New Hebrides Islands
(h = 660 km).

" 15 Ki iPn 11 14 03.5
iSn 11 15 03.0
iLgl 11 15 22.1
D = 560 km = 5.0°.
Origin time = 11 12 45.

" 15 Ud iPg 11 31 36.7
iSn 11 31 56.6
iSg 11 31 59.5
D = 190 km = 1.7°.
De iSg 11 32 16.7
Origin time = 11 31 03.

" 15 Um iP 12 06 45.2
Ud iP 12 06 37.9
Guatemala (h = 110 km).

" 15 Up iPg 13 39 45.5
iSg 13 40 10.0
Sk iLgl 13 42 11.1
Um iSg 13 41 27.6
Ud iSg 13 41 13.0
De eSg 13 41 46
Baltic Sea, 59.5°N, 21.1°E.
Origin time = 13 39 08.
Probably underwater
explosion.

" 15 Up i(P) 14 25 23.3

" 15 Ki iSg 16 18 42.5
Sk eSg 16 18 46
(cont.)

1969
Oct. 15 (cont.)
Um eSg 16 19 08
Nordland, Norway.
Origin time = 16 17 13.
Explosion?

" 15 Ud iP 16 35 01.7 C

" 16 Up iPKP 09 59 36.7
Ud iPKP 09 59 39.3
De iPKP 09 59 49.5

" 16 Um iP 11 41 25.5

" 16 Ud iP 12 15 36.9
Sumatra (h = 150 km).

" 16 Ki iSg 17 34 08.5
Sk iSg 17 34 14.2
Um iSg 17 34 37.2
Nordland, Norway.
Origin time = 17 32 41.
Explosion?

" 16 Up iPKP 19 00 20.6
i 19 00 28.5
Ud iPKP 19 00 20.8
Tonga-Kermadec Islands
(h = 140 km).

" 16 Up i(P) 20 11 45.6

" 16 Up iP 23 00 09.3
Sk iP 23 00 58.3
Um iP 23 00 58.8
Ud iP 23 00 15.6
i 23 00 19.0
Greece-Albania.

" 16 Up iP 23 11 31.9
Kansu, China (h = N).

" 17 Up iP 01 35 30.3 D
ipP 01 36 06
iPP 01 37 54
iPa 01 39 34
iS 01 43 52
isS 01 44 49
iScS 01 45 10
micr sec
P E 2.9 1
P Z 6.9 1
P Z' 1.3 0.8
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 17 (cont.)

			micr	sec
Up	S	E	2.1	3
	S	N	5.0	5
	S	Z	1.7	4
	Mx	E	3.3	15
	Mx	N	19	20
	Mx	Z	6.1	15

D = 7150 km = 64 1/2°.

Ki	iP	01 35 24.0 D
	ipP	01 35 58.5
	iS	01 43 44
	isS	01 44 44

		micr	sec
P	E	2.1	5
P	Z	3.5	4
P	Z'	2.8	1.1
S	E	9.9	9
S	N	4.0	8
S	Z	2.4	6
Mx	E	17	18
Mx	N	5.7	16
Mx	Z	20	18

D = 7050 km = 63 1/2°.

Sk	iP	01 35 46.8
	ipP	01 36 20.9
	iS	01 44 25.5
Um	iP	01 35 23.2 D
	ipP	01 35 57.5
	iS	01 43 40.3
	ipS	01 44 26
	isS	01 44 42
Ud	iP	01 35 43.6
	ipP	01 36 19.8
	iS	01 44 19.0
De	iP	01 35 44.8
	i	01 35 46.8
	ipP	01 36 19.0
	iS	01 44 21.2

Burma-India. h = 140 km (Up,Ki,Sk,Um,Ud,De).
m = 7.0, M = 6.3 (Up,Ki).
M uncorrected for focal depth.

" 17 Um iP 12 30 43.3

" 17

Up	iPKP	13 55 06.0
Sk	iPKP	13 54 59.1
Um	iPKP	13 54 52.2
Ud	iPKP	13 55 07.5
De	iPKP	13 55 15.9

Kermadec Islands (h = 100 km).

1969
Oct. 17

Sk	eSg	15 44 10
Ud	iPg	15 41 55.4
	iSg	15 42 20.6
	iRg	15 42 29.7

D = 210 km = 1.9°.

De	iSg	15 42 28.5

Origin time = 15 41 17.
Probably explosion.

" 17

Up	iPKP2	16 44 35.3
Ki	iPKP	16 44 02.7
Um	iPKP	16 44 10.1 C
	iPKP2	16 44 19.5
Ud	iPKP2	16 44 40.5

New Zealand (h = 200 km).

" 17 Ud iP 20 27 31.2

" 17 Ud iP 21 30 22.6

" 17 Um iPKP 23 08 51.0
Santa Cruz Islands (h = 60 km).

" 18

Up	iP	01 25 05.5
	ipP	01 25 29.3
	iPP	01 27 45.1
	iS	01 34 11

		micr	sec
P	Z'	0.2	0.8

D = 7800 km = 70°.

Ki	iP	01 24 25.1 C
	ipP	01 24 45.5

		micr	sec
P	Z'	0.2	1.0

Sk	iP	01 24 59.1 C
	ipP	01 25 22.1
Um	iP	01 24 42.8
	ipP	01 25 04.6
	iS	01 33 30
	isS	01 34 16
Ud	iP	01 25 13.2 C
De	iP	01 25 28.6 C
	iPP	01 28 16.8

Japan. h = 90 km (Up,Ki,Sk,Um, De).
m = 6.0 (Up,Ki).

" 18

Um	iP	06 57 28.5
Ud	iP	06 57 46.7

Hindu Kush.

" 18

Up	iP	08 54 47.4 C
	ipP	08 54 57.0
	iS	09 03 34

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Oct. 18 (cont.)

Up			micr	sec
	P	Z'	0.5	1.0
	Mx	E	0.4	16
	Mx	N	1.1	18
	Mx	Z	1.6	17
	D = 7400 km = 66 1/2°.			
Ki	iP		08 53 53.7 C	
	ipP		08 54 02.4	
			micr	sec
	P	Z'	0.4	1.0
	Mx	E	1.2	18
	Mx	N	1.5	19
	Mx	Z	2.5	20
Sk	iP		08 54 28.1 C	
Um	iP		08 54 19.8 C	
	ipP		08 54 28.4	
	iPa		08 58 22	
	eS		09 02 35	
Ud	iP		08 54 49.1 C	
	ipP		08 54 58.2	
De	iP		08 55 10.9 C	

Aleutian Islands. h = 35 km (Up,Ki,Um,Ud).
m = 6.6, M = 5.2 (Up,Ki).

"	18	Up	iPKP	09 07 57.1
		Ud	iPKP	09 07 58.8
		De	iPKP	09 08 09.0

Tonga-Kermadec Islands (h = 300 km).

"	18	Up	iP	13 50 04.9
"	18	Ki	iPn	20 11 05.0
			iSn	20 11 43.3
			iSg	20 12 00.4
			D = 340 km = 3.1°.	
		Sk	iSg	20 14 53.2

North Finland-Russia border region.
Origin time = 20 10 15.
Explosion?

"	19	Up	e	03 08 50
			iLgl	03 08 57.3
		Ki	ePn	03 04 47
			iSn	03 05 40.3
			iSg	03 06 02.4
			D = 500 km = 4.5°.	
		Sk	i	03 08 20.3
			iLgl	03 08 28.1
		Um	iLgl	03 06 50.9

(cont.)

1969 Oct. 19 (cont.)

Um	iSg	03 07 06.1
Ud	e	03 09 22
	iLgl	03 09 28.6

Northwest Russia, 68.1°N, 32.5°E.
Origin time = 03 03 35.
Explosion?

"	19	Ud	iP 07 48 16.6
"	19	Up	iP 09 16 11.6
		Um	iP 09 15 44.1
		Ud	eP 09 16 10

Aleutian Islands (h = 40 km).

"	19	Ki	iPn 09 31 30.5
			iSn 09 32 14.6
			iSg 09 32 33.4
			D = 400 km = 3.6°.
		Sk	iSg 09 35 10.5
		Um	e 09 33 09
			iSg 09 33 29.5

Russia-Finland border region, 67.6°N, 30.0°E.
Origin time = 09 30 33.
Explosion?

"	19	Up	iP	12 38 50.0
			i	12 38 55.6
			micr	sec
			Mx E	0.6 20
			Mx N	1.4 23
			Mx Z	1.0 21
		Ki	eP	12 38 37
		Sk	iP	12 38 53.8
		Um	iP	12 38 40.4
			iSKS	12 49 04
		Ud	iP	12 38 57.5 C

Mindanao (h = 60 km).

"	19	Up	iP	12 40 36.5
		Ki	iP	12 39 55.3
		Um	iP	12 40 13.0
		Ud	iP	12 40 44.1

Japan (h = N).

"	20	Up	iP	04 21 21.7
		Ki	eP	04 20 37
		Ud	iP	04 21 27.9

Japan (h = 120 km).

"	20	Ki	iP	06 27 53.0

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 20 Ud iP 06 47 05.5
Celebes Sea (h = 560 km).

" 20 Ud iP 07 02 46.9 C
Celebes Sea (h = 510 km).

" 20 Ud iP 09 01 19.6
Luzon (h = N).

" 20 Up iP 13 23 42.4 C
iScS 13 34 04
Ki iP 13 23 44.5
Sk iP 13 23 28.2
Um iP 13 23 46.1
iSKS 13 33 58
Ud iP 13 23 30.9
De iP 13 23 32.9
Venezuela (h = 60 km).

" 20 Up iP 13 23 48.0
micr sec
P Z' 0.1 0.6
Ki iP 13 23 50.3
Sk iP 13 23 32.8
Um iP 13 23 51.2
iSKS 13 34 04
Ud iP 13 23 36.9
De iP 13 23 38.2
Venezuela (h = 40 km).

" 20 Up iP 15 33 08.5
ipP 15 33 35.1
iSKS 15 43 22
Ki iP 15 32 56.8
ipP 15 33 21.7
micr sec
P Z' 0.1 1.0
pP Z' 0.8 2.0
Sk iP 15 32 49.9
Um iP 15 33 03.4
ipP 15 33 29.4
iS 15 43 18
i 15 43 27
iSS 15 48 48
Ud iP 15 33 00.8
De iP 15 33 09.0
i 15 33 23.0
i 15 33 28.8
Mexico. h = 100 km
(Up,Ki,Um).

" 20 Ki iP 16 34 47.3
Ud iP 16 34 28.0 C
i 16 34 34.6
(cont.)

1969
Oct. 20 (cont.)
De iP 16 34 10.6
i 16 34 21.2
Iran (h = 50 km).

" 20 Up iP 22 12 28.3 C
Ki iP 22 11 37.3
Um iP 22 12 00.5 C
Ud iP 22 12 31.7
Okhotsk Sea (h = 380 km).

" 20 Up iPKP 22 52 09.4
Ud iPKP 22 52 10.2
De iPKP 22 52 20.2

" 20 Ud iP 22 56 08.5

" 21 Ud iP 01 51 23.1
Japan (h = 70 km).

" 21 Up iLgl 10 42 25.9
Ki iPg 10 39 33.7
iSn 10 39 57.3
iSg 10 40 12.8
Sk ePn 10 39 39
iS* 10 40 20.7
iSg 10 40 30.8
Um iPg 10 40 07.0
iSn 10 40 32.7
iSg 10 40 51.8
Ud iSn 10 41 41.3
iLgl 10 42 12.8
iSg 10 42 20.6
Nordland, Norway,
66.7°N, 14.2°E.
Origin time = 10 38 43.

" 21 Um iP 13 50 52.5

" 21 Ud iP 14 47 48.3
i 14 47 56.1

" 21 Up iPn 20 00 16.3
iSn 20 01 15.4
iSg 20 01 47.9
Sk iLgl 20 02 12.0
Um eLgl 20 03 19
Ud ePn 19 59 57
iSn 20 00 44.1
iSg 20 00 53.1
De i(Pn) 19 59 41.0
iSn 20 00 20.8
iSg 20 00 34.4
Skagerrack, 57.4°N, 9.1°E.
Origin time = 19 59 00.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 21 Ud iP 20 03 16.1
i 20 03 30.6
North Atlantic Ocean (h = N).

" 21 Up iP 20 47 10.1

" 21 Up iP 21 04 44.6 C
ipP 21 04 56.2
micr sec
P Z' 0.5 0.5
Mx E 2.3 20
Mx N 3.4 21
Mx Z 2.9 22
Ki iP 21 03 50.9 C
micr sec
P Z' 0.3 0.8
Mx N 2.1 19
Sk iP 21 04 23.9 C
Um iP 21 04 17.6 C
ipP 21 04 28.6
Ud iP 21 04 45.3 C
De iP 21 05 07.1 C
Aleutian Islands. h = 40 km (Up,Um).
m = 6.6, M = 5.6 (Up,Ki).
Excessive m-M differences are frequently occurring for Aleutian shocks, recorded at our stations; cf Oct. 18, 08 54.

" 21 Up iP 23 15 55.2
Ud iP 23 15 43.6
Portugal (h = 9 km).

" 22 Up iP 02 43 21.2
i 02 43 22.9
Sk iP 02 43 36.8
Ud iP 02 43 35.6
India-China (h = 30 km).

" 22 Up iP 03 21 28.2
Ki iP 03 20 35.6
Sk iP 03 21 05.5
Um iP 03 21 01.7
Ud iP 03 21 27.5
De eP 03 21 50
Aleutian Islands (h = 25 km).

" 22 De iPKP 06 16 54.3
Solomon Islands (h = 390 km).

" 22 Ud ePKP 07 30 44
De iPKP 07 30 49.2
New Britain (h = 70 km).

1969
Oct. 22 Ud iP 09 26 18.5
De iP 09 26 38.3
Kamchatka (h = 60 km).

" 22 Up iP 12 22 19.3 C
ipP 12 22 30.0
micr sec
P Z' 0.2 1.0
Ki iP 12 21 25.9
ipP 12 21 37.2
micr sec
P Z' 0.3 1.0
Sk iP 12 21 56.3
iX 12 22 43.2
Um iP 12 21 51.8
ipP 12 22 04.3
Ud iP 12 22 17.9
ipP 12 22 29.6
De iP 12 22 40.6 C
ipP 12 22 52.4
iX 12 23 27.4
Aleutian Islands. h = 45 km (Up,Ki,Um,Ud,De).
m = 6.3 (Up,Ki).
X (Sk,De) is probably P of another shock in the Aleutians, 47 sec later.

" 22 Up iP 13 04 00.2 C
ipP 13 04 20.6
micr sec
P Z' 0.3 0.7
pP Z' 0.5 0.7
Ki iP 13 04 09.5 C
ipP 13 04 31.1
iX 13 05 23.9
micr sec
P Z' 0.2 1.0
Sk iP 13 03 48.7 C
ipP 13 04 07.6
Um iP 13 04 09.8
ipP 13 04 28.7
iX 13 05 22.5
Ud iP 13 03 49.3 C
ipP 13 04 09.5
De iP 13 03 47.8 C
ipP 13 04 07.9
Venezuela. h = 80 km (Up, Ki,Sk,Um,Ud,De).
m = 6.1 (Up,Ki).

" 22 Up iP 20 51 35.7

" 22 Up iP 23 03 42.5
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 22 (cont.)

Up			micr	sec
	P	Z	1.3	4
	P	Z'	0.2	1.2
	Mx	E	1.0	17
	Mx	N	2.0	17
	Mx	Z	2.4	19
Ki	iP		23 03 07.0 C	
			micr	sec
	P	Z'	1.6	2.5
	Mx	E	2.1	18
	Mx	N	1.1	14
	Mx	Z	2.9	15
Sk	eP		23 03 17	
Um	iP		23 03 27.1	
	iS		23 13 20	
	iScS		23 13 48	
Ud	iP		23 03 34.6 C	
De	iP		23 03 51.2	

California (h = 15 km).
m = 6.3, M = 5.7 (Up,Ki).

" 23 Um LP N exhibits long-period microseisms (period around 18 sec) in the interval Oct. 23-25.

" 23 Ki ePKP 01 58 17
South Sandwich Islands (h = 100 km).

" 23

Up	iP	02 17 14.2
Um	iP	02 17 53.7
Ud	iP	02 17 19.0
De	iP	02 16 39.6

Italy (h = 270 km).

" 23

Ki	iPKP	03 11 48.3
Um	iPKP	03 11 56.7
Ud	iPKP	03 12 05.8
	iPKS	03 15 34.7

New Hebrides Islands (h = 30 km).

" 23

Up	ePKP	05 10 24
Ud	iPKP	05 10 26.3

Tonga-Kermadec Islands (h = 35 km).

" 23 Ud iP 08 41 12.1

" 23

Up	iP	10 32 31.2 C
Ki	iP	10 32 03.0

(cont.)

1969
Oct. 23 (cont.)

Sk	iP	10 32 28.2
Um	iP	10 32 15.0 C
Ud	iP	10 32 37.1

Mariana Islands (h = 380 km).

" 23 Ud iP 17 34 18.1

" 23 Ki eP 18 35 34

" 24

Up	iPKP		00 45 30.8 D	
			micr	sec
	PKP	Z'	0.2	0.6
Ki	iPKP		00 45 20.7 D	
Sk	i(PKP)		00 45 31.7	
Ud	iPKP		00 45 33.1 D	
De	iPKP		00 45 43.0	

Tonga-Kermadec Islands (h = 620 km).

" 24

Up	iP		00 57 10.9 C	
	ipP		00 57 23.2	
			micr	sec
	P	Z'	0.1	1.0
Ki	iP		00 56 17.3 C	
	ipP		00 56 29.6	
			micr	sec
	P	Z'	0.2	1.0
Sk	iP		00 56 48.1	
	i		00 56 57.8	
Um	iP		00 56 44.1 C	
Ud	iP		00 57 10.4	
De	iP		00 57 32.9	

Aleutian Islands. h = 45 km (Up,Ki).
m = 6.2 (Up,Ki).

" 24

Sk	i(Sg)	08 05 24.9
Um	iP	08 04 40.6
	i	08 05 06.8

" 24 Ud i(Sg) 08 38 21.0

" 24

Up	iP		08 41 29.7	
			micr	sec
	Mx	E	1.7	18
	Mx	N	1.9	16
	Mx	Z	2.9	18
Ki	iP		08 40 56.9	
Sk	iP		08 41 05.5	
Um	iS		08 51 09	
Ud	iP		08 41 19.0	

California (h = 10 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 24 Ki iP 10 22 35.9
Gulf of Aden (h = 25 km).

" 24 Up iP 11 47 25.5
Mariana Islands
(h = 160 km).

" 24 Up iP 11 55 04.6
Ki iP 11 55 25.1
Ud iP 11 55 19.7
India (h = 15 km).

" 24 Up iP 14 36 06.2 C
Ud iP 14 36 06.8 C
Aleutian Islands (h = 45 km).

" 24 Ki iSg 17 43 28.7
Sk iSg 17 43 33.3
Um iSg 17 43 55.7
Nordland, Norway.
Origin time = 17 42 00.
Explosion?

" 25 Up iPKP 10 30 44.2
Ud iPKP 10 30 44.6
Tonga-Kermadec Islands
(h = 60 km).

" 25 Ud eP 11 18 27

" 25 Ki iPn 12 07 08.6
iSn 12 08 03.2
iLgl 12 08 20.7
D = 500 km = 4.5°.
Sk eSg 12 11 05
Probably northwest Russia.
Origin time = 12 05 59.
Explosion?

" 25 Up iP 12 14 47.5
ipP 12 14 57.3
Ki iP 12 14 01.6
Sk iP 12 14 37.3
Um iP 12 14 22.8
ipP 12 14 31.3
Ud iP 12 14 52.9
Kurile Islands. h = 35 km
(Up,Um).

" 26 Up iPKP 04 04 26.0 C
i 04 04 32.9
micr sec
PKP Z' 0.2 0.7
Ki iPKP 04 04 13.8
(cont.)

1969
Oct. 26 (cont.)
Ud iPKP 04 04 27.4
De iPKP 04 04 37.2 C
Tonga-Kermadec Islands
(h = 30 km).

" 26 De iPKP 05 10 27.4
Tonga-Kermadec Islands
(h = 450 km).

" 26 Up iPKP 05 38 28.1
i 05 38 36.4
Ud iPKP 05 38 29.8
Tonga-Kermadec Islands (h = N).

" 26 Up iPKP 06 57 12.3
Ki iPKP 06 56 55.8 C
ipPKP 06 57 27.6
micr sec
PKP Z' 0.1 1.0
Um iPKP 06 57 02.1
ipPKP 06 57 32.3
Ud iPKP 06 57 09.9
i 06 57 18.3
De iPKP 06 57 20.9 C
ipPKP 06 57 52.8
Tonga Islands. h = 120 km
(Ki,Um,De).

" 26 Up iP 09 18 45.8
Aleutian Islands (h = 40 km).

" 26 Up iP 15 40 21.4 C
i 15 40 26.5
iLg2 15 45 07
micr sec
P Z' 0.3 0.7
Mx E 46 11
Mx N 110 10
Mx Z 110 10
Ki iP 15 41 56.6
i 15 42 01.1
iS 15 46 08
iLgl 15 48 37
iLg2 15 49 27
micr sec
P Z' 0.7 1.5
S N 9.9 9
Mx E 60 10
Mx N 57 11
Mx Z 78 11
D = 2550 km = 23°.
Sk iP 15 41 11.3
Um iP 15 41 11.5 C
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 26 (cont.)

Ud	iP		15 40 27.9
	i		15 40 31.9
	iS		15 43 24.9
	iLg1		15 45 07.2

Yugoslavia (h = N).
m = 6.1, M = 6.5 (Up,Ki).
Double P, small and large, 4-5 sec apart. Well developed higher-mode surface waves.

" 26

Up	iP		19 26 55.1	C
	ipP		19 27 06.3	
			micr	sec
	P	Z'	0.2	0.9
Ki	iP		19 26 09.8	
			micr	sec
	P	Z'	0.1	1.0
Um	iP		19 26 31.6	
Ud	iP		19 27 00.9	C

Kurile Islands. h = 40 km (Up).
m = 6.1 (Up,Ki).

" 26

Up	iPKP		21 40 10.6
Ud	iPKP		21 40 11.8

Tonga-Kermadec Islands (h = N).

" 26

Up	iPKP		21 45 06.1	
Ud	iPKP		21 45 07.6	C

Tonga-Kermadec Islands (h = 45 km).

" 26

Up	iPS		22 08 29	
			micr	sec
	Mx	E	4.0	21
	Mx	N	14	22
	Mx	Z	15	23
Ki	iPKP		21 58 09.4	
			micr	sec
	PKP	Z'	0.1	1.3
	Mx	N	5.0	20

South of Africa (h = N).
M = 6.5 (Up,Ki).

" 27

Up	iP		02 59 05.7	
	i		02 59 11.2	
			micr	sec
	P	Z'	0.1	0.5
Ki	eP		03 00 41	
Um	iP		02 59 56.6	
Ud	iP		02 59 12.9	

Yugoslavia (h = N).

1969
Oct. 27

Up	iP		08 14 25.4	C
	i		08 14 30.2	
	iSS		08 17 29	
	iLg1		08 18 56	
	iLg2		08 19 07	
			micr	sec
	P	N	2.4	3
	P	Z	1.6	2
	P	Z'	0.8	0.8
	Mx	E	99	11
	Mx	N	160	10
	Mx	Z	150	10

D = 1650 km = 15°.

Ki	iP		08 16 02.6	C
	i		08 16 05.0	
	iS		08 20 16	
			micr	sec
	P	Z	4.8	4
	P	Z'	2.5	1.7
	S	E	7.5	8
	S	N	22	10
	S	Z	9.3	7
	Mx	E	160	10
	Mx	N	85	11
	Mx	Z	130	12

D = 2550 km = 23°.

Sk	iP		08 15 16.6	
Um	iP		08 15 16.5	C
	iS		08 18 44	
Ud	iP		08 14 34.5	
De	iP		08 13 44.7	
	i		08 13 48.4	

Yugoslavia (h = N).
m = 6.5, M = 6.7 (Up,Ki).
Same remarks apply as for Oct. 26, 15 40.

" 27

Up	iP		08 46 49.8	
			micr	sec
	P	Z'	0.1	0.5
Um	i(P)		08 47 37.5	
Ud	iP		08 46 56.6	
	i		08 47 08.7	

Greece-Albania (h = 40 km).

" 27

Up	iP		08 57 14.4	
	i		08 57 18.1	
			micr	sec
	P	Z'	0.1	0.6
Ki	iP		08 58 47.2	
			micr	sec
	P	Z'	0.1	1.0
Sk	eP		08 58 02	
Um	iP		08 58 01.7	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 27 (cont.)
Ud iP 08 57 19.3
De iP 08 56 29.7
Yugoslavia (h = N).
m = 5.2 (Up,Ki).

" 27 Ud iP 11 52 35.6
South of Japan (h = 100 km).

" 27 Up iP 18 37 29.4
Ki iP 18 37 39.3
Um iP 18 37 31.1
Ud iP 18 37 45.7
Hindu Kush (h = 140 km).

" 27 Um iP 19 48 52.1
Mona Passage (h = 180 km).

" 28 Ud iP 07 31 38.4 D
Luzon (h = 60 km).

" 28 Up iP 18 52 32.4 C
ipP 18 53 20.4
iPP 18 54 08.0
micr sec
P Z' 0.3 0.7
Ki iP 18 52 41.2 C
micr sec
P Z' 0.3 0.6
Sk iP 18 52 57.7
ipP 18 53 47.7
Um iP 18 52 30.6 C
ipP 18 53 18.0
Ud iP 18 52 48.7 C
ipP 18 53 37.5
iPP 18 54 31.0
De iP 18 52 44.9 C
ipP 18 53 32.2
iPP 18 54 25.7
Hindu Kush. h = 240 km
(Up,Sk,Um,Ud,De).
m = 5.9 (Up,Ki).

" 28 Up iP 19 35 40.8
Um iP 19 35 15.7
Ud iP 19 35 47.1 D
Kurile Islands (h = 60 km).

" 28 Ki iP 21 36 12.5
Hindu Kush.

" 29 Ud iP 02 01 45.4

" 29 Ud iP 04 48 03.2
Kurile Islands (h = 40 km).

1969
Oct. 29 Up iP 15 31 31.7
Greece-Albania.

" 29 Up iP 18 23 42.3 C
Bonin Islands (h = 450 km).

" 29 Ud iP 20 11 41.1
Nevada. Underground explosion.

" 29 Ki iPn 20 50 51.2
i(P☆) 20 51 00.1
iSn 20 51 37.7
iLgl 20 51 50.4
iSg 20 51 55.2
D = 430 km = 3.9°.
Um iSg 20 53 31.0
Probably northwest Russia.
Origin time = 20 49 48.
Explosion?

" 29 Up iP 22 13 39.8 C
micr sec
P Z' 0.1 0.7
Ki iP 22 13 05.6
micr sec
P Z' 0.1 1.2
Um iP 22 13 24.9
Ud iP 22 13 31.2 C
Nevada. m = 6.0 (Up,Ki).
Underground explosion.

" 30 Ki iP 00 16 08.0
ipP 00 16 43.8
Um iP 00 16 24.8
ipP 00 17 02.9
Ud iP 00 16 54.2
ipP 00 17 32.4
Japan. h = 150 km (Ki,Um,Ud).

" 30 Up iP 00 59 50.8
Ki iP 00 59 28.0
Ud iP 01 00 00.6
Formosa (h = 50 km).

" 30 Ki iP 08 02 07.0
Sk iP 08 02 44.2
Ud iP 08 02 57.5
Japan (h = 90 km).

" 30 Up iP 12 25 09.7 C
i 12 25 15.3
micr sec
P Z' 0.1 0.7
Ki iP 12 24 37.1
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Oct. 30 (cont.)

Um	iP		12 24 47.4 C
Ud	iP		12 25 22.8

West of Lake Baikal (h = N).

" 31 Ud iP 01 24 16.8

" 31 Up iP 06 54 16.9
iPcP 06 54 45.5

			micr	sec
	P	Z'	0.1	0.5

Ki iP 06 53 29.6 C
i 06 54 28.8

			micr	sec
	P	Z'	0.1	1.0

Sk iP 06 54 05.4
Um iP 06 53 50.8
Ud iP 06 54 21.9 C
De iP 06 54 41.6
Kurile Islands (h = 9 km).
m = 6.1 (Up,Ki).

" 31 Up iP 07 11 42.2
ipP 07 11 52.1

			micr	sec
	Mx	E	2.4	16
	Mx	N	1.8	18
	Mx	Z	3.4	18

Ki iP 07 11 01.4
eSS 07 24 18

			micr	sec
	Mx	E	3.0	15
	Mx	N	1.7	14
	Mx	Z	3.6	15

Um iP 07 11 18.6 C
ipP 07 11 28.9
Ud iP 07 11 48.1
ipP 07 11 59.8
Japan. h = 40 km (Up,Um,Ud).
M = 5.7 (Up,Ki).

" 31 Ki iPKP 07 46 56.1
Fiji Islands (h = 60 km).

" 31 Up i(P) 08 09 20.5
i 08 09 51.6

" 31 Up iP 08 59 59.5 C

			micr	sec
	P	Z'	0.1	0.5

Ki iP 09 00 41.5 C

			micr	sec
	P	Z'	0.1	1.0

Um iP 09 00 14.8
(cont.)

1969
Oct. 31 (cont.)

Ud	iP		09 00 14.4 C
De	iP		08 59 56.7 C

Iran (h = 50 km).
m = 5.7 (Up,Ki).

" 31 Ki iP 10 51 09.3
California (h = 7 km).

" 31 Up iP 11 44 02.8 C
ipP 11 44 13.5
iS 11 52 54

			micr	sec
	P	N	2.1	4
	P	Z	1.2	3
	P	Z'	1.9	1.0
	S	E	1.1	4
	S	N	2.3	6
	Mx	E	12	17
	Mx	N	23	20
	Mx	Z	15	19

D = 7550 km = 68°.

Ki iP 11 43 09.5 C
iPP 11 45 21.6
iPa 11 47 04
eS 11 51 18
iPS 11 51 37

			micr	sec
	P	N	2.7	7
	P	Z	4.6	6
	P	Z'	0.7	1.0
	PP	N	2.5	8
	PP	Z	4.0	7
	S	E	2.8	7
	S	N	2.9	8
	Mx	E	21	17
	Mx	N	14	17
	Mx	Z	20	17

D = 6650 km = 60°.

Sk iP 11 43 42.0
Um iP 11 43 35.6 C
iS 11 52 07
iPS 11 52 45
Ud iP 11 44 02.7
De iP 11 44 25.1 C
Aleutian Islands. h = 40 km (Up).
m = 6.8, M = 6.5 (Up,Ki).

" 31 Up iP 11 58 31.4
Ki iP 11 57 37.2
Aleutian Islands (h = 50 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969				
Oct.	31	Ki	iP	12 43 29.3
		Ud	iP	12 44 21.8
		Aleutian Islands		
		(h = 50 km).		

Markus Båth
October 16, 1970

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

Seismological Institute
Uppsala

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å

U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.2'N,	13°52.2'E;	h = 150 m

N O V E M B E R 1 - 30, 1969

1969
Nov. 1 Up eP 00 02 18

" 1 Up iP 04 25 25.8
Ki iP 04 24 33.0
Ud iP 04 25 25.8
Aleutian Islands (h = 45 km).

" 1 Up iP 11 21 08.1
i 11 21 13.5
iSKS 11 31 33
i 11 37 18

		micr	sec
P	Z	1.9	6
P	Z'	0.1	1.1
SKS	E	3.3	9
SKS	N	14	12
Mx	E	33	27
Mx	N	91	30
Mx	Z	30	23

D = 9800 km = 88°.

Ki iP 11 20 43.2
i 11 20 47.0
iSKS 11 30 55

		micr	sec
P	E	2.3	6
P	N	1.2	6
P	Z	6.1	6
P	Z'	2.1	2.0
SKS	E	4.6	9
SKS	N	5.8	10
Mx	E	44	14
Mx	N	30	15
Mx	Z	42	14

D = 9200 km = 83°.

Sk iP 11 20 47.3
Um iP 11 20 57.0
i 11 21 01.4
(cont.)

1969
Nov. 1 (cont.)
Um iPP 11 24 16.0
iSKS 11 31 20
i 11 36 30
Ud iP 11 21 00.4
De iP 11 21 10.9
Gulf of California (h = N).
m = 6.8, M = 7.1 (Up,Ki).
P Z' exhibits a small beginning with following bigger phases.

" 1 Ki iP 11 31 03.4 C
Um iP 11 31 18.0
Ud iP 11 31 46.4
Japan (h = 350 km).

" 1 Ki iPn 13 42 15.6
iSn 13 43 08.9
iLgl 13 43 29.1
D = 500 km = 4.5°.
Um iSg 13 44 34.4
Probably northwest Russia.
Origin time = 13 41 06.
Explosion?

" 2 Up iPKP 02 51 46.6
De iPKP 02 51 59.4
Tonga-Kermadec Islands (h = 640 km).

" 2 Up iP 06 28 38.2
Sakhalin (h = 340 km).

" 2 Ki iPn 17 09 28.7
iSn 17 10 15.3
iLgl 17 10 29.7
D = 420 km = 3.8°.
Origin time = 17 08 29.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.	2	Ki	eL	19 43		
				micr	sec	
			Mx E	0.6	17	
			Mx N	0.9	21	
			Mx Z	0.9	17	
			Java (h = 60 km).			
"	3	Sk	iPKP	03 49 44.6		
		Um	iPKP	03 49 37.3		
		South of Australia (h = N).				
"	3	Up	iPKP	04 09 11.7		
		Sk	iPKP	04 09 04.8		
"	3	Um	ePKP	07 04 47		
		New Zealand (h = N).				
"	3	Ki	iPKP	08 44 48.3		
		Um	iPKP	08 44 57.0		
		New Zealand (h = 15 km).				
"	3	Up	iPKP	11 06 48.5		
		Ki	i(PKP)	11 06 18.2		
			i	11 06 33.2		
		Sk	iPKP	11 06 40.9		
			i	11 06 43.3		
		Um	iPKP	11 06 37.4		
		Kermadec Islands (h = 120 km).				
"	3	Ki	iP	22 01 39.5		
		Sk	eP	22 01 38		
			i	22 01 47.1		
		Iran (h = 8 km).				
"	3	Up	iP	22 26 11.2		
		Sk	eP	22 26 07		
"	3	Ki	iP	23 32 21.0		
		Sk	iP	23 32 30.7		
		Um	iP	23 32 08.9		
		India (h = N).				
"	4	Ki	iP	01 20 00.7		
		Um	iP	01 20 28.1		
"	4	Up	iP	09 01 47.1		
				micr	sec	
			P Z'	0.1	0.5	
		Ki	iP	09 01 12.0		
			ipP	09 02 27.4		
		Sk	iP	09 01 43.4		
		(cont.)				

1969 Nov.	4	(cont.)			
		Um	iP	09 01 27.2	
			i	09 02 04.3	
		De	iP	09 02 07.9	C
		Japan. h = 330 km (Ki).			
"	4	Ki	iP	09 31 09.3	
		Kurile Islands (h = N).			
"	4	Up	iP	12 16 22.4	
		Ki	iP	12 15 29.1	
		Aleutian Islands (h = 45 km).			
"	4	Um	iP	13 48 35.9	
"	4	Ki	iP	14 40 09.3	
		Um	iP	14 40 36.2	
		Aleutian Islands (h = 40 km).			
"	4	Ki	eP	15 06 43	
"	4	Up	iP	17 30 18.9	
		Ki	iP	17 29 32.6	
		Kurile Islands (h = N).			
"	4	Up	iP	20 23 46.3	
			i	20 23 56.0	
			i	20 24 06.5	
		Ki	iP	20 24 13.4	
		Sk	iP	20 24 22.3	
		Um	eP	20 23 50	
			iPP	20 24 52.4	
		Caspian Sea (h = 30 km).			
"	4	Ki	iP	21 12 21.9	
		Caspian Sea (h = N).			
"	4	Ki	eP	22 17 37	
		Molucca Sea (h = N).			
"	4	Up	iPKP	23 58 36.6	
			iSKP	00 01 25.7	
		Ki	iPKP	23 58 24.9	
			iSKP	00 01 03.2	
				micr	sec
			SKP Z'	0.2	1.5
		Sk	ePKP	23 58 29	
			iSKP	00 01 20.5	
		Um	iSKP	00 01 13.8	
		De	iPKP	23 58 49.8	D
			iSKP	00 01 36.2	
		Tonga-Kermadec Islands (h = 610 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.	5	Ki	iPn		10 53 10.0	
			iSn		10 54 08.5	
			iLgl		10 54 30.3	
			D = 540 km = 4.9°.			
		Sk	iLgl		10 56 56.8	
			iSg		10 57 04.6	
		Um	iSg		10 55 23.8	
		Northwest Russia, 67.5°N, 33.3°E.				
		Origin time = 10 51 54.				
		Explosion?				
"	5	Um	iP		11 49 24.3	
"	5	Up	iP		12 55 59.0	C
"	5	De	iP		13 46 49.4	
"	5	Up	iP		18 06 20.3	C
			iS		18 16 27	
			iScS		18 16 50	
					micr	sec
			P	N	0.7	5
			P	Z	1.6	5
			P	Z'	0.2	1.0
			S	E	0.5	5
			Mx	E	2.7	18
			Mx	N	6.8	17
			Mx	Z	6.1	19
			D = 8900 km = 80°.			
		Ki	iP		18 05 45.1	C
			iPP		18 08 27	
			iS		18 15 19	
					micr	sec
			P	N	1.0	5
			P	Z	2.4	5
			P	Z'	0.3	1.3
			PP	N	0.7	7
			PP	Z	1.6	7
			S	E	1.7	7
			S	N	0.7	8
			Mx	E	4.6	15
			Mx	N	5.7	20
			Mx	Z	11	21
			D = 8150 km = 73 1/2°.			
		Sk	iP		18 05 55.4	C
		Um	iP		18 06 04.9	C
			i		18 06 24.4	
			iPP		18 08 55	
			iS		18 15 57	
		De	iP		18 06 29.2	
		California (h = N).				
		m = 6.2, M = 6.1 (Up,Ki).				

1969 Nov.	5	Ki	iP		19 10 38.0	
		De	iP		19 10 04.8	
		Iran (h = N).				
"	5	Up	iP		20 35 06.4	C
					micr	sec
			P	Z'	0.1	0.5
		Ki	iP		20 35 01.2	C
		Sk	iP		20 35 23.7	C
		Um	iP		20 34 59.1	C
		De	iP		20 35 21.5	
		Bhutan (h = 15 km).				
"	5	Up	iP		21 08 51.4	
					micr	sec
			Mx	N	0.9	15
		Ki	iP		21 08 32.9	
					micr	sec
			Mx	E	1.0	13
			Mx	N	1.8	19
			Mx	Z	1.1	15
		Um	iP		21 08 41.0	
		Szechwan, China (h = N).				
		M = 5.3 (Up,Ki).				
"	5	Up	iP		21 48 33.6	
			i		21 48 51.3	
		Sk	eP		21 49 12	
"	5	Up	iP		23 17 08.2	
		Ki	iP		23 16 47.6	
		Um	iP		23 16 54.3	
		Luzon (h = 15 km).				
"	6	Up	iP		02 06 46.7	
		Ki	iP		02 06 01.2	
					micr	sec
			P	Z'	0.1	1.0
			Mx	E	0.7	15
			Mx	N	0.4	15
			Mx	Z	1.4	19
		Sk	eP		02 06 37	
		Um	iP		02 06 21.8	
		De	iP		02 07 11.1	
		Kurile Islands (h = N).				
"	6	Up	iP		04 43 46.4	
		Ki	iP		04 44 22.4	
		Sk	iP		04 44 21.1	
		Um	iP		04 44 01.7	
		De	iP		04 43 45.8	
		Iran (h = N).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.	6	Ki	iPn	10 52 44.7	C
			iSn	10 53 43.1	
			iSg	10 54 06.9	
			i	10 54 22.7	
			D = 530 km = 4.8°.		
		Sk	eLgl	10 56 28	
			iSg	10 56 44.2	
		Um	i(S^x)	10 54 37.8	
			iSg	10 55 02.3	
		Northwest Russia, 67.7°N, 33.1°E. Origin time = 10 51 29. Explosion?			
"	6	De	iP	11 15 09.4	
"	6	Ki	iP	11 46 00.9	
			ipP	11 46 27.2	
		De	iP	11 45 45.1	
		Colombia. h = 100 km (Ki).			
"	6	Up	iP	13 26 29.6	
		Ki	iP	13 26 17.8	
		Um	iP	13 26 26.8	
		Mexico (h = 110 km).			
"	6	De	iP	14 34 43.6	
"	6	Ki	iP	14 42 36.5	
			i	14 42 44.3	
			iS	14 43 54.2	
			iT	14 47 34.5	
			i	14 48 16.3	
				micr	sec
			Mx E	1.1	13
			Mx N	0.9	14
			Mx Z	1.9	20
			D = 760 km = 6.8°.		
		Um	iP	14 43 27.7	
		Northeast of Jan Mayen (h = N).			
"	6	Up	iP	20 31 16.1	
			i	20 31 20.2	
				micr	sec
			P Z'	0.6	1.0
			Mx E	3.6	19
			Mx N	4.2	19
			Mx Z	3.9	20
		Ki	iP	20 30 23.4	
				micr	sec
			P Z'	0.3	1.0
			Mx E	2.7	19
			Mx N	3.7	20
			Mx Z	4.4	20
		(cont.)			

1969 Nov.	6	(cont.)			
		Sk	eP	20 30 56	
			i	20 31 31.1	
		Um	iP	20 30 50.5	
			i	20 30 53.3	
		De	iP	20 31 38.8	
		Aleutian Islands (h = 35 km). m = 6.5, M = 5.8 (Up,Ki).			
"	7	Ki	iP	08 17 05.5	
		Um	iP	08 17 24.3	
		Japan (h = 80 km).			
"	7	Um	iP	12 56 50.2	
		North of Ascension Island (h = N).			
"	7	Ki	iP	13 15 56.7	
		Um	iP	13 15 40.1	
		North of Ascension Island (h = N).			
"	7	Ki	iP	13 27 05.3	
		Um	iP	13 26 40.8	
		Iran (h = N).			
"	7	Up	iP	13 52 48.1	C
			ipP	13 53 20.3	
				micr	sec
			P Z'	0.1	1.0
		Ki	iP	13 52 21.4	
			ipP	13 52 54.4	
				micr	sec
			P Z'	0.1	1.0
		Um	iP	13 52 30.8	
		Ryukyu Islands. h = 130 km (Up,Ki). m = 5.6 (Up,Ki).			
"	7	Ki	iP	15 24 23.9	
		Um	iP	15 24 03.8	
		De	iP	15 23 46.8	
		Iran (h = N).			
"	7	Up	iP	16 38 12.8	
		Ki	iP	16 38 49.9	C
		Um	iP	16 38 26.0	
		De	iP	16 38 11.3	
		Iran (h = N).			
"	7	Ki	iP	16 52 39.5	
		Um	iP	16 52 20.2	
		North of Ascension Island (h = N).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Nov. 7 Up iP 18 41 57.5 C
iPP 18 43 36.3
iS 18 48 16
iSS 18 51 28
micr sec
P E 3.0 5
P Z 3.8 4
P Z' 1.4 1.0
PP E 4.4 5
PP N 2.1 5
PP Z 6.5 6
PP Z' 1.1 1.0
S E 28 12
S N 17 8
Mx E 21 20
Mx N 31 20
Mx Z 21 20
D = 4800 km = 43°.
Ki iP 18 42 24.8 C
iPP 18 44 07
iPa 18 44 35
iS 18 49 06
iScS 18 52 12
micr sec
P E 6.2 7
P N 4.9 7
P Z 11 7
P Z' 2.4 1.5
PP E 6.1 7
PP N 6.4 6
PP Z 11 7
PP Z' 1.3 1.3
S E 17 8
S N 13 10
Mx E 24 12
Mx N 29 15
Mx Z 33 12
D = 5150 km = 46 1/2°.
Sk iP 18 42 29.1 C
iPP 18 44 23.3
Um iP 18 42 06.2 C
iPP 18 43 48.8
iS 18 48 30
De iP 18 42 00.5 C
Iran (h = 35 km).
m = 6.8, M = 6.5 (Up,Ki).

" 7 Up eP 20 01 16
i 20 01 23.1
Aleutian Islands (h = 45 km).

" 7 Up iP 20 43 00.2
i 20 43 01.9
micr sec
P Z' 0.1 0.6

1969
Nov. 8 Up i(P) 00 38 53.8

" 8 Up iPKP 02 00 52.7
iPKS 02 04 14.8
micr sec
PKS Z' 0.1 0.8
Ki iPKP 02 00 38.3
micr sec
PKP Z' 0.1 1.2
Sk iPKP 02 00 48.2
Um iPKP 02 00 44.7
De iPKP 02 01 01.2
New Hebrides Islands
(h = 25 km).

" 8 Um iP 02 20 29.3 C

" 8 Up iP 07 32 24.6
Ki iP 07 31 38.0
Kurile Islands (h = 50 km).

" 8 Ki iPn 11 04 47.9
iP^x 11 04 56.2
iSn 11 05 34.2
iLgl 11 05 49.4
D = 420 km = 3.8°.
Sk eSg 11 08 40
Um iSg 11 07 04.1
Northwest Russia,
68.2°N, 30.5°E.
Origin time = 11 03 48.
Explosion?

" 8 Ki ePn 12 10 37
iSn 12 11 30.9
iLgl 12 11 49.5
D = 500 km = 4.5°.
Origin time = 12 09 27.

" 8 Ki iP 20 39 57.6
i 20 40 03.5
North of Ascension Island
(h = N).

" 8 Up iPKP 21 18 31.2
Ki iPKP 21 18 23.8
De iPKP 21 18 44.7
Tonga-Kermadec Islands
(h = 600 km).

" 8 Up ---
micr sec
Mx E 2.1 22
Mx N 4.3 23
Mx Z 3.8 23
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Nov. 8 (cont.)

Ki	iP		22 08 41.5	
			micr	sec
	P	Z'	0.1	1.0
	Mx	E	2.8	17
	Mx	N	3.1	23
	Mx	Z	3.2	17
Um	iSKS		22 19 24	

Halmahera (h = N).
M = 6.0 (Up,Ki).

" 8 Ki eP 23 39 29
Halmahera (h = 60 km).

" 9 Ki iP 01 22 59.2
Halmahera (h = 20 km).

" 9

Up	iPKP		09 26 42.7	D
	iSKP		09 29 49.9	
	i		09 30 21.0	
			micr	sec
	SKP	Z	1.4	5
	SKP	Z'	0.6	0.7
Ki	iPKP		09 26 27.9	
	iSKP		09 29 26.9	
Sk	iPKP		09 26 38.1	
	iSKP		09 29 44.3	
De	i(PKP)		09 26 38.0	
	iPKP		09 26 51.3	
	iSKP		09 30 03.2	

New Hebrides Islands
(h = 190 km).

" 10 Up i(P) 11 38 38.8

" 10 De iP 14 49 08.5

" 10

Ki	iP		18 18 14.3
	iS		18 20 11.2
	iLgl		18 21 11.8
Sk	iP		18 19 13.5
	i		18 20 00.1
	iLgl		18 23 14.0
Um	iP		18 19 08.6
	iSS		18 22 01.7
	iLgl		18 23 09.7
De	iP		18 20 37.4

Svalbard (h = N).
The clear Lgl (Ki,Sk,Um) are remarkable, considering that the paths are almost tangential to the continental border.

1969
Nov. 10

Up	iP		19 24 10.2
	ipP		19 24 21.0
Ki	iP		19 23 24.3

Kurile Islands.
h = 40 km (Up).

" 11

Up	iP		00 37 32.6
Ki	iP		00 38 06.7
	i		00 39 56.1

Iran (h = N).

" 11 Ki iP 00 51 35.1
Aleutian Islands
(h = 45 km).

" 11 Um iP 01 08 49.7

" 11

Up	iP		01 47 26.7
Ki	iP		01 46 33.4	C

Aleutian Islands
(h = 45 km).

" 11

Up	iP		06 00 02.7	C
Ki	iP		05 59 56.6	
Sk	iP		06 00 19.4	
Um	iP		05 59 48.7	C

India (h = N).

" 11 Up iP 11 48 18.4

" 11

Ki	iP		12 24 39.4
Ud	iP		12 25 30.6	C

Kurile Islands (h = 60 km).

" 11

Up	iPKP		15 42 30.5
Ki	ePKP		15 42 22
Sk	iPKP		15 42 32.7
Um	iPKP		15 42 27.1	D
Ud	ePKP		15 42 36
De	iPKP		15 42 41.5	D

New Britain (h = 70 km).

" 11

Ki	iP		16 18 08.7
			micr	sec
	Mx	N	1.0	1.5

Luzon (h = 30 km).

" 11 Um iP 22 48 18.2

" 12 De iPKP 01 09 23.4
Fiji Islands (h = 610 km).

" 12 Up iP 01 38 06.0
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.	12	(cont.)				
		Ki	iP		01 37 21.0	
		Um	iP		01 37 41.2	
		Ud	iP		01 38 11.9	C
		Kurile Islands (h = N).				
"	12	Ki	iPn		11 04 15.2	
			iSn		11 05 12.6	
			iLgl		11 05 35.8	
			D = 540 km = 4.9°.			
		Sk	iSg		11 08 08.7	
		Um	iSg		11 06 26.3	
		Northwest Russia, 67.4°N, 33.2°E.				
		Origin time = 11 02 59.				
		Explosion?				
"	12	Up	iP		12 40 47.1	C
			ipP		12 40 54.2	
					micr sec	
			P	Z'	0.2 0.7	
		Ki	iP		12 40 03.1	C
			ipP		12 40 09.6	
					micr sec	
			P	Z'	0.1 1.0	
		Sk	iP		12 40 38.1	C
		Um	iP		12 40 22.8	C
			ipP		12 40 29.6	
		Ud	iP		12 40 53.7	
			i		12 41 04.4	
		De	iP		12 41 10.4	
		Japan. h = 25 km (Up,Ki,Um).				
		m = 6.2 (Up,Ki).				
"	12	Up	iP		14 56 57.7	
"	12	Up	iP		18 34 56.1	
		Ki	iP		18 34 17.1	
		Um	iP		18 34 34.5	C
		Ud	iP		18 35 03.4	
			i		18 35 29.5	
		Japan (h = 70 km).				
"	12	Up	iP		19 19 53.0	C
					micr sec	
			P	Z'	0.1 1.0	
			Mx	E	1.8 19	
			Mx	N	2.2 18	
			Mx	Z	2.6 20	
		Ki	iP		19 18 58.6	
			iPcP		19 19 46.8	
					micr sec	
			P	Z'	0.2 1.5	
			Mx	E	2.5 23	
		(cont.)				

1969 Nov.	12	(cont.)				
		Ki			micr sec	
			Mx	N	2.3 20	
			Mx	Z	3.8 20	
		Sk	iP		19 19 30.2	
			i(PcP)		19 20 04.6	
		Um	iP		19 19 25.8	C
			iS		19 27 51	
		Ud	iP		19 19 51.4	C
		De	iP		19 20 14.3	C
		Aleutian Islands (h = 50 km).				
		m = 6.0, M = 5.6 (Up,Ki).				
"	12	Up	iP		19 20 20.7	
		Ki	iP		19 19 25.9	
		Um	iP		19 19 53.0	
		Aleutian Islands.				
		Origin time = 19 09 29.				
"	12	Ud	iP		23 58 32.7	
"	13	Um	iSKP		05 19 38.5	
		Ud	iPKP		05 16 58.5	
			iSKP		05 19 50.0	
		Tonga-Kermadec Islands (h = 540 km).				
"	13	Up			---	
					micr sec	
			Mx	E	1.5 20	
			Mx	Z	1.7 18	
		Um	i(S)		08 19 05	
			iPS		08 20 59	
			iSS		08 27 13	
		Chile (h = N).				
"	13	Um	iP		12 15 33.2	
"	13	Up	iP		14 02 02.6	
"	13	Ki	eP		21 20 22	
			i		21 20 29.2	
"	14	Um	iP		06 53 18.6	
		Italy (h = 15 km).				
"	14	Ud	iP		07 04 44.8	
		Colombia (h = 50 km).				
"	14	Up	iPKP		07 56 36.8	
		Ki	iPKP		07 56 31.8	
			iSKP		07 59 38.6	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Nov. 14 (cont.)

Ki		micr	sec
	SKP Z'	0.7	1.6
Sk	eSKP	07 59	55
Um	iPKP	07 56	37.8
	ipPKP	07 57	36.1
	iSKP	07 59	51.4
Ud	iPKP	07 56	37.7
	iSKP	08 00	04.1
De	iPKP	07 56	49.6

Tonga Islands.
h = 230 km (Um).

" 14	Um	iP	09 48 44.5
	Ud	iP	09 48 58.7
		i	09 49 06.6
	De	iP	09 48 56.9

Afghanistan-USSR.

" 14	Ki	iPn	12 18 01.7
		iSn	12 19 00.0
		iLgl	12 19 19.4
		D = 530 km = 4.8°.	
	Sk	eSg	12 21 49
	Um	iSg	12 20 08.1

Northwest Russia,
67.2°N, 32.9°E.
Origin time = 12 16 47.
Explosion?

" 14	Up	iSg	15 48 44.3
	Sk	iSg	15 48 40.8
	Ud	ePg	15 46 47
		iSg	15 47 45.3

Off southwest coast of
Norway, 58.1°N, 6.0°E.
Origin time = 15 45 20.

" 14	Up	iP	16 08 54.9
		i	16 09 46.3
" 14	Ud	iP	21 35 43.4
" 15	Up	iSn	00 07 12.8
		iLgl	00 08 03.6
	Ki	iSg	00 06 53.0
		i	00 06 56.2
	Sk	iS^x	00 05 45.2
		iSg	00 05 51.5
	Um	i	00 06 48.7
		iSg	00 07 25.4
	Ud	iPg	00 05 42.7
		iSn	00 06 32.6

(cont.)

1969
Nov. 15 (cont.)

Ud	iS^x	00 06 59.9	
	i(Sg)	00 07 30.2	
De	iLgl	00 09 01.4	
	iSg	00 09 26.3	

Norwegian Sea, near
66 1/2°N, 3 1/2°E.
Origin time = 00 03 16.

" 15	Up	iP	02 59 48.6
	Sk	iP	03 00 33.0
	Um	i(P)	03 00 25.5
	Ud	iP	03 00 00.5 D

Turkey (h = 6 km).

" 15	Um	iP	03 41 16.4
	Ud	iP	03 41 30.6
" 15	Up	iPn	09 18 23.9
		iPg	09 18 25.4
		iSg	09 18 45.0
		iRg	09 18 48.7
	Ud	iPn	09 18 50.5
		iSn	09 19 31.0
		iSg	09 19 45.5
	De	iSg	09 20 42.9

Gulf of Bothnia,
60.3°N, 20.4°E.
Origin time = 09 17 56.
Underwater explosion.

" 15	Up	iPg	09 18 33.6
		iSg	09 18 54.4
		iRg	09 18 57.0
	Sk	i	09 20 19.6
	Um	i	09 19 27.3
	Ud	iPn	09 18 57.8
		iSn	09 19 38.3
		iSg	09 19 54.0
	De	iSg	09 20 50.4

Gulf of Bothnia,
60.3°N, 20.4°E.
Origin time = 09 18 04.
Underwater explosion.
It appears likely that the
readings at Sk and Um
belong to a different event.

" 16	Up	iP	00 06 33.4 C
	Ki	iP	00 07 10.1 C
	Sk	iP	00 07 07.6
	Um	iP	00 06 47.1
	Ud	iP	00 06 48.5
	De	iP	00 06 32.0

Iran (h = 40 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.	16	Up	iP	09 38 12.9	
		Greece-Albania.			
"	16	Up	iP	10 42 34.7	
			i	10 42 41.2	
		Ki	iP	10 42 30.9	
		Sk	eP	10 42 22	
		Um	iP	10 42 37.4	
		El Salvador (h = 80 km).			
"	16	Up	iP	14 31 40.8	
		Aleutian Islands (h = 30 km).			
"	16	Ki	iPKP	16 39 37.8	C
			i	16 39 45.2	
				micr sec	
			PKP Z'	0.1 1.0	
		Um	iPKP2	16 40 06.8	
		New Zealand (h = N).			
"	16	Ki	iP	20 06 18.2	
		Alaska (h = 30 km).			
"	16	Sk	iP	20 07 58.5	
		Ud	iP	20 08 11.5	C
"	16	Up	iP	20 50 32.1	
"	17	Up	iPKP	01 02 21.1	D
			i	01 02 24.1	
				micr sec	
			PKP Z'	0.3 0.7	
		Ki	iPKP	01 02 04.5	
		Sk	iPKP	01 02 14.5	D
		Um	iPKP	01 02 08.7	D
			i	01 02 15.1	
		Ud	iPKP	01 02 22.8	
			i	01 02 26.9	
		De	iPKP	01 02 31.3	
			i	01 02 40.9	
		Kermadec Islands (h = 340 km). The dilatational motion of PKP is preceded by a small compression at Ud.			
"	17	Up	iP	05 33 41.2	
		Ki	eP	05 33 24	
		Ud	iP	05 33 51.0	
		Leyte (h = 80 km).			
"	17	Ki	iPn	12 09 06.7	
		(cont.)			

1969 Nov.	17	(cont.)			
		Ki	iSn	12 09 53.7	
			iLgl	12 10 06.3	
			D = 430 km = 3.9°.		
		Sk	iLgl	12 12 56.4	
		Um	eSg	12 11 45	
		Ud	iLgl	12 14 10.7	
		Northwest Russia, 69.3°N, 30.6°E. Origin time = 12 08 04. Explosion? This event is especially strong in this series from NW Russia.			
"	17	Ki	iP	13 02 02.4	
				micr sec	
			Mx E	0.7 17	
			Mx N	0.5 15	
			Mx Z	0.7 15	
		Ud	iP	13 03 02.1	
		Kurile Islands (h = 40 km).			
"	17	Up	iP	15 36 39.5	
		Ud	iP	15 36 43.4	
"	17	Ki	eP	18 07 06	
		Ud	iP	18 07 58.2	
		Kurile Islands (h = 60 km).			
"	17	Ki	iP	19 01 04.7	
		Ud	iP	19 02 00.0	
		Aleutian Islands (h = 40 km).			
"	17	Up	iP	21 36 15.3	
		Ki	iP	21 36 13.3	C
			i	21 36 20.3	
		Sk	iP	21 36 36.5	
		Um	iP	21 36 07.7	C
		Ud	iP	21 36 31.9	C
		De	iP	21 36 32.4	C
		Sinkiang (h = 70 km).			
"	17	Up	iP	22 39 39.2	
		Ki	iP	22 38 54.3	
		Ud	iP	22 39 45.8	C
		De	iP	22 40 03.8	
		Kurile Islands (h = 50 km).			
"	17	Um	eP	23 32 33	
		Ud	iP	23 32 55.2	
"	18	Ki	iP	13 18 29.2	
		Aegean Sea.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.	18	Sk	iP	14 04 54.8	
		Um	iP	14 05 10.7	
		Ud	iP	14 05 03.8	
		Mexico (h = 160 km).			
"	18	Ud	iPKP	21 05 06.1	
		De	iPKP	21 05 16.4	
			i	21 05 26.5	
		Tonga Islands (h = N).			
"	19	Up	iSg	08 17 54.9	
		Sk	iPg	08 15 48.2	
			iSg	08 16 40.5	
			i	08 16 47.2	
		Um	iSg	08 18 35.2	
		Ud	iPg	08 15 54.9	
			iS^{x}	08 16 38.8	
			iSg	08 16 52.3	
		West coast of Norway, 61.4°N, 5.4°E.			
		Origin time = 08 14 32.			
		Readings at Bergen incorporated in the solution.			
"	19	Ud	i(Sg)	08 50 00.5	
"	19	Up	iP	08 55 06.7	C
			i	08 55 12.8	
			iPP	08 57 38.4	
				micr sec	
			P Z'	0.1 0.9	
		Ki	iP	08 54 27.7	
			iPP	08 56 41.6	
				micr sec	
			P Z'	0.1 0.9	
		Sk	iP	08 55 01.8	
			iPP	08 57 30.3	
		Um	iP	08 54 44.4	C
			i	08 55 37.7	
		Ud	iP	08 55 14.4	
			i	08 55 21.6	
		Sea of Japan (h = 420 km).			
		m = 5.3 (Up,Ki).			
"	19	Up	iP	13 24 15.8	
		Ki	iP	13 24 16.6	
		Um	iP	13 24 13.2	
		Ud	iP	13 24 26.0	
		Sumatra (h = 30 km).			
"	20	Ki	iP	03 54 20.2	
		Banda Sea (h = 630 km).			
"	20	Up	iP	13 24 16.8	

1969 Nov.	20	De	iP	13 29 48.9	D
"	20	Up	iP	20 09 38.9	
			i	20 10 26.7	
"	20	Up	iP	21 11 31.3	
			ipP	21 11 43.1	
				micr sec	
			P Z'	0.1 0.7	
			Mx Z	2.0 16	
		Ki	iP	21 10 46.8	
			ipP	21 10 59.3	
				micr sec	
			P Z'	0.1 1.0	
			Mx E	1.7 19	
			Mx N	1.4 18	
			Mx Z	1.8 15	
		Sk	iP	21 11 22.2	
		Um	iP	21 11 07.2	
			ipP	21 11 19.3	
		Ud	iP	21 11 37.8	
			ipP	21 11 49.6	
		De	iP	21 11 57.6	
		Kurile Islands. h = 45 km (Up,Ki,Um,Ud).			
		m = 6.0 (Up,Ki).			
"	20	Ki	iP	21 39 58.2	
		Um	iP	21 40 34.2	
		Ud	eP	21 40 57	
"	20	Up	iP1	23 56 40.2	
			iP2	23 56 45.1	
			iS	00 05 21	
				micr sec	
			P2 Z'	0.1 0.6	
			Mx E	2.0 18	
			Mx N	2.2 16	
			Mx Z	2.7 17	
			D = 7100 km = 64°.		
		Ki	i(P)	23 55 43.8	
			iP1	23 55 47.2	
			iP2	23 55 51.3	
				micr sec	
			P2 Z'	0.3 1.2	
			Mx E	3.0 23	
			Mx N	2.0 20	
			Mx Z	4.3 23	
		Sk	iP1	23 56 13.8	
			iP2	23 56 18.4	
		Um	iP1	23 56 14.7	
			iP2	23 56 18.2	
			i	23 56 23.7	
			iS	00 04 27	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Nov. 20 (cont.)

Um	iSS	00 08 35	
Ud	iP1	23 56 37.6	
	iP2	23 56 43.7	
De	iP1	23 57 02.1	
	i	23 57 16.1	

Kodiak Island (h = N).
m = 6.2, M = 5.5 (Up,Ki).
Double P, P1 and P2, 4.6 sec apart in average, P2 bigger than P1.

" 21

Up	iP		00 24 43.6	
	i		00 24 52.7	
Ki	iP		00 23 49.5	C
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		00 24 16.3	C
Um	iP		00 24 17.2	C
Ud	iP		00 24 40.7	

Kodiak Island (h = N).

" 21

Up	iP		00 40 23.6	C
	i		00 40 30.7	
Ki	iP		00 39 29.7	C
	i		00 39 36.7	
			micr	sec
	P	Z'	0.1	0.9
Sk	iP		00 39 56.0	
Um	iP		00 39 57.8	
	i		00 40 04.7	
Ud	iP		00 40 20.7	
	i		00 40 25.9	

Kodiak Island (h = 10 km).
Double P.

" 21

Up	iP		02 17 52.4	
	i		02 18 00.0	
	iS		02 27 55	
			micr	sec
	P	E	3.0	5
	P	N	1.2	5
	P	Z	15	7
	P	Z'	1.6	1.0
	S	E	60	15
	S	N	130	17
	Mx	E	250	20
	Mx	N	600	22
	Mx	Z	260	22

D = 9100 km = 82°.

Ki	iP		02 17 56.1	C
	i		02 18 04.4	
	iPP		02 21 01	
	iS		02 28 03	

(cont.)

1969
Nov. 21 (cont.)

Ki			micr	sec
	P	E	11	9
	P	N	4.3	7
	P	Z	26	9
	P	Z'	2.4	1.0
	PP	E	11	8
	S	E	60	10
	S	N	73	11
	Mx	E	200	16
	Mx	N	310	20
	Mx	Z	230	16

D = 9150 km = 82 1/2°.

Sk	iP	02 18 09.2	C
	i	02 18 17.9	
Um	iP	02 17 50.4	
	i	02 18 05.7	
	iPP	02 20 59	
Ud	iP	02 18 03.8	
	i	02 18 11.4	
De	iP	02 18 01.0	
	i	02 18 03.3	

Sumatra (h = 20 km).
m = 7.5, M = 7.8 (Up,Ki).
A strong onset follows the first P after 8.1 sec in average (Up,Ki,Sk,Ud), either a double P or a pP, in the latter case the depth becomes 30 km. This is the third largest shock in 1969, the other two being Feb. 28, Atlantic Ocean, M = 7.9, and Aug. 11, Kurile Islands, M = 8.1.

" 21

Um	iP	02 41 44.0
Ud	iP	02 41 54.4

Sumatra (h = N).

" 21

Up	iP		02 43 17.9	
Ki	iP		02 42 23.8	
			micr	sec
	P	Z'	0.1	0.9
Sk	iP		02 42 51.4	

Kodiak Island (h = 35 km).

" 21

Up	iP		08 23 31.4	
Ki	iP		08 22 46.2	
			micr	sec
	P	Z'	0.1	1.0
Sk	iP		08 23 25.4	
Um	iP		08 23 06.2	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.					
	21	(cont.)			
		Ud	iP	08 23 36.9	
			ipP	08 23 46.8	
		Kurile Islands.			
		h = 35 km (Ud).			
"	21	Ud	iP	08 26 56.8	D
			i	08 27 08.7	
"	21	Up	iP	09 08 20.0	
		Ki	iP	09 07 35.1	C
		Um	iP	09 07 55.4	
		Ud	iP	09 08 26.1	
			ipP	09 08 37.6	
		Kurile Islands.			
		h = 45 km (Ud).			
"	21	Up	iP	11 31 43.5	
		Ki	eP	11 30 57	
		Ud	iP	11 31 49.0	
		Kurile Islands (h = N).			
"	21	Ud	iP	15 03 40.7	
		Nevada.			
		Underground explosion.			
"	21	Up	iP	21 42 20.9	
"	22	Up	iPKP	05 20 12.9	C
				micr sec	
			PKP Z'	0.2 0.6	
		Ki	iPKP	05 19 55.1	
		Sk	iPKP	05 20 04.5	C
		Um	iPKP	05 20 00.2	C
			i	05 20 02.1	
		Ud	iPKP	05 20 14.4	C
		De	iPKP	05 20 23.9	C
			i	05 20 30.7	
		Kermadec Islands (h = 70 km).			
"	22	Ud	iP	05 40 32.2	
"	22	Ki	iP	06 29 08.5	
		Ud	iP	06 30 00.0	
		Kurile Islands.			
"	22	Up	iP	06 50 02.7	
		Ud	iP	06 50 08.8	
		Kurile Islands.			
"	22	Up	iP	11 34 10.0	
		Ki	iP	11 33 21.0	
		Um	iP	11 33 43.9	C
		Ud	iP	11 34 15.2	
		(cont.)			

1969 Nov.					
	22	(cont.)			
		Ud	ipP	11 34 28.0	
		De	iP	11 34 35.1	
		Kurile Islands.			
		h = 45 km (Ud).			
"	22	Ki	iP	14 22 55.6	
		Sk	iP	14 23 22.8	
		Um	iP	14 23 22.2	
		Ud	iP	14 23 47.2	
		De	iP	14 24 10.1	
		Kodiak Island (h = 25 km).			
"	22	Ki	iP	15 15 43.1	
		Um	iP	15 15 47.7	C
		Ud	iP	15 16 05.1	
		Banda Sea (h = 330 km).			
"	22	Ki	eP	15 34 55	
"	22	Ud	iP	15 44 56.8	
"	22	Up	iP	17 01 32.3	C
"	22	Up	iPKP	19 47 10.3	
		Um	iPKP	19 47 07.7	
		Ud	iPKP	19 47 08.8	
		De	iPKP	19 47 20.3	C
		Tonga Islands (h = N).			
"	22	Up	iP	20 39 33.9	
		Sk	iP	20 40 17.8	
		Um	iP	20 40 17.2	
		Ud	iP	20 39 45.0	
		Greece (h = 60 km).			
"	22	Up	iP	23 19 38.2	C
			i	23 19 44.6	
			iPa	23 23 20	
			iS	23 27 51	
			iP'P'	23 49 04.2	
				micr sec	
			P E	7.3 10	
			P N	17 9	
			P Z	25 8	
			P Z'	4.2 1.5	
			S E	36 13	
			Mx E	350 21	
			Mx N	350 22	
			Mx Z	220 20	
			D = 6600 km = 59 1/2°.		
		Ki	iP	23 18 41.9	C
			iS	23 26 07	
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Nov. 22 (cont.)

Ki			micr	sec
	P	E	4.1	9
	P	N	10	9
	P	Z	21	9
	P	Z'	1.4	1.0
	S	E	91	16
	Mx	E	340	20
	Mx	N	360	20
	Mx	Z	230	19

D = 5700 km = 51 1/2°.

Sk	iP	23 19 20.5	C
Um	iP	23 19 09.6	C
	iPP	23 21 19	
	iS	23 26 57	
	iP'P'	23 49 09.6	
Ud	iP	23 19 40.1	
	i	23 19 42.1	
De	iP	23 20 04.6	C

Kamchatka (h = N).
m = 7.2, M = 7.6 (Up,Ki).

" 23	Up	iP	00 03 48.5	C
	Ud	iP	00 03 56.0	

Kamchatka (h = N).

" 23	Up	iP	00 58 45.3	
	Ki	iP	00 57 48.9	C
	Sk	iP	00 58 27.1	
	Ud	iP	00 58 48.2	

Kamchatka (h = 30 km).

" 23	Up	iPKP	04 28 50.5	
			micr	sec
		PKP Z'	0.1	1.0
	Ud	iPKP	04 28 52.2	
		i	04 28 59.5	
	De	iPKP	04 29 02.0	

Tonga-Kermadec Islands
(h = 50 km).

" 23	Up	iP	07 19 48.2	
	Ki	iP	07 19 02.9	
			micr	sec
		Mx E	1.1	20
		Mx N	0.8	19
		Mx Z	0.9	17
	Um	iP	07 19 23.3	
	Ud	iP	07 19 54.8	

Kurile Islands
(h = 45 km).

" 23	Ki	eP	11 47 50	
	Um	iP	11 47 19.2	
	Ud	iP	11 47 26.3	

Iran-USSR (h = 40 km).

1969
Nov. 23

Up	iP	11 48 15.9		
Ki	iP	11 48 49.5		
		micr	sec	
	P Z'	0.1	1.5	
	Mx E	0.7	12	
	Mx N	0.8	14	
	Mx Z	0.6	12	
Sk	iP	11 48 53.0		
Um	iP	11 48 18.6		

Iran-USSR.
Origin time = 11 41 44.5.

" 23	Ud	iP	14 01 32.2	C
" 23	Ud	iP	21 52 58.5	
" 24	Up	iP	02 11 16.5	
	Ki	iP	02 11 09.5	
	Ud	iP	02 11 30.7	

Tibet (h = 10 km).

" 24	Up	iP	03 06 08.4	
" 24	Up	iPKP	04 50 26.2	

South Atlantic Ocean
(h = N).

" 24	Ud	iP	11 43 04.5	
" 24	Ud	iP	15 51 03.7	
		i	15 51 22.0	

Iran-USSR (h = 50 km).

" 24	Up	iP	17 30 50.2	D
		i	17 30 51.1	
		ipP	17 31 18.5	
		iPP	17 32 30	
		ipPP	17 32 57	
		iS	17 36 50	
			micr	sec
		P Z'	0.7	0.5
		S N	0.8	4
		Mx E	1.7	13
		Mx N	1.9	16
		Mx Z	2.6	14

D = 4600 km = 41 1/2°.

	Ki	iP	17 30 57.4	
		ipP	17 31 25.9	
		isP	17 31 39	
		iPa	17 32 57	
		iS	17 36 55	
			micr	sec
		P Z'	1.0	1.0
		S E	1.1	5
		S N	0.8	5

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Nov. 24 (cont.)

Ki			micr	sec
	Mx	E	2.7	10
	Mx	N	2.1	8
	Mx	Z	2.1	10

D = 4650 km = 42°.

Sk	iP	17 31 14.9
	i	17 31 16.0
	ipPP	17 33 33.2
Um	iP	17 30 47.5
	i	17 30 48.3
	i	17 31 10.4
	iScP	17 36 25
	iS	17 36 47
	i	17 39 11
	iSS	17 39 45
Ud	iP	17 31 06.7
	i	17 31 07.8
	ipP	17 31 35.1
De	iP	17 31 04.4
	ipP	17 31 31.8

Pamir. h = 140 km (Up,Ki, Ud,De).
m = 6.2, M = 5.4 (Up,Ki). M uncorrected for focal depth. Double P, small and large, separated by 1.0 sec in average (Up, Sk,Um,Ud).

" 24	Up	iP		21 21 11.8
	Ki	iP		21 20 46.0
			micr	sec
		P Z'	0.1	1.0
	Sk	iP		21 20 36.5
	Um	iP		21 21 02.4
		i		21 21 11.6
	Ud	iP		21 20 57.2
	De	iP		21 21 16.0

Davis Strait (h = N).

" 24	Ud	iP	21 29 33.7
" 24	Ud	iP	21 34 33.6
" 24	Up	iPKP	21 49 25.5
		iSKP	21 52 11.5
	Ki	iPKP	21 49 18.1
		iSKP	21 51 46.1
			micr sec
		PKP Z'	0.2 1.2
		SKP Z'	0.5 1.8
	Sk	iPKP	21 49 28.0
		iSKP	21 52 03.2

(cont.)

1969
Nov. 24 (cont.)

Um	iPKP	21 49 24.5
	iSKP	21 51 59.1
Ud	iPKP	21 49 24.3 C
	iPKP	21 49 34.1
	iSKP	21 52 12.9
De	iPKP	21 49 33.6

Fiji Islands (h = 590 km). All reported PKP phases are very sharp and clear, but obviously they belong to two different branches, one comprising Ki,Um,Sk,Ud (second PKP), the other Up, Ud (first PKP), De.

" 24	Sk	iP	22 19 42.1
	Ud	iP	22 19 50.8 C
	De	iP	22 19 59.4
" 24	Ud	iP	22 22 21.3 C

Hindu Kush.

" 24	Ud	iP	22 49 38.1
" 24	Up	iP	23 02 22.1
		ipP	23 02 30.0
		iS	23 10 55
			micr sec
		P Z	0.6 4
		P Z'	0.1 0.5
		S N	1.8 5
		S Z	1.3 6
		Mx E	2.4 18
		Mx N	2.7 19
		Mx Z	3.0 19

D = 7100 km = 64°.

	Ki	iP	23 01 27.7 C
		iPP	23 03 36
		iS	23 09 18
			micr sec
		P N	0.6 6
		P Z	1.2 6
		P Z'	0.3 1.1
		PP N	0.5 6
		S E	1.5 8
		S N	2.0 8
		S Z	0.8 6
		Mx E	3.2 22
		Mx N	2.8 22
		Mx Z	3.9 22

D = 6200 km = 56°.

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Nov. 24 (cont.)

Sk	iP	23 01 55.0	
Um	iP	23 01 56.3	C
	iS	23 10 11	
Ud	iP	23 02 18.8	
	ipP	23 02 27.0	
De	iP	23 02 43.1	

Kodiak Island. h = 30 km (Up,Ud).
m = 6.2, M = 5.5 (Up,Ki).

" 25 Ud iPKP 01 51 10.9
Fiji Islands (h = 590 km).

" 25

Up	iPKP		05 07 24.2	
	i		05 07 33.8	
			micr	sec
	PKP	Z'	0.2	0.6
Ki	iPKP		05 07 04.3	
	i		05 07 10.5	
Sk	iPKP		05 07 17.3	
Um	iPKP		05 07 12.3	
	i		05 07 19.5	
Ud	iPKP		05 07 26.4	
	i		05 07 36.5	
De	iPKP		05 07 34.8	C
	i		05 07 44.9	

Kermadec Islands (h = 30 km).
The time difference between the two phases reported shows a steady increase with epicentral distance, corresponding to different PKP-branches.

" 25

Sk	iPKP		08 53 59.2
Um	iPKP		08 53 54.7
Ud	iPKP		08 54 08.1

" 25 Ud eP 09 04 29

" 25

Up	iP		09 22 30.7
Ud	iP		09 22 49.7 C

Iran-USSR (h = N).

" 25 Ud iP 13 59 07.8

" 25

Up	iP		19 44 03.3	
Ki	iP		19 43 17.5	
			micr	sec
	P	Z'	0.1	1.0
Um	iP		19 43 38.5	
Ud	iP		19 44 09.6	

Kurile Islands (h = N).

1969
Nov. 25

Up	iP		21 23 16.4 C
Ud	iP		21 23 16.5

Aleutian Islands (h = 35 km).

" 25 Ud iP 21 27 52.5

" 26

Up	iPKP		00 01 39.0	
	i		00 01 51.2	
Ki	iPKP		00 01 20.5	
			micr	sec
	PKP	Z'	0.1	1.3
Sk	iPKP		00 01 35.1	C
	i		00 01 44.2	
Um	iPKP		00 01 30.1	C
	i		00 01 37.1	
Ud	iPKP		00 01 41.5	

New Zealand (h = 200 km).
Same remark applicable as for Nov. 25, 05 07 (Up, Sk,Um).

" 26 Ud iP 03 10 28.0
Aleutian Islands (h = 45 km).

" 26 Ud iP 09 18 04.6

" 26

Up			---	
			micr	sec
	Mx	E	1.0	21
	Mx	N	1.8	22
	Mx	Z	2.0	21
Ki	iPKP		13 03 01.5	
			micr	sec
	Mx	E	1.8	22
	Mx	N	1.3	20
	Mx	Z	2.1	21
Sk	ePKP		13 03 19	
Um	iPKP		13 03 15.6	
	ePKS		13 06 30	
Ud	ePKP		13 03 20	

New Hebrides Islands (h = 30 km).
M = 5.8 (Up,Ki).

" 26

Ki	ePKP		14 46 16
Sk	ePKP		14 46 30
Ud	iPKP		14 46 31.8

New Hebrides Islands (h = 35 km).

" 26 Ki iPKP 14 55 58.4
New Hebrides Islands (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.	26	Ud	iP	16 24 38.4		
"	26	Ki	iP	16 52 58.3		
		Alaska (h = 130 km).				
"	26	Up	iPKP	18 34 08.8		
		South Sandwich Islands (h = N).				
"	26	Up	iPKP	18 45 01.6		
				micr	sec	
			Mx	E	1.0	18
			Mx	N	2.6	21
			Mx	Z	2.6	20
		Ki	iPKP	18 45 29.0		
				micr	sec	
			Mx	E	1.1	17
			Mx	N	2.0	20
			Mx	Z	3.2	20
		Um	iPKP	18 45 18.4		
			iSS	19 04 09		
		Ud	iPKP	18 45 00.1		
		South Sandwich Islands (h = N).				
		M = 6.0 (Up,Ki).				
"	26	Ud	iP	20 58 24.0		
"	26	Ki	iPKP	21 36 57.5		
		New Hebrides Islands (h = 15 km).				
"	27	Ud	iPn	01 03 35.9		
			iPg	01 03 41.4		
			iSg	01 04 07.4		
			D = 220 km = 2.0°.			
		Origin time = 01 03 01.				
"	27	Up	iPKP	03 26 45.9		
		Ki	iPKP	03 26 31.6		
		Sk	iPKP	03 26 42.1		
		Um	iPKP	03 26 38.1		
		Ud	iPKP	03 26 48.6		
		De	iPKP	03 26 49.0		
		New Hebrides Islands (h = 140 km).				
"	27	De	iP	11 49 52.6		
"	27	Um	iP	12 31 59.0	C	
"	27	Ki	iPKP	20 14 11.9		
		Sk	iPKP	20 14 22.7		
		(cont.)				

1969 Nov.	27	(cont.)				
		Um	iPKP	20 14 17.1		
		New Hebrides Islands (h = 30 km).				
"	27	Up	iP	21 09 53.9		
		Ki	iP	21 09 22.8		
		Um	iP	21 09 36.1		
		Ud	iP	21 10 00.6		
"	28	Ki	iP	01 36 10.1		
			i	01 36 14.0		
		Ud	iP	01 35 44.5		
		De	iP	01 35 26.2		
		Iran-Iraq (h = 15 km).				
"	28	Ki	iPn	12 44 18.5		
			iSn	12 45 15.7		
			iLgl	12 45 36.6		
			D = 530 km = 4.8°.			
		Sk	i(Sg)	12 48 08.6		
		Um	iSg	12 46 32.2		
		Northwest Russia, 67.5°N, 33.1°E.				
		Origin time = 12 43 04.				
		Explosion?				
"	28	Up	iP	13 58 50.6		
"	28	Up	iPKP	15 07 11.1		
				micr	sec	
			PKP	Z'	0.1	0.6
		Ki	iPKP	15 06 58.9		
		Ud	iPKP	15 07 13.1		
		De	iPKP	15 07 22.3		
		Tonga-Kermadec Islands (h = 380 km).				
"	28	De	iP	19 59 38.5	C	
"	28	Um	iP	20 30 38.6		
		Ud	iP	20 31 10.9		
		Japan (h = 60 km).				
"	29	Up	iP	16 22 21.8		
			ipP	16 22 35.7		
		Ki	iP	16 21 32.5		
				micr	sec	
			P	Z'	0.1	1.0
		Um	iP	16 21 55.3		
			ipP	16 22 08.4		
		Ud	iP	16 22 26.3	C	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Nov.	29	(cont.)			
		Ud	ipP	16 22 40.4	
		Kurile Islands. h = 50 km (Up,Um,Ud).			
"	29	Up	iP	16 54 44.9	
		Um	iP	16 54 23.4	
		Ud	iP	16 54 48.0	
		Japan (h = 50 km).			
"	29	Ud	eP	22 47 51	
"	30	Up	iP	03 39 55.1	C
			iLi	03 49 57	
			i	03 50 57	
			iLgl	03 51 29	
				micr sec	
			P Z'	0.8 0.5	
			Mx E	0.7 5	
			Mx N	1.3 4	
			Mx Z	0.9 5	
		Ki	iP	03 39 38.9	C
			iPn	03 40 38.7	
				micr sec	
			P Z'	1.3 0.7	
		Sk	iP	03 40 10.4	C
			iPP	03 41 33.2	
		Um	iP	03 39 40.0	C
			iRg	03 53 01	
		Ud	iP	03 40 11.6	C
		De	iP	03 40 19.5	C
			i	03 41 17.5	
			iPn	03 41 43.6	
		Kazakh SSR. m = 7.0 (Up,Ki). Underground explosion. A Kazakh explosion of the same magnitude was made on January 15, 1965, these two being the largest in this series so far.			
"	30	Up	iP	04 23 45.0	
			i	04 23 58.1	
		Ki	iP	04 23 12.9	
		Sk	eP	04 23 43	
		Um	iP	04 23 22.4	
		Japan (h = 50 km).			
"	30	Up	iPKP	08 00 04.6	
		Chile (h = 140 km).			
"	30	Sk	iP	08 32 07.8	
1969 Nov.	30	Ud	iP	19 18 34.4	
			i	19 18 37.4	

Markus Båth
October 29, 1970

SEISMOLOGICAL INSTITUTE
BOX 517
751 20 UPPSALA 1
SWEDEN

Seismological Institute
Uppsala

S E I S M O L O G I C A L B U L L E T I N

U P P S A L A, K I R U N A, S K A L S T U G A N, U M E Å

U D D E H O L M and D E L A R Y

Uppsala	(Up):	59°51.5'N,	17°37.6'E;	h = 14 m
Kiruna	(Ki):	67°50.4'N,	20°25.0'E;	h = 390 m
Skalstugan	(Sk):	63°34.8'N,	12°16.8'E;	h = 580 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Uddeholm	(Ud):	60°05.4'N,	13°36.4'E;	h = 240 m
Delary	(De):	56°28.2'N,	13°52.2'E;	h = 150 m

D E C E M B E R 1 - 31, 1969

1969					
Dec.	1	Ud	iPKP		02 34 53.7
		De	iPKP		02 35 08.7
		Fiji Islands (h = 600 km).			
"	1	Ud	iP		09 15 04.9
"	1	Up	iSg		12 00 17.3
		Um	iSg		12 00 49.2
		Ud	iLgl		12 01 21.0
		De	eLgl		12 01 46
		Esthonia. Explosion?			
"	1	Ki	iP		13 12 54.3
		Ud	iP		13 12 32.8 C
		De	iP		13 12 16.6 C
		Iran (h = 30 km).			
"	1	Ki	iP		20 07 55.0
		Sk	iP		20 08 23.1
		Kodiak Island (h = N).			
"	1	Up	iP		20 23 27.3
			i		20 23 42.3
					micr sec
			P	Z'	0.1 0.5
		Ki	iP		20 24 36.1 C
					micr sec
			P	Z'	0.1 0.6
		Sk	iP		20 24 06.1 C
		Um	iP		20 24 00.6
			i		20 24 05.4
		Ud	iP		20 23 34.8 C
		De	iP		20 23 02.0
		Crete (h = 50 km).			
		m = 5.8 (Up,Ki).			
"	1	Up	iPKP		20 53 43.8
		(cont.)			

1969					
Dec.	1	(cont.)			
		Sk	iPKP		20 53 48.3
		Ud	ePKP		20 53 44
		South Sandwich Islands			
		(h = 160 km).			
"	1	Up	iP		22 25 06.5
			ipP		22 25 20.8
			iS		22 34 06
					micr sec
			Mx	E	2.0 18
			Mx	N	2.3 19
			Mx	Z	3.0 19
		D = 7850 km = 70 1/2°.			
		Ki	iP		22 25 09.4 C
			ipP		22 25 28.6
					micr sec
			P	Z'	0.1 1.2
			Mx	E	4.6 18
			Mx	N	3.3 19
			Mx	Z	5.1 18
		Sk	iP		22 24 49.0
			ipP		22 25 05.7
		Um	iP		22 25 10.7
			ipP		22 25 27.5
			iS		22 34 24
		Ud	iP		22 24 49.9 C
			ipP		22 25 06.9
		De	iP		22 24 49.4
			ipP		22 25 06.3
		Leeward Islands. h = 60 km			
		(Up,Ki,Sk,Um,Ud,De).			
		M = 5.8 (Up,Ki).			
"	2	Ki	iP		04 21 48.0
		Kamchatka (h = N).			
"	2	Sk	e(Sg)		09 57 09

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Dec.	2	Up	i(P)		14 54 26.3
"	2	Up	iP		18 10 03.3
			ipP		18 10 28.8
			iX		18 10 45.6
			iS		18 20 51
					micr sec
			P	Z'	0.1 0.9
			Mx	E	1.8 19
			Mx	N	2.4 20
			Mx	Z	3.2 20
			D = 10200 km = 92°.		
		Ki	iP		18 09 43.8
			ipP		18 10 10.9
			iX		18 10 26.9
			iS		18 20 17
					micr sec
			P	Z'	0.1 1.1
			S	E	1.8 9
			S	N	1.6 11
			Mx	E	4.3 18
			Mx	N	2.5 18
			Mx	Z	2.4 16
			D = 9800 km = 88°.		
		Sk	iP		18 10 06.5
			ipP		18 10 33.0
		Um	iP		18 09 50.7
			ipP		18 10 17.3
			iSKS		18 20 09
			iS		18 20 26
		Ud	iP		18 10 10.4
			ipP		18 10 35.1
			iX		18 10 53.4
		De	iP		18 10 17.9

Mindanao. h = 100 km (Up,Ki,Sk,Um,Ud).
m = 6.0, M = 5.9 (Up,Ki).
M uncorrected for focal depth. The clear phase marked X (Up,Ki,Ud), in average 42.8 sec after P, is too late to be sP and is probably P of another shock in the same place.

"	2	Ki	iP	18 24 23.7 C
"	2	Up	iP	18 24 23.2
		Ki	iP	18 24 32.7 C
		Um	iP	18 24 21.5
		Ud	iP	18 24 39.3 C

Hindu Kush (h = 210 km).

"	2	Ud	iP	18 27 13.9
1969 Dec.	2	Up	iP	19 13 00.4
		Ud	iP	19 13 12.7

Japan (h = 35 km).

"	2	Ki	iP	22 53 51.3
		Ud	iP	22 53 40.3

Iran (h = N).

"	3	Up	iP	02 40 26.4
			i	02 40 43.3
		Ki	iP	02 40 52.8
		Sk	iP	02 40 56.7
		Ud	iP	02 40 40.9

West Pakistan (h = N).

"	3	Ki	iPn	11 01 36.8
			iSn	11 02 36.2
			iLgl	11 02 54.8
			D = 540 km = 4.9°.	
		Sk	i(Sg)	11 05 31.6

Northwest Russia.
Origin time = 11 00 21.
Explosion?

"	3	Ud	i(Sg)	11 31 14.8
"	3	Up	iP	12 45 09.4
		Ki	iP	12 44 16.9
		Sk	iP	12 44 53.7
		Um	iP	12 44 42.4
		Ud	iP	12 45 13.9
		De	iP	12 45 36.9

Kamchatka (h = 35 km).

"	3	Up	iRg	13 50 13.3
		Ud	iPg	13 49 58.7
			iSg	13 50 18.5
			iRg	13 50 27.5
			D = 170 km = 1.5°.	

Origin time = 13 49 30.
Explosion.

"	3	Ud	iP	16 52 00.1

Hindu Kush (h = 210 km).

"	3	Um	iP	19 44 40.6
			i	19 44 47.1
			i	19 45 47.8
"	4	Up	iP	00 46 22.1 D
			ipP	00 46 46.7
				micr sec
			P	Z' 0.1 0.6

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 4 (cont.)

Ki	iP	00 46 22.2	
Sk	iP	00 46 39.1	
Um	iP	00 46 18.1	D
	ipP	00 46 43.5	
Ud	iP	00 46 34.0	D
	ipP	00 46 58.9	
De	iP	00 46 32.7	

Andaman Islands.
h = 100 km (Up,Um,Ud).

" 4

Up	iP	03 16 22.5	
Ki	iP	03 15 56.9	
Um	iP	03 16 05.8	
Ud	iP	03 16 28.5	

Mariana Islands (h = N).

" 4

Up	iPKP	03 30 32.5	C
Ud	iPKP	03 30 34.9	
De	iPKP	03 30 45.4	

" 4

Ud	iP	03 55 44.3	

" 4

Up	iPKP2	04 57 56.1	
Sk	iPKP	04 57 45.7	
Um	iPKP	04 57 37.4	
Ud	iPKP	04 57 49.9	
De	iPKP2	04 58 13.4	

South of Kermadec Islands
(h = N).

" 4

Up	iP	09 01 37.2	
		micr sec	
	P	Z' 0.2 0.9	
Ki	iP	09 00 54.9	
	i	09 00 59.0	
		micr sec	
	P	Z' 0.2 0.9	
Sk	iP	09 01 28.8	
Um	iP	09 01 13.0	
Ud	iP	09 01 43.1	D
De	iP	09 01 59.9	

Japan (h = 20 km).
m = 6.3 (Up,Ki).

" 5

Up	iPKP2	03 24 09.0	
		micr sec	
	PKP2	Z' 0.1 0.6	
Sk	iPKP	03 24 00.3	
Um	iPKP	03 23 51.9	
Ud	iPKP	03 24 04.6	C
	iPKP2	03 24 12.4	
De	iPKP2	03 24 25.8	

1969
Dec. 5

Sk	iPKP	08 41 28.2	
Um	iPKP	08 41 22.9	
Ud	iPKS	08 45 02.3	

New Hebrides Islands (h = N).

" 5

Ki	iP	10 06 03.8	

" 5

Up	iP	11 47 50.8	
	ipP	11 47 57.5	
Ki	iP	11 48 27.5	
	ipP	11 48 33.2	
Um	iP	11 48 05.3	
Ud	iP	11 48 01.9	
	ipP	11 48 08.7	

Arabian Sea. h = 25 km
(Up,Ki,Ud).

" 5

De	iP	13 29 26.5	

" 5

De	iP	14 39 41.7	

" 5

Ud	iP	17 11 40.5	

Nevada. Underground explosion.

" 5

Up	iPKP	17 58 34.5	
Sk	iPKP	17 58 27.0	
Ud	iPKP	17 58 36.4	D
De	iPKP	17 58 45.6	D

" 5

Ki	iP	18 54 24.5	
Sk	iP	18 54 43.0	
Ud	iP	18 54 36.4	C

Nepal-India (h = N).

" 5

Ud	iP	20 48 24.4	

" 6

Ud	iP	02 54 45.8	

" 6

Ud	iP	02 59 41.9	

" 6

Up	iP	04 40 44.8	
Ki	iP	04 40 48.9	
Sk	iP	04 41 08.9	
Um	iP	04 40 40.6	D
Ud	iP	04 41 01.4	D
De	iP	04 40 59.4	

Tadzhik SSR (h = 130 km).

" 6

Up	iP	06 10 28.0	
Ki	iP	06 09 34.0	
Sk	iP	06 10 03.7	
Um	iP	06 10 01.2	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Dec.	6	(cont.)				
		Ud	iP		06 10 26.8	
		De	iP		06 10 50.2	
		Unimak Island (h = 30 km).				
"	6	Up	iP		07 08 45.3	C
			iPn		07 09 01.9	
			iPP		07 09 25	
			iPPP		07 09 36	
			iSa		07 14 00	
					micr sec	
			P	Z'	0.7 0.9	
			Mx	E	1.4 15	
			Mx	Z	1.8 14	
		Ki	iP		07 09 09.2	C
			iPn		07 09 33.6	
					micr sec	
			P	Z'	0.2 0.9	
			Pn	Z'	0.3 0.9	
			Mx	Z	1.4 10	
		Sk	iP		07 09 17.9	C
			iPn		07 09 45.3	
			iPP		07 10 20.9	
		Um	iP		07 08 49.8	C
			iPn		07 09 06.7	
		Ud	iP		07 09 03.6	C
			iPn		07 09 26.3	
			i		07 09 38.2	
			i		07 09 48.1	
		De	iP		07 08 55.1	C
			iPn		07 09 14.8	
			i		07 09 25.9	
		East of the Caspian Sea.				
		m = 6.2, M = 4.8 (Up,Ki).				
		Underground explosion.				
		Pn is exceptionally strong				
		in this case.				
"	6	Up	iSg		09 29 06.4	
		Ud	i(Pn)		09 27 39.2	
			iSg		09 28 06.6	
		De	iSg		09 28 49.7	
		Oslo Fjord, 59.1°N, 11.0°E.				
		Origin time = 09 27 12.				
"	6	Up	iPKP		15 12 50.8	
		Ki	iPKP		15 13 07.3	
		Um	iPKP		15 13 00.8	
		Ud	iPKP		15 12 51.4	
		South Sandwich Islands				
		(h = N).				
"	6	Up	iP		15 47 15.5	
		(cont.)				

1969 Dec.	6	(cont.)				
		Ki	iP		15 46 40.7	
		Um	iP		15 46 55.3	
		Ud	iP		15 47 22.5	C
		South of Japan (h = 120 km).				
"	6	Ki	iP		15 59 47.8	
		Ud	iP		15 59 43.4	
"	6	Ki	iP		17 24 32.7	
		North Atlantic Ocean (h = N).				
"	6	Ki	iP		20 22 02.8	
			i		20 23 20.5	
			iS		20 23 32.7	
		Sk	iP		20 22 22.9	
			iS		20 24 03.6	
		Um	iP		20 22 38.3	
			iS		20 24 23.7	
			i		20 25 06.0	
		Ud	iP		20 23 10.4	
		Northeast of Jan Mayen.				
		Origin time = 20 20.2.				
"	6	Ud	iP		21 41 33.2	C
"	6	Um	iP		23 01 01.6	
"	6	Ud	i(Sg)		23 43 56.6	
"	7	Up	iP		00 46 38.1	
		Ud	iP		00 46 26.6	
"	7	Up	iPKP		04 14 42.4	
		Ki	iPKP		04 14 28.5	
		Sk	iPKP		04 14 40.1	
		Um	iPKP		04 14 35.2	C
		Ud	iPKP		04 14 44.4	C
		New Hebrides Islands				
		(h = 50 km).				
"	7	Ud	iP		07 41 33.8	
"	7	Ud	iP		09 45 11.0	
"	7	Ki	iP		13 46 31.0	
		Um	iP		13 46 36.3	
		Banda Sea (h = 120 km).				
"	7	Up	iP		21 59 13.6	
			ipP		21 59 20.9	
		Ki	eP		21 58 56	
			ipP		21 59 04.3	
		(cont.)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Dec.	7	(cont.)		
		Ud	iP	21 59 20.7
			ipP	21 59 29.2
		Mindanao. h = 30 km (Up,Ki,Ud).		
"	7	Ud	iP	23 44 44.3
"	8	Ki	eP	05 17 27
		Halmahera (h = 100 km).		
"	8	Up	iP	05 28 35.1
		Ud	iP	05 28 38.3
		Kamchatka (h = 50 km).		
"	8	Ud	eP	06 50 36
"	8	Ud	iPKP	10 34 25.0
		Tonga-Kermadec Islands (h = 550 km).		
"	9	Up	iP	01 29 31.7
"	9	Ki	iP	03 39 06.7
			ipP	03 39 48.8
		Ud	iP	03 39 32.9
			ipP	03 40 15.0
		Molucca Passage. h = 170 km (Ki,Ud).		
"	9	Up	iSg	08 37 00.8
		Um	iLgl	08 37 25.6
			iSg	08 37 32.5
		Ud	eSn	08 37 34
			iLgl	08 38 01.0
		De	eLgl	08 38 28
		Esthonia, 59.7°N, 25.6°E. Origin time = 08 34 50. Explosion?		
"	9	Ud	iP	13 48 41.7
			i	13 48 45.6
		Tadzhik SSR (h = N).		
"	9	Up	iPKP	14 07 36.7
		Um	iPKP	14 07 21.6
		Ud	iPKP	14 07 41.7
		De	iPKP	14 07 58.2
"	9	Ki	iP	19 04 12.1
		Um	iP	19 04 36.5
		Ud	iP	19 05 09.7
		De	iP	19 05 29.7
		Kurile Islands (h = N).		

1969 Dec.	9	Ki	iPKP	19 57 56.9
		Um	iPKP	19 58 07.6
		Ud	iPKP2	19 58 29.7
		South of Kermadec Islands (h = 30 km).		
"	9	Up	iP	20 10 02.4
		Ki	iP	20 09 36.5
		Um	iP	20 09 47.2
		Ud	iP	20 10 08.5
"	9	Ud	iP	21 30 29.3
"	9	Up	iP	22 10 14.2
		Ud	iP	22 10 20.0 C
		De	iP	22 10 38.0
		Kurile Islands (h = N).		
"	10	Ud	iPKP	00 17 59.4
		De	iPKP	00 18 12.0
		Tonga-Kermadec Islands (h = 550 km).		
"	10	Up	iP	05 16 29.1
		Ud	eP	05 16 10
			i	05 16 15.9
"	10	Up	iPKP	13 01 26.4
		Sk	iPKP	13 01 18.2
		Um	iPKP	13 01 13.3 C
			i	13 01 18.1
		Ud	iPKP	13 01 27.4 C
		De	ePKP	13 01 34
		Kermadec Islands (h = 35 km).		
"	10	Up	iP	18 38 27.4
"	10	Up	iPKP	20 13 14.6
			iPKS	20 16 33.3
		Ki	iPKP	20 12 58.8
				micr sec
			PKP Z'	0.1 1.0
			Mx E	3.7 2.0
			Mx N	4.0 22
			Mx Z	7.8 22
		Sk	iPKP	20 13 09.6
		Um	iPKP	20 13 05.1
		Ud	i(PKP)	20 13 12.6
			iPKP	20 13 19.0
			iPKS	20 16 43.2
		De	i(PKP)	20 13 12.0
			iPKP	20 13 23.3
			iPKS	20 16 50.5
			i	20 16 59.8
		New Hebrides Islands (h = 20 km).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 10 Up iPKP 22 11 08.5
iPKS 22 14 36.0
Ki iPKP 22 10 51.6
Sk iPKP 22 11 06.5
i(PKS) 22 14 44.9
Um iPKP 22 11 00.6
Ud iPKP 22 11 10.7
iPKS 22 14 41.7
New Hebrides Islands
(h = 80 km).

" 11 Up iPKP 01 04 48.0
Ki iPKP 01 04 34.1
Um iPKP 01 04 40.3
Ud iPKP 01 04 50.2
iPKS 01 08 22.5
New Hebrides Islands
(h = 45 km).

" 11 Up iP 01 05 14.0
Um iP 01 04 54.8
Ud iP 01 05 21.0 D
De iP 01 05 34.1

" 11 Up iP 11 05 29.3

" 11 Ki iPn 13 13 10.8
iP^{x} 13 13 19.1
iSn 13 13 57.5
iLgl 13 14 09.7
D = 430 km = 3.9°.
Sk eSn 13 16 07
iLgl 13 16 59.1
Um iSn 13 15 11.4
iSg 13 15 49.7
Northwest Russia,
69.5°N, 30.4°E.
Origin time = 13 12 08.
Explosion?

" 11 Um iP 22 54 16.1
Ud iP 22 54 12.8

" 12 Um iSS 01 10 20
iSSS 01 17 30
South Pacific Ocean
(h = N).

" 12 Up iP 01 24 29.5
ipP 01 24 38.4
micr sec
P Z' 0.1 0.9
Mx E 2.7 20
(cont.)

1969
Dec. 12 (cont.)
Up micr sec
Mx N 2.2 18
Mx Z 2.4 19
Ki iP 01 23 47.7
micr sec
Mx E 3.7 20
Mx N 2.5 18
Mx Z 3.6 18
Sk eP 01 24 22
epP 01 24 32
i 01 24 52.2
Um iP 01 24 06.2
ipP 01 24 14.6
Ud iP 01 24 36.5 C
ipP 01 24 45.1
Japan. h = 35 km (Up,Sk,Um,Ud).
M = 5.7 (Up,Ki).

" 12 Sk iP 04 13 21.3
North Atlantic Ocean (h = N).

" 13 Up iP 02 49 35.6

" 13 Ki iSg 03 09 05.2
Sk iSg 03 09 09.3
Um iPg 03 08 44.5
iSn 03 09 19.5
iSg 03 09 33.4
Ud iSg 03 10 55.6
Nordland, Norway, 66.3°N, 14.5°E.
Origin time = 03 07 36.

" 13 Up iP 03 30 58.3 C
micr sec
Mx E 2.0 21
Mx N 2.1 21
Mx Z 2.0 21
Ki iP 03 31 36.4
micr sec
Mx E 2.7 22
Mx N 1.7 18
Sk iP 03 31 02.9
Um iP 03 31 19.4
i 03 31 28.5
Ud iP 03 30 49.3
Atlantic Ocean (h = N).
M = 5.7 (Up,Ki).

" 13 Up iP 03 51 32.6 C
i 03 52 11.1
micr sec
P Z' 0.1 0.5
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 13 (cont.)

Ki	iP	03 50 57.1	
Sk	iP	03 51 29.3	
Um	iP	03 51 12.2	C
Ud	iP	03 51 39.5	C

Japan (h = 360 km).

" 13

Up	iP	04 17 27.2	
	ipP	04 17 34.3	
Ki	iP	04 17 10.8	
	ipP	04 17 20.3	
Um	iP	04 17 16.1	C
	ipP	04 17 23.7	
Ud	iP	04 17 34.4	C
	ipP	04 17 42.0	

Molucca Passage. h = 30 km (Up,Ki,Um,Ud).

" 13

Um	iP	12 41 38.0	

" 13

Um	iP	12 50 03.5	
	i	12 50 18.8	

" 13

Up	iP	13 39 34.7	
Ki	iP	13 38 47.0	
Um	iP	13 39 09.0	
Ud	iP	13 39 40.2	
De	iP	13 39 58.6	

Kurile Islands (h = N).

" 13

Up	iP		21 49 07.5	
	i		21 49 19.9	
			micr	sec
	P	Z'	0.1	0.8
	Mx	E	1.5	20
	Mx	N	1.8	18
	Mx	Z	1.5	16
Ki	iP		21 48 41.4	C
			micr	sec
	Mx	E	1.5	18
	Mx	N	1.0	15
	Mx	Z	1.4	17
Sk	iP		21 49 09.1	
Um	iP		21 48 51.2	
Ud	iP		21 49 15.8	

Ryukyu Islands (h = 20 km). M = 5.6 (Up,Ki).

" 13

Um	iPKP	21 51 57.8	
Ud	iPKP	21 51 49.4	

Chile-Argentina (h = 110 km).

" 13

Up	iP	22 20 16.7	

(cont.)

1969
Dec. 13 (cont.)

Ki	iP	22 20 01.1	
Um	iP	22 20 07.5	
Ud	iP	22 20 25.3	

Talaud Islands (h = 40 km).

" 14

Up	iP		02 55 40.3	
	i		02 55 48.2	
	i		02 56 03.9	
	i(PP)		02 59 27.0	
	i		02 59 54.9	
	iSKS		03 06 09.9	
			micr	sec
	SKS	E	1.0	4
	Mx	E	3.4	20
	Mx	N	3.7	20
	Mx	Z	4.1	21
Ki	iP		02 55 24.3	
	iPP		02 59 08.7	
	iSKS		03 05 50	
	iS		03 06 34	
			micr	sec
	P	Z'	0.4	1.3
	PP	E	2.0	5
	PP	Z	1.5	6
	SKS	E	3.8	8
	SKS	N	1.0	5
	S	E	2.4	7
	S	N	1.1	6
	Mx	E	3.4	18
	Mx	N	3.3	20
	Mx	Z	3.2	17

D = 10450 km = 94°.

Sk	eP	02 55 46	
	i	02 55 51.8	
Um	iP	02 55 30.0	C
	i(PP)	02 59 11.9	
	iPP	02 59 23	
	iSKS	03 05 58	
Ud	iP	02 55 47.8	
	i	02 55 57.1	
	i(PP)	02 59 35.5	
De	iP	02 55 54.3	
	i(PP)	02 59 24.7	

Molucca Passage (h = 40 km). m = 6.7, M = 6.0 (Up,Ki). (PP) belongs to the group of early PP-arrivals. The phase arriving nearly 10 sec after P has a pronounced higher frequency than P, especially clear at Ud.

" 14

Up	i(P)	08 49 58.4	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 14 Up iP 16 14 50.7
Ki iP 16 14 06.7
Um iP 16 14 26.5
Ud iP 16 14 56.6
Japan (h = 70 km).

" 14 Up iP 18 47 13.9 D
iS 18 55 25
micr sec
P Z' 0.4 0.9
Mx E 1.7 18
Mx N 2.2 18
Mx Z 2.3 18
D = 6650 km = 60°.
Ki iP 18 47 45.2
iS 18 56 24
micr sec
P Z' 0.4 1.5
S E 2.2 7
S N 0.8 9
Mx E 2.1 18
Mx N 2.3 16
Mx Z 3.2 17
D = 7150 km = 64 1/2°.
Sk iP 18 47 42.9
Um iP 18 47 25.3
iS 18 55 46
Ud iP 18 47 25.2
De iP 18 47 09.5
Indian Ocean (h = N).
m = 6.4, M = 5.5 (Up,Ki).

" 14 Up iP 21 02 23.3

" 14 Ki iP 22 51 23.5 C
Sk iP 22 51 02.6
Ud iP 22 51 05.1
Caribbean Sea (h = 30 km).

" 15 Up iP 00 25 20.9
micr sec
P Z' 0.1 0.7
Sk iP 00 25 01.3
Ud iP 00 25 21.0
Aleutian Islands
(h = 35 km).

" 15 Ki iP 03 54 01.1
Ud iP 03 54 06.1
Hindu Kush (h = 40 km).

" 15 Ki eP 10 06 19
iSg 10 07 01.1

" 15 Um iP 13 33 57.6

1969
Dec. 15 Up iP 15 58 40.4
Ki iP 15 59 27.8
Ud eP 15 58 51
Caucasus.

" 15 Up iP 21 37 08.4

" 15 Up iP 23 00 38.1

" 16 Up iP 11 52 05.8
micr sec
P Z' 0.1 0.6
Ki iP 11 53 30.1
Sk iP 11 52 48.5
Um eP 11 52 46
i 11 53 02.2
Ud iP 11 52 11.3
Greece-Albania (h = 60 km).

" 16 Sk i 12 01 33.2
i 12 01 40.2
Ud iSg 12 00 40.9
West coast of Norway.

" 16 Um i(P) 12 33 13.0

" 16 De iP 13 31 32.2

" 16 Ud iP 15 25 30.2

" 16 Sk iSg 15 56 17.2
Ud iLgl 15 55 58.6
iSg 15 56 04.0
West coast of Norway,
60.6°N, 5.2°E.
Origin time = 15 53 50.
Solution obtained by combination
with Norwegian readings.

" 17 Sk iPKP 01 54 16.4 C
Um iPKP 01 54 09.3
Ud iPKP 01 54 22.8

" 17 Up iP 02 42 02.5
i 02 42 06.9
Ki iP 02 42 06.0
Sk eP 02 42 18
Um iP 02 41 59.2 C
Ud iP 02 42 13.6
Sumatra (h = 50 km).

" 17 Um iP 04 51 22.1
Sea of Japan (h = 380 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 17 Ki iP 06 43 54.5
Ud iP 06 44 02.1
De iP 06 43 59.4
Hindu Kush (h = 60 km).

" 17 Ki iPKP 07 49 03.4 C
Sk iPKP 07 49 14.5
Um iPKP 07 49 09.1
Ud iPKP 07 49 17.2
New Hebrides Islands
(h = 130 km).

" 17 Up iP 08 11 45.6
Um iP 08 11 33.0
Ud iP 08 11 56.1
Hainan Island (h = N).

" 17 Up iPKP 09 22 53.5
Ud iPKP 09 22 55.1
Tonga-Kermadec Islands
(h = 45 km).

" 17 Ki iPn 11 11 18.7
iSn 11 12 16.9
iSg 11 12 42.2
D = 530 km = 4.8°.
Sk iLgl 11 15 05.0
Um iS^{x} 11 13 11.5
iSg 11 13 33.4
Northwest Russia,
67.5°N, 33.1°E.
Origin time = 11 10 04.
Explosion?

" 17 Ki iPn 12 49 54.5
iSn 12 50 39.5
iSg 12 50 56.0
D = 410 km = 3.7°.
Sk iLgl 12 53 19.6
Um iSn 12 51 19.8
iSg 12 51 51.6
Northwest Russia,
67.5°N, 30.1°E.
Origin time = 12 48 55.
Explosion?

" 17 Up iP 15 11 48.8 C
micr sec
P Z' 0.1 0.8
Ki iP 15 11 14.8 C
micr sec
P Z' 0.1 1.2
Sk iP 15 11 22.9
Um iP 15 11 34.0
(cont.)

1969
Dec. 17 (cont.)
Ud iP 15 11 40.9 C
De iP 15 11 57.3
Nevada. m = 6.0 (Up,Ki).
Underground explosion.

" 17 Um iP 15 13 25.9

" 17 Um iP 15 26 34.8
Ud iP 15 26 41.3
Nevada. Underground explosion.

" 17 Up iP 18 43 57.8

" 17 Up iP 20 48 51.8
Ki iP 20 49 59.0
Sk iP 20 49 31.6
Um iP 20 49 23.3
Ud iP 20 49 00.0

" 17 Up iPKP 21 01 12.4 D
i 21 01 18.3
micr sec
PKP Z' 0.3 0.5
Ki iPKP 21 00 51.5
Sk iPKP 21 01 06.9 D
Um iPKP 21 01 01.6 D
Ud iPKP 21 01 14.6 D
i 21 01 21.4
De iPKP 21 01 22.5 D
i 21 01 35.0
Kermadec Islands (h = 410 km).

" 18 Ki iSKP 01 56 43.6
Fiji Islands (h = 580 km).

" 18 Um iP 02 27 51.1
Sea of Japan (h = 370 km).

" 18 Ki iP 06 24 20.1
Um iP 06 24 40.5
Ud iP 06 25 11.6
Kurile Islands.

" 18 Up iPKP 06 29 37.4
Um iPKP 06 29 22.9
i 06 29 35.4
Ud iPKP 06 29 31.2
i 06 29 39.5
De iPKP 06 29 51.4
Tonga-Kermadec Islands
(h = 50 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969					
Dec.	18	Ud	iP		07 18 07.9
			i		07 18 11.0
"	18	Up	iP		08 36 38.1
"	18	Um	iP		10 51 48.0
"	18	Up	iP		13 42 09.4 C
			iPcP		13 42 40.2
			ipP		13 43 29
			iS		13 50 20.7
			iScS		13 51 26.9
					micr sec
			P	Z'	0.9 0.7
			S	E	1.4 3
			S	N	1.3 3
			Mx	E	1.5 16
			Mx	N	2.1 21
			Mx	Z	1.9 20
			D = 7300 km = 65 1/2°.		
		Ki	iP		13 41 24.3 C
			i		13 41 27.3
			ipP		13 42 44.4
			isP		13 43 17
			iS		13 48 55
			iScS		13 50 38
			isS		13 51 14
					micr sec
			P	Z'	0.7 1.0
			S	E	4.9 12
			S	N	1.9 10
			S	Z	1.3 12
			Mx	E	3.6 17
			Mx	N	2.3 16
			Mx	Z	4.2 21
			D = 6500 km = 58 1/2°.		
		Sk	iP		13 42 00.2 C
			i		13 42 02.5
			iPP		13 44 23.1
		Um	iP		13 41 44.6 C
			i		13 42 13.2
			ipP		13 43 04.4
			i		13 43 31
			iScP		13 45 46
			i		13 47 18
			iS		13 49 35
			iScS		13 51 00.1
			isS		13 51 54
		Ud	iP		13 42 16.1 C
			i		13 42 17.6
			ipP		13 43 37.8
			iS		13 50 35.0
		(cont.)			

1969					
Dec.	18	(cont.)			
		De	iP		13 42 33.6
		Sakhalin. h = 370 km (Up,Ki, Um,Ud).			
		m = 6.2, M = 5.6 (Up,Ki).			
		M uncorrected for focal depth.			
		Double P; the interval between the two P decreases slightly with distance over our net, which suggests slightly different epicenters for the two phases.			
"	18	Up	i(P)		18 14 08.2
		Ud	iP		18 13 43.0
"	18	Ki	iP		18 39 08.6
		Sk	iP		18 39 22.4
		Sumatra (h = 45 km).			
"	18	Up	iP		19 04 03.6
		Ki	iP		19 02 48.4
		Sk	iP		19 03 00.5
			iS		19 04 47.4
		Um	iP		19 03 26.5 C
		Ud	iP		19 03 47.9
		Jan Mayen (h = N).			
"	18	Up	iP		19 11 47.9
		Ki	iP		19 11 14.0
		Um	iP		19 11 34.1
		Ud	iP		19 11 40.4 C
		Nevada. Underground explosion.			
"	18	Up	iP		22 24 35.6
			i		22 24 58.8
"	19	Ki	iP		00 41 17.3
"	19	Up	iP		04 41 05.0
			i		04 41 24.6
					micr sec
			Mx	E	0.8 17
			Mx	N	1.0 17
			Mx	Z	1.3 16
		Ki	iP		04 40 20.1
			i		04 40 41.3
					micr sec
			Mx	E	2.4 19
			Mx	N	1.1 16
		Um	iP		04 40 40.6
			ipP		04 40 51.5
			iS		04 49 27
		(cont.)			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 19 (cont.)

Um	eSS	04 53 56	
Ud	iP	04 41 11.2	
	ipP	04 41 25.6	

Kurile Islands.
h = 45 km (Um,Ud).
M = 5.4 (Up,Ki).

" 19	Ki	iP	13 40 02.7
			micr sec
		P Z'	0.1 1.1
	Sk	iP	13 40 29.7
	Um	iP	13 40 32.2
	Ud	iP	13 40 56.5

Alaska (h = 15 km).

" 19	Up	i(P)	14 51 56.2
	Sk	iP	14 52 07.2
	Um	iP	14 51 43.3
	Ud	iP	14 52 05.2
		i	14 52 09.9

Burma-India (h = 60 km).

" 19	Ud	iP	17 08 00.4
" 19	Ud	i(P)	17 11 34.7
		i	17 11 55.8

Probably local.

" 19	Ud	i(Sg)	18 23 40.0
" 19	Ud	iP	19 37 24.2
" 19	Sk	iP	23 59 58.5
	Ud	iP	23 59 26.1

Greece (h = 70 km).

" 20 Microseisms in the period range 16-18 sec are recorded on Dec. 20, especially by LP N at Um.

" 20	Up	iP	02 20 57.1
	Um	iP	02 20 42.0
	Ud	iP	02 21 07.3

Hainan Island (h = N).

" 20	Ud	iP	04 31 17.5

Hindu Kush.

" 20	Um	iP	05 51 08.6
		ipP	05 51 20.0

Japan. h = 40 km (Um).

1969
Dec. 20

Up	iP	07 02 56.0 C	
		micr	sec
	P Z'	0.1	0.6
Ud	iP	07 02 58.3 C	
De	iP	07 03 08.4	

These phases could be PKP instead of P.

" 20	Um	iP	07 09 18.4

Aleutian Islands
(h = 40 km).

" 20	Ki	iP	13 19 09.5
	Um	iP	13 19 14.0

Banda Sea (h = 180 km).

" 20	Um	iP	13 51 06.1
" 20	Up	iP	14 36 48.8 D
	Ki	iP	14 36 03.1
		ipP	14 36 14.7
	Um	iP	14 36 24.2
	Ud	iP	14 36 54.7

Kurile Islands. h = 45 km (Ki).

" 20	Up	iP	17 45 38.0
	Ki	iP	17 46 49.9
		ipP	17 47 09.0
	Sk	iP	17 46 18.3
		ipP	17 46 38.8
	Ud	iP	17 45 45.8
	De	iP	17 45 11.5
		i	17 45 15.3

Greece. h = 100 km (Ki,Sk).

" 21	Up	i(PKP)	00 48 59.1
		iPKP	00 49 02.5
		i	00 49 06.3
			micr sec
		PKP Z'	0.2 0.5
	Ki	iPKP	00 48 39.7
	Sk	iPKP	00 48 55.8
	Um	iPKP	00 48 50.2
	Ud	i(PKP)	00 49 00.4
		iPKP	00 49 04.2
		i	00 49 08.7
	De	iPKP	00 49 12.6
		i	00 49 22.1

Kermadec Islands (h = 270 km).

" 21	Ki	iPn	04 26 04.7
		iSn	04 27 02.8
		iLgl	04 27 24.6

D = 530 km = 4.8°.
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 21 (cont.)

Sk	iLgl	04 29 50.0	
Um	iSn	04 27 39.5	
	iSg	04 28 17.8	
	i	04 28 28.5	
Ud	iSg	04 31 02.3	

Northwest Russia,
67.5°N, 33.1°E.
Origin time = 04 24 51.
Explosion?

" 21 Up iPKP 07 38 55.7
New Guinea (h = 130 km).

" 21

Up	iP		10 29 51.2	
			micr	sec
	P	Z'	0.1	1.0
Ki	iP		10 29 21.2	
	ipP		10 29 34.4	
			micr	sec
	P	Z'	0.1	1.3
Sk	iP		10 29 51.0	
Um	iP		10 29 33.0	
	ipP		10 29 46.9	
Ud	iP		10 29 59.4	D
	ipP		10 30 12.9	
De	iP		10 30 11.3	

Ryukyu Islands.
h = 50 km (Ki,Um,Ud).
m = 5.9 (Up,Ki).

" 21

Up	iP		12 31 20.1	
	ipP		12 31 30.5	
			micr	sec
	P	Z'	0.1	0.7
Ki	iP		12 30 36.2	C
Sk	iP		12 31 11.2	
Um	iP		12 30 55.6	
Ud	iP		12 31 27.0	
	ipP		12 31 36.6	

Japan. h = 35 km (Up,Ud).

" 21 Up iP 15 24 19.8
Java (h = 220 km).

" 21 Ki iP 15 46 42.4
Tien-Shan.

" 21

Ki	iPKP	16 51 16.1
Um	iPKP	16 51 22.7

New Hebrides Islands
(h = 130 km).

1969
Dec. 21

Ki	iPn	17 04 14.0
	iSn	17 05 00.7
	iLgl	17 05 14.8

D = 430 km = 3.9°.
Origin time = 17 03 12.

" 21

Up	iP		19 09 57.4	
	iS		19 12 36.4	
	iLgl		19 14 24.5	
	i		19 14 34	
			micr	sec
	P	Z'	0.1	0.5
	S	Z'	0.1	0.7

D = 1700 km = 15 1/2°.

Ki	eP		19 11 22
	iS		19 15 36.2
	e		19 18 09
	iLgl		19 18 17.0

D = 2550 km = 23°.

Sk	iP		19 10 53.7
	i		19 15 16.3
	iLgl		19 16 55.3
Um	iP		19 10 37.4
	i		19 10 41.4
	iS		19 13 53.2
	i		19 15 55
	iLgl		19 16 03.9
	iRg		19 17 42
Ud	iP		19 10 11.5
	iS		19 13 09.4
	iLgl		19 15 08.4
De	iP		19 09 31.3
	iLgl		19 13 47.9

Rumania (h = 35 km).

" 21 Ki iP 22 07 23.5
Dodecanese Islands
(h = 70 km).

" 22

Up	iP		00 22 18.8
Ki	iP		00 21 33.4
Um	iP		00 21 53.9
Ud	iP		00 22 24.8

Kurile Islands.
Origin time = 00 11 15.

" 22 Um iP 01 06 42.5

" 22

Up	iP		01 26 07.2
Um	iP		01 25 43.3
Ud	iP		01 26 13.4

Kurile Islands (h = N).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Dec.	22	Up	iP		11 30 15.7 C	
					micr	sec
			P	Z'	0.1	1.0
			Mx	N	1.1	18
			Mx	Z	1.3	16
		Ki	iP		11 29 22.4 C	
					micr	sec
			P	Z'	0.2	1.0
			Mx	E	1.4	19
			Mx	N	1.1	18
		Sk	iP		11 29 52.0	
		Um	iP		11 29 49.0 C	
			iScS		11 39 47	
		Ud	iP		11 30 14.7 C	
		De	iP		11 30 37.2 C	
		Aleutian Islands (h = N).				
		m = 6.1, M = 5.2 (Up,Ki).				
"	22	Sk	iP		11 42 38.6	
"	22	Ki	iP		12 33 39.5	
		Um	iP		12 34 07.9	
		Yukon (h = 4 km).				
"	22	Ki	iP		15 13 51.8	
		Colombia (h = 50 km).				
"	22	Sk	i(Sg)		17 34 32.4	
"	22	Ki	iSg		17 38 20.2	
		Sk	eSg		17 38 24	
		Um	iSg		17 38 45.3	
		Nordland, Norway.				
		Explosion?				
"	22	Up	iPKP		21 11 19.8	
			i		21 11 31.0	
		Sk	iPKP		21 11 14.3	
			i		21 11 23.7	
		Um	iPKP		21 11 08.3	
		Ud	iPKP		21 11 22.8	
			i		21 11 32.7	
		De	iPKP		21 11 41.8	
		Kermadec Islands				
		(h = 30 km).				
"	23	Sk	iP		02 19 17.3	
		Ud	eP		02 18 42	
		Aegean Sea (h = 55 km).				
"	23	Sk	iP		05 29 42.5	
"	23	Sk	iP		12 33 09.6	
		Panama (h = N).				

1969 Dec.	23	Ki	iP		12 54 12.1	
		Ud	iP		12 53 32.0	
			i		12 53 38.6	
		Atlantic Ocean (h = N).				
"	23	Up	iP		13 32 58.7 C	
			iS		13 41 11	
					micr	sec
			P	Z	0.5	3
			P	Z'	0.3	1.3
			Mx	E	2.8	21
			Mx	N	2.8	20
			Mx	Z	3.2	20
			D = 6650 km = 60°.			
		Ki	iP		13 32 01.8	
			iS		13 39 28	
					micr	sec
			P	Z'	0.1	1.1
			S	E	1.5	10
			S	N	0.6	8
			Mx	E	4.8	20
			Mx	N	3.9	18
			Mx	Z	3.4	19
			D = 5800 km = 52°.			
		Sk	iP		13 32 39.5	
		Um	iP		13 32 29.9	
			iS		13 40 18	
			iScS		13 42 19	
			iSS		13 44 21	
		Ud	iP		13 33 01.3	
			i		13 33 06.8	
		De	iP		13 33 25.7	
		Kamchatka (h = N).				
		m = 5.9, M = 5.7 (Up,Ki).				
"	23	Up	iP		14 20 20.6	
			ipP		14 20 48.0	
					micr	sec
			P	Z'	0.2	0.7
		Ki	iP		14 20 03.5	
			ipP		14 20 31.0	
					micr	sec
			P	Z'	0.1	0.9
			Mx	E	1.1	22
			Mx	N	1.0	17
		Sk	iP		14 20 27.5	
			isP		14 21 04.4	
		Um	iP		14 20 08.8	
			i		14 20 41.0	
		Ud	iP		14 20 29.5	
			isP		14 21 04.2	
		De	iP		14 20 35.5	
		Mindoro. h = 100 km				
		(Up,Ki,Sk,Ud).				
		m = 5.9 (Up,Ki).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Dec.	23	Ud	iP	16 01 13.3	
		Kurile Islands (h = 90 km).			
"	24	Up	iP	05 10 50.7	
			i	05 11 07.9	
				micr	sec
			P Z'	0.1	1.0
		Ki	iP	05 11 46.7	C
		Sk	iP	05 10 57.6	
		Um	iP	05 11 22.3	C
		Ud	iP	05 10 39.4	C
		De	iP	05 10 18.5	
		Atlantic Ocean, off Portugal (h = N).			
"	24	Ki	iPn	11 12 57.0	C
			iSn	11 13 54.9	
			iLgl	11 14 14.9	
			D = 530 km = 4.8°.		
		Sk	iLgl	11 16 43.3	
			iSg	11 16 51.0	
		Um	iLgl	11 15 04.4	
			iSg	11 15 14.9	
		Ud	iLgl	11 17 41.0	
		Northwest Russia, 67.6°N, 33.1°E. Origin time = 11 11 43. Explosion?			
"	24	Ki	iPn	13 26 50.1	
			iSn	13 27 38.2	
			iLgl	13 27 51.2	
			D = 440 km = 4.0°.		
		Origin time = 13 25 46.			
"	24	Ki	iP	18 42 47.1	
		Um	iP	18 43 15.2	
		Ud	iP	18 43 40.8	C
		De	iP	18 44 03.7	
		Aleutian Islands (h = 25 km).			
"	25	Up	iP	02 12 55.6	
		Ki	eP	02 13 48	
		Turkey (h = 70 km).			
"	25	Up	eSn	12 09 49	
			iSg	12 10 06.0	
		Ki	eSg	12 12 37	
		Um	iSg	12 10 36.2	
			i	12 10 46.5	
		Ud	iLgl	12 11 04.5	
		De	iLgl	12 11 35.7	
		Esthonia, 59.7°N, 25.6°E. Origin time = 12 07 56. Explosion?			
1969 Dec.	25	Up	iPKP	16 41 46.2	
		Ki	iPKP	16 41 32.0	
		Sk	iPKP	16 41 42.2	
		Um	iPKP	16 41 38.3	
		Ud	iPKP	16 41 48.5	
		De	iPKP	16 41 52.4	
		Loyalty Islands (h = 120 km).			
"	25	Up	iP	21 43 40.7	
			iS	21 52 50	
			iP'P'	22 11 44.7	
				micr	sec
			P E	1.6	3
			P N	0.7	3
			P Z	3.4	3
			P Z'	0.6	0.8
			S E	14	11
			S N	9.5	8
			P'P' Z'	0.1	1.2
			Mx E	49	19
			Mx N	59	20
			Mx Z	65	20
			D = 7800 km = 70°.		
		Ki	iP	21 43 52.1	
			i	21 44 03	
			iS	21 53 08	
			i	21 53 24	
				micr	sec
			P E	5.2	10
			P N	0.7	4
			P Z	3.8	3
			P Z'	6.7	2.0
			S E	20	13
			S N	9.2	11
			Mx E	88	19
			Mx N	44	19
			Mx Z	85	19
			D = 7950 km = 71 1/2°.		
		Sk	iP	21 43 28.7	
			iP'P'	22 11 48.0	
			i	22 11 52.8	
		Um	iP	21 43 50.6	C
			i	21 44 02	
			iS	21 53 06	
		Ud	iP	21 43 28.8	
			iP'P'	22 11 53.0	
		De	iP	21 43 28.0	
		Leeward Islands (h = 7 km). m = 7.1, M = 7.1 (Up,Ki). P Z' exhibits a gradual amplitude increase for about 12 sec after the first arrival.			
"	25	Ud	iP	22 24 45.9	
		Leeward Islands (h = N).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Dec.	25	Up	iP		22 28 52.4 C
		Ki	iP		22 29 02.8
		Ud	iP		22 28 40.7 C
		Leeward Islands (h = 25 km).			
"	25	Up	iP		22 37 24.2
		Sk	iP		22 37 13.0
		Ud	iP		22 37 12.8
		De	iP		22 37 13.0
		Leeward Islands (h = 15 km).			
"	25	Up	iP		22 42 14.7
					micr sec
			P	Z	0.6 3
			P	Z'	0.2 1.2
		Ki	iP		22 42 25.4
					micr sec
			P	Z'	1.5 2.0
		Sk	iP		22 42 01.9 C
		Um	iP		22 42 23.7
		Ud	iP		22 42 02.8
		De	iP		22 42 01.3
		Leeward Islands (h = 8 km).			
		m = 6.4 (Up,Ki).			
"	25	Ud	iP		23 26 48.7
		Leeward Islands (h = N).			
"	25	Ud	iP		23 29 54.1
"	26	Ud	iP		00 22 10.8
		Leeward Islands (h = N).			
"	26	Up	iP		00 29 00.9
			ipP		00 29 18.2
					micr sec
			P	Z'	0.2 0.9
		Ki	iP		00 28 07.3 C
			ipP		00 28 23.8
					micr sec
			P	Z'	0.3 1.3
		Sk	iP		00 28 37.4
		Um	iP		00 28 35.2
			ipP		00 28 51.3
		Ud	iP		00 28 59.4 C
			ipP		00 29 16.0
		De	iP		00 29 23.0
			ipP		00 29 39.3
		Alaska. h = 60 km			
		(Up,Ki,Um,Ud,De).			
		m = 6.3 (Up,Ki).			
"	26	Up	iP		00 57 38.8
			i		00 57 54.3

1969 Dec.	26	Ki	iP	03 08 08.9
		Leeward Islands (h = N).		
"	26	Ud	iP	03 21 27.7
		Leeward Islands (h = N).		
"	26	Ud	iP	04 41 26.9
		Leeward Islands (h = N).		
"	26	Ud	eP	05 01 33
		Leeward Islands (h = N).		
"	26	Um	i(P)	05 45 47.5
		Ud	iP	05 45 30.9
		Leeward Islands (h = N).		
"	26	Ud	iP	07 11 03.5
			ipP	07 11 16.5
		Leeward Islands. h = 50 km (Ud).		
"	26	Up	iP	08 57 27.0
			ipP	08 57 39.3
		Ki	iP	08 57 37.2
			ipP	08 57 50.3
		Sk	iP	08 57 14.4
			ipP	08 57 26.8
		Um	iP	08 57 36.1
			ipP	08 57 48.8
		Ud	iP	08 57 15.0
			ipP	08 57 27.3
		De	iP	08 57 13.8
			ipP	08 57 25.9
		Leeward Islands. h = 45 km		
		(Up,Ki,Sk,Um,Ud,De).		
"	26	Ud	iP	09 00 32.7
		Leeward Islands (h = N).		
"	26	Ud	iP	10 26 11.0
		Leeward Islands (h = N).		
"	26	Sk	iP	10 44 58.0
		Ud	iP	10 44 58.9
			ipP	10 45 11.8
		De	iP	10 44 58.4
		Leeward Islands. h = 50 km (Ud).		
"	26	Ki	iP	10 57 39.2
		Ud	iP	10 57 17.6
		Leeward Islands (h = 9 km).		
"	26	Ki	iPn	11 03 14.0
			iSn	11 04 13.8
		(cont.)		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 26 (cont.)
Ki iLgl 11 04 33.6
D = 560 km = 5.0°.
Sk i(Lgl) 11 07 01.5
Um iS^x 11 05 06.7
iSg 11 05 26.0
Northwest Russia,
67.3°N, 33.5°E.
Origin time = 11 01 56.
Explosion?

" 26 Ki iP 12 06 04.8
Ud iP 12 05 41.6
Leeward Islands (h = 6 km).

" 26 Ud iP 16 54 24.4
Leeward Islands (h = N).

" 26 Ud iP 18 49 44.9
Leeward Islands (h = N).

" 26 Ud iP 19 50 05.4
Leeward Islands (h = N).

" 26 Up iP 20 14 38.1
ipP 20 14 52.9
micr sec
pP Z' 0.1 0.7
Ki iP 20 14 49.7
ipP 20 15 04.1
micr sec
P Z' 0.1 0.9
Sk iP 20 14 26.4
ipP 20 14 40.4
Um iP 20 14 48.3
ipP 20 15 01.7
Ud iP 20 14 26.7
ipP 20 14 41.6
De iP 20 14 24.9
ipP 20 14 39.9
Leeward Islands. h = 55 km
(Up,Ki,Sk,Um,Ud,De).
m = 6.0 (Up,Ki).

" 27 Up iP 03 09 50.5
Philippine Islands (h = N).

" 27 Ud iP 03 12 46.2

" 27 Up i(P) 03 24 36.6
Ud eP 03 24 28
i 03 24 38.2

" 27 De iP 05 50 39.6

1969
Dec. 27 Up iP 07 36 36.1 C
i 07 36 51.1
Sk iP 07 37 19.3
Um iP 07 37 14.1
Ud iP 07 36 45.3
De iP 07 36 10.4
Aegean Sea (h = 30 km).

" 27 Ki iP 09 25 20.2
Sumbawa Island (h = N).

" 27 Ud iP 10 06 31.8
De iP 10 06 31.1 C
Leeward Islands (h = N).

" 27 Um iP 10 40 33.3
Ud iP 10 40 58.5

" 27 Up iP 12 06 04.1

" 27 Ki iPn 13 17 50.0
iSn 13 18 51.1
iLgl 13 19 05.8
iSg 13 19 14.5
D = 570 km = 5.1°.
Um iSg 13 20 35.3
Probably northwest Russia.
Origin time = 13 16 29.
Explosion?

" 27 Ki iP 13 20 00.3
Leeward Islands (h = N).

" 27 Sk iP 14 14 00.0
De iP 14 13 59.5
Leeward Islands (h = N).

" 27 Ki iP 15 55 13.9
ipP 15 55 24.8
Sk iP 15 54 49.4
De iP 15 54 49.6
Leeward Islands.
h = 40 km (Ki).

" 28 Up iP 01 30 16.1
Ki iP 01 29 30.9
micr sec
P Z' 0.1 1.0
Um iP 01 29 51.6
Kurile Islands (h = 45 km).

" 28 Up iP 03 53 50.4 C
i 03 54 41.7
iPn 03 54 54.3
(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 28 (cont.)

Up	iLi		04 04 17	
	iLgl		04 04 56	
	iX		04 05 37.3	
			micr	sec
	P	Z'	0.3	0.5
Ki	iP		03 53 35.2	C
	iPP		03 54 48.9	
	iX		04 04 30.8	
			micr	sec
	P	Z'	0.6	0.5
	PP	Z'	0.1	0.8
Sk	iP		03 54 06.1	C
	iPn		03 55 05.6	
	iPP		03 55 27.4	
Um	iP		03 53 35.3	C
	iPP		03 54 47.7	
De	iP		03 54 13.9	C
	iPn		03 55 29.6	

Kazakh SSR.
m = 6.6 (Up,Ki).
Underground explosion.

" 28

Up	iP		04 35 44.3	
Ki	iP		04 34 58.7	
Um	iP		04 35 19.7	

Kurile Islands (h = 30 km).

" 28

Up	iP		05 04 14.3	
			micr	sec
	P	Z'	0.1	0.7
	Mx	E	1.7	15
	Mx	N	1.7	17
	Mx	Z	1.4	15
Ki	iP		05 03 28.6	
			micr	sec
	P	Z'	0.2	1.0
	Mx	E	3.4	19
	Mx	N	2.3	17
	Mx	Z	3.6	17
Sk	iP		05 04 05.2	
Um	iP		05 03 48.9	
	ipP		05 04 01.4	
De	iP		05 04 37.9	

Kurile Islands.
h = 45 km (Um).
m = 6.2, M = 5.7 (Up,Ki).

" 28

Up	iP		05 17 54.8	
Ki	iP		05 17 09.7	
Um	iP		05 17 30.2	

Kurile Islands (h = 45 km).

" 28

Up	iP		14 49 02.5	

(cont.)

1969
Dec. 28 (cont.)

Up	i		14 49 08.6	
Ki	iP		14 48 16.8	
			micr	sec
	P	Z'	0.1	1.0
Um	iP		14 48 36.8	
Ud	iP		14 49 08.3	C
De	iP		14 49 27.8	

Kurile Islands (h = N).

" 28

Up	iP		16 57 25.3	
Ki	iP		16 57 34.1	
Um	iP		16 57 23.6	
Ud	iP		16 57 42.1	D
De	iP		16 57 39.0	

Hindu Kush (h = 200 km).

" 28

Ud	iP		17 03 42.9	C

Leeward Islands (h = N).

" 28

Um	iP		17 54 13.0	

Japan (h = 130 km).

" 28

Up	iP		20 12 57.1	
Ki	iP		20 12 04.2	
Sk	iP		20 12 34.8	
Um	iP		20 12 31.0	
Ud	iP		20 12 56.8	
De	iP		20 13 19.2	C

Aleutian Islands (h = 50 km).

" 28

Ud	iPKP		21 43 55.8	C
De	iPKP		21 44 06.7	

Tonga-Kermadec Islands
(h = 490 km).

" 28

Up	eP		22 06 56	
Sk	eP		22 07 40	
Um	iP		22 07 38.5	
Ud	eP		22 07 02	

Albania (h = N).

" 28

Up	iP		22 59 47.9	
Ki	iP		22 59 26.9	
Um	iP		22 59 33.6	
Ud	iP		22 59 56.5	

Luzon (h = 50 km).

" 28

Ki	iP		23 34 32.0	
Ud	iP		23 34 09.0	

Leeward Islands (h = 15 km).

" 29 Microseisms in the period range 16-18 sec are recorded on Dec. 29, especially by LP N at Um.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 29 Up iP 01 02 57.6
iS 01 12 05
micr sec
Mx E 1.3 17
Mx N 1.4 18
Mx Z 1.3 17
D = 7800 km = 70°.
Ki iP 01 03 08.3
micr sec
P Z' 0.3 1.6
Mx E 2.8 18
Mx N 1.5 17
Mx Z 2.5 18
Sk iP 01 02 44.2
i 01 02 48.5
Um iP 01 03 06.3
iS 01 12 24
Ud iP 01 02 45.7
De iP 01 02 44.3
Leeward Islands (h = 15 km).
M = 5.5 (Up,Ki).

" 29 Ud iP 01 40 41.0
Leeward Islands (h = N).

" 29 Ud iP 01 49 25.0
Leeward Islands (h = N).

" 29 Ud iP 02 18 06.7
De iP 02 18 17.6
These phases could be PKP instead if P.

" 29 Ki iP 04 08 38.1
Ud iP 04 09 09.8
Kazakh SSR.
Underground explosion.

" 29 Ki iP 08 32 58.1
Ud iP 08 32 35.7
Leeward Islands (h = N).

" 29 Ki iP 09 32 02.7
Ud iP 09 32 53.6
Unimak Island (h = N).

" 29 Ki iP 14 06 46.5
Leeward Islands (h = 20 km).

" 29 Ki iP 14 06 57.6
Sk eP 14 06 35
Um iP 14 06 55.5
Ud iP 14 06 35.2
i 14 06 41.1
Leeward Islands (h = N).

1969
Dec. 29 Up iP 14 06 58.9
Ki iP 14 07 08.7
micr sec
P Z' 0.1 1.0
Sk iP 14 06 46.0
Um iP 14 07 07.6
Ud iP 14 06 47.0
De iP 14 06 45.5
Leeward Islands (h = N).

" 29 Ki iP 14 24 50.5
Sk iP 14 24 27.1
Um iP 14 24 49.1
Ud iP 14 24 28.4
De iP 14 24 26.5
Leeward Islands (h = 20 km).

" 29 Ud iP 18 16 52.6
Pamir (h = 40 km).

" 29 Ud i(P) 23 20 02.4

" 30 Up iPKP 00 09 23.4
micr sec
PKP Z' 0.1 1.0
Ud iPKP 00 09 24.4
Tonga-Kermadec Islands (h = 60 km).

" 30 Up iP 05 16 49.3
Ki iP 05 17 47.5
micr sec
P Z' 0.1 0.9
Sk iP 05 17 26.9
Um iP 05 17 15.1
Ud iP 05 16 58.6
Red Sea (h = 15 km).

" 30 Ud iP 08 22 46.3
Leeward Islands (h = N).

" 30 Ud iP 08 40 00.5
Aleutian Islands (h = N).

" 30 Ud iP 10 26 54.3
Leeward Islands (h = N).

" 30 Ki iPn 11 18 09.7
iSn 11 19 07.7
iLgl 11 19 28.2
D = 530 km = 4.8°.
Sk iLgl 11 21 56.1
Um iSg 11 20 23.2
Northwest Russia, 67.5°N, 33.1°E.
Origin time = 11 16 56.
Explosion?

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969 Dec.	30	Ki	iP	11 30 44.9	
		Um	iP	11 30 48.6	
		Ud	iP	11 31 06.8	D
		Molucca Sea (h = 90 km).			
"	30	Um	iP	13 58 07.5	
"	30	Ki	iSg	17 34 15.1	
		Sk	iSg	17 34 19.7	
		Um	iSg	17 34 44.2	
		Nordland, Norway.			
		Explosion?			
"	31	Up	iP	00 57 19.3	
		Ki	iP	00 56 25.7	
		Ud	iP	00 57 19.2	
		Aleutian Islands			
		(h = 35 km).			
"	31	Up	iP	05 13 40.5	
		Ki	iP	05 14 47.4	
		Sk	iP	05 14 18.2	
		Ud	iP	05 13 48.3	
		De	iP	05 13 16.8	
		Crete (h = N).			
"	31	Up	iP	05 42 00.1	
		Ki	iP	05 43 07.1	
		Ud	iP	05 42 07.8	
		De	iP	05 41 35.7	
		Crete.			
		Origin time = 05 36 28.2.			
"	31	Up	iP	05 42 34.4	
			eS	05 47 07	
				micr sec	
			P Z'	0.1 0.5	
			Mx E	0.8 14	
			Mx N	1.0 13	
			Mx Z	1.3 16	
			D = 2900 km = 26°.		
		Ki	iP	05 43 41.3	
				micr sec	
			P Z'	0.1 0.8	
			Mx E	1.5 18	
			Mx N	1.2 13	
			Mx Z	1.1 13	
		Sk	iP	05 43 13.0	
		Um	iP	05 43 06.0	
			eS	05 48 18	
		Ud	iP	05 42 41.9	
		De	iP	05 42 10.2	
		Crete (h = 25 km).			
		m = 5.8, M = 4.8 (Up,Ki).			

1969 Dec.	31	Up	iP	05 50 10.4	
		Ki	iP	05 49 25.6	
				micr sec	
			P Z'	0.1 1.0	
		Um	iP	05 49 45.2	
		Ud	iP	05 50 16.3	C
			ipP	05 50 28.8	
		Kurile Islands.			
		h = 45 km (Ud).			
"	31	Ud	iP	05 52 56.5	
			ipP	05 53 08.6	
		Leeward Islands.			
		h = 45 km (Ud).			
"	31	Ud	iP	07 00 54.0	
		Leeward Islands (h = N).			
"	31	Up	iLgl	10 05 55.3	
		Ki	iPn	10 01 40.3	
			iSn	10 02 39.8	
			iLgl	10 03 00.0	
			D = 560 km = 5.0°.		
		Sk	iLgl	10 05 31.2	
		Um	i	10 03 33.8	
			iSg	10 04 05.5	
		Northwest Russia,			
		68.1°N, 33.7°E.			
		Origin time = 10 00 22.			
		Explosion?			
"	31	Ki	iPn	10 21 40.2	
			iSn	10 22 25.4	
			iLgl	10 22 41.3	
			D = 410 km = 3.7°.		
		Um	iSg	10 23 36.9	
		Northwest Russia,			
		67.5°N, 30.1°E.			
		Origin time = 10 20 40.			
		Explosion?			
"	31	Ki	iPn	10 25 38.9	
			iSn	10 26 36.9	
			iLgl	10 26 57.8	
			D = 530 km = 4.8°.		
		Um	iSg	10 27 52.6	
		Northwest Russia,			
		67.5°N, 33.1°E.			
		Origin time = 10 24 25.			
		Explosion?			
"	31	Up	iP	13 22 04.6	
			i	13 22 11.2	

(cont.)

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Um = Umeå, Ud = Uddeholm, De = Delary

1969
Dec. 31 (cont.)

Up			micr	sec
	P	Z'	0.1	0.8
	Mx	E	4.4	10
	Mx	N	4.3	10
	Mx	Z	3.1	10
Ki	iP		13 23 40.4	
			micr	sec
	P	Z'	0.3	1.6
	Mx	E	6.3	10
	Mx	N	2.2	10
	Mx	Z	2.7	10
Sk	iP		13 22 51.3	
Um	iP		13 22 55.3	
	iS		13 26 32	
Ud	iP		13 22 10.6	
De	iP		13 21 22.0	
	iLi		13 24 29.7	
	iLg2		13 25 11.6	

Yugoslavia (h = N).
m = 5.3, M = 5.3 (Up,Ki).

" 31

Up	iP		19 13 37.6	
	i		19 13 44.7	
	iS		19 23 13	
			micr	sec
	P	Z'	0.2	0.7
	Mx	E	40	14
	Mx	N	41	13
	Mx	Z	44	13
	D = 8400 km = 75 1/2°.			
Ki	iP		19 13 07.9	
	iPa		19 17 27	
	iS		19 22 20	
			micr	sec
	P	Z	2.2	7
	P	Z'	0.2	1.2
	S	N	1.4	6
	Mx	E	25	14
	Mx	N	26	14
	Mx	Z	40	14
	D = 7850 km = 70 1/2°.			
Sk	eP		19 13 38	
Um	iP		19 13 18.9	
	iPP		19 15 59	
	iPa		19 17 48	
	iS		19 22 34	
Ud	iP		19 13 46.1	
De	iP		19 13 57.1	

Ryukyu Islands
(h = 45 km).
m = 6.3, M = 7.0 (Up,Ki).

" 31 Up iP 20 53 41.5
(cont.)

1969
Dec. 31 (cont.)

Ki	iP	20 52 44.1
Um	iP	20 53 14.7 C
Ud	iP	20 53 39.8
De	iP	20 54 02.8

Alaska (h = N).

" 31

Up	iP		23 51 49.3	
	iSKS		00 01 39	
	iSP		00 04 13	
Ki	iP		23 51 40.8	
	ipP		23 53 31.8	
			micr	sec
	P	Z'	0.1	1.0
Um	iSKS		00 01 31	
	iSP		00 03 59	
Ud	iP		23 51 58.9	
De	iP		23 52 01.3	

Bali Sea. h = 490 km (Ki).

Markus Båth
November 19, 1970