Seismological Institute
Uppsala

P R E L I M I N A R Y

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, G Ö T E B O R G, U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

J A N U A R Y 1 - 31, 1963

1963
Jan 1 Up iP 04 17 43.2
Sk iP 04 17 31.0
Um iP 04 17 49.6
Colombia (h = 150 km).

" 1 Up i(P) 18 07 20.1

" 1 Up iP 23 49 34.1 C
i 23 50 49
iPcS 23 54 05.6
iS 23 58 02
iScS 23 59 19
iP'P' 00 18 22.8
i 00 18 28.8
i 00 18 49.9

		microns	sec
P	N	1.7	1
P	Z	2.3	1
P	Z'	0.5	0.5
S	E	1.8	3
P'P'	Z'	0.2	1.5
M	E	4.7	22
M	N	4.7	23
M	Z	3.8	23

D = 7050 km = 63½°.

Ki iP 23 48 39.7 C
e 23 49 12
iS 23 56 20
eScS 23 58 24

		microns	sec
P	Z	5.9	2
P	Z'	4.4	0.9
S	E	4.0	7
S	Z'	0.7	1.5
M	E	4.4	18

1963
Jan 1 Ki M N 1.9 20
cont. M Z 5.2 20
D = 6150 km = 55½°.
Sk iP 23 49 08.0 C
i 23 50 58.1
Gb iP 23 49 46.7 C
iP'P' 00 18 22
i 00 18 43.4
Um iP 23 49 07.7 C
iPcP 23 49 54.1
iS 23 57 13.6
eScS 23 58 47
iP'P' 00 18 37.6
D = 6600 km = 59½°.
Alaska (h = 50 km)
Magn. = 7.1 (Up, Ki).

" 2 Up -

		microns	sec
M	E	1.9	20
M	N	2.8	23
M	Z	3.0	19

Ki -

		microns	sec
M	E	2.0	19

Um eSS 15 29 16
New Guinea (h = 30 km).

" 2 Gb iPKP 16 15 37.2
South Pacific Ocean
(h = 30 km).

" 3 Up iP 03 16 43.3 C
i 03 16 51.6

		microns	sec
P	Z'	0.1	1.0

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Jan cont.	3	Up	M	E	4.4	14
			M	N	5.2	15
			M	Z	7.1	15
		Ki	iP		03 16 12	
			microns sec			
			M	E	4.7	20
			M	N	2.6	19
		Sk	iP		03 16 43	
		Gb	iP		03 17 03.8	
		Um	iP		03 16 24.0	
			eS		03 25 51	
		Ryukyu Islands (h = 30 km).				
		Magn. = 5.9 (Up, Ki).				
"	3	Ki	i(P)		06 36 17	
		Local?				
"						
"	3	Ki	iP		08 42 05.5	
"	3	Gb	i(P)		10 10 20	
"	3	Up	iP		12 25 02.0 C	
		Local?				
"	3	Up	i(P)		15 54 06.2	
"	3	Up	iP		19 03 46.9	
			i		19 09 24.3	
		Um	iP		19 04 31.4	
			i		19 09 46.8	
		Greece region.				
"	4	Up	iP		00 34 53.4 C	
			i		00 35 00.2	
			microns sec			
			P	Z'	0.1	1.0
		Ki	iP		00 35 31.1 C	
		Sk	iP		00 35 02.6	
		Um	iP		00 35 16.3	
			i		00 35 24.5	
		1500 km south of Cape Verde Islands (h = 30 km).				
"	4	Up	i(P)		02 00 34.0	
"	4	Up	iP		05 54 42.3	
			i		05 54 53	
		Ki	iP		05 54 07	
		Sk	iP		05 54 38.1	
		Gb	iP		05 55 09.1	
			i		05 55 36.3	
		Um	iP		05 54 25.1	
			i		05 54 35.3	
		Bonin Islands region (h = 30 km).				

1963 Jan	4	Up	iP	06 39 01.8
		Gb	iP	06 38 25.6
"	4	Up	iPKP	07 03 38
		Um	iPKP	07 03 20.2
			i	07 03 37
		Kermadec Islands region (h = 40 km).		
"	5	Up	iP	00 01 06.4
		Ki	iP	00 00 17.9
		Sk	iP	00 00 56.4
		Gb	iP	00 01 27.8
		Um	iP	00 00 41.4
		Kurile Islands (h = 30 km).		
"	5	Ki	iP	00 33 23.0
		Um	iP	00 33 29.5
		Halmahera region (h = 30 km).		
"	5	Um	iP	00 46 34.5 C
"	5	Up	iP	03 46 45.5
		Ki	iP	03 46 30.4
		Sk	iP	03 46 50
		Um	iP	03 46 36.4 C
		Sangihe Islands (h = 130 km).		
"	5	Up	iP	07 16 18.0
			i	07 17 06.3
			microns sec	
			P Z'	0.1 0.9
		Ki	iP	07 15 29.9
		Sk	eP	07 16 05
		Gb	iP	07 16 39.1
		Um	iP	07 15 53.8
			i	07 16 42.4
		Kurile Islands (h = 30 km).		
"	5	Up	-	
			microns sec	
			M E	1.9 20
		Ki	iPKP	13 23 47.2
		Um	iPKP	13 23 54.0
		New Hebrides Islands (h = 30 km).		
"	5	Um	eSKS	13 41 35
		Timor (h = 30 km).		
"	5	Up	iP	15 15 33.7
		Um	eP	15 14 31
			i	15 15 07.6
		Kurile Islands region (h = 30 km).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Jan 5 Sk iP 17 55 53.1 C
Western Brazil (h = 540 km).

" 5 Up i(P) 20 44 13

" 5 Um iP 21 39 29.5

" 6 Um iP 04 53 56.9

" 6 Gb i(P) 05 31 55.3

" 6 Up iP 07 40 50.4 D

		microns	sec
	P	Z' 0.1	1.0

Ki iP 07 40 11.6
Um iP 07 40 24.3
Kurile Islands (h = 30 km).

" 6 Um iP 12 46 10.9

" 6 Up iP 17 35 31.0 C
Ki iP 17 34 34.2 C

		microns	sec
	P	Z' 0.1	0.8

Sk iP 17 35 02.0
Gb iP 17 35 43.5
Um iP 17 35 03.4 C
Alaska (h = 120 km).

" 6 Up iP 21 31 52.3 D
i 21 32 09.7
iS 21 40 50

		microns	sec
	P	Z' 0.1	0.9
	M	E 0.8	20
	M	N 0.7	18
	M	Z 1.5	16

D = 7500 km = $67\frac{1}{2}^{o}$.

Ki iP 21 31 03.0 D
eS 21 39 16

		microns	sec
	P	N 0.3	5
	P	Z 0.6	5
	P	Z' 0.2	0.8
	S	E 0.7	5
	M	E 1.2	16
	M	N 0.6	17
	M	Z 1.2	17

D = 6650 km = 60^{o}.
Sk iP 21 31 38.7
Gb iP 21 32 12.6
i 21 32 18.0
Um iP 21 31 26.6
i 21 31 41.9

1963 Jan 6 cont. Um eS 21 39 54
D = 7050 km = $63\frac{1}{2}^{o}$.
Kurile Islands (h = 30 km).
Magn. = 6.1 (Up, Ki).

" 6 Up iP 22 14 39.0
Sk iP 22 15 17.2
Southeast of Crete
(h = 30 km).

" 7 Up -

		microns	sec
	M	E 2.3	20
	M	Z 3.8	21

Ki iP 12 01 43.1

		microns	sec
	M	E 3.2	21
	M	N 1.8	21
	M	Z 3.5	20

Um iP 12 01 46.0
eS 12 12 59
D = 10650 km = 96^{o}.
Halmahera region
(h = 40 km).

" 7 Um iPKP 19 38 43.5
New Hebrides Islands
(h = 20 km).

" 7 Up i(P) 22 57 58

" 8 Um eP 10 56 14
i 10 58 04.9

" 8 Up iP 15 58 01.1 C

		microns	sec
	P	Z' 0.3	0.6

Ki iP 15 57 29.0 C

		microns	sec
	P	Z' 0.2	0.8

Sk iP 15 57 59.1
Gb iP 15 58 20.7
Um iP 15 57 42.2 C
Near south coast of Kyushu,
Japan (h = 180 km).

" 9 Up iPKP 02 22 12.1 C *
i 02 22 26.3

		microns	sec
	PKP	Z' 0.1	0.9

Sk iPKP 02 22 04.2
Gb iPKP 02 22 20.6
Um iPKP 02 22 02.4
Kermadec Islands
(h = 70 km).

* 8 Um e(Pn) 22 56 29 iSg 22 57 07.3
Explosion at Oulu, Finland.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Jan	9	Up	iP		03 26 08.6	
			i		03 26 15.2	
		Ki	iP		03 25 40.8	
			ipP		03 26 23.4	
				microns	sec	
			P	Z'	0.1	1.0
		Sk	iP		03 26 06.0	
		Gb	eP		03 26 25	
		Um	iP		03 25 51.8	
			ipP		03 26 41.2	
		Mariana Islands.				
		h = 190 km (Ki, Um).				
"	9	Ki	iP		18 08 04.4	
"	9	Gb	iP		18 32 54	
			iPcP		18 33 33	
		Um	iP		18 33 26.0	
		Ka	iP		18 32 43.9	
		Congo (h = 30 km).				
"	10	Ki	i(Sg)		05 11 58	
		Um	i(P)		05 12 45.1	
			i(Sg)		05 13 22.6	
"	10	Um	iP		06 54 26.5	
		Hindu Kush (h = 190 km).				
"	10	Ka	i(P)		09 34 28.0	
"	10	Ki	iP		19 07 41.4	
		Um	iP		19 07 51.4	
		Mariana Islands (h = 60 km).				
"	11	Up	iP		01 17 01.3	D
			i		01 17 04.7	
		Ki	iP		01 16 40.2	
				microns	sec	
			M	N	0.7	17
		Sk	iP		01 17 10.7	
		Um	iP		01 16 44.6	
		Tsinghai Province, China				
		(h = 30 km).				
"	11	Um	iP		05 13 08.0	
"	11	Up			-	
				microns	sec	
			M	E	2.7	19
			M	N	1.1	19
			M	Z	3.7	19
		Ki	iPKP		12 31 28	
			ePKS		12 35 07	
				microns	sec	
			PKS	E	0.9	4

1963 Jan cont.	11	Ki	M	E	1.3	19
			M	N	1.3	18
			M	Z	2.2	18
		Um	iPKP		12 31 26.6	
			ePKS		12 34 51	
			e		12 45 34	
		Near coast of southern Chile				
		(h = 30 km).				
		Magn. = 6.1 (Up, Ki).				
"	11	Up	iPKP		17 24 59.4	D
			i		17 25 34.7	
				microns	sec	
			PKP	Z'	0.2	0.6
		Ki	iPKP		17 24 41.3	
		Sk	iPKP		17 24 52.2	D
		Gb	iPKP		17 25 07.2	
		Um	iPKP		17 24 46.8	D
		Ka	iPKP		17 25 05.3	
			i		17 25 15.0	
		Kermadec Islands				
		(h = 230 km).				
"	12	Ki	iP		03 53 16.7	D
				microns	sec	
			P	Z'	0.1	1.2
		Ka	iP		03 53 02.3	
		Gb	iP		03 53 02.1	
		Um	iP		03 53 18.7	D
		Colombia (h = 100 km).				
"	12	Up	iP		06 27 45.6	
			iPP		06 29 21.4	
		Ki	iP		06 27 55.8	
		Sk	iP		06 28 12.3	
		Gb	iP		06 28 05.7	
			iPP		06 29 45	
		Um	iP		06 27 44.8	
			iPP		06 28 19.4	
		Ka	iP		06 27 47.4	
		Hindu Kush (h = 100 km).				
"	12	Um	iP		19 19 25.6	
"	14	Um	iPKP		11 39 00.0	
		Loyalty Islands				
		(h = 30 km).				
"	14	Ki	eL		12 44	
				microns	sec	
			M	E	1.6	21
			M	N	1.3	20
			M	Z	3.1	21
"	14	Up	iP		18 36 51.1	C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Jan 14 cont.	Up	i	18 37 53.8		
		iS	18 39 26		
		i(S)	18 39 46.5		
		iLg1	18 41 06		
		iLg2	18 41 34.9		
			microns	sec	
		P	Z' 0.1	0.5	
		S	E 0.6	3	
		(D = 1650 km = 15°).			
	Ki	iP	18 38 13.3		
		ipP	18 38 43.3		
		i	18 44 52.8		
			microns	sec	
		P	Z' 0.1	1.0	
		(D = 2550 km = 23°).			
	Sk	iP	18 37 45.8		
		ipP	18 38 08.9		
		iS	18 41 32.4		
		i	18 43 34.5		
		(D = 2100 km = 19°).			
	Gb	iP	18 36 53.2		
		iS	18 39 43.0		
		(D = 1650 km = 15°).			
	Um	iP	18 37 31.5	C	
		iS	18 41 04.9		
		iLg1	18 42 53.1		
		(D = 2000 km = 18°).			
	Ka	iP	18 36 28		
		i	18 36 43.4		
		i(S)	18 39 19.9		
		iLg2	18 40 32.0		
		(D = 1450 km = 13°).			
		Romania (h = 130 km).			
		Magn. = 5.3 (Up, Ki).			
" 14	Up	iP	20 34 32.8	C	
			microns	sec	
		P	Z' 0.1	0.7	
" 15	Up	iS	01 39 21		
			microns	sec	
		S	E 1.5	10	
		M	E 2.1	15	
		M	N 1.0	16	
		M	Z 1.3	16	
	Ki	eP	01 35 35		
		iPP	01 35 42.0		
		e	01 36 22		
		eSS	01 38 14		
		eSSS	01 38 31		
			microns	sec	
		P	E 0.4	8	
		M	E 4.1	16	
		M	N 2.7	16	
		M	Z 7.2	16	
		D = 1500 km = 13½°.			

1963 Jan 15 cont.	Sk	iP	01 35 21		
	Gb	iP	01 36 24.7		
	Um	iP	01 36 02.9		
		e	01 38 34		
		e(S)	01 38 43		
		Between Iceland and Jan Mayen (h = 30 km).			
" 15	Ki	iP	02 45 36.1	D	
	Sk	eP	02 46 00		
	Um	iP	02 45 47.3	D	
		eSKS	02 56 22		
		Mariana Islands (h = 40 km).			
" 15	Up	iP	05 27 11.6	C	
		i	05 27 48.4		
		iS	05 30 12		
			microns	sec	
		P	N 0.5	3	
		P	Z' 0.1	1.0	
		S	E 0.8	6	
		S	N 1.5	10	
		M	E 4.1	14	
		M	N 3.6	21	
		M	Z 2.6	20	
		D = 1950 km = 17½°.			
	Ki	eP	05 26 16		
		ePP	05 26 25		
		i	05 26 32.3		
		eS	05 28 54		
		eSS	05 29 15		
			microns	sec	
		PP	E 0.6	8	
		PP	N 0.4	6	
		PP	Z 0.9	9	
		M	E 7.2	16	
		M	N 6.4	16	
		M	Z 13	16	
		D = 1450 km = 13°.			
	Sk	iP	05 26 11.7		
	Gb	iP	05 27 11.2		
	Um	iP	05 26 49.0		
		i	05 26 54.6		
		eS	05 29 26		
		eSS	05 29 48		
		D = 1700 km = 15½°.			
		Between Iceland and Jan Mayen (h = 30 km).			
		Magn. = 5.3 (Up).			
" 15	Up	iP	12 32 06.5		
	Um	iP	12 31 50.9		
		Tsinghai, China (h = 30 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963					
Jan	15	Up	iP	15 09 23.5	
			i	15 09 39.7	
		Ki	iP	15 10 33.6	
		Sk	iP	15 10 03.9	C
		Gb	iP	15 09 13.8	
			i	15 09 16.6	
		Um	iP	15 09 57.7	
		Ka	iP	15 08 47.4	
		Mediterranean Sea (h = 80 km).			
"	15	Up	iPKP	19 44 54.6	
			i	19 45 11.2	
			iPKS	19 48 38.8	
				microns sec	
			PKP	Z' 0.2 1.0	
		Ki	iPKP	19 44 33.8	
			i!	19 44 47.5	
		Sk	iPKP	19 44 46.1	
			i	19 44 57.8	
		Gb	iPKP	19 45 04.3	
		Ka	iPKP	19 45 04.5	
		Fiji Islands (h = 500 km).			
"	15	Sk	iP	21 30 31	
		Greece.			
"	15	Um	eS	22 43 06	
		South Atlantic Ocean (h = 30 km).			
"	16	Up	iP	05 00 44.5	C
		Ki	iP	05 00 45.9	C
		Nicobar Islands (h = 70 km).			
"	16	Up	iP	05 55 50.4	C
				microns sec	
			P	Z' 0.2 0.7	
		Ki	iP	05 54 57.9	
				microns sec	
			P	Z' 0.1 0.8	
		Sk	iP	05 55 29.6	C
		Gb	iP	05 56 07.2	C
		Andreanof Islands, Aleutian Islands (h = 40 km).			
"	17	Um	iP	04 01 53.0	
		Sea of Okhotsk (h = 450 km).			
"	17	Up	iP	06 09 04.4	C
				microns sec	
			P	Z' 0.1 0.5	
		Sk	iP	06 09 09.7	
		Gb	iP	06 09 21.6	
		Um	iP	06 08 52.1	
		Luzon (h = 210 km).			

1963					
Jan	17	Ki	i(P)	10 14 25.1	
			i	10 14 30.9	
"	17	Um	iP	16 15 29.2	
"	17	Up	iP	20 52 50.7	
			i	20 53 00.8	
				microns sec	
			P	Z' 0.1 0.7	
		Ki	iP	20 52 24.0	D
				microns sec	
			P	Z' 0.2 0.8	
		Sk	iP	20 52 52.1	D
		Gb	iP	20 53 10.8	D
		Um	iP	20 52 33.9	D
		Ryukyu Islands (h = 140 km).			
"	17	Up	iP	21 37 39.6	
"	18	Up	iP	03 22 58.8	C
		Ki	iP	03 22 25.1	C
				microns sec	
			P	Z' 0.1 0.8	
		Sk	eP	03 22 55	C
		Gb	eP	03 23 18	
		Um	iP	03 22 39.0	C
		South of Honshu, Japan (h = 430 km).			
"	18	Um	iP	12 44 19.0	
		Kurile Islands region (h = 30 km).			
"	18	Up	iP	20 33 14.2	
"	18	Up	iP	22 57 14.1	
"	19	Up	e(P)	03 17 18	
"	19	Ki	iP	07 32 49.3	
		Um	iP	07 33 08.2	D
		South of Hokkaido, Japan (h = 30 km).			
"	19	Up	iPg	19 54 29.8	
			iSg	19 54 46.9	
			iL	19 54 49.0	
				microns sec	
			M	E 1.6 3	
			M	N 0.6 3	
			M	Z 1.8 3	
		D = 140 km = 1.3°.			
		Sk	iSg	19 56 15.2	
		Gb	i(Sg)	19 55 25.2	
			iL	19 55 38.6	
		Um	iSg	19 56 31.6	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Jan 19 cont.
Um iL 19 57 00.4
Ka iSg 19 56 01.4
iL 19 56 09.9
South-central Sweden, 59.8°N, 15.1°E. Origin time = 19 54 04. Remarkably well developed surface waves (L) with normal dispersion; period range 3 - 1 sec.

" 20 Um iPKP 22 56 19.0 C
New Hebrides (h = 110 km).

" 21 Um iP 03 15 14.9 C

" 21 Um iP 04 47 13.4

" 21 Ki iP 05 31 09.9

" 21 Um iP 05 38 35.4
i 05 39 22.0

" 21 Um iPKP 07 19 59.4
Sandwich Islands region (h = 30 km).

" 21 Gb iP 07 51 39.8
Panama-Costa Rica border (h = 90 km).

" 21 Ki e 08 27 07
i(Sg) 08 27 25.5

" 21 Up iP 13 12 53.9 C

" 21 Ki iP 14 56 11.1
Um iP 14 57 02.5
Kenai Peninsula, Alaska (h = 70 km).

" 21 Up i(P) 18 31 35.5

" 22 Up iP 05 04 41.2 C

		microns	sec
M	E	0.3	15
M	N	1.6	20
M	Z	0.6	19

Ki -

		microns	sec
M	E	0.8	17
M	N	2.1	18
M	Z	1.0	17

Sk iP 05 04 57.9 C
Um iP 05 04 32.6
eLg1 05 23 04
Tibet (h = 30 km).

1963
Jan 22 Gb iP 11 17 34.8

" 22 Um iP 11 33 55.8 D

" 22 Up iPKP 15 46 06.9
South of Fiji Islands (h = 530 km).

" 22 Up iP 16 18 02.0
Ki iP 16 17 11.4
Gb eP 16 18 13
Um iP 16 17 35.0
Ka eP 16 18 18
Kurile Islands (h = 50 km).

" 22 Up iP 16 22 30.5
Ki iP 16 21 39.3
Kurile Islands (h = 50 km).

" 23 Up eP 03 17 49
i 03 17 51.0

		microns	sec
P	Z'	0.2	1.5

" 23 Ki eP 07 46 16

" 23 Up iP 12 58 16.8 D
Ki iP 12 59 25

" 23 Gb iPKP 14 58 47.3
South of Fiji Islands (h = 300 km).

" 24 Up eP 03 03 56
Ki iP 03 04 08.8
Sk eP 03 03 46
Um iP 03 04 08.9
Near coast of Venezuela (h = 70 km).

" 24 Up iP 04 03 23.4
Sk iP 04 04 10.5
Gb i(P) 04 02 47
Um eP 04 04 13
Ka iP 04 02 48.6
Corfou Island.

" 24 Ki iP 09 41 46.1 C
Um iP 09 41 45.9
Java Sea (h = 490 km).

" 24 Um iPKP 12 28 24.1
i 12 28 32.4
Ka ePKP 12 28 37
Tonga Islands region (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963					
Jan	24	Up	iP	15 49 56.1	
		Ki	iP	15 50 26	
		Sk	iP	15 50 30.0	D
		Gb	iP	15 50 16.5	
		Um	iP	15 50 07.1	
		Ka	iP	15 49 45	
		Southern Iran (h = 100 km).			
"	24	Up	iP	22 04 45.5	
"	24	Up	iP	22 40 37.3	
			eSKS	22 51 14	
				microns sec	
			M E	2.5 18	
			M N	2.8 20	
			M Z	3.8 17	
		Ki	iP	22 40 20.1	
			iSKS	22 50 54	
				microns sec	
			P Z'	0.2 1.3	
			SKS E	0.8 12	
			M E	3.6 18	
			M N	1.5 17	
			M Z	3.7 19	
		Sk	iP	22 40 41.6	D
		Gb	iP	22 40 53.9	
		Um	iP	22 40 26.6	
			ePP	22 44 04	
			eSKS	22 50 58	
		D = 9900 km = 89°.			
		Off east coast of Mindanao (h = 70 km).			
"	24	Ki	iP	22 45 29.2	
		Um	iP	22 45 35.2	
		(Mindanao).			
"	24	Um	iP	22 57 10.8	
		Near east coast of Mindanao (h = 150 km).			
"	24	Ki	iP	23 34 52.6	
		Near east coast of Mindanao (h = 150 km).			
"	24	Um	e(P)	23 55 50	
"	25	Um	iP	00 00 20.6	
"	25	Um	iPKP	00 35 02.4	C
		Loyalty Islands region (h = 140 km).			
"	25	Up	iP	13 02 06.9	
			ipP	13 02 58.9	

1963					
Jan	25	Up	i	13 03 05.4	
cont.		Ki	iP	13 01 37.9	C
			ipP	13 02 30.6	
		Sk	iP	13 02 04	
			ipP	13 02 59.9	
		Gb	iP	13 02 23.6	
		Um	iP	13 01 50.2	C
			i	13 02 36.4	
		Ka	iP	13 02 20.5	
		Mariana Islands region. h = 220 km (Up, Ki, Sk).			
"	25	Up	iP	13 12 50.2	
		Rat Islands, Aleutian Islands (h = 30 km).			
"	25	Up	iP	20 31 13.9	
"	26	Up	i	03 30 57.0	
			iSg	03 31 03.7	
		Ki	iPg	03 28 16.9	
			i	03 28 30.1	
			iSg	03 29 00.7	
		D = 320 km = 2.9°.			
		Sk	iPn	03 28 11.2	
			i	03 28 34.5	
			iSg	03 28 57.2	
		Um	ePn	03 28 24	
			iPg	03 28 37.0	
			iSn	03 29 07.5	
			iS*	03 29 22.2	
			iSg	03 29 33.0	
		D = 430 km = 3.9°.			
		West coast of Norway, 66.6°N, 13.6°E. Origin time = 03 27 22.			
"	26	Ki	iP	04 00 36.7	
		Um	iP	04 01 11.2	
		Jan Mayen Island region (h = 30 km).			
"	27	Up	iP	01 18 47.5	D
			ipP	01 19 00.5	
				microns sec	
			P Z'	0.1 0.6	
			M E	2.2 17	
			M N	2.4 20	
			M Z	2.9 18	
		Ki	iP	01 18 19.6	D
			ipP	01 18 32.7	
		Sk	iP	01 18 48.3	D
			ipP	01 19 01.5	
		Gb	iP	01 19 06.7	D
			ipP	01 19 22.1	
		Um	iP	01 18 30.5	D

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963					
Jan	27	Um	ipP	01	18 43.3
cont.		Ka	iP	01	19 03.7
			ipP	01	19 18.9
		Ryukyu Islands. h = 60 km			
		(Up, Ki, Sk, Gb, Um, Ka).			
"	27	Up	iP	11	58 23.1
		Ki	iP	11	57 05.6
		Gb	iP	11	57 54.5
		Um	iP	11	57 12.9
			iPcP	11	58 07.5
		Gulf of Alaska (h = 90 km).			
"	27	Gb	iP	12	15 22.9
"	27	Up	iP	15	35 50.5
		Ki	iP	15	35 12.1
		Um	iP	15	35 34.0
		Idaho, U.S.A. (h = 30 km).			
"	27	Up	iP	15	49 58.8
		Ryukyu Islands			
		(h = 110 km).			
"	27	Up	iP	19	40 56.6
			i	19	41 17.2
			eS	19	45 34
			iSn	19	46 01.1
			iLg1	19	49 03
			eLg2	19	49 59
			microns		sec
			P Z'	0.3	0.5
			S N	2.1	6
			M E	9.3	21
			M N	4.7	18
			M Z	15	22
			D = 3000 km = 27°.		
		Ki	iP	19	41 31.2
			i	19	41 45.7
			iS	19	46 33
			iSn	19	47 30
			e	19	47 43
			e(SS)	19	48 19
			microns		sec
			P Z'	0.7	1.0
			S E	1.7	5
			S N	1.6	8
			M E	7.4	18
			M N	4.5	18
			M Z	14	18
			D = 3450 km = 31°.		
		Sk	iP	19	41 32.6
			iPP	19	42 39.9
			iSn	19	47 31
			i	19	49 33.8
		Gb	iP	19	41 13.4

1963					
Jan	27	Gb	i	19	41 39.1
cont.			iSn	19	46 45.7
		Um	iP	19	41 07.4
			eS	19	45 48
			iSn	19	46 38.1
			iLg1	19	50 19
			iLg2	19	50 48
			D = 3150 km = 28½°.		
		Ka	iP	19	40 52.0
			iSn	19	45 54.4
		Caspian Sea (h = 30 km).			
		Magn. = 6.1 (Up, Ki).			
		The phase denoted Sn and preliminary interpreted in this way is an extremely clear phase in all short-period records, and to our knowledge observed at so large distances for the first time. Its velocity in km/sec is: 4.64 (Up), 4.69 (Ki), 4.72 (Sk), 4.65 (Gb), 4.63 (Um), 4.64 (Ka), i.e. in average 4.66 km/sec. The extremely homogeneous structure of the Russian platform may favour the propagation of Sn to large distances.			
"	28	Up	iP	04	16 32.8
			microns		sec
			M E	2.4	18
			M N	1.9	19
			M Z	1.3	20
		Ki	iP	04	16 02.8 C
			microns		sec
			M E	2.6	20
			M N	1.4	19
			M Z	1.4	18
		Gb	iP	04	16 53.3
		Um	iP	04	16 10
		Near south coast of Hokkaido, Japan (h = 30 km).			
		Magn. = 5.6 (Up, Ki).			
"	28	Up	i(P)	06	46 02.5
"	28	Ki	iP	09	32 06.6
"	28	Ki	iP	11	26 43.6
"	28	Up	ePP	12	31 30
			iS	12	38 58.3
			ePS	12	41 08
			e	12	48 56

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Jan 28 cont.	Up	eSSS		12 51 20	
		(D = 12300 km = 110½°).			
	Ki	ePP		12 30 59	
			microns	sec	
		PP	Z 1.8	5	
	Um	iPKP		12 30 51.3	
		ePP		12 31 08	
		i		12 37 04	
		eSKS		12 37 20	
		iS		12 38 47	
		ePS		12 40 36	
		iSS		12 46 39	
		(D = 12000 km = 108°).			
	New Britain (h = 30 km).				
" 28	Up	iP		13 11 34.3 C	
		iP'P'		13 40 13	
			microns	sec	
		P	N 0.8	1	
		P	Z 1.1	1	
		P	Z' 1.2	0.8	
		M	E 22	18	
		M	N 59	26	
		M	Z 57	26	
	Ki	iP		13 10 40.1 C	
			microns	sec	
		P	N 2.6	5	
		P	Z 3.7	5	
		P	Z' 1.9	1.2	
		M	E 20	20	
		M	N 11	18	
		M	Z 22	18	
	Sk	iP		13 11 09.0 C	
		i		13 11 27.8	
	Gb	iP		13 11 47.3 C	
		eP'P'		13 39 58	
	Um	iP		13 11 07.5 C	
		iP'P'		13 40 20	
	Ka	iP		13 11 57.4 C	
		e(P'P')		13 40 14	
	Alaska (h = 30 km).				
	Magn. = 6.9 (Up, Ki).				
" 28	Up	iPKP		14 08 38.5	
	Gb	iSKP		14 11 35.8	
	Um	iPKP		14 08 32.2	
	Fiji Islands (h = 590 km).				
" 28	Ki	i(P)		14 30 37.7	
" 28	Up	iP		15 01 11.1	
			microns	sec	
		M	E 1.9	20	
		M	N 2.0	20	
		M	Z 1.9	20	

1963 Jan 28 cont.	Ki	iP		15 01 43.8	
			microns	sec	
		M	E 1.5	18	
		M	N 1.9	20	
		M	Z 3.7	19	
" 28	Up	iPKP		16 27 04.6	
		i		16 27 10.6	
			microns	sec	
		PKP	Z' 0.1	0.5	
	Ki	iPKP		16 26 45	
	Sk	iPKP		16 26 59.5 C	
	Gb	iPKP		16 27 11.4	
		i		16 27 22	
	Um	iPKP		16 26 52.5 C	
	Ka	iPKP		16 27 13.1	
	Kermadec Islands (h = 30 km).				
" 28	Up	iPKP		17 24 39.6	
	Sk	iPKP		17 24 29.1 C	
	Gb	iPKP		17 24 43.0	
	Um	iPKP		17 24 24.3 C	
	Kermadec Islands (h = 180 km).				
" 29	Gb	eP		07 39 40	
	Indian Ocean (h = 30 km).				
" 29	Up	iP		08 12 44.1	
	Um	iP		08 12 20.3 D	
		i		08 12 32.9	
	Off coast of Honshu, Japan (h = 25 km).				
" 29	Up	iP		09 31 44.2 C	
		ipP		09 32 16.6	
		isS		09 40 57	
			microns	sec	
		P	Z 0.8	1	
		P	Z' 0.3	0.5	
		M	E 1.4	18	
		M	N 2.5	18	
		M	Z 2.3	18	
		(D = 7100 km = 64°).			
	Ki	iP		09 30 53.2 C	
			microns	sec	
		P	Z' 0.5	0.6	
		M	E 2.7	20	
		M	N 1.6	20	
		M	Z 3.5	20	
	Sk	iP		09 31 29.7 C	
	Gb	iP		09 32 04.8 C	
		i		09 32 29.2	
		i		09 35 06	
	Um	iP		09 31 16.8 C	
		ePP		09 33 29	
		i		09 35 06	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Jan cont.	29	Um	iS	09 39 21	
			(D = 6650 km = 60°).		
		Ka	iP	09 32 08.4	C
		Kurile Islands.			
		h = 140 km (Up).			
		Magn. = 6.4 (Up, Ki).			
"	29	Um	i(P)	12 04 13.2	
"	30	Up	iP	04 50 40.0	C
		Ki	iP	04 49 45.9	C
		Sk	iP	04 50 14.9	C
		Gb	iP	04 50 53.1	C
		Um	iP	04 50 13.3	C
			i	04 50 21.7	
		Alaska (h = 30 km).			
"	30	Up	iP	09 39 54.5	
"	30	Up	iPKP	10 28 52.4	
			i	10 28 56.7	
			eSKS	10 35 52	
			iSKKS	10 37 22	
			ePKKP	10 38 57	
			iPS	10 40 21	
			eSS	10 46 41	
				microns	sec
			PKP	Z' 0.1	0.7
			SKS	E 0.6	5
			SKS	N 2.5	10
			M	E 16	24
			M	N 45	21
			M	Z 27	21
			(D = 13350 km = 120°).		
		Ki	iPKP	10 29 06.6	
			e	10 32 25	
			eSKKS	10 38 00	
			iPS	10 41 29	
				microns	sec
			PKP	Z' 0.6	1.4
			M	E 18	18
			M	N 10	18
			M	Z 24	18
		Sk	iPKP	10 28 58.4	
		Gb	ePKP	10 28 48	
			iPP	10 30 09.5	
		Um	iPKP	10 29 00.4	
			i	10 29 06.4	
			ePP	10 30 48	
		Ka	iPKP	10 28 50.3	
		Sandwich Islands region			
		(h = 30 km).			
		Magn. = 7.1 (Up, Ki).			
"	30	Up	iP	10 42 58.9	
			i	10 43 07.5	
1963 Jan cont.	30	Ki	iP	10 43 00.1	
		Sk	iP	10 43 21.3	
		Um	iP	10 42 55.3	
		Ka	iP	10 43 04.0	
		India-Nepal border			
		(h = 60 km).			
"	30	Ki	e(P)	10 59 08	
"	30	Ki	iP	11 04 17.7	
"	30	Up	iPKP	19 54 05.3	
		Sk	iPKP	19 54 01.5	
		Um	iPKP	19 53 54.6	
"	30	Up	iP	20 34 46.3	C
				microns	sec
			P	Z' 0.1	0.5
"	31	Ki	iP	03 18 38.3	
			i	03 18 43.1	
		Sk	iP	03 19 04.6	
		Um	iP	03 19 08.4	
		Alaska (h = 60 km).			
"	31	Ki	e	04 47 19	
			eSn	04 47 38	
			iSg	04 47 55.2	
			D = 360 km = 3.2°.		
		Sk	eSn	04 48 09	
			eSg	04 48 34	
			D = 490 km = 4.4°.		
		Um	iPn	04 47 32.5	
			eSg	04 49 06	
			D = 600 km = 5.4°.		
		Off west coast of Norway,			
		near Lofoten, 68.2°N, 12.0°E.			
		Origin time = 04 46 08			
"	31	Up	iP	05 18 26.4	
			i(pP)	05 18 53	
			ePP	05 21 17	
			ePa	05 23 09	
			eS	05 28 05	
			eSa	05 37 16	
			e	05 39 39	
				microns	sec
			P	Z 1.2	5
			P	Z' 0.1	1.0
			S	E 0.9	10
			S	N 0.7	12
			M	E 32	16
			M	N 23	20
			M	Z 49	18
			D = 8350 km = 75°.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Jan 31 cont.
Ki iP 05 17 59.5
i(pP) 05 18 19.6
ePa 05 22 23
eS 05 27 18

		microns	sec
P	E	0.7	7
P	Z	1.8	8
S	E	2.1	10
S	N	0.6	7
M	E	16	16
M	N	10	15
M	Z	20	16

D = 7900 km = 71°.
Sk eP 05 18 39
Gb iP 05 18 48.0
i(pP) 05 19 13.0
Um eP 05 18 09
i(pP) 05 18 30.8
ePa 05 22 32
eS 05 27 35
eSS 05 32 25
D = 8050 km = 72½°.
Ka iPP 05 21 39.9
Ryukyu Islands. h = 90 km
(Up, Ki, Um, Gb)
Magn. = 6.1 (Up, Ki).

" 31 Ki iP 09 36 46.0

" 31 Ki i(P) 09 54 53.4

" 31 Up iP 11 38 13.9
Ki iP 11 37 19.5
Um iP 11 37 47.1
Alaska (h = 30 km).

" 31 Ki e(Sn) 13 21 02
i(Sg) 13 21 18.5

" 31 Up iP 15 12 14.3 C
iS 15 16 34.0

		microns	sec
P	Z'	0.1	0.5
M	E	0.3	18
M	N	0.9	21
M	Z	0.6	20

D = 2650 km = 24°.
Ki iP 15 13 25.5 C

		microns	sec
P	Z'	0.1	1.0
M	E	0.9	15
M	N	0.4	15
M	Z	0.8	15

Sk iP 15 12 52.3 C
Gb iP 15 12 02.0

1963
Jan 31 cont.
Um iP 15 12 49.7
Ka iP 15 11 36.3 C
Ionian Sea (h = 30 km).

" 31 Up iP 17 11 45.9
i 17 12 03.3
iSn 17 16 56.6
iLg1 17 20 21
iLg2 17 20 59
D = 3000 km = 27°.
Ki iP 17 12 20.4 D
i 17 16 33.9
iSn 17 18 43.7

		microns	sec
P	Z'	0.1	0.8

D = 3450 km = 31°.
Sk iP 17 12 21.3 D
Gb eP 17 11 55
i 17 12 28.8
Um iP 17 11 56.5 D
iSn 17 17 26.8
Ka iP 17 11 39.9
Caspian Sea (h = 30 km).
The phases denoted Sn have the following velocities, km/sec: 4.59 (Up), 4.54 (Ki), 4.64 (Um). They are clearly recorded only by short-period seismographs. Compare remark to earthquake on Jan. 27, 1963, 19 40.

" 31 Up iP 18 54 51
Ki iP 18 54 01.9
Um iP 18 54 28.7 C
Fox Islands, Aleutian Islands
(h = 30 km).

" 31 Up iP 19 20 42
Ki iP 19 19 55.6 C
Um iP 19 20 21.4
Bering Sea (h = 50 km).

" 31 Ki e(P) 20 10 24

" 31 Ki iP 20 34 38.1

Markus Båth
May 21, 1963

Seismological Institute
Uppsala

P R E L I M I N A R Y

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, G Ö T E B O R G,

U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

NOTES: We are using the notation i and e in the same sense as we have always done, i.e. i = time error less than ½ sec, e = time error greater than ½ sec.
Geographical names indicate only the region of the epicenter.

F E B R U A R Y 1 - 28, 1963

1963 Feb	1	Ki	eL	08 33			1963 Feb	2	Up	iP	16 54 30.8 C
			microns sec					2	Up	iP	18 12 08.2
		M	E	0.7	20				Aleutian Islands		
		M	N	0.3	19				(h = 30 km).		
		M	Z	0.6	19						
"	1	Up	iPKP	09 08 57.4			"	2	Gb	iP	18 43 54.2
			i	09 09 02.0							
		Sk	iPKP	09 08 47.9			"	2	Up	iP	19 44 12.7
		Um	iPKP	09 08 42.8 D					Cayman Islands (h = 70 km).		
		Kermadec Islands									
		(h = 50 km).					"	2	Um	eP	21 38 25
									Guatemala (h = 30 km).		
"	1	Ki	iP	11 23 19.6 C							
							"	2	Up	i(P)	22 38 35.2 C
"	1	Up	iP	13 47 49.8							
		Sk	eP	13 48 47			"	3	Gb	iPKP	02 06 41.3
		Um	iP	13 47 00.5					Um	iSKP	02 09 11.5
									Fiji Islands (h = 500 km).		
"	1	Ki	iP	15 20 03.6 C							
							"	3	Up	iP	02 21 01.6
"	1	Ki	iP	15 42 35.6 C					(Greece).		
"	2	Up	iP	04 41 17.5			"	3	Up	iP	13 04 38.8
									Ki	iP	13 04 42.8 C
"	2	Ki	i(P)	09 53 01.2					Sk	iP	13 04 25.8
									Um	iP	13 04 43.8 C
"	2	Um	iP	10 13 24.8					Venezuela-Colombia		
									(h = 30 km).		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Feb 3 Up iP 14 26 54.0

" 3 Up iP 14 30 35.6
Ki iP 14 29 13.7
Um eP 14 29 54
Greenland (h = 30 km).

" 4 Ki iPKP 01 35 30.8
Um iPKP 01 35 35.5 C
New Britain (h = 40 km).

" 4 Up iP 05 22 07.7
Ki eP 05 22 42
Sk iP 05 22 48
Um iP 05 22 19.3
Southern Iran (h = 30 km).

" 4 Up iP 07 25 47.1
Ki iP 07 26 20.1 C
Sk iP 07 26 18.6
Um eP 07 25 58
Southern Iran (h = 30 km).

" 4 Um iP 13 04 50.3 C

" 4 Ki eP 15 45 43

" 4 Ki iP 16 26 39.0
Um iP 16 26 49.8
Ryukyu Islands (h = 30 km).

" 4 Up iP 23 31 05.6
Ki iP 23 30 33.4
Sk iP 23 31 02.2
Um iP 23 30 47.2

" 4 Up iP 23 31 51.1 C
iPcP 23 32 23.4
microns sec
P Z' 0.5 0.5
Ki iP 23 31 01.5 C
iPcP 23 31 49.0
microns sec
P Z' 0.2 0.7
M E 0.8 17
M N 0.2 16
Sk iP 23 31 37.2
iPcP 23 32 14.8
Gb iP 23 32 11.1
Um iP 23 31 24.2 C
eS 23 39 46
Ka iP 23 32 18.9
Kurile Islands (h = 90 km).

" 5 Um iP 02 00 56.6
Celebes (h = 160 km).

" 5 Ki eP 05 16 30

1963
Feb 5 Um iP 05 16 44.6
cont. Mariana Islands (h = 40 km).

" 5 Up iP 09 42 29.3
Ki iP 09 42 26.5 D
Sk iP 09 41 59.2 D

" 5 Um iP 11 53 16.0 C

" 5 Up iP 12 19 10.5
Ki iP 12 18 16.3 C
Sk iP 12 18 46.7 C
Gb iP 12 19 24.5
Um iP 12 18 43.6 C
Aleutian Islands (h = 30 km).

" 5 Up iPKP 14 22 53
Um iPKP 14 22 36.7 D
Kermadec Islands (h = 140 km).

" 5 Up iPKP 19 49 12.4 C
i 19 49 18.9
microns sec
PKP Z' 0.1 0.8
Ki ePKP 19 48 50
Sk iPKP 19 49 05.5
Gb ePKP 19 49 18
Um iPKP 19 49 00.0 C
Kermadec Islands (h = 70 km).

" 5 Up iPKP 20 58 11.8
e 21 11 04
i 21 11 13
iSS 21 16 35
microns sec
M E 8.0 20
M N 6.1 19
M Z 11 20
Ki iPKP 20 58 20.1
iPP 21 00 17
e(SKP) 21 01 36
ePS 21 10 11
iSS 21 17 29
microns sec
PP Z 1.7 5
(SKP) E 0.8 9
M E 8.2 20
M N 3.2 18
M Z 8.0 20
(D = 14100 km = 127°).
Um iPKP 20 58 17.4
iPP 21 00 10
i(SKP) 21 01 31
e 21 02 36
i 21 08 16
(D = 14000 km = 126°).
Chile (h = 40 km).
Magn. = 6.7 (Up, Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Feb 6 Up i 01 53 27
microns sec
M E 3.4 20
M N 2.8 20
M Z 3.9 20
Ki eSS 01 59 31
microns sec
M E 2.9 20
M N 1.9 20
M Z. 2.8 20
Um ePKP 01 40 25
iPKKS 01 54 05
eSS 01 59 10
Chile (h = 30 km).
Magn. = 6.2 (Up, Ki).

" 6 Up iP 02 09 25.7
Ki iP 02 09 16.3
Flores Sea (h = 310 km).

" 6 Up iP 03 40 16.1
Ki iP 03 40 19.8
Sk eP 03 40 04
Um iP 03 40 21.6 C
Colombia-Venezuela
(h = 110 km).

" 6 Um iPKP 06 12 10.3
Fiji Islands (h = 500 km).

" 6 Ki iP 07 14 32.7 C
Sk iP 07 14 21.2
Um iP 07 14 37.0
Panama (h = 60 km).

" 6 Up -
microns sec
M E 1.7 18
M N 1.1 18
M Z 2.9 18
Ki -
microns sec
M E 1.2 21
M N 0.6 16
M Z 1.9 19
Um eSS 10 54 27
Bismarck Sea (h = 30 km).

" 6 Um e(P) 15 56 40

" 6 Up iP 18 27 29.4
Ki iP 18 26 34.9
Sk iP 18 27 23.8 C
Gb iP 18 27 49.1 C
Um eP 18 27 01
Ka iP 18 27 54
Komandorskie Islands
(h = 30 km).

1963 Feb 6 Ki iPKP 21 05 46.9
Sandwich Islands
(h = 30 km).

" 6 Um i(P) 21 48 31.0

" 7 Um iP 01 43 34.9

" 7 Up eP 09 46 45

" 7 Up iP 12 56 24.2

" 7 Ki iP 16 54 27.3
Um iP 16 54 11.0
Gulf of Aden (h = 30 km).

" 7 Up iP 17 23 56.3

" 7 Gb iPKP 17 28 06.7
Um iPKP 17 27 46.7
Kermadec Islands
(h = 30 km).

" 7 Ki iP 17 48 34.1
Um iP 17 48 52.2
Luzon (h = 150 km).

" 7 Up iP 17 57 55.6
i 17 58 00.2

" 7 Up i(P) 19 50 02.6

" 7 Up i(P) 21 20 18.9

" 8 Up iPKP 02 48 18.9
Gb iPKP 02 48 27.2
Kermadec Islands
(h = 190 km).

" 8 Up iP 03 18 18.0

" 8 Up iP 10 12 35.5
Ki iP 10 11 41.6 D
Sk iP 10 12 18.3
Um iP 10 12 06.9
Kamchatka (h = 30 km).

" 8 Um iP 11 46 09.4

" 8 Ki e(P) 15 56 30

" 8 Um e(P) 18 06 39

" 8 Up iSKP 18 38 30.8
New Hebrides Islands
(h = 630 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Feb	8	Up	iP	22 41 21.8		
			i	22 41 42.9		
		Um	iP	22 40 55.0		
		Kurile Islands (h = 60 km).				
"	9	Up	iP	04 04 28.3		
			i	04 04 31.1		
			i	04 04 36.5		
				microns sec		
			M	E 1.3	17	
			M	N 0.7	18	
			M	Z 0.8	17	
		Ki	iP	04 03 50.0		
				microns sec		
			M	E 1.3	15	
			M	N 1.2	17	
			M	Z 1.2	15	
		Sk	iP	04 04 24.3 D		
		Gb	iP	04 04 53		
		Um	iP	04 04 06.9 D		
			eS	04 12 54		
		Japan (h = 30 km).				
"	9	Ki	iPn	05 39 48		
			iSn	05 40 42.1		
			iSg	05 41 05.9		
			D = 500 km = 4.5°.			
		Sk	eSg	05 43 35		
		Um	iSn	05 41 28.1		
			iS*	05 41 43.7		
			iSg	05 42 03.0		
			D = 700 km = 6.3°.			
		Northwest Russia, 68.2°N, 31.6°E. Origin time = 05 38 37. Explosion?				
"	9	Up	iP	08 10 51.4		
				microns sec		
			P	Z' 0.1	0.8	
		Ki	iP	08 10 06.6		
		Sk	eP	08 10 30		
		Gb	iP	08 11 08.6		
		Um	iP	08 10 25.2		
		Aleutian Islands (h = 30 km).				
"	9	Up	iSKP	08 58 29.4		
		Um	iPKP	08 55 12.7		
		New Hebrides Islands (h = 130 km).				
"	9	Up	iP	12 01 14.2 C		
"	9	Up	eP	16 13 50		
		Ki	iP	16 13 41.4		
		Sk	eP	16 14 09		
		Um	iP	16 13 43		
1963 Feb	9	Up	iP	16 16 12		
			iPcP	16 16 40.7		
		Ki	iP	16 15 27.2 C		
			i	16 15 37.0		
		Sk	iP	16 16 02.2		
		Gb	iP	16 16 32.3 C		
		Um	iP	16 15 45.7		
			i	16 15 58.5		
		Kurile Islands (h = 30 km).				
"	9	Um	ePKP	17 14 32		
		New Zealand (h = 170 km).				
"	9	Up	iP	17 24 40.2		
		Gb	iP	17 24 46.7		
		Um	iP	17 25 12.9		
"	9	Gb	iPKP	17 26 34.1		
		South of Fiji Islands (h = 550 km).				
"	9	Um	iPKP	23 20 33.0		
		Tonga Islands (h = 70 km).				
"	10	Up	iP	05 21 39.9		
		Ki	eP	05 20 52		
		Um	iP	05 21 14.2		
		Aleutian Islands (h = 30 km).				
"	10	Ki	iP	05 25 25.4		
		Um	i(P)	05 26 37.5		
"	10	Up		-		
				microns sec		
			M	E 0.6	15	
			M	N 0.3	14	
			M	Z 0.3	10	
		Ki	eP	06 56 15		
			i	06 58 19.0		
				microns sec		
			M	E 0.5	14	
			M	N 0.3	12	
			M	Z 0.5	10	
		Um	iP	06 56 33.8		
		Lake Baikal (h = 25 km).				
"	10	Up	iP	12 11 40.5 C		
		Um	iP	12 11 16.5 C		
		Japan (h = 50 km).				
"	10	Up	eP	12 50 55		
"	10	Up	iP	15 11 13.5		
		Ki	iP	15 11 20.9		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963					
Feb	10	Sk	iP	15 10 48.9	C
cont.		Gb	e(P)	15 10 54	
		Um	iP	15 11 20.3	
		North Atlantic Ocean (h = 40 km).			
"	10	Ki	iP	15 26 47.4	
"	10	Um	iP	16 46 40.1	
"	10	Um	iP	17 54 42.7	
		Hindu Kush (h = 120 km).			
"	10	Up	e(P)	21 15 36	
"	10	Up	iP	21 46 43.7	C
				microns sec	
			P	Z´ 0.1 0.5	
		Ki	iP	21 45 57.5	
		Sk	iP	21 46 33.8	
		Gb	iP	21 47 05	
		Um	iP	21 46 18.8	
		Kurile Islands (h = 70 km).			
"	11	Up	iPKP	04 55 13.6	
			i	04 55 17.6	
				microns sec	
			PKP	Z´ 0.1 0.5	
		Sk	iPKP	04 55 07.1	
		Gb	iPKP	04 55 22.0	
		Um	iPKP	04 55 01.9	
		Kermadec Islands (h = 530 km).			
"	11	Ki	iP	06 28 26.5	
		Um	iP	06 28 21.5	
"	11	Um	eP	08 25 06	
			i	08 25 17.1	
"	11	Ki	eP	12 57 17	
"	11	Ki	iP	14 34 22.5	C
		Um	iP	14 35 36.8	C
"	11	Um	iP	15 14 24.5	
		Alaska (h = 30 km).			
"	11	Up	e(P)	21 30 25	
		Sk	e(P)	21 30 10	
"	12	Up	iP	00 38 41.3	C
			i	00 38 58.7	
		Ki	iP	00 38 19.4	C
		Gb	eP	00 39 00	

1963					
Feb	12	Um	eP	00 38 24	
cont.		Luzon (h = 30 km).			
"	12	Um	eP	04 53 08	
"	12	Up	i(P)	05 55 35.0	
"	12	Ki	iPn	06 29 51.7	
			iSn	06 30 45	
			D = 500 km = 4.5°		
		Um	iSn	06 31 32.2	
			iSg	06 32 11.3	
			D = 710 km = 6.4°.		
		Northwest Russia, 68.3°N, 31.6°E. Origin time = 06 28 40. Explosion?			
"	12	Ki	iP	09 35 47.7	
			iSg	09 36 23.2	
"	12	Ki	e(P)	14 04 18	
"	12	Ki	iP	21 45 13.0	
		Um	eP	21 45 48	
			e	21 45 58	
"	12	Up	iPKP	23 25 33.3	
		Ki	iPKP	23 25 30.0	C
		Ki	iSKP	23 27 57.6	
		Sk	ePKP	23 25 33	
			iSKP	23 28 15.9	
		Gb	iPKP	23 25 43.3	
		Um	ePKP	23 25 28	
			e	23 25 37	
			eSKP	23 28 11	
		Ka	iPKP	23 25 52	
		Fiji Islands (h = 580 km).			
"	13	Ki	iP	00 26 22.5	
"	13	Sk	iP	00 35 12.2	
		Um	iP	00 35 27.4	
		Guatemala (h = 120 km).			
"	13	Up	iP	01 44 11.4	
			i	01 44 19.5	
		Ki	iP	01 44 44.1	
		Sk	iP	01 44 42.1	
			i	01 44 51.8	
		Gb	iP	01 44 19.9	
		Um	iP	01 44 24.4	
			i	01 44 34.7	
			eS	01 52 23	
		Ka	iP	01 44 06.3	
		Arabian Sea (h = 30 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Feb	13	Up	iP	01 58 08.1	
			i	01 58 19.6	
"	13	Up	iP	03 14 19.7	D
		Ki	iP	03 14 54.4	
		Sk	iP	03 14 54.0	
		Um	iP	03 14 32.2	
			i	03 17 07.3	
		Ka	iP	03 14 13.9	
		Southern Iran (h = 30 km).			
"	13	Um	eP	03 40 06	
"	13	Ki	i(P)	04 29 07.5	
"	13	Ki	i(P)	05 13 24.1	
"	13	Ki	iPn	05 43 14.1	
			iSn	05 44 09.1	
			D = 510 km = 4.6°.		
		Sk	eSg	05 46 58	
		Um	eSn	05 44 54	
			iSg	05 45 31.3	
			i	05 45 41.8	
			D = 710 km = 6.4°.		
		Northwest Russia, 68.2°N, 31.8°E.Origin time = 05 42 01. Explosion?			
"	13	Ki	e	08 21 44	
			iSn	08 21 59.9	
		Um	iSg	08 23 28.8	
		Same area as for preceding event. Explosion?			
"	13	Up	iP	09 01 46.9	C
			iPP	09 04 40	
			i	09 05 23.3	
			iPa	09 06 32.7	
			i	09 08 00	
			iS	09 11 25	
			microns	sec	
			P E 4.7	5	
			P N 3.0	5	
			P Z 10	5	
			P Z' 0.4	0.5	
			PP E 1.3	4	
			PP Z 3.8	7	
			S N 12	10	
			M E 550	18	
			M N 330	18	
			M Z 560	18	
			D = 8450 km = 76°.		
		Ki	iP	09 01 23.2	C
			i(PP)	09 03 55	
			iPP	09 04 02.7	

1963 Feb cont.	13	Ki	iPa	09 05 47	
			iS	09 10 38	
			iScS	09 11 36	
			microns	sec	
			P E 6.2	6	
			P N 1.2	7	
			P Z 15	7	
			P Z' 12	2.9	
			PP E 3.8	4	
			PP Z 6.6	8	
			PP Z' 2.5	2.4	
			S E 18	12	
			S N 8.2	10	
			M E 106	13	
			M N 130	19	
			M Z 200	20	
			D = 8000 km = 72°.		
		Sk	iP	09 01 50.8	C
			i	09 02 58.1	
		Gb	iP	09 02 07.1	C
			iPP	09 05 09.2	
		Um	iP	09 01 31.9	C
			iPP	09 04 08	
			iPa	09 06 01	
			iS	09 10 54	
			D = 8100 km = 73°.		
		Ka	iP	09 01 57.9	C
		Northern Formosa (h = 30 km). Magn. = 7.4(Up.Ki). Exceptionally clear and well developed Pa.			
"	13	Up	iP	09 17 06.2	
"	13	Up	iP	09 21 14.3	
			i	09 21 44.4	
		Ki	iP	09 20 50.1	
			i	09 20 57.0	
		Sk	eP	09 21 18	
		Gb	iP	09 21 34.4	
		Um	iP	09 20 58.3	
			i	09 21 06.0	
			iPcP	09 21 14.4	
		Northern Formosa.			
"	13	Up	iP	09 42 17.8	
			i	09 42 22.4	
			microns	sec	
			P Z' 0.2	1.2	
		Ki	iP	09 41 56.7	
		Sk	iP	09 42 23.5	
		Gb	iP	09 42 38.4	
		Um	iP	09 42 03.3	
			i	09 42 06.4	
		Ka	iP	09 42 30.0	
		Northern Formosa (h = 30 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Feb 13 Up iP 12 49 26.4
i 12 49 38.6
microns sec
M E 0.5 10
M N 0.8 11
M Z 0.8 10
Ki -
microns sec
M E 0.9 13
M N 0.7 10
M Z 1.3 10
Sk iP 12 50 16.3
Gb eP 12 49 21
Um iP 12 50 15.3
Italy.

" 13 Up iP 15 09 28.7

" 13 Up iPKP 18 32 50.3
i 18 34 20
microns sec
M E 6.4 22
M N 7.1 23
M Z 8.2 21
Ki iPKP 18 32 39.1
ePP 18 33 45
ePKKP 18 43 12
microns sec
PP E 1.3 3
PP N 0.6 5
PP Z 1.2 8
M E 13 20
M N 8.4 19
M Z 21 21
(D = 13000 km = 117°).
Sk iPKP 18 32 49.6
Gb iPKP 18 32 59.6
Um iPKP 18 32 41.2
i 18 32 45.3
iPP 18 34 01
Ka iPKP 18 32 57
Solomon Islands(h = 30 km).
Magn.= 6.8 (Up,Ki).

" 13 Up e(P) 18 45 03
i 18 46 02.2

" 13 Up eP 19 13 52
i 19 13 58.3
Ki iP 19 13 27.5
Sk eP 19 13 57
Um iP 19 13 36.2
Northern Formosa
(h = 30 km).

" 13 Up iP 20 05 18.3

1963
Feb 13 Ki eP 20 05 57
cont. Sk iP 20 05 45.9
Gb iP 20 05 26.5
Um iP 20 05 29.3 C
i 20 05 43.0
Ka eP 20 05 11
Socotra region (h = 30 km).

" 13 Up i(P) 20 52 32.7

" 13 Up i(P) 23 45 25.1

" 14 Up iP 01 40 44.3

" 14 Up iP 02 10 21.8

" 14 Ki iP 07 14 46.2 D
microns sec
P Z' 0.3 1.9
Sk iP 07 15 20.4
Um iP 07 15 14.8 D

" 14 Up iP 07 18 33.4
i 07 18 36.3
i 07 21 46.1
i 07 21 53.7
i(PKP) 07 22 45.2
e 07 25 21
ePS 07 32 27
e 07 33 12
microns sec
M E 4.0 21
M N 4.9 21
M Z 3.2 20
(D = 11900 km = 107°).
Ki iP 07 18 20.4 C
i 07 18 27.0
e 07 21 23
iPP 07 22 41.8
iSKS 07 28 42
iPS 07 31 47
iPKKP 07 34 22.0
eSS 07 37 19
microns sec
P Z' 0.2 1.4
SKS E 0.9 6
SKS Z 1.2 4
M E 5.5 20
M N 3.5 19
M Z 4.4 17
(D = 11550 km = 104°).
Sk iP 07 18 40.4
i 07 18 49.2
e 07 22 19
iPKP 07 22 34.7
i 07 22 55.5

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Feb cont.	14	Sk	iPKKP	07 33 59.6	
			(D = 12000 km = 108°).		
		Gb	iP	07 18 51.2	
			i	07 22 21	
			iPP	07 23 32.2	
			(D = 12200 km = 110°).		
		Um	iP	07 18 24.5	C
			i	07 18 31.5	
			e	07 21 32	
			iPP	07 22 44.3	
			i	07 23 09.9	
			iSKS	07 28 59	
			iS	07 30 01	
			(D = 11650 km = 105°).		
		Ka	iP	07 18 39	
			iPP	07 23 13	
			i	07 23 30.3	
			(D = 12100 km = 109°).		
		Banda Sea (h = 200 km).			
"	14	Ki	iP	07 29 09.0	
"	14	Up	i(P)	10 54 56.3	
"	14	Um	i(P)	10 58 06.7	
"	14	Um	i(P)	11 43 08.4	
"	14	Up	iP	12 20 16.0	
			i	12 20 25.8	
			eS	12 29 23	
			eScS	12 30 22	
				microns	sec
			P	Z' 0.1	1.2
			S	N 0.3	5
			M	E 3.5	24
			M	N 1.8	18
			M	Z 3.7	19
			D = 7650 km = 69°.		
		Ki	iP	12 20 53.6	
			eSS	12 35 27	
				microns	sec
			P	Z' 0.3	1.5
			M	E 2.2	20
			M	N 1.7	19
			M	Z 4.2	20
		Sk	iP	12 20 21.6	
		Gb	iP	12 19 54.7	
		Um	iP	12 20 37.1	
			eS	12 30 05	
		Ka	iP	12 19 58.7	
		Mid-Atlantic Ocean (h = 30 km). Magn. = 5.8 (Up.Ki).			

1963 Feb	14	Up	iP	12 52 29.3	
		Sk	eP	12 53 10	
		Um	iP	12 53 11.8	
		Ka	iP	12 51 48.8	
		Albania (h = 30 km).			
"	14	Up	iP	13 22 37.4	
			iLg1	13 27 29.8	
			eLg2	13 27 45	
			eRg	13 28 57	
				microns	sec
			P	Z' 0.2	0.5
		Ki	iP	13 24 05.2	
			eRg	13 33 37	
				microns	sec
			M	E 0.5	10
			M	N 1.0	10
			M	Z 1.4	11
		Sk	iP	13 23 19.3	C
		Gb	iP	13 22 05.5	
			iLg2	13 26 21.0	
		Um	iP	13 23 23.8	C
			iS	13 27 11.7	
		Ka	iP	13 21 44.6	C
			i	13 25 34.5	
		Yugoslavia (h = 40 km).			
"	14	Um	iP	13 54 44.8	
"	14	Up	iP	14 21 51.6	
			i	14 22 04.4	
			i	14 22 14.8	
		Ka	i(P)	14 23 12.1	
"	14	Up	iP	17 25 19.5	
		Ki	iP	17 26 02.9	
"	14	Um	iP	18 03 09.4	
			i	18 03 16.3	
"	14	Um	iP	22 06 43.2	
"	14	Up	iPKP	22 26 22	
			iPP	22 27 25	
			eSP	22 36 32	
				microns	sec
			M	E 2.8	22
			M	N 3.2	24
			M	Z 4.0	24
			(D = 12550 km = 113°).		
		Ki	eP	22 22 14	
			i(PKP)	22 26 24.4	
			eSKS	22 32 35	
			eSP	22 35 53	
				microns	sec
			SKS	E 1.0	10

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Feb 14 cont.

Ki — microns sec
M E 4.0 21
M N 3.3 25
M Z 7.0 25
(D = 12000 km = 108°).
Sk iPKP 22 26 21.8
Gb ePKP 22 26 26
Um iPKP 22 26 15.8
iPP 22 26 44.7
iSKS 22 32 40
eSP 22 36 04
ePS 22 36 19
(D = 12200 km = 110°).
Ka iPP 22 27 45
Eastern New Guinea
(h = 80 km).

" 15 Up iPKP 01 08 37.7
microns sec
PKP Z' 0.1 0.6
Ki iPKP 01 08 18.9
Sk iPKP 01 08 32.9
Gb iPKP 01 08 46.4
Um iPKP 01 08 26.1
i 01 08 33.5
Ka ePKP 01 08 59
Kermadec Islands(h = 40 km).

" 15 Ki iPg 06 49 12.5
iSn 06 49 56.5
iSg 06 50 13.0
D = 500 km = 4.5°.
Um iSn 06 50 40.7
iSg 06 51 20.2
D = 710 km = 6.4°.
Northwest Russia,68.3°N, 31.6°E.
Origin time = 06 47 48.
Explosion?

" 15 Sk iPKP 07 14 51.5 D
Um iPKP 07 14 47.0
Fiji Islands (h = 30 km).

" 15 Up iP 09 42 11.2

" 15 Up iP 10 22 51.2
microns sec
P Z' 0.1 0.9
M E 1.1 20
M N 1.4 18
M Z 1.6 20
Ki -
microns sec
M E 1.6 14
M N 0.7 13
M Z 2.4 14
Sk iP 10 23 34.7 C

1963
Feb 15 cont.

Gb iP 10 22 36.6
Um iP 10 23 32.6 C
i 10 23 39.4
eS 10 27 48
Ka iP 10 22 07.1
Albania (h = 30 km).

" 15 Up iP 10 47 20.1
Sk iP 10 47 10.7
Um iP 10 47 03.5

" 15 Up i(P) 14 59 17
Local explosion?

" 15 Ki iP 15 30 35.6

" 15 Sk iP 15 58 01.6
Lake Baikal.

" 15 Up iP 16 41 29.4
i 16 41 43.7
Ki iP 16 41 30.6 C
Sk eP 16 41 44
Gb iP 16 41 44.0
Um iP 16 41 26.6
i 16 41 40.9
Ka iP 16 41 33 C
Sumatra (h = 30 km).

" 15 Up iP 20 44 24.7

" 15 Up iP 21 03 30.5
Ki iP 21 02 13.6

" 15 Um iP 22 49 05.1

" 16 Um i(P) 03 45 40.9
iSg 03 46 29.5

" 16 Up iP 04 18 14.4

" 16 Ki iP 05 02 29.1 C
Um iP 05 03 13.3

" 16 Ki eP 05 57 13
South of Mindanao
(h = 130 km).

" 16 Up iP 06 26 22.3
ipP 06 26 42.8
Ki iP 06 27 25.3
ipP 06 27 48.9
Sk eP 06 27 17
Gb eP 06 26 16
Um eP 06 27 09

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Feb cont.	16	Ka	iP	06 26 05	
		Turkey. h = 110 km (Up,Ki).			
"	16	Up	iP	06 33 29.5	C
		Gb	iP	06 33 28.2	
		Um	iP	06 33 39.2	
"	16	Up	iP	08 44 39.4	
		Ki	iP	08 44 27.8	
		Um	iP	08 44 34.0	
		Negros, Philippine Islands (h = 30 km).			
"	16	Um	iPKP	08 49 29.4	D
		Fiji Islands (h = 530 km).			
"	16	Up	iPKP	11 03 08.6	
			iPP	11 03 23.7	
		Ki	ipP	11 01 12.6	
			ePKP	11 03 11	
		Um	esP	11 02 13	
			iPKP	11 03 13.3	
		Flores Sea (h = 560 km).			
"	16	Up	iP	12 26 52.2	C
			eS	12 32 41	
				microns sec	
			P	Z' 0.1 0.5	
			M	E 0.3 6	
			M	N 0.6 7	
			M	Z 0.5 7	
		Ki	iP	12 27 02	C
				microns sec	
			P	Z' 0.4 1.3	
			M	E 0.7 10	
			M	N 0.5 14	
		Sk	iP	12 27 17.9	C
			iPP	12 29 04.8	
		Gb	iP	12 27 13.8	
			iPP	12 28 58.4	
		Um	iP	12 26 51.0	C
			isP	12 27 58.6	
		Ka	iP	12 26 57.0	C
			ipP	12 27 40.2	
		Hindu Kush. h = 210 km (Um,Ka).			
		Magn. = 5.9 (Up,Ki).			
"	16	Sk	eSg	15 18 28	
"	17	Up	e(P)	01 04 13	
"	17	Up	eP	02 43 28	
		Um	eP	02 43 21	
		Ryukyu Islands (h = 30 km).			

1963 Feb	17	Up	iP	05 45 42.3	
			ipP	05 46 26.7	
		Ki	iP	05 45 50.7	
		Sk	iP	05 46 07.3	
		Um	iP	05 45 40.2	
			ipP	05 46 24.0	
		Ka	iP	05 45 46.4	
		Hindu Kush. h = 220 km (Up,Um).			
"	17	Up	iP	08 33 10.4	C
			i	08 33 18.1	
			iS	08 37 01.2	
			D = 2350 km = 21°.		
		Ki	iP	08 34 06.7	C
			i	08 34 23.6	
			iSn	08 39 23.7	
		Sk	iP	08 33 55.6	C
		Gb	iP	08 33 19.7	C
		Um	iP	08 33 35.3	C
			iSn	08 38 13.3	
		Ka	iP	08 32 53.0	C
		Black Sea (h = 30 km).			
		Concerning Sn, see remark to Jan.27,1963. 19 40			
"	17	Up	iP	11 21 01.5	
		Sk	iP	11 21 37.3	C
		Gb	iP	11 20 40.0	
		Um	iP	11 21 41.0	
		Ka	i(P)	11 20 28.3	
"	17	Um	iP	13 36 56.1	
"	17	Up	iPKP	19 44 59.2	
		Ki	ePKP	19 44 48	
		Gb	iPKP	19 45 09.6	
		Um	iSKP	19 47 41.5	
		Fiji Islands (h = 520 km).			
"	17	Up	iP	20 16 00.0	
				microns sec	
			P	Z' 0.1 1.2	
		Ki	iP	20 17 27.3	
				microns sec	
			P	Z' 0.1 1.3	
		Sk	iP	20 16 42.6	
		Gb	eP	20 15 41	
		Um	iP	20 16 45.0	
		Yugoslavia (h = 30 km).			
"	17	Up	e(P)	22 11 29	
"	17	Um	iP	22 36 12.5	
"	18	Um	i(P)	03 28 31.1	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå, Ka = Karlskrona

1963 Feb	18	Up	i(P)	04 32 09.5	
"	18	Ki	e(Sg)	05 20 30	
		Sk	i(Sg)	05 21 50.4	
"	18	Ki	iPn	06 26 09.2	
			iSn	06 27 04.6	
			iSg	06 27 19.1	
			D = 460 km = 4.1°.		
		Um	iSn	06 27 49.7	
			iSg	06 28 29.9	
			D = 690 km = 6.2°.		
		Northwest Russia, 68.6°N, 30.3°E. Origin time = 06 25 05. Explosion?			
"	18	Um	iP	09 12 40.4	
"	18	Up	iP	10 48 13.0	
"	18	Um	iP	11 08 15.4	
"	18	Um	iP	11 54 33.4	
"	18	Um	iP	14 31 19.7	
"	18	Up	iP	14 32 41.0 C	
			i	14 33 33.8	
			isP	14 33 50.5	
			iPP	14 34 21.2	
			microns sec		
			P	Z' 0.1 0.5	
		Ki	iP	14 32 49.7 C	
			microns sec		
			P	Z' 0.1 0.9	
		Sk	iP	14 33 05.1	
			iPP	14 34 00.1	
		Gb	iP	14 33 02.5	
			ipP	14 33 47	
			iPP	14 34 51.9	
		Um	iP	14 32 39.3 C	
			iPP	14 34 23.1	
			eS	14 38 33	
		Ka	iP	14 32 42.9	
		Hindu Kush. h = 220 km (Up,Gb). Magn. = 5.7 (Up,Ki).			
"	18	Sk	iPKP	15 11 30	
		Um	iPKP	15 11 09.3	
		Kermadec Islands (h = 30 km).			
"	18	Um	iP	15 14 36.1	

1963 Feb	18	Up	iP	15 44 30.8	
"	18	Up	iP	18 29 28.8 C	
		Ki	iP	18 29 24.2	
		Sk	iP	18 28 58.1 C	
		Um	iP	18 29 29.0	
		North Atlantic Ocean (h = 30 km).			
"	18	Up	iP	19 08 28.0	
		Ki	eP	19 08 27	
		Sk	iP	19 07 56.1 D	
		Gb	eP	19 08 14	
		Um	iP	19 08 26.8 D	
		North Atlantic Ocean (h = 30 km).			
"	18	Ki	iP	22 04 26	
		Um	iP	22 04 42.7 D	
		Japan (h = 320 km).			
"	19	Up	iP	01 06 44.7	
		Ki	iP	01 06 45.9	
		Um	iP	01 06 42.4 D	
		Sumatra (h = 90 km).			
"	19	Up	iP	03 21 28.0	
"	19	Up	iP	03 38 17.0	
		Ki	eP	03 37 38	
			e	03 37 53	
		Gb	iP	03 38 37.4	
		Um	iP	03 38 03.7	
"	19	Ki	eP	12 23 13	
		Um	iP	12 23 33.1 D	
		Japan (h = 30 km).			
"	19	Um	iP	13 03 33	
"	19	Up	iPKP	16 58 13.2	
		Ki	i(PKP)	16 58 18.2	
			i	16 58 29.0	
		Um	iPKP	16 58 21.5	
		Sandwich Islands (h = 30 km).			
"	19	Up	iP	18 30 51.7	
			i	18 31 00.4	
"	19	Up	iP	22 40 03.9	
		Sk	iP	22 40 07.0	
		Gb	iP	22 40 23.4	
		Formosa (h = 30 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Feb 20 Ki iP 13 08 42.4 C
Um iP 13 08 50.1

" 20 Um iP 14 00 15.7

" 20 Up iP 14 11 54.0 D

" 20 Up iP 15 12 18.6 D

" 20 Um iP 15 34 18.4

" 20 Up iP 16 56 48.6
Ki iP 16 56 08.6
Sk iP 16 56 42.6
Um iP 16 56 26.1
Japan (h = 180 km).

" 20 Up iP 19 52 15.5 C
microns sec
M E 1.0 20
M N 2.4 20
Ki eP 19 51 52 C
Gb eP 19 52 36
i 19 52 51.4
Um iP 19 52 02.4
Formosa (h = 30 km).

" 21 Up iP 02 45 02.2
iPP 02 47 51.4
microns sec
P Z' 0.1 0.7
Ki iP 02 44 26.9 D
microns sec
P Z' 0.1 0.8
Sk iP 02 44 57.2
Gb iP 02 45 22.0
Um iP 02 44 41.9 D
i 02 44 58.9
Ka iP 02 45 22.1
Japan (h = 170 km).
Magn. = 5.7 (Up,Ki).

" 21 Um iP 08 00 23.3
Japan (h = 30 km).

" 21 Up iP 09 53 05.6 C
i 09 53 09.7

" 21 Ki iP 10 32 24.4

" 21 Up iP 10 33 34.5
i 10 33 57.8
Ki i(P) 10 35 26.5
Sk eP 10 34 25
Um iP 10 34 23
Greece.

1963
Feb 21 Up iP 13 14 07.7
Ki iP 13 13 39.4
Um iP 13 13 51.0
Ka iP 13 14 22.4
Mariana Islands (h = 90 km).

" 21 Gb iPKP 13 35 31.2
Um iPKP 13 35 21.8
Tonga Islands (h = 30 km).

" 21 Gb iPKP 14 47 58.7
Ka iPKP 14 48 10.3
Tonga Islands (h = 30 km).

" 21 Um i(P) 15 26 19.8

" 21 Up iP 17 20 17.3
i 17 20 19.9
eS 17 24 56
iSn 17 25 39
microns sec
P Z' 0.2 1.0
S E 0.2 4
S N 0.8 4
M E 6.5 20
M N 3.7 17
M Z 4.5 16
D = 3000 km = 27°.
Ki iP 17 21 28.3
i 17 21 32.3
iS 17 27 07
eSS 17 29 24
e 17 30 30
microns sec
P Z' 0.5 1.5
S N 1.5 11
M E 8.0 20
M N 2.0 14
M Z 3.1 14
D = 3900 km = 35°.
Sk iP 17 20 55.6
i 17 21 04.3
Gb iP 17 20 04.4
i 17 20 18.5
Um iP 17 20 51.9
iS 17 25 53
Ka iP 17 19 47.1
iS 17 24 08.9
Libya (h = 30 km).
Magn. = 5.6 (Up,Ki).

" 21 Up eP 17 30 26
Ka iP 17 29 52.8
i 17 30 39.5
Libya

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963					
Feb	21	Up	iP	18 38 48.9	D
		Gb	eP	18 38 35	
		Ka	iP	18 38 19.3	D
		Libya (h = 30 km).			
"	21	Up	iP	18 42 09	
		Ka	iP	18 41 35.6	
		Libya.			
"	21	Up	iP	19 08 27.6	C
"	21	Up	iP	20 32 28.4	
		Ki	iP	20 33 38.7	
		Sk	eP	20 33 06	
		Gb	iP	20 32 13.9	
		Um	iP	20 33 02.5	
			i	20 33 29.5	
		Ka	iP	20 31 57.6	
		Libya (h = 30 km).			
"	21	Ki	iP	21 09 33.0	
"	22	Up	iP	01 42 06.6	
		Ki	iP	01 42 04.0	
		Sk	iP	01 42 25.4	
		Gb	eP	01 42 28	
		Um	iP	01 42 00.4	
		Nepal-Tibet (h = 30 km).			
"	22	Up	eP	02 53 03	
		Gb	iP	02 52 49.3	
		Ka	iP	02 52 32.7	
		Libya (h = 30 km).			
"	22	Ki	ePg	05 26 09	
			iSn	05 26 54.7	
			iSg	05 27 12.8	
			D = 500 km = 4.5°.		
		Sk	e	05 29 03	
			eSg	05 29 48	
		Um	iSn	05 27 39.3	
			iSg	05 28 18.5	
			D = 710 km = 6.4°.		
		Northwest Russia, 68.3°N, 31.6°E. Origin time = 05 24 47. Explosion?			
"	22	Up	iP	07 16 35.9	C
			i	07 16 42.7	
			iS	07 21 33	
				microns	sec
			P Z'	0.2	1.4
			M E	4.0	21
			M N	2.7	19
			M Z	2.9	18
			D = 3350 km = 30°.		

1963					
Feb	22	Ki	iP	07 15 19.4	
cont.			i	07 15 25.0	
			iPP	07 15 51.2	
			iS	07 19 23	
			eLg1	07 21 46	
				microns	sec
			P E	0.9	6
			P N	2.4	6
			P Z	3.2	4
			P Z'	0.3	1.5
			PP Z	2.4	5
			PP Z'	3.6	3.0
			S E	9.7	12
			S N	3.8	9
			M E	7.9	19
			M N	6.1	21
			M Z	5.8	21
			D = 2450 km = 22°.		
		Sk	iP	07 16 06.9	C
			iPP	07 16 54.3	
		Gb	iP	07 16 58.8	C
		Um	iP	07 15 57.9	C
			i	07 16 28.8	
			iS	07 20 28	
		Ka	iP	07 17 11.2	C
			i	07 17 18.2	
			iPP	07 18 28.9	
			i	07 20 13.1	
		Arctic (h = 30 km).			
		Magn. = 5.8 (Up,Ki).			
"	22	Ki	iP	07 28 09.5	C
			i	07 28 13.4	
		Sk	iP	07 28 55.6	C
		Gb	iP	07 29 47.8	
		Um	iP	07 28 46.9	C
		Ka	iP	07 29 59.5	
		Arctic (h = 30 km).			
"	22	Um	iP	08 05 12.4	
"	22	Up	iSKP	08 19 59.9	
		Ki	iPKP	08 17 02.0	
		Sk	iSKP	08 19 52.4	
		Gb	iSKP	08 20 09.0	
		Um	iPKP	08 17 08.4	
			iSKP	08 19 47.4	
		Ka	iSKP	08 20 12.6	
		Fiji Islands (h = 550 km).			
"	22	Up	iPKP	11 25 14.9	
			i	11 25 18.6	
				microns	sec
			PKP Z'	0.1	0.5
		Ki	ePKP	11 25 01	
		Sk	iPKP	11 25 08.6	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Feb 22 cont.
Gb iPKP 11 25 21.9
Um iPKP 11 25 01.9
Ka iPKP 11 25 23.5
Kermadec Islands (h = 110 km).

" 22 Up iP 14 17 19.9
eS 14 21 04
microns sec
M E 3.3 10
M N 3.7 15
M Z 3.3 15
D = 2150 km = 19½°.
Ki iP 14 18 38.0
microns sec
M E 9.0 16
M N 2.5 16
M Z 5.3 16
Sk iP 14 18 02.4 D
Gb iP 14 17 05.5
Um iP 14 18 00.4 D
iS 14 22 19.7
Ka iP 14 16 39.6 D
Albania-Greece (h = 30 km).

" 22 Up iP 18 48 39.6

" 22 Up iP 21 25 38.4
Ki iP 21 25 38.9
Gb iP 21 25 23.4
Um iP 21 25 41.9 C
Ka iP 21 25 33.3 C
Dominican Republic
(h = 50 km).

" 22 Up iP 22 40 43.5

" 23 Up iPg 11 05 44.3
iSg 11 05 46.3
Local blast?

" 23 Up iP 14 09 11.1

" 23 Up iP 17 22 27.0

" 23 Up iP 17 23 33.6 D
i 17 23 46.8
microns sec
P Z' 0.1 0.9
Ki iP 17 22 43.0 C
Sk iP 17 23 19.8
Gb iP 17 23 54.8
Um iP 17 23 07.0 C
i 17 23 18.9
Ka iP 17 24 01.6 C
Kurile Islands (h = 50 km).

1963
Feb 24 Ki ePn 05 03 04
eSn 05 04 02
iSg 05 04 24.0
D = 510 km = 4.6°.
Um eSn 05 04 43
iSg 05 05 13.3
D = 690 km = 6.2°.
Northwest Russia, 67.9°N,
31.8°E. Origin time =
05 01 53.

" 24 Up iPKP 06 54 28.4 C
Um iP 06 54 18
Fiji Islands (h = 540 km).

" 24 Up iP 13 46 44.9 C
iPP 13 50 08.8
eS 13 57 14
microns sec
P Z' 0.1 1.0
S E 0.4 3
M Z 1.4 22
(D = 9650 km = 87°).
Ki iP 13 46 35.1 C
iPP 13 49 48.5
microns sec
P Z' 0.3 1.3
M E 9.0 16
M N 2.5 16
M Z 5.3 16
(D = 9450 km = 85°).
Sk iP 13 46 28.0 C
Gb iP 13 46 36.2 C
i 13 46 57.8
Um iP 13 46 42.9 C
ipP 13 47 15.4
iPP 13 50 03.0
eS 13 56 59
Ka iP 13 46 45.5 C
Guatemala. h = 130 km (Um).
Magn. = 5.9 (Up,Ki).

" 24 Um iP 14 44 39.0

" 24 Um eP 15 48 27
i 15 48 33.8

" 24 Up iPKP 17 54 53.5
i 17 54 58.5
Kermadec Islands (h = 30 km).

" 24 Up iP 22 26 11.1
i 22 26 24.6
Ki eP 22 27 41
Sk eP 22 27 03

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963						
Feb	24	Um	eP	22 26 52		
cont.			i	22 27 03.0		
		Ka	iP	22 25 44		
		Greece.				
"	24	Up	iP	22 44 20.2		
		Ki	iP	22 44 40.4		
		Gb	iP	22 43 59.5		
		Um	iP	22 44 35.0		
		North Atlantic Ocean (h = 30 km).				
"	25	Um	iP	01 50 58		
"	25	Um	eP	04 15 30		
"	25	Up	iP	05 02 19.8		
			i	05 02 32.2		
		Um	eP	05 02 06		
		Luzon (h = 60 km).				
"	25	Ki	iP	07 25 35.6		
			iT	07 30 37.0		
			i	07 31 20.8		
		Sk	iP	07 26 12.6		
			iS	07 27 57.9		
			D = 1050 km = $9\frac{1}{2}^{o}$.			
		Um	iP	07 26 23.2		
			iS	07 28 32.5		
			i	07 29 02.9		
			e(T)	07 33 12		
			D = 1150 km = $10\frac{1}{2}^{o}$.			
		Northeast of Jan Mayen (h = 30 km).				
"	25	Up	iPg	08 51 53.7		
			iSg	08 51 55.9		
		Local blast?				
"	25	Ki	iP	09 23 55.0		
		Um	iP	09 23 59.5	D	
		Panay, Philippine Islands (h = 50 km).				
"	25	Um	iP	10 54 41.2		
"	25	Up	iPg	12 57 18.5		
			iSg	12 57 20.7		
		Local blast?				
"	25	Up	iPg	14 44 27.5		
			iSg	14 44 29.5		
		Local blast?				
"	25	Um	iP	15 34 45.0		

1963						
Feb	25	Up	iP	17 22 49.6	C	
			iS	17 32 28		
				microns sec		
			P	Z' 0.1 0.5		
			M	E 1.5 20		
			M	N 1.0 17		
			M	Z 1.7 18		
			D = 8500 km = $76\frac{1}{2}^{o}$.			
		Ki	iP	17 22 25.4	C	
			eS	17 31 40		
				microns sec		
			P	Z' 0.1 1.0		
			S	E 0.3 7		
			S	N 0.3 9		
			M	E 1.8 18		
			M	N 0.8 18		
			M	Z 0.9 14		
			D = 8000 km = 72^{o}.			
		Sk	iP	17 22 52.9	C	
		Um	iP	17 22 34.5		
			eS	17 32 08		
		Ka	iP	17 23 00		
			i	17 23 05.7		
		Formosa (h = 30 km).				
		Magn. = 6.0(Up,Ki).				
"	25	Up	iP	19 33 58.0		
		Um	iP	19 33 44.5		
		Luzon (h = 30 km).				
"	25	Up	iP	22 53 23.8		
"	25	Up	iP	23 57 42.9		
				microns sec		
			M	E 0.8 20		
			M	N 2.7 22		
		Ki	iP	23 57 23.5		
				microns sec		
			M	E 0.7 13		
			M	N 0.9 19		
			M	Z 0.7 14		
		Sk	iP	23 57 46.5		
		Um	iP	23 57 29.4		
			eS	00 07 35		
			D = 9000 km = 81^{o}.			
		Ka	iP	23 57 57		
		Luzon (h = 30 km).				
"	26	Ki	iP	02 25 04.9	C	
		Luzon (h = 60 km).				
"	26	Up	iP	03 09 55.4		
"	26	Up	iP	05 56 39.4	C	
"	26	Up	iPg	07 05 42.0		
			iSg	07 05 43.5		
		Local blast?				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Feb 26 Up iPg 11 19 52.0
iSg 11 19 54.1

		microns	sec
Pg	Z'	0.1	0.5
Sg	Z'	0.2	0.5

Local blast?

" 26 Up iPg 15 21 11.6
iSg 15 21 13.5

		microns	sec
Pg,Sg	Z'	0.1	0.5

Local blast?

" 26 Up iP 19 30 45.0

" 26 Up iP 19 38 41.1

" 26 Up iP 20 28 40.9
iPKP 20 32 29.0
ipPKP 20 33 15.4
iPP 20 33 28
ipPP 20 34 22
iSKS 20 38 58
i 20 40 11
iS 20 40 54
iSP 20 42 47
iPKKP 20 43 05.1

		microns	sec
P	Z'	0.2	0.6
PKP	Z	0.7	5
PKP	Z'	0.1	0.9
PP	E	1.6	4
PP	N	2.5	5
PP	Z	4.5	4
SKS	E	1.5	6
SKS	N	1.0	5
S	E	5.7	9
S	N	5.5	5
M	E	16	20
M	N	55	20
M	Z	21	20

(D = 12900 km = 116°).

Ki iP 20 28 17.9 C
iPKP 20 32 20.2
iPP 20 32 48.6
i(PP) 20 32 55
ipPP 20 33 44.5
iSKS 20 38 33
i(S) 20 39 55
i 20 42 16
iSS 20 48 06

		microns	sec
P	Z'	0.6	1.2
PKP	Z'	0.4	1.0
PP	E	5.0	5
PP	N	1.6	6

1963
Feb 26 Ki cont.

		microns	sec
PP	Z	11	3
PP	Z'	10	3.5
SKS	N	1.8	7
(S)	N	15	9
M	E	27	18
M	N	23	19
M	Z	19	21

(D = 12350 km = 111°):
Sk iP 20 28 41.7 C
i 20 31 49.7
iPKP 20 32 29.9
ipPKP 20 33 16.5
iSKS 20 38 56.5
iSP 20 43 05.9
i 20 43 59.5
Gb iP 20 28 58.3 C
iPKP 20 32 36.8
ipPKP 20 33 23.6
iPP 20 33 59.0
eSP 20 43 33
Um iP 20 28 27.0
iPKP 20 32 23.9
i 20 32 43
iPP 20 33 07.9
ipPKP 20 33 10
iSKS 20 38 41
iS 20 40 29
ipS 20 41 43
iSP 20 42 38
iPKKP 20 43 29.5
iSS 20 48 33
(D = 12550 km = 113°).
Ka iP 20 28 55.9 C
iPKP 20 32 37.2
iPP 20 33 52.7
Eastern New Guinea (h = 170 km).
Magn. = 7.7 (Up,Ki).

" 27 Up iPP 04 49 40
iPKS 04 52 12

		microns	sec
M	E	15	19
M	N	23	19
M	Z	27	19

Ki ePKP 04 48 35
eSKS 04 55 13
ePS 04 58 22

		microns	sec
SKS	E	2.2	16
M	E	15	20
M	N	14	21
M	Z	29	23

(D = 12100 km = 109°).
Sk iPKP 04 48 47.8
Gb iPKP 04 48 53.3 C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Feb cont.	27	Um	iPKP	04 48 33.1	
			i	04 48 41.6	
			ePP	04 49 16	
			ePS	04 58 49	
		New Britain (h = 50 km).			
"	27	Up	eL	06 30	
				microns sec	
			M	E 3.8 20	
			M	N 3.0 21	
			M	Z 6.5 20	
		Ki	eL	06 30	
				microns sec	
			M	E 2.4 18	
			M	N 2.3 18	
			M	Z 5.5 20	
		New Britain (h = 60 km).			
"	27	Up	iPg	07 38 04.9	
			iSg	07 38 07.2	
				microns sec	
			Pg,Sg	Z' 0.1 0.5	
		Local blast?			
"	27	Ki	i(PP)	07 55 49.4	
		Tonga Islands (h = 30 km).			
"	27	Up	iPg	11 54 25.4	
			iSg	11 54 27.4	
				microns sec	
			Pg,Sg	Z' 0.1 0.5	
		Local blast?			
"	27	Up	iP	20 06 16.9	
		Um	iP	20 06 13.9	
"	27	Up	iPKP	20 47 06.4	C
		Gb	iPKP	20 47 14.6	C
		Um	iPKP	20 47 00.8	C
		Ka	iPKP	20 47 07.3	
		New Britain (h = 100 km).			
"	27	Ki	iP	21 23 10.4	
"	27	Up	iP	23 47 02.8	C
		Ki	iP	23 46 09.2	C
		Sk	iP	23 46 37.8	
		Gb	iP	23 47 16.6	
		Um	iP	23 46 36.7	
		Ka	iP	23 47 21.0	
		Alaska (h = 30 km).			
"	28	Up	iP	00 58 42.4	
"	28	Up	iP	01 43 47.5	
		Gb	iP	01 43 52.4	

1963 Feb cont.	28	Um	eS	01 54 41	
			iSS	02 00 34	
		Ka	iP	01 43 44.7	
		Indian Ocean (h = 30 km).			
"	28	Um	eP	06 26 05	
		Japan (h = 60 km).			
"	28	Up	iPg	07 06 14.1	
			iSg	07 06 16.1	
				microns sec	
			Pg,Sg	Z' 0.1 0.5	
		Local blast?			
"	28	Up	e(P)	08 43 45.3	
"	28	Ki	iP	12 43 23	
"	28	Ki	iP	17 14 17.0	
"	28	Ki	iP	18 10 45.5	
"	28	Ki	iP	19 07 30	
"	28	Up	iP	19 21 49.3	
		Gb	iP	19 21 36.4	
		Ka	iP	19 21 16.0	
		(Greece).			
"	28	Up	i(P)	21 39 49.7	

Markus Båth
June 13, 1963

Seismological Institute
Uppsala

PRELIMINARY SEISMOLOGICAL BULLETIN

UPPSALA, KIRUNA, SKALSTUGAN, GÖTEBORG, UMEÅ and KARLSKRONA

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

MARCH 1 - 31, 1963

1963 Mar	1	Up	iP	03 27 03.5	
			i	03 27 07.7	
			iPP	03 28 11.5	
		Ki	iP	03 27 37.8	
		Gb	iP	03 27 25.8	
		Um	eP	03 27 07.5	
		Iran (h = 30 km).			
"	1	Um	iP	04 15 16.5	
		Mexico (h = 30 km).			
"	1	Ki	iSn	05 47 56.0	
			iSg	05 48 14.1	
		Sk	eSg	05 50 49	
		Um	iSn	05 48 41.4	
			iSg	05 49 19.4	
		Northwest Russia, 68.3°N, 31.6°E.			
		Origin time = 05 45 48.			
		Explosion?			
"	1	Up	iP	09 35 46.9	
		Ki	iP	09 36 57.2	
		Um	eP	09 36 21	
		South of Greece (h = 160 km).			
"	1	Up	iP	10 57 02.5	
				microns	sec
			P	Z' 0.1	0.9
			M	E 1.4	15
			M	N 2.2	18
			M	Z 2.3	18
		Ki	iP	10 56 20.4	
				microns	sec
			M	E 2.9	17
			M	N 2.3	19
			M	Z 3.9	17
1963 Mar cont.	1	Sk	eP	10 57 08	
		Gb	iP	10 57 23.7	
		Um	iP	10 56 39.0	
			iPS	11 05 49	
		Japan (h = 40 km).			
		Magn. = 5.6 (Up,Ki).			
"	1	Up	iP	12 03 12.7	
		Ki	iP	12 03 04.0	
		Sk	iP	12 03 30.5	
		Gb	iP	12 03 38.3	
		Um	iP	12 03 02.6	
		Ka	eP	12 03 12	
		Sinkiang Province, China (h = 30 km).			
"	1	Um	iP	15 55 17.5	C
"	1	Up	iP	19 25 14.6	
				microns	sec
			M	E 1.6	21
			M	N 1.9	19
			M	Z 1.6	17
		Sk	eP	19 25 20	
		Gb	eP	19 25 03	
		Um	iP	19 25 37.9	C
		Ka	iP	19 24 55.9	
		Atlantic Ocean (h = 30 km).			
"	2	Up	iP	02 55 55.4	
		Um	iP	02 55 48.0	
		Ka	iP	02 56 02.9	
		East Pakistan - India (h = 40 km).			
"	2	Up	eP	07 47 52	
			i	07 48 05.3	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963						
Mar	2	Up	iP		09 36 53.1	
				microns	sec	
			M	E	1.0	17
			M	N	1.5	19
			M	Z	1.7	18
		Ki	iP		09 36 05.3	
				microns	sec	
			M	E	2.4	18
			M	N	1.5	18
			M	Z	5.0	19
		Um	iP		09 36 27.6	C
		Kurile Islands.				
		Magn. = 5.4 (Up,Ki).				
"	2	Up	iP		11 22 59.7	C
		Ki	iP		11 22 12.3	
		Um	iP		11 22 34.2	C
		Kurile Islands				
		(h = 30 km).				
"	2	Ki	e(P)		12 17 05	
"	2	Up	iP		16 02 41.9	
		Um	eP		16 03 25	
		Greece.				
"	2	Up	iP		17 17 05.8	
		Greece.				
"	2	Um	iPKP		22 35 22.2	
		Tonga Islands				
		(h = 240 km).				
"	2	Ki	i(Sn)		23 03 34.8	
			iSg		23 03 54.0	
		Sk	e(Sg)		23 05 03	
		Um	e		23 04 46	
			i(Sg)		23 05 04.5	
"	3	Up	iP		01 55 34.0	
		Ki	iP		01 55 42.0	C
		Um	iP		01 55 31.8	C
		Ka	iP		01 55 41	C
		Hindu Kush (h = 210 km),				
"	3	Up	iP		07 40 06.2	
"	3	Um	iP		09 50 08.2	
		Aleutian Islands				
		(h = 100 km).				
"	3	Ki	iP		14 01 42.9	
"	3	Ki	iP		14 06 48.1	
"	3	Um	iP		16 24 37.5	C

1963						
Mar	3	Up	iP		16 58 37.4	
		Um	iP		16 58 20.7	D
"	3	Up	iP		17 12 34.0	
		Ki	iP		17 12 42.0	
			ipP		17 13 19.9	
		Sk	iP		17 12 59.5	
		Um	iP		17 12 32.0	
		Ka	iP		17 12 40	
		Hindu Kush				
		h = 180 km (Ki).				
"	3	Up	iP		17 41 06.7	
		Ki	eP		17 40 41	
		Um	iP		17 40 54.6	C
		Missouri, U.S.A.				
"	3	Up	iP		18 47 28.2	
		Um	iP		18 47 37.3	
		Maldive Islands.				
"	3	Ki	iP		21 25 21.9	
"	3	Up	iP		23 10 46.6	C
			i		23 10 52.9	
			iS		23 19 50.5	
			iPKKP		23 29 54.6	
				microns	sec	
			P	Z'	0.1	0.5
		Ki	iP		23 10 14.0	C
				microns	sec	
			P	Z'	0.1	0.8
		Sk	iP		23 10 43.6	
			iPP		23 13 43.7	
		Um	iP		23 10 27.4	C
			iPKKP		23 29 36.5	
		Ka	iP		23 11 02	C
		Japan (h = 490 km).				
		Magn. = 5.5 (Up,Ki).				
"	4	Up	iP		07 47 02.9	C
			i		07 47 09.2	
			i		07 50 13	
			iS		07 51 01	
				microns	sec	
			P	N	2.0	5
			P	Z	1.4	5
			P	Z'	0.2	1.3
			S	N	0.8	5
			M	E	2.2	19
			M	N	5.7	23
			M	Z	3.6	22
		D = 2650 km = 24°.				
		Ki	iP		07 45 37.7	D
			iS		07 48 47	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar 4 cont.

Ki
P N 2.4 5
P Z 2.8 5
P Z' 1.4 1.4
S E 2.9 5
S N 1.8 6
M E 3.5 17
M N 8.9 23
M Z 17 22
D = 1850 km = 16½°.
Sk iP 07 46 21.8
i 07 46 35.7
Gb iP 07 47 20.4
Um iP 07 46 22.5 C
iS 07 50 19
Ka iP 07 47 29
iPcP 07 50 59
North Polar region
(h = 30 km).
Magn. = 5.7 (Up,Ki).

" 4 Up iP 12 48 21.0
Ki iP 12 47 32.5
Um iP 12 47 55.2
Kurile Islands
(h = 140 km).

" 4 Um iP 13 00 48.0 C
Kurile Islands
(h = 30 km).

" 4 Up iP 13 50 27.4
i 13 50 30.2
iS 14 00 11
eSa 14 09 01
P Z' 0.4 1.4
S N 0.7 4
M E 12 20
M N 25 20
M Z 14 21
D = 8450 km = 76°.
Ki iP 13 50 05.4
i 13 50 40
iS 13 59 09
P Z' 0.3 1.5
S E 1.2 8
M E 16 16
M N 12 18
M Z 12 14
D = 7950 km = 71½°.
Sk eP 13 50 32
Gb eP 13 50 46
i 13 50 50.2
Um iP 13 50 10.5
i 13 50 14.0

1963 Mar 4 cont.

Um eS 13 59 35
iSS 14 04 17
D = 8150 km = 73½°.
Ka eP 13 50 35
i 13 50 40
i 13 50 52
Formosa (h = 30 km).
Magn. = 6.4 (Up,Ki).

" 4 Up iP 15 15 42.1 C
iS 15 20 04.9
P Z' 0.1 0.8
S N 0.8 3
M E 4.3 22
M N 2.4 15
M Z 2.8 15
D = 2800 km = 25°.
Ki iP 15 16 49.6 C
P Z' 0.2 1.0
M E 6.6 19
M Z 1.9 15
Sk iP 15 16 20.9
Gb iP 15 15 33.2 C
i 15 15 47.9
Um iP 15 16 13.6 C
i 15 16 16.3
iPP 15 16 55.5
iS 15 21 02.4
D = 3150 km = 28½°.
Ka iP 15 15 05 C
iS 15 19 07
Crete (h = 40 km).
Magn. = 5.5 (Up,Ki).

" 4 Gb i(P) 15 26 06.6 D

" 4 Up ——
M E 2.7 20
M N 2.3 22
M Z 4.3 22
Ki ——
M E 4.0 21
M N 4.0 22
M Z 5.1 22
Gb eP 15 56 28
Um iP 15 56 42.5
eSKS 16 07 16
Ka iP 15 56 34
Peru (h = 30 km).
Magn. = 6.1 (Up,Ki).

" 4 Um iP 20 45 14.2

" 4 Up iP 22 06 46.0
Um iP 22 06 27.6 C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	5	Gb	iP	02 04 00.1	
		Um	iP	02 05 04.5	
		Morocco (h = 30 km).			
"	5	Up	eP	02 44 14	
		Ki	iP	02 44 17.4	C
		Ka	eP	02 44 29	
		Nepal (h = 30 km).			
"	5	Up	i(P)	03 11 29.2	
"	5	Ki	eP	04 28 03	
"	5	Ki	ePn	05 52 28	
			iSn	05 53 23.5	
			iSg	05 53 41.0	
			D = 500 km = 4.5°.		
		Sk	eSg	05 56 13	
		Um	iSn	05 54 08.4	
			iSg	05 54 45.6	
			D = 710 km = 6.4°.		
		Northwest Russia, 68.3°N, 31.6°E. Origin time = 05 51 15. Explosion?			
"	5	Up			
				microns	sec
			M	E 1.5	25
			M	Z 1.7	25
		Um	iP	07 18 40.6	
			eSKS	07 29 21	
		Peru (h = 30 km).			
"	5	Ki	eP	08 00 03	
		Gb	eP	07 58 47	
		Aegean Sea (h = 80 km)			
"	5	Up	iP	13 19 20.9	
		Ki	iP	13 18 49.6	D
		Sk	eP	13 19 17	
		Um	iP	13 19 03.0	D
		Bonin Islands (h = 500 km).			
"	5	Ki	i(P)	20 09 04.0	C
"	5	Um	iP	21 24 09.1	C
"	5	Um	iP	21 50 33.5	
"	6	Um	iP	04 12 18.1	C
			i	04 12 46.5	
"	6	Up	iP	04 41 27.2	C
		Um	iP	04 41 08.5	C

1963 Mar	6	Up	iP	04 49 29.8	
		Ki	eP	04 49 01	
		Sk	iP	04 49 29.0	
		Gb	iP	04 49 49.8	
		Um	iP	04 49 11.5	
		Ryukyu Islands (h = 60 km).			
"	6	Um	iP	07 05 38.8	
		Kamchatka (h = 30 km).			
"	6	Up	iP	08 43 08.4	C
		Ki	iP	08 43 18.2	C
		Sk	iP	08 43 34.0	
		Ka	iP	08 43 13.1	
		West Pakistan (h = 40 km).			
"	6	Um	iP	12 15 19.0	D
"	6	Ki	iPn	17 00 12.0	
			iSn	17 01 00.4	
			iSg	17 01 16.1	
			D = 420 km = 3.8°.		
		Um	iSg	17 02 43.7	
		Northwest Russia, 68.8°N, 30.4°E. Origin time = 16 59 11. Explosion?			
"	6	Um	iPKP	18 11 59.0	D
		Santa Cruz Islands (h = 200 km).			
"	6	Ki	i(P)	21 12 28.1	
"	6	Up	iP	23 34 26.0	
		Um	iP	23 34 04.4	
		Japan (h = 70 km).			
"	6	Um	iP	23 43 27.6	
"	7	Up	i(S*)	04 30 28.2	
			iSg	04 30 41.6	
		Ki	iS*	04 31 27.5	
			i	04 32 10.9	
		Sk	ePn	04 28 09	
			iSn	04 28 58.3	
			iSg	04 29 16.9	
			D = 450 km = 4.1°.		
		Gb	iSn	04 29 22.5	
			iSg	04 29 59.1	
			D = 590 km = 5.3°.		
		Um	i(P*)	04 29 18.1	
			iSn	04 30 21.4	
			i	04 30 57.6	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar 7 cont.

Um iSg 04 31 10.5
D = 840 km = 7.6°.
Ka e(Sn) 04 30 41
West coast of Norway,
61.7°N, 4.8°E.
Origin time = 04 27 02.

" 7 Ki iP 05 24 32.4
Um iP 05 24 53.6
Kurile Islands
(h = 30 km).

" 7 Up iPP 05 43 42.8
eSS 06 01 17
microns sec
M E 3.1 23
M N 4.7 25
M Z 5.3 23
Ki ePKP 05 41 10
i(PP) 05 43 27.3
iPKS 05 44 39
e 05 46 45
microns sec
M E 3.8 18
M N 1.8 17
M Z 4.9 17
(D = 14700 km = 132°).
Um iPKP 05 41 19.1 C
iPP 05 43 45
iPKS 05 44 50
i 06 00 40
Easter Island
(h = 30 km).
Magn. = 6.4 (Up,Ki).

" 7 Ki e(P) 10 26 47

" 7 Um iP 12 28 34.0 C

" 7 Up iPKP 12 35 30.7
microns sec
M E 2.6 22
M N 3.2 20
M Z 4.0 18
Ki iPKP 12 35 39.0 C
iPKS 12 39 07
microns sec
PKP Z' 0.6 2.0
PKS E 2.6 7
M E 5.9 23
M N 2.1 18
M Z 6.7 23
Sk iPKP 12 35 30.7
Gb iPKP 12 35 25.7 C
Um iPKP 12 35 37.2
iPKS 12 39 01
eSS 12 55 31

1963 Mar 7 cont.

Ka ePKP 12 35 25
Chile (h = 50 km).
Magn. = 6.3 (Up,Ki).

" 7 Up iP 13 54 01.3
microns sec
P Z' 0.1 0.8
Ki iP 13 53 08.9
Um iP 13 53 34.0 D
Aleutian Islands
(h = 30 km).

" 7 Up iP 20 30 25.5 C

" 7 Ki i(P) 20 39 17.9

" 7 Up iP 21 57 00.4
i 21 57 26.4
isP 21 58 00.4
microns sec
P Z' 0.2 0.8
Ki iP 21 57 09.0
microns sec
P Z' 0.1 1.0
Sk iP 21 57 26.6
Gb iP 21 57 22.6
Um iP 21 56 58.5
Ka iP 21 57 06.9
Hindu Kush
(h = 200 km).
Magn. = 5.8 (Up,Ki).

" 8 Up iP 00 04 50.6 C
Oregon, U.S.A.
(h = 30 km).

" 8 Um iP 00 20 59.6

" 8 Up iP 00 48 56.9

" 8 Up e(Lgl) 07 58 48
Ka iPg 07 56 44.2
iL 07 56 53.0
Explosion near
Karlskrona.

" 8 Ka iPg 08 03 01.3
iL 08 03 10.3
Local explosion.

" 8 Up e(Lgl) 08 21 18
Ka iPg 08 19 15.1
iL 08 19 24.1
Explosion near
Karlskrona.

" 8 Up i(Lgl) 08 29 45.9

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar 8 cont.

Ka iPg 08 27 43.4
iL 08 27 51.6
Explosion near Karlskrona.

" 8 Up e(Lgl) 08 38 49
Ka iPg 08 36 43.5
iL 08 36 51.7
Explosion near Karslkrona.

" 8 Up e(Lgl) 08 41 39
Ka iPg 08 39 34.0
iL 08 39 41.4
Explosion near Karlskrona.

" 8 Up e(Lgl) 09 08 45
Sk e(Lgl) 09 10 48
Gb eRg 09 08 16
Ka iPg 09 06 40.5
iSg 09 06 44.0
iL 09 06 48.4
D = 30 km = 0.3°.
Explosion near Karlskrona, the largest in the series which started Mar. 8 at 07.56. T-phases are probably recorded at Karlskrona.

" 8 Up iP 09 41 03.3
i 09 41 10.1
Um iP 09 41 38.0

" 8 Up i(P) 12 16 40.1

" 8 Um e(P) 12 25 07

" 8 Up eP 15 17 08
microns sec
M E 1.7 18
M N 1.4 18
M Z 1.7 18
Ki iP 15 17 43.6
eSS 15 32 12
microns sec
P Z' 0.2 2.0
M E 0.8 17
M N 0.5 14
M Z 1.9 23
Sk iP 15 17 12.2 C
Gb iP 15 16 45.7
Um iP 15 17 29.0 C
iS 15 26 58

1963 Mar 8 cont.

Mid-Atlantic Ocean (h = 30 km).
Magn. = 5.5 (Up,Ki).

" 8 Um iPKP 16 23 57.4
Loyalty Islands (h = 110 km).

" 8 Um iP 22 39 20.1
Costa Rica (h = 30 km).

" 8 Up eP 22 55 33

" 9 Up iP 01 33 59.6

" 9 Ki i(P) 01 52 45.7

" 9 Up iP 02 26 25.6 C
Ki iP 02 26 52.9 C
microns sec
P Z' 0.3 1.0
Sk iP 02 26 56.3 C
Gb iP 02 26 37.5 C
Um iP 02 26 34.7 C
iPcP 02 27 52.5
iPP 02 28 31.5
D = 5500 km = 49½°.
Ka iP 02 26 19.2 C
Arabian Sea (h = 30 km).

" 9 Up iPKP 03 08 02.4
Kermadec Islands (h = 30 km).

" 9 Up iP 03 25 43.3

" 9 Up iP 06 55 05.3
Ki eP 06 54 21
Sk eP 06 54 55
Gb iP 06 55 26.9 C
Um iP 06 54 39.6 C
Kurile Islands (h = 30 km).

" 9 Um iP 17 09 13.0 C
Mindanao (h = 30 km).

" 9 Ki eL 17 20
microns sec
M E 0.5 16
M Z 0.9 16
New Britain (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	9	Ki			
				microns	sec
			M	E 0.6	15
			M	N 0.6	20
		Um	eSS	19 30 05	
		New Britain			
		(h = 30 km).			
"	9	Up	iPKP	23 02 11.1	
		Ki	ePKP	23 02 04	
		Gb	iPKP	23 02 20.6	D
		Um	iPKP	23 02 05.0	
			i	23 02 11.0	
		Fiji Islands			
		(h = 530 km).			
"	10	Up	iP	01 36 36.4	C
				microns	sec
			P	Z' 0.2	0.7
		Ki	iP	01 35 42.2	C
				microns	sec
			P	Z' 0.5	1.0
		Sk	iP	01 36 09.5	C
		Gb	iP	01 36 48.4	C
			i	01 37 00.0	
		Um	iP	01 36 10.0	C
		Ka	iP	01 36 58.0	C
		Alaska (h = 30 km).			
		Magn. = 6.4 (Up,Ki).			
"	10	Up	iPKP	01 38 30.9	
		Ki	iPKP	01 38 18.0	
		Sk	iPKP	01 38 28.3	
		Gb	iPKP	01 38 39.2	
		Um	iPKP	01 38 23.7	D
		New Hebrides Islands			
		(h = 140 km).			
"	10	Up	iPKP	01 45 18.3	C
				microns	sec
			PKP	Z' 0.1	0.6
		Gb	iPKP	01 45 27.2	C
		Um	iPKP	01 45 06.5	
"	10	Up	iP	03 05 17.1	C
			i	03 05 21.1	
			eSa	03 23 58	
				microns	sec
			P	Z' 0.4	1.5
			M	E 6.5	20
			M	N 14	18
			M	Z 7.3	19
			D = 8450 km = 76°.		
		Ki	iP	03 04 55.0	
			iS	03 14 15	
				microns	sec
			P	Z' 0.2	1.3

1963 Mar cont.	10	Ki	S	E 0.9	8
			M	E 3.7	15
			M	N 3.5	15
			M	Z 4.6	13
			D = 8000 km = 72°.		
		Sk	eP	03 05 23	
		Gb	eP	03 05 39	
		Um	iP	03 05 01.7	
			i	03 05 04.0	
			eS	03 14 25	
		Formosa (h = 30 km).			
		Magn. = 6.3 (Up,Ki).			
"	10	Up	iP	04 36 02.7	D
		Kurile Islands			
		(h = 30 km).			
"	10	Up	e(P)	06 09 39	
"	10	Sk	iP	06 16 59.7	
		Um	iP	06 17 15.4	
		El Salvador			
		(h = 30 km).			
"	10	Um	iPKP	09 57 40.6	C
		New Hebrides Islands			
		(h = 280 km).			
"	10	Up	eSKSP	11 20 59	
				microns	sec
			M	E 2.0	18
			M	N 2.0	20
			M	Z 2.3	18
		Ki			
				microns	sec
			M	E 0.9	20
			M	N 0.8	18
			M	Z 1.9	21
		Um	eSKSP	11 21 16	
		Chile (h = 70 km).			
"	10	Up	eP	12 01 41	
			i	12 01 54.9	
		Ki	eP	12 01 04	
			i	12 01 13.7	
		Gb	iP	12 02 14.3	
		Um	eP	12 01 15	
			i	12 01 31.7	
		Japan (h = 60 km).			
"	10	Up	iP	12 55 06.9	
		Um	iP	12 54 48.6	
"	10	Up	iP	14 04 35.1	
		Ki	iP	14 04 19.6	C
		Um	iP	14 04 24.1	
		Celebes Sea			
		(h = 40 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	11	Ki	iPn	05 09 18.2	
			iPg	05 09 32.0	
			iSg	05 10 14.0	
			D = 370 km = 3.3°.		
		Um	iSn	05 10 58.2	
			iSg	05 11 33.4	
			D = 640 km = 5.8°.		
		Northwest Russia, 68½°N, 29 1/4°E.			
		Origin time = 05 08 23.			
		Explosion?			
"	11	Up	iP	07 32 25.0	
			iS	07 36 40	
			iLgl	07 39 40	
			microns sec		
			P N 1.8 5		
			P Z 0.9 5		
			P Z' 0.3 1.2		
			S E 2.8 9		
			S N 2.8 7		
			M E 8.5 18		
			M N 8.3 15		
			M Z 5.3 14		
			D = 2550 km = 23°.		
		Ki	iP	07 33 31.7	
			i(PP)	07 34 23	
			i(PcP)	07 36 24.7	
			eS	07 38 29	
			e	07 39 18	
			e	07 41 41	
			iLgl	07 43 19	
			microns sec		
			P Z' 0.5 1.5		
			(PP) N 0.7 4		
			S N 1.2 14		
			M E 6.8 14		
			M N 4.1 12		
			M Z 8.1 12		
			D = 3400 km = 30½°.		
		Sk	iP	07 33 06.9	
		Gb	iP	07 32 21.1	
			i	07 33 04.7	
		Um	iP	07 32 56.7	
			iPcP	07 36 21.2	
			eS	07 37 31	
		Ka	iP	07 31 53.0	
			i	07 32 47.2	
		Turkey (h = 30 km).			
		Magn. 5.7 (Up, Ki).			
"	11	Up	iP	10 35 08.1	
		Ki	iP	10 35 16.8 C	
		Sk	iP	10 35 33.5	
		Gb	iPP	10 37 44.4	
		Um	iP	10 35 06.4 C	
			ipP	10 35 58.0	
1963 Mar cont.	11	Ka	iP	10 35 12.4	
		Hindu Kush, h = 250 km (Um).			
"	11	Up	iP	14 33 20.3	
		Ki	iP	14 32 46.7 C	
		Um	iP	14 33 00.7	
		Japan (h = 400 km).			
"	11	Um	iP	15 33 18.5	
"	11	Um	iP	15 42 55.1	
		Ka	iP	15 43 07.5	
		Mexico (h = 30 km).			
"	11	Um	iP	15 58 43.6	
"	11	Up	iP	20 37 13.9	
		Ki	eP	20 37 19	
"	11	Um	iP	21 26 14.1	
"	11	Um	iP	23 57 32.7	
"	12	Gb	iP	01 45 07.3	
"	12	Um	iP	03 35 02.0	
			i	03 35 14.3	
			i	03 35 27.1	
"	12	Ki	e(P)	06 46 08	
"	12	Up	iP	08 16 12.2	
		Ki	iP	08 15 18.4	
		Sk	iP	08 15 54.9	
		Gb	iP	08 16 32.7	
		Um	iP	08 15 44.2	
		Ka	iP	08 16 35.0	
		Kamchatka (h = 30 km).			
"	12	Up	iP	09 06 38.2	
		Ki		——	
			microns sec		
			M E 0.4 11		
		Sk	iP	09 07 19.5	
		Um	iP	09 07 18.7 D	
		Ka	iP	09 05 56.4	
		Greece.			
"	12	Up	iP	12 44 13.2	
		Um	iP	12 44 34.6	
		Ka	iP	12 43 55.6	
		Turkey (h = 70 km).			
"	12	Up	iP	15 21 18.1	
			micron sec		
			P Z' 0.1 0.8		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar cont.	12	Ki	iP	15 20 01.9	
			i	15 20 10.9	
				microns sec	
			P	Z' 0.3	1.0
			M	E 1.5	18
			M	N 0.7	15
			M	Z 1.6	15
		Sk	iP	15 20 19.2	
			eS	15 22 04	
		Gb	iP	15 21 33.2	
			i	15 21 40.7	
		Um	iP	15 20 41.4	
		Ka	iP	15 21 53.2	
		Jan Mayen (h = 30 km).			
"	12	Um	iP	16 08 37.6	
"	12	Ki	e(P)	17 35 01	
"	12	Ki	eP	19 24 22	
"	12	Up	iP	20 38 16.2	
"	12	Ki	iP	20 47 31.4	
"	13	Um	iP	11 05 41.5	C
		Japan (h = 50 km).			
"	13	Um	iP	15 52 04.6	
"	13	Up	iP	17 34 47.5	
		Um	iP	17 34 46.1	
		Hindu Kush (h = 190 km).			
"	13	Ki	i(P)	20 07 28.0	
"	14	Up	iP	01 54 42.1	
		Sk	eP	01 55 25	
		Um	iP	01 55 29.6	C
		Greece.			
"	14	Um	iPKP	02 16 31.2	
		Australia (h = 30 km).			
"	14	Up	iP	08 12 19.2	
			i	08 12 29.1	
			iS	08 22 18	
				microns sec	
			P	Z' 0.1	0.7
			M	E 1.7	13
			M	N 2.8	23
			M	Z 2.0	13
			D = 8800 km = 79°.		
		Ki	iP	08 11 59.6	
			i	08 12 09.4	
			eS	08 21 43	

1963 Mar cont.	14	Ki	eSa	08 30 16	
				microns sec	
			S	E 0.8	10
			M	E 3.5	13
			M	N 1.3	14
			M	Z 4.0	13
			D = 8450 km = 76°.		
		Sk	iP	08 12 25.7	
		Gb	eP	08 12 38	
		Um	iP	08 12 05.7	
			i	08 12 15.8	
			iS	08 21 50	
		Luzon (h = 50 km).			
		Magn. = 5.8 (Up,Ki).			
"	14	Sk	iP	09 39 35.6	
"	14	Um	iP	18 23 56.6	
		Aleutian Islands (h = 30 km).			
"	14	Up	iP	18 41 37.6	
			i	18 41 48.6	
				microns sec	
			P	Z' 0.1	1.0
		Ki	iP	18 40 50.1	
		Sk	e(P)	18 41 25	
		Gb	iP	18 41 59.0	
		Um	iP	18 41 11.9	
		Kurile Islands (h = 30 km).			
"	14	Um	iP	20 12 02.5	
"	15	Ki	iP	00 17 21.6	
		Um	iP	00 17 26.0	
		Banda Sea (h = 300 km).			
"	15	Up	iP	00 28 57.7	
				microns sec	
			M	E 1.6	21
			M	N 1.7	21
			M	Z 2.3	23
		Ki	iP	00 28 39.4	
			e(S)	00 39 23	
				microns sec	
			P	Z' 0.2	1.0
			(S)	E 0.8	12
			M	E 2.1	18
			M	N 1.0	18
			M	Z 2.2	18
		Sk	iP	00 29 01.3	
		Gb	iP	00 29 14.2	
		Um	iP	00 28 45.5	
			e(S)	00 39 32	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar cont.	15	Ka	iP	00 29 06	
		Mindanao (h = 120 km).			
"	15	Um	iSKP	03 56 09.2	
		Fiji Islands (h = 570 km).			
"	15	Up	iPKP	04 21 31.7	C
		Gb	iPKP	04 21 42.4	
		Fiji Islands (h = 560 km).			
"	15	Ki	iP	05 56 45.6	
		Sk	iP	05 56 15.1	D
		Um	iP	05 56 38.4	
		North Atlantic Ocean (h = 30 km).			
"	15	Up	iP	11 06 11.9	
		Ki	iP	11 05 52.6	
			microns	sec	
		M	E	0.6 14	
		M	Z	0.9 13	
		Um	iP	11 05 58.8	
		Ka	iP	11 06 24.6	
		Luzon (h = 30 km).			
"	15	Sk	iP	14 05 30.8	
"	15	Um	iP	15 12 36.9	
"	15	Um	iP	19 01 10.8	C
		Japan (h = 30 km).			
"	15	Ki	iP	21 07 17.8	
			i(L)	21 07 22.0	
		Possibly local explosion.			
"	16	Ki	iP	02 35 30.0	
		Um	iP	02 36 13.6	C
"	16	Up	iP	03 45 28.5	C
			microns	sec	
		P	Z'	0.1 0.5	
		Ki	iP	03 45 22.9	C
		Sk	iP	03 45 44.8	C
		Um	iP	03 45 20.8	C
			i	03 45 30.5	
		Ka	iP	03 45 37	
		Assam, India (h = 50 km).			
"	16	Up	iP	08 55 47.1	C
			i	08 55 52.2	
			iPa	08 59 30	

1963 Mar cont.	16	Up	iS	09 04 48	
			iSS	09 09 05	
			iP'P'	09 23 54.9	
			iP'P'	09 24 08.4	
			microns	sec	
		P	Z'	2.0 0.7	
		S	E	39 8	
		S	N	85 18	
		P'P'	Z'	0.6 1.5	
		M	E	560 28	
		M	N	430 29	
		M	Z	190 22	
		D = 7550 km = 68°.			
		Ki	iP	08 54 59.4	C
			i	08 55 01.9	
			i	08 55 15	
			iS	09 03 18	
			iSS	09 07 20	
			iP'P'	09 24 12.9	
			iP'P'	09 24 24.5	
			microns	sec	
		P	E	12 5	
		P	Z'	8.0 1.0	
		S	E	24 7	
		S	N	32 11	
		S	Z	48 16	
		P'P'	Z'	1.3 2.0	
		M	E	220 20	
		M	N	200 22	
		M	Z	370 20	
		D = 6800 km = 61°.			
		Sk	iP	08 55 35.7	
			i	08 55 37.7	
			iS	09 04 29.8	
			iP'P'	09 24 06.5	
			iP'P'	09 24 19.0	
		Gb	iP	08 56 08.4	C
			iPP	08 58 45.8	
			eS	09 05 38	
			eP'P'	09 23 52	
			iP'P'	09 24 11.0	
		Um	iP	08 55 21.4	C
			i	08 55 26.6	
			i	08 55 42	
			iPP	08 57 53	
			iS	09 03 38	
			iP'P'	09 23 54.6	
			iP'P'	09 24 09.9	
		D = 7100 km = 64°.			
		Ka	iP	08 56 12	C
			i	08 56 21	
			iS	09 05 41	
			iP'P'	09 23 47	
			iP'P'	09 24 05	
		Kurile Islands (h = 25 km).			
		Magn. = 7.7 (Up,Ki).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	16	Up	iP	13 26 48.0	
"	16	Um	iP	18 37 06.9	D
"	16	Up	iP	22 36 21.8	C
			microns	sec	
		M	E	0.7	13
		M	N	0.9	15
		M	Z	1.0	13
		Ki	iP	22 36 27.2	C
			microns	sec	
		P	Z'	0.1	0.9
		M	E	0.6	13
		Sk	iP	22 36 46.5	C
			iPP	22 38 22.9	
		Gb	iP	22 36 44.9	C
		Um	iP	22 36 17.0	C
		Ka	iP	22 36 31	C
		Tadzhik, U.S.S.R.			
		(h = 70 km).			
"	17	Um	iP	04 02 52.5	C
"	17	Ki	iSn	04 54 03.9	
			eSg	04 54 25	
			D = 480 km = 4.3°.		
		Sk	eSg	04 56 53	
		Um	iSn	04 54 44.0	
			i	04 55 15.5	
			iSg	04 55 20.8	
			D = 670 km = 6.0°.		
		Northwest Russia,			
		67.5°N, 31.8°E.			
		Origin time = 04 52 03.			
		Explosion?			
"	17	Up	iP	08 53 13.4	
		Ki	iP	08 52 27.3	
		Sk	eP	08 53 04	
		Um	iP	08 52 48.0	
			i	08 53 07.3	
		Kurile Islands			
		(h = 40 km).			
"	17	Um	i(Pg)	11 58 10.4	
			iSg	11 58 18.6	
"	17	Um	iP	13 19 26.9	D
			i	13 19 37.3	
		Kurile Islands			
		(h = 30 km).			
"	17	Up	iP	14 21 57.7	
			iPP	14 22 17.0	
			microns	sec	
		P	Z'	0.3	0.9
		M	E	1.0	13
1963 Mar cont.	17	Up	M	N	1.2	15
			M	Z	1.4	15
		Ki	iP	14 23 14.4	D
			i	14 23 25.9	
			microns	sec	
		P	Z'	0.1	1.0
		M	E	1.0	12
		M	N	0.7	13
		M	Z	1.5	13
		Sk	iP	14 22 40.5	
		Gb	iP	14 21 44.1	
		Um	iP	14 22 37.5	D
			i	14 22 47.5	
			eS	14 27 07	
		Ka	iP	14 21 21.8	
		Greece (h = 80 km).			
		Magn. = 5.6 (Up,Ki).			
"	17	Up	iP	19 47 34.7	
		Ki	iP	19 47 15.0	
		Eastern Siberia			
		(h = 30 km).			
"	18	Up	iPKP	04 20 16.4	C
		Gb	iPKP	04 20 25.6	
			i	04 20 35.2	
		Um	iPKP	04 20 04.0	
		Kermadec Islands			
		(h = 30 km).			
"	18	Up	iPKP	04 45 48.1	
		Um	ePKP	04 45 40	
		Kermadec Islands			
		(h = 30 km).			
"	18	Up	iP	10 09 08.9	
		Ki	iP	10 10 15.2	C
		Sk	iP	10 09 34.8	
		Um	iP	10 09 45.0	C
			i	10 09 51.1	
		Southern Algeria			
		(h = 0 km).			
		Underground nuclear explosion.			
"	18	Sk	iP	11 47 45.8	
		Greece.			
"	18	Ki	iP	12 18 24.8	D
"	18	Um	iP	12 25 20.6	
"	18	Um	iPKP	13 34 24.6	
		Gb	iPKP	13 34 34.3	C
		Fiji Islands			
		(h = 560 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	18	Um	iP	14 08 04.5	
"	18	Sk	iP	14 20 36.6	
		Um	iP	14 20 36.1	
		Greece.			
"	18	Um	iP	23 57 46.5	
"	19	Sk	iP	04 56 18.6	
		Um	iP	04 56 23.5	D
		Arctic Ocean			
		(h = 30 km).			
"	19	Up	iP	05 23 45.9	
		Ki	iP	05 23 19.2	
		Sk	iP	05 23 44.0	
		Um	iP	05 23 30.1	
		Mariana Islands			
		(h = 220 km).			
"	19	Um	iP	10 23 50.5	C
"	19	Um	iPKP	13 32 32.6	
		Loyalty Islands			
		(h = 50 km).			
"	19	Um	iPKP	15 01 15.5	
		Loyalty Islands			
		(h = 30 km).			
"	19	Ki	iP	17 32 40.4	
		Java (h = 90 km).			
"	19	Up	iP	19 21 05.7	
		Ki	iP	19 20 48.0	C
		Sk	iP	19 21 10.5	
		Um	iP	19 20 53.7	
		Mindanao (h = 110 km).			
"	19	Ki	e(P)	19 47 04	
"	19	Up	iP	23 54 50.6	
			i	23 55 02.6	
"	20	Ki	iP	04 31 55.5	C
"	20	Up	iPKP	05 01 14.7	
			iSKP	05 03 58.9	
				microns sec	
			SKP Z'	0.2 1.5	
		Ki	iPKP	05 01 09.4	
			iSKP	05 03 33.9	D
				microns sec	
			SKP Z'	0.3 1.6	
		Sk	iPKP	05 01 07.5	
			iSKP	05 03 50.2	

1963 Mar	20	Gb	iPKP	05 01 24.4	
			iSKP	05 04 07.2	D
		Um	iPKP	05 01 09.3	
			i	05 01 15.2	
			iSKP	05 03 46.6	D
		Ka	iPKP	05 01 27.4	C
			iSKP	05 04 03.5	
		Fiji Islands			
		(h = 680 km).			
"	20	Up	iPKP	05 03 49.5	
			iSKP	05 06 33.0	C
			i	05 06 42.6	
				microns sec	
			SKP Z'	0.1 1.0	
		Ki	iPKP	05 03 44.4	
			iSKP	05 06 08.5	C
				microns sec	
			SKP Z'	0.2 1.3	
		Sk	iPKP	05 03 43.5	
			iSKP	05 06 25.9	C
		Gb	iPKP	05 04 00.3	
			iSKP	05 06 42.0	
		Um	iSKP	05 06 20.9	C
		Ka	iSKP	05 06 43.8	C
		Fiji Islands			
		(h = 680 km).			
		Note that SKP has an			
		initial motion opposite			
		to previous shock with the			
		same location.			
"	20	Um	i(P)	05 13 37.9	
"	20	Ki	ePn	05 24 34	
			iSn	05 25 33.0	
			iSg	05 25 50.6	
			D = 500 km = 4.5°		
		Sk	eSg	05 28 22	
		Um	iSn	05 26 17.0	
			iSg	05 26 56.5	
			D = 710 km = 6.4°		
		Northwest Russia,			
		68.3°N, 31.6°E.			
		Origin time = 05 23 24.			
		Explosion?			
"	20	Up	iP	07 15 20.3	C
		Ki	iP	07 14 32.5	C
				microns sec	
			P Z'	0.1 1.0	
		Sk	iP	07 15 09.3	C
		Um	iP	07 14 54.5	
			i	07 15 14.6	
		Kurile Islands (h = 15 km).			
"	20	Um	iP	11 32 18.7	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	20	Sk	iP	14 11 17.4	
"	20	Up	iP	14 53 12.5	
			i	14 53 29.9	
		Ki	iP	14 53 13.8	D
		Sk	iP	14 53 29.5	
		Gb	iP	14 53 23.9	
			i	14 53 28.9	
		Um	iP	14 53 09.3	D
		Andaman Islands (h = 30 km).			
"	20	Um	iP	16 00 59.4	
"	20	Up	ePS	17 06 51	
				microns sec	
			M	E 1.2 21	
			M	N 1.7 21	
			M	Z 1.6 20	
		Ki	iP	16 52 48.2	
			eS	17 04 25	
			ePS	17 06 03	
				microns sec	
			M	E 1.8 22	
			M	N 0.5 18	
			M	Z 1.7 20	
			D = 11350 km = 102°.		
		Um	iP	16 52 56.5	
			ePP	16 57 15	
			eSKS	17 03 32	
			ePS	17 06 21	
		New Guinea (h = 40 km).			
		Magn. = 5.8 (Up,Ki).			
"	21	Up	iP	04 11 38.5	C
			ipP	04 11 51.7	
			iPP	04 14 21.0	
				microns sec	
			P	Z' 0.1 0.7	
		Ki	iP	04 10 59.4	C
			ipP	04 11 11.0	
			iPP	04 13 25.9	
				microns sec	
			P	Z' 0.1 1.0	
			M	E 0.9 18	
			M	N 0.5 20	
			M	Z 1.0 17	
		Sk	iP	04 11 32.5	C
			iPP	04 14 10.9	
		Gb	iP	04 11 58.4	C
		Um	iP	04 11 16.7	C
			ipP	04 11 29.0	
		Ka	iP	04 11 54.2	C
		Japan (h = 50 km).			
"	21	Sk	iPg	09 16 37.8	
			iSg	09 17 06.7	
1963 Mar	21	Um	i(P)	10 59 47.7	
			i	11 01 14.7	
			i	11 01 25.2	
		Seismic?			
"	21	Up	iP	12 11 33.7	
"	21	Um	i(P)	13 24 57.1	
		Seismic?			
"	21	Um	iP	14 21 46.4	C
			i	14 22 02.2	
"	21	Sk	iPg	14 28 01.5	
			iSg	14 28 31.1	
"	21	Um	iP	18 03 50.6	C
		Kurile Islands (h = 30 km).			
"	21	Up	iP	23 46 49.9	C
		Ki	iP	23 46 00.5	C
		Um	iP	23 46 24.0	
			i	23 46 26.8	
			ipP	23 46 39.5	
		Kurile Islands (h = 70 km).			
"	22	Um	iP	02 49 49.1	C
		Japan (h = 80 km).			
"	22	Up	iP	04 08 06.8	D
		Gb	iP	04 08 40.8	
		Um	iP	04 07 41.5	
		Kurile Islands (h = 120 km).			
"	22	Gb	i(P)	12 22 34.3	
"	22	Um	iP	16 30 03.0	
"	22	Up	iP	20 39 57.1	
"	22	Up	iP	22 32 06.5	C
		Sk	iP	22 32 49.0	C
		Ka	iP	22 31 32.6	
		(Cyprus).			
"	22	Up	iP	22 34 30.4	
		Ki	iP	22 35 26.5	C
		Um	iP	22 34 53.0	
		Cyprus (h = 30 km).			
"	22	Ki	iP	22 36 29.2	D
		Um	iP	22 35 55.3	
		Cyprus.			
"	22	Ki	iP	23 42 05.4	
		Cyprus (h = 30 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Mar 22 Ki ePKP 23 56 11
Um iPKP 23 56 09.1 C
SW of Tasmania (h = 30 km).

" 23 Ki iP 00 39 13.9 C

" 23 Up iPKP 01 29 14.2
Um iSKP 01 31 57.1
Fiji Islands (h = 560 km).

" 23 Ki iSn 05 24 23.9
iSg 05 24 41.1
Um eSg 05 25 48
Northwest Russia,
68.3°N, 31.6°E.
Origin time = 05 22 15.
Explosion?

" 23 Up iP 05 56 37.1
Ki iP 05 56 24.4
Sk eP 05 56 53
Um iP 05 56 24.9 C
Sinkiang Province, China
(h = 30 km).

" 23 Up i(P) 08 15 18.5

" 23 Up iP 11 39 53.1
Um iP 11 39 43.0 C

" 23 Up iP 12 16 30.7
Tien-Shan, U.S.S.R.

" 23 Ki iP 14 07 07.9
i 14 07 13.9
Sk eP 14 07 14
iS 14 09 05.7
D = 1090 km = 9.8°.
Um iP 14 07 44.3
i 14 08 12.5
iS 14 10 03.0
i 14 10 37.9
D = 1350 km = 12°.
Jan Mayen, 71°N, 5°W.
Origin time = 14 04 49.

" 23 Up iPn 22 53 24.2 D
iSn 22 54 45.6
i 22 55 00.0
iSg 22 55 33.0
microns sec
Sg Z' 0.1 0.5
D = 810 km = 7.3°.
Ki iPn 22 52 19.9 D
iPg 22 52 26.5
iSn 22 52 53.1

1963
Mar cont. 23 Ki iSg 22 53 02.9
microns sec
Sg Z' 0.8 0.8
D = 300 km = 2.7°.
Sk iPn 22 52 31.9
iPg 22 52 48.7
i 22 53 24.0
iSg 22 53 28.7
D = 380 km = 3.4°.
Gb e 22 56 18
iSg 22 56 33.3
D = 1010 km = 9.1°.
Um iPn 22 52 41.8 D
iPg 22 52 49.0
iSn 22 53 29.6
iSg 22 53 50.1
D = 440 km = 4.0°.
Ka e 22 56 27.5
iSg 22 57 27.9
D = 1190 km = 10.7°.
West coast of Norway,
67.0°N, 14.1°E.
Origin time = 22 51 35.
The first motions observed could be explained by a fault strike roughly parallel to the coast line and a dip slip motion, the eastern (continental) side rising in relation to the western (Atlantic) side.

" 24 Up iP 02 21 18.2
i 02 21 25.2
e 02 24 34
iPKP 02 25 34.2
iPP 02 25 51.6
iSKS 02 31 53
microns sec
PP Z' 0.1 1.0
M E 6.7 23
M N 10 23
M Z 10 24
D = 11700 km = 105½°.
Ki iP 02 21 16.7
e 02 25 15
iSKS 02 31 43
microns sec
P Z' 0.1 1.1
SKS E 1.6 10
M E 8.0 22
M N 8.3 21
M Z 8.0 19
D = 11650 km = 105°.
Sk e 02 25 18
iPP 02 26 01.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar 24 cont.

Gb	eP	02 21 36	
	e	02 25 15	
Um	iP	02 21 13.1	
	i	02 21 17.5	
	e	02 25 07	
	iPKP	02 25 32.3	
	iSKS	02 31 46	
Ka	iP	02 21 33.1	
	e	02 24 47.2	
	iPKP	02 25 42.6	

Sumba Island (h = 30 km).
Magn. = 6,5 (Up,Ki).
The phases arriving in the 24th minute (Up,Ka) and the 25th minute (Ki,Sk,Gb, Um) are remarkable in as much they cannot be explained by our travel time tables (J.-B.).

" 24

Up	iP	02 35 47.3
Ki	iP	02 35 07.9
Gb	eP	02 36 12
Um	iP	02 35 21.1

Aleutian Islands
(h = 60 km).

" 24

Ki	ePg	06 09 38
	iSg	06 10 11.4
	i	06 10 17.8
	D = 300 km = 2.7°.	
Sk	eSg	06 10 40
Um	iPn	06 09 50.6
	iSn	06 10 37.6
	iSg	06 10 58.5
	D = 440 km = 4.0°.	

West coast of Norway,
67.0°N, 14.1°E.
Origin time = 06 08 44.
Aftershock of Mar. 23 at 22 51 35.

" 24

Up	iP	09 56 19.3
	e(PP)	09 59 41

		microns	sec
P	Z'	0.3	1.2
M	E	0.6	16
M	N	0.8	19
M	Z	1.1	18

Ki	iP	09 56 01.4
	eS	10 06 46

		microns	sec
P	Z'	0.2	1.2
M	E	1.5	18
M	N	0.6	20
M	Z	2.1	20

Sk	iP	09 56 23.7
Gb	iP	09 56 35.8
Um	iP	09 56 07.5
	iS	10 06 50
Ka	iP	09 56 27.7

Mindanao (h = 50 km).
Magn. = 6.1 (Up,Ki).

" 24

Up	iP	11 06 17.5

Hindu Kush (h = 220 km).

" 24

Up	iP	12 33 03.9

" 24

Up	iP	12 50 29.2
	i	12 50 41.9
	iPP	12 51 26
	i	12 51 42
	iS	12 55 41
	iSS	12 57 42

		microns	sec
P	Z'	0.1	1.0
PP	Z	0.8	5
S	N	2.8	13
M	E	7.8	15
M	N	8.9	14
M	Z	12	17

D = 3550 km = 32°.

Ki	iP	12 51 12.0 D
	iPP	12 52 31
	iS	12 56 56
	iSS	12 59 16

		microns	sec
P	N	0.6	7
P	Z	1.4	6
P	Z'	0.4	1.0
PP	E	0.9	6
PP	N	1.1	6
PP	Z	1.6	4
S	E	1.4	8
S	N	2.0	8
S	Z	1.4	8
M	E	5.1	10
M	N	8.3	13
M	Z	16	13

D = 4100 km = 37°.

Sk	iP	12 51 06.9 D
Gb	iP	12 50 40.7 D
	i	12 51 09.5
	i	12 51 36.2
	iPP	12 51 52.9
Um	iP	12 50 45.6 D
	iPP	12 51 57
	iS	12 56 07
	iSS	12 57 55
	iSSS	12 58 28
Ka	iP	12 50 22.5 D

Iran (h = 30 km).
Magn. = 6.0 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	24	Up	iP	15 18 02.9	
"	24	Up	iP	21 46 18.4	C
			ipP	21 46 36.2	
			eP'P'	22 14 28	
				microns sec	
			P	Z' 0.3 0.5	
		Ki	iP	21 45 25.6	C
			ipP	21 45 40.9	
			eP'P'	22 14 48	
		Sk	iP	21 45 58.7	C
			ipP	21 46 16.4	
		Gb	iP	21 46 34.8	
		Um	iP	21 45 51.5	C
			ipP	21 46 06.4	
			iP'P'	22 14 35.0	
			i	22 14 43.5	
		Ka	iP	21 46 46.5	
		Aleutian Islands. h = 60 km (Up,Ki,Sk,Um).			
"	25	Up	iP	03 18 14.9	
"	25	Um	eP	03 23 29	
			i	03 23 43.8	
"	25	Up	iP	04 07 37.7	
		Ki	iP	04 07 18.0	
		Um	iP	04 07 24.9	
		Luzon (h = 30 km).			
"	25	Ki	iPn	05 53 16.0	
			iSg	05 54 11.3	
			i	05 54 24.9	
			D = 370 km = 3.3°.		
		Um	iSn	05 54 56.9	
			eSg	05 55 32	
			D = 640 km = 5.8°.		
		Northwest Russia, 68½°N, 29 1/4°E.			
		Origin time = 05 52 21.			
		Explosion?			
"	25	Up	iP	08 21 14.8	
				microns sec	
			P	Z' 0.1 0.5	
		Ki	iP	08 20 57.6	
		Um	iP	08 21 02.9	
		Luzon (h = 40 km).			
"	25	Up	iP	19 44 00.5	
		Um	i(P)	19 43 51.0	
"	25	Um	iP	19 58 32.4	
"	25	Up	iPKP	20 37 02.3	
			i	20 37 17.0	
1963 Mar cont.	25	Ki	iPKP	20 37 03.8	C
		Um	iPKP	20 37 02.1	
		Macquarie Islands (h = 40 km).			
"	25	Up	iP	22 58 43.3	D
			ipP	22 58 54.0	
				microns sec	
			P	Z' 0.3 0.8	
			M	E 0.8 14	
			M	N 0.8 14	
			M	Z 1.3 14	
		Ki	iP	22 58 45.1	
			ipP	22 58 56.0	
				microns sec	
			P	Z' 0.6 1.0	
			M	E 1.5 15	
			M	N 1.3 15	
			M	Z 1.3 16	
		Sk	iP	22 58 58.6	D
			ipP	22 59 09.4	
		Gb	iP	22 58 56.9	D
			ipP	22 59 07.5	
		Um	iP	22 58 40.9	
			ipP	22 58 51.5	
			eS	23 08 56	
		Ka	iP	22 58 44.1	D
			ipP	22 58 54.8	
		Sumatra. h = 40 km (Up,Ki,Sk,Gb,Um,Ka).			
		Magn. = 6.5 (Up,Ki).			
"	26	Um	iP	05 53 35.1	
			i	05 54 59.1	
			i	05 55 05.0	
"	26	Up	i(P)	09 52 32.1	
"	26	Um	iP	10 01 38.0	
"	26	Up	eP	10 05 38	
			iPKP	10 07 59.2	C
			i	10 08 06	
			iPP	10 11 34	
			i	10 18 17.9	
				microns sec	
			PKP	E 1.2 3	
			PKP	N 1.9 3	
			PKP	Z' 1.1 0.5	
			M	E 19 22	
			M	N 47 23	
			M	Z 52 24	
		(D = 16650 km = 150°).			
		Ki	iPKP	10 07 39.4	
			i	10 07 44.9	
			i	10 10 45	
			iPP	10 10 58	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar cont.	26	Ki	iPKS	10 11 25		
			i	10 18 46.1		
			iSS	10 29 29		
				microns	sec	
			PKP	Z 3.8	5	
			PKP	Z' 0.6	0.9	
			PKS	E 3.7	7	
			PKS	N 3.6	7	
			M	E 32	21	
			M	N 27	20	
			M	Z 62	21	
			(D = 15800 km = 142°.			
		Sk	iPKP	10 07 52.4	C	
			e	10 18 09		
		Gb	iPKP	10 08 06.2	C	
		Um	eP	10 05 30		
			iPKP	10 07 47.2	C	
			iPP	10 11 08		
			i	10 18 14.4		
			i	10 21 14		
			iSS	10 29 52		
			(D = 16100 km = 145°).			
		Ka	iPKP	10 08 08.1		
			i	10 08 14.9		
		Kermadec Islands (h = 50 km). Magn. = 7.3 (Up,Ki). The clear existence of diffracted P waves (especially on ultra-long-period vertical records) at the distances of 145° (Um) and 150° (Up) is quite remarkable. The periods of diffracted P are 24-26 sec. The phase arriving in the 18th minute and recorded by short-period vertical instruments, travels probably over the greater arc, but it has not been able to identify it.				
"	26	Up	iP	10 53 04.1	D	
		Sk	iP	10 52 54.0	D	
		Um	iP	10 52 48.6		
"	26	Up	iPKP	12 05 42.6		
			i	12 05 45.8		
				microns	sec	
			PKP	Z' 0.1	0.7	
		Sk	iPKP	12 05 35.7		
			i	12 05 49.3		
		Gb	iPKP	12 05 48.8		
		Um	iPKP	12 05 30.1		
			i	12 05 44.0		
		Kermadec Islands (h = 50 km).				

1963 Mar	26	Up	iPKP	13 11 18.2		
			i	13 11 23.3		
				microns	sec	
			PKP	Z' 0.1	0.5	
		Sk	iPKP	13 11 11.0	C	
			i	13 11 20.6		
		Gb	iPKP	13 11 26.3		
			i	13 11 33.9		
		Um	iPKP	13 11 06.1	C	
			i	13 11 13.5		
		Ka	iPKP	13 11 28.7		
		Kermadec Islands (h = 60 km).				
"	26	Up	iPKP	13 44 40.8		
			i	13 44 42.8		
			e(PP)	13 48 12		
			i	13 55 06.7		
				microns	sec	
			PKP	Z' 0.9	0.5	
			M	E 6.4	22	
			M	N 19	23	
			M	Z 18	24	
		Ki	iPKP	13 44 20.4		
			i	13 44 29.7		
			i(PP)	13 47 24		
			iPKS	13 48 00		
			i	13 55 44.4		
				microns	sec	
			PKP	Z 1.6	7	
			PKP	Z' 0.3	0.9	
			(PP)	Z 1.6	9	
			PKS	E 1.6	6	
			PKS	N 2.1	10	
			M	E 12	21	
			M	N 13	21	
			M	Z 19	20	
		Sk	iPKP	13 44 34.5		
		Gb	iPKP	13 44 46.6		
			i	13 44 51.0		
		Um	iPKP	13 44 27.6		
			i	13 44 30.9		
		Ka	iPKP	13 44 51.7		
		Kermadec Islands (h = 40 km). Magn. = 7.0 (Up,Ki). Compare remark to earthquake on Mar. 26, 09 48 19.7, concerning phase arriving 10-11 min after PKP (Up,Ki).				
"	26	Um	iPKP	14 53 22.7		
		New Hebrides Islands (h = 30 km).				
"	26	Up	eP	18 38 23		
		Sk	iP	18 38 16.9		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar cont.	26	Um	eP	18 38 05	
"	26	Up	iP	19 58 35.9	
			ipP	19 58 59.3	
				microns sec	
			P	Z' 0.2 0.5	
		Ki	iP	19 57 49.6	
				microns sec	
			P	Z' 0.2 1.0	
		Sk	iP	19 58 25.5	
		Gb	iP	19 58 56.8	
		Um	iP	19 58 10.3	
			isP	19 58 44.1	
		Ka	iP	19 58 54.5	
		Kurile Islands.			
		h = 90 km (Up,Um).			
		Magn. = 6.2 (Up,Ki).			
"	26	Um	iP	20 09 09.2	
"	26	Up	iP	20 40 04.6	
"	26	Um	iP	21 08 30.5	
		Greece.			
"	26	Up	iP	21 46 00.9 C	
			i	21 46 02.4	
			iS	21 55 21	
				microns sec	
			P	E 0.8 5	
			P	N 1.0 5	
			P	Z 2.0 5	
			P	Z' 0.6 1.2	
			S	E 0.9 5	
			S	N 2.4 8	
			M	E 34 17	
			M	N 40 16	
			M	Z 17 13	
			D = 8000 km = 72°.		
		Ki	iP	21 45 26.0 C	
			i	21 45 31.0	
			iS	21 54 11	
				microns sec	
			P	E 2.1 7	
			P	N 0.8 7	
			P	Z 4.6 7	
			P	Z' 0.4 1.0	
			S	E 1.9 8	
			S	N 4.0 8	
			M	E 36 13	
			M	N 30 13	
			M	Z 27 15	
			D = 7350 km = 66°.		
		Sk	iP	21 45 58.3 C	
		Gb	iP	21 46 23.3 C	
		Um	iP	21 45 40.0 C	
			i	21 45 41.2	

1963 Mar cont.	26	Um	iPP	21 48 08	
			iS	21 54 39	
		Ka	iP	21 46 14.9 C	
		Japan (h = 30 km).			
		Magn. = 6.7 (Up,Ki).			
"	26	Up	iP	22 48 20.0 D	
			ipP	22 48 44.3	
		Ki	eP	22 47 43	
		Sk	i(P)	22 48 15.4	
		Um	iP	22 47 59.2 D	
			ipP	22 48 23.0	
		Japan. h = 100 km (Up,Um).			
"	27	Up	e(P)	01 28 56	
		Ka	iP	01 27 52.0 D	
			i	01 29 28.6	
		Greece.			
"	27	Um	iP	03 38 53.1	
"	27	Um	iP	03 46 28.4	
		Hindu Kush (h = 190 km).			
"	27	Up	iP	05 23 01.9	
		Ki	iP	05 22 17.0 C	
		Kurile Islands (h = 30 km).			
"	27	Um	iP	07 00 23.9	
		Japan (h = 30 km).			
"	27	Up	iP	09 01 36.9	
		Sk	eP	09 01 28	
		Um	iP	09 01 26.4 C	
"	27	Up	iSg	11 26 21.7	
		Gb	iPg	11 24 21.0	
			iSg	11 24 27.0	
			iL	11 24 29.5	
			D = 60 km = 0.5°.		
		West coast of Sweden,			
		57 1/4°N, 12°E.			
		Origin time = 11 24 12.			
		Explosion?			
"	27	Sk	eSg	11 40 49	
		Gb	iPg	11 37 38.5	
			iSg	11 37 44.5	
			iL	11 37 47.2	
			D = 60 km = 0.5°.		
		West coast of Sweden,			
		57 1/4°N, 12°E.			
		Origin time = 11 37 30.			
		Explosion?			
"	27	Ki	iP	11 54 03.2 C	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	27	Up	iSg	11 57 39.1	
		Gb	iPg	11 55 38.3	
			iSg	11 55 44.7	
			iL	11 55 46.8	
			D = 60 km = 0.5°.		
		Um	i(Sg)	11 59 29.9	
		Ka	iPn	11 56 11.0	
			eSg	11 56 49	
			D = 270 km = 2.4°.		
		West coast of Sweden, 57 1/4°N, 12°E.			
		Origin time = 11 55 29.			
		Explosion?			
"	27	Up	iSg	12 21 29.7	
			i	12 21 45.5	
		Gb	iPg	12 19 30.8	
			iSg	12 19 38.0	
			iL	12 19 41.9	
			D = 70 km = 0.6°.		
		Um	i(Sg)	12 23 22.6	
		Ka	iPn	12 19 58.1	
			iSg	12 20 31.3	
			D = 240 km = 2.2°.		
		West coast of Sweden, 57.1°N, 12.0°E.			
		Origin time = 12 19 19.			
		Explosion?			
		The records have an appearance which is different from the three preceding cases on the west coast of Sweden.			
"	27	Ki	iP	12 44 09.7	
		Colombia (h = 180 km).			
"	27	Up	iP	13 55 30.2	
"	27	Um	iP	15 09 57.8	
"	27	Up	i(P)	15 45 51.9	
"	27	Um	iP	16 24 17.9	
		Japan.			
"	27	Up	iP	20 35 24.9	
"	27	Up	iP	21 59 13.6	
			i	21 59 28.2	
		Sk	eP	21 59 04	
		Um	iP	21 58 52.9	
			i	21 59 04.9	
		Ka	e(P)	21 59 33	
"	28	Up	iP	00 19 55.3 C	

1963 Mar cont.	28	Up	iS	00 23 13	
				microns	sec
			P	E 37	10
			P	N 33	10
			P	Z 36	9
			P	Z' 20	3.0
			S	E 230	21
			S	N 230	22
			S	Z 30	16
			M	E 240	15
			M	N 320	17
			M	Z 170	16
			D = 1950 km = 17½°.		
		Ki	iP	00 19 27.1 C	
			iS	00 22 30	
			i	00 23 20	
				microns	sec
			P	E 44	10
			P	N 17	10
			P	Z 58	10
			P	Z' 9.3	1.5
			S	E 34	7
			S	N 8.2	11
			S	Z 28	10
			M	E 240	13
			M	N 140	11
			M	Z 360	12
			D = 1700 km = 15½°.		
		Sk	iP	00 19 01.9 C	
			i	00 19 07.1	
			iS	00 21 39.3	
		Gb	iP	00 19 45.8	
			i	00 19 51.6	
		Um	eP	00 19 42 C	
			iS	00 22 37	
		Ka	eP	00 20 18 C	
		Iceland (h = 15 km).			
		Magn. = 7.0 (Up,Ki).			
		P(Z') has usually a relatively long period in shocks from this area.			
"	28	Up	i(P)	00 23 52.4	
"	28	Up	iP	00 30 34.2	
		Ki	iP	00 30 05.8	
			i	00 30 09.5	
			i	00 30 14.3	
				microns	sec
			P	Z' 0.5	1.2
		Sk	iP	00 29 47.5	
		Um	iP	00 30 21.3 C	
		Ka	iP	00 30 51.6	
		Iceland (h = 30 km).			
"	28	Up	iP	00 31 13.6 C	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar cont.	28	Up	i	00 31 16.8	
				microns sec	
			P	Z' 0.3 1.0	
		Ki	iP	00 30 44.8	
			i(S)	00 33 56.5	
				microns sec	
			P	Z' 2.8 1.7	
		Sk	iP	00 30 20.6	C
			i	00 32 49.1	
		Gb	iP	00 31 03.7	
			i	00 31 07.3	
		Um	iP	00 31 00.4	C
		Ka	iP	00 31 32.4	
		Iceland.			
		Origin time = 00 27 06.			
"	28	Up	iP	01 03 44.6	
			e	01 07 37	
				microns sec	
			P	Z' 0.1 1.0	
		Ki	iP	01 03 16.8	
			i	01 03 22.0	
				microns sec	
			P	Z' 1.1 1.6	
		Sk	iP	01 02 52.2	
		Gb	iP	01 03 35.1	
		Um	iP	01 03 32.0	
		Ka	iP	01 04 05.4	
		Iceland (h = 30 km).			
"	28	Ki	iP	01 32 22.9	C
		Um	iP	01 32 35.4	
		Iceland (h = 30 km).			
"	28	Up	iP	02 40 37.2	D
			i	02 40 58.1	
"	28	Ki	iP	04 02 45.7	
		Sk	eP	04 03 12	
		Um	iP	04 02 40.8	
		Sinkiang Province, China.			
"	28	Up	iP	09 57 52.6	
		Ki	iP	09 57 02.2	C
		Um	iP	09 57 25.5	C
		Kurile Islands (h = 50 km).			
"	28	Up	iPKP	11 32 12.2	C
				microns sec	
			PKP	Z' 0.2 0.5	
		Ki	ePKP	11 31 49	
		Sk	iPKP	11 32 05.6	C
			i	11 32 22.6	
		Gb	iPKP	11 32 20.4	C
		Um	iPKP	11 31 59.9	C
		Ka	iPKP	11 32 23.7	C
		Kermadec Islands (h = 40 km).			
1963 Mar	28	Sk	iP	14 37 11.1	
"	28	Um	i(P)	15 23 19.4	
"	28	Um	iP	17 20 41.0	
		West Pakistan.			
"	28	Up	iPKP	23 48 51.9	
				microns sec	
			PKP	Z' 0.2 1.0	
			M	E 0.8 18	
			M	N 1.1 19	
			M	Z 0.9 18	
		Ki	iPKP	23 48 35.4	C
		Sk	iPKP	23 48 45.1	
			i	23 48 53.8	
		Gb	iPKP	23 49 00.8	
			i	23 49 08.5	
		Um	iPKP	23 48 40.2	C
			iPP	23 51 45.5	
		Ka	iPKP	23 49 07.3	C
		Kermadec Islands (h = 50 km).			
"	29	Um	iP	01 37 18.8	
		Italy.			
"	29	Up	ePKP	01 59 57	
		Sk	iPKP	01 59 49.7	
		Um	iPKP	01 59 44.7	D
		Kermadec Islands (h = 30 km).			
"	29	Up	iP	03 13 46.8	
			i	03 13 50.2	
				microns sec	
			M	E 4.2 15	
			M	N 2.1 15	
		Ki	iP	03 15 03.3	
				microns sec	
			M	E 2.7 12	
			M	N 1.0 11	
			M	Z 1.2 11	
		Sk	iP	03 14 32.1	
		Um	iP	03 14 23.0	C
			i	03 14 28.0	
		Ka	iP	03 13 17.4	
		Turkey (h = 30 km).			
"	29	Up	iP	06 00 47.9	
		Sk	eP	06 00 46	
		Um	iP	06 00 38.1	C
			i	06 00 50.0	
"	29	Um	iP	06 43 37.8	
		Japan (h = 30 km).			
"	29	Um	eP	09 11 08	
"	29	Up	i(P)	13 29 29.3	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar	29	Um	iP	13 56 44.5	
"	29	Up	iP	14 02 21.2	
"	29	Um	iP	14 43 49.2	C
"	29	Um	iP	15 27 53.1	
"	29	Um	i(P)	16 07 48.2	
"	29	Um	iP	20 12 12.9	C
		Hindu Kush (h = 200 km).			
"	29	Ki	e(P)	21 10 08	
			i	21 10 12.9	
"	29	Up	iPKP	21 36 21.6	C
			microns sec		
			PKP Z' 0.1 0.5		
		Ki	eP	21 36 01	
		Sk	iPKP	21 36 15.1	C
			i	21 36 18.1	
		Gb	iPKP	21 36 29.9	C
		Um	iPKP	21 36 09.6	C
		Ka	iPKP	21 36 30.6	
		Kermadec Islands (h = 60 km).			
"	29	Ki	iP	21 58 31.1	C
		Dodecanese Islands (h = 30 km).			
"	30	Um	iP	00 40 25.1	C
"	30	Up	iPKP	02 12 23.8	
			i	02 12 29.0	
			iSKP	02 15 41.7	
			i	02 15 45.9	
			iPKS	02 15 57	
			epPKS	02 16 37	
			i	02 21 37	
			microns sec		
			SKP Z' 0.2 0.6		
			PKS N 0.4 3		
			M E 0.9 19		
			M N 1.2 20		
			(D = 14900 km = 134°).		
		Ki	iPKP	02 12 14.0	
			iSKP	02 15 17.0	
			ePKS	02 15 29	
			i	02 22 11	
			eSP	02 24 08	
			microns sec		
			PKP Z' 0.4 1.1		
			PKS N 0.4 7		
			M E 1.2 18		
			M N 0.7 14		
			(D = 14100 km = 127°).		
1963 Mar cont.	30	Sk	iPKP	02 12 16.6	
			i	02 12 25.3	
			iSKP	02 15 36.9	
		Gb	iPKP	02 12 27.8	
			i	02 12 36.7	
			iSKP	02 15 52.4	
		Um	iPKP	02 12 12.0	
			i	02 12 20.8	
			iSKP	02 15 28.6	
			iPKS	02 15 44	
			epPKS	02 16 21	
			i	02 21 13	
			i	02 22 34	
			i(PS)	02 24 46.4	
		Ka	iPKP	02 12 35.1	
			iSKP	02 15 53.3	
		New Hebrides Islands (h = 160 km).			
"	30	Um	iP	07 05 33.1	D
		Aleutian Islands (h = 30 km).			
"	30	Up	iP	11 47 38.0	
"	30	Up	iPKP	11 57 12.1	
		Um	iPKP	11 56 57.5	
		Kermadec Islands (h = 30 km).			
"	30	Up	iP	12 01 05.6	C
"	30	Um	i(P)	16 56 50.5	
"	30	Up	iP	17 02 55.7	C
			i	17 02 57.7	
			iS	17 11 52	
			i	17 13 12	
			eP'P'	17 30 28	
			microns sec		
			P N 0.4 3		
			P Z 1.0 3		
			P Z' 0.1 0.5		
			M E 2.8 21		
			M N 3.7 25		
			M Z 3.9 20		
			D = 7550 km = 68°.		
		Ki	iP	17 02 10.3	C
			iPcP	17 02 52.9	
			eS	17 10 25	
			eScS	17 12 03	
			eP'P'	17 31 29	
			microns sec		
			P Z' 0.3 1.2		
			S E 0.7 10		
			M E 7.3 20		
			M N 3.9 20		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar cont.	30	Ki		microns	sec
			M Z	8.3	20
			D = 6800 km = 61°.		
		Sk	iP	17 02 45.8	
			iPcP	17 03 15.4	
			i	17 04 28.8	
			eP'P'	17 31 08	
		Gb	iP	17 03 17.7	C
			iPcP	17 03 36.6	
		Um	iP	17 02 31.5	C
			iPcP	17 03 05.0	
			i	17 05 16.8	
			ePa	17 06 43	
			eS	17 11 04	
		Ka	iP	17 03 19.5	C
			iPcP	17 03 37.7	
		Kurile Islands (h = 30 km).			
		Magn. = 6.1 (Up,Ki).			
"	30	Ki	eP	17 38 11	
		Sinkiang Province, China (h = 30 km).			
"	30	Um	iP	21 03 02.6	C
"	31	Up	iP	02 33 54.4	
			i	02 35 00.2	
			iPP	02 35 11.9	
				microns	sec
			M N	0.7	14
		Ki	iP	02 34 20.4	
			i(PP)	02 35 37.3	
			eLgl	02 46 35	
				microns	sec
			M E	1.1	13
			M N	1.0	16
			M Z	1.7	14
		Sk	iP	02 34 27.4	
		Um	iP	02 34 00.9	C
		Iran (h = 30 km).			
"	31	Ki	e(P)	02 44 38	
"	31	Ki	e(Pg)	04 59 18	
			iSn	04 59 47.3	
			iSg	05 00 10.8	
			D = 490 km = 4.4°.		
		Sk	iSg	05 02 41.2	
		Um	i	05 00 44.0	
			iSg	05 01 03.9	
		Northwest Russia, 67.5°N, 31.9°E.			
		Origin time = 04 57 46.			
		Explosion?			
"	31	Up	iPP	05 03 47	
			iSKS	05 10 20	
			ePS	05 12 47	
		Ki	ePP	05 03 53	
			eSKS	05 10 21	

1963 Mar cont.	31	Ki	iPS	05 12 53	
				microns	sec
			SKS E	0.5	7
		Um	ePP	05 03 51	
			iSKS	05 10 25	
			eS	05 11 20	
			ePS	05 12 49	
		Peru (h = 30 km).			
"	31	Um	iP	05 24 38.1	
"	31	Up	iPKP	05 50 25.6	
			i	05 50 29.2	
			i	05 50 35.1	
			ePKS	05 53 57	
			e	06 01 04	
				microns	sec
			PKP Z	1.1	3
			PKP Z'	0.2	0.5
			M E	3.1	23
			M N	7.1	23
			M Z	7.2	24
		Ki	iPKP	05 50 07.8	
			ePP	05 53 10	
			iPKS	05 53 47	
				microns	sec
			PKP Z	1.2	8
			PP Z	1.0	9
			PKS E	0.6	8
			PKS N	0.9	12
			M E	4.4	20
			M N	4.8	20
			M Z	12	21
		Sk	iPKP	05 50 21.5	C
		Gb	iPKP	05 50 36.5	C
		Um	iPKP	05 50 16.4	C
			i	06 00 28.8	
		Ka	iPKP	05 50 33.8	
			i	05 50 37.0	
		Kermadec Islands (h = 50 km).			
		Magn. = 6.5 (Up,Ki).			
		Compare remark to earthquake on Mar. 26, 09 48 19.7, concerning phase arriving 10-11 min after PKP (Up,Um).			
"	31	Gb	iP	06 40 48.9	C
"	31	Ki	iSn	06 53 17.2	
			iSg	06 53 38.0	
			D = 460 km = 4.1°.		
		Um	iSg	06 54 28.9	
		Northwest Russia, 67 1/4°N, 31°E.			
		Origin time = 06 51 23.			
		Explosion?			
"	31	Up	—		
				microns	sec
			M E	3.1	23

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Mar 31 cont.

Up — microns sec
M N 5.7 20
M Z 6.1 19
Ki —
microns sec
M E 6.0 25
M N 4.0 22
M Z 11 23

" 31 Sk ePKP 07 26 08
e 07 26 15
Um iPKP 07 26 06.0
i 07 26 51.1
New Britain (h = 60 km).

" 31 Um i(P) 08 00 24.9

" 31 Up iPKP 08 32 19.8
Sk iPKP 08 32 11.8
Gb i(PKP) 08 32 41.2
Kermadec Islands
(h = 60 km).

" 31 Up iPKP 09 27 00.1
i 09 27 03.6
microns sec
PKP Z' 0.2 0.6
Ki ePKP 09 26 39
Sk iPKP 09 26 53.2 C
Gb iPKP 09 27 07.7 C
Ka iPKP 09 27 10.6
Kermadec Islands
(h = 50 km).

" 31 Up eP 10 12 18
Um iP 10 12 07.3 C

" 31 Up eP 11 04 35
Sk iP 11 04 27.4
Um iP 11 04 22.4

" 31 Um iP 12 37 02.9
Japan (h = 30 km).

" 31 Um iP 15 04 43.9
i 15 04 53.2
Morocco (h = 30 km).

" 31 Up iP 17 41 19.7 D
i 17 41 29.5
microns sec
P Z' 0.1 0.5
Ki iP 17 41 21.9 D
i 17 41 31.4
eS 17 51 45
microns sec
P Z' 0.1 1.0
S E 0.5 8

1963 Mar 31 cont.

Ki — microns sec
M E 0.6 14
M N 0.5 15
M Z 0.6 15
D = 9350 km = 84°.
Sk iP 17 41 34.3
Gb iP 17 41 32.1
i 17 42 14.4
Um iP 17 41 17.4 D
i 17 41 26.9
eS 17 51 31
Nicobar Islands
(h = 30 km).
Magn. = 6.0 (Up,Ki).

" 31 Up iPKP 19 42 30.0
i 19 42 33.6 C
microns sec
PKP Z' 0.4 0.8
M E 1.4 24
M N 3.3 23
M Z 3.0 23
Ki iPKP 19 42 10.4
i 19 42 17.1
i 19 44 34.5
iPKS 19 45 49
microns sec
PKP Z 0.5 7
PKS E 0.5 7
PKS N 0.4 6
M E 1.6 21
M N 1.6 20
M Z 3.9 21
Sk iPKP 19 42 26.0 C
Gb ePKP 19 42 35
i 19 42 41.6
Um iPKP 19 42 20.8 C
e 19 45 31
eSS 20 04 43
Ka iPKP 19 42 37.7 C
Kermadec Islands
(h = 50 km).
Magn. = 6.2 (Up,Ki).

" 31 Up iPKP 19 48 08.5 D
Sk iPKP 19 47 58.1
Um iPKP 19 47 52.9 D
Kermadec Islands.

Markus Båth
August 23, 1963

Seismological Institute
Uppsala

P R E L I M I N A R Y

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, G Ö T E B O R G, U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

A P R I L 1 - 30, 1963.

1963 Apr 1 Ki eL 03 16
microns sec
M N 0.7 21
M Z 1.5 21
New Britain (h = 60 km).

" 1 Ki iPKP 04 10 16.3
Sk iPKP 04 10 26.5
Um iPKP 04 10 21.5
Santa Cruz Islands
(h = 210 km).

" 1 Up iP 04 39 03.9 D
iPcP 04 39 33.4
ipP 04 40 05.5
iS 04 47 26
iScS 04 48 30
microns sec
P Z' 0.1 0.7
S E 0.1 2
M E 0.6 15
M Z 1.1 17
(D = 7350 km = 66°).
Ki iP 04 38 19.9 D
iPcP 04 39 05.9
iS 04 46 04
iScS 04 47 42
eSa 04 52 51
microns sec
P Z' 0.1 1.0
S E 0.6 7
S N 0.5 8
(D = 6650 km = 60°).
Sk iP 04 38 54.9 D
i(PP) 04 41 09.5
Gb iP 04 39 25.9 D

1963 Apr cont. 1 Um iP 04 38 39.0 D
iPcP 04 39 16.9
iS 04 46 40
iScS 04 48 03
(D = 7000 km = 63°).
Ka iP 04 39 21.7 D
Japan. h = 270 km (Up).
Magn. = 5.7 (Up, Ki).

" 1 Up e(P) 04 47 01
Ki ePn 05 30 22
iSn 05 31 17.4
iSg 05 31 40.3
D = 510 km = 4.6°.
Sk eSg 05 34 14
Um eSn 05 32 03
iSg 05 32 40.3
D = 710 km = 6.4°.
Northwest Russia,
67.8°N, 32.5°E.
Origin time = 05 29 09.
Explosion?

" 1 Ki iP 06 49 31.4
Um iP 06 49 41.5

" 1 Up iPKP 08 50 20.1
i 08 50 26.4
Sk iPKP 08 50 08.9
Gb iPKP 08 50 32.1 C
Um iPKP 08 50 06.0
Kermadec Islands (h = 40 km).

" 1 Up iP 09 30 28.2
i(pP) 09 30 54.7
iPP 09 32 00.6

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr 1 cont.

Up i 09 32 12.4
i 09 32 43.5
iS 09 36 35
e 09 39 06
microns sec
PP E 0.4 5
M E 0.6 11
M N 1.7 12
M Z 0.9 15
D = 4550 km = 41°.
Ki iP 09 30 36.6
i(pP) 09 31 31.5
e(PP) 09 32 17
i 09 33 31.4
microns sec
M E 0.7 10
M N 0.4 13
M Z 0.6 10
Sk iP 09 30 54.2 C
Gb eP 09 30 37
i 09 30 49.1
Um iP 09 30 27.4 C
ePP 09 32 05
iS 09 36 22
i 09 39 20
Ka iP 09 30 22.2
i 09 30 29.1
i(pP) 09 31 04.2
Hindu Kush (h = 100 km).

" 1 Um i(P) 10 55 42.9
Local blast?

" 1 Up ePKP 11 36 34
Sk ePKP 11 36 25
Um ePKP 11 36 20
Kermadec Islands (h = 30 km).

" 1 Up i(P) 13 34 28.8
Local blast?

" 1 Um iP 14 16 14.3

" 1 Ka iPg 14 49 14.4
iSg 14 49 15.2
Probably explosion, near Ka.

" 1 Um iP 15 35 14.9

" 1 Up iP 15 44 25.6

" 1 Up i(P) 15 51 18.0 C

" 1 Ki iP 16 39 01.9
Sinkiang Province, China
(h = 200 km).

1963 Apr 1 Up iP 18 43 48.0
Um iP 18 43 45.9 C
Ka eP 18 43 49
Hindu Kush (h = 240 km).

" 1 Um iPKP 20 15 22.2 D
Santa Cruz Islands
(h = 30 km).

" 1 Up iP 20 44 15.4

" 1 Ki iPg 22 34 40.0
iSg 22 35 08.5
D = 240 km = 2.2°.
Um iSg 22 36 17.9
Possibly Northern Finland.
Origin time = 22 33 56.

" 1 Up i(PKP) 22 38 03.2
Sk i(PKP) 22 37 55.6
Gb e(PKP) 22 38 11
Um i(PKP) 22 37 50.6
(Kermadec Islands).

" 2 Up ePKP 03 52 55
Um iPKP 03 52 39.6 C
i 03 52 48.1
Kermadec Islands (h = 30 km).

" 2 Up iP 04 17 11.3
microns sec
P Z' 0.1 1.4
Ki eP 04 16 15
Um eP 04 16 41
Ka iP 04 17 35.1 C
Kamchatka (h = 30 km).

" 2 Um iP 04 22 41.0

" 2 Up iPKP 05 03 11.0
Sk iPKP 05 03 04.7
Gb iPKP 05 03 14.8
Um iPKP 05 02 58.1
Ka ePKP 05 03 17
i 05 03 34.8
Kermadec Islands (h = 50 km).

" 2 Up iPKP 05 24 48.1
Sk ePKP 05 24 41
Um iPKP 05 24 35.5
Kermadec Islands (h = 40 km).

" 2 Up ePKP 05 40 36
Sk iPKP 05 40 33.8
Um iPKP 05 40 21.5
i 05 40 29.0
Kermadec Islands (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr	2	Um	iP	08 02 40.6	
			i	08 02 41.8	
		Local blast?			
"	2	Ki	i(P)	11 13 27.9	
		Um	iP	11 14 12.0	D
"	2	Up	iPKP	11 45 12.9	
		Gb	iPKP	11 45 13.9	
		Um	iPKP	11 44 58.0	
		Kermadec Islands (h = 50 km).			
"	2	Ki	iP	11 48 57.2	C
		Sumatra (h = 90 km).			
"	2	Um	iP	11 59 27.5	C
"	2	Up	iP	12 45 38.7	C
"	2	Ka	iPg	14 49 37.9	
			iSg	14 49 38.8	
		Probably explosion, near Ka.			
"	2	Up	i(P)	15 12 34.5	
		Local blast?			
"	2	Gb	i(P)	14 09 58.2	
"	2	Up	iP	16 29 34.4	D
			ipP	16 30 15.4	
			iS	16 38 15	
			eP'P'	16 57 47	
			i	16 57 53.8	
			microns sec		
			P Z' 0.4	1.0	
			pP Z' 0.8	1.1	
			P'P' Z' 0.3	2.0	
		Ki	iP	16 28 41.6	D
			ipP	16 29 20.7	
			iP'P'	16 58 14.4	
			microns sec		
			P Z' 0.6	1.2	
			pP Z' 0.9	1.1	
			P'P' Z' 0.3	1.8	
		Sk	iP	16 29 12.4	D
			ipP	16 29 52.4	
		Gb	iP	16 29 49.8	D
			ipP	16 30 30.8	
			isP	16 30 48.6	
			eP'P'	16 57 49	
		Um	iP	16 29 08.0	D
			ipP	16 29 48.0	
			iP'P'	16 57 58.6	
			i	16 58 43.0	
			iS	16 37 27	
		Ka	iP	16 29 58	D
			ipP	16 30 40	
1963 Apr cont.	2	Ka	eP'P'	16 57 47	
		Aleutian Islands. h = 160 km (Up, Ki, Sk, Gb, Um, Ka). Magn. = 6.4 (Up, Ki).			
"	2	Up	iP	20 43 23.2	C
"	3	Ki	iP	01 24 05.4	
		Um	iP	01 23 58.0	
		North Atlantic Ocean (h = 30 km).			
"	3	Um	i(P)	06 46 56.9	
		Local blast?			
"	3	Ka	iPg	09 05 20.6	C
			iSg	09 05 21.3	
		Probably explosion, near Ka. This record like all the others in the same series exhibits Rayleigh surface waves of 0.5 sec period.			
"	3	Ka	iPg	09 45 27.8	
			iSg	09 45 28.7	
		Probably explosion, near Ka.			
"	3	Ka	iPg	10 10 17.8	C
			iSg	10 10 18.6	
		Probably explosion, near Ka.			
"	3	Um	iP	10 23 27.4	
"	3	Up	iPKP	11 41 28.3	C
			i	11 41 33.4	
		Ki	iPKP	11 41 14.6	
		Sk	iPKP	11 41 21.4	C
		Gb	iPKP	11 41 36.2	C
		Um	iPKP	11 41 16.3	C
		Ka	iPKP	11 41 38.3	
		Kermadec Islands (h = 50 km).			
"	3	Um	iP	11 58 16.7	
		Java (h = 160 km).			
"	3	Up	eP	12 10 11	
			i	12 10 19.5	
		Ki	iP	12 09 50.2	C
		Sk	iP	12 10 15.7	
		Um	iP	12 09 57.0	
		Philippine Islands (h = 70 km).			
"	3	Ka	iPg	12 09 53.2	C
			iSg	12 09 54.0	
		Probably explosion, near Ka.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr	3	Ka	iPg	12 45 42.7	C
			iSg	12 45 43.5	
		Probably explosion, near Ka.			
"	3	Um	i(P)	13 15 36.7	
"	3	Up	i(P)	14 52 28.3	
"	3	Up	iP	14 59 56.9	C
"	3	Um	e(PKP)	15 08 38	
			i	15 08 47.4	
			i	15 20 07	
		South Pacific Ocean (h = 30 km).			
"	3	Up	eP	16 04 39	
		Ki	iP	16 03 48.9	
			i	16 03 57.0	
		Sk	iP	16 04 32.2	
		Gb	iP	16 04 56.1	
		Um	iP	16 04 17.8	
			i	16 04 27.0	
		Alaska (h = 80 km).			
"	3	Up	eL	16 06	
				microns sec	
			M	E 0.7 18	
			M	N 1.6 20	
			M	Z 1.8 19	
		Ki	eL	16 08	
				microns sec	
			M	E 2.2 20	
			M	N 1.0 20	
			M	Z 3.7 19	
		New Britain (h = 60 km).			
"	3	Um	iP	18 33 11.5	
"	3	Up	iP	19 12 46.6	
		Gb	iP	19 12 57.6	
		Um	iP	19 12 16.9	
			i(PP)	19 15 30.1	
		Ka	iP	19 13 01	
		Mariana Islands (h = 30 km).			
"	3	Ki	i(P)	20 26 43.4	C
		Um	iP	20 27 25.4	
"	3	Um	e(P)	23 45 46	
"	4	Ka	iPg	08 36 09.6	
			iSg	08 36 10.5	
		Probably explosion, near Ka.			
"	4	Ka	iPg	09 01 12.7	
			iSg	09 01 13.4	
		Probably explosion, near Ka.			
1963 Apr	4	Um	iP	09 57 54.3	
"	4	Up	i(P)	10 40 01.3	
			i	10 40 06.4	
"	4	Ki	eP	13 55 10	
		Formosa (h = 20 km).			
"	4	Up	eP	14 03 37	
			i(P)	14 04 31.3	
		Um	i(P)	14 01 25.9	C
			i(P)	14 06 11.4	
"	4	Up	i(P)	16 35 00.7	
"	4	Up	ePKP	18 45 22	
			i	18 45 30.5	
		Sk	ePKP	18 45 20	
		Um	iPKP	18 45 15.0	
		Kermadec Islands (h = 20 km).			
"	4	Up	eP	20 34 49	
			i	20 34 56.7	
"	4	Ki	iP	20 54 09.7	
"	4	Up	iPKP	22 20 43.9	
			i	22 20 48.6	
		Ki	ePKP	22 20 24	
			i	22 20 31.2	
		Sk	iPKP	22 20 37.7	
		Gb	iPKP	22 20 53.8	
		Um	iPKP	22 20 32.5	
		Ka	iPKP	22 20 53	D
		Kermadec Islands (h = 40 km).			
"	4	Up	iPKP	23 47 29.8	
		Ki	i(PKP)	23 47 21.4	
		Sk	iPKP	23 47 24.5	
		Um	iPKP	23 47 19.1	
		Kermadec Islands (h = 30 km).			
"	5	Up	iP	01 03 12.5	D
				microns sec	
			P	Z' 0.1 0.8	
		Ki	iP	01 02 32.0	D
		Sk	iP	01 03 06.0	
		Um	iP	01 02 50.0	D
		Japan (h = 50 km).			
"	5	Up	iPKP	02 45 51.6	
			i	02 45 55.6	
			i	02 45 59.7	
		Ki	ePKP	02 45 34	
		Sk	iPKP	02 45 45.1	
		Um	iPKP	02 45 40.1	
		Kermadec Islands (h = 30 km)			
"	5	Um	e(P)	03 34 13	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr	5	Ki	iP	07 02 27.5	
		Um	iP	07 02 23.8	
		Sumatra (h = 30 km).			
"	5	Up	eLgl	07 10 41	
			i	07 10 49.9	
		Ki	iLgl	07 14 30.8	
			i	07 14 37.4	
		Sk	eS	07 11 24	
			iLgl	07 12 58.2	
		Gb	iLgl	07 10 23.6	
			iLg2	07 10 50.3	
			iRg	07 11 43.4	
		Um	iS	07 10 46.5	
			iLgl	07 12 28.9	
			i	07 12 32.9	
		Ka	eLi	07 09 12	
			i	07 10 53	
			i	07 11 39	
		Carpathians. Very well developed Lgl.			
"	5	Up	iPKP	11 09 48.2	
		Um	ePKP	11 09 30	
		Kermadec Islands (h = 40 km).			
"	5	Ki	eS	13 58 51	
		Sk	i(Lgl)	13 59 55.5	
		Um	iLgl	14 00 11.4	
		Italy.			
"	5	Ki	eP	14 35 14	
			i	14 35 23.8	
			eS	14 37 26	
			i	14 37 36.7	
			D = 1300 km = 11 $\frac{1}{2}^{o}$.		
		Um	eS	14 39 16	
			i	14 40 56.0	
		Spitsbergen area (including Finnish and Norwegian observations).			
"	5	Up	iP	20 59 13.8	C
"	6	Up	iP	01 30 14.8	
			i	01 30 21.5	
			i	01 31 23.7	
"	6	Up	iPKP	05 53 50.0	
		Sk	e(PKP)	05 53 49	
		Um	iPKP	05 53 39.9	
		Kermadec Islands (h = 30 km).			
"	6	Up	iSKP	07 24 08.8	
			i	07 24 15.9	
		Ki	iPKP	07 21 12.3	
			iSKP	07 23 43.6	
1963 Apr cont.	6	Sk	ePKP	07 21 10	
			iSKP	07 24 00.8	
		Gb	iPKP	07 21 34.8	
		Um	iPKP	07 21 14.3	
			iSKP	07 23 55.5	
		Fiji Islands (h = 530 km).			
"	6	Up	iP	07 35 13.6	
			i	07 35 30.4	
"	6	Um	iP	08 05 42.4	
"	6	Up	iP	09 19 24.6	
			i	09 19 34.9	
"	6	Up	iP	09 51 44.0	
			i	09 51 48.0	
		Sk	eP	09 52 25	
		Um	iP	09 52 12.4	
			i	09 52 25.0	
		Greece.			
"	6	Up	iP	11 29 02.8	C
			i	11 29 13.0	
				microns sec	
			P	Z' 0.2 1.2	
		Ki	iP	11 28 05.9	C
			i	11 28 09.3	
				microns sec	
			P	Z' 0.3 1.3	
		Sk	iP	11 28 33.7	C
		Gb	iP	11 29 15.1	C
			i	11 29 19.0	
		Um	iP	11 28 35.4	C
			i	11 28 39.0	
			iPa	11 31 37.0	
		Ka	iP	11 29 26.6	C
			i	11 29 30.4	
		Alaska (h = 40 km). Magn. = 6.1 (Up, Ki).			
"	6	Up	iP	11 57 44.7	C
"	6	Up	iP	12 16 46.3	
		Ki	iP	12 15 48.9	C
		Sk	iP	12 16 17.1	C
		Gb	iP	12 16 58.5	
		Um	iP	12 16 19.0	
		Ka	iP	12 17 11.9	
		Alaska (h = 60 km).			
"	6	Up	iPKP	15 29 25.0	
		Ki	iPKP	15 29 19.4	C
		Sk	iPKP	15 29 17.8	
		Um	iPKP	15 29 12.4	C
		Kermadec Islands (h = 30 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr	6	Ki	iPn	15 48 56.6	
			iSn	15 49 45.7	
			iSg	15 50 01.4	
			D = 420 km = 3.8°.		
		Um	iSg	15 51 31.0	
		Northwest Russia, 68.9°N, 30.4°E.			
		Origin time = 15 47 57.			
		Explosion?			
"	6	Up	iP	16 27 32.0	
"	6	Um	iP	16 36 41.1	
		Japan (h = 80 km).			
"	6	Up	iP	17 57 40.1	C
			i	17 57 42.7	
			microns	sec	
			P	Z' 0.1	1.0
		Ki	iP	17 57 39.0	
			microns	sec	
			M	E 0.5	16
			M	N 0.9	17
		Sk	iP	17 58 01.9	
		Um	iP	17 57 33.0	
			ePa	18 00 33	
		Tibet (h = 30 km).			
"	6	Up	iPKP	18 22 03.5	D
			i	18 22 10.9	
		Ki	ePKP	18 21 50	
			i	18 22 14.0	
		Sk	iPKP	18 21 57.5	
			i	18 22 11.5	
		Um	iPKP	18 21 52.2	
		Kermadec Islands (h = 200 km).			
"	7	Up	iPKP	04 16 48.3	
			isPKP	04 17 28.3	
		Sk	i	04 17 55.7	
		Gb	iPKP	04 16 58.0	C
			i	04 17 06.6	
		Um	iPKP	04 16 46.5	
			i	04 17 44.0	
		Ka	iPKP	04 17 04	
		Tonga Islands (h = 110 km).			
"	7	Up	iSg	05 13 03.7	
		Ki	iPn	05 08 47.5	
			iSn	05 09 43.9	
			eSg	05 10 05	
			D = 480 km = 4.3°.		
		Sk	eSg	05 12 40	
		Um	iSn	05 10 25.8	
			i	05 10 39.5	

1963 Apr cont.	7	Um	eSg	05 11 03	
		D = 670 km = 6.0°.			
		Northwest Russia, 67.5°N, 32.0°E.			
		Origin time = 05 07 43.			
		Explosion?			
"	7	Up	i(P)	07 49 17.8	
"	7	Up	iP	08 28 42.6	
"	7	Ki	eP	11 06 25	
		Gb	eP	11 07 33	
		Jan Mayen (h = 70 km).			
"	7	Up	iP	11 19 58.5	
		Ki	iP	11 18 50.9	
			microns	sec	
			M	E 2.7	17
			M	N 1.2	14
		Sk	iP	11 19 00.7	C
		Gb	eP	11 20 06	
		Um	iP	11 19 27.6	C
		Ka	iP	11 20 27.3	C
		Jan Mayen (h = 30 km).			
"	7	Up	iP	13 17 02.2	
		Ki	iP	13 16 36.7	C
		Um	iP	13 16 46.5	
		Ryukyu Islands (h = 120 km).			
"	7	Up	eP	14 38 18	
"	7	Up	iP	15 19 25.5	C
		Ki	iP	15 18 57.9	
			i	15 19 32.4	
			i	15 19 48.5	
		Sk	eP	15 19 27	
		Gb	iP	15 19 51.2	
		Um	iP	15 19 08.1	C
			iPcP	15 19 27.6	
		Ka	iP	15 19 44.7	
			i	15 19 58.0	
		Ryukyu Islands (h = 30 km).			
"	7	Up	iP	15 38 31.9	
			epP	15 39 15	
		Ki	eP	15 37 38	
			epP	15 38 25	
		Sk	eP	15 38 10	
		Gb	iP	15 38 57.0	
			ipP	15 39 34.9	
		Um	iP	15 38 05.9	
			ipP	15 38 50.5	
		Ka	iP	15 38 53.9	
			ipP	15 39 42.3	
		Aleutian Islands. h = 180 km (Up, Ki, Gb, Um, Ka).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr	7	Um	iP	21 48 39.7	D
"	7	Up	iP	22 49 05.3	C
			iPP	22 52 44.3	
			eSKS	22 59 30	
			iS	22 59 52	
			i	23 00 25	
				microns sec	
			P E	0.4 3	
			P Z	0.9 2	
			P Z'	0.8 1.2	
			PP E	0.4 2	
			PP Z	0.6 2	
			PP Z'	1.3 1.8	
			S E	1.9 7	
			M E	3.4 20	
			M N	4.1 20	
			M Z	4.3 19	
			D = 10300 km = 92½°.		
		Ki	iP	22 49 04.5	C
			ipP	22 49 22.2	
			iS	22 59 58	
				microns sec	
			P Z'	1.0 1.2	
			S E	3.7 8	
			M E	7.9 19	
			M N	6.0 22	
			D = 10200 km = 92°.		
		Sk	iP	22 49 18.9	
			iPP	22 53 09.6	
		Gb	iP	22 49 18.6	C
			iPP	22 53 07.7	
		Um	iP	22 49 02.4	C
			iPP	22 52 45.3	
			i	22 52 58.5	
			iS	22 59 48	
			i	23 00 18	
		Ka	iP	22 49 09	C
			i	22 52 41	
			iPP	22 52 51	
			i	22 53 06	
		Sumatra (h = 70 km).			
		Magn. = 6.7 (Up, Ki).			
"	8	Ki	iP	06 50 37.5	C
		Sk	iP	06 51 02.1	
		Um	eP	06 50 31	
		Kirghiz, U.S.S.R.			
		(h = 30 km).			
"	8	Up	iP	07 39 43.8	
"	8	Up	iP	07 51 07.2	
			i	07 51 13.6	
"	8	Up	iP	11 30 22.1	
		Um	iP	11 29 56.5	D
1963 Apr cont.	8	Ka	iP	11 30 43.5	
		Kurile Islands (h = 110 km).			
"	8	Um	e(P)	11 37 06	
"	8	Up	iP	14 47 38.9	
			iS	14 55 09	
			D = 5850 km = 52½°.		
		Ki	iP	14 47 57.5	
			i	14 48 04.3	
				microns sec	
			P Z'	0.1 1.0	
		Sk	iP	14 47 26.0	
		Gb	iP	14 47 13.1	
		Um	iP	14 47 53.0	
			eS	14 55 37	
		Ka	iP	14 47 28	
		North Atlantic Ocean			
		(h = 30 km).			
"	8	Um	iSKP	22 58 51.9	
		Fiji Islands (h = 420 km).			
"	9	Up	iP	00 13 44.0	
		Sk	iP	00 14 00.7	
		Um	iP	00 13 40.5	C
		Ka	i(P)	00 14 06	
		India (h = 30 km).			
"	9	Up		---	
				microns sec	
			M N	1.0 16	
			M Z	1.0 16	
		Ki	e	01 44 56	
		Um	e	01 45 30	
		Ka	eS	01 46 46	
		Jan Mayen (h = 20 km).			
		The waves read at Ki and Um have group velocities = 3.52 and 3.79 km/sec resp., agreeing with Lgl and Li resp., which is remarkable, considering the paths.			
"	9	Up	e(PKP)	02 20 32	
			i	02 21 14.0	
			iSKP	02 23 24.1	
				microns sec	
			SKP Z'	0.1 1.0	
		Ki	iPKP	02 20 29.5	C
			iSKP	02 22 59.7	
				microns sec	
			SKP Z'	0.4 1.8	
		Sk	iPKP	02 20 39.3	
			iSKP	02 23 17.1	
		Gb	iPKP	02 20 41.9	
			iSKP	02 23 33.5	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont.	9	Um	iPKP	02 20 36.5	
			iSKP	02 23 12.4	
		Ka	iPKP	02 21 00	
			i	02 21 05	
			iSKP	02 23 51	
		Fiji Islands (h = 540 km).			
"	9	Um	e(P)	02 33 07	
"	9	Up	eP	04 06 34	
			i	04 06 40.8	
"	9	Up	i(P)	12 06 30.3	
"	9	Um	iP	12 17 58.6	D
"	9	Up	iSg	13 03 22.9	
		Ki	iSg	13 01 22.4	
		Sk	eSg	13 02 37	
		Um	iPg	13 00 44.6	
			iSg	13 01 09.8	
			i(Rg)	13 01 23.0	
		D = 220 km = 1.9°.			
		Luleå harbour, Sweden.			
		Underwater explosion of 85 ton dynamite.			
		Origin time = 13 00 05.			
"	9	Up	i(Pg)	14 08 39.6	
			iSg	14 09 29.8	
"	9	Ka	iP	17 16 46.9	
"	9	Ki	iP	18 54 24.6	C
		Um	iP	18 54 29.0	
		Philippine Islands (h = 60 km).			
"	9	Ki	i(Sg)	19 41 09.2	
		Um	e(Sg)	19 42 39	
"	9	Up	i(Pg)	21 01 38.1	
			iSg	21 02 25.7	
"	9	Ki	iP	22 07 49.0	
"	9	Up	i(P)	22 28 55.7	
"	10	Up	i(P)	00 37 05.9	
		Ka	iP	00 36 31.3	
		Greece.			
"	10	Ki	e(P)	01 34 34	
"	10	Up	i(P)	08 00 20.2	

1963 Apr	10	Up	ePS	08 18 26	
				microns	sec
			M N	2.1	21
			M Z	1.9	20
		Timor (h = 30 km).			
"	10	Ka	iPKP	12 46 06.0	C
		Fiji Islands (h = 560 km).			
"	10	Up	iP	12 55 07.4	
		Sk	eP	12 55 46	
"	10	Um	iP	12 59 11.3	
"	10	Up	i(P)	13 02 08.6	C
			i	13 02 13.7	
"	10	Up	iP	13 20 36.6	
			i	13 20 39.9	
"	10	Um	iP	14 17 55.6	
"	10	Up	iP	23 23 15.1	
		Sk	iP	23 22 55.9	C
		Gb	iP	23 23 06.3	
		Um	iP	23 23 10.4	
		Mexico (h = 130 km).			
"	11	Um	iP	00 35 03.0	C
"	11	Up	iP	00 41 33.8	
		Gb	i(P)	00 42 35.6	
"	11	Ki	iPn	05 30 25.5	
			iSn	05 31 20.8	
			iSg	05 31 43.7	
		D = 530 km = 4.8°.			
		Sk	e	05 33 30	
			eSg	05 34 19	
		Um	iPn	05 30 52.0	
			iSn	05 32 05.1	
			iSg	05 32 53.0	
		D = 760 km = 6.8°.			
		Northwest Russia, 68.1°N, 33.2°E.			
		Origin time = 05 29 08.			
		Explosion?			
"	11	Up	iP	10 15 31.4	
		Ki	iP	10 14 42.7	
		Sk	iP	10 15 19.0	
		Um	iP	10 15 05.4	D
			i	10 15 20.2	
		Kurile Islands (h = 80 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr	11	Um	iP	11 45 02.8	
		Alaska (h = 70 km).			
"	11	Up	iP	13 13 28.6	
		Um	eP	13 12 53	
		Aleutian Islands			
		(h = 30 km).			
"	11	Ki	iPg	13 15 55.1	C
			iSg	13 16 03.7	
			iRg	13 16 07.4	
			D = 80 km = 0.7°.		
		Sk	iSg	13 18 19.7	
		Um	eSg	13 17 29	
		Gällivare, Sweden,			
		67.1°N, 20.6°E.			
		Origin time = 13 15 41.			
		Probably explosion in the			
		iron ore mines.			
"	11	Gb	e(Pg)	13 31 38	
			iSg	13 31 44.2	
			iL	13 31 53.4	
"	11	Ki	iP	14 22 10.0	C
		Sk	iP	14 23 08.3	
		Um	iP	14 23 02.9	C
		Svalbard (h = 15 km).			
"	11	Up	ePKP	17 04 16	
		Um	iPKP	17 04 24.6	
		Sandwich Islands			
		(h = 30 km).			
"	12	Up	iP	00 50 10.0	D
			i	00 50 15.5	
				microns sec	
			P	Z' 0.1 0.7	
		Ki	iP	00 50 13.4	
				microns sec	
			P	Z' 0.1 1.3	
			M	E 0.8 14	
			M	N 1.3 15	
		Sk	iP	00 50 32.1	D
		Gb	iP	00 50 31.0	
		Um	iP	00 50 06.0	D
		Ka	iP	00 50 15.2	D
			i	00 50 21.2	
		India (h = 30 km).			
		Magn. = 5.8 (Up, Ki).			
"	12	Um	iP	02 14 35.4	
"	12	Ki	iP	03 20 38.0	C
				microns sec	
			P	Z' 0.1 0.7	

1963 Apr	12	Ki	iP	04 22 28.5	D
		Um	iP	04 22 57.9	
		Alaska (h = 60 km).			
"	12	Up	iPKP	09 01 48.0	C
			i	09 02 01.8	
		Ki	iPKP	09 01 26.2	C
				microns sec	
			PKP	Z' 0.1 1.0	
		Sk	iPKP	09 01 39.3	
		Um	iPKP	09 01 34.0	C
		New Zealand (h = 110 km).			
"	12	Up	iSg	13 39 40.8	
		Ki	iPg	13 36 43.2	
			iSg	13 37 20.4	
			D = 310 km = 2.8°.		
		Sk	e	13 37 11	
			eSg	13 37 36	
		Um	e(Pg)	13 37 05	
			i	13 37 32.4	
			iSg	13 38 06.8	
			D = 470 km = 4.2°.		
		West coast of Norway,			
		67.0°N, 13.6°E.			
		Origin time = 13 35 47.			
"	12	Up	iP	13 49 02.8	
		Ki	iP	13 48 10.2	D
		Sk	iP	13 48 41.7	
		Gb	iP	13 49 19.7	
		Um	iP	13 48 36.1	
			iPcP	13 49 10.8	
		Aleutian Islands			
		(h = 30 km).			
"	12	Up	iP	19 52 30.0	
			iS	19 56 14	
				microns sec	
			P	Z' 0.1 1.0	
			D = 2300 km = 20½°.		
		Ki	iP	19 50 52.5	
				microns sec	
			P	Z' 0.2 1.5	
		Sk	iP	19 51 45.6	
		Gb	iP	19 52 48.0	
			i	19 53 05.7	
		Um	iP	19 51 42.0	
			i	19 51 47.6	
		Ka	iP	19 53 09	C
		Svalbard (h = 30 km).			
"	13	Up	iP	00 04 06.7	C
		Ki	eP	00 05 42	
		Sk	iP	00 04 45.8	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr 13 Um iP 00 04 43.8
cont. i 00 04 54.8
Ka iP 00 03 34 C
iPP 00 03 54
Ionian Sea (h = 30 km).

" 13 Up iP 02 11 10.6
Ka iP 02 10 36 C
(Ionian Sea).

" 13 Up iP 02 34 18.1 D
i 02 34 34
ePP 02 38 16
eSKS 02 44 41
iS 02 45 39
ipS 02 46 20

		microns	sec
P	Z	0.5	2
P	Z'	0.5	1.3
PP	Z'	0.2	1.8
S	E	1.2	7
M	E	1.7	22
M	N	2.3	22
M	Z	2.2	22

(D = 10900 km = 98°).

Ki iP 02 34 22.4 D
iPP 02 38 18.8
iSKS 02 44 49
iS 02 45 49
ipS 02 46 37

		microns	sec
P	Z'	0.4	1.7
PP	Z'	0.3	1.7
SKS	E	0.9	5
S	E	2.1	7
M	E	4.4	20
M	N	2.3	20

(D = 11000 km = 99°).

Sk iP 02 34 07.4 D
Gb iP 02 34 05.2 D
i 02 34 17.1
iPP 02 37 51.7
Um iP 02 34 23.0 D
iPP 02 38 22.3
i 02 38 30.3
i 02 41 12
eS 02 45 44
ipS 02 46 34
i 02 47 55
Ka iP 02 34 15 D
iPP 02 38 07
Peru (h = 130 km).
Magn. = 6.7 (Up, Ki).

" 13 Up iP 02 38 40.2
Ki iP 02 38 40.2 C

		microns	sec
P	Z'	0.1	0.9

1963 Apr 13 Sk iP 02 38 53.9
cont. These P-phases arrive during the preceding record, but could be clearly distinguishe e.g. from PP of the previous shock, by their significantly higher frequency.

" 13 Um iP 11 35 11.4
Japan (h = 110 km).

" 13 Up iP 14 45 32.9
i 14 45 45.7
iPKP 14 49 36.4
iPP 14 50 14.7

		microns	sec
M	E	2.7	20
M	N	2.6	21
M	Z	5.8	22

Ki iP 14 45 14.4
i 14 45 27.1
ePP 14 49 24
i 14 49 47.9
iSKS 14 55 53

		microns	sec
P	Z'	0.2	1.2
M	E	2.3	19
M	N	0.9	19

Sk iPP 14 50 14.4
Um iP 14 45 21.4
iPP 14 49 37.2
i 14 49 54.9
iSKS 14 55 57
ePS 14 58 46
New Guinea (h = 30 km).
Magn. = 6.0 (Up, Ki).

" 13 Up iP 14 57 12.4
Ki iP 14 57 22.0
Sk iP 14 57 38.3
Um iP 14 57 10.6
Ka iP 14 57 18.4

" 13 Ki iP 15 53 16.9 C
(New Guinea).

" 13 Um eP 18 56 36
Ka iP 18 55 16 D

" 13 Up iP 19 56 08.0
Ki eP 19 55 37
Um iP 19 55 50.5
Volcano Islands
(h = 110 km).

" 13 Up iPKP 22 26 54.8
Ki iPKP 22 26 39.9
Sk iPKP 22 26 50.0

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont.	13	Gb	iPKP	22 27 02.7	C
		Um	iPKP	22 26 44.3	C
		Kermadec Islands (h = 420 km).			
"	14	Up	iPKP	05 52 18.6	
			i	05 52 25.0	
				microns	sec
			PKP Z'	0.1	0.5
		Ki	iPKP	05 52 04.4	
			i	05 52 24.2	
		Sk	iPKP	05 52 13.0	
		Gb	iPKP	05 52 26.7	
		Um	iPKP	05 52 07.9	C
		Ka	iPKP	05 52 27	C
		Kermadec Islands (h = 30 km).			
"	14	Um	eP	07 36 08	
		Japan (h = 30 km).			
"	14	Up	iP	15 14 41.3	
		Sk	eP	15 14 37	
		Um	iP	15 14 49.5	C
"	14	Up	iP	19 10 26.7	
		Ki	iP	19 09 52.4	D
		Sk	iP	19 10 22.2	
		Um	iP	19 10 07.0	
		Japan (h = 110 km).			
"	14	Ki	iP	20 48 06.9	
		Um	iP	20 48 21.3	
		Japan (h = 110 km).			
"	15	Ki	iP	07 41 59.4	
		Um	iP	07 42 28.4	
		Alaska (h = 60 km).			
"	15	Um	iP	12 20 56.7	
"	15	Um	iP	17 50 35.2	C
			i	17 51 33.6	
"	15	Um	iP	18 39 25.9	
"	15	Ki	iP	20 32 51.5	C
		Halmahera (h = 30 km).			
"	15	Ki	iPKP	23 58 34.7	
		Sk	iPKP	23 58 46.5	C
		Um	iPKP	23 58 36.8	C
		Tonga Islands (h = 30 km).			
"	16	Up	iP	01 43 12.9	
			i	01 43 22.0	
			i	01 44 40	

1963 Apr cont.	16	Up	i	01 47 12	
			i(PP)	01 47 39	
			i	01 47 56	
			i	01 48 07.8	
			iSKS	01 53 54	
			i	01 54 16	
			iPS	01 56 28	
				microns	sec
			(PP) Z	3.5	15
			SKS E	5.9	10
			M E	73	17
			M N	130	19
			M Z	100	18
		(D = 11350 km = 102°).			
		Ki	iP	01 42 51.0	
			i	01 43 07.4	
			i	01 44 23	
			iX	01 46 15.6	
			iPP	01 46 53	
			iSKS	01 53 28	
				microns	sec
			PP E	1.4	6
			SKS E	7.4	10
			M E	110	17
			M N	66	16
		(D = 10900 km = 98°).			
		Sk	eP	01 43 19	
			i	01 43 29.2	
			iX	01 46 48.8	
			i	01 47 04.8	
			iPP	01 47 43.7	
		Gb	i(X)	01 47 40.0	
			iPP	01 48 05.9	
		Um	iP	01 42 55.3	
			e	01 43 36	
			iX	01 46 33.4	
			ePP	01 46 58	
			i	01 47 45	
			iSKS	01 53 36	
			iS	01 54 12	
		Ka	iP	01 43 16.6	
			iX	01 46 49.6	
			iPP	01 47 39.3	
		Halmahera (h = 30 km). Magn. = 6.6 according to PP (Up,Ki), but = 7.6 according to surface waves (Up,Ki). Many phases are left unexplained. For instance, the phase denoted X (Ki, Sk, Um, Ka) appears 3.25-3.38 after P, and could possibly correspond to PKP.			
"	16	Up	i(PP)	01 55 28	
				microns	sec
			(PP) N	9.0	12

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont.	16	Ki	iP	01 50 32.2	
			iPP	01 54 35	
			i(PKP)	01 55 14	
				microns	sec
			PP	N 1.9	8
			(PKP)	N 4.1	11
		Sk	eP	01 50 56	
		Um	iP	01 50 37.2	
			i	01 50 43.9	
		Ka	iX	01 54 31.9	
		Halmahera (h = 30 km).			
"	16	Up	eP	02 09 12	
			i	02 09 34.7	
			iPP	02 13 35.8	
				microns	sec
			PP	Z' 0.3	1.1
		Ki	e(P)	02 08 41	
			i	02 09 00.5	
			i	02 13 11.4	
		Sk	iP	02 09 22.0	
			eX	02 12 49	
		Gb	e	02 12 22	
			iPP	02 13 48.7	
		Um	iP	02 08 58.0	
		Ka	iX	02 12 46.5	
			iPP	02 13 29.9	
		Halmahera (h = 30 km).			
"	16	Ki	iP	02 19 34.2	
				microns	sec
			P	Z' 0.3	1.8
		Um	iP	02 19 33.7	
		Halmahera (h = 30 km).			
"	16	Ki	iP	02 25 38.7	
		Um	iP	02 25 35.0	
		(Halmahera).			
"	16	Ki	iP	04 17 37.5	
		Halmahera (h = 30 km).			
"	16	Up	i(P)	10 36 55.6	
"	16	Ki	iP	12 17 11.9	C
				microns	sec
			P	Z' 0.1	1.5
		Halmahera (h = 30 km).			
"	16	Ki	iP	18 35 36.1	D
"	16	Up	iP	18 53 08.4	C
			i	18 59 40	
				microns	sec
			M	E 1.7	18
			M	N 2.5	18
			M	Z 1.4	22

1963 Apr cont.	16	Ki	iP	18 53 54.1	C
				microns	sec
			P	Z' 0.1	0.8
			M	E 2.6	15
			M	N 1.7	15
			M	Z 3.1	13
		Sk	iP	18 53 48.0	C
		Gb	iP	18 53 18.1	
		Ka	iP	18 52 57.5	
		Iraq (h = 100 km).			
"	16	Ki	iP	20 14 25.4	
		Halmahera (h = 30 km).			
"	17	Up	iP	01 39 40.2	
				microns	sec
			M	E 1.1	20
			M	N 1.4	18
			M	Z 2.6	20
		Ki	e	01 42 04	
				microns	sec
			M	E 2.2	20
			M	N 0.7	17
			M	Z 2.5	19
"	17	Up	ePKP	02 30 42	
			ePP	02 33 30	
			iPKS	02 34 19	
				microns	sec
			PP	Z 1.0	8
			PKS	N 1.2	7
			M	E 2.1	22
			M	N 4.7	23
			M	Z 5.3	23
		(D = 15450 km = 139°).			
		Ki	ePKP	02 30 31	
			iPP	02 32 44	
			iPKS	02 33 52	
			ePPS	02 44 41	
				microns	sec
			PKP	Z' 0.2	1.8
			PP	Z 1.0	9
			PKS	E 1.0	8
			PKS	N 1.2	8
			M	E 2.3	19
			M	N 2.0	19
			M	Z 2.8	18
		(D = 14550 km = 131°).			
		Sk	ePKP	02 30 33	
			i	02 30 44.9	
		Gb	ePKP	02 30 50	
			i	02 30 53.9	
		Ka	iPKP	02 30 51.9	
			i	02 31 00.2	
		Fiji Islands (h = 30 km), Magn. = 6.3 (Up, Ki).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Apr 17 Up iP 10 52 54.5
ipP 10 53 19.5
Ki ipP 10 53 22.5
iPP 10 55 08.2
Sk epP 10 53 28
isP 10 53 39.4
Ka iP 10 52 59.4
Hindu Kush. h = 120 km (Up).

" 17 Up iP 13 15 59.8

" 17 Sk iP 17 33 33.7
Um iP 17 34 07.0
North Atlantic Ocean

" 17 Up iP 17 54 54.6
Sk iP 17 54 23.2
North Atlantic Ocean
(h = 30 km).

" 17 Up eP 18 00 26
Sk eP 17 59 56
Um iP 18 00 27.4 C
North Atlantic Ocean
(h = 30 km).

" 17 Um eP 18 07 33

" 17 Ki eL 19 27

		microns	sec
M	E	1.2	18
M	N	0.5	18
M	Z	1.2	19

Sandwich Islands
(h = 25 km).

" 17 Up iP 20 41 33.3 C

" 18 Up e(PKP) 02 10 12
Sk ePKP 02 10 15
Gb iPKP 02 10 21.3
Um ePKP 02 10 12
Ka iPKP 02 10 25.8
Fiji Islands (h = 530 km).

" 18 Ki iSn 05 19 24.0
iSg 05 19 41.3
D = 460 km = 4.1°.
Um iSn 05 20 08.4
iSg 05 20 45.4
D = 670 km = 6.0°.
Northwest Russia,
67.8°N, 31.2°E.
Origin time = 05 17 28.
Explosion?

" 18 Um iP 09 03 07.4

1963
Apr 18 Up iP 20 50 53.1

" 18 Ki eP 22 23 29
Um iP 22 23 35.0
Halmahera (h = 60 km).

" 18 Um iP 22 44 43.5 C

" 19 Ki iSn 06 29 04.0
iSg 06 29 21.4
(Northwest Russia).

" 19 Up eP 07 35 38
Ki iP 07 36 46.4 C
Sk eP 07 36 20
Gb eP 07 35 29
Um iP 07 36 11.0
Crete (h = 50 km).

" 19 Up iP 07 44 49.4 C
iPP 07 46 57
iS 07 52 33
iSa 07 56 50
i 07 58 44
iLgl 08 04 07

		microns	sec
P	E	2.3	4
P	N	0.5	3
P	Z	3.7	3
P	Z'	1.0	0.7
PP	E	2.3	4
PP	Z	2.7	5
S	E	9.5	8
S	N	11	10
M	E	33	11
M	N	60	15
M	Z	41	12

D = 6050 km = 54½°.
Ki iP 07 44 33.1 C
iPP 07 46 43.4
iS 07 52 01

		microns	sec
P	E	3.5	5
P	Z	5.8	5
P	Z'	1.1	1.2
PP	E	2.2	8
PP	Z	3.4	7
PP	Z'	1.9	2.0
S	E	9.3	9
S	N	13	8
M	E	68	14
M	N	94	17
M	Z	83	14

D = 5800 km = 52°.
Sk iP 07 45 01.3 C
iPa 07 48 25.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont.	19	Gb	iP	07 45 13.4	
			iPa	07 48 39.8	
		Um	iP	07 44 36.0	C
			i	07 44 41	
			iPP	07 46 39	
			iS	07 52 04	
		Ka	iP	07 45 04.5	C
			iPa	07 48 06.9	
		Tsinghai Province, China (h = 30 km). Magn. = 6.9 (Up, Ki).			
"	19	Up	iP	10 46 47.3	
		Ki	eP	10 46 19	
		Sk	iP	10 46 33.5	
		Um	iP	10 46 28.7	C
"	19	Ki	eP	12 30 05	
		Um	iP	12 29 48.5	
"	19	Up	iPKP	16 36 38.2	C
			i	16 36 51.8	
				microns sec	
			PKP	Z' 0.1 0.7	
		Ki	ePKP	16 36 51	
		Sk	ePKP	16 36 43	C
		Um	iPKP	16 36 46.4	
		Ka	iPKP	16 36 26.0	C
		Sandwich Islands (h = 100 km).			
"	19	Ki	eP	16 42 26	
			i	16 42 31.8	
		Um	iP	16 42 31.6	
		Halmahera (h = 30 km).			
"	19	Um	iP	17 50 04.1	
"	19	Ki	ePg	21 04 42	
			iRg	21 04 49.2	
"	19	Up	iPKP	23 03 56.5	
			i	23 04 00.6	
				microns sec	
			PKP	Z' 0.1 0.6	
		Sk	iPKP	23 03 49.9	
		Gb	iPKP	23 04 05.1	
		Um	iPKP	23 03 45.2	C
		Ka	iPKP	23 04 04	
		Kermadec Islands (h = 40 km).			
"	20	Up	iP	00 48 41.3	
		Sk	eP	00 49 23	
		Um	iP	00 49 21.2	
		Ka	iP	00 48 02	
		Greece (h = 50 km).			

1963 Apr	20	Up	iP	01 00 46.2	
			i	01 01 13.8	
		Ki	iP	01 00 00.0	
		Gb	iP	01 01 07.6	
		Um	iP	01 00 20.6	
"	20	Ki	iP	01 21 33.1	C
		Halmahera (h = 30 km).			
"	20	Um	iP	01 41 33.9	D
"	20	Up	i	02 50 26.1	
			iSg	02 50 35.8	
		Ki	iPg	02 46 06.7	D
			iSg	02 46 34.1	
				microns sec	
			Sg	Z' 0.6 0.5	
			D = 220 km = 2.0°.		
		Sk	e	02 47 55	
			i	02 48 17.5	
			eSg	02 48 45	
		Gb	e	02 51 37	
			iSg	02 51 48.2	
		Um	ePn	02 46 58	
			i	02 47 47.3	
			iSn	02 48 06.3	
			iSg	02 48 30.1	
			D = 620 km = 5.6°.		
		Northern Norway (h = 40 km). This earthquake demonstrates that in near shocks, like this one, Sg is by far the most trustworthy phase (compare A. Ben-Menahem & M. Båth: A method for determination of epicenters of near earthquakes, Geof. pura e appl., Vol. 46, 1960, pp. 37-46).			
"	20	Up	iP	07 14 17.5	C
				microns sec	
			P	Z' 0.1 0.5	
		Ki	iP	07 13 25.0	C
		Sk	iP	07 14 01.7	
		Gb	iP	07 14 38.0	C
		Um	iP	07 13 49.6	C
		Ka	iP	07 14 40	C
		Kamchatka (h = 30 km).			
"	20	Up	iP	08 18 43.5	C
"	20	Up	iP	10 07 48.4	
"	20	Um	e(P)	12 32 02	
			i	12 32 26.5	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr	20	Um	i(P)	15 40 47.6		
"	20	Um	eP	16 43 21		
"	20	Ki	e(P)	16 59 27		
"	20	Up	iP	20 42 47.7 C		
				microns	sec	
			P	Z' 0.1	0.6	
			M	E 1.2	21	
			M	N 0.8	20	
			M	Z 1.4	21	
		Ki	iP	20 41 55.2		
		Sk	iP	20 42 32.9		
		Gb	iP	20 43 09.7		
		Um	iP	20 42 19.9		
		Ka	iP	20 43 13 C		
			Kamchatka (h = 30 km).			
			Origin time = 20 32 15.3.			
"	20	Up	i(P)	21 10 24.4		
"	21	Up	iP	04 50 08.1 C		
			iSa	05 09 03		
			microns	sec		
			P	Z' 0.1	0.9	
			M	E 8.5	18	
			M	N 4.5	22	
			M	Z 11	18	
		Ki	iP	04 49 44.0 C		
			eS	04 59 02		
			microns	sec		
			P	Z' 0.1	1.0	
			M	E 2.3	19	
			M	N 2.8	17	
			D = 8000 km = 72°.			
		Sk	iP	04 50 11.9 C		
		Gb	iP	04 50 27.8		
		Um	iP	04 49 52.7 C		
			eS	04 59 21		
		Ka	iP	04 50 25		
			Formosa (h = 30 km).			
			Magn. = 6.0 (Up, Ki).			
"	21	Ki	e(P)	05 28 00		
		Um	iP	05 27 32.9		
"	21	Up	iP	09 28 56.1 C		
			microns	sec		
			P	Z' 0.1	0.8	
			M	E 1.0	13	
			M	N 0.6	16	
			M	Z 1.3	14	
		Ki	iP	09 28 27.9 C		
			microns	sec		
			P	Z' 0.1	1.2	
			M	E 0.4	15	
			M	N 0.5	14	

1963 Apr cont.	21	Sk	iP	09 28 56.8		
		Gb	iP	09 29 16.0 C		
		Um	iP	09 28 38.5 C		
		Ka	iP	09 29 11 C		
			Ryukyu Islands (h = 30 km).			
			Magn. = 5.9 (Up, Ki).			
"	21	Up		---		
			microns	sec		
		M	Z	0.6	19	
		Ki		---		
			microns	sec		
		M	E	0.9	18	
		M	N	0.6	19	
		Um	eSS	11 12 54		
			Bismarck Sea (h = 30 km).			
"	21	Up	iP	11 52 11.9		
"	21	Ki	iP	13 13 30.4		
		Um	iP	13 13 46.1		
			Japan (h = 50 km).			
"	21	Gb	iP	15 58 03.5		
"	22	Up	iP	00 59 34.5		
		Ki	iP	00 59 43.3		
		Sk	iP	00 59 59.2		
		Um	iP	00 59 33.0		
		Ka	iP	00 59 38 C		
			West Pakistan (h = 40 km).			
"	22	Um	iP	02 01 58.7		
			Banda Sea (h = 140 km).			
"	22	Up	iPKP	07 45 11.5 C		
			i	07 45 15.8		
			microns	sec		
			PKP	Z' 0.2	0.5	
		Ki	iPKP	07 44 48.7		
		Sk	iPKP	07 45 05.3 C		
			i	07 45 20.8		
		Gb	iPKP	07 45 20.1 C		
			i	07 45 28.0		
		Um	iPKP	07 45 00.0 C		
		Ka	iPKP	07 45 18 C		
			Kermadec Islands (h = 30 km).			
"	22	Um	iP	11 50 54.8 C		
"	22	Up	iSg	14 09 30.0		
			i	14 09 56.5		
		Sk	eSg	14 11 20		
		Gb	iSg	14 08 32.3		
		Um	iSg	14 11 36.7		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont. 22 Ka iPg 14 06 46.2
iSg 14 07 12.5
iL 14 07 39.9
D = 220 km = 2.0°.
Near Baltic coast of Poland, 54°N, 16½°E. Origin time = 14 06 06. Explosion?

" 22 Up iP 15 21 06.4 C
microns sec
P Z' 0.1 0.7

" 22 Up iP 15 43 19.3 D
iS 15 47 26
microns sec
P Z' 0.2 1.0
D = 2550 km = 23°.
Ki iP 15 44 12.4 D
iPP 15 44 56.1
Sk eP 15 43 52
iPP 15 44 23.9
Gb iP 15 43 29.1
i 15 43 36.8
Um iP 15 43 41.5
eS 15 48 15
D = 2850 km = 25½°.
Ka iP 15 42 59.2
Black Sea (h = 30 km).

" 23 Up iP 03 00 08.8
iS 03 07 06
iLg2 03 19 08
microns sec
P Z' 0.2 1.5
M E 2.0 15
M N 1.7 12
M Z 3.0 16
D = 5500 km = 49½°.
Ki iP 02 59 32.6
i 02 59 38.6
iLg1 03 15 37
eLg2 03 15 59
i 03 17 32
microns sec
P Z' 0.3 1.4
M E 2.7 17
M N 0.7 13
Sk eP 03 00 09 C
i 03 00 14.5
Gb eP 03 00 35
iPP 03 02 37.5
Um iP 02 59 42.6
i 02 59 48.8
eS 03 06 31
eSS 03 10 10
iLg2 03 17 14
D = 5150 km = 46½°.

1963 Apr cont. 23 Ka iP 03 00 25.0
Outer Mongolia (h = 30 km). Magn. = 6.0 (Up, Ki). There is a small P-phase preceding a much larger one by about 6 sec at Ki, Sk, Um. Both phases are given here. For the other stations, the P-phases given refer to the later large-amplitude phase.

" 23 Sk iPKP 07 38 45.7
Um iPKP 07 38 48.5 C
Sandwich Islands (h = 30 km).

" 23 Um iP 09 19 09.0

" 23 Up iP 10 05 39.9 C
eS 10 14 10
microns sec
P Z' 0.1 0.7
M E 0.8 14
M N 2.5 18
M Z 1.0 16
Ki iP 10 05 28.2 C
microns sec
M E 1.1 13
M N 0.7 14
Sk iP 10 05 52.7
Gb e(P) 10 05 52
Um iP 10 05 29.1
e 10 20 43
Ka iP 10 05 48.7
China.

" 23 Um iP 11 49 41.1
Philippine Islands (h = 30 km).

" 23 Sk iP 13 08 19.2
Vancouver Island (h = 40 km).

" 23 Up iP 14 06 59.8
i 14 07 06.6
i 14 07 54.0
microns sec
P Z' 0.1 0.7
Ki iP 14 08 21.4
i 14 08 44.3
Sk iP 14 07 44.1 C
Gb iP 14 06 53.3
Um iP 14 07 42.1
i 14 07 51.2

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont.	23	Ka	iP	14 06 18.5	C
		Yugoslavia-Albania (h = 40 km).			
"	23	Ki	iP	14 10 35.1	
		Sk	iP	14 10 00.8	
		Um	iP	14 10 02.0	
		Ka	iP	14 08 35.5	
		Yugoslavia-Albania.			
"	23	Um	iP	14 19 16.2	
"	23	Um	iP	15 58 21.2	C
"	23	Ki	iP	22 33 41.1	
"	24	Um	iP	03 18 24.4	
"	24	Ki	iP	06 05 13.1	
"	24	Um	iP	06 05 18.5	
		Halmahera (h = 30 km).			
"	24	Up	iP	07 36 57.1	
"	24	Up	i(P)	07 52 19.9	
"	24	Up	i(P)	08 07 11.2	
"	24	Up	eP	13 30 33	
			i	13 30 45.7	
"	24	Up	iP	13 44 02.5	
			i(pP)	13 44 14.6	
				microns sec	
			(pP)	Z' 0.1 0.6	
			M	E 1.2 13	
			M	N 0.8 14	
			M	Z 1.8 14	
		Ki	iP	13 43 33.8	
			i(pP)	13 43 44.8	
				microns sec	
			(pP)	Z' 0.1 1.0	
			M	E 0.5 16	
			M	N 0.6 15	
		Sk	iP	13 44 03.3	
			i(pP)	13 44 14.3	
		Gb	iP	13 44 17.4	
			i(pP)	13 44 30.0	
		Um	iP	13 43 45.2	D
			i(pP)	13 43 56.6	
		Ryukyu Islands.			
"	24	Up	iP	16 01 35.7	
			i	16 01 44.9	
"	24	Up	iP	20 37 04.0	
1963 Apr	24	Up	iP	20 38 44.1	
		Sk	iP	20 39 09.5	
		Um	eP	20 38 42	C
		Hindu Kush (h = 120 km).			
"	24	Sk	iPKP	21 07 50.5	
		Um	iPKP	21 07 45.0	
		Kermadec Islands (h = 30 km).			
"	24	Up	iPKP	22 00 58.5	
			iSKP	22 03 46.5	
			i	22 03 57.9	
				microns sec	
			SKP	Z' 0.1 0.8	
		Ki	iPKP	22 00 52.3	
			iSKP	22 03 23.3	
				microns sec	
			SKP	Z' 0.4 1.5	
		Sk	iPKP	22 00 51.9	
			iSKP	22 03 39.7	
		Gb	iPKP	22 01 09.7	D
			iSKP	22 03 54.7	
		Um	iPKP	22 00 47.9	
			i	22 00 53.8	
			iSKP	22 03 34.9	
		Ka	iPKP	22 01 12.3	D
			iSKP	22 03 56.1	
		Fiji Islands (h = 600 km).			
"	25	Ki	eP	01 58 30	
"	25	Up	e(P)	03 02 00	
"	25	Up	iP	04 43 44.3	
		Ki	iP	04 44 13.9	
			i	04 44 19.9	
				microns sec	
			P	Z' 0.1 1.5	
		Sk	eP	04 44 13	
		Um	eP	04 43 57	
			i	04 44 02.5	
"	25	Up	eP	06 09 43	
		Sk	iP	06 10 18.6	
		Gb	iP	06 09 28.4	
		Um	iP	06 10 17.2	
			i	06 10 30.4	
		Ka	iP	06 08 52.4	
		Yugoslavia-Albania (h = 40 km).			
"	25	Up	i(P)	08 15 23.1	
		Ki	eP	08 16 45	
"	25	Up	iP	08 25 08.1	
			i	08 28 49.0	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont.	25	Up	iPP	08 29 07.1	
				microns sec	
			PP	Z' 0.1 1.2	
		Ki	iP	08 24 54.3	C
				microns sec	
			P	Z' 0.1 1.1	
		Sk	iP	08 25 14.7	
		Gb	iP	08 25 24.3	C
		Um	iP	08 24 58.0	
		Celebes Sea (h = 610 km).			
"	25	Um	iP	09 52 29.2	
"	25	Ki	iP	11 12 20.0	
		Um	iP	11 12 02.7	C
"	25	Up	eP	11 20 07	
		Ki	iP	11 20 35.5	
		Sk	iP	11 20 34.7	
		Gb	iP	11 20 14.7	
		Um	iP	11 20 17.6	
		Maldive Islands (h = 30 km).			
"	25	Up	iP	11 31 10.0	
		Ki	eP	11 30 33	
		Sk	iP	11 31 06.0	
		Um	iP	11 30 48.7	
		Japan (h = 50 km).			
"	25	Um	eP	12 06 51	
		Japan (h = 30 km).			
"	25	Up	i(P)	12 21 03.8	
		Ki	iP	12 20 49.2	
"	25	Up	iP	13 40 03.2	
		Ki	iP	13 41 16.0	
		Sk	iP	13 40 34.6	D
		Um	iP	13 40 50.1	
		France (h = 30 km).			
"	25	Ka	i(Pg)	15 22 55.5	
			iL	15 23 10.0	
"	25	Up	iSKS	17 00 24	
			iPS	17 02 58	
		Ki	iP	16 49 31.0	
			i	16 49 36.4	
			iPP	16 53 36	
			iSKS	17 00 08	
				microns sec	
			M	E 0.8 21	
			M	N 0.6 20	
			M	Z 1.2 19	
		D = 10900 km = 98°.			

1963 Apr cont.	25	Um	iP	16 49 36.2	
			eSKS	17 00 14	
		Halmahera (h = 30 km).			
"	25	Up	iPKP	18 09 02.6	D
		Ki	iPKP	18 08 54.0	
		Sk	e(PKP)	18 09 04	
		Gb	iPKP	18 09 11.3	D
		Um	e(PKP)	18 08 50	
			iPKP	18 09 02.0	
		Ka	iPKP	18 09 14.2	D
		Fiji Islands (h = 380 km).			
"	26	Ki	i(P)	05 23 36.9	
"	26	Um	iP	14 03 48.0	
"	26	Up	i(P)	14 34 30.5	
"	26	Up	iP	15 32 12.4	
		Ki	iP	15 31 15.4	
		Sk	eP	15 31 41	
		Um	iP	15 31 42.0	C
		Alaska (h = 140 km).			
"	26	Up	i(P)	15 41 38.5	
"	26	Up	i(P)	20 41 00.2	
"	26	Up	iP	23 56 49.1	
				microns sec	
			M	E 0.9 16	
			M	N 1.0 17	
			M	Z 1.1 17	
		Ki	iP	23 56 25.0	
				microns sec	
			M	E 0.7 13	
			M	N 0.4 15	
			M	Z 1.2 19	
		Sk	iP	23 56 52.7	
		Gb	iP	23 57 09.0	D
		Um	iP	23 56 33.6	D
		Ka	iP	23 57 06	
		Formosa (h = 30 km).			
"	27	Up	iP	02 48 37.0	
"	27	Up	eP	03 46 38	
			i	03 46 45.8	
				microns sec	
			M	N 0.5 13	
		Ki	iP	03 46 08.9	
			i	03 46 14.4	
			eS	03 49 18	
				microns sec	
			P	Z' 0.2 1.0	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Apr 27 cont. Ki

		microns	sec
M	E	0.9	15
M	N	0.3	14
M	Z	1.7	18

D = 1800 km = 16°.

Sk	eP	03 45 51
	i	03 46 00.1
Um	iP	03 46 27.4
Ka	iP	03 47 01 C

Iceland (h = 30 km).
The first P-phase (Up,Ki, Sk) is less definite and of smaller amplitude than the one arriving 6-9 sec later.

" 27 Up iP 05 30 28.3

" 27 Um iP 06 20 27.6

" 27 Ki

iSn	06 25 03.4	
iSg	06 25 18.0	

D = 390 km = 3.5°.

Um	iSn	06 25 49.5
	iSg	06 26 22.2

D = 600 km = 5.4°.
Northwest Russia - Finland border, 67.6°N, 29.6°E.
Origin time = 06 23 23.
Explosion?

" 27 Up

e	09 00 30	
eS	09 08 23	
	microns	sec
M	E 1.3	23
M	N 2.8	23
M	Z 1.5	23
Ki eP	08 56 29	
iSKS	09 07 18	
	microns	sec
SKS	E 0.4	6
M	E 2.9	20
M	N 2.2	21
M	Z 3.1	21
Um iP	08 56 34.8	
eSKS	09 07 18	
e(ScS)	09 08 13	

Halmahera (h = 30 km).
Magn. = 6.1 (Up, Ki).

" 27 Up iP 12 43 18.3 C

" 27 Up

iP	12 48 08.9 C	
i	12 48 15.5	
Gb i(P)	12 47 35.9	

" 27 Up iP 13 39 48.7

1963
Apr 27 Up iP 15 20 08.4
Ki iP 15 19 06.4
Sk iP 15 19 44.2
Um iP 15 19 43.1
Alaska (h = 40 km).

" 28 Up iP 00 46 35.8

	microns	sec
M	E 1.3	17
M	N 1.0	17
M	Z 0.8	9
Ki	---	
	microns	sec
M	E 1.4	10
M	N 0.6	11
M	Z 1.0	11
Gb iP	00 46 31.5	
Um iP	00 47 12.7 C	
e	00 51 45	

Turkey (h = 160 km).

" 28 Up iP 04 16 37.2
Ki iP 04 16 05.0
Sk iP 04 16 37.1
Um iP 04 16 18.4 D
Japan (h = 60 km).

" 28 Up iP 19 57 44.5 C

	microns	sec
P	Z' 0.1	0.6
Ki iP	19 57 52.9 C	
Sk iP	19 58 09.9 C	
Gb iP	19 58 05.9 C	
ePP	19 59 51	
Um iP	19 57 42.5 C	
Ka iP	19 57 53.0 C	
iPP	19 59 36.7	

Hindu Kush (h = 150 km).

" 28 Um i(P) 20 05 36.8

" 29 Ki iP 01 16 14.0

" 29 Up e(P) 05 15 08
Ki iP 05 14 51.2
Um iP 05 15 06.0
i 05 15 18.3
Luzon (h = 120 km).

" 29 Ki

iPn	05 26 24.5
iSn	05 27 19.1
iSg	05 27 37.2

D = 480 km = 4.3°.

Sk	eSg	05 30 18
Um	eSn	05 28 04
	iS*	05 28 21.4

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont.	29	Um	eSg	05 28 42	
			D = 690 km = 6.2°.		
			Northwest Russia,		
			67.9°N, 31.8°E.		
			Origin time = 05 25 16.		
			Explosion?		
"	29	Ki	e(P)	12 48 35	
"	29	Ki	iP	12 50 06.0	
"	29	Ki	i(P)	13 03 08.5	
"	29	Ka	iP	15 11 45.0	
"	29	Up	iPKP	15 12 36.0	C
		Ki	iPKP	15 12 39.8	C
			microns	sec	
			PKP Z' 0.1	1.0	
		Sk	iPKP	15 12 51.2	
		Gb	iPKP	15 12 40.9	
		Um	iPKP	15 12 35.9	
			i	15 16 19	
		Ka	iPKP	15 12 26.8	
		Antarctic.			
"	29	Up	iP	20 38 50.7	
"	29	Up	iP	20 48 14.6	
		Ki	iP	20 48 03.5	C
			microns	sec	
			P Z' 0.2	1.5	
		Sk	iP	20 47 56.2	
		Um	iP	20 48 11.5	
		Ka	iP	20 48 18.6	
		Mexico (h = 25 km).			
"	29	Up	iP	21 55 10.5	C
			iS	22 04 07	
			iPS	22 04 46	
			eP'P'	22 23 40	
			microns	sec	
			P Z	0.8 5	
			P Z'	0.2 1.0	
			S E	0.5 5	
			M E	5.7 20	
			M N	9.3 20	
			M Z	7.8 20	
			D = 7500 km = 67½°.		
		Ki	iP	21 54 19.6	C
			ePa	21 57 58	
			eS	22 02 20	
			eP'P'	22 23 49	
			microns	sec	
			P N	0.7 7	
			P Z	1.8 8	
			P Z'	0.1 1.0	

1963 Apr cont.	29	Ki		microns	sec
			S E	1.4 14	
			S N	0.9 10	
			M E	9.2 19	
			M N	4.5 20	
			M Z	12 23	
			D = 6600 km = 59½°.		
		Sk	iP	21 54 51.8	
		Gb	iP	21 55 28.5	
		Um	iP	21 54 45.0	C
			iPcP	21 55 32.7	
			e	21 56 39	
			iS	22 03 15	
			eP'P'	22 23 40	
			i	22 23 48.1	
		Ka	iP	21 55 32.2	
			i	21 55 35.7	
		Aleutian Islands			
		(h = 60 km).			
		Magn. = 6.0 (Up, Ki).			
"	29	Up	iP	22 09 45.2	
		Ki	iP	22 09 23.0	
		Um	iP	22 09 30.6	
"	30	Up	iP	01 12 13.7	
			iSKS	01 22 44	
			e	01 25 09	
			microns	sec	
			SKS E	1.0 9	
			M E	7.4 25	
			M N	9.4 21	
			M Z	8.4 20	
		Ki	iP	01 11 51.0	
			i	01 11 57.7	
			iPP	01 15 52	
			ePKS	01 20 02	
			iSKS	01 22 43	
			eS	01 23 17	
			microns	sec	
			P Z'	0.2 1.1	
			PP Z	1.5 10	
			PKS E	0.8 10	
			SKS E	1.1 12	
			S N	1.0 11	
			M E	9.9 20	
			M N	15 23	
			M Z	12 21	
			D = 10900 km = 98°.		
		Sk	iP	01 12 18.5	C
			iPP	01 16 35.2	
		Gb	i	01 15 35.0	
		Um	eP	01 11 55	
			i	01 12 03.3	
			ePP	01 15 56	
			e	01 22 27	
			eSKS	01 22 48	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Apr cont.	30	Ka	eP	01 12 24	
			e	01 15 34	
			iPP	01 16 39.7	
		Halmahera (h = 30 km).			
		Magn. = 6.5 (Up, Ki).			
"	30	Ki	iP	01 41 20.5	
"	30	Up	eP	02 47 53	
		Um	iP	02 47 51.2	
		Mindanao (h = 30 km).			
"	30	Up	iP	03 29 46.8	
		Aleutian Islands			
		(h = 50 km).			
"	30	Up	iP	03 36 59.4	
				microns sec	
			P	Z' 0.1 1.0	
		Ki	iP	03 36 07.0	
		Sk	eP	03 36 41	
		Um	iP	03 36 33.3	
		Ka	iP	03 37 24.0	
		Aleutian Islands			
		(h = 50 km).			
"	30	Up	iP	05 25 21.0	
		Ki	iP	05 26 37.4	
		Sk	iP	05 26 02.9	
		Um	iP	05 26 02.9	
		Ka	iP	05 24 43.1	
		Albania - Greece			
		(h = 30 km).			
"	30	Up	iP	07 18 49.0	
				microns sec	
			P	Z' 0.1 0.7	
		Ki	iP	07 17 57.1	
				microns sec	
			M	E 2.2 20	
			M	N 1.4 20	
		Sk	iP	07 18 30.6	
		Um	iP	07 18 23.4	
			iPcP	07 18 58.2	
		Ka	iP	07 19 13.3	
		Aleutian Islands			
		(h = 60 km).			
"	30	Up	iP	09 57 44.1	
"	30	Ki	iP	10 32 27.5	
		Um	iP	10 32 30.6	
		Andaman Islands			
		(h = 30 km).			
"	30	Up	i(P)	12 04 53.8	
1963 Apr	30	Um	i(P)	13 55 26.7	
"	30	Up	eP	18 33 13	
		Sk	iP	18 33 06.8	
		Um	iP	18 33 01.8	
			i	18 33 11.1	
"	30	Up	i(P)	22 08 21.4	
"	30	Ki	iSn	23 33 16.8	
			iSg	23 33 37.1	
			D = 440 km = 4.0°.		
		Sk	eSg	23 36 06	
		Um	i	23 34 13.1	
			iSg	23 34 35.5	
		Northwest Russia,			
		67.6°N, 30.8°E.			
		Origin time = 23 31 25.			
		Explosion?			

Markus Båth
October 12, 1963

Uppsala

PRELIMINARY SEISMOLOGICAL BULLETIN

UPPSALA, KIRUNA, SKALSTUGAN, GÖTEBORG, UMEÅ and KARLSKRONA

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

MAY 1 - 31, 1963.

1963 May 1

Up	iP	01 16 08.4	D
	i	01 16 10.9	
Ki	iP	01 15 15.6	
	ipP	01 15 32.9	
Sk	eP	01 15 49	
Um	iP	01 15 41.9	

Aleutian Islands.
h = 70 km (Ki).

" 1

Um	iP	02 37 27.8	

Indian Ocean.

" 1

Up	i(PKP)	10 22 13.1	
	iPKP	10 22 22.5	
	ipPKP	10 22 59	
	i(SKP)	10 25 28	
	iSKP	10 25 35.9	
	i	10 25 40.3	
	ipPKS	10 26 27	
	isPKS	10 26 44	

		microns	sec
PKP	Z'	0.1	1.0
(SKP)	E	0.7	5
(SKP)	N	1.2	6
(SKP)	Z	2.4	6
SKP	Z'	0.2	0.8
M	E	3.4	22
M	N	6.3	25
M	Z	9.2	25

(D = 15000 km = 135°).

Ki	iPKP	10 22 06.9	
	ipPKP	10 22 44.1	
	iPP	10 24 40	
	epPKS	10 26 00	

		microns	sec
PKP	Z'	0.4	1.3
PP	E	0.9	8

1963 May 1 cont.

		microns	sec
Ki	PP N	1.5	7
	PP Z	4.1	8
	M E	7.4	23
	M N	3.2	21
	M Z	7.7	22

(D = 14200 km = 128°).

Sk	i(PKP)	10 22 11	
	iPKP	10 22 20	
	iSKP	10 25 31	
	ipPKS	10 26 28	
Gb	iPKP	10 22 28.3	
	isPKP	10 23 15.6	
	iSKP	10 25 47.6	
Um	e(PKP)	10 22 07	
	iPKP	10 22 14.4	
	ipPKP	10 22 51.4	
	i	10 25 00	
	iSKP	10 25 22.7	
	ipPKS	10 26 12	
	isPKS	10 26 31.7	

(D = 14450 km = 130°).

Ka	i(PKP)	10 22 20.7	
	iPKP	10 22 28.8	
	ipPKP	10 23 03.2	
	iSKP	10 25 48.1	
	isPKS	10 27 02.6	

New Hebrides Islands.
h = 140 km (Up,Ki,Um,Ka).
Magn. = 6.6 (Ki).
This earthquake is another example of early core phases, described in detail in a paper by G. Payo Subiza and M. Båth: Core phases and the inner core boundary, Geophys. Journ. (in press).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May	1	Up	iP	10 34 18.4
		Ki	iP	10 34 19.8
		Um	eP	10 34 24
"	1	Ka	i(P)	11 00 54.4
"	1	Up	iP	19 59 58.1
		Ki	iP	19 59 58.4
		Sk	iP	20 00 21
		Um	iP	19 59 51.4
		Sinkiang Province, China (h = 150 km).		
"	2	Up	iP	02 05 57.6
		Ki	iP	02 06 32.7
		Um	iP	02 06 10.9
		Iran (h = 50 km).		
"	2	Up	iPKP	09 38 43.5
			i	09 38 47.4
		Gb	iPKP	09 38 53.5
		Fiji Islands (h = 30 km).		
"	2	Up	i(P)	10 49 52.8
			i	10 50 00.0
"	2	Up	iP	23 22 50.4
		Ki	iP	23 21 50.6
		Um	iP	23 22 20.0
		Alaska (h = 80 km).		
"	3	Ki	eP	10 52 13
			iPP	10 54 05.2
		Um	iP	10 51 44.0
			iPP	10 53 20.3
		Iran (h = 25 km).		
"	3	Ki	eL	12 00
				microns sec
			M E	0.8 21
			M N	0.4 18
			M Z	1.2 21
		Tonga Islands (h = 30 km).		
"	3	Ki	iP	16 19 20.3
"	3	Up	iP	23 25 34.7
"	4	Up	iP	04 11 37.6
		Ki	iP	04 11 05.9
		Sk	iP	04 11 34.8
		Um	iP	04 11 19.2
		Ka	iP	04 12 00.0
"	4	Up	iP	06 06 59.0 D
				microns sec
			P	Z' 0.1 1.2

1963 May cont.	4	Ki	iP	06 06 05.4
			ipP	06 06 20.1
				microns sec
			pP	Z' 0.1 1.0
		Sk	eP	06 06 37
		Gb	iP	06 07 14.2
		Um	iP	06 06 31.0
			ipP	06 06 46.4
		Ka	eP	06 07 41
		Aleutian Islands, h = 60 km (Ki,Um).		
"	4	Up	i(P)	14 53 26.4
"	4	Up	iP	16 32 03.6
		Ki	iP	16 31 54.1
		Sk	iP	16 31 46.8
		Um	iP	16 32 00.9
		Guatemala (h = 160 km).		
"	4	Ki	iP	16 36 05.9
		Um	iP	16 36 33.2
"	4	Up	iP	16 51 48.5
			i	16 58 02
		Sk	iP	16 52 45.3
		Um	iP	16 52 33.0
		Ka	eP	16 51 08
"	4	Ki	iPKP	18 43 57.1
		Um	iPKP	18 43 56.3
		South of Australia (h = 30 km).		
"	4	Ki	iPKP	19 20 43.9
		Sandwich Islands (h = 30 km).		
"	4	Ki	eP	19 40 33
		Um	iP	19 40 10.7
"	4	Up	iP	22 20 54.5 C
			i	22 21 04.2
		Ki	iP	22 20 33.9
		Um	iP	22 20 34.3
		Japan (h = 170 km).		
"	5	Up	iP	07 43 36.6
		Sk	e	07 45 48
"	5	Up	iP	11 15 49.7 C
		Um	iP	11 15 28.8
		Japan (h = 130 km).		
"	5	Sk	iP	14 45 56.8
"	5	Gb	iP	19 01 49.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May	6	Up	i(P)	02 05 23.0	
"	6	Um	iP	08 52 06.4	C
		Java (h = 80 km).			
"	6	Up	i	09 33 22.5	
			i	09 33 28.6	
		Ka	iPg	09 31 07.8	D
			iSg	09 31 33.8	
"	6	Up	i	13 07 06.8	
			i	13 07 28.8	
		Ka	iPg	13 06 04.2	
			iSg	13 06 30.4	
"	6	Up	iP	15 23 51.2	
"	6	Up	iP	19 35 05.8	C
			i	19 35 10.8	
				microns sec	
			M E	0.7 10	
			M N	0.7 11	
			M Z	0.7 11	
		Ki	iP	19 36 30.6	C
				microns sec	
			M E	1.7 15	
			M N	0.7 12	
			M Z	0.9 13	
		Sk	iP	19 35 48.4	
		Gb	iP	19 35 03.0	C
		Um	iP	19 35 47.1	
			iPP	19 36 22.3	
		Ka	iP	19 34 30.5	
		Greece-Albania (h = 30 km).			
"	6	Up	iP	20 11 25.1	
"	6	Up	iP	20 53 28.3	
"	7	Up	iP	00 51 35.2	C
"	7	Up	iP	02 26 09.3	
				microns sec	
			M E	0.8 15	
			M N	1.2 20	
			M Z	1.5 19	
		Ki	iP	02 26 02.4	
				microns sec	
			M E	1.1 12	
			M N	0,8 18	
			M Z	1.4 12	
		Sk	iP	02 26 22.2	
		Gb	iP	02 26 18.0	
		Um	iP	02 25 59.5	C
		Sinkiang Province, China (h = 30 km).			

1963 May	7	Up	e(P)	03 02 58	
		Gb	i(P)	03 02 37.0	
"	7	Up	iP	03 24 01.8	C
		Ki	iP	03 24 10.5	C
		Um	iP	03 24 00.3	C
		Ka	iP	03 24 09.1	C
		Hindu Kush (h = 230 km).			
"	7	Up	iP	04 58 07.3	
		Ka	iP	04 58 13.1	D
		Hindu Kush (h = 180 km).			
"	7	Ki	iP	05 24 56.2	
		Um	iP	05 25 26.5	
		Alaska (h = 30 km).			
"	7	Um	iP	15 39 14.9	
"	7	Um	iP	17 37 10.2	D
"	7	Up	i(P)	20 37 11.8	
"	8	Up	iP	09 01 30.9	
			eP'P'	09 30 05	
		Ki	iP	09 00 37.0	D
			ipP	09 01 03.8	
		Sk	iP	09 01 07.1	
		Um	iP	09 01 03.9	
			iP'P'	09 30 14.0	
		Aleutian Islands. h = 110 km (Ki).			
"	8	Up	iP	10 33 37.8	C
			ipP	10 33 50.4	
			iPP	10 36 21.6	
			eS	10 43 02	
			i	10 43 25	
				microns sec	
			P Z	1.0 4	
			P Z'	0.3 1.0	
			pP Z'	0.4 1.1	
			S N	1.2 6	
			M E	8.5 23	
			M N	14 22	
			M Z	12 19	
			D = 8100 km = 73°.		
		Ki	iP	10 32 58.6	C
			i	10 34 23.6	
			iS	10 41 52	
			eSS	10 46 27	
				microns sec	
			P Z'	0.2 1.1	
			S N	1.9 6	
			M E	21 17	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May cont. 8 Ki
microns sec
M N 17 23
M Z 24 18
D = 7400 km = 66½°.
Sk iP 10 33 31.8 C
ipP 10 33 45.4
iPP 10 36 07.7
Gb iP 10 33 57.8
i 10 36 24.1
Um iP 10 33 15.9 C
ipP 10 33 27.4
iS 10 42 22
Ka iP 10 33 56 C
ipP 10 34 08
ePP 10 36 42
Japan. h = 50 km
(Up,Sk,Um,Ka).
Magn. = 6.4 (Up,Ki).

" 8 Up iP 15 37 25.9
Ki iP 15 37 06.8 C
microns sec
M E 2.0 19
M N 1.1 21
Sk eP 15 37 30
Um iP 15 37 13.9
Mindanao (h = 70 km).

" 8 Up iP 21 38 45.1
Um iP 21 38 25.3
Japan (h = 40 km).

" 9 Up iP 03 22 51.5

" 9 Up iP 04 50 35.3
Um iP 04 50 22.9
Ka i(P) 04 50 51

" 9 Ki ePn 04 51 09
iSn 04 51 57.1
iSg 04 52 19.1
D = 460 km = 4.1°.
Um iSn 04 52 41.4
iSg 04 53 17.4
D = 660 km = 5.9°.
Northwest Russia,
67.7°N, 31.2°E.
Origin time = 04 50 03.
Explosion?

" 9 Up iPKP 07 45 02.9
Sk iPKP 07 44 55.8
Um iPKP 07 44 50.2
Kermadec Islands
(h = 270 km).

1963 May 9 Up iP 11 35 26.4
Ki iP 11 34 50.6
Um iP 11 35 06.0 D
Japan (h = 30 km).

" 9 Up iP 13 06 10.6 D
i 13 06 27.5

" 9 Ki eP 15 16 16
Sk eP 15 16 04
Um iP 15 16 21.4
Nicaragua (h = 30 km).

" 9 Ki iP 15 18 55.9
Um iP 15 18 59.9
Ka iP 15 19 00
i 15 20 04
Nicaragua (h = 30 km).

" 9 Up iP 15 21 05.6
microns sec
M E 0.7 18
M N 0.7 18
M Z 0.9 18
Ki iP 15 20 55.9
microns sec
P Z' 0.1 1.5
M E 1.1 17
M N 0.5 16
M Z 1.0 15
Sk eP 15 20 46
Gb iP 15 20 55.1
Um iP 15 21 01.9
i 15 21 05.5
Ka iP 15 20 58
Nicaragua (h = 30 km).

" 9 Up iP 15 54 26.9
Ka e(P) 15 55 11

" 9 Up iP 16 01 39.1
i 16 01 45.8

" 9 Ki e(P) 18 34 01

" 9 Up iP 20 56 02.2 D
Ki iP 20 55 08.5 D
Sk iP 20 55 38.9
Um iP 20 55 36.0 D
Aleutian Islands (h = 30 km).

" 10 Up iP 02 01 03.7
Ki iP 02 00 33.7
microns sec
M E 0.4 14

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May cont. 10 Sk iP 02 01 04.4
Um iP 02 00 46.2
Japan (h = 30 km).

" 10 Up i(P) 03 02 20.5

" 10 Ki iPKP 04 47 44.9
Sk ePKP 04 47 56
Um iPKP 04 47 51.4 C
i 04 48 05.4
Loyalty Islands (h = 30 km).

" 10 Up iP 11 02 52.4
i 11 03 03.4
epP 11 03 17
Ki iP 11 03 37.6
i 11 03 52.7
i 11 04 25.0
eSn 11 10 10
Sk ipP 11 04 04.2
Gb epP 11 03 46
Um iP 11 03 10.4
ipP 11 03 40.9
iS 11 08 15.9
(D = 3200 km = 29°).
Ka iP 11 02 56.8 C
Azerbaijan, U.S.S.R.
h = 140 km (Up,Um).
Concerning Sn at Ki, see remark to Caspian Sea earthquake on Jan. 27, 1963, at 19 35 14.3.

" 10 Up iP 11 21 49.3 C
Ki iP 11 22 05.8 C
Indian Ocean (h = 30 km).

" 10 Um iP 15 32 24.0

" 10 Up i(P) 20 25 58.5

" 10 Up iP 22 36 01.7 C
e(SKS) 22 46 29
eS 22 47 10

		microns	sec
S	N	1.3	11
M	E	5.7	20
M	N	4.9	20
M	Z	9.8	23

D = 10550 km = 95°.
Ki iP 22 36 03.6
ePP 22 40 04
eSKS 22 46 38
eS 22 47 11

		microns	sec
PP	Z	0.6	5

1963 May cont. 10 Ki

		microns	sec
SKS	E	1.2	8
S	N	1.2	
M	E	7.3	20
M	N	4.8	20
M	Z	7.6	20

D = 10600 km = 95½°.
Sk iP 22 35 55.1 C
Gb iP 22 35 47.1
Um iP 22 36 03.9
i 22 46 17
iSKS 22 46 47
Ka iP 22 35 54.9
Ecuador (h = 30 km).
Magn. = 6.3 (Up,Ki).
A long train of oscillatory motion without pronounced phases follows the P wave on all our short-period records.

" 10 Up iP 22 57 16.8

" 11 Up eP 01 16 29
Ki iP 01 17 45.5
Sk iP 01 17 11.8
Um eP 01 17 09
Libya (h = 30 km).

" 11 Ki iPKP 05 02 36.4
Um iPKP 05 02 43.0
iSKP 05 05 33.5
Fiji Islands (h = 400 km).

" 11 Up i(P) 05 10 59.1

" 11 Up iP 18 01 29.0 C
i 18 02 13.0
i 18 02 29.5
iS 18 11 10

		microns	sec
M	E	4.5	19
M	N	4.7	21
M	Z	7.3	19

D = 8450 km = 76°.
Ki iP 18 01 05.1
eL(3.24) 18 30 54

		microns	sec
M	E	2.2	16
M	N	2.2	15
M	Z	2.3	15

Um iP 18 01 13.4
i 18 01 36.0
eS 18 10 46
D = 8150 km = 73½°.
Formosa (h = 30 km).
Magn. = 5.9 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May	11	Ki	ePn	19 54 16	
			iSn	19 54 51.6	
			iSg	19 55 06.5	
			D = 330 km = 3.0°.		
		Um	ePn	19 55 02.8	
			iSn	19 56 16.6	
			iSg	19 57 03.2	
			D = 720 km = 6.5°.		
			Off northwest coast of Norway, 70°N, 14°E.		
			Origin time = 19 53 26.		
"	12	Um	iP	01 17 36.3	
			Sea of Japan (h = 310 km).		
"	12	Um	iP	03 08 22.7	C
			Japan (h = 30 km).		
"	12	Up	e(P)	04 00 38	
			i	04 00 46.9	
"	12	Um	iP	05 14 06.0	
"	12	Up	ePKP	10 02 48	
			iPKP2	10 03 32.1	
				microns sec	
			PKP2	Z' 0.1 1.3	
		Ki	iPKP2	10 03 26.5	C
				microns sec	
			PKP2	Z' 0.2 1.3	
		Sk	ePKP2	10 03 43	
		Um	iPKP	10 02 48.6	
			iPKP2	10 03 28.6	
		Ka	ePKP	10 02 43	
			iPKP2	10 03 32.6	
			Macquarie Islands (h = 40 km).		
"	12	Up	iP	20 19 02.3	D
			ipP	20 19 13	
			iS	20 27 24	
			isS	20 27 47	
				microns sec	
			P	N 1.0 3	
			P	Z 2.0 3	
			P	Z' 0.4 0.8	
			S	E 2.1 3	
			S	N 2.7 4	
			M	E 1.7 18	
			M	N 3.6 22	
			M	Z 3.6 22	
			D = 7000 km = 63°.		
		Ki	iP	20 18 07.5	D
			iS	20 25 48	
			iScS	20 27 54	
				microns sec	

1963 May cont.	12	Ki		microns sec	
			P	Z 1.2 4	
			P	Z' 1.1 1.0	
			S	E 2.2 7	
			S	N 1.6 7	
			M	E 2.7 20	
			M	N 2.6 20	
			M	Z 3.8 20	
			D = 6150 km = 55½°.		
		Sk	iP	20 18 35.4	D
			ipP	20 18 46.4	
		Gb	iP	20 19 14.7	D
			ipP	20 19 25.6	
		Um	iP	20 18 35.9	D
			ipP	20 18 46.6	
			eS	20 26 34	
			i(S)	20 26 40	
			eScS	20 28 23	
		Ka	iP	20 19 24	D
			i	20 19 32	
			i	20 19 36	
			eS	20 28 14	
			Alaska. h = 40 km (Up,Sk,Gb, Um). Magn. = 6.6 (Up,Ki).		
"	12	Up	iP	20 47 26.5	C
			ipP	20 47 46	
			iPcP	20 48 03.2	
				microns sec	
			P	Z' 0.4 1.8	
		Ki	iP	20 46 30.9	C
				microns sec	
			P	Z' 0.4 2.0	
		Sk	iP	20 47 08.1	C
		Gb	iP	20 47 46.5	C
		Um	iP	20 46 57.0	C
			iPcP	20 47 51.6	
		Ka	iP	20 47 49	C
			ipP	20 48 08	
			Kamchatka. h = 80 km (Up,Ka). Magn. = 6.0 (Up,Ki).		
"	12	Up	iP	20 56 00.0	
"	13	Up	iP	01 15 20.7	
			i	01 15 29.5	
		Um	iP	01 15 13.4	
			i	01 15 22.4	
		Ka	iP	01 15 33	
			i	01 15 41	
"	13	Up	iPKP	07 29 18.1	C
		Ka	iPKP	07 29 34	
			Fiji Islands (h = 450 km).		
"	13	Up	eP	09 55 21	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May cont.	13	Ki	iP	09 54 39.7	
			ipP	09 54 52.8	
		Um	iP	09 54 58.0	
			ipP	09 55 11.2	
		Japan. h = 50 km (Ki,Um).			
"	13	Ki	iP	10 36 27.0	D
		Um	iP	10 36 34.2	
"	13	Up	iP	12 56 44.0	
			i	12 57 29.6	
			microns	sec	
			M E	1.9 20	
			M N	1.2 20	
			M Z	2.7 21	
		Ki	iP	12 56 32.9	
			microns	sec	
			P Z'	0.1 1.5	
			M E	2.0 21	
			M N	0.9 17	
			M Z	2.1 20	
		Gb	eP	12 56 34	
		Um	iP	12 56 41.5	
		Ka	iP	12 56 48.4	
			i	12 57 41.1	
		Mexico - Guatemala (h = 60 km).			
"	13	Up	iSKP	14 30 01.3	
			i	14 30 05.8	
			microns	sec	
			SKP Z'	0.1 0.9	
		Ki	iPKP	14 26 32.5	
			eSKP	14 29 38	
		Sk	eSKP	14 29 50	
		Gb	iSKP	14 30 11.4	
		Um	iPKP	14 26 39.4	C
			iSKP	14 29 47.7	
		Ka	iSKP	14 30 18.0	
		New Hebrides Islands (h = 160 km).			
"	13	Sk	i(P)	14 48 12.7	
"	13	Ki	iP	17 59 34.0	
		Alaska (h = 90 km).			
"	14	Ki	iP	08 17 27.9	
		Venezuela (h = 50 km).			
"	14	Ki	iP	14 00 10.7	C
			i	14 00 22.1	
		Sk	eP	14 00 39	
		Um	iP	14 00 39.0	C
		Alaska (h = 40 km).			
1963 May	14	Um	iP	15 21 58.5	
		Banda Sea (h = 410 km).			
"	14	Up	i(P)	17 42 17.6	
"	14	Up	ePKP	18 16 01	
		Sk	ePKP	18 15 50	
		Um	iPKP	18 15 45.6	
		Kermadec Islands (h = 30 km).			
"	15	Ki	eP	06 43 12	
		Sk	eP	06 43 16	
		Um	iP	06 43 03.6	
		Hindu Kush (h = 30 km).			
"	15	Up	iP	11 19 51.0	
			i	11 20 02.3	
		Ki	iP	11 21 11.5	
		Sk	iP	11 20 35.5	D
		Gb	eP	11 19 37	
		Um	iP	11 20 33.4	
			i	11 20 38.5	
		Ka	iP	11 19 08.2	
			i	11 19 11.3	
			i	11 19 57.8	
		Albania (h = 30 km).			
"	15	Ki	i(Sg)	11 59 08.1	
		Um	eSg	12 00 44	
"	15	Up	iP	12 15 01.7	D
			i	12 15 09.2	
			microns	sec	
			P Z'	0.2 1.3	
			M E	0.8 15	
			M Z	1.0 13	
		Ki	iP	12 15 37.1	
			i	12 16 27.7	
			microns	sec	
			P Z'	0.2 1.2	
			M E	1.3 20	
			M N	1.2 19	
			M Z	2.1 20	
		Sk	iP	12 14 56.0	
		Gb	iP	12 14 32.1	
		Um	iP	12 15 23.6	D
		Ka	iP	12 14 44.1	D
			i	12 14 51.0	
		Azores (h = 30 km). Magn. 5.8 (Up,Ki).			
"	15	Up	iP	13 59 07.0	
		Ki	iP	13 59 42.1	
		Um	iP	13 59 29.1	C
		Azores.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May 15 Up iP 15 44 00.0
Ki iP 15 43 35.4 C
Sk iP 15 44 03.1 C
Gb iP 15 44 20.0
Um iP 15 43 44.0
Formosa (h = 30 km).

" 15 Ki eP 23 47 53

" 16 Um iP 01 48 35.0

" 16 Ki eSn 05 27 11
eSg 05 27 34
Um iSg 05 28 42.4
Northwest Russia,
68°N, 32°E.
Origin time = 05 25 07.
Explosion?

" 16 Ki i(P) 08 26 27.6

" 16 Um iPKP 09 20 53.5
Kermadec Islands
(h = 50 km).

" 16 Ki i(P) 09 36 03.7

" 16 Up iPg 11 49 56.4
i 11 49 59.4
iSg 11 50 12.4
iSn 11 50 14.3
microns sec
Pg Z' 0.1 0.3
Sg Z' 0.1 0.3
D = 130 km = 1.2°.
Um eSg 11 52 06
Ka ePg 11 50 35
iSg 11 51 22.3
D = 370 km = 3.3°.
Central Baltic,
59°N, 19°E.
Origin time = 11 49 33.
Underwater explosion.

" 16 Ki iP 16 05 47.7
microns sec
P Z' 0.1 1.5
Halmahera (h = 50 km).

" 16 Ki iP 16 14 34.3 D

" 16 Up i(P) 16 26 07.0
i 16 26 11.4
i 16 26 26.6

" 16 Ki iP 16 31 31.8 C
Halmahera (h = 30 km).

1963 May 16 Up iP 23 48 27.3
Um iP 23 48 02.9 C
Kurile Islands (h = 30 km).

" 17 Up iP 04 17 35.0 C
iPcP 04 17 59.0
microns sec
P Z' 0.2 0.8
Ki iP 04 16 48.3 C
microns sec
P Z' 0.1 1.0
Sk iP 04 17 24.6
Gb iP 04 17 56.1 C
iPcP 04 18 13.2
Um iP 04 17 09.6 C
Ka iP 04 18 01 C
Kurile Islands (h = 30 km).
Magn. = 6.0 (Up,Ki).

" 17 Up iP 06 21 33.9 D
iS 06 31 41
microns sec
P Z' 0.3 1.2
S E 0.4 5
S N 1.0 6
M E 1.0 18
M N 1.6 20
M Z 1.1 17
D = 9200 km = 83°.
Ki iP 06 21 16.0 D
eS 06 31 05
eSa 06 42 27
microns sec
P Z' 0.4 1.4
S E 0.6 7
S N 1.1 6
M E 1.0 16
M N 2.8 22
M Z 2.1 20
D = 8850 km = 79½°.
Sk iP 06 21 39.5
Gb iP 06 21 51.5 D
isP 06 22 20.6
Um iP 06 21 21.4 D
ipP 06 21 40.0
iS 06 31 15
Ka iP 06 21 49 D
Luzon. h = 80 km (Gb,Um).
Magn. = 6.2 (Up,Ki).
The dilatation of P at Umeå is preceded by a very small compression.
The same could be true for the other stations.

" 17 Up iPKP 07 52 21.2 D

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May cont.	17	Up	i	07 52 26.8		
				microns	sec	
			PKP	Z' 0.1	1.0	
		Sk	iPKP	07 52 15.4	D	
		Gb	iPKP	07 52 29.4		
		Um	iPKP	07 52 09.8		
		Ka	iPKP	07 52 33		
			i	07 52 46		
		Kermadec Islands (h = 360 km).				
"	17	Up	iP	12 20 06.4		
				microns	sec	
			M	E 1.2	21	
			M	N 2.6	21	
			M	Z 2.6	20	
		Ki	iP	12 19 24.8		
			e	12 28 20		
				microns	sec	
			M	E 1.3	19	
			M	N 1.0	18	
			M	Z 2.0	17	
		Sk	iP	12 20 01.1		
			i	12 20 53.8		
		Um	eP	12 19 44		
			eS	12 28 20		
		D = 7200 km = 65°.				
		Japan (h = 50 km).				
"	17	Ki	iP	17 28 58.7		
		Um	iP	17 29 02.9		
		Celebes.				
"	17	Up	iPKP	22 59 28.0		
				microns	sec	
			PKP	Z' 0.2	0.9	
		Ki	iPKP	22 59 10.2		
			iSKP	23 02 37.9		
		Sk	ePKP	22 59 21		
		Gb	iPKP	22 59 38.1		
		Um	iPKP	22 59 16.5		
			iSKP	23 02 48.7		
		Ka	iPKP	22 59 40		
		Tonga Islands (h = 70 km).				
"	17	Ki	i(P)	23 07 06.2		
				microns	sec	
			(P)	Z' 1.1	0.5	
		Local explosion?				
"	17	Ki	iP	23 17 30.9	C	
		Mariana Islands (h = 160 km).				
"	18	Up	eL	06 34		

1963 May cont.	18	Up			microns	sec
			M	E	1.8	19
			M	N	1.4	17
			M	Z	2.3	18
		Argentina (h = 30 km).				
"	18	Up	eL	13 10		
					microns	sec
			M	E	1.8	19
			M	N	3.0	24
			M	Z	1.9	20
		Ki	eL	13 10		
					microns	sec
			M	E	1.8	18
			M	N	1.0	18
			M	Z	1.9	19
		Bali (h = 40 km).				
"	18	Up	eP	16 55 28		
		Ki	iP	16 55 10.7		
		Um	iP	16 55 21.9		
		Luzon (h = 50 km).				
"	18	Ki	iP	23 26 39.6		
		Um	iP	23 26 58.1	C	
		Japan (h = 50 km).				
"	18	Up	iP	23 57 56.2		
		Kurile Islands (h = 70 km).				
"	19	Um	iP	00 06 37.0		
		Hindu Kush.				
"	19	Ka	iP	00 21 53	C	
"	19	Up	ePKP	01 22 12		
			iPP	01 24 25.3		
			iSKP	01 25 17		
			iPKS	01 25 30		
			iSP	01 34 19		
				microns	sec	
			PKP	Z' 0.3	1.6	
			PP	Z 1.5	6	
			SKP	N 0.6	5	
			PKS	E 3.1	6	
			M	E 4.6	20	
			M	N 9.0	22	
			M	Z 9.4	22	
		Ki	iPKP	01 22 17.2		
			iPP	01 24 52		
			iPKS	01 25 44		
			eSP	01 34 51		
				microns	sec	
			PKP	Z 2.3	6	
			PKP	Z' 0.4	1.5	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May 19 cont.

Ki microns sec
PP E 1.1 5
PP Z 2.8 6
PP Z' 0.3 2.0
PKS E 5.1 7
PKS N 0.8 10
M E 9.9 20
M N 4.0 22
M Z 8.6 22
Sk ePKP 01 22 03
i 01 22 09.6
Gb e(PKP) 01 22 06
Um ePKP 01 22 15
iPP 01 24 43.5
iPKS 01 25 42
i 01 31 43
iSP 01 34 48
iPPS 01 36 48
Ka iPKP 01 22 06
Chile (h = 30 km).
Magn. = 6.8 (Up,Ki).
Our readings rather favour a location about 3° to the north and at greater depth (around 100 km) than the solution given by USCGS, provided their origin time is assumed to be correct.

" 19 Sk e(P) 03 26 31

" 19 Ki i(Sg) 05 12 34.3

" 19 Up i(P) 09 51 41.4 C
Ki iP 09 51 42.7 D
Ka iP 09 50 38

" 19 Ki iP 10 01 21.7
Sumatra (h = 100 km).

" 19 Up iP 10 03 21.0
i 10 03 29.7
iSS 10 06 20.5
iLg1 10 07 31.4
iLg2 10 07 46
microns sec
P Z' 0.1 0.9
M E 1.9 5
M N 3.0 10
M Z 1.9 9
D = 1550 km = 14°.
Ki iP 10 04 58.4
e(Li) 10 11 19
iLg1 10 11 43

1963 May 19 cont.

Ki microns sec
P Z' 0.1 1.2
M E 1.2 6
M N 2.1 10
M Z 2.8 10
D = 2450 km = 22°.
Sk iP 10 04 07.5
Gb iP 10 02 54.3
eLg2 10 06 32
Um iP 10 04 12.5
i 10 08 18.0
iLg1 10 09 44
Ka iP 10 02 32
iLg2 10 05 46
Yugoslavia (h = 30 km).

" 19 Um i(P) 10 18 52.7

" 19 Ki iP 19 34 25.8 C
Um iP 19 34 30.5
Halmahera (h = 170 km).

" 19 Up iP 21 45 29.1 C
iS 21 53 21
i 21 53 30
microns sec
P E 0.6 3
P Z 1.2 3
P Z' 1.1 1.7
S E 20 20
S N 16 22
M E 39 23
M N 23 17
M Z 62 23
D = 6300 km = 56½°.
Ki iP 21 45 49.5 C
i 21 45 59.7
iS 21 53 57
iPS 21 54 14
eP'P' 22 15 21
microns sec
P E 0.9 6
P Z 1.7 4
P Z' 0.6 1.8
S E 1.4 9
S N 3.1 12
M E 16 17
M N 11 15
M Z 15 16
D = 6550 km = 59°.
Sk iP 21 45 19.3 C
Gb iP 21 45 06.2 C
Um iP 21 45 43.0 C
eS 21 53 39
i 21 53 49
eP'P' 22 15 25

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May cont. 19 Ka iP 21 45 14 C
North Atlantic Ocean
(h = 30 km).
Magn. = 6.4 (Up,Ki).
An exceptionally large G-wave has been recorded on long-period instruments (N comp.), especially at Uppsala and Umeå.

" 20 Um iP 01 48 20.8
Panama - Costa Rica
(h = 30 km).

" 20 Ki ePn 05 14 58
iSn 05 15 54.0
iSg 05 16 19.2
D = 510 km = 4.6°.
Um iSn 05 16 38.9
iSg 05 17 18.1
D = 710 km = 6.4°.
Northwest Russia,
67.9°N, 32.6°E.
Origin time = 05 13 47.
Explosion?

" 20 Ki iP 09 19 49.6
Luzon (h = 50 km).

" 20 Up i(PKP) 11 57 34.9
i 11 57 40.4
iPKP 11 57 44.4
iPKS 12 01 11
iSKKS 12 08 00
eSKSP 12 11 23

		microns	sec
PKP	N	1.1	5
PKP	Z'	1.3	0.7
PKS	N	1.5	6
PKS	Z	2.7	8
M	E	9.0	23
M	N	22	23
M	Z	20	23

(D = 16650 km = 150°).
Ki i(PKP) 11 57 21.7
iPKP 11 57 28.8
iPP 12 00 29
iPKS 12 01 02
eSKKS 12 07 17

		microns	sec
PKP	N	0.4	8
PKP	Z	3.1	6
PKP	Z'	0.5	1.0
PP	Z	2.1	7
PKS	E	2.3	7

1963 May cont. 20 Ki

		microns	sec
PKS	N	2.4	8
M	E	13	22
M	N	9.3	21
M	Z	27	22

(D = 15900 km = 143°).

Sk iPKP 11 57 37.0 C
Gb i(PKP) 11 57 46.1 C
iPKP 11 57 52.1
Um iPKP 11 57 32.4 C
ePP 12 00 51
iPKS 12 01 14.8
iSKKS 12 07 52.6
Ka i(PKP) 11 57 46.0
iPKP 11 57 54.0
i 11 58 11.8
Kermadec Islands (h = 30 km).
Magn. = 6.9 (Up,Ki).
Complicated beginning, with PKP of much larger amplitude than (PKP), except at Umeå and Skalstugan with simple large-amplitude beginning.

" 20 Ki iP 14 04 04.7 C
North Atlantic Ocean
(h = 30 km).

" 20 Ki iP 17 08 04.9 C
Yakutsk, U.S.S.R.
(h = 30 km).

" 20 Up e(PKP) 19 36 05
iPKP 19 36 12.8
Kermadec Islands
(h = 30 km).

" 20 Up i(P) 19 50 18.5

" 20 Up iP 21 18 18.9
Sk iP 21 18 23.0
Halmahera (h = 150 km).

" 21 Up iP 16 34 05.0
i 16 34 17.5
Ki iP 16 33 14.1
Kamchatka (h = 30 km).

" 21 Ki i(P) 16 42 29.2

" 21 Um iP 17 21 51.9
Japan (h = 30 km).

" 21 Ki i(P) 17 30 21.5
Sk i(P) 17 30 34.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May 21 Up iP 17 32 54.9
microns sec
P Z' 0.1 0.6

" 21 Up ---
microns sec
M E 1.3 22
M N 1.1 18
M Z 1.6 20
Ki e 18 02 07
microns sec
M E 0.9 18
M N 0.7 19
M Z 1.9 19
Solomon Islands
(h = 30 km).

" 21 Sk iPKP 18 29 54.6
Um ePKP 18 29 43
Kermadec Islands
(h = 80 km).

" 21 Um iP 21 26 06.9

" 22 Ki eL 03 28
microns sec
M N 0.3 18
M Z 0.9 19
Solomon Islands
(h = 60 km).

" 22 Ki eL 05 06
microns sec
M E 0.7 18
M N 0.4 19
M Z 1.0 17
Mexico (h = 30 km).

" 22 Ki iP 05 52 32.8
Kurile Islands
(h = 90 km).

" 22 Um i(P) 07 45 31.5

" 22 Up iP 14 07 30.6 C
i 14 07 33.7
iPa 14 11 48
iS 14 16 14
iScS 14 17 22
iSa 14 24 12
eP'P' 14 35 55
microns sec
P Z' 0.4 1.1
S E 3.1 10
S N 1.9 12
M E 7.7 22

1963 May cont. 22 Up
microns sec
M N 18 22
M Z 17 23
D = 7400 km = 66½°.
Ki iP 14 06 40.8 C
i 14 06 43.5
e 14 07 07
iPa 14 10 24
eS 14 14 38
iScS 14 16 25
eP'P' 14 36 09
microns sec
P Z 0.9 10
P Z' 0.3 1.2
S E 2.6 12
M E 18 21
M N 16 22
M Z 25 19
D = 6550 km = 59°.
Sk iP 14 07 19.4
e(P'P') 14 36 13
Gb iP 14 07 53.8 D
eP'P' 14 35 55
Um iP 14 07 06.5 C
i 14 07 09.0
iPa 14 11 20
eS 14 15 23
Ka iP 14 07 54.5
i 14 07 56.2
i 14 08 37.5
eP'P' 14 35 56
Kurile Islands (h = 20 km).
Magn. = 6.3 (Up,Ki).
The P-phase is multiple, the second phase denoted i above, appearing between 1.7 and 3.1 sec after the first, has a much larger amplitude than the first.

" 22 Um iP 15 55 15.1

" 22 Up iP 15 56 10.1 C
ipP 15 56 27.9
i 15 59 33.5
ePP 16 00 12
microns sec
pP Z' 0.1 1.4
M E 1.1 22
M N 1.4 22
M Z 1.7 21
Ki iP 15 55 53.3 C
ipP 15 56 07.7
eSKS 16 06 18
iS 16 06 48

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May 22 cont.

Ki — microns sec
P Z' 0.3 1.4
SKS E 0.4 8
S E 0.8 5
S N 0.3 5
M E 2.4 21
M N 1.0 20
M Z 2.7 21
D = 10100 km = 91°.
Sk iP 15 56 15.0
ipP 15 56 32.0
Um iP 15 55 59.7
ipP 15 56 17.4
eSKS 16 06 29
Ka eP 15 56 22
Molucca Passage.
h = 70 km (Up,Ki,Sk,Um).

" 22 Up iP 16 36 36.1
microns sec
P Z' 0.1 1.0
Ki iP 16 35 43.2
microns sec
P Z' 0.1 1.0
Sk iP 16 36 13.0
Gb iP 16 36 49.8
Um iP 16 36 09.9
i 16 36 20.4
Ka iP 16 37 01 C
Aleutian Islands
(h = 30 km).

" 22 Up i(P) 16 46 45.3

" 22 Up eSKS 22 17 23
ePS 22 20 03
eSS 22 25 37
e 22 30 43
microns sec
SKS E 0.9 12
M E 1.7 18
M N 4.2 25
M Z 2.6 20
Ki eP 22 06 46
iSKS 22 17 15
e(PS) 22 19 48
microns sec
SKS E 1.2 12
M E 2.2 20
M N 1.7 19
M Z 3.9 21
Um iSKS 22 17 17
eS 22 18 09
iPS 22 19 39
Java Sea (h = 30 km).
Magn. = 6.0 (Up,Ki).

1963 May 22 Up iP 22 10 59.6
i 22 11 08.0
Sk eP 22 10 54
Um eP 22 10 43
ePP 22 13 01
Ka eP 22 11 10
Kurile Islands (h = 30 km).

" 23 Ki iP 01 05 00.4
Molucca Passage (h = 30 km).

" 23 Up ePKP 03 52 05
iSKP 03 55 06.7
microns sec
M E 0.9 19
M N 1.5 24
M Z 1.8 26
Ki iPKP 03 51 50.0
ePS 04 05 14
microns sec
M E 0.9 20
M N 0.8 20
M Z 1.0 17
Sk ePKP 03 52 00
iSKP 03 54 56.0
Gb iPKP 03 52 11.2
Um iPKP 03 51 57.5
iSKP 03 54 53.1
Fiji Islands (h = 280 km).

" 23 Up iP 07 10 03.9
Ki iP 07 09 36.4 D
Um iP 07 09 48.1
Mariana Islands
(h = 480 km).

" 23 Up iS 08 04 10
microns sec
M E 1.1 20
M Z 1.6 20
Ki e(P) 07 55 13
microns sec
M E 0.6 18
M N 0.2 17
M Z 0.6 18
Um i(P) 07 55 42.9
Leeward Islands
(h = 60 km).

" 23 Up iP 10 20 06.9
i 10 20 32.3
Ki iP 10 21 12.2 C
Gb iP 10 20 18.1
Turkey (h = 230 km).

" 23 Up iP 15 25 14.0 C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May cont.

23 Up microns sec
P Z' 0.1 1.0
Ki iP 15 24 57.7 C
microns sec
P Z' 0.2 1.0
Sk eP 15 25 18
Gb iP 15 25 29.6
Um iP 15 25 02.3
Ka iP 15 25 23
Mindanao (h = 90 km).

" 23 Up iP 16 38 35.0 C
iPcP 16 39 01.3
microns sec
P Z' 0.1 0.8
Ki iP 16 37 47.4 C
microns sec
M N 0.3 18
M Z 0.6 19
Sk iP 16 38 22.7 C
Gb iP 16 38 55.5 C
Um iP 16 38 09.4 C
i 16 39 14.3
Ka iP 16 38 58 C
Kurile Islands (h = 50 km).

" 23 Up iP 18 34 33.1
Mexico (h = 30 km).

" 23 Um iPKP 21 56 04.9
i 21 56 14.4
Kermadec Islands
(h = 30 km).

" 24 Sk iP 07 06 47.6
Um iP 07 06 32.5
i 07 06 40.0

" 24 Up i(P) 10 31 40.4

" 24 Up i(P) 10 33 29.8

" 24 Gb i(P) 15 21 32.4 C

" 24 Ki i(P) 17 44 11.4

" 24 Up iP 20 37 46.5 C
microns sec
P Z' 0.1 0.7

" 24 Up iP 21 11 50.3
i 21 12 02.0
Ki iP 21 11 11.5
Um iP 21 11 28.9
Japan (h = 50 km).

1963 May

25 Up iP 01 47 34.6
Ki iP 01 47 10.2
Um iP 01 47 19.1 D
Formosa (h = 30 km).

" 25 Ki ---
microns sec
M E 0.4 22
M N 0.5 18
Um iP 02 48 56.7
Japan (h = 80 km).

" 25 Ki iP 04 32 30.3
Um iP 04 32 57.4
Aleutian Islands (h = 70 km).

" 25 Up iP 07 45 54.0
microns sec
P Z' 0.1 0.8
Ki iP 07 45 01.1
Um iP 07 45 26.4
Aleutian Islands (h = 80 km).

" 25 Up iP 08 52 06.7 C
ipP 08 52 23.8
microns sec
P Z' 0.3 0.7
Ki iP 08 51 22.9 C
iPP 08 53 32.3
microns sec
P Z' 0.4 1.2
Sk iP 08 51 57.7 C
iPP 08 54 24.1
Gb iP 08 52 27.7 C
Um iP 08 51 42.1 C
Ka iP 08 52 29 C
Japan. h = 70 km (Up).
Magn. = 6.5 (Up, Ki).

" 25 Ki iP 10 25 27.4
Banda Sea (h = 100 km).

" 25 Up iP 10 50 09.8

" 25 Up iPKP 16 26 48.6
e(PPP) 16 31 18
e 16 33 36
microns sec
M E 2.9 19
M N 3.8 19
M Z 5.5 19
Ki ePKP 16 27 04
ePKS 16 30 27
microns sec
PKP Z' 0.1 1.5
PKS Z 1.0 11

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May 25 cont.

Ki microns sec
M E 2.7 17
M N 1.9 18
M Z 3.0 17
Um e(PKP) 16 27 03
e 16 27 24
Sandwich Islands
(h = 30 km).
Magn. = 6.2 (Up,Ki).

" 25 Up eP 16 57 56
Ki eP 16 57 24
Um iP 16 57 35.5
Formosa (h = 30 km).

" 25 Up iP 20 09 11.5
i 20 09 21.0
Ki iP 20 08 39.6
eS 20 17 54
microns sec
M E 0.4 14
M N 0.5 18
M Z 0.6 15
D = 8000 km = 72°.
Um iP 20 08 54.1 C
Japan (h = 110 km).

" 25 Ki iPKP 22 37 54.8
Sk ePKP 22 38 11
Um iPKP 22 38 03.4 D
New Zealand (h = 30 km).

" 26 Um iPKP 00 19 13.3
i 00 19 24.5
Tonga Islands (h = 30 km).

" 26 Ki iPKP 01 01 21.8
Um iPKP 01 01 27.5
Solomon Islands
(h = 90 km).

" 26 Up iP 04 53 36.8
Ki iP 04 52 43.5
Sk iP 04 53 21.2
Um iP 04 53 08.9
Kamchatka (h = 30 km).

" 26 Up iP 05 03 00.8
i 05 03 11.0
eS 05 11 42
microns sec
M E 0.6 17
M N 1.5 15
M Z 1.0 16
D = 7200 km = 65°.

1963 May 26 cont.

Ki eP 05 02 10
microns sec
M E 1.1 15
M N 0.8 18
M Z 1.5 16
Gb eP 05 03 23
Um iP 05 02 34 C
eS 05 10 45
Ka eP 05 03 33
Kamchatka (h = 30 km).

" 26 Ki eP 18 45 07
Volcano Islands (h = 30 km).

" 26 Up iP 19 36 25.4
Ki iP 19 37 06.7
Sk eP 19 36 50
Um iP 19 36 45.8
Mozambique (h = 30 km).

" 26 Ki iP 21 07 26.8
Sk e(P) 21 07 16
Um iP 21 07 54.0

" 26 Up iP 21 09 17.4
i 21 09 20.7
i 21 09 32.3
iS 21 14 05.9
iSn 21 14 20.6
D = 2950 km = 26½°.
Ki iP 21 09 52.4
Sk i(P) 21 10 21.6
Gb iP 21 09 34.1
Um eP 21 09 32
eS 21 14 33
Ka iP 21 09 06.7
i 21 09 08.9
Caspian Sea (h = 30 km).
Our arrival times of P are too early by 14 sec in average as compared to the USCGS solution (Up,Ki,Gb, Um,Ka). Concerning Sn, read at Up, see remark to Caspian Sea earthquake on Jan. 27, 1963, at 19 35 14.3.

" 26 Sk eP 22 02 40
Um iP 22 03 17.5

" 26 Up iP 23 17 07.3 D
iPP 23 19 27.9
iPa 23 20 45
eS 23 25 25
iSS 23 29 45

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May 26 cont.

Up — microns sec

P	Z'	0.2	1.2
PP	N	0.4	6
PP	Z	0.6	6
S	E	0.5	9
S	N	0.8	8
M	E	2.5	18
M	N	4.3	18
M	Z	4.3	22

D = 6800 km = 61°.

Ki iP 23 16 12.8 D
iS 23 23 51

microns sec

P	N	0.4	7
P	Z	1.0	7
P	Z'	0.1	1.5
S	E	0.5	7
S	N	0.8	8
M	E	4.4	20
M	N	4.3	19
M	Z	5.9	17

D = 5950 km = 53½°.

Sk iP 23 16 50.7
iPP 23 19 06.1
Gb iP 23 17 29.3
Um iP 23 16 38.9 D
ePP 23 18 48
ePa 23 20 05
iS 23 24 38
Ka iP 23 17 31.5
Kamchatka (h = 50 km).
Magn. = 5.9 (Up,Ki).
Very clear Pa (Up,Um).

" 26 Um iP 23 46 32.1

" 27 Up i(P) 00 42 43.5

" 27 Ki eSn 01 21 53
iSg 01 22 14.1
Sk eSg 01 21 58
Um iSg 01 22 34.5
Off west coast of Norway,
67°N, 11½°E.
Origin time = 01 20 12.

" 27 Up iP 04 08 58.8 D
ePP 04 11 13
iPa 04 12 45
eS 04 17 21
iSS 04 21 24

microns sec

P	Z'	0.8	1.5
PP	Z	0.6	6
S	E	0.4	5
S	N	0.6	8
M	E	2.2	17

1963 May 27 cont.

Up — microns sec

M	N	3.8	19
M	Z	3.6	22

D = 6800 km = 61°.

Ki iP 04 08 03.9 D
ePP 04 10 05
eS 04 15 39
i 04 15 52

microns sec

P	N	0.3	6
P	Z	0.9	6
P	Z'	0.4	1.5
PP	Z	0.5	6
S	N	0.4	7
M	E	2.7	18
M	N	3.1	18
M	Z	3.9	17

D = 5900 km = 53°.

Sk iP 04 08 42.0
iPP 04 10 52.5
Gb iP 04 09 20.2
ePP 04 11 36
Um iP 04 08 29.8 D
iPP 04 10 38.1
iPa 04 12 00
eS 04 16 26
D = 6350 km = 57°.
Ka iP 04 09 23.9 D
Kamchatka (h = 50 km).
Magn. = 6.3 (Up,Ki).
Very clear Pa (Up,Um).

" 27 Um iP 06 20 12.5

" 27 Up iP 14 08 29.0

microns sec

P	Z'	0.1	0.7

" 27 Ki eP 16 33 43
Halmahera (h = 30 km).

" 27 Up iP 16 37 35.0
e 16 37 43

" 27 Up iSg 20 03 02.5
Ki ePg 20 00 23
eSn 20 00 50
iSg 20 01 12.5
D = 400 km = 3.6°.
Sk ePg 20 00 17
iSg 20 00 55.7
D = 370 km = 3.3°.
Gb eSg 20 04 09
Off west coast of Norway,
67°N, 11½°E.
Origin time = 19 59 10.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May	27	Up	eP	21 22 38		1963 May	29	Ki	iP	01 01 26.8	
"	28	Up	iP	00 19 46.3 D		"	29	Ka	iP	01 19 14	
				microns sec							
			P	Z' 0.1 0.6		"	29	Ki	iPn	04 57 46.4	
		Ki	iP	00 18 53.3 D					iSn	04 58 42.4	
		Sk	iP	00 19 26.5 D					iSg	04 59 05.2	
		Gb	iP	00 20 03.5 D				Northwest Russia.			
		Ka	iP	00 20 12 D				Origin time = 04 56 34.			
		Aleutian Islands						Explosion?			
		(h = 60 km).									
						"	29	Up	iP	05 00 40.3	
"	28	Up	iP	01 27 37.3					i	05 00 48.9	
		Japan (h = 70 km).						Ki	iP	04 59 44.3	
								Sk	eP	05 00 13	
"	28	Up	iP	01 35 00				Gb	iP	05 00 51.2	
		Ryukyu Islands						Ka	eP	05 01 04	
		(h = 30 km).							i	05 01 11	
								Kodiak Island (h = 60 km).			
"	28	Ki	iP	10 39 51.5							
		Iran (h = 30 km).				"	29	Up	iP	08 43 02.4	
									i	08 43 20.6	
"	28	Up	i(P)	13 10 46.8					iPP	08 44 47	
									i	08 45 03.3	
"	28	Up	iP	21 14 50.5 C					iS	08 49 25	
			i	21 15 17.8					eScS	08 53 00	
				microns sec						microns sec	
			P	Z' 0.3 0.7					P	Z' 0.1 1.1	
		Ki	iP	21 14 01.6 C					M	E 0.6 16	
				microns sec					M	N 0.9 15	
			P	Z' 0.1 0.7					M	Z 1.1 14	
		Sk	iP	21 14 37.9					D = 4800 km = 43°.		
		Gb	iP	21 15 11.4 C				Ki	iP	08 43 31.1	
		Ka	iP	21 15 16 C					i	08 43 47.3	
		Kurile Islands (h = 120 km).							eS	08 50 25	
		Magn. = 6.1 (Up,Ki).							eSS	08 53 53	
										microns sec	
"	28	Up	iP	22 09 53.5					P	Z' 0.4 1.3	
		Ki	iP	22 09 15.7 C					M	E 1.6 15	
		Sk	iP	22 09 48.1					M	N 1.1 15	
		Gb	iP	22 10 13.5 C					D = 5200 km = 47°.		
		Japan (h = 80 km).						Sk	iP	08 43 34.8	
									i	08 43 52.7	
"	29	Up	iP	00 55 16.4 C				Gb	iP	08 43 16.8	
			i	00 55 21.0					i	08 43 33.7	
				microns sec				Ka	iP	08 42 57	
			P	Z' 0.1 1.0					i	08 43 14	
		Ki	iP	00 55 53.8 C					iPP	08 44 49	
				microns sec				Iran.			
			P	Z' 0.1 1.0				The phase appearing on the			
		Sk	iP	00 55 51.3 C				average 17 sec after P at			
			i	00 55 55.8				all stations, with about			
		Gb	iP	00 55 27.2 C				twice the amplitude of P,			
		Ka	iP	00 55 09 C				could either be pP, which			
		Iran (h = 50 km).						would mean a focal depth of			
		Magn. = 5.8 (Up,Ki).						75 km (instead of 33, given			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 May cont.	29		by USCGS) or it could be the P of a new shock with the same locality.		
"	29	Ki	i(Pn)	09 17 34.9	
			i	09 18 21.4	
			iSg	09 18 32.9	
"	29	Up	iP	10 08 25.7	
"	29	Ki	i(SKP)	11 19 40.1	
		Fiji Islands (h = 550 km).			
"	29	Gb	iP	17 56 25.8	C
"	29	Ki	i(Sg)	20 23 23.6	
		Sk	e(Sg)	20 23 28	
"	29	Up	iP	20 39 07.7	D
"	29	Ki	i(P)	20 53 10.8	
"	30	Up	iP	03 55 32.1	
		Ki	iP	03 54 40.8	
		Sk	iP	03 55 17.9	
		Gb	iP	03 55 52.8	
		Ka	iP	03 56 01.1	
		Kurile Islands (h = 50 km).			
"	30	Up	iPKP	05 53 30.4	D
			microns sec		
			PKP Z' 0.1 0.5		
		Gb	iPKP	05 53 40.2	
			i	05 53 44.0	
		Ka	iPKP	05 53 44.1	
			i	05 53 48.5	
			ipPKP	05 56 02.0	
			i	05 56 07.8	
		Fiji Islands (h = 610 km).			
"	30	Ki	iPn	06 50 14.9	
			iSn	06 51 09.3	
			iSg	06 51 32.9	
			D = 500 km = 4.5°.		
		Sk	iSg	06 54 03.2	
			i	06 54 10.5	
		Northwest Russia, 67½°N, 32 1/4°E. Origin time = 06 49 04. Explosion?			
"	30	Sk	ePg	07 11 48	
			iSg	07 12 07.4	
"	30	Sk	e(Sg)	07 13 37	
1963 May	30	Sk	i(Sg)	07 14 53.1	
"	30	Up	iPKP	07 15 56.4	
			microns sec		
			M E 1.0 20		
			M N 1.0 20		
			M Z 2.9 22		
		Ki	iPKP	07 15 59.7	
			microns sec		
			M E 1.8 20		
			M N 0.8 20		
		Sk	ePKP	07 16 11	
		Gb	ePKP	07 16 07	
		Ka	ePKP	07 15 58	
			i	07 16 16.5	
		South of Australia (h = 30 km).			
"	30	Ki	iP	17 49 41.7	
		Aleutian Islands (h = 80 km).			
"	30	Up	iP	18 43 38.6	C
"	30	Ka	iP	20 13 08.8	
"	30	Gb	iPKP	20 49 56.8	
		Tonga Islands (h = 60 km).			
"	31	Up	iP	02 33 49.1	
"	31	Up	iP	03 58 50.0	C
"	31	Ki	iP	05 38 46.6	
		Kamchatka (h = 60 km).			
"	31	Sk	iPKP	06 22 47.0	
		Tonga Islands (h = 30 km).			
"	31	Ki	e	07 11 23	
			microns sec		
			M E 0.9 20		
			M N 0.6 20		
"	31	Ki	i(P)	09 03 59.3	
"	31	Ki	i(P)	11 50 57.0	
"	31	Up	iP	13 59 42.6	C
"	31	Up	iPKP	14 27 46.8	
		Ki	iPKP	14 27 29.4	
		Sk	iPKP	14 27 36.6	C
		Gb	iPKP	14 27 51.1	C
		Um	iPKP	14 27 31.3	
		Kermadec Islands (h = 60 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963								
May	31	Gb	iPg		15	09	48.9	C
			iSg		15	09	50.9	
"	31	Up	eL		18	01		
				microns		sec		
			M	E	0.4		16	
			M	Z	0.5		15	

Markus Båth
January 20, 1964

Seismological Institute
Uppsala

PRELIMINARY

SEISMOLOGICAL BULLETIN

UPPSALA, KIRUNA, SKALSTUGAN, GÖTEBORG, UMEÅ and KARLSKRONA

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E; h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E; h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E; h = 11 m

JUNE 1 - 30, 1963

1963 June	1	Up	ePKS	00 21 37	
				microns	sec
			M	E 0.6	20
			M	N 1.1	21
			M	Z 1.3	20
		Ki	eSS	00 36 50	
				microns	sec
			M	E 1.2	21
			M	N 0.7	19
			M	Z 1.7	20
		Um	ePKP	00 17 57	
			iPKS	00 21 21	
			iSS	00 37 36	
		Samoa Islands (h = 30 km).			
"	1	Um	iP	00 28 19.4	
			i	00 28 30.7	
"	1	Up	iP	02 18 32.6	C
		Ki	iP	02 17 44.9	C
		Sk	iP	02 18 20.3	
		Um	iP	02 18 06.5	
		Kurile Islands (h = 30 km).			
"	1	Um	i(P)	06 21 12.7	
"	1	Um	i(P)	08 38 13.5	
			i	08 38 16.5	
"	1	Um	iP	08 52 20.0	
"	1	Um	i(P)	10 11 12.3	
"	1	Up	iP	10 57 34.9	C
			iPP	10 59 09.0	
			i	11 01 21.2	
			eSa	11 07 05	

1963 June cont.	1	Up		microns	sec
			P	Z' 0.2	0.7
			PP	E 0.2	3
			PP	Z' 0.1	0.9
			D = 4600 km = 41½°.		
		Ki	iP	10 57 43.7	C
			i	10 58 18.5	
			iPP	10 59 22.5	
			eLi	11 10 37	
				microns	sec
			P	Z' 0.2	1.0
			M	E 0.3	9
			M	N 0.4	10
			D = 4800 km = 43°.		
		Sk	iP	10 58 00.6	C
			iPP	10 59 44.2	
		Gb	iP	10 57 56.6	
			iPP	10 59 43.6	
		Um	iP	10 57 33.2	C
			ePP	10 59 11	
		Ka	iP	10 57 39.9	C
			i	10 58 03.7	
			iPP	10 59 24.7	
		Hindu Kush (h = 70 km).			
		Magn. = 6.0 (Up,Ki).			
"	1	Ki	ePKP	12 49 57	
		Tonga Islands (h = 30 km).			
"	1	Up	---		
				microns	sec
			M	E 0.5	13
			M	N 0.7	14
			M	Z 0.6	12
		Ki	iP	18 32 20.8	
				microns	sec
			M	E 0.6	18
			M	N 0.9	19

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont. 1 Sk iP 18 32 57.4
Um iP 18 32 30.0 C
Lake Baikal, U.S.S.R.
(h = 30 km).

" 1 Up iP 20 20 57.7
Ki eP 20 20 39
Sk iP 20 21 04.3
Um iP 20 20 45.5
Ka iP 20 21 08
Luzon (h = 30 km).

" 1 Up iP 20 40 30.9 D
microns sec
P Z' 0.1 0.7
Ki iP 20 41 44.8
microns sec
P Z' 0.1 1.0
Sk iP 20 41 05.4
Gb iP 20 40 09.9
Um iP 20 41 09.2 D
i 20 41 57.5
Ka iP 20 39 51 D
i 20 39 57
Mediterranean Sea
(h = 290 km).

" 1 Um iPKP 21 27 30.6 C
Loyalty Islands (h = 40 km).

" 1 Up iPKS 21 36 38
iSKKS 21 42 34
microns sec
PKS Z 0.7 7
M E 0.8 20
M N 1.4 22
M Z 1.4 22
Ki iPKP 21 32 53.6
ePP 21 34 49
e 21 36 07
eSKKS 21 41 46
microns sec
PP N 0.2 6
M E 1.6 21
M N 0.8 20
M Z 2.1 20
(D = 14150 km = 127½°).
Sk ePKP 21 33 02
ePKS 21 36 31
Gb ePKP 21 33 13
ePP 21 36 04
Um iPKP 21 33 03.2
iPP 21 35 12.3
iPKS 21 36 25
eSKKS 21 42 05

1963 June cont. 1 Um iSS 21 52 37
(D = 14450 km = 130°).
Samoa Islands (h = 30 km).
Magn. = 5.9 (Up,Ki).

" 1 Up iP 22 29 08.4 C
Ki iP 22 28 37.1 C
Sk iP 22 29 05.4
Um iP 22 28 50.3 C
Japan (h = 520 km).

" 2 Up iP 01 28 51.7
Ki iP 01 28 38.5
Sk iP 01 28 32.4
ipP 01 29 08.9
Um iP 01 29 24.6 D
Mexico. h = 150 km (Sk).

" 2 Um iP 04 52 22.8

" 2 Up iP 07 17 53.3
Ki iP 07 17 44.3
Sk iP 07 18 08.5
Um iP 07 17 44.1
Assam (h = 140 km).

" 2 Up eP 07 39 42

" 2 Up ---
microns sec
M E 0.8 20
M N 0.9 18
M Z 0.9 19
Ki ePS 10 29 03
microns sec
M E 1.2 21
M N 0.8 20
M Z 1.0 17
Solomon Islands (h = 50 km).

" 2 Up iP 18 08 58.0
Ki iP 18 08 04.4
Sk eP 18 08 34
Um iP 18 08 31.6
Alaska (h = 40 km).

" 2 Up ePKP 21 23 15
e 21 24 36
e 21 34 10
eSKKS 21 40 59
microns sec
M E 1.8 19
M N 2.7 19
M Z 3.0 19
(D = 13800 km = 124°).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June 2 cont.

	Ki	iPKP	21 23 24.9	C
		i	21 23 38.6	
		ePP	21 25 38	
			microns sec	
		M E	2.6 20	
		M N	2.4 20	
		M Z	6.0 22	
		(D = 14350 km = 129°).		
	Sk	iPKP	21 23 15.6	
	Um	ePKP	21 23 17	
		iPP	21 25 17.3	
		e	21 33 20	
		ePS	21 35 08	
		e	21 41 46	
		iSS	21 42 28	
	Ka	i	21 24 12.5	
	Sandwich Islands (h = 50 km). Magn. = 6.2 (Up,Ki).			
" 2	Up	iPKP	21 26 56.8	
	Ki	iPKP	21 26 41.8	
	Sk	iPKP	21 26 51.1	C
	Gb	iPKP	21 27 04.1	C
	Um	iPKP	21 26 45.9	
	Kermadec Islands (h = 60 km).			
" 2	Up	iP	22 08 37.8	
	Sk	eP	22 08 24	
	Um	iP	22 08 22.6	C
		i	22 08 26.6	
" 2	Ki	iP	22 34 29.2	
		microns sec		
		M E	0.5 19	
		M N	0.6 20	
		M Z	1.7 20	
	Sk	iP	22 34 21.4	
	Um	iP	22 34 38.3	
	Guatemala (h = 70 km).			
" 2	Up	iP	22 38 48.8	
	Ki	iP	22 38 50.6	
	Sk	iP	22 38 35.2	
	Um	iP	22 38 52.6	
	Colombia (h = 40 km).			
" 3	Up	iP	07 31 24.2	C
	Ki	iP	07 30 42.9	C
	Gb	iP	07 31 45.0	
	Um	iP	07 31 01.2	C
	Japan (h = 25 km).			
" 3	Up	iP	07 47 29.5	
		i	07 47 36.3	

1963 June 3 cont.

	Up	iS	07 57 01	
		microns sec		
		P Z'	0.1 1.2	
		S N	0.4 5	
		M E	3.7 18	
		M N	4.5 22	
		M Z	1.3 16	
		D = 8300 km = 74½°.		
	Ki	iP	07 46 53.4	
		i	07 46 59.9	
		iS	07 55 43	
		e	07 56 05	
		microns sec		
		P Z'	0.3 1.5	
		S N	0.5 6	
		M E	4.9 19	
		M N	6.3 19	
		M Z	4.3 19	
		D = 7550 km = 68°.		
	Sk	iP	07 47 27.2	
		i	07 47 32.0	
	Gb	iP	07 47 50.2	
		i	07 47 56.5	
	Um	iP	07 47 08.0	
		iPP	07 49 48.1	
		iS	07 56 24	
		eSS	08 00 47	
	Ka	iP	07 47 54.0	
	Japan (h = 40 km). Magn. = 5.9 (Up,Ki). The phase (i) arriving about 6 sec after iP has a much larger amplitude than this phase (Up,Ki,Sk,Gb).			
" 3	Up	eP	11 44 40	
		e	11 45 01	
		e	11 54 34	
		microns sec		
		M E	1.3 23	
		M N	1.2 23	
		M Z	2.3 23	
	Ki	i(P)	11 44 24.4	
		eSKS	11 54 54	
		microns sec		
		SKS E	0.8 14	
		M E	2.2 22	
		M N	0.9 21	
		M Z	3.7 24	
	Sk	eP	11 44 21	
		i	11 44 53.3	
		i	11 45 09.2	
	Gb	e	11 44 47	
		i	11 45 08.7	
	Um	eP	11 44 51	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont.	3	Um	i(SKS)	11 54 52	Colombia (h = 20 km). Magn. = 5.7 (Up,Ki).
"	3	Up	iP	12 42 03.4	D
		Ki	eP	12 42 12	
		Sk	ePP	12 44 01	
		Gb	iP	12 42 26.3	
			iPP	12 44 03.4	
		Um	iP	12 42 00.5	D
		Ka	iP	12 42 10.8	Tadzhik, U.S.S.R. (h = 30 km).
"	3	Up	iPKP	19 08 32.7	C
			i	19 08 37.9	
				microns sec	
			PKP Z'	0.1 0.8	
		Ki	ePKP	19 08 12	
		Sk	iPKP	19 08 26.1	C
		Gb	iPKP	19 08 40.8	C
		Um	iPKP	19 08 20.5	C
		Ka	iPKP	19 08 41.7	C Kermadec Islands (h = 50 km).
"	3	Up	iPKP	21 49 06.1	
		Um	iPKP	21 49 14.1	Sandwich Islands (h = 50 km).
"	4	Um	iP	11 16 02.3	
"	4	Up	iPKP	12 13 51.9	
			i	12 13 56.9	
				microns sec	
			PKP Z'	0.1 0.6	
			M N	0.9 21	
			M Z	1.2 24	
		Ki	iPKP	12 13 30.6	
		Sk	iPKP	12 13 44.3	
			i	12 13 53.7	
			i	12 14 39.0	
		Gb	iPKP	12 13 57.7	
		Um	iPKP	12 13 38.5	
		Ka	iPKP	12 14 00.1	
			i	12 14 17.3	Kermadec Islands (h = 30 km).
"	4	Up	iPKP	13 25 34.3	
			i	13 25 50.5	
		Sk	iPKP	13 25 31.8	C
		Gb	iPKP	13 25 46.9	
		Um	iPKP	13 25 26.5	C
1963 June cont.	4	Ka	iPKP	13 25 48.6	Kermadec Islands (h = 30 km).
"	4	Up	iP	19 34 48.1	D
			ipP	19 35 13.2	
			iPP	19 38 14.3	
			i	19 38 24.6	
				microns sec	
			P Z'	0.1 0.5	
		Ki	iP	19 34 20.2	
			ipP	19 34 44.8	
				microns sec	
			P Z'	0.5 1.0	
		Sk	iP	19 34 45.2	D
			ipP	19 35 09.6	
			i	19 37 38.9	
			iPP	19 38 09.7	
		Gb	iP	19 35 05.3	
			ipP	19 35 28.8	
		Um	iP	19 34 32.0	D
			iPP	19 38 00.0	
		Ka	iP	19 35 05	D
			iPP	19 38 54	Mariana Islands. h = 100 km (Up,Ki,Sk,Gb).
"	4	Up	iP	20 41 22.1	D
				microns sec	
			P Z'	0.1 0.5	
		Um	iP	20 41 35.1	Mexico (h = 150 km).
"	4	Up	iP	21 18 34.9	
			i	21 19 02.8	
			i	21 21 30.9	
			i	21 21 57.7	
			iPP	21 22 41.0	
			eSKS	21 29 03	
				microns sec	
			PP Z	0.5 5	
			SKS E	0.5 11	
			M E	1.9 20	
			M N	2.4 20	
			M Z	4.2 25	
		Ki	iP	21 18 12.2	
			iPP	21 22 16.3	
			iSKS	21 28 49	
			iS	21 29 34	
			iSS	21 36 20	
				microns sec	
			P Z'	0.1 1.0	
			PP E	0.5 6	
			PP Z	0.8 6	
			PP Z'	0.1 1.3	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June 4 cont.

Ki

		microns	sec
SKS	E	0.7	8
S	N	0.3	8
M	E	2.7	17
M	N	2.1	17
M	Z	2.5	17

D = 10800 km = 97°.

Sk	iP	21 18 39.9
	e	21 21 39
	ePP	21 22 38
Gb	iPP	21 23 11.1
Um	eP	21 18 16
	i	21 21 42.4
	iPP	21 22 21.4
	iSKS	21 28 51
	eS	21 29 35

D = 10900 km = 98°.

Ka	e	21 22 05
	iPP	21 22 56

Halmahera (h = 30 km).
Magn. = 6.2 (Up,Ki).
Pronounced G-waves recorded (Up,Um). Our stations cover the distance range of about 97-105° and clearly demonstrate the gradual disappearance of the P-wave due to the shadow zone.

" 4 Up iP 22 16 13.5 C

		microns	sec
P	Z'	0.2	0.7

Ki iP 22 17 28.9 C

		microns	sec
P	Z'	0.1	1.0

Sk	iP	22 16 54.6 C
Gb	iP	22 15 59.6
	iPP	22 16 23.6
Um	iP	22 16 52.7 C
Ka	iP	22 15 36

Greece (h = 30 km).

" 5 Up iP 00 00 19.6 C

" 5 Up iPKP 05 26 42.6
i 05 26 50.7
iX 05 27 58.6
Sk iPKP 05 26 36.1
iX 05 27 50.5
i 05 28 14.5
Gb i(PKP) 05 26 58.6
Um iPKP 05 26 30.9 D
iX 05 27 34.7
Ka iPKP 05 26 53

Kermadec Islands
(h = 70 km).

1963 June 5 cont.

The phase marked X above has no explanation, unless it belongs to another shock.

" 5 Ki iP 09 17 56.2
iSg 09 18 34.3

" 5 Ki iP 09 21 27.7

" 5 Up iP 09 23 49.2
Ki iP 09 23 09.2
i 09 23 34.2
Sk iP 09 23 44.7
Um iP 09 23 29.2
i 09 23 42.1

Japan (h = 30 km).

" 5 Up i 10 34 41.4
Ki iPKP 10 31 00.8
Sk ePKP 10 31 12
Um iPKP 10 31 06.6

New Hebrides Islands
(h = 40 km).

" 5 Ki iP 12 18 16.2

" 5 Up iPKP 15 06 39.7
Sk iPKP 15 06 32.7
Um iPKP 15 06 27.1

Kermadec Islands
(h = 190 km).

" 5 Up iPP 23 12 09
iSKS 23 18 40

		microns	sec
M	E	0.8	18
M	N	1.6	20
M	Z	1.1	18

Ki ---

		microns	sec
M	E	1.8	20
M	N	0.9	19
M	Z	1.4	18

Um e 23 20 35

Celebes (h = 80 km).

" 6 Ki i(Pg) 05 01 57.2
iSn 05 02 34.2
iSg 05 02 48.7

D = 410 km = 3.7°.

Sk eSg 05 05 15
Um iSn 05 03 16.7
iSg 05 03 47.2

D = 600 km = 5.4°.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June 6 cont. **Northwest Russia, 67.4°N, 30.0°E. Origin time = 05 00 49. Explosion?**

"	6	Up	iP	05 30 57.8 D
			i	05 31 42.3
			iS	05 40 56
				microns sec
			P Z'	0.7 1.0
			S E	1.5 7
			S N	0.7 7
			M E	4.9 14
			M N	3.2 20
			M Z	5.7 14
			D = 8800 km = 79°.	
		Ki	iP	05 30 37.2 D
			iS	05 40 16
				microns sec
			P E	0.6 7
			P Z	2.1 4
			P Z'	0.9 1.8
			S E	1.6 6
			S N	0.6 10
			M E	4.4 18
			M N	4.0 19
			M Z	4.4 18
			D = 8400 km = 75½°.	
		Sk	iP	05 31 02.4 D
		Gb	iP	05 31 16.5 D
			iPP	05 34 20.4
		Um	iP	05 30 44.2 D
			iPcP	05 31 00.0
			iS	05 40 30
		Ka	iP	05 31 11 D
			iPcP	05 31 22

Luzon (h = 30 km).
Magn. = 6.4 (Up,Ki).
Pronounced Airy-phase on long-period E and Z component records (Up,Um).

"	6	Up	iP	06 19 24.9 D
				microns sec
			P Z'	0.2 1.4
		Sk	eP	06 19 36
		Gb	iP	06 19 44.1
		Um	iP	06 19 11.2
		Ka	iP	06 19 38

Luzon (h = 30 km).

"	6	Up	iP	08 33 06.6
			i	08 33 27.4
		Ki	iP	08 33 08.3 D
			i	08 33 28.9
		Sk	iP	08 33 22.7 D
			i	08 33 43.9

1963 June 6 cont.

		Gb	eP	08 33 31
			e	08 33 40
		Um	iP	08 33 03.9
			i	08 33 24.6
		Ka	iP	08 33 07

Nicobar Islands (h = 30 km).
The phase appearing in the average 20.8 sec after P is either pP, which would mean a focal depth of 80 km, or the P of a new shock with the same epicenter.

"	6	Up	e(P)	11 28 35
		Um	i(P)	11 26 37.5
"	6	Up	iPKP	11 44 52.0
		Sk	iPKP	11 44 45.2
		Um	iPKP	11 44 40.2

Kermadec Islands (h = 110 km).

"	6	Ki	eL	13 03
				microns sec
			M N	0.6 20
			M Z	1.4 20

Kerguelen Islands (h = 30 km).

"	6	Up	iPKP	18 01 37.4
			iSKP	18 04 47.7
		Sk	iPKP	18 01 34.2 C
		Gb	iPKP	18 01 45.2 C
		Um	iPKP	18 01 29.5
		Ka	iPKP	18 01 47 C
			iSKP	18 05 03

New Hebrides Islands (h = 160 km).

"	7	Up	iPKP	00 02 03.2
		Gb	iPKP	00 02 12.7
		Ka	iPKP	00 02 14

Fiji Islands (h = 370 km).

"	7	Um	iPP	00 39 53.5

Argentina (h = 210 km).

"	7	Gb	iP	08 27 54.9 C
"	7	Up	iPKP	15 54 17.8

Fiji Islands (h = 30 km).

"	7	Up	iP	16 02 07.5 C
			i	16 02 12.5
			iS	16 12 09

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June 7 cont.

Up
microns sec
P Z' 0.2 1.2
M E 1.1 20
M N 1.6 20
M Z 1.3 20
D = 8950 km = 80½°.
Ki iP 16 01 46.9
i 16 01 51.2
eS 16 11 31
microns sec
P Z' 0.2 1.0
S E 0.4 9
M E 1.2 16
M N 1.8 21
M Z 1.3 16
D = 8550 km = 77°.
Sk iP 16 02 10.5
i 16 02 49.1
Gb iP 16 02 26.8
i 16 02 33.7
ePP 16 05 45
Um iP 16 01 54.1 C
i 16 01 58.3
iS 16 11 42
Ka iP 16 02 20.2 C
Luzon (h = 30 km).
Magn. = 5.7 (Up,Ki).
The phase arriving about 5 sec after the first P has a much larger amplitude than this phase.

" 7 ---
microns sec
M E 3.0 22
M N 2.0 24
M Z 3.2 20
Ki eS 19 54 58
e 19 56 03
eSS 20 01 22
microns sec
M E 2.1 18
M N 1.4 21
M Z 2.2 16
Um eSKS 19 54 39
e 19 56 24
ePS 19 56 50
Clipperton Island (h = 30 km).
Magn. = 5.9 (Up,Ki).

" 7 Up iP 20 35 27.3

" 7 Um ePKS 22 54 29
Samoa Islands (h = 30 km).

1963 June 7 Up ePKS 23 00 11
microns sec
PKS N 0.5 9
M E 0.7 18
M N 1.4 23
M Z 1.3 20
Ki ePP 22 58 25
ePKS 22 59 48
eSS 23 15 20
microns sec
PKS N 0.3 9
M E 1.8 20
M N 1.4 19
M Z 2.5 19
Um iPP 22 58 53
ePKS 23 00 02
e 23 06 47
eSS 23 16 22
Samoa Islands (h = 30 km).

" 8 Up ---
microns sec
M E 0.4 20
M N 0.9 22
M Z 0.6 20
Ki eS 04 47 25
microns sec
M E 0.6 15
M N 0.5 18
M Z 0.5 17
Um eS 04 46 47
ePS 04 48 28
e 04 52 41
South Atlantic Ocean (h = 30 km).

" 8 Um iP 21 06 27.2
i(P) 21 06 39.7

" 8 Um eP 21 59 12

" 9 Up iP 01 04 43.4 C
Um iP 01 04 24.0

" 9 Gb iPKP 01 50 07.5
Ka iPKP 01 50 12
Tonga Islands (h = 30 km).

" 9 Ki iPg 05 48 37.1
iSg 05 49 20.2
D = 390 km = 3.5°.
Um eSn 05 49 41
i 05 50 02.8
iSg 05 50 09.0
D = 540 km = 4.9°.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June 9 cont.

Northwest Russia, 67.0°N, 29.3°E.
Origin time = 05 47 26.
Explosion?

" 9 Ki eSn 05 57 23
iSg 05 57 44.0
D = 460 km = 4.1°.
Sk eSg 06 00 11
Um e(S*) 05 58 17
iSg 05 58 35.2
D = 620 km = 5.6°.
Northwest Russia, 67.3°N, 31.0°E.
Origin time = 05 55 29.
Explosion?

" 9 Up iP 07 20 24.9
Ki eP 07 19 30
Aleutian Islands (h = 70 km).

" 9 Ki iP 09 15 12.5
Mindanao (h = 110 km).

" 9 Ki iP 09 41 38.7
Sk iP 09 42 37.1
Um iP 09 42 44.0
Ka iP 09 44 01
Svalbard (h = 60 km).

" 9 Gb iP 10 18 39.0

" 9 Up i(P) 19 12 36.3
i 19 12 45.2

" 9 Up iP 19 47 21.1

" 9 Up iP 20 48 32.7 C
eS 20 57 23
microns sec
M E 0.4 22
M N 1.1 22
M Z 0.7 22
D = 7300 km = 65½°.
Ki iP 20 49 00.4
eS 20 58 16
microns sec
S N 0.2 7
M E 0.5 17
M N 0.3 20
M Z 0.6 18
D = 7800 km = 70°.
Sk iP 20 48 32.5
Gb iP 20 48 10.3

1963 June 9 cont.

Um eP 20 48 46
i 20 48 53.7
Ka iP 20 48 20.0
Mid-Atlantic Ocean (h = 30 km).

" 9 Up iSg 21 26 30.9
Ki e 21 24 15
iSg 21 24 38.0
Sk ePn 21 23 43
iSg 21 24 22.4
D = 290 km = 2.6°.
Um iPg 21 24 06.5
iSg 21 24 58.6
D = 410 km = 3.7°.
Central Norway, 66.2°N, 13.7°E.
Origin time = 21 22 56.
Foreshock to the following earthquake.

" 9 Up iSg 21 34 35.7
Ki iPn 21 31 55.3
iSn 21 32 36.2
iSg 21 32 44.6
D = 350 km = 3.1°.
Sk iPn 21 31 50.2
iSg 21 32 29.0
D = 290 km = 2.6°.
Gb eSg 21 35 37
Um iPg 21 32 12.5
i 21 32 37.5
iSn 21 32 47.8
iSg 21 33 04.7
D = 410 km = 3.7°.
Ka eS* 21 36 02
eSg 21 36 30
Central Norway, 66.2°N, 13.7°E
Origin time = 21 31 03.

" 9 Ki e 23 49 52
eSg 23 49 59
Sk eSg 23 49 42
Um iSg 23 50 18.7
Central Norway, 66.2°N, 13.7°E.
Origin time = 23 48 17.
Aftershock of preceding earthquake.

" 9 Up iP 23 55 35.4 C
Ki iP 23 54 43.1
Um iP 23 55 09.3

" 10 Up ePKP 04 36 25
iPKP 04 36 30.9 C
e(PP) 04 40 26

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June 10 cont. Up

		microns	sec
PKP	Z'	0.3	1.5
M	E	1.9	20
M	N	2.0	20
M	Z	3.6	22

(D = 17650 km = 159°).

Ki iPKP 04 36 31.1 C

		microns	sec
PKP	Z	0.7	8
PKP	Z'	0.5	1.5
M	E	2.9	20
M	N	1.6	20
M	Z	4.2	20

(D = 17200 km = 155°).

Sk ePKP 04 36 33
iPKP 04 36 37.5
e(PP) 04 40 36

Gb iPKP 04 36 30.7
i(PP) 04 40 38.1

Um ePKP 04 36 25
iPKP 04 36 30.3 C
i 04 36 33.7
e 04 46 58
iSS 04 59 53

Ka iPKP 04 36 29.2
iPKP 04 36 34.5
i(PP) 04 40 30.8

West of Macquarie Islands (h = 30 km).
Magn. = 6.1 (Up,Ki).
The second PKP phase, following the first by 5.5 sec in average, has a much larger amplitude than the first PKP (Up,Sk,Um,Ka).

" 10 Up iPKP 05 34 09.3 C
i 05 34 20.7
Ki iPKP 05 34 07.6

		microns	sec
PKP	Z'	0.1	1.0

Sk ePKP 05 34 17
Um iPKP 05 34 03.1
iPKP 05 34 07.3
Ka iPKP 05 34 09.2
West of Macquarie Islands (h = 30 km).

" 10 Up iPKP 06 58 57.9
iPKS 07 02 36.7
e 07 09 30
e 07 21 55

		microns	sec
PKP	Z	1.0	4
PKP	Z'	0.4	1.5
M	E	3.2	21

1963 June 10 cont. Up

		microns	sec
M	N	4.5	20
M	Z	4.5	20

(D = 17650 km = 159°).

Ki iPKP 06 58 50.4
iPKP 06 58 57.0
i 07 09 29

		microns	sec
PKP	Z	0.9	8
PKP	Z'	0.8	1.5
M	E	8.2	19
M	N	5.4	21
M	Z	12	20

(D = 17200 km = 155°).

Sk ePKP 06 58 54
iPKP 06 59 04.9
i 06 59 23.1
i(PP) 07 03 05.7

Gb iPKP 06 58 54.3
iPKP 06 59 04.8
i(PP) 07 02 58.2

Um iPKP 06 58 48.5
iPKP 06 58 57.1
iPKS 07 02 42
e 07 22 04

Ka iPKP 06 58 47.7
iPKP 06 58 55.5
i(PP) 07 02 42.4

West of Macquarie Islands (h = 20 km).
Magn. = 6.5 (Up,Ki).
The second PKP with much larger amplitude arrives in this case on the average 9 sec after the first; compare remark to the earthquake just before the preceding one.

" 10 Up iP 08 05 26.3
Ki iP 08 04 33.2
iPcP 08 05 17.2
Aleutian Islands.

" 10 Up iP 10 57 35.0
i 10 57 39.1
iS 11 06 22

		microns	sec
P	Z'	0.1	1.3
S	E	0.4	5
S	N	0.4	5
M	E	1.2	21
M	N	1.1	22
M	Z	1.2	24

D = 7200 km = 65°.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June 10 cont.

Ki iP 10 56 47.0
iS 11 04 46
microns sec
P N 0.3 6
P Z 0.6 5
P Z' 0.1 1.5
S E 0.5 8
S N 0.3 8
M E 2.2 22
M N 1.6 22
M Z 0.9 16
D = 6450 km = 58°.
Sk iP 10 57 23.3
Gb iP 10 57 58.9
iPP 11 00 29.5
Um iP 10 57 11.3
eS 11 05 31
Ka iP 10 58 01.1
i 10 58 17.1
Kamchatka (h = 30 km).
Magn. = 5.7 (Up,Ki).

" 10 Um iPKP 12 38 24.4
New Britain.

" 10 Ka i(P) 16 21 59.6

" 11 Up iPKP 00 17 19.6
Um iPKP 00 17 11.6
i 00 17 28.4
ePP 00 18 08
e 00 23 48
eSKS 00 24 46
e 00 27 08
Ka iPKP 00 17 41.1
New Britain (h = 70 km).

" 11 Up iP 03 33 14.2 C
iPP 03 34 48.4
i 03 35 42.0
eSS 03 42 05
microns sec
P Z' 0.1 0.6
PP Z' 0.1 1.0
M E 0.9 16
M N 1.2 12
M Z 1.3 17
Ki iP 03 33 23.5 C
eSS 03 42 26
eLi 03 46 50
microns sec
P Z' 0.1 1.4
M E 1.4 10
M N 0.6 10
M Z 1.7 10

1963 June 11 cont.

Sk iP 03 33 40.3 C
iPP 03 35 23.1
Gb iP 03 33 36.0 C
i 03 33 40.0
iPP 03 35 16.3
i 03 35 26.5
Um iP 03 33 12.2 C
iS 03 39 16
eSa 03 41 40
eSS 03 42 05
D = 4450 km = 40°.
Ka iP 03 33 20.7 C
i 03 33 30.4
Hindu Kush (h = 40 km).
Magn. = 5.8 (Up,Ki).

" 11 Ki i(P) 04 25 28.9
Ka iP 04 26 17.8
Alaska (h = 50 km).

" 11 Up i(P) 12 26 11.3
i 12 26 36.4
Seismic?

" 11 Up iP 13 18 19.0
Ki iP 13 17 17.0
Sk iP 13 17 45.4
Gb iP 13 18 27.7
Um iP 13 17 48.1
Ka iP 13 18 37.8
i 13 18 50.7
Alaska (h = 30 km).

" 11 Ki iP 15 35 26.4
Sk eP 15 35 32
Um iP 15 35 44.1
Ka iP 15 36 08.8
Baja California (h = 30 km).

" 11 Up iP 18 16 42.1
i 18 16 44.1
microns sec
M E 0.3 17
M N 0.7 14
M Z 0.5 17
Ki iP 18 16 42.5
microns sec
M E 0.3 10
M N 0.8 14
M Z 0.2 10
Sk iP 18 17 02.2
Gb iP 18 17 05.7
i 18 17 36.8
Um iP 18 16 36.4 C
Ka iP 18 16 54.1
i 18 17 00.5
Tibet (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963				
June	11	Up	iP	18 41 34.5
		Ki	iP	18 41 43.6
		Sk	iP	18 42 00.5
		Um	iP	18 41 32.1
		Ka	iP	18 41 41.0
		Hindu Kush (h = 200 km).		
"	11	Ki	iP	18 47 21.5
			i	18 47 30.3
			microns	sec
			P Z' 0.1	1.3
		Sk	iP	18 47 15.8
		Gb	iP	18 47 16.1
		Colombia (h = 30 km).		
"	12	Um	iP	03 02 38.5
		Japan (h = 30 km).		
"	12	Up	i(P)	20 34 08.7
			i	20 34 28.3
			i	20 34 39.0
"	13	Ki	i(P)	00 54 34.3
"	13	Ki	iSn	05 46 37.9
			iSg	05 46 45.9
		Sk	iSg	05 46 28.6
		Um	iSg	05 47 05.1
		Central Norway, 66.2°N, 13.7°E. Origin time = 05 45 04. Aftershock of June 9, 21 31 03.		
"	13	Up	iP	08 42 28.8
			eS	08 46 22
			D = 2400 km = 21½°.	
		Ki	iP	08 43 41.4
			microns	sec
			P Z' 0.1	1.5
			M N 0.3	13
			M Z 0.6	13
		Sk	iP	08 42 53.8
			i	08 43 01.4
			i	08 43 24.0
		Gb	iP	08 42 04.4 C
		Um	iP	08 43 06.5
			e(S)	08 47 46
		Ka	iP	08 41 47.9
		Sicily (h = 30 km).		
"	13	Ki	iP	10 48 33.6 C
		Banda Sea (h = 150 km).		
"	13	Up	eP	22 35 45
			i	22 35 52.3

1963				
June cont.	13	Ki	eP	22 36 08
		Indian Ocean (h = 30 km).		
"	14	Sk	iP	07 35 24.5
		(Mexico; h = 30 km).		
"	14	Ki	iP	15 38 58.4
			iLgl	15 41 07.1
			i	15 42 35
			i	15 42 43.7
			microns	sec
			M E 0.4	7
			M N 0.2	7
		Sk	iP	15 40 06.0
			eLg2	15 44 48
			iPcP	15 45 33.0
		Um	iP	15 39 49.8
			iLi	15 43 12.5
			eRg	15 44 42
		Svalbard (h = 30 km). The paths are inside the continental border and channel phases are recorded, as distinct from the Svalbard earthquake of June 9, 1963, 09 39 06.9.		
"	15	Up	iP	13 03 06.3
		Aleutian Islands (h = 30 km).		
"	15	Ki	ePKP	15 50 02
			microns	sec
			M E 0.7	18
			M N 0.5	20
			M Z 0.9	19
		Um	ePKP	15 50 03
			ePKS	15 53 22
			e	16 04 28
		SE Pacific (h = 30 km).		
"	16	Um	iP	03 02 52.8 C
		Japan (h = 440 km).		
"	16	Um	iP	04 54 18.9
		Japan (h = 80 km).		
"	17	Ka	iP	14 27 10.5
"	17	Up	iP	18 42 10.8 C
			iS	18 50 16
			microns	sec
			P Z' 0.3	0.8
			S N 0.4	5
			M E 0.7	13
			M N 1.4	14

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont.	17	Up		microns	sec	
			M	Z 1.5	16	
			D = 6500 km = 58½°.			
		Ki	iP	18 41 16.2		C
			i	18 52 19.8		
			e	19 02 56		
				microns	sec	
			P	Z' 0.9	1.0	
			M	E 1.5	18	
			M	N 1.2	17	
			M	Z 1.1	16	
		Sk	iP	18 41 41.2		C
		Gb	iP	18 42 21.1		C
			iPcP	18 43 06.0		
		Um	iP	18 41 45.0		C
			eS	18 49 25		
			i	18 56 46		
			D = 6100 km = 55°.			
		Ka	iP	18 42 27.8		C
		Yukon (h = 30 km).				
"	17	Up	eL	19 41		
				microns	sec	
			M	E 1.8	19	
			M	N 2.5	18	
			M	Z 3.0	19	
		Ki	eL	19 41		
				microns	sec	
			M	E 5.4	23	
			M	N 1.7	19	
			M	Z 5.1	22	
		Scott Island (h = 30 km).				
		Magn. = 6.2 (Up,Ki).				
"	17	Up	iP	23 15 03.0		C
			iPP	23 18 41.9		
			iSKS	23 25 26		
			i	23 26 26		
				microns	sec	
			P	Z' 0.1	0.6	
			PP	Z' 0.2	1.5	
			D = 10100 km = 91°.			
		Ki	iP	23 15 02.7		C
				microns	sec	
			P	Z' 0.6	1.0	
		Sk	iP	23 15 16.3		C
			e	23 18 40		
		Um	iP	23 14 59.9		C
			eSKS	23 25 19		
			iS	23 25 45		
			iSS	23 31 46		
		Ka	iP	23 15 03.2		C
			i	23 19 01.5		
			e	23 26 29		
			i	23 28 22.2		
		Sumatra (h = 70 km).				
		Magn. = 6.2 (Up,Ki).				
1963 June	18	Um	iP	03 23 38.1		D
"	18	Up	iP	04 14 13.4		C
				microns	sec	
			P	Z' 0.1	0.8	
			M	E 1.6	17	
			M	N 1.8	13	
			M	Z 2.4	15	
		Ki	iP	04 13 43.3		
			iPP	04 16 18.6		
				microns	sec	
			P	Z' 0.1	1.0	
			M	E 1.6	19	
			M	N 1.0	20	
			M	Z 3.1	19	
		Sk	iP	04 14 12.8		C
		Gb	iP	04 14 33.7		C
		Um	iP	04 13 55.0		C
		Ka	iP	04 14 32.5		
		Ryukyu Islands (h = 30 km).				
		Magn. = 5.7 (Up,Ki).				
"	18	Up	iP	08 45 19.8		
		Ki	iP	08 45 29.9		
		Sk	eP	08 45 46		
		Hindu Kush (h = 220 km).				
"	18	Up	iPg	09 08 13.5		
			i	09 08 23.1		
			iSg	09 08 30.9		
			i	09 08 38.0		
				microns	sec	
			Sg	Z' 0.1	0.5	
			D = 140 km = 1.3°.			
		Sk	eSg	09 10 49		
		Um	iS*	09 10 30.1		
			iSg	09 10 44.6		
		Ka	iSg	09 09 08.9		
			i	09 09 22.9		
		Central Baltic,				
		58.6°N, 17.5°E.				
		Origin time = 09 07 48.				
		Probably explosion.				
		Possibly two subsequent events, which complicate the records.				
"	18	Up	iPg	09 14 36.6		
			iSg	09 14 54.1		
			i	09 15 12.4		
				microns	sec	
			Sg	Z' 0.1	0.5	
			D = 140 km = 1.3°.			
		Sk	eS*	09 17 03		
			iSg	09 17 16.0		
		Um	iS*	09 16 54.9		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont.	18	Ka	iSg	09 15 37.6	
		Central Baltic, 58.6°N, 17.5°E. Origin time = 09 14 11. Probably explosion.			
"	18	Ka	iPg	13 42 02.9	
			iSg	13 42 29.2	
"	18	Gb	i(P)	14 30 25.8	
"	18	Ki	eP	16 04 08	
"	18	Up	iP	23 27 09.8	
			i	23 27 15.4	
		Ki	iP	23 26 52.2	
		Luzon (h = 15 km).			
"	19	Up	iP	09 22 20.0	C
			iSKS	09 32 49	
			iS	09 33 26	
			microns	sec	
			P Z'	0.3	0.8
			SKS E	0.5	4
			M E	3.4	22
			M N	3.4	19
			M Z	5.0	22
			D = 10650 km = 96°.		
		Ki	iP	09 22 03.3	C
			ePP	09 25 40	
			iSKS	09 32 28	
			iS	09 32 55	
			microns	sec	
			P Z	0.7	12
			P Z'	0.4	1.0
			PP E	0.3	10
			PP Z	0.8	13
			SKS E	1.2	6
			S N	1.0	5
			M E	4.5	22
			M N	1.4	16
			M Z	3.9	21
			D = 10200 km = 92°.		
		Gb	iP	09 22 35.9	C
		Um	iP	09 22 08.5	C
			ePP	09 25 47	
			iSKS	09 32 36	
		Ka	iP	09 22 32.0	C
		Taland Islands (h = 80 km). Magn. = 6.3 (Up,Ki).			
"	19	Up	iP	10 57 34.2	C
			ipP	10 57 46.3	
			microns	sec	
			P Z'	0.2	0.6
			M E	1.2	21
1963 June cont.	19	Up	microns	sec	
			M N	0.9	21
			M Z	1.3	20
		Ki	iP	10 57 28.9	C
			eS	11 05 45	
			microns	sec	
			P Z	0.6	4
			P Z'	0.3	1.0
			S E	0.4	8
			M E	4.0	21
			M N	0.7	17
			M Z	4.2	20
			D = 6650 km = 60°.		
		Gb	iP	10 57 54.2	C
		Um	iP	10 57 26.9	C
			iS	11 05 35	
		Ka	iP	10 57 42.4	C
			ipP	10 57 54.5	
		Assam. h = 50 km (Up,Ka). Magn. = 6.2 (Up,Ki).			
"	19	Up	iPKP	12 17 45.8	
		Ki	iPKP	12 17 33.2	D
			microns	sec	
			M E	0.5	17
			M N	0.2	17
		Gb	iPKP	12 17 52.8	
		Um	iPKP	12 17 38.5	
		Solomon Islands (h = 30 km).			
"	19	Up	iPg	17 01 42.8	
			iSg	17 02 45.8	
			D = 500 km = 4.5°.		
		Sk	eS*	17 03 48	
			iSg	17 04 06.2	
			D = 790 km = 7.1°.		
		Gb	iPg	17 00 46.0	
			i	17 00 47.7	
			iSg	17 01 03.9	
			D = 140 km = 1.3°.		
		Ka	iPg	17 00 59.1	
			iSg	17 01 28.1	
			i	17 01 43.9	
			D = 240 km = 2.2°.		
		Kattegatt, between Sweden and Denmark, 56.5°N, 11.7°E. Origin time = 17 00 14.			
"	19	Um	i(P)	18 41 45.1	
"	19	Up	iP	23 13 44.3	
			iS	23 23 25	
			iSKS	23 23 37	
			microns	sec	
			P Z'	0.2	1.5

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont.	19	Up		microns	sec	
			SKS	E 0.5	5	
			SKS	N 0.7	7	
			M	E 1.9	17	
			M	N 3.7	20	
			M	Z 3.6	22	
			D = 8550 km = 77°.			
		Sk	iP	23 13 40.4 D		
		Gb	eP	23 14 01		
		Um	iP	23 13 24.6 D		
			iPP	23 16 11		
			eS	23 22 51		
			eSS	23 27 44		
		Ka	iP	23 14 10.3		
		Japan (h = 40 km).				
		Magn. = 5.8 (Up).				
"	20	Up	iP	01 07 42.4		
				microns	sec	
			P	Z' 0.1	1.2	
		Sk	iP	01 07 34.7		
		Um	iP	01 07 19.8 D		
		Japan (h = 30 km).				
"	20	Up	iP	19 53 26.2		
				microns	sec	
			M	E 0.8	15	
			M	N 1.0	17	
			M	Z 0.5	16	
		Sk	iP	19 53 43.1		
			i	19 53 50.8		
		Gb	iP	19 52 56.3		
		Um	iP	19 54 01.0 C		
			i	19 54 13.1		
			e(Sa)	19 59 10		
		Western Mediterranean (h = 50 km).				
"	20	Up	iPKP	23 05 54.1 C		
			i	23 07 07.8		
			i	23 08 22.1		
				microns	sec	
			PKP	Z' 0.2	0.6	
			M	E 0.8	20	
			M	Z 0.6	20	
		Sk	iPKP	23 05 46.4		
		Gb	iPKP	23 06 03.5 C		
		Um	iPKP	23 05 42.5 C		
			i	23 05 48.7		
			ePP	23 08 49		
			eSS	23 27 32		
		Ka	iPKP	23 06 12.6		
			i	23 06 35.8		
		Kermadec Islands (h = 40 km).				
1963 June	21	Up	ePKP	00 28 08		
			i	00 28 19.1		
		Sk	iPKP	00 28 01.9 C		
		Gb	iPKP	00 28 17.0		
		Um	iPKP	00 27 57.0 C		
		Kermadec Islands.				
"	21	Up	---			
				microns	sec	
			M	N 0.4	9	
			M	Z 0.5	8	
		Um	iP	06 07 24.1		
		Yugoslavia.				
"	21	Up	iP	13 54 30.2		
			eS	14 02 32		
				microns	sec	
			M	E 2.4	18	
			M	N 2.4	17	
			M	Z 0.9	12	
			D = 6650 km = 60°.			
		Ki	iP	13 53 42.5 C		
			eSa	14 05 35		
			eLg2	14 13 37		
				microns	sec	
			P	Z' 0.1	1.1	
			M	E 2.9	17	
			M	N 2.0	15	
			M	Z 1.8	16	
		Sk	iP	13 54 19.8 C		
		Um	iP	13 54 00.9 C		
			eLi	14 12 16		
		Manchuria (h = 30 km).				
		Magn. = 5.6 (Up,Ki).				
"	21	Up	iP	15 36 38.9 C		
				microns	sec	
			P	Z' 0.2	0.5	
		Ki	iP	15 36 33.9 C		
				microns	sec	
			P	Z' 0.2	1.0	
			M	E 1.6	21	
			M	N 0.6	19	
			M	Z 1.2	19	
		Sk	iP	15 36 55.4 C		
			i	15 37 04.5		
		Gb	iP	15 36 59.0 C		
		Um	iP	15 36 31.0 C		
		Ka	iP	15 36 47.8 C		
		India (h = 60 km).				
		Magn. = 6.4 (Up,Ki).				
"	21	Ki	iSn	17 10 31.9		
			iSg	17 10 53.8		
			D = 480 km = 4.3°.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont.	21	Um	i	17 12 05.6	
			iSg	17 12 17.2	
		Northwest Russia.			
		Origin time = 17 08 32.			
		Explosion?			
		Location is very close to			
		or coinciding with the			
		following event.			
"	21	Ki	iSn	17 19 45.4	
			iSg	17 20 08.1	
			D = 490 km = 4.4°.		
		Sk	eSg	17 22 53	
		Um	eSg	17 21 25	
		Northwest Russia,			
		68.6°N, 32.3°E.			
		Origin time = 17 17 43.			
		Explosion?			
"	21	Up	iPKP	18 02 13.5	C
			i	18 02 33.6	
		Sk	ePKP	18 02 03	
		Gb	iPKP	18 02 28.2	
		Kermadec Islands			
		(h = 30 km).			
"	21	Up	iP	21 37 32.8	D
		Um	iP	21 36 33.7	
"	21	Up	iPKP	22 01 41.5	
			i	22 01 52.0	
		Sk	iPKP	22 01 33.8	
		Gb	iPKP	22 01 49.8	
		Um	iPKP	22 01 28.5	
		Kermadec Islands			
		(h = 40 km).			
"	21	Up	iP	22 08 00.8	
		Sk	iP	22 07 48.5	
		Um	iP	22 07 43.9	
"	22	Ki	e(Pn)	00 51 57	
			eSn	00 52 55	
			iSg	00 53 18.3	
			D = 490 km = 4.4°.		
		Sk	eSg	00 55 58	
		Um	iSn	00 53 56.6	
			iSg	00 54 37.9	
			D = 740 km = 6.7°.		
		Northwest Russia,			
		68.5°N, 32.0°E.			
		Origin time = 00 50 55.			
		Explosion?			
"	22	Up	iP	16 24 47.2	
		Ki	iP	16 24 40.6	
1963 June cont.	22	Sk	iP	16 24 57.7	
		Java Sea (h = 600 km).			
"	22	Up	iP	21 01 03.8	
			iLgl	21 19 21	
				microns	sec
			M E	1.0	18
			M N	1.4	18
			M Z	0.9	15
		Ki	iP	21 00 19.0	
			e	21 12 49	
				microns	sec
			M E	0.9	15
			M N	0.9	13
			M Z	0.9	13
		Sk	iP	21 00 58.6	
		Um	iP	21 00 39.9	
			eSS	21 11 19	
		Manchuria (h = 30 km).			
"	22	Up	iPKP	21 47 40.5	
		Sk	iPKP	21 47 33.7	
			i	21 47 56.8	
		Um	iPKP	21 47 29.2	
		Kermadec Islands			
		(h = 30 km).			
"	23	Um	iP	01 27 46.0	D
"	23	Up	iPKP	04 09 12.1	C
			i	04 09 17.6	
				microns	sec
			PKP Z'	0.2	0.5
			M N	0.9	22
		Ki	iPKP	04 08 52.4	
				microns	sec
			PKP Z'	0.1	1.0
			M E	0.4	20
			M N	0.3	20
			M Z	0.8	21
		Sk	iPKP	04 09 05.6	C
		Gb	iPKP	04 09 20.1	C
		Um	iPKP	04 08 53.0	C
			eSS	04 31 19	
		Ka	ePKP	04 09 27	C
		Kermadec Islands			
		(h = 60 km).			
"	23	Ki	e(Pn)	04 39 06	
			eSn	04 39 58	
			eSg	04 40 14	
			D = 500 km = 4.5°.		
		Sk	eSg	04 42 53	
		Um	e(Pn)	04 39 34	
			iSn	04 40 45.4	
			iSg	04 41 24.7	
			D = 730 km = 6.6°.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont. 23 Northwest Russia, 68.3°N, 32.4°E. Origin time = 04 37 47. Explosion?

" 23 Up e(P) 06 51 33

" 23 Um e(P) 07 41 27

" 23 Ki iP 09 14 33.4
Sk iP 09 15 06.4
Um iP 09 14 50.8
Japan (h = 40 km).

" 23 Up iP 09 37 24.0
Sk iP 09 38 04.0
Um eP 09 38 04
i 09 38 09.2
Yugoslavia (h = 30 km).

" 23 Ki iP 18 40 05.8
Mariana Islands (h = 40 km).

" 23 Up iP 21 12 22.7

" 24 Up iP 04 36 44.9 D
iS 04 44 58
iScS 04 46 32
eP'P' 05 06 10

		microns	sec
P	N	1.3	3
P	Z	1.8	3
P	Z'	0.5	0.8
S	E	3.3	5
S	N	1.5	5
M	E	8.1	22
M	N	16	21
M	Z	16	20

D = 6650 km = 60°.

Ki iP 04 35 48.0
iS 04 43 16
iScS 04 45 39

		microns	sec
P	E	0.3	5
P	N	0.6	5
P	Z	1.5	5
P	Z'	1.2	1.0
S	E	7.7	9
S	N	2.6	8
M	E	15	17
M	N	17	19
M	Z	35	21

D = 5850 km = 52½°.

Sk iP 04 36 16.5
iPcP 04 37 24.5

1963 June cont. 24 Sk eS 04 44 14
eP'P' 05 06 18
Gb iP 04 36 57.5 D
Um iP 04 36 17.3 D
iP'P' 05 06 17.8
Ka iP 04 37 09 D
iS 04 45 35
Alaska (h = 50 km).
Magn. = 6.6 (Up,Ki).

" 24 Ki iSn 04 58 58.3
iS* 04 59 12.8
iSg 04 59 21.3
D = 490 km = 4.4°.
Um iSn 04 59 44.0
iSg 05 00 20.8
D = 690 km = 6.2°.
Northwest Russia, 67.7°N, 32.1°E. Origin time = 04 56 56. Explosion?

" 24 Ki iP 05 52 59.5

		microns	sec
M	E	0.8	17
M	N	0.7	15
M	Z	1.0	15

Sk iP 05 53 27.2
Um eP 05 53 26
i 05 53 31.9
Alaska (h = 60 km).

" 24 Ki eL 07 01

		microns	sec
M	E	0.9	18
M	N	0.6	19
M	Z	1.7	20

Alaska (h = 40 km).

" 24 Up iP 10 27 38.0
Sk iP 10 27 09.4
Queen Charlotte Islands (h = 40 km).

" 24 Up iPKP 13 37 16.5

		microns	sec
PKP	Z'	0.1	0.9

Ki e(PKP) 13 37 19
Gb iPKP 13 37 25.5
i 13 37 41.4
Um iPKP 13 37 06.3
Ka iPKP 13 37 29.4
Tonga Islands (h = 240 km).

" 24 Sk iP 14 28 01.7
Alaska (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June	24	Ki	iPKP	15 19 58.8	
		Um	iPKP	15 20 06.7	
		Fiji Islands (h = 410 km).			
"	24	Up	iP	16 28 12.7	
			eS	16 37 01	
			microns	sec	
			P Z'	0.1	1.0
			S N	0.5	16
			M E	1.0	18
			M N	3.6	22
			M Z	3.0	23
			D = 7550 km = 68°.		
		Ki	iP	16 27 19.2	
			iS	16 35 28	
			ePS	16 35 42	
			microns	sec	
			P Z'	0.1	1.3
			S N	0.3	9
			M E	2.2	18
			M N	1.6	20
			M Z	2.5	19
			D = 6650 km = 60°.		
		Sk	iP	16 27 49.8	
			iPcP	16 28 24.2	
		Gb	iP	16 28 27.8	
		Um	iP	16 27 45.7	
			eS	16 36 13	
		Ka	iP	16 28 39.2	
		Aleutian Islands (h = 30 km). Magn. = 5.6 (Up,Ki). Although not very clear, the first motion exhibits a small dilatation followed by a much larger compression.			
"	25	Sk	iP	11 56 14.1	C
		Um	iP	11 56 28.0	
		Panama - Costa Rica (h = 40 km).			
"	25	Um	e(P)	13 35 44	
			i	13 35 52.8	
"	25	Up	i(P)	16 01 36.0	C
"	25	Um	iPKP	16 23 09.4	
		Tonga Islands (h = 250 km).			
"	25	Up	iP	19 51 18.9	
		Um	eP	19 51 32	
			i	19 53 34.4	
"	26	Up	---		
			microns	sec	
			M E	0.6	12
1963 June cont.	26	Up	microns	sec	
			M N	0.5	12
		Um	iP	05 53 45.5	
		Bulgaria.			
"	26	Um	iP	08 08 48.5	
		Mariana Islands (h = 50 km).			
"	26	Um	iP	08 44 13.9	
		Japan (h = 30 km).			
"	26	Up	iP	09 54 52.3	
			microns	sec	
			M E	0.6	14
			M N	0.7	15
			M Z	0.6	12
		Sk	eP	09 54 57	
		Gb	eP	09 55 02	
		Um	iP	09 54 42.0	D
		Mindanao (h = 30 km).			
"	26	Up	iP	10 32 51.1	
		Sk	eP	10 33 10	
		Gb	iP	10 32 21.3	
		Um	iP	10 33 26.5	D
		Western Mediterranean (h = 30 km).			
"	26	Up	iP	14 17 18.7	
			microns	sec	
			P Z'	0.1	0.6
		Ki	iP	14 17 21.0	
			iS	14 23 52.8	
			microns	sec	
			P Z'	0.2	0.6
			D = 4900 km = 44°.		
		Sk	iP	14 17 40.7	
		Gb	iP	14 17 40.9	
		Um	iP	14 17 13.2	
			i	14 17 49.4	
		Ka	iP	14 17 29.7	
			i	14 17 57.5	
		Sinkiang (h = 30 km).			
"	26	Ki	eP	14 35 28	
		Colombia (h = 30 km).			
"	26	Up	iP	17 32 18.1	
		Ki	iP	17 32 11.3	C
		Sk	iP	17 32 33.1	
			i	17 33 00.4	
		Um	iP	17 32 10.1	C
		Burma (h = 80 km).			
"	26	Up	iP	17 55 33.3	C
			iS	18 06 20	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont.	26	Up			microns	sec
			P	Z'	0.1	0.7
			S	E	0.7	12
			S	N	1.2	12
			M	E	1.7	18
			M	N	3.3	23
			M	Z	4.0	24
			D = 9900 km = 89°.			
		Ki	iP		17 55 31.4	
			i		17 55 41.5	
			ePP		17 58 57	
			eS		18 06 03	
					microns	sec
			P	Z	0.5	6
			P	Z'	0.4	1.6
			S	E	1.2	12
			S	N	0.6	11
			M	E	2.9	20
			M	N	1.3	18
			M	Z	1.8	19
			D = 9800 km = 88°.			
		Sk	iP		17 55 19.3 C	
			i		17 55 30.9	
			iPP		17 58 37.6	
		Gb	iP		17 55 22.7	
		Um	iP		17 55 35.1	
			iPP		17 59 06.1	
			eS		18 06 08	
		Panama (h = 20 km).				
		Magn. = 6.1 (Up,Ki).				
"	26	Up	i(P)		20 45 17.5	
"	27	Ki	iP		02 04 24.7	
"	27	Up	iP		07 17 58.3 C	
					microns	sec
			P	Z'	0.3	1.3
		Ki	iP		07 17 04.0 C	
					microns	sec
			P	Z'	0.5	1.1
		Sk	iP		07 17 28.7 C	
		Gb	iP		07 18 08.8	
			i		07 18 23.9	
		Um	iP		07 17 32.7 C	
			iS		07 25 25	
		Ka	iP		07 18 23	
		Yukon (h = 30 km).				
"	27	Ki	e		07 51 08	
			eSg		07 51 32	
		Sk	ePg		07 50 59	
			iSg		07 51 38.2	
			D = 320 km = 2.9°.			
		Um	iPg		07 51 13.3	
			iSn		07 51 47.2	
1963 June cont.	27	Um	iSg		07 52 01.2	
			D = 400 km = 3.6°.			
		Central Norway, 66.5°N, 14.5°E.				
		Origin time = 07 50 02.				
"	27	Ki	eP		10 49 23	
			i		10 49 31.6	
"	27	Up	iPKP		12 41 05.3	
					microns	sec
			PKP	Z'	0.1	0.9
		Ki	ePKP		12 40 43	
		Sk	iPKP		12 40 59.1 C	
		Um	iPKP		12 40 53.8 C	
		Kermadec Islands (h = 40 km).				
"	27	Um	iP		14 31 03.4	
"	27	Up	iP		15 44 06.9 C	
					microns	sec
			P	Z'	0.1	0.6
		Ki	iP		15 44 06.4 C	
					microns	sec
			P	Z'	0.1	0.6
		Sk	iP		15 44 23.1 C	
		Gb	iP		15 44 23.9	
		Um	iP		15 44 02.5 C	
			eS		15 53 09	
		Ka	iP		15 44 14	
		Andaman Islands (h = 30 km).				
"	27	Ki	iP		16 43 35.3	
"	27	Up	iP		23 35 41.0	
		Ki	iP		23 34 51.7 C	
		Um	iP		23 35 14.1 C	
		Kurile Islands (h = 110 km).				
"	28	Ki	iP		02 42 37.5	
			iPP		02 46 45.9	
			i		02 46 54.1	
			eSS		03 01 12	
					microns	sec
			PP	N	0.3	5
			PP	Z	0.6	5
			PP	Z'	0.2	2.0
			M	E	0.9	20
			M	N	0.6	20
			M	Z	1.1	18
			(D = 11200 km = 101°).			
		Sk	iPP		02 46 39.4	
		Um	iP		02 42 23.7 C	
			ePS		02 55 18	
			eSS		03 00 27	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont. 28 Indian Ocean (h = 30 km). Magn. = 6.3 (Ki).

" 28 Ki i(P) 04 19 33.2 C

" 28 Ki iP 06 09 56.9 C
Um iP 06 10 04.1

" 28 Ki iP 08 32 27.4

" 28 Ki eP 11 22 21

" 28 Up iP 14 00 11.7
iS 14 10 31
microns sec
M E 0.7 16
M N 2.1 21
M Z 1.2 15
D = 9200 km = 83°.
Ki iP 14 00 14.0
eS 14 10 32
microns sec
P Z' 0.1 1.0
S E 0.5 8
S N 0.6 15
M E 1.2 16
M N 0.6 16
M Z 1.2 15
D = 9300 km = 83½°.
Sk iP 14 00 28.5 D
Gb iP 14 00 28.1
i 14 01 10.7
Um iP 14 00 10.0
i 14 00 26.1
iPP 14 03 26
iS 14 10 28
Sumatra (h = 50 km).
Magn. = 5.7 (Up,Ki).

" 28 Um iP 15 18 58.1
Iceland (h = 30 km).

" 28 Ki iP 16 04 56.0
microns sec
M E 0.4 15
M N 0.2 15
M Z 0.7 14
Um iP 16 05 13.8
Iceland (h = 30 km).

" 28 Ki iP 17 28 32.0
Um iP 17 28 49.1
Ka iP 17 29 33.4 D

" 28 Um iP 19 50 14.0

1963 June 28 Ki iP 20 35 08.6

" 28 Up iP 22 06 35.9 C
iS 22 15 31
i 22 15 46.5
microns sec
P N 6.4 12
P Z 11 10
P Z' 0.7 0.8
S E 9.2 15
S N 10 14
M E 43 18
M N 58 17
M Z 47 20
D = 7550 km = 68°.
Ki iP 22 05 48.0 C
eS 22 13 54
iPS 22 14 12
microns sec
P E 2.5 8
P N 3.2 8
P Z 11 8
P Z' 1.1 1.0
S N 6.6 10
M E 86 18
M N 88 19
M Z 180 18
D = 6700 km = 60½°.
Sk iP 22 06 23.4 C
iS 22 15 12.3
Gb iP 22 06 56.9 C
i 22 07 11.8
iS 22 16 26.4
Um iP 22 06 10.0 C
ePa 22 10 04
eS 22 14 31
i! 22 14 44
iP'P' 22 35 11.0
Kurile Islands (h = 30 km).
Magn. = 6.9 (Up,Ki).

" 28 Um iP 22 15 19.5

" 28 Up iP 22 26 25.2
Ki iP 22 25 36.9 C
Gb eP 22 26 46
Um iP 22 25 58.7 C
Kurile Islands (h = 30 km).

" 28 Up iP 22 32 59.2
Ki iP 22 32 11.2
Um iP 22 32 33.1
Kurile Islands (h = 30 km).

" 28 Up iP 22 36 00.8

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont.	28	Up		microns sec	
			P	Z' 0.4	1.5
		Ki	iP	22 35 12.8	C
				microns sec	
			P	Z' 0.5	2.0
		Sk	eP	22 35 46	
		Gb	iP	22 36 21.1	
		Um	iP	22 35 34.8	C
		Ka	iP	22 36 28.7	
		Kurile Islands (h = 30 km).			
		Magn. = 6.3 (Up,Ki).			
"	28	Um	iP	22 54 06.5	C
"	28	Up	iP	23 00 30.2	
		Ki	iP	22 59 42.5	
		Gb	iP	23 00 51.1	
		Um	iP	23 00 04.3	C
		Kurile Islands (h = 30 km).			
"	28	Up	iP	23 08 00.8	C
			i	23 08 02.3	
				microns sec	
			P	Z' 0.2	1.0
		Ki	iP	23 07 12.5	
				microns sec	
			P	Z' 0.5	1.5
		Sk	iP	23 07 48.6	
		Gb	iP	23 08 23.0	
			iPcP	23 08 45.7	
		Um	iP	23 07 34.2	
		Ka	iP	23 08 28.8	
		Kurile Islands (h = 30 km).			
		Magn. = 6.2 (Up,Ki).			
"	28	Um	iP	23 26 18.2	
"	28	Ki	e(Pn)	23 55 58	
			iSn	23 56 50.0	
			iSg	23 57 07.0	
			D = 400 km = 3.6°.		
		Sk	iSg	23 59 44.0	
		Um	iSn	23 57 46.6	
			iSg	23 58 21.5	
			D = 640 km = 5.8°.		
		Northwest Russia, 68.0°N, 30.0°E.			
		Origin time = 23 55 09.			
		Explosion?			
"	29	Up	iP	00 04 53.3	C
			i	00 05 04.8	
				microns sec	
			P	Z' 0.5	1.1
		Ki	iP	00 04 04.9	C
			i	00 04 18.5	

1963 June cont.	29	Ki		microns sec	
			P	Z' 0.7	1.7
		Sk	iP	00 04 40.4	C
			i	00 04 52.1	
		Gb	iP	00 05 14.0	C
		Um	iP	00 04 27.1	C
			i	00 04 38.0	
		Ka	iP	00 05 19.9	C
			i	00 05 32.1	
		Kurile Islands (h = 30 km).			
		Magn. = 6.5 (Up,Ki).			
		The second phase (Up,Ki,Sk, Um,Ka) is either pP, which would mean a focal depth of 50 km or it is the P of a new shock in about the same location.			
"	29	Up	iP	00 07 42.4	
		Ki	iP	00 06 53.7	
		Kurile Islands.			
"	29	Um	iP	02 00 30.1	
"	29	Up	iP	02 32 44.5	
				microns sec	
			P	Z' 0.1	1.0
		Ki	iP	02 31 56.0	C
				microns sec	
			P	Z' 0.1	1.1
			M	E 0.5	15
			M	N 0.5	17
			M	Z 0.9	16
		Sk	eP	02 32 22	
		Gb	iP	02 33 04.8	
		Um	iP	02 32 18.2	C
		Kurile Islands (h = 30 km).			
		Magn. = 5.8 (Up,Ki).			
"	29	Ki	iP	02 34 51.1	
		Um	iP	02 34 11.2	C
"	29	Up	eP	04 18 09	
		Ki	iP	04 17 21.9	C
				microns sec	
			P	Z' 0.1	1.2
		Um	iP	04 17 43.9	C
		Kurile Islands (h = 30 km).			
"	29	Up	iP	05 49 54.1	C
				microns sec	
			P	Z' 0.1	1.3
		Ki	iP	05 49 05.5	
				microns sec	
			P	Z' 0.2	2.0
		Sk	iP	05 49 41.6	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June cont.	29	Gb	eP	05 50 14	
		Um	iP	05 49 28.0	C
		Kurile Islands (h = 30 km).			
		Magn. = 5.7 (Up,Ki).			
"	29	Up	e(P)	06 04 15	
			i	06 04 19.1	
		Um	i(P)	06 04 22.7	
"	29	Sk	eP	09 11 21	
"	29	Up	iP	12 57 12.8	
		Ki	iP	12 56 46.2	
			microns sec		
			P Z'	0.1 1.0	
			M E	0.5 16	
			M N	0.4 15	
			M Z	1.1 18	
		Um	iP	12 56 57.3	
			eSKS	13 07 28	
		Mariana Islands (h = 30 km).			
"	29	Up	iP	13 17 47.4	
		Um	iP	13 17 32.8	C
		Mariana Islands (h = 30 km).			
"	29	Up	iP	13 25 01.7	
		Ki	iP	13 24 13.4	
			microns sec		
			P Z'	0.1 1.0	
		Sk	iP	13 24 50.3	
		Gb	iP	13 25 21.8	
		Um	iP	13 24 35.9	
		Kurile Islands (h = 30 km).			
"	29	Up	iP	14 31 54.8	
		Ki	iP	14 31 06.4	C
		Gb	iP	14 32 14.6	
		Um	iP	14 31 29.0	C
		Kurile Islands (h = 30 km).			
"	29	Up	iP	18 09 35.2	
"	29	Up	iP	18 53 13.0	
			microns sec		
			P Z'	0.1 1.0	
		Ki	iP	18 52 23.5	
		Sk	eP	18 53 03	
		Gb	iP	18 53 34.1	
			i	18 53 36.9	
		Um	iP	18 52 46.9	C
		Kurile Islands (h = 30 km).			
"	29	Up	iP	20 27 38.5	C

1963 June cont.	29	Up		microns sec	
			P Z'	0.1 1.0	
		Ki	iP	20 26 49.8	C
		Sk	i(P)	20 27 37.7	
		Gb	iP	20 27 59.2	
		Um	iP	20 27 12.4	C
		Ka	iP	20 28 01.6	
		Kurile Islands (h = 30 km).			
"	29	Up	iP	20 28 39.2	
"	29	Up	iP	21 54 50.4	
			microns sec		
			P Z'	0.1 1.0	
		Um	iP	21 55 37.5	
"	29	Up	iP	22 14 29.4	C
		Sk	iP	22 14 25.2	
		Gb	iP	22 14 47.1	C
		Um	iP	22 14 10.4	C
"	29	Um	iPKP	23 19 35.1	
		Tonga Islands (h = 30 km).			
"	30	Up	iP	00 11 09.2	
		Ki	eP	00 12 17	
		Sk	eP	00 11 47	
		Gb	iP	00 10 58.9	
		Ka	iP	00 10 32.1	
			i	00 10 36.2	
		Mediterranean Sea (h = 30 km).			
"	30	Up	iP	00 18 35.3	
		Um	iP	00 18 13.2	
"	30	Up	iP	00 53 19.7	
			microns sec		
			P Z'	0.1 1.0	
		Ki	iP	00 52 31.1	C
		Sk	iP	00 53 08.0	
		Gb	iP	00 53 40.5	
		Um	iP	00 52 53.9	C
		Kurile Islands (h = 30 km).			
"	30	Um	iP	01 52 15.2	
		Mariana Islands (h = 30 km).			
"	30	Up	iP	02 27 18.1	
		Um	iP	02 27 05.9	
"	30	Up	iP	04 06 38.3	
		Ki	iP	04 06 46.8	
		Sk	eP	04 07 03	
		Um	iP	04 06 36.2	
		Hindu Kush (h = 200 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 June	30	Ki	iP	04 32 16.2	
		Um	iP	04 32 27.1	D
		Mariana Islands (h = 30 km).			
"	30	Ki	iP	05 26 45.4	C
		Sk	iP	05 27 13.2	
		Um	iP	05 27 15.6	
		Alaska (h = 25 km).			
"	30	Ki	eSn	05 36 21	
			eSg	05 36 41	
			D = 440 km = 4.0°.		
		Sk	eSg	05 39 07	
		Um	i	05 37 16.4	
			iSg	05 37 33.7	
		Northwest Russia, 67.3°N, 30.8°E. Origin time = 05 34 29. Explosion?			
"	30	Gb	iP	06 28 22.4	
"	30	Up	iP	06 58 16.7	C
			ipP	06 59 00.3	
			microns	sec	
			pP Z'	0.1 1.5	
		Ki	iP	06 58 15.0	C
			ipP	06 58 59.7	
			microns	sec	
			P Z'	0.1 1.0	
		Sk	iP	06 58 29.6	
			ipP	06 59 15.2	
		Gb	iP	06 58 29.9	
		Um	iP	06 58 13.4	C
			ipP	06 58 57.2	
			iS	07 08 44	
		Ka	iP	06 58 22.8	
		Sumatra. h = 180 km (Up,Ki,Sk,Um).			
"	30	Up	iP	07 47 46.7	
		Ki	iP	07 48 26.4	
			microns	sec	
			M E	0.6 15	
		Sk	iP	07 48 23.3	
		Gb	iP	07 47 57.8	
		Um	iP	07 48 01.5	
		Ka	iP	07 47 36.4	
		Iran (h = 40 km).			
"	30	Ki	i(P)	07 49 51.7	C
		Um	i(P)	07 49 26.1	
"	30	Um	iP	16 23 43.9	
1963 June	30	Ki	i(P)	18 26 38.3	
		Um	iP	18 26 53.9	
"	30	Ka	iP	18 46 01.7	
"	30	Up	iP	22 15 49.9	C
			eS	22 24 45	
			microns	sec	
			P Z'	0.4 1.0	
			M E	1.0 17	
			M N	1.4 18	
			M Z	1.3 20	
			D = 7550 km = 68°.		
		Ki	iP	22 15 01.0	C
			eS	22 23 18	
			microns	sec	
			P Z'	0.2 0.8	
			S N	0.3 9	
			M E	1.9 17	
			M N	1.8 18	
			M Z	5.5 18	
			D = 6700 km = 60½°.		
		Sk	iP	22 15 36.8	C
		Gb	iP	22 16 10.2	C
		Um	iP	22 15 23.7	C
			eS	22 23 58	
		Ka	iP	22 16 14.7	C
		Kurile Islands (h = 30 km). Magn. = 6.2 (Up,Ki).			
"	30	Up	iP	23 30 08.1	
		Sk	iP	23 29 56.5	
		Gb	eP	23 30 13	
		Um	iP	23 29 51.4	

Markus Båth
February 1, 1964

Seismological Institute
Uppsala

P R E L I M I N A R Y

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, G Ö T E B O R G, U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

J U L Y 1 - 31, 1963

1963 July 1 Up iPKP 06 49 54.9
Fiji Islands (h = 580 km).

" 1 Um iP 09 31 49.0
Japan (h = 80 km).

" 1 Ki ---
microns sec
M E 0.4 13
M N 0.3 12
M Z 0.5 12
Sk iP 10 31 14.1
Gb iP 10 31 44.8
Um eP 10 31 49
(Iceland).

" 1 Um iP 12 06 37.0

" 1 Ki iP 20 33 04.2 D
Um iP 20 32 38.5 D
Sumatra (h = 90 km).

" 1 Up iP 21 19 46.3 C
i 21 19 50.4
microns sec
P Z' 0.2 0.6
Ki iP 21 19 29.4 C
i 21 20 28.9
iPcP 21 20 44.5
microns sec
P Z' 0.1 0.8
M E 0.4 13
M N 0.4 15
M Z 0.4 10
Sk iP 21 19 58.1 C
i 21 20 02.8
Gb iP 21 20 10.2 C
i 21 20 15.2

1963 July 1 cont. Um iP 21 19 32.0 C
iPcP 21 20 45.5
Ka iP 21 20 00.8 C
Tsinghai Province, China
(h = 30 km).

" 1 Up iPKP 22 28 07.7
i 22 28 12.3
Sk iPKP 22 28 01.7
Gb iPKP 22 28 15.2
i 22 28 25.2
Um iPKP 22 27 55.9
(Kermadec Islands).

" 1 Up iP 22 50 50.3 C
i 22 51 12.4
Ki iP 22 50 02.1
Sk eP 22 50 38
Gb iP 22 51 11.2
i 22 51 22.6
Um iP 22 50 24.5 C
Ka eP 22 51 27
i 22 51 38.3
Kurile Islands (h = 70 km).

" 2 Up iP 00 23 15.9
i 00 23 20.6
iLgl 00 38 20
microns sec
M E 0.8 11
M N 1.1 11
M Z 1.0 11
Ki iP 00 23 01.4
microns sec
M E 0.5 12
M N 0.5 16
M Z 0.6 11
Sk iP 00 23 30.5

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	2	Gb	eP	00 23 45
		Um	iP	00 23 02.0
		Sinkiang Province, China (h = 40 km).		
"	2	Up	iP	01 50 27.3
		Um	i(P)	01 49 50.4
			i	01 50 03.0
		Kurile Islands (h = 30 km).		
"	2	Gb	iP	03 50 55.5
"	2	Up	iP	06 12 49.3
		Gb	iP	06 13 09.0
		Um	iP	06 12 21.5
		Kamchatka (h = 30 km).		
"	2	Gb	i(P)	07 53 21.3
"	2	Ki	i(P)	12 45 12.0
		Oregon, U.S.A.		
"	2	Gb	iP	12 59 28.7 C
		Local explosion with a train of Rayleigh-waves in the period range 1.7-0.8 sec.		
"	2	Gb	i(P)	15 15 29.5
"	2	Um	eP	18 18 15
		Panama - Costa Rica (h = 60 km).		
"	3	Gb	iP	12 04 05.4
"	3	Up	iS*	13 51 56.7
			iSg	13 52 10.6
			D = 650 km = 5.9°.	
		Ki	eS*	13 52 28
			iSg	13 52 47.5
			D = 780 km = 7.0°.	
		Sk	eSg	13 53 15
			i	13 53 27.2
		Um	ePn	13 50 14
			eSn	13 51 08
			iSg	13 51 27.5
			D = 500 km = 4.5°.	
		Southeast Finland, 61 3/4°N, 29°E.		
		Origin time = 13 48 57.		
		Explosion?		
"	3	Gb	iP	15 10 32.6
"	3	Ki	iPn	17 47 19.9
			iSn	17 47 57.8

1963 July cont.	3	Ki	iSg	17 48 08.9
			D = 330 km = 3.0°.	
		Sk	eSg	17 50 52
		Um	iSn	17 49 11.1
			eSg	17 49 54
			D = 680 km = 6.1°.	
		Northern Finland, 69°N, 28°E.		
		Origin time = 17 46 30.		
		Explosion?		
"	3	Ki	e(P)	18 15 15
"	3	Gb	iPKP	18 56 06.1
		Tonga Islands (h = 30 km).		
"	3	Ki	eP	20 51 05
			i	20 51 10.4
"	4	Ki	iP	01 05 41.0
		Kurile Islands (h = 50 km).		
"	4	Up	iP	03 14 26.6
		Sk	iP	03 15 07.4
"	4	Ki	e(Sg)	05 21 06
"	4	Ki	iP	07 06 37.7
		Um	eP	07 06 47
		Formosa (h = 60 km).		
"	4	Ki	iP	07 35 23.5
"	4	Up	iPKP	11 17 29.9 D
			ipPKP	11 18 15
			iSKP	11 20 47.9
			i	11 26 25.7
			iSKKP	11 28 55.1

		microns	sec
PKP	E	0.7	2
PKP	N	2.4	2
PKP	Z	7.9	2
PKP	Z'	0.7	0.6
SKP	N	1.0	3
SKP	Z	3.2	4
SKP	Z'	1.3	1.6
M	E	1.6	21
M	N	3.1	25
M	Z	1.9	20

(D = 16200 km = 146°).

Ki	iPKP	11 17 08.5	
	i!	11 19 58.1	
	iPP	11 20 09	
	iSKP	11 20 34.3	
	iPKS	11 20 49	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July 4 cont.

Ki
microns sec
PKP Z 1.7 6
PKP Z' 0.4 1.2
SKP Z 3.1 6
SKP Z' 1.0 1.8
PKS E 1.8 7
PKS N 2.3 7
M E 1.8 20
M N 2.8 22
M Z 3.5 20
(D = 15350 km = 138°).

Sk iPKP 11 17 21.4
i 11 20 31.7

Gb iPKP 11 17 35.6 D
ipPKP 11 18 24.0

Um iPKP 11 17 12 D
i 11 20 22.1
i! 11 25 59.2

Ka iPKP 11 17 38.0 D
ipPKP 11 18 26.5
iSKP 11 21 09.1

Tonga Islands. h = 180 km (Up,Gb,Ka).

" 4 Gb iPKP 14 36 25.1
i 14 36 37.6
Tonga Islands (h = 30 km).

" 4 Up iP 20 33 47.8 D
i 20 33 54.1

" 4 Um iP 21 58 43.7
Celebes (h = 60 km).

" 4 Up eP 23 08 33 D
eS 23 18 50
microns sec
P Z' 0.2 1.7
M E 0.6 16
M N 1.6 20
M Z 1.7 21
D = 9100 km = 82°.

Ki iS 23 20 10
microns sec
M E 1.3 17
M N 1.4 19
M Z 2.8 20

Sk iP 23 08 45.6 D
Gb eP 23 08 17
Um iP 23 08 54.5 D
eS 23 19 21
eSS 23 25 03
Ka iP 23 08 15.8
St. Helena (h = 30 km).
Magn. = 5.6 (Up,Ki).

" 5 Gb iP 01 35 20.0

1963 July 5

Ki iP 03 36 48.3 D
Sk eP 03 37 23
Um iP 03 36 54.9
Outer Mongolia (h = 30 km).

" 5 Ki iSn 04 58 10.1
iSg 04 58 31.1
D = 480 km = 4.3°.
Sk eSg 05 01 04
Um iSn 04 58 55.3
iSg 04 59 31.9
D = 680 km = 6.1°.
Northwest Russia,
67.7°N, 31.8°E.
Origin time = 04 56 10.
Explosion?

" 5 Um iPKP 06 06 22.7
Peru (h = 60 km).

" 5 Um iP 08 46 58.5
Japan (h = 30 km).

" 5 Up i(P) 11 59 53.2

" 5 Um iP 12 38 20.6 C

" 5 Up iP 13 19 14.8
microns sec
M N 0.9 15

Ki iP 13 19 19.6
microns sec
M N 0.5 14

Sk iP 13 19 38.6
iPP 13 21 20.6

Um iP 13 19 10.7

Ka iP 13 19 19.3
Hindu Kush (h = 110 km).

" 5 Up eP 14 26 13
iS 14 30 05
microns sec
M E 0.8 15
M N 0.6 15
M Z 0.6 10
D = 2350 km = 21°.

Ki iP 14 27 14.0
microns sec
M E 1.0 14
M N 0.3 10
M Z 0.7 11

Sk iP 14 26 53.3
Um iP 14 26 51.5
iS 14 31 22
D = 2800 km = 25°.
Ka e(P) 14 25 33
Greece (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July	5	Up	iP	14 53 25.0	
		El Salvador (h = 90 km).			
"	5	Up	iP	15 21 32.6	
		Sk	iP	15 22 14.3	
		Um	iP	15 22 10.8	
"	5	Ki	e(P)	15 30 17	
"	5	Up	eSg	16 46 29	
		Ki	iPg	16 43 09.0	C
			iSn	16 43 33.3	
			iSg	16 43 39.1	
				microns sec	
			Sg	Z' 0.2 0.5	
			D = 240 km = 2.2°.		
		Sk	ePn	16 43 28	
			iSn	16 44 15.2	
			iSg	16 44 30.5	
			D = 420 km = 3.8°.		
		Um	iPn	16 43 32.8	C
			iS*	16 44 31.3	
			iSg	16 44 43.6	
			D = 470 km = 4.2°.		
		West coast of Norway, 67.4°N, 14.9°E.			
		Origin time = 16 42 26.			
"	5	Sk	eP	18 12 52	
"	5	Sk	eP	18 27 28	
"	6	Up	iP	01 11 36.9	
		Ki	iP	01 11 22.6	C
		Sk	iP	01 11 48.9	
		Sikang Province, China (h = 30 km).			
"	6	Um	iP	01 48 56.8	
"	6	Up	iPKP	05 40 54.0	
			i	05 40 58.6	
		Ki	ePKP	05 40 28	
		Sk	iPKP	05 40 43.3	
		Um	iPKP	05 40 37.7	C
		Kermadec Islands (h = 30 km).			
"	6	Ki	iP	10 31 33.6	D
"	6	Up	i(Sg)	12 11 48.8	
		Ka	e(Sg)	12 11 02	
		Probable origin not far from the following two events. Explosion?			

1963 July	6	Up	i	12 15 43.2	
			i(Sg)	12 16 00.1	
		Ka	i	12 15 04.4	
			i(Sg)	12 15 11.6	
		Origin in the same area as for the following event. Explosion?			
"	6	Up	i	12 16 49.1	
			eSg	12 17 14	
		Sk	eSg	12 19 32	
			i	12 19 44.4	
		Gb	eSg	12 17 04	
		Um	e(Sg)	12 19 17	
		Ka	i	12 15 46.3	
			iSg	12 15 56.8	
		Near Öland, Sweden.			
		Origin time = 12 15 31.			
		Explosion?			
"	6	Up	iP	13 41 57.6	
		Ki	iP	13 42 17.8	
		Sk	iP	13 42 19.2	
		Iran (h = 80 km).			
"	6	Ki	iP	22 33 07.9	D
		Sk	eP	22 33 41	
		Um	iP	22 33 24.7	
		Japan (h = 30 km).			
"	6	Up	iP	22 44 33.5	D
		Sk	iP	22 44 57.5	
		Um	iP	22 44 49.9	
		Mozambique (h = 30 km).			
"	7	Um	iP	00 15 58.9	
		Indian Ocean (h = 30 km).			
"	7	Ki	iP	04 34 07.5	
"	7	Ki	iSn	05 18 13.7	
			iSg	05 18 33.5	
			D = 490 km = 4.5°.		
		Um	eSn	05 18 56	
			i	05 19 07.2	
			iSg	05 19 30.7	
			D = 680 km = 6.2°.		
		Northwest Russia, 67½°N, 32°E.			
		Origin time = 05 16 09.			
		Explosion?			
"	7	Um	iP	06 29 09.4	
"	7	Ki	iP	09 40 31.9	C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	7	Um	iP	09 40 56.2	
		Kamchatka (h = 30 km).			
"	7	Up	iP	10 30 17.6	C
		Ki	iP	10 29 48.6	
		Mariana Islands (h = 140 km).			
"	7	Ki	iP	11 04 55.6	D
		Mindanao (h = 30 km).			
"	7	Up	iP	19 32 08.5	
		Ki	iP	19 31 34.2	
		Sk	iP	19 31 41.2	
		Um	iP	19 31 52.3	
		Utah, U.S.A. (h = 30 km).			
"	7	Up	iP	21 14 35.2	
		Ki	iP	21 14 25.1	
		Sk	iP	21 14 49.3	
		Um	iP	21 14 25.1	
"	8	Up	iP	03 13 42.8	
			i	03 14 23.0	
"	8	Ki	i(P)	08 14 46.4	
"	8	Up	iP	09 05 54.9	
		Ki	iP	09 06 29.0	
		Sk	iP	09 06 27.9	
		Um	iP	09 06 07.2	
		Iran (h = 30 km).			
"	8	Sk	iP	09 10 01.8	
"	8	Ki	iP	09 47 24.0	
"	8	Up	iP	11 15 49.3	
			i	11 15 58.5	
			eS	11 24 34	
				microns sec	
			M	E 0.4 20	
			M	N 1.1 19	
			M	Z 0.9 18	
			D = 7300 km = 65½°.		
		Ki	iP	11 16 32.2	
			eS	11 26 00	
				microns sec	
			M	E 0.8 17	
			M	N 0.2 14	
			M	Z 0.7 20	
			D = 8050 km = 72½°.		
		Sk	iP	11 15 58.6	
		Um	iP	11 16 14.0	
			iS	11 25 22	
		Mid-Atlantic Ocean (h = 30 km).			
		Magn. = 5.3 (Up,Ki).			

1963 July	8	Um	e(P)	12 08 22	
			i(P)	12 11 41.7	
"	8	Ki	iP	14 22 01.5	
		Sk	iP	14 22 28.0	
		Kodiak Island (h = 30 km).			
"	8	Ki	eP	15 24 22	
"	8	Up	iP	16 07 40.8	
			eS	16 11 58	
				microns sec	
			M	E 0.4 13	
			M	N 1.4 14	
			M	Z 1.9 15	
			D = 2650 km = 24°.		
		Ki	iP	16 08 47.5	
				microns sec	
			M	E 0.6 14	
			M	N 0.3 13	
			M	Z 0.5 13	
		Sk	eP	16 08 21	
		Gb	iP	16 07 35.9	
		Um	iP	16 08 13.8	
			e(S)	16 13 09	
		Ka	e(P)	16 07 11	
		Turkey (h = 30 km).			
"	8	Ki	iP	17 57 58.0	
			eS	18 04 46	
				microns sec	
			P	Z' 0.1 1.2	
			S	E 0.4 7	
			M	E 0.5 20	
			M	N 0.4 22	
			M	Z 0.7 20	
			D = 5150 km = 46½°.		
		Sk	iP	17 58 28.3	
		Um	iP	17 58 28.7	C
			iS	18 05 43	
		Alaska (h = 30 km).			
		Magn. = 5.7 (Ki).			
"	9	Ki	eP	00 52 07	
"	9	Up	iP	03 15 34.8	
			ipP	03 15 46.5	
				microns sec	
			P	Z' 0.2 1.4	
			M	E 0.3 17	
			M	N 0.7 18	
			M	Z 0.8 17	
		Ki	iP	03 14 47.0	C
			ipP	03 14 58.1	
			eS	03 23 05	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	9	Ki		microns	sec	
			P	Z 0.4	5	
			P	Z' 0.2	1.5	
			M	E 0.6	15	
			M	N 0.7	17	
			M	Z 1.3	16	
			D = 6700 km = 60½°.			
		Sk	iP	03 15 22.2		
		Gb	iP	03 15 47.0		
			ipP	03 15 56.9		
		Um	iP	03 15 09.5	C	
			ipP	03 15 20.5		
			iS	03 23 45		
		Kurile Islands. h = 40 km (Up,Ki,Gb,Um). Magn. = 6.0 (Up,Ki).				
"	9	Up	iP	04 33 37.5		
		Ki	iP	04 33 24.7	C	
		Sk	iP	04 33 18.4		
		Um	iP	04 33 33.9		
		Mexico - Guatemala (h = 30 km).				
"	9	Ki	iP	06 29 53.8		
		Um	iP	06 29 57.1		
		Celebes (h = 140 km).				
"	9	Ki	eP	07 00 19		
"	9	Up	iP	09 37 20.8		
			eS	09 47 59		
				microns	sec	
			S	E 0.7	8	
			S	N 0.7	8	
			M	E 2.3	20	
			M	N 1.5	19	
			M	Z 3.0	19	
			D = 9800 km = 88°.			
		Ki	iP	09 37 17.4		
			ePP	09 40 44		
			eS	09 47 45		
				microns	sec	
			P	Z 0.5	5	
			P	Z' 0.2	1.7	
			PP	Z 0.5	9	
			S	E 1.5	9	
			S	N 0.4	9	
			M	E 2.4	18	
			M	N 2.1	18	
			M	Z 5.0	18	
			D = 9650 km = 87°.			
		Sk	iP	09 37 05.2	D	
		Um	iP	09 37 22.0	D	
			eS	09 47 49		
		Costa Rica - Panama (h = 30 km). Magn. = 6.1 (Up,Ki).				
1963 July	9	Ki	i	11 56 25.0		
			i(Sg)	11 56 41.9		
"	9	Up	iP	17 46 20.3		
				microns	sec	
			M	E 0.7	18	
			M	N 0.5	17	
			M	Z 1.1	18	
		Ki	iP	17 45 55.8		
				microns	sec	
			M	E 0.4	17	
			M	N 0.1	13	
			M	Z 0.5	14	
		Sk	eP	17 46 29		
		Gb	iP	17 46 40.2		
		Um	iP	17 46 05.0		
		Formosa (h = 30 km).				
"	10	Up	iP	02 19 43.9		
			ipP	02 20 07.7		
		Ki	iP	02 19 50.0		
			ipP	02 20 24.0		
				microns	sec	
			M	N 0.3	9	
		Sk	epP	02 20 29		
		Um	iP	02 19 40.1		
			ipP	02 20 03.9		
		Ka	ipP	02 20 24.9		
		Hindu Kush. h = 130 km (Up,Ki,Um).				
"	10	Up	iP	03 25 39.3	C	
				microns	sec	
			P	Z' 0.1	0.8	
			M	E 0.7	15	
			M	N 1.1	18	
			M	Z 1.1	18	
		Ki	iP	03 24 50.9		
			eS	03 33 06		
				microns	sec	
			P	Z 0.5	6	
			P	Z' 0.1	0.9	
			S	N 0.3	9	
			M	E 1.9	16	
			M	N 1.4	16	
			M	Z 3.4	17	
			D = 6700 km = 60½°.			
		Sk	iP	03 25 26.4		
		Gb	iP	03 25 59.4		
		Um	iP	03 25 13.0	C	
			iS	03 33 48		
		Ka	eP	03 25 57		
			i	03 25 59.9		
		Kurile Islands (h = 30 km). Magn. = 5.7 (Up,Ki).				
"	10	Up	iPKP	04 49 07.7		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	10	Up	i	04 49 14.2	
		Sk	iPKP	04 49 00.0	
		Um	iPKP	04 48 54.9	
		Kermadec Islands (h = 30 km).			
"	10	Ki	ePn	04 55 17	
			iSn	04 56 11.6	
			iSg	04 56 29.2	
			D = 520 km = 4.7°.		
		Sk	eSg	04 58 58	
		Um	iSn	04 56 56.0	
			iSg	04 57 35.0	
			D = 730 km = 6.6°.		
		Northwest Russia, 67.8°N, 32.6°E. Origin time = 04 53 59. Explosion?			
"	10	Up	iP	05 33 53.8	
			iS	05 42 54	
				microns	sec
			P	N 0.7	2
			P	Z 1.4	2
			P	Z' 2.3	1.5
			S	E 1.3	12
			S	N 1.4	10
			M	E 8.0	17
			M	N 11	18
			M	Z 7.3	19
			D = 7550 km = 68°.		
		Ki	iP	05 33 05.9	
			i	05 34 07.3	
			iPa	05 36 50	
			eS	05 41 23	
				microns	sec
			P	E 0.9	6
			P	N 0.9	7
			P	Z 2.6	7
			P	Z' 0.7	1.3
			S	E 2.6	11
			S	N 1.6	10
			M	E 16	17
			M	N 15	17
			M	Z 39	18
			D = 6700 km = 60½°.		
		Sk	iP	05 33 42.8 C	
			i	05 33 44.6	
		Gb	iP	05 34 15.5	
		Um	iP	05 33 27.5 C	
			ePa	05 37 25	
			eS	05 42 00	
		Ka	iP	05 34 21.2 C	
		Kurile Islands (h = 30 km). Magn. = 6.6 (Up,Ki).			

1963 July	10	Up	iP	07 24 09.8	
				microns	sec
			M	E 0.9	16
			M	N 0.9	11
			M	Z 1.0	16
		Sk	iP	07 24 52.4	
		Um	iP	07 24 48.1	
		Aegean Sea (h = 130 km).			
"	10	Up	iP	10 00 05.5	
		Ki	iP	10 00 28.5	
			i	10 00 35.6	
				microns	sec
			P	Z' 0.2	1.0
			M	E 1.1	20
		Sk	iP	09 59 59.5	
		Um	iP	10 00 20.8	
		Ka	iP	09 59 53.2	
		North Atlantic Ocean (h = 40 km).			
"	10	Up	iP	10 05 03.8 C	
		Um	iP	10 04 36.9	
"	10	Ki	eP	14 04 36	
		Um	iP	14 04 54.3	
		Kurile Islands (h = 30 km).			
"	10	Gb	iPg	15 11 39.4 C	
			iSg	15 11 41.5	
		Probably local explosion.			
"	10	Gb	iPg	15 36 09.7	
			iSg	15 36 11.0	
		Probably local explosion.			
"	10	Up	iP	16 08 00.9	
"	10	Up	iPKP	17 08 25.3	
			i	17 08 32.3	
			i	17 08 41.6	
		Sk	iPKP	17 08 17.8	
		Gb	iPKP	17 08 32.4	
		Um	iPKP	17 08 12.6	
		Kermadec Islands (h = 25 km).			
"	10	Ki	iP	17 35 49.0 C	
				microns	sec
			P	Z' 0.1	1.2
"	10	Up	iP	20 05 01.5 D	
			i	20 05 07.9	
			iPP	20 08 38.5	
				microns	sec
			P	Z' 0.3	0.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	10	Ki	iP	20 04 33.6 D	
				microns	sec
			P	Z' 0.5	1.1
		Sk	iP	20 04 58.6 D	
		Gb	iP	20 05 18.1	
		Um	iP	20 04 44.9 D	
		Ka	iP	20 05 17.7	
		Mariana Islands (h = 170 km).			
		Magn. = 6.5 (Up,Ki).			
"	10	Ki	e(P)	21 16 46	
"	11	Up	iP	00 51 14.1	
"	11	Ka	e	05 05 34	
			i(Sg)	05 06 11.5	
"	11	Ka	e	05 19 56	
			i(Sg)	05 20 17.9	
"	11	Um	iP	05 20 06.6	
"	11	Ka	i(P)	05 45 05.0	
			i	05 45 30.8	
"	11	Ka	e	05 50 14	
			i(Sg)	05 51 02.6	
"	11	Ka	e(P)	05 58 50	
			e	05 59 47	
			i(Sg)	06 00 20.8	
"	11	Ka	e	06 02 47	
			i(Sg)	06 03 19.6	
"	11	Ka	e	06 15 39	
			i(Sg)	06 16 12.0	
		The series of events recorded at Karlskrona since July 11 at 05 05, are probably explosions.			
"	11	Up	eSg	13 26 14	
		Ki	eS*	13 26 34	
			iSg	13 26 52.1	
		Sk	eSg	13 27 24	
		Um	iSg	13 25 34.1	
		Lake Ladoga, $61\frac{1}{2}^{o}$N, 31^{o}E.			
		Origin time = 13 22 33.			
		Explosion?			
"	11	Up	i	18 11 53.4	
			i	18 12 28.2	
		Sk	iPKP	18 07 53.7 D	
		Santa Cruz Islands (h = 140 km).			

1963 July	12	Ki	eSn	05 05 05	
			eSg	05 05 24	
		Probably northwest Russia. Explosion?			
"	12	Ki	iP	05 51 15.5	
		Sk	eP	05 51 30	
		Java (h = 130 km).			
"	12	Gb	i(P)	06 38 23.1	
"	12	Ki	iPP	08 15 30.9	
		Fiji Islands (h = 550 km).			
"	12	Gb	iPg	12 30 12.9	
			iSg	12 30 14.9	
		Probably local explosion.			
"	12	Ki	iP	14 13 35.6	
			i	14 13 42.1	
		Sk	eP	14 13 59	
		Vancouver Island (h = 30 km).			
"	12	Up	iP	15 39 03.6	C
			i	15 39 15.9	
			i	15 39 59.5	
			eS	15 48 01	
			microns	sec	
			P	Z' 0.2	1.0
			S	N 0.3	5
			M	E 0.9	16
			M	N 2.2	16
			M	Z 1.6	17
			D = 7500 km = $67\frac{1}{2}^{o}$.		
		Ki	iP	15 38 15.6	C
			iS	15 46 32	
			microns	sec	
			P	E 0.3	5
			P	N 0.3	6
			P	Z 0.9	5
			P	Z' 0.2	1.2
			S	E 0.5	10
			S	N 0.5	8
			M	E 2.5	22
			M	N 2.3	18
			M	Z 3.7	17
			D = 6650 km = 60^{o}.		
		Sk	iP	15 38 51.4	C
		Gb	iP	15 39 25.0	
		Um	iP	15 38 36.3	C
			i	15 38 37.6	
			ePa	15 42 43	
			iS	15 47 12	
		Ka	iP	15 39 25.4	
		Kurile Islands (h = 30 km).			
		Magn. = 5.9 (Up,Ki).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July	12	Up	iP		20 44 28.4	
			i		20 44 46.7	
			i		20 45 19.3	
"	12-13	Up			---	
				microns	sec	
			M	E	0.7	15
			M	N	0.8	13
			M	Z	1.3	16
		Ki	eS		00 02 14	
				microns	sec	
			M	E	1.4	16
			M	N	0.6	15
			M	Z	2.0	17
		Um	iP		23 53 32.3	
			eS		00 02 41	
		Japan (h = 70 km).				
"	13	Gb	iP		01 03 20.1	
"	13	Up	iP		07 43 42.5	
				microns	sec	
			P	Z'	0.1	0.6
		Sk	iP		07 44 26.1	
		Gb	iP		07 43 29.2	
		Um	eP		07 44 29	
		Ka	eP		07 43 04	
		Greece.				
"	13	Up	iP		08 31 35.9	C
			i		08 33 56.6	
				microns	sec	
			P	Z'	0.1	1.2
		Ki	iP		08 32 15.7	
			iPP		08 33 55.2	
		Sk	iP		08 32 11.6	C
		Gb	eP		08 31 47	
		Ka	iP		08 31 25.0	C
		Iran (h = 40 km).				
"	13	Ki	iP		13 46 03.1	
"	13	Up	iP		14 09 27.6	
				microns	sec	
			P	Z'	0.1	0.5
		Ki	iP		14 08 42.8	C
		Sk	iP		14 09 17.1	C
		Gb	iP		14 09 48.9	
		Um	iP		14 09 02.7	
		Ka	iP		14 09 49.7	
		Kurile Islands (h = 30 km).				
"	13	Up	iP		14 18 11.5	
			iS		14 27 55	
				microns	sec	
			M	E	1.7	18
1963 July cont.	13	Up		microns	sec	
			M	N	2.2	18
			M	Z	2.7	17
			D = 8500 km = 76½°.			
		Ki	iP		14 17 46.7	C
				microns	sec	
			P	Z'	0.1	1.0
			M	E	1.3	15
			M	N	0.9	15
			M	Z	1.9	15
		Sk	eP		14 18 14	
			i		14 18 49.8	
		Gb	iP		14 18 30.8	C
		Um	iP		14 17 56	C
		Formosa (h = 30 km).				
"	13	Up	iP		19 17 38.0	
		Ki	eP		19 17 50	
		Gb	eP		19 17 49	
		West Pakistan (h = 30 km).				
"	13	Sk	ePg		23 33 45	
			eSn		23 34 15	
			iSg		23 34 34.2	
			D = 440 km = 4.0°.			
		Probably west coast of Norway.				
		Origin time = 23 32 23.				
"	14	Up	iPKP		00 22 06.1	
			eSS		00 44 53	
				microns	sec	
			PKP	Z'	0.1	1.0
			M	E	0.5	18
			M	N	1.0	20
			M	Z	0.9	19
		Ki	iPKP		00 21 53.3	
			ePKS		00 25 31	
			iSS		00 43 21	
				microns	sec	
			M	E	0.9	20
			M	N	1.0	20
			M	Z	2.1	20
		Sk	iPKP		00 21 59.5	
			iPKP2		00 22 22.4	
		Gb	iPKP		00 22 13.7	
		Um	iPKP		00 21 54.2	
			ePP		00 25 13	
			iSS		00 44 03	
		Ka	iPKP		00 22 15.1	
			i		00 22 27.4	
		Kermadec Islands (h = 30 km).				
		Magn. = 5.8 (Up,Ki).				
		SS is a very pronounced phase in several shocks from this region.				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont. 14 SS at Up, Ki and Um has an average residual O-C = -16 sec.

" 14 Up iP 01 42 06.8
Um iP 01 41 44.3
Kurile Islands (h = 30 km).

" 14 Up ePKP 04 18 54
iPKP2 04 19 07.9
microns sec
PKP2 Z' 0.1 1.0
Sk iPKP 04 18 50.1 C
Gb ePKP 04 18 56
iPKP2 04 19 08.7
Um iPKP 04 18 41.9
Ka iPKP 04 19 10.9
iPKP2 04 19 27.2
Kermadec Islands (h = 50 km).

" 14 Up iP 05 49 46.1
Um iP 05 49 21.2
Kurile Islands (h = 30 km).

" 14 Up iP 05 53 30.6 D
iS 06 03 11
microns sec
P Z 1.1 7
P Z' 0.1 0.7
S E 0.7 7
S N 2.4 5
M E 1.7 18
M N 1.6 20
M Z 2.0 21
D = 8500 km = $76\frac{1}{2}^{o}$.
Ki iP 05 53 38.7 D
microns sec
P E 0.6 8
P Z 1.2 7
P Z' 0.2 1.4
M E 2.9 20
M N 1.3 18
M Z 2.5 19
Sk iP 05 53 18.7 D
Gb iP 05 53 12.7 D
Um iP 05 53 38.4 D
iS 06 03 23
Ka iP 05 53 23.6
Venezuela (h = 25 km).
Magn. = 6.3 (Up,Ki).

" 14 Up iP 06 51 55.7
Sk eP 06 51 42
Venezuela (h = 40 km).

" 14 Up iP 07 53 35.0

1963 July cont. 14 Sk eP 07 54 11
Persian Gulf (h = 30 km).

" 14 Up iP 10 59 15.5
microns sec
P Z' 0.1 0.5
Ki iP 10 59 25.5 C
ipP 10 59 53.6
iPP 11 01 10.0
microns sec
PP Z' 0.1 1.5
Sk iP 10 59 41.6 C
iPP 11 01 22.8
Gb iP 10 59 36.7
Um iP 10 59 14.5 C
i 10 59 16.3
Ka iP 10 59 18.7
Hindu Kush. h = 140 km (Ki).

" 14 Up ePKP 14 48 02
i 14 48 24.2
Sk iPKP 14 47 57.5 D
i 14 48 07.9
Gb ePKP 14 48 11
i 14 48 21.4
Um iPKP 14 47 52.2 D
Kermadec Islands (h = 40 km).

" 14 Up iPKP 17 26 19.2
i 17 26 33.0
iPP 17 30 06.5
Ki iPKP 17 26 00.7 C
i 17 27 30.8
microns sec
PKP Z' 0.1 1.0
Sk iPKP 17 26 13.4 C
i 17 26 28.5
i(pPKP) 17 27 11.4
Gb iPKP 17 26 36.1 C
i 17 26 38.8
i 17 26 49.2
Um iPKP 17 26 07.9 C
i 17 26 18.0
i 17 26 47.2
New Zealand (h = 190 km).

" 14 Sk iP 17 33 40.2 C

" 15 Up i(PKP) 01 24 04.2 C
Sk i(PKP) 01 23 58.3
Um i(PKP) 01 23 52.7 C

" 15 Ki iP 05 32 52.9
Um eP 05 32 58
Halmahera (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July	15	Ki	eP	06 38 25	
		Aleutian Islands (h = 30 km).			
"	15	Up	iP	08 51 19.0	C
			microns	sec	
			P Z' 0.1	1.0	
		Ki	iP	08 50 24.5	C
			microns	sec	
			P Z' 0.1	1.0	
		Sk	iP	08 51 01.8	
			i	08 51 30.9	
		Gb	iP	08 51 40.0	C
			i	08 52 03.8	
		Um	iP	08 50 50.7	C
		Ka	iP	08 51 44.0	C
		Kamchatka (h = 60 km).			
"	15	Up	iP	17 07 40.9	
"	16	Up	i(P)	16 47 21.6	
"	16	Up	iP	18 32 11.5	C
			iS	18 36 13	
			microns	sec	
			P E 19	7	
			P N 19	7	
			P Z 29	7	
			P Z' 0.7	0.5	
			S E 34	8	
			S N 30	7	
			S Z' 2.8	1.7	
			M E 120	15	
			M N 160	16	
			M Z 200	16	
			D = 2450 km = 22°.		
		Ki	iP	18 32 59.4	C
			iPP	18 33 42	
			iS	18 37 33	
			iSn	18 38 00	
			microns	sec	
			P E 2.7	9	
			P N 2.8	8	
			P Z 7.1	8	
			P Z' 2.8	1.6	
			PP E 3.7	8	
			S E 88	10	
			S N 27	11	
			M E 120	14	
			M N 100	13	
			M Z 180	13	
			D = 3000 km = 27°.		
		Sk	iP	18 32 52.7	C
			iLgl	18 40 55.3	
		Gb	iP	18 32 26.4	
			iS	18 36 47.0	
		Um	iP	18 32 30.8	C
			iS	18 36 35	

1963 July cont.	16	Ka	iP	18 32 02.0	C
			iS	18 35 56.8	
		Georgia, U.S.S.R. (h = 30 km). Magn. = 6.8 (Up,Ki). An outstanding case of higher mode surface waves recorded at the Swedish stations. The existence of Sn to such large distance (or of short-period Sa) is noteworthy; compare remark to Jan. 27, 1963, 19 40.			
"	16	Up	iPKP	19 28 11.8	
			i	19 28 16.8	
			iPKP2	19 28 31.2	
			microns	sec	
			PKP2 Z' 0.1	0.7	
		Ki	ePKP	19 27 49	
			i	19 28 07.8	
		Sk	iPKP	19 28 04.5	
		Gb	iPKP	19 28 19.3	
		Um	iPKP	19 27 55.2	
		Ka	iPKP	19 28 23.5	
			i	19 28 36.3	
		Kermadec Islands (h = 40 km).			
"	16	Up	iP	22 16 18.0	C
			iPP	22 16 38.5	
			iS	22 20 24.0	
			microns	sec	
			PP Z' 0.1	0.5	
			D = 2450 km = 22°.		
		Ki	iP	22 17 06.0	
			eLgl	22 25 28	
			microns	sec	
			P Z' 0.1	1.2	
			M E 0.3	10	
			M N 0.2	10	
			M Z 0.4	10	
		Sk	eP	22 17 07	
		Gb	eP	22 16 41	
		Um	iP	22 16 37.3	
		Ka	iP	22 16 07.6	
		Georgia, U.S.S.R. (h = 20 km).			
"	17	Up	iP	00 08 47.0	
"	17	Ki	iP	07 15 18.8	C
		Java (h = 40 km).			
"	17	Up	iP	12 02 00.4	C
			iS	12 06 00.8	
			i	12 06 02.7	
			iLg2	12 09 07	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	17	Up			microns	sec
			P	N	0.3	3
			P	Z'	0.2	1.0
			S	E	0.5	5
			S	N	1.1	7
			M	E	1.8	16
			M	N	3.0	15
			M	Z	3.3	15
			D = 2450 km = 22°.			
		Ki	iP		12 02 47.9	C
			eS		12 07 29	
			eSn		12 07 42	
			iLgl		12 11 06	
					microns	sec
			P	Z'	0.2	1.0
			S	N	0.3	10
			M	E	2.2	16
			M	N	1.5	15
			M	Z	2.4	14
			D = 3000 km = 27°.			
		Sk	iP		12 02 50.5	C
			i		12 09 18.7	
			iLgl		12 11 17.4	
		Gb	iP		12 02 15.8	
			i		12 02 22.3	
		Um	iP		12 02 19.5	C
			eS		12 06 37	
			iLgl		12 09 45	
		Ka	iP		12 01 49.3	
		Georgia, U.S.S.R.				
		(h = 30 km).				
		Magn. = 5.6 (Up,Ki).				
"	17	Up	iP		14 20 27.8	
		Ki	iP		14 19 38.3	
		Um	iP		14 20 01.3	
		Sea of Okhotsk (h = 370 km).				
"	17	Up	iP		21 02 54.0	C
		Ki	iP		21 02 34.3	
		Um	iP		21 02 42.8	
"	17	Ki	iP		22 58 34.5	
"	18	Up	e(P)		04 04 55	
			i		04 05 20.6	
"	18	Up	ePKP		05 17 02	
			i		05 17 15.8	
					microns	sec
			M	E	0.7	18
			M	N	0.9	17
			M	Z	0.8	16
		Ki	iPKP		05 17 18.1	
			iPKS		05 20 46	
			e(SS)		05 37 08	

1963 July cont.	18	Ki			microns	sec
			PKS	N	0.3	6
			M	E	0.8	17
			M	N	0.7	17
			M	Z	1.0	17
		Sk	iPKP		05 17 07.3	
			i		05 17 12.1	
		Um	iPKP		05 17 10.9	C
			e		05 20 25	
			e		05 27 38	
			e(SS)		05 36 19	
		Sandwich Islands				
		(h = 30 km).				
"	19	Up	iP		05 49 31.1	C
			iS		05 52 52	
			iSS		05 53 06.8	
					microns	sec
			P	N	1.0	5
			P	Z	0.6	4
			P	Z'	0.2	0.5
			D = 1950 km = 17½°.			
		Ki	iP		05 50 51.9	C
					microns	sec
			P	E	0.3	6
			P	N	0.6	6
			P	Z	1.2	5
			P	Z'	1.4	1.4
		Sk	iP		05 50 03.1	C
			i		05 50 05.1	
		Gb	eP		05 48 53	
		Um	iP		05 50 15.3	C
			iS		05 54 12	
		Ka	iP		05 48 41.1	C
		Ligurian Sea (h = 30 km).				
		Magn. = 5.7 (Up,Ki).				
"	19	Up	iP		05 50 08.7	
			iS		05 53 24	
			iSS		05 53 41.5	
					microns	sec
			P	E	0.8	4
			P	N	2.5	5
			P	Z	3.2	4
			P	Z'	0.4	0.5
			S	E	3.9	8
			M	E	30	13
			M	N	43	11
			M	Z	38	10
			D = 1950 km = 17½°.			
		Ki	iP		05 51 29.4	C
			iS		05 55 50	
			iLg2		05 59 46	
					microns	sec
			P	E	0.9	6
			P	N	1.7	6

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July 19 cont.

Ki
microns sec
P Z 2.6 5
P Z' 2.4 1.5
S E 5.7 8
M E 27 12
M N 19 10
M Z 25 10
D = 2800 km = 25°.
Sk iP 05 50 39.9 C
Gb eP 05 49 35
Um iP 05 50 51.3
iS 05 54 49
Ka iP 05 49 25.9
Ligurian Sea (h = 30 km).
Magn. = 6.0 (Up,Ki).

" 19 Ki iP 06 37 14.1
Sk eP 06 36 26
Um iP 06 36 35.4
(Ligurian Sea).

" 19 Ki iP 07 07 04.0
Sk iP 07 06 16.1
Um iP 07 06 24.9
France - Italy (h = 30 km).

" 19 Ki iP 07 09 58.5
Sk iP 07 09 11.3
Um iP 07 09 19.0
(Ligurian Sea).

" 19 Ki e(Sn) 07 55 13
iSg 07 55 33.4

" 19 Up iP 09 12 11.6 C
iS 09 21 39
microns sec
P Z' 0.1 0.7
M E 0.7 18
M N 1.2 20
M Z 1.0 16
D = 8100 km = 73°.
Ki iP 09 11 32.7 C
microns sec
P Z' 0.1 1.0
M E 1.8 18
M N 0.7 17
M Z 2.0 17
Sk iP 09 12 05.8 C
Gb iP 09 12 32.1 C
Um iP 09 11 50.2 C
Ka iP 09 12 33.2 C
Japan (h = 70 km).
Magn. = 5.9 (Up,Ki).

" 19 Um iP 10 13 19.7

1963 July 19 Up i(P) 15 12 56.1

" 19 Up e(P) 19 24 57

" 20 Up iP 00 20 52.1
microns sec
P Z' 0.1 0.8
Ki iP 00 19 55.7
microns sec
P Z' 0.1 1.0
Sk iP 00 20 22.1
Um iP 00 20 24.4
eS 00 27 33
Yukon (h = 30 km).
Magn. = 5.8 (Up,Ki).

" 20 Up iP 00 56 46.8
iPP 00 57 07.8
iS 01 00 46
iLg2 01 03 58
microns sec
P Z' 0.1 1.5
M E 0.3 15
M N 0.6 15
M Z 0.7 15
D = 2450 km = 22°.
Ki iP 00 57 34.9
eS 01 02 19
iLg1 01 06 06
microns sec
P Z' 0.1 1.3
M E 0.6 15
M N 0.4 13
M Z 0.9 14
D = 3000 km = 27°.
Sk eP 00 57 42
Gb eP 00 57 04
Um iP 00 57 06.3
eS 01 01 21
e(Sn) 01 02 14
Ka iP 00 56 36.9
iLg1 01 02 38
Georgia, U.S.S.R.
(h = 30 km).
Magn. = 5.3 (Up,Ki).

" 20 Up iP 02 24 27.9
ipP 02 24 54.0
Ki iP 02 23 40.1
Um iP 02 24 02.4 C
Kurile Islands. h = 110 km
(Up).

" 20 Up ePKP 06 56 13
i 06 56 35.1
eX 06 58 14

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont. 20 Up e 07 03 36
microns sec
PKP Z' 0.2 1.8
M E 3.1 18
M N 3.9 21
M Z 5.8 20
(D = 17800 km = 160°).
Ki ePKP 06 56 08
i 06 56 19.3
eX 06 58 10
i 06 58 56
ePP 07 00 15
microns sec
PKP Z' 0.4 2.4
M E 7.2 22
M N 3.9 20
M Z 6.9 21
(D = 17650 km = 159°).
Sk ePKP 06 56 44
Um ePKP 06 56 04
i 06 56 29.5
iX 06 58 12
Ka iPKP 06 56 19.5
Macquarie Island
(h = 30 km).
Magn. = 6.4 (Up,Ki).
The phase denoted X above occurring in the average 2 min 4 sec after PKP has no explanation. It could be PKP of another shock in the same area, but remarkably enough, it is recorded only by long-period instruments (E and Z components), unlike PKP.

" 20 Up iP 07 50 29.8 C
Ki iP 07 49 53.5
Sk eP 07 50 26
Um iP 07 50 09.3
Japan (h = 120 km).

" 20 Up iP 15 11 07.0
i 15 13 16.3
iS 15 13 49.1
microns sec
S Z' 0.1 0.6
D = 1500 km = 13½°.
Ki iP 15 10 10.1
i 15 10 19.0
iS 15 11 51.5
i 15 12 06.6
microns sec
P Z' 0.3 0.8
S Z' 0.4 1.0
M E 0.5 12

1963 July cont. 20 Ki
microns sec
M N 0.5 12
M Z 0.4 12
D = 1000 km = 9°.
Sk iP 15 10 00.0
iS 15 11 30.7
Um iP 15 10 32.3
iS 15 12 30.6
i 15 12 55.7
Jan Mayen (h = 50 km).

" 20 Up iP 18 27 16.4
i 18 27 39.1

" 21 Up iP 06 11 14.3 C
Ki iP 06 11 46.2 C
Um iP 06 11 37.1
eS 06 19 23
Arabian Sea (h = 30 km).

" 21 Up eP 09 10 39
microns sec
P Z' 0.1 1.0

" 21 Up iP 11 12 29.9
microns sec
P Z' 0.1 1.3
Ki iP 11 13 54.8
microns sec
M E 0.6 15
Sk iP 11 13 06.6
Um iP 11 13 14.3
Italy.

" 21 Ki iP 12 55 52.9
Japan (h = 30 km).

" 21 Up iP 12 58 44.8 C
microns sec
P Z' 0.1 1.1

" 21 Up iP 14 57 56.5 C
Ki eP 14 57 40
Negros, Philippine Islands
(h = 50 km).

" 22 Up ---
microns sec
M E 1.1 19
M N 1.6 20
M Z 1.9 20
Ki ---
microns sec
M E 2.0 23
M N 1.8 23
M Z 3.8 23

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	22	Um	iPP	00 48 40	
		New Britain (h = 60 km).			
"	22	Ki	iP	05 05 46.3	
"	22	Up	iP	14 29 07.4	D
		Ki	eP	14 29 15	
"	22	Um	iP	16 17 36.0	D
"	22	Gb	e(P)	18 12 33	
"	23	Um	iP	03 32 10.7	C
		Sakhalin (h = 30 km).			
"	23	Ki	e	05 44 24	
			iSg	05 44 37.8	
		Um	i	05 45 25.1	
			iSg	05 45 48.9	
		Possibly northwest Russia. Explosion?			
"	23	Up	iP	06 28 49.9	
			ipP	06 29 08.3	
		Ki	iP	06 28 07.5	
		Sk	eP	06 28 43	
		Gb	iP	06 29 11.4	C
		Um	iP	06 28 25.7	
		Ka	iP	06 29 10.9	C
		Japan. h = 70 km (Up).			
"	23	Up	iPg	11 44 19.1	
			iSg	11 44 22.0	
		Seismic?			
"	23	Up	iP	12 52 01.6	
		Ki	iP	12 51 16.7	
		Um	iP	12 51 36.9	
		Kurile Islands (h = 30 km).			
"	23	Um	iP	13 04 47.5	D
"	23	Up	iP	22 02 20.6	
		Ki	iP	22 01 26.9	
		Gb	eP	22 02 36	
		Um	iP	22 01 53.5	C
		Aleutian Islands (h = 80 km).			
"	24	Ka	iPKP	05 41 25.8	
		Fiji Islands (h = 530 km).			
"	24	Up	iP	06 21 12.3	
		Ki	iP	06 21 27.7	C
		Um	iP	06 21 20.2	C

1963 July	24	Um	iP	06 25 29.1	
"	24	Up	iP	07 04 10.9	C
		Sk	eP	07 04 00	
		Um	iP	07 03 53.0	
"	24	Up	iP	09 01 35.3	
		Um	iP	09 01 15.6	C
		Japan (h = 300 km).			
"	24	Up	iP	11 44 02.3	C
			iS	11 53 41	
				microns	sec
			P	Z' 0.3	1.1
			M	E 8.5	18
			M	N 12	21
			M	Z 12	17
			D = 8450 km = 76°.		
		Ki	iP	11 43 38.0	C
				microns	sec
			P	Z' 0.3	1.5
			M	E 7.7	17
			M	N 6.4	20
			M	Z 4.9	13
		Sk	iP	11 44 06.1	
		Gb	iP	11 44 22.5	
		Um	iP	11 43 46.6	C
			iS	11 53 12	
		Ka	eP	11 44 18	
		Formosa (h = 30 km). Magn. = 6.3 (Up,Ki).			
"	24	Um	iP	12 01 32.3	
		Japan (h = 30 km).			
"	25	Ki	eS*	02 09 55	
			iSg	02 10 11.6	
		Sk	eSg	02 13 03	
		Um	iSg	02 11 40.6	
		Probably Arctic Ocean, off north coast of Kola Peninsula.			
"	25	Up	eP	03 44 16	
		Ki	iP	03 45 41.6	
		Sk	iP	03 44 54.5	C
			i	03 44 57.5	
		Um	eP	03 45 00	
"	25	Up	iP	07 16 38.5	
		Ki	iP	07 16 41.7	
				microns	sec
			P	Z' 0.2	1.2
		Sk	iP	07 16 25.4	
		Um	iP	07 16 43.2	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont. 25 Ka iP 07 16 35.0
Colombia (h = 150 km).

" 25 Ki iP 20 44 35.8
Ecuador (h = 30 km).

" 26 Up iP 04 21 22 C
iS 04 24 44
iLg1 04 26 55
iLg2 04 27 11
iRg 04 28 37

		microns	sec
P	N	2.3	3
P	Z	1.3	3
P	Z'	0.2	0.6
S	E	3.9	6
S	N	3.0	5
M	E	45	15
M	N	34	10
M	Z	25	9

D = 2000 km = 18°.

Ki iP 04 22 46.0
iS 04 27 17
iLg1 04 30 57
iRg 04 33 59

		microns	sec
P	N	1.4	6
P	Z'	0.4	1.2
S	E	3.8	8
S	N	13	16
S	Z	18	14
M	E	68	12
M	N	16	9
M	Z	28	9

D = 2900 km = 26°.

Sk iP 04 22 10.1
i 04 22 11.2
Gb iP 04 21 10.6 C
Um iP 04 22 05.9 C
i 04 22 10
iS 04 26 06
Ka iP 04 20 39.3
Skopje, Yugoslavia
(h = 30 km).
Magn. = 6.0 (Up,Ki).
P exhibits two dominating periods on the short-period records: one between 0.5 and 1.4 sec, the other between 3 and 4.5 sec.

" 26 Sk iP 04 58 09.1
Um iP 04 58 05.1
Yugoslavia (h = 30 km).

" 26 Up iP 05 53 58.0

1963 July 26 Up iPg 07 58 26.1
iSg 07 58 49.8
D = 210 km = 1.9°.
Sk e(Sg) 08 00 20
Um iPg 07 58 45.1
iSg 07 59 24.9
D = 320 km = 2.9°.
Gulf of Bothnia,
60.9°N, 20.8°E.
Origin time = 07 57 48.
Explosion?

" 26 Up iP 08 16 08.9

" 26 Up iPg 08 20 18.3
iSg 08 20 41.1
D = 210 km = 1.9°.
Near the same location as for July 26, 07 58.
Explosion?

" 26 Up iP 09 30 58.5
Um iP 09 31 37.1
Ka iP 09 30 18.0
Mediterranean Sea
(h = 340 km).

" 26 Ki iP 16 18 15.2

" 26 Up eP 19 51 44
Ki iP 19 52 51.7 C

		microns	sec
P	Z'	0.1	1.0

Dodecanese Islands
(h = 30 km).

" 27 Up iP 06 02 25.1
i 06 02 35.9
Ki iP 06 03 47.6 D

		microns	sec
P	Z'	0.3	1.1

Sk iP 06 02 58.3 D
Um iP 06 03 09.8
i 06 03 29.0
Ligurian Sea (h = 30 km).

" 27 Up iP 06 49 18.4

" 27 Up iP 13 50 02.3
Sk eP 13 50 39
Gb iP 13 49 50.1
Ka iP 13 49 28.1 D
Crete (h = 30 km).

" 27 Um iPKP 17 06 27.6
Easter Island (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July 27 Up iP 21 38 33.7
Um iP 21 38 13.7
Japan (h = 100 km).

" 27 Up iPKP 22 40 34.3
Fiji Islands (h = 30 km).

" 28 Up iP 04 28 49.9 D
Gb eP 04 29 04
Um iP 04 28 22.7
Aleutian Islands (h = 30 km).

" 28 Up iPKP 07 32 00.1
i 07 32 12.5
microns sec
PKP Z' 0.1 1.0
Sk iPKP 07 31 52.6 C
Gb iPKP 07 32 07.5 C
i 07 32 20.5
Um iPKP 07 31 47.9 C
i 07 32 01.1
Ka iPKP 07 32 08.0 C
Kermadec Islands (h = 30 km).

" 28 Up iP 08 09 15.5
Ki iP 08 09 11.9
microns sec
M E 0.9 15
M N 0.4 15
M Z 1.2 17
Um iP 08 09 11.1
Java (h = 20 km).

" 28 Up iP 10 04 36.2
microns sec
P Z' 0.1 1.5

" 28 Um e(P) 10 36 26
i 10 36 33.1

" 28 Up iP 12 21 56.7
Gb iP 12 22 16.8 C
Um iP 12 21 28.0
Kamchatka (h = 30 km).

" 28 Up iP 13 28 35.2
microns sec
M E 1.1 20
M N 2.7 17
M Z 3.0 19
Ki eP 13 27 17
iPP 13 27 25.0
i(S) 13 29 29
iT 13 33 57.7
i 13 34 37.7
microns sec
P E 0.6 8

1963 July cont. 28 Ki microns sec
P N 0.3 7
M E 5.6 15
M N 2.5 13
M Z 8.3 14
Sk iP 13 27 36.4
iS 13 29 19.2
D = 1050 km = 9½°.
Gb eP 13 28 55
Um iP 13 27 58.6
iS 13 30 20
D = 1300 km = 11½°.
Ka iP 13 29 16.6
Jan Mayen (h = 30 km).

" 28 Up iP 14 53 39.6 C
Ki iP 14 52 49.8
Aleutian Islands (h = 30 km).

" 28 Up iP 14 59 07.5 C
Aleutian Islands (h = 30 km).

" 28 Um iPKP 16 50 54.9
New Ireland (h = 70 km).

" 28 Up iP 19 02 32.5 C
microns sec
P Z' 0.3 1.1
M E 0.8 17
M N 1.1 18
M Z 1.1 18
Ki iP 19 01 44.8 C
microns sec
P Z' 0.1 1.0
M E 1.3 17
M N 1.3 18
M Z 3.3 18
Sk iP 19 02 20.1 C
Gb iP 19 02 53.1
Um iP 19 02 07.0 C
i 19 02 20.8
eS 19 10 39
Ka iP 19 02 55.5 C
Kurile Islands (h = 30 km).
Magn. = 6.0 (Up,Ki).

" 29 Up iPKP 05 08 31.7 C
i 05 08 36.3
Sk iPKP 05 08 25.3
Gb iPKP 05 08 39.8 C
Um iPKP 05 08 20.2 C
Ka iPKP 05 08 44.2
Kermadec Islands (h = 30 km

" 29 Up iP 06 18 04.7 C
microns sec
P Z' 0.2 1.1

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	29	Ki	iP		06 18 38.0	C
				microns	sec	
			P	Z'	0.4	1.3
			M	E	0.5	12
			M	N	0.7	12
			M	Z	1.2	13
		Sk	iP		06 18 38.2	C
		Gb	iP		06 18 16.8	C
			iPP		06 19 59.6	
		Um	iP		06 18 16.1	
			eSa		06 27 27	
		Ka	iP		06 17 57.7	C
		Iran (h = 40 km).				
"	29	Up	iP		12 47 48.9	
		Ki	iP		12 46 13.0	
		Sk	iP		12 46 58.8	C
		Gb	iP		12 48 05.7	
		Um	iP		12 47 03.1	
		Ka	iP		12 48 21.6	C
		Svalbard (h = 30 km).				
"	29	Up	e(P)		16 30 10	
"	29	Sk	eP		17 01 25	
		Um	iP		17 01 08.6	D
		Java Sea (h = 530 km).				
"	29	Up	iPKP		20 33 49.4	C
			i		20 33 55.2	
			eSS		20 56 26	
				microns	sec	
			PKP	Z	2.2	9
			PKP	Z'	0.3	1.5
		Ki	ePKP		20 33 30	
			iPKS		20 37 11	
				microns	sec	
			PKS	E	0.5	6
			PKS	N	0.4	7
		Sk	iPKP		20 33 42.5	C
		Gb	ePKP		20 33 53	
			i		20 33 57.5	
		Um	iPKP		20 33 37.6	C
			eSS		20 55 37	
		Ka	iPKP		20 33 59.5	
		Kermadec Islands (h = 40 km).				
"	29	Up	iPKP		20 36 18.7	
				microns	sec	
			PKP	Z	2.2	9
			PKP	Z'	0.1	0.6
			M	E	1.4	19
			M	N	4.9	20
			M	Z	4.5	20
		Ki	ePKP		20 36 01	
			i		20 36 22.4	

1963 July cont.	29	Ki		microns	sec	
			PKP	Z	1.2	6
			M	E	6.6	20
			M	N	5.8	20
			M	Z	13	20
		Sk	iPKP		20 36 11.4	
		Gb	ePKP		20 36 22	
			i		20 36 28.7	
		Um	iPKP		20 36 07.2	
			iPP		20 39 35	
			iSS		20 58 14	
		Ka	ePKP		20 36 30	
		Kermadec Islands (h = 30 km). Magn. = 6.4 (Up,Ki).				
"	29	Up	iP		23 07 01.2	C
		Sk	eP		23 06 49	
		Venezuela (h = 40 km).				
"	29	Up	iPKP		23 38 24.3	
		Sk	iPKP		23 38 17.5	
		Gb	iPKP		23 38 32.1	
			i		23 38 41.7	
		Um	iPKP		23 38 12.4	
		Kermadec Islands (h = 50 km).				
"	29	Um	eP		23 53 57	
		Banda Sea (h = 30 km).				
"	30	Up	iP		02 16 40.1	
		Ki	iP		02 16 22.1	
		Um	iP		02 16 27.6	
"	30	Up	iPKP		02 38 31.8	
		Sk	ePKP		02 38 19	
		Gb	ePKP		02 38 32	
		Um	iPKP		02 38 12.9	
		Kermadec Islands (h = 40 km).				
"	30	Up	iPKP		03 17 17.8	C
		Sk	ePKP		03 17 05	
		Um	iPKP		03 17 00.4	C
		Kermadec Islands (h = 40 km).				
"	30	Up	iP		04 27 26.8	
		Ki	iPP		04 29 21.6	
		Um	iPP		04 28 46.6	
		Turkey (h = 30 km).				
"	30	Up	iPKP		04 47 16.9	
		Sk	iPKP		04 47 03.3	D
			i		04 47 14.4	
		Gb	iPKP		04 47 27.0	
		Um	iPKP		04 46 56.9	
			i		04 46 58.8	
		Kermadec Islands (h = 20 km)				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July 30 Up iPKP 06 05 34.3 C
eSS 06 28 17
microns sec
PKP Z 3.7 10
PKP Z' 0.3 1.0
M E 1.0 18
M N 4.9 20
M Z 3.2 20
Ki ePKP 06 05 13
i 06 05 20.9
eSS 06 26 49
microns sec
PKP Z 0.8 7
PKP Z' 0.1 1.0
M E 3.3 20
M N 2.9 20
M Z 6.2 20
Sk iPKP 06 05 27.2 C
Gb iPKP 06 05 42.4 C
Um iPKP 06 05 21.9 C
i 06 05 36.5
iSS 06 27 26
Ka iPKP 06 05 44.4 C
i 06 06 07.7
iPP 06 09 23.4
Kermadec Islands (h = 30 km).
Magn. = 6.3 (Up,Ki).

" 30 Up iP 07 02 56.4
Ki iP 07 02 04.6
Sk iP 07 02 40.5
Gb iP 07 03 16.6
Um iP 07 02 29.2
Ka iP 07 03 20.6
Kamchatka (h = 30 km).

" 30 Up iPKP 08 15 23.7
Sk iPKP 08 15 16.7
Kermadec Islands (h = 30 km).

" 30 Sk eP 08 18 24

" 30 Um iP 08 39 05.9
Japan (h = 150 km).

" 30 Up iP 10 00 48.1

" 30 Up i(PKP) 14 10 45.0
iPKP 14 11 00.3
i 14 12 09.3
microns sec
M E 0.9 22
M N 0.8 20
M Z 0.9 18
Ki i(PKP) 14 11 00.4 C
iPKP 14 11 15.6

1963 July cont. 30 Ki i 14 14 12.6
microns sec
(PKP) Z' 0.2 1.5
PKP Z' 0.3 1.1
M E 1.3 22
M N 0.8 20
M Z 1.7 20
Sk e(PKP) 14 10 50
iPKP 14 11 04.8
i 14 12 26.8
Um i(PKP) 14 10 52.9
iPKP 14 11 07.9
i 14 12 39.2
i 14 14 21.9
Sandwich Islands (h = 30 km).
Magn. = 5.8 (Up,Ki).
PKP is multiple, with (PKP) preceding PKP by 15 sec. In the light of a recent study of multiple PKP phases (G. Payo Subiza & M. Båth: Core phases and the inner core boundary, Geophys. J., in press) it appears more likely that there have been two shocks in the present case.

" 30 Up iPKP 14 42 55.6 D
microns sec
PKP Z' 0.1 0.8
Ki iPKP 14 42 40.9
Sk iPKP 14 42 48.3 D
i 14 43 02.8
Gb iPKP 14 43 03.6
i 14 43 13.2
Um iPKP 14 42 43.5
i 14 43 07.7
Ka iPKP 14 43 07.5 D
i 14 43 17.1
Kermadec Islands (h = 30 km).

" 30 Up iPKP 15 24 17.0 C
i 15 24 21.2
microns sec
M E 0.5 19
M N 1.0 20
M Z 1.3 20
Ki eSS 15 45 30
microns sec
M E 0.7 19
M N 1.0 20
M Z 1.9 19
Sk iPKP 15 24 09.4 C
Gb iPKP 15 24 24.6 C
i 15 24 33.3
Um iP 15 24 04.4 C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 July cont.	30	Ka	iPKP	15 24 30.8	
		Kermadec Islands (h = 80 km).			
		Magn. = 5.7 (Up,Ki).			
"	30	Sk	eP	15 38 03	
"	30	Up	iP	17 48 20.2	
		Ki	iP	17 47 24.6	
		Sk	eP	17 47 51	
		Um	iP	17 47 53.2	D
		Kenai Peninsula (h = 30 km).			
"	30	Um	iP	19 19 00.8	
"	31	Up	iPKP	02 03 57.7	
			i	02 04 03.6	
		Ki		---	
				microns sec	
			M E	0.7 20	
			M N	0.6 20	
			M Z	1.0 20	
		Sk	iPKP	02 03 52.8	C
			i	02 03 56.2	
		Gb	ePKP	02 04 08	
			i	02 04 16.2	
		Um	iPKP	02 03 46.0	
			i	02 03 56.2	
			i	02 04 37	
			e	02 17 11	
		Ka	iPKP	02 04 09.4	
		Kermadec Islands (h = 70 km).			
"	31	Ki	iSn	06 14 25.7	
			iSg	06 14 48.1	
			D = 470 km = 4.2°.		
		Sk	eSg	06 17 18	
		Um	iSg	06 15 51.2	
		Northwest Russia,			
		67.9°N, 31.5°E.			
		Origin time = 06 12 29.			
		Explosion?			
"	31	Ki	iP	07 18 05.9	
"	31	Ki	iP	08 34 43.4	
		Sk	eP	08 34 49	
			i	08 34 53.5	
			eS	08 36 46	
			i	08 36 52.2	
			D = 1200 km = 11°.		
		Um	iP	08 35 18.4	
		Jan Mayen (h = 30 km).			
"	31	Up	iP	11 40 22.5	
		Ki	iP	11 39 40.6	
		Sk	iP	11 40 15.3	
1963 July cont.	31	Gb	iP	11 40 44.4	
		Um	iP	11 39 59.6	
		Japan (h = 30 km).			
"	31	Ki	iP	15 19 56.5	C
		Sk	iP	15 20 31.5	
		Um	iP	15 20 15.7	C
		Japan (h = 30 km).			
"	31	Ki	eP	15 59 40	
		Um	eP	16 00 25	
			i	16 00 33.0	
"	31	Up	iP	22 01 13.0	C
		Ki	iP	22 00 57.4	C
		Sk	iP	22 01 27.0	C
		Um	iP	22 00 59.2	C
		Sinkiang (h = 50 km).			

Markus Båth
March 7, 1964

Seismological Institute
Uppsala

P R E L I M I N A R Y

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, G Ö T E B O R G, U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

A U G U S T 1 - 31, 1963

1963 Aug. 1 Up i(P) 02 10 35.8

" 1 Up iP 10 55 16.9 C
microns sec
P Z' 0.1 1.2
Ki iP 10 54 22.9 C
microns sec
P Z' 0.1 1.2
Sk iP 10 54 59.7 C
Gb iP 10 55 37.9 C
Um iP 10 54 49.0
Kamchatka (h = 50 km).
Magn. = 5.8 (Up,Ki).

" 1 Ki iP 14 56 01.2
Sk iP 14 56 28.1
Kodiak Island (h = 40 km).

" 1 Up iPKP 15 40 36.3
microns sec
PKP Z' 0.1 1.0
Ki iPKP 15 40 16.2
Sk iPKP 15 40 30.9
ipPKP 15 40 42.0
Gb iPKP 15 40 44.7
ipPKP 15 40 55.3
Um iPKP 15 40 22.7
Ka iPKP 15 41 00
Kermadec Islands
(h = 60 km).

" 1 Up iPn 16 03 38.4
iSn 16 04 36.8
iLi 16 04 53.4
microns sec
Pn Z' 0.1 0.5
D = 580 km = 5.2°.

1963 Aug. 1 cont. Ki ePn 16 03 45
iSn 16 04 55.1
iLgl 16 05 21.1
D = 640 km = 5.8°.
Sk iPn 16 04 03.6
i 16 05 13.2
iSn 16 05 19.8
iLgl 16 05 51.9
D = 770 km = 6.9°.
Gb i 16 06 36.0
iLgl 16 06 55.0
Um ePn 16 03 12
iSn 16 03 51.1
iLgl 16 04 01.9
D = 370 km = 3.3°.
Ka iSn 16 06 14
iLgl 16 06 50
Finland, 62.7°N, 27.0°E.
Origin time = 16 02 17.
Felt.
This earthquake is remarkable by the strong excitation of Lgl, whereas Sg is hardly noticeable, contrary to what is usually the case for near shocks in continental areas.

" 1 Up iP 17 19 07.1
Ki iP 17 18 42.3 C
Gb iP 17 19 15.7
Um iP 17 18 55.6

" 1 Ki iP 18 33 12.7 C
Um iP 18 33 31.2 C
Japan (h = 25 km).

" 1 Up iP 20 07 07.3

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. cont. 1 Ki iP 20 06 41.7
Um iP 20 06 43.5
Sinkiang (h = 30 km).

" 1 Ki e(P) 20 49 23

" 1 Up iP 21 53 51.7
Ki iP 21 52 58.1 C
Um iP 21 53 24.0
Aleutian Islands
(h = 90 km).

" 2 Up iP 03 17 47.6

" 2 Ki iP 05 32 26.2

" 2 Ki ---

		microns	sec	
	M	E	0.9	15
	M	Z	1.2	15

Sk iP 09 12 31.4 C
Gb eP 09 12 40
Um eP 09 13 00
North Atlantic Ocean
(h = 40 km).

" 2 Up iP 09 19 42.6

		microns	sec	
	M	E	0.8	20
	M	N	0.7	18
	M	Z	0.9	19

Ki iP 09 19 28.8

		microns	sec	
	M	E	1.1	15
	M	N	0.4	15
	M	Z	1.6	15

Sk eP 09 19 00
Gb eP 09 19 11
Um iP 09 19 32.2
North Atlantic Ocean
(h = 30 km).

" 2 Ki eP 10 32 18
Sk iP 10 32 47.2
Um iP 10 32 32.4
Mariana Islands
(h = 110 km).

" 2 Ki iP 10 56 32.4
Morocco (h = 30 km).

" 2 Sk eP 12 54 30
Um eP 12 55 05
North Atlantic Ocean
(h = 30 km).

1963 Aug. 2 Ki e(Pn) 15 40 19
i(Sn) 15 41 07.8
iSg 15 41 22.2

" 3 Up iPKP 04 06 08.2
Ki iPKP 04 05 56.8
Sk iPKP 04 06 07.7
Gb iPKP 04 06 16.0 D
Um iPKP 04 06 01.6
Ka iPKP 04 06 17.2 D
Solomon Islands (h = 400 km).

" 3 Up iP 05 32 57.0

" 3 Up iP 10 32 18.3 C
iS 10 41 05

	microns	sec	
P	E	0.9	3
P	N	0.7	3
P	Z	2.2	3
P	Z'	8.2	2.5
S	E	5.1	7
S	N	27	15
M	E	63	18
M	N	63	16
M	Z	130	19

D = 7300 km = $65\frac{1}{2}^{o}$.

Ki iP 10 32 50.4 C
iS 10 42 07

	microns	sec	
P	E	1.6	6
P	N	0.8	6
P	Z	2.9	4
P	Z'	4.5	2.5
S	E	8.9	10
S	N	20	11
M	E	61	17
M	N	28	17
M	Z	130	24

D = 7850 km = $70\frac{1}{2}^{o}$.

Sk iP 10 32 18.9 C
eP'P' 11 01 03
Gb iP 10 31 55.3 C
Um iP 10 32 38.0 C
iPP 10 35 04
iS 10 41 32
i 10 41 41
Ka iP 10 32 04.3 C
eP'P' 11 01 00
Mid-Atlantic Ocean
(h = 30 km).
Magn. = 7.0 (Up,Ki).
P has an unusually long period, being equal to 2.5 sec on all short-period records.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug.	3	Up	iP	10 45 07.8	C
		Ki	iP	10 45 39.6	
				microns sec	
			P	Z' 0.1 0.9	
		Sk	iP	10 45 07.7	
		Gb	iP	10 44 44.4	C
		Um	iP	10 45 27.1	
		Ka	iP	10 44 52.4	C
		Mid-Atlantic Ocean			
		(h = 30 km).			
"	3	Um	iP	13 27 42.1	
"	3	Up	iP	16 40 35.0	C
			ipP	16 40 48.8	
				microns sec	
			P	Z' 0.1 1.0	
		Ki	iP	16 39 42.0	C
				microns sec	
			P	Z' 0.1 1.0	
		Sk	iP	16 40 12.8	C
		Gb	iP	16 40 50.5	C
			ipP	16 41 03.9	
		Um	iP	16 40 08.5	
			ipP	16 40 21.3	
		Ka	iP	16 40 58.2	C
			ipP	16 41 11.7	
		Aleutian Islands.			
		h = 50 km (Up,Gb,Um,Ka).			
		Magn. = 5.8 (Up,Ki).			
"	3	Up	iP	20 18 27.2	
		Ki		---	
				microns sec	
			M	E 0.9 20	
			M	N 0.3 15	
			M	Z 0.7 20	
		Mid-Atlantic Ocean			
		(h = 30 km).			
"	3	Up	iP	20 29 38.3	
		Ki	iP	20 29 05.2	
		Um	iP	20 29 18.8	
"	3	Up	i(PKP)	20 45 42.4	
			iPKP	20 45 47.0	C
				microns sec	
			PKP	Z' 0.2 0.7	
		Ki	iPKP	20 45 25.0	
		Sk	iPKP	20 45 40.8	C
		Gb	iPKP	20 45 55.2	C
		Um	iPKP	20 45 35.2	C
			iPP	20 49 14.2	
		Ka	iPKP	20 45 56.0	C
		Kermadec Islands			
		(h = 40 km).			
1963 Aug.	4	Up	iP	03 29 59.0	C
		Ki	iP	03 29 52.2	
		Sk	iP	03 30 14.5	C
		Um	iP	03 29 51.1	C
		Ka	iP	03 30 09.6	C
"	4	Ki	iPn	05 42 33.4	
			iSn	05 43 28.6	
			iSg	05 43 46.5	
			D = 480 km = 4.3°.		
		Sk	ePn	05 43 39	
			eSn	05 45 20	
			iSg	05 46 22.5	
			D = 1000 km = 9.0°.		
		Um	ePn	05 43 00	
			iSn	05 44 14.5	
			iSg	05 44 51.5	
			D = 700 km = 6.3°.		
		Northwest Russia,			
		68.0°N, 32.0°E.			
		Origin time = 05 41 25.			
		Explosion?			
"	4	Up	iP	05 51 05.3	
		Ki	iP	05 50 17.8	
		Kurile Islands (h = 30 km).			
"	4	Up	iP	11 54 48.1	
				microns sec	
			P	Z' 0.1 1.0	
		Ki	iP	11 54 10.3	C
		Um	iP	11 54 26.2	
		Japan (h = 70 km).			
"	4	Up	iSg	12 54 49.1	
		Sk	e(Pn)	12 52 26	
			iSn	12 53 05.6	
			iSg	12 53 24.9	
			D = 430 km = 3.9°.		
		Gb	iSg	12 54 08.9	
		Um	iSn	12 54 25.5	
			iSg	12 55 13.5	
			D = 790 km = 7.2°.		
		Ka	eSg	12 55 26	
		West coast of Norway,			
		61.7°N, 5.4°E.			
		Origin time = 12 51 16.			
"	4	Ki	iP	13 13 40.5	
		Um	iP	13 13 50.2	
		Mariana Islands			
		(h = 60 km).			
"	4	Um	e(P)	16 52 58	
			iSg	16 53 33.9	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug.	4	Ki	eP	18 43 01	
			i	18 43 15.7	
			iS	18 44 44.0	
			D = 1000 km = 9°.		
		Sk	eLgl	18 47 33	
		Um	iS	18 46 18.7	
			iLgl	18 47 04.8	
		Arctic Ocean, between Spitsbergen and Novaya Zemlya, near 75°N, 38°E.			
"	5	Up	i(PKP)	00 12 24.4	
			iSKP	00 15 19.6	
		Ki	iPKP	00 12 21.2	
			iPKS	00 15 44.6	
				microns sec	
			PKP Z'	0.1 1.2	
		Sk	iPKP	00 12 31.4	
			eSKP	00 15 10	
		Gb	iPKP	00 12 44.2	
		Um	iPKP	00 12 28.1	
			iSKP	00 15 06.5	
		Fiji Islands (h = 520 km).			
"	5	Um	iP	00 58 29.2	
"	5	Um	iP	03 21 31.0	
"	5	Up	iPKP	08 01 14.9	
		Kermadec Islands (h = 30 km).			
"	5	Up	---		
				microns sec	
			M E	0.7 18	
			M N	1.1 18	
			M Z	1.1 18	
		Ki	iPKP2	15 59 43.1	
			e(SS)	16 23 23	
				microns sec	
			M E	1.1 20	
			M N	0.8 20	
			M Z	2.1 20	
		Um	i(SS)	16 23 21	
		Macquarie Island (h = 30 km).			
"	5	Up	iP	20 14 22.3 C	
			i	20 14 27.3	
		Ki	iP	20 14 05.2 C	
		Sk	iP	20 14 34.3 C	
		Um	iP	20 14 08.0	
		Tsinghai (h = 30 km).			
"	5	Up	iP	20 33 27.4	

1963 Aug.	6	Up	iP	13 42 17.1 C	
			iS	13 46 44	
				microns sec	
			P Z'	0.2 1.5	
			S E	0.4 6	
			M E	1.1 19	
			M N	1.7 17	
			M Z	1.7 18	
			D = 3000 km = 27°.		
		Ki	eP	13 42 09 C	
			eS	13 46 47	
			iSa	13 47 01	
				microns sec	
			P E	0.4 6	
			P Z	0.4 7	
			P Z'	0.1 2.0	
			S E	0.5 9	
			M E	1.3 17	
			M N	0.7 12	
			M Z	2.5 17	
			D = 2950 km = 26½°.		
		Sk	iP	13 41 41.4	
		Gb	iP	13 41 49.8	
		Um	iP	13 42 13.6	
			eS	13 46 51	
			eSa	13 47 09	
		North Atlantic Ocean (h = 30 km). Magn. = 5.2 (Up,Ki). Like the Mid-Atlantic shock on Aug. 3, 10 21, the P has remarkably long period, usually 2 sec on the short-period records. The phase termed Sa is followed by a remarkably regular wave train, lasting approx. 1 min, with normal dispersion, the period decreasing from 8 to 5 sec; this is especially clear on Kiruna Galitzin E; otherwise Sa usually exhibits only one or two cycles.			
"	7	Um	iP	00 09 24.8 C	
"	7	Up	iP	04 43 34.7 C	
				microns sec	
			P Z'	0.1 0.6	
			M E	0.3 15	
			M N	0.9 17	
			M Z	0.9 15	
		Ki	iP	04 42 43.2 C	
				microns sec	
			M E	0.7 16	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. 7 cont.

Ki		microns	sec	
	M	N	0.4	13
	M	Z	1.4	14
Sk	eP		04 43 21	
Gb	iP		04 43 58.3	C
Um	iP		04 43 06.7	C
	iPcP		04 44 09.4	
Ka	iP		04 44 01	C

Sakhalin (h = 30 km).

" 7 Up iPKP 04 45 23.2
Loyalty Islands
(h = 110 km).

" 7 Ki iP 07 28 36.7
Um eP 07 28 23
Atlantic Ocean (h = 30 km).

" 7 Ki iSKP 11 35 40.6

	microns	sec	
SKP	Z'	0.1	1.3

Gb	iSKP	11 36 13.8
Um	iSKP	11 35 53.4
Ka	iSKP	11 36 14.7

Fiji Islands (h = 600 km).

" 7 Ki iSKP 11 37 22.2
Fiji Islands (h = 600 km).

" 7 Ki iPKP 17 32 20.6
Sandwich Islands
(h = 30 km).

" 7 ---

	microns	sec	
M	E	0.7	20
M	N	0.4	19
M	Z	1.2	19

Sk	eP	18 49 09
Um	iP	18 49 24.3

Guatemala (h = 70 km).

" 8 Up iP 02 25 24.9 C
ipP 02 25 38.4
iS 02 33 57
i 02 34 11

	microns	sec	
P	N	0.3	2
P	Z	0.5	2
P	Z'	0.7	1.3
S	E	0.5	4
M	E	2.0	18
M	N	3.6	22
M	Z	2.6	20

D = 7100 km = 64°.

Ki iP 02 24 30.7 C

1963 Aug. 8 cont.

Ki ipP 02 24 43.2
ePa 02 28 00
iS 02 32 11

	microns	sec	
P	N	0.5	6
P	Z	0.9	5
P	Z'	1.0	1.4
S	E	1.1	8
S	N	0.4	12
M	E	1.7	15
M	N	3.9	20
M	Z	7.6	20

D = 6200 km = 56°.

Sk	iP	02 25 06.0	C
	ipP	02 25 19.6	
	eS	02 33 22	
Gb	iP	02 25 44.3	C
	ipP	02 25 57.9	
Um	iP	02 24 56.6	C
	ipP	02 25 09.7	
	iPa	02 28 42	
	iS	02 33 04	
Ka	iP	02 25 50.6	C
	ipP	02 26 03.9	

Aleutian Islands. h = 50 km
(Up,Ki,Sk, Gb,Um,Ka).
Magn. = 6.2 (Up,Ki).

" 8 Um iPKP 11 17 48.3
i 11 18 00.8
Easter Island (h = 30 km).

" 8 Up ---

	microns	sec	
M	E	1.5	20
M	N	1.6	20
M	Z	1.9	20

Ki	ePP	11 35 12
	e(PS)	11 44 27

	microns	sec	
M	E	2.2	22
M	N	1.7	19
M	Z	4.3	22

Um	ePKP	11 34 42
	ePP	11 35 29

New Britain (h = 50 km).

" 8 Up iP 11 53 13.6
i 11 53 23.0
Ki iP 11 52 43.2
Sk eP 11 52 55
ipP 11 53 13.8
Gb iP 11 53 32.9
Um iP 11 52 55.9
Ryukyu Islands.
h = 80 km (Sk).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug.	8	Up	iP	14 06 00.1 D		
				microns sec		
			P	Z' 0.1 0.6		
		Ki	iP	14 05 32.7 D		
				microns sec		
			P	Z' 0.2 1.0		
		Sk	iP	14 05 57.4		
			e(PP)	14 09 28		
		Um	iP	14 05 43.8 D		
		Mariana Islands (h = 420 km). Magn. = 5.8 (Up,Ki).				
"	8	Um	iP	19 22 37.7		
		Japan (h = 80 km).				
"	9	Up	iP	06 09 13.0		
			i	06 09 16.3 C		
			i(π g)	06 10 53.6		
			iS	06 12 19		
			iLi	06 13 29		
			iLg2	06 14 24		
				microns sec		
			P	Z' 0.3 0.8		
			M	E 1.7 13		
			M	N 4.2 14		
			M	Z 4.4 14		
			D = 1800 km = 16°.			
		Ki	iP	06 10 43.4		
			i	06 10 50.2		
			eLg1	06 18 23		
				microns sec		
			P	Z' 0.2 1.0		
			M	E 2.6 15		
			M	N 1.7 14		
			M	Z 2.4 13		
		Sk	iP	06 09 53.1 C		
			iL(3.21)	06 16 29.3		
		Gb	eP	06 08 50		
			iLg2	06 13 10.7		
		Um	iP	06 10 01.4 C		
			i π g	06 11 39.4		
			eS	06 13 44		
			eLi	06 15 34		
			iLg1	06 16 07.5		
			D = 2200 km = 20°.			
		Ka	iP	06 08 23.9		
			iLi	06 11 18.3		
			iL(3.27)	06 12 19.3		
		Italy (h = 30 km).				
"	9	Up	iP	12 30 57.5		
		Aleutian Islands (h = 30 km).				
1963 Aug.	9	Up	iPKS	14 59 28		
				microns sec		
			M	E 1.1 20		
			M	N 2.2 20		
			M	Z 2.0 21		
		Ki	iSS	15 14 50		
				microns sec		
			M	E 1.8 20		
			M	N 0.9 19		
			M	Z 3.5 20		
		Sk	ePKP	14 56 03		
		Um	iPKP	14 56 00.5		
			ePKS	14 59 14		
			eSS	15 15 29		
		Fiji Islands (h = 30 km). Magn. = 6.0 (Up,Ki).				
"	9	Up	iP	22 00 03.1		
		Sk	iP	21 59 54.3		
		Gb	iP	22 00 19.1		
		Um	iP	21 59 47.6		
"	10	Up	iPKP	03 54 04.3 C		
			ipPKP	03 54 35.4		
		Kermadec Islands. h = 110 km (Up).				
"	10	Up	iP	04 35 03.7 C		
			eSS	04 44 03		
				microns sec		
			P	Z' 0.1 1.0		
			M	N 0.8 20		
			M	Z 0.8 17		
		Ki	iP	04 35 40.4 C		
				microns sec		
			M	E 0.8 12		
			M	N 0.3 10		
			M	Z 0.8 12		
		Sk	iP	04 35 42.6		
		Gb	iP	04 35 19.0		
		Um	iP	04 35 17.3		
			eSS	04 44 31		
		Ka	iP	04 34 58.6		
		Iran (h = 50 km).				
"	10	Up	i(P)	09 46 29.3		
"	10	Up	iP	12 18 21.1 D		
"	10	Up	iP	13 30 17.0		
		Ki	iP	13 29 46.7		
		Sk	iP	13 30 14.1		
		Volcano Islands (h = 30 km).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. 10 Up iP 18 50 33.2 C
Panama - Costa Rica
(h = 30 km).

" 11 Ki ---
microns sec
M E 0.4 15
M N 0.3 13
Um iP 02 02 13.1

" 11 Up ---
microns sec
M E 0.3 18
M N 0.8 20
M Z 0.8 25
Ki iPKP 01 54 25.1
iPKP2 01 55 11.3
microns sec
M E 0.9 20
M N 0.7 21
M Z 1.7 20
Balleny Islands
(h = 30 km).

" 11 Ki iPn 05 11 34.5
iSn 05 12 29.8
iSg 05 12 53.2
D = 500 km = 4.5°.
Sk eSg 05 15 24
Um iSg 05 13 52.1
Northwest Russia,
67.8°N, 32.3°E.
Origin time = 05 10 24.
Explosion?

" 11 Up iP 07 48 35.8 C
Ki iP 07 47 55.4
Sk iP 07 48 29.0 C
Um iP 07 48 13.0
Japan (h = 50 km).

" 11 Up iP 19 48 24.9
Ki iP 19 48 33.2
Sk eP 19 48 50
Hindu Kush (h = 150 km).

" 12 Up iP 03 10 21.6 D
Ki iP 03 10 09.6 D
Sk iP 03 10 36.9
Um iP 03 10 09.9 D
Sinkiang (h = 30 km).

" 12 Up iP 07 27 29.5 C
Ki iP 07 28 06.5
iPP 07 29 48.6
Sk iP 07 28 04.8

1963 Aug. cont. 12 Gb iP 07 27 41.0
Um iP 07 27 43.0 C
Iran (h = 30 km).

" 12 Ki iP 12 15 18.6

" 12 Up iP 18 38 11.3 C
eS 18 45 06
microns sec
M E 0.8 17
M N 0.9 15
M Z 1.4 18
D = 5200 km = 47°.
Ki iP 18 38 29.7
i 18 38 38.7
microns sec
P Z' 0.1 1.3
M E 1.4 14
M N 0.9 15
M Z 2.3 15
Sk eP 18 38 34 C
i 18 38 44.2
Um iP 18 38 11.0
ePP 18 40 06
eSa 18 48 51
West Pakistan (h = 30 km).

" 12 Gb iPKP 21 18 39.3
Tonga Islands (h = 30 km).

" 12 Gb iPKP 21 32 49.0
Sandwich Islands
(h = 30 km).

" 13 Up iP 03 11 09.4
Ki iP 03 10 52.4
Mindoro, Philippine Islands
(h = 30 km).

" 13 Up eP 03 37 32
Ki iP 03 36 33.2
microns sec
P Z' 0.1 1.1
Sk iP 03 37 00.8
Gb iP 03 37 51.3
Um iP 03 37 03.7
i 03 37 10.9
eS 03 45 23
Kodiak Island (h = 30 km).

" 13 Ki eP 04 23 44

" 13 Ki eP 05 06 49
i 05 06 53.9
Banda Sea (h = 540 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug.	13	Up	iPKP	06 47 34.8	D
		Sk	ePKP	06 47 27	
			iSKP	06 50 16.7	
		Gb	iPKP	06 47 43.5	
		Ka	iPKP	06 47 46	
		Fiji Islands (h = 560 km).			
"	13	Up	iP	07 11 11.0	
				microns	sec
			P	Z' 0.1	0.7
		Ki	iP	07 11 19.1	D
			i(pP)	07 12 23.1	
				microns	sec
			P	Z' 0.1	1.0
		Sk	iP	07 11 35.9	D
			isP	07 12 58.4	
		Gb	iP	07 11 32.9	
			ipP	07 12 26.5	
		Um	iP	07 11 08.9	D
		Ka	iP	07 11 15	
			ipP	07 12 09	
		Hindu Kush. h = 260 km (Sk,Gb,Ka).			
		Magn. = 5.4 (Up,Ki).			
"	13	Up	iP	11 46 00.9	C
"	13	Up	iP	13 31 58.9	
		Ki	iP	13 30 17.5	
			i	13 30 20.1	
			eT	13 38 55	
			i	13 39 07.5	
				microns	sec
			P	N 0.3	8
			P	Z' 0.1	1.0
			M	E 1.2	21
			M	N 0.7	17
			M	Z 1.7	18
		Sk	iP	13 31 09.0	
		Gb	eP	13 32 27	
		Um	iP	13 31 11.4	C
			e(T)	13 38 45	
			i	13 39 18.1	
		Svalbard (h = 30 km).			
"	13	Up	ePKS	22 15 34	
				microns	sec
			M	E 0.3	16
			M	N 0.9	21
			M	Z 0.6	20
		Ki	ePKS	22 15 09	
			eSS	22 31 31	
				microns	sec
			PKS	N 0.3	8
			M	E 0.5	16
			M	N 0.6	19
			M	Z 1.0	17
1963 Aug. cont.	13	Um	iPKP	22 11 53	C
			iPP	22 14 25	
			iPKS	22 15 24	
			eSS	22 32 15	
		Tonga Islands (h = 30 km).			
"	13	Up	iP	23 11 52.7	D
			isP	23 14 19.9	
				microns	sec
			P	Z' 0.1	0.5
		Ki	iP	23 11 21.7	D
				microns	sec
			P	Z' 0.2	0.9
		Sk	iP	23 11 50.0	D
			iPP	23 15 00.1	
		Gb	iP	23 12 10.5	D
		Um	iP	23 11 35.4	D
			ipP	23 13 29.6	
			isP	23 14 08.2	
		Ka	iP	23 12 13.6	
		Bonin Islands (h = 450 km).			
		Magn. = 5.9 (Up,Ki).			
"	14	Up	iP	00 26 58.2	C
		Um	iP	00 27 18.9	
		Rhodesia (h = 30 km).			
"	14	Ki	---		
				microns	sec
			M	E 0.9	22
			M	N 0.7	23
			M	Z 1.4	23
		Um	e(PP)	03 51 43	
		New Britain (h = 60 km).			
"	14	Ki	iP	13 44 17.8	
"	14	Ki	iP	13 49 54.4	
		Sk	eP	13 50 42	
		Um	iP	13 50 40.5	
		Svalbard (h = 30 km).			
"	14	Sk	eP	16 30 11	
			i	16 30 51.1	
		Um	eP	16 29 52	
		Formosa (h = 30 km).			
"	14	Up	---		
				microns	sec
			M	E 0.6	17
			M	N 0.9	18
			M	Z 1.3	17
		Ki	eP	16 42 13	
			i	16 42 15.4	
				microns	sec
			M	E 0.5	14
			M	N 0.4	15

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. cont.	14	Ki		microns	sec	
			M	Z 0.5	12	
		Sk	iP	16 43 03.8		
		Um	iP	16 42 58.9		
"	14	Up	iP	18 58 07.3		C
			i	18 58 21.3		
			i	19 04 07.3		
				microns	sec	
			P	Z' 0.1	0.9	
		Ki	iP	18 57 48.5		C
				microns	sec	
			P	Z' 0.1	0.8	
			M	E 0.5	20	
			M	N 0.3	20	
			M	Z 1.5	21	
		Sk	eP	18 58 11		
			ePKP	19 02 20		
		Um	iP	18 57 55.4		
			i	18 58 08.1		
			iPKP	19 02 13.6		
		West Irian (h = 30 km).				
		Magn. = 5.8 (Up,Ki).				
"	14	Um	iP	21 31 04.9		
		Japan (h = 30 km).				
"	15	Up	iP	02 28 38.5		D
				microns	sec	
			P	Z' 0.1	0.5	
		Ki	iP	02 28 07.1		D
				microns	sec	
			P	Z' 0.1	1.0	
		Sk	iP	02 28 35.5		D
		Gb	iP	02 28 56.7		
		Um	iP	02 28 20.7		D
			ipP	02 30 11.9		
		Ka	iP	02 29 00		
		Bonin Islands.				
		h = 500 km (Um).				
		Magn. = 6.0 (Up,Ki).				
"	15	Ki	i	05 33 43.8		
			iSg	05 34 10.1		
"	15	Ki	iSn	06 04 14.2		
			iSg	06 04 36.2		
		Um	iSg	06 06 00.1		
		Northwest Russia.				
		Explosion?				
"	15	Up	iP	06 22 54.9		C
			iPP	06 25 37		
			iS	06 32 11		
			i	06 32 39		
				microns	sec	
			P	E 0.7	6	

1963 Aug. cont.	15	Up		microns	sec	
			P	N 1.2	5	
			P	Z 3.2	4	
			P	Z' 0.6	1.2	
			PP	N 0.7	6	
			S	E 0.6	7	
			S	N 3.0	7	
			M	E 14	16	
			M	N 24	19	
			M	Z 28	18	
		D = 8000 km = 72°.				
		Ki	iP	06 22 15.1		C
			ipP	06 22 27.6		
			iS	06 30 59		
			i	06 32 31		
			eP'P'	06 50 53		
				microns	sec	
			P	E 1.6	7	
			P	N 1.2	7	
			P	Z 5.4	7	
			P	Z' 1.3	2.2	
			S	E 4.1	6	
			S	N 4.8	10	
			P'P'	Z' 0.3	2.1	
			M	E 36	16	
			M	N 22	18	
			M	Z 65	17	
		D = 7300 km = 65½°.				
		Sk	iP	06 22 48.5		C
			iPP	06 25 26.8		
		Gb	iP	06 23 15.7		C
			iPP	06 26 06.2		
			iPS	06 33 19.0		
		Um	iP	06 22 32.7		C
			i(PP)	06 24 48		
			iS	06 31 32		
			iP'P'	06 50 51.0		
		Ka	iP	06 23 20		C
			ipP	06 23 33		
		Japan. h = 50 km (Ki,Ka).				
		Magn. = 6.7 (Up,Ki).				
"	15	Up	iP	08 13 17.3		
		Ki	iP	08 13 00.3		
		Um	iP	08 13 06.0		
"	15	Sk	e(Pg)	09 27 48		
			i(S*)	09 28 40.6		
			iSg	09 28 54.7		
		Um	iSg	09 30 36.9		
		Probably southwest coast of Norway.				
"	15	Gb	iP	13 03 26.3		
"	15	Up	iPKP	15 16 41.5		
		Fiji Islands (h = 300 km).				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. 15 Up

i(P)	17 37 55.2	
iP	17 38 09.8	
iPP	17 42 19	
isPP	17 45 21	
iSKS	17 47 48	
iS	17 48 52	
iSP	17 50 26	
iSS	17 56 04	
iP'P'	18 02 35.8	
	microns	sec
P E	0.4	3
P Z	1.8	3
P Z'	0.5	0.5
PP E	2.3	5
PP Z	7.5	6
PP Z'	1.1	1.1
SKS E	7.0	5
SKS N	2.5	4
S N	6.3	8
P'P' Z'	0.2	1.0
M E	11	20
M N	18	21
M Z	14	20

(D = 11200 km = 101°).

Ki

i(P)	17 38 06.7	
iP	17 38 21.7	
ipP	17 40 23.1	
i	17 42 19	
iPP	17 42 39	
iSKS	17 48 03	
i	17 48 44	
iS	17 49 13	
iSP	17 50 48	
ipS	17 51 57	
iPKKP	17 54 10.1	
i	17 54 18.5	
iP'P'	18 02 20.6	
	microns	sec
P E	1.4	6
P Z	5.0	8
P Z'	2.7	1.8
PP N	0.9	10
PP Z'	3.7	1.5
SKS E	13	10
S N	13	8
PKKP Z'	0.2	1.0
P'P' Z'	0.1	0.9
M E	28	20
M N	22	20
M Z	48	23

(D = 11550 km = 104°).

Sk

i(P)	17 37 47.5
iP	17 38 03.7
ipP	17 40 05.0
iPKKP	17 54 26.3
iP'P'	18 02 44.0

1963 Aug. cont. 15 Gb

i(P)	17 37 40.9
iP	17 37 55.5
iPP	17 41 46.0
iPKKP	17 54 36.8
iP'P'	18 02 44.8

Um

i(P)	17 38 04.8
iP	17 38 20.0
epP	17 40 20
iPP	17 42 32
ipPP	17 44 26.5
iSKS	17 48 03
i	17 53 52.1
iPKKP	17 54 22.5
i	17 54 29.5
iP'P'	18 02 38.1

Ka

i(P)	17 37 50.6
iP	17 38 04.9
i	17 52 45.5
iPKKP	17 54 17.0
i	17 54 31.5
iP'P'	18 02 44.5

Peru - Bolivia. h = 550 km (Ki,Sk,Um).
Magn. = 7.4 (Up,Ki).
(P) precedes P by 15.0 sec on the average, is of much smaller amplitude than P, and can only be interpreted as due to a foreshock.

" 15 Up

iP	18 20 13.0
e	18 22 49

Ki iP 18 20 25.0
Sk eP 18 19 53
i 18 23 41.8
Gb eP 18 20 00 C
e 18 23 02
Um iP 18 20 23.0
Ka eP 18 20 05

Probably of the same origin as the preceding shock.

" 15 Sk eP 19 50 25 (Greece).

" 15 Up iP 20 38 53.4

" 15 Gb iPKP 22 48 08.2
Um iSKP 22 50 32.5
Fiji Islands (h = 600 km).

" 15-16 Up

iP	23 59 34.3
iS	00 01 29.1
	microns sec
P Z'	0.1 0.7

D = 1150 km = 10½°.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Aug. 15-16 Ki iP 23 58 12.5 D
cont. iS 23 59 14.6

		microns	sec
P	Z'	0.3	0.5
S	Z'	0.3	0.8
M	E	1.0	9
M	N	0.7	10
M	Z	1.6	9

D = 550 km = 5°.

Sk iP 23 58 38.9 D
iS 23 59 51.4
Gb eP 23 59 58
iS 00 02 11.1
i(Li) 00 02 51.7
Um iP 23 58 53.5
iS 00 00 13.5
Ka eP 00 00 25
iS 00 03 17.0
Arctic Ocean (h = 30 km).

" 16 Up iP 14 04 20.2

		microns	sec
P	Z'	0.1	0.8

" 16 Up i(P) 21 51 44.9

		microns	sec
(P)	Z'	0.1	1.2

" 16 Um iP 22 39 06.0
Japan (h = 80 km).

" 16 Up iP 23 18 21.8 C
Ki iP 23 18 55.5
Sk iP 23 18 27.2
Um iP 23 18 38.1
i 23 18 44.1
eS 23 28 50
South Atlantic Ocean
(h = 30 km).

" 16 Ki ePKP 23 38 53

		microns	sec
M	E	0.9	20
M	N	0.3	21
M	Z	1.3	22

Sk ePKP 23 38 55
Um iPKP 23 38 48.5
South of Australia
(h = 30 km).

" 17 Up iP 06 28 33.5
Ki iP 06 27 40.0
Sk iP 06 28 09.6
Um iP 06 28 06.6
Aleutian Islands
(h = 30 km).

1963
Aug. 17 Up iPKP 09 54 37.1 C
Sk iPKP 09 54 33.1 C
Um iPKP 09 54 28.7 C
i 09 54 42.5
Kermadec Islands
(h = 370 km).

" 17 Up iP 11 24 17.1 C
iS 11 33 47

		microns	sec
P	E	0.4	5
P	N	0.6	5
P	Z	1.7	5
P	Z'	0.2	0.7
M	E	31	18
M	N	42	18
M	Z	64	18

D = 8200 km = 74°.

Ki iP 11 23 45.3 C
iPa 11 27 50
iS 11 32 49

		microns	sec
P	E	1.1	7
P	N	0.4	6
P	Z	2.6	5
P	Z'	1.7	2.5
S	E	2.0	8
M	E	67	18
M	N	45	17
M	Z	140	18

D = 7650 km = 69°.

Sk eP 11 24 16 C
Gb iP 11 24 37.8 C
Um iP 11 23 58.0 C
iPP 11 26 37
iS 11 33 14
Ka eP 11 24 31
i 11 24 36.3
Ryukyu Islands (h = 30 km).
Magn. = 6.6 (Up,Ki).
A remarkable case of extremely well developed higher-mode surface waves. Pa is followed by an unusually regular wave train lasting nearly 2 min and of constant period = 7-8 sec, especially clear on Kiruna Galitzin E.

" 17 Up iP 11 46 43.3

		microns	sec
P	Z'	0.1	0.7

Ki iP 11 46 29.9
ipP 11 47 12.2
Sk iP 11 46 23.9

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. cont.	17	Um	iP	11 46 38.6	
			ipP	11 47 20.1	
		Mexico. h = 170 km (Ki,Um).			
"	17	Um	iP	19 59 35.8	
"	17	Um	iP	20 14 01.8	C
"	17	Up	iP	22 05 48.7	C
			i	22 06 58.9	
			iS	22 11 27.2	
			D = 3950 km = 35½°.		
		Ki	iP	22 06 11.9	C
			i	22 07 31.6	
			microns	sec	
			M E	0.5 13	
			M N	0.3 14	
			M Z	1.0 14	
		Sk	iP	22 06 20.3	C
			iPP	22 07 55.4	
		Gb	iP	22 06 07.3	
		Um	iP	22 05 53.8	C
		Iran (h = 30 km).			
"	17	Ki	iP	22 24 14.9	
		Sk	iP	22 23 41.2	
		Um	iP	22 24 08.0	
		North Atlantic Ocean (h = 30 km).			
"	18	Up	iP	07 21 06.9	
		Ki	iP	07 20 28.8	
		Sk	iP	07 21 01.1	
		Gb	iP	07 21 27.2	
		Um	iP	07 20 45.1	
		Japan (h = 150 km).			
"	18	Up	iP	14 40 29.6	
"	18	Up	iP	18 54 22.1	D
			ipP	18 54 36.4	
			iS	19 03 26	
			iP'P'	19 22 23.2	
			microns	sec	
			P Z'	1.0 1.0	
			S E	0.5 9	
			S N	0.8 7	
			M E	0.7 19	
			M N	1.4 23	
			M Z	1.0 21	
			D = 7700 km = 69½°.		
		Ki	iP	18 53 29.6	D
			ipP	18 53 42.7	
			eS	19 01 47	
			microns	sec	
			P N	0.3 7	
			P Z	0.8 7	

1963 Aug. cont.	18	Ki	microns	sec	
			P Z'	0.4 1.1	
			S E	0.5 9	
			S N	0.4 7	
			M E	1.3 20	
			M N	1.0 18	
			M Z	3.1 19	
			D = 6850 km = 61½°.		
		Sk	iP	18 54 01.3	
		Gb	iP	18 54 38.3	D
			ipP	18 54 52.6	
		Um	iP	18 53 55.6	D
			ipP	18 54 10.4	
			eS	19 02 32	
			iScS	19 03 49	
			eP'P'	19 22 30	
			i	19 22 35.0	
		Ka	iP	18 54 47	
			ipP	18 55 02	
		Aleutian Islands. h = 60 km (Up,Ki,Gb,Um,Ka).			
		Magn. = 6.2 (Up,Ki).			
"	18	Up	iPKP	20 47 28.0	
			i	20 47 34.0	
			microns	sec	
			PKP Z'	0.1 0.7	
		Ki	ePKP	20 47 08	
		Sk	iPKP	20 47 24.6	C
		Gb	ePKP2	20 47 52	
		Um	iPKP	20 47 17.4	
		Kermadec Islands (h = 30 km).			
"	18	Um	iP	22 16 34.6	
"	18	Up	iP	23 46 32.4	
		Sk	iP	23 47 15.7	
		Greece.			
"	19	Up	iPKP	04 43 48.7	
			i	04 43 58.4	
			microns	sec	
			PKP Z'	0.1 0.6	
		Ki	ePKP	04 43 32	
		Sk	ePKP	04 43 43	
			i	04 43 54.0	
		Gb	iPKP2	04 44 08.5	C
		Um	iPKP	04 43 36.6	C
		Kermadec Islands (h = 30 km).			
"	19	Ki	iPKP	07 48 41.3	
		Um	iPKP	07 48 37.1	
		Indian Ocean (h = 30 km).			
"	19	Um	iPKP	10 10 25.3	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. cont.	19	Sandwich Islands (h = 30 km).			
"	19	Ki	ePn	12 04 02	
			iP*	12 04 12.0	
			iSn	12 04 54.4	
			D = 430 km = 3.9°.		
		Sk	ePn	12 05 15	
			eSg	12 07 54	
			D = 990 km = 8.9°.		
		Um	iSg	12 06 44.5	
		Northwest Russia, 69.3°N, 30.3°E. Origin time = 12 03 02. Explosion?			
"	19	Ki	ePn	13 08 14	
			iP*	13 08 23.1	
			iSn	13 09 03.8	
			iSg	13 09 16.8	
			D = 430 km = 3.9°.		
		Sk	ePn	13 09 26	
			eSg	13 12 02	
			D = 990 km = 8.9°.		
		Um	iPn	13 08 56.6	
			i	13 10 32.1	
			iSg	13 10 56.1	
			D = 760 km = 6.8°.		
		Northwest Russia, 69.3°N, 30.3°E. Origin time = 13 07 12. Explosion? In this record, like the preceding one, P* at Kiruna has a much shorter period than all other waves, around 0.2 sec.			
"	19	Ki	iP	15 09 11.7	
		Um	iP	15 09 50.0	
		Japan (h = 120 km).			
"	19	Up	iP	20 37 05.9	
"	19	Up	iP	21 41 07.6	
"	20	Ki	ePn	04 31 36	
			iP*	04 31 44.8	
			iSn	04 32 26.4	
			iSg	04 32 42.3	
			D = 430 km = 3.9°.		
		Sk	ePn	04 32 51	
			eSg	04 35 24	
			D = 1000 km = 9.0°.		
		Northwest Russia, 69.3°N, 30.3°E. Origin time = 04 30 35. Explosion?			
1963 Aug.	20	Ki	e(P)	13 00 19	
"	20	Up	iPg	13 46 24.6	
			i	13 46 27.4	
			iSg	13 46 40.3	
		Central Baltic. Explosion?			
"	20	Up	iPg	14 02 21.2	
			i	14 02 24.2	
			iSg	14 02 37.1	
		Um	iSg	14 04 37.2	
		Central Baltic. Explosion?			
"	20	Up	iP	15 59 17.9 C	
			iPcP	15 59 39.4	
			eS	16 08 21	
				microns sec	
			P	Z' 0.1 1.2	
			M	E 1.0 21	
			M	N 1.7 21	
			M	Z 1.6 20	
			D = 7700 km = 69½°.		
		Ki	iP	15 58 34.8 C	
			eS	16 07 03	
				microns sec	
			P	Z' 0.1 1.3	
			S	E 0.5 9	
			S	N 0.3 7	
			M	E 1.8 20	
			M	N 1.7 19	
			M	Z 2.8 18	
			D = 7000 km = 63°.		
		Sk	iP	15 59 09.1 C	
		Um	iP	15 58 53.4 C	
			iS	16 07 37	
		Japan (h = 50 km). Magn. = 5.8 (Up,Ki).			
"	20	Up	eP	16 07 15	
				microns sec	
			P	Z' 0.1 0.9	
"	20	Up	ePKP	20 03 42	
		Sk	iPKP	20 03 31.0	
		Um	iPKP	20 03 25.9 D	
		Kermadec Islands (h = 40 km).			
"	20	Up	iP	20 50 12.6 C	
"	20	Ki	ePn	22 26 38	
			eSn	22 27 26	
			iSg	22 27 49.3	
			D = 470 km = 4.2°.		
		Sk	eSg	22 30 44	
		Um	iSn	22 28 50.8	
			iSg	22 29 38.3	
			D = 830 km = 7.5°.		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. cont.

20 North Norway, 70.5°N, 30.0°E. Origin time = 22 25 30.

" 21 Up iP 02 26 48.1

" 21 Up eP 03 51 36
Ki eP 03 51 20
Sk iP 03 51 06.9
Um iP 03 51 22.8
Caribbean Sea (h = 30 km).

" 21 Ki iPn 04 29 43.7
iSg 04 30 49.0
D = 420 km = 3.8°.
Sk eSg 04 33 33
i 04 33 47.9
Um iSg 04 32 13.2
i 04 32 35.2
Northwest Russia, 68.9°N, 30.3°E.
Origin time = 04 28 43.
Explosion?

" 21 Sk iP 10 30 24.5
Java (h = 230 km).

" 21 Up iP 18 13 31.9
i 18 13 36.1
Ki eP 18 12 45
eS 18 20 54
microns sec
M E 0.4 15
M N 0.2 17
M Z 0.4 15
D = 6600 km = 59½°.
Sk eP 18 13 26
Um iP 18 13 07.7
eS 18 21 37
Kurile Islands (h = 30 km).

" 21 Ki iP 22 51 01.7 C

" 21 Up iP 22 56 29.4

" 21 Up iP 22 59 11.1 D

" 22 Up iP 04 08 16.9
Ki iP 04 07 19.6
Sk eP 04 07 48
i 04 07 50.7
Um iP 04 07 51.0
i 04 08 09.7
Alaska (h = 100 km).

" 22 Um iP 05 43 40.8 C

1963 Aug.

22 Ki iSn 05 47 16.9
iSg 05 47 34.4
Probably northwest Russia.
Explosion?

" 22 Ki eP 09 38 05
microns sec
M E 0.4 15
M Z 0.4 15
Oregon (h = 30 km).

" 22 Up iP 15 10 26.8

" 22 Ki iP 20 04 34.2 D

" 22 Up ePKP 20 11 19
ePP 20 12 51
eSS 20 29 26
microns sec
PP Z' 0.2 1.7
M E 4.0 21
M N 7.7 20
M Z 8.9 21
(D = 13450 km = 121°).
Ki ePKP 20 11 06
ePP 20 12 12
i 20 12 32.8
eSKKS 20 19 08
ePS 20 21 48
microns sec
PP Z 0.5 5
M E 9.1 20
M N 6.8 20
M Z 17 20
(D = 12700 km = 114½°).
Sk ePKP 20 11 17
iPP 20 12 49.7
Gb ePKP 20 11 25
ePP 20 13 16
Um iPKP 20 11 09.8
ePP 20 12 20
i 20 12 26.0
eSKS 20 18 05
eSKKS 20 19 21
Ka iPKP 20 11 27 C
iPP 20 13 13
Solomon Islands (h = 30 km).
Magn. = 6.6 (Up,Ki).

" 22 Up iP 21 06 12.2

" 22 Up iP 23 33 02.5 C
Sk iP 23 32 50.2
Um iP 23 33 06.0
Colombia (h = 100 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug.	23	Up	iP	03 56 00.8	
		Ki	iP	03 55 15.3	
		Um	iP	03 55 35.4	
		Ka	iP	03 56 25	
		Kurile Islands (h = 140 km).			
"	23	Ki	iP	05 13 55.0	
"	23	Up	iP	13 19 56.3	C
			iS	13 28 32	
				microns sec	
			P Z'	0.1 0.5	
			M E	1.1 23	
			M N	1.4 23	
			M Z	1.4 21	
			D = 7100 km = 64°.		
		Ki	iP	13 19 04.6	
				microns sec	
			P Z'	0.1 1.0	
			M E	1.2 18	
			M N	0.7 17	
			M Z	1.2 17	
		Sk	iP	13 19 40.8	
		Gb	iP	13 20 18.0	
		Um	iP	13 19 28.3	C
			i	13 19 29.8	
		Ka	iP	13 20 19.3	
		Kamchatka (h = 30 km).			
		Magn. = 5.8 (Up,Ki).			
"	23	Ka	i(P)	16 48 53.3	C
"	23	Up	iP	16 52 19.8	
"	23	Up	iP	16 53 01.5	C
				microns sec	
			P Z'	0.1 0.5	
		Gb	iP	16 53 22.7	
		Um	iP	16 52 33.9	C
			ipP	16 52 47.4	
		Kamchatka. h = 50 km (Um).			
"	23	Up	iP	23 34 21.1	
		Sk	eP	23 34 30	
		Um	iP	23 34 08.3	
		Bonin Islands (h = 50 km).			
"	24	Ki	iPKP	02 30 50.6	C
		Bouvet Island (h = 30 km).			
"	24	Up	iPKP	03 37 50.9	C
			i	03 37 55.7	
				microns sec	
			PKP Z'	0.1 0.5	
		Ki	ePKP	03 37 29	
		Sk	iPKP	03 37 44.8	C
			i	03 37 50.5	
1963 Aug. cont.	24	Gb	iPKP	03 37 59.0	C
		Um	iPKP	03 37 39.8	
		Ka	iPKP	03 38 03.2	C
			i	03 38 16.6	
		Kermadec Islands (h = 40 km).			
"	24	Up	iP	11 09 26.6	
		Ki	iP	11 08 34.3	
		Aleutian Islands (h = 30 km).			
"	24	Up	iPKP	13 10 26.8	
		Ki	iPKP	13 10 09.9	C
		Sk	iPKP	13 10 23.7	
		Um	iPKP	13 10 18.7	C
		New Zealand (h = 40 km).			
"	24	Up	iP	22 51 06.4	
"	25	Up	iP	02 30 38.7	
		Um	iP	02 30 06.7	
		Sea of Okhotsk (h = 130 km).			
"	25	Up	iP	05 32 18.1	
		Kurile Islands (h = 30 km).			
"	25	Up	eP	06 17 01	
			eS	06 21 21	
			iSa	06 21 34	
				microns sec	
			P Z'	0.3 1.0	
			M E	1.0 11	
			M N	1.1 14	
			M Z	0.9 15	
			D = 2700 km = 24½°.		
		Ki	iP	06 17 55.9	
			iSa	06 23 53	
				microns sec	
			P Z'	0.1 0.8	
			M E	1.6 13	
			M N	0.7 12	
			M Z	1.2 13	
		Sk	iP	06 17 42.3	
			i	06 17 45.3	
		Gb	iP	06 17 10.1	
			i	06 17 16.7	
		Um	iP	06 17 24.5	
			i	06 17 28.4	
			eS	06 22 05	
			eSa	06 22 20	
			D = 3000 km = 27°.		
		Ka	iP	06 16 47	
		Turkey (h = 30 km).			
		Magn. = 5.8 (Up,Ki).			
"	25	Up	iP	08 01 15.8	C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug.	25	Up	i(PKP)	12 36 18.3	PO"	
			i	12 36 22.5	P1"	
			iPKP	12 36 36.3	P"	
			iSKP	12 39 09.6		
			iPKS	12 40 03		
			ipPKS	12 42 18		
			isPKS	12 43 13		
			iSS	12 56 35		
				microns	sec	
			PKP Z'	0.2	0.5	
			SKP Z'	0.3	1.0	
			PKS N	1.1	3	
			M E	2.9	19	
			M N	3.7	20	
			M Z	3.4	21	
			(D = 15100 km = 136°).			
		Ki	ePKP	12 36 04	PO"	
			iPKP	12 36 15.5	P"	
			ePP	12 38 34		
			iSKP	12 38 44.3		
			iPKS	12 39 36		
			isPKS	12 42 47		
			eSPP	12 49 31		
				microns	sec	
			PKP Z'	0.4	1.1	
			PP Z	1.6	9	
			SKP Z'	0.4	1.1	
			PKS E	0.9	5	
			PKS N	1.1	8	
			M E	5.6	19	
			M N	2.9	20	
			M Z	4.2	20	
			(D = 14350 km = 129°).			
		Sk	i(PKP)	12 36 13.7	PO"	
			iPKP	12 36 25.2	P"	
			iSKP	12 38 56.5		
		Gb	iPKP	12 36 25.2		
			ipPKP	12 38 48.5		
		Um	i(PKP)	12 36 06.2	PO"	
			i	12 36 16.7	P1"	
			iPKP	12 36 22.1	P"	
			ipPKP	12 38 37.2		
			ePP	12 38 49		
			iSKP	12 38 56.4		
			iPKS	12 39 49		
			isPKS	12 42 56		
			iSPP	12 49 57		
		Ka	iPKP	12 36 31.5		
			ipPKP	12 38 58.3		
			i	12 39 14.4		
			iSKP	12 39 26.5		
		Fiji Islands. h = 570 km (Gb,Um,Ka). This is a good example of multiple PKP-phases, the notation according to G. Payo Subiza and M. Båth (Core phases and the inner core boundary, Geophys. Journ., in press) being indicated above to the right of the resp. times.				
1963 Aug. cont.	25					
"	26	Up	iPKP	02 46 43.7		
		Fiji Islands (h = 550 km).				
"	26	Up	iP	05 56 05.4		
		Ki	iP	05 55 57.4		
		Java (h = 30 km).				
"	26	Up	iP	20 46 14.6		
"	26	Up	iP	21 23 00.8		
"	27	Ki	eP	03 17 25		
			i	03 17 34.3		
			iS	03 18 57.8		
			eT	03 23 13		
		Sk	eP	03 17 55		
			i(S)	03 19 33.9		
		Um	eP	03 18 09		
		Arctic Ocean (h = 30 km).				
"	27	Up		---		
				microns	sec	
			M	E 1.7	18	
			M	N 1.7	21	
			M	Z 2.4	19	
		Ki	iPKS	03 46 31		
			e	03 57 22		
				microns	sec	
			M	E 1.6	19	
			M	N 0.7	17	
			M	Z 1.5	17	
		Um	i	03 57 09		
		Chile (h = 30 km).				
"	27	Ki	iP	20 53 08.4		
		Mariana Islands (h = 80 km).				
"	27	Up	iP	22 14 23.2		
		Japan (h = 60 km).				
"	28	Ki	iPn	05 18 06.7		
			iSn	05 19 01.3		
			iSg	05 19 24.4		
			D = 500 km = 4.5°.			
		Sk	e(Sg)	05 21 49		
		Um	i(Sg)	05 20 35.7		
		Northwest Russia. Origin time = 05 16 56. Explosion?				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. 28 Up iP 07 49 28.2
iS 07 52 20.4
D = 1730 km = 15.6°.
Ki iP 07 48 21.9
iS 07 50 25.0

		microns	sec
P	Z'	0.1	0.7
S	Z'	0.1	1.0
M	E	0.5	15
M	N	0.7	14
M	Z	0.8	15

D = 1220 km = 11.0°.
Sk iP 07 48 27.2
i 07 48 34.5
iS 07 50 16.7
Um iP 07 48 55.9
iS 07 51 21.0
i 07 51 37.0
D = 1460 km = 13.1°.
Ka iP 07 50 05
Jan Mayen, 71°N, 10°W.
Origin time = 07 45 48.

" 28 Up iPg 14 12 42.3
i 14 12 52.6
iSg 14 13 02.6
Sk e(Sg) 14 15 13
Um iSg 14 14 55.2
Ka eSg 14 13 51
i 14 14 06.7
Central Baltic, near Gotska Sandön.
Probably explosion.

" 28 Ki eL 14 15

		microns	sec
M	E	0.7	20
M	N	0.5	18
M	Z	0.7	20

Balleny Islands (h = 30 km).

" 28 Up iP 16 03 09.1

		microns	sec
P	Z'	0.3	0.5

Ki iP 16 02 36.2

		microns	sec
P	Z'	0.1	0.9

Sk iP 16 03 05.6
iPP 16 06 07.2
Um iP 16 02 50.2
i 16 03 18.0
Ka iP 16 03 28
Bonin Islands (h = 100 km).

" 28 Up iP 18 46 45.6

1963 Aug. 29 Up iP 09 01 23.3 C
iPP 09 02 56.3
iS 09 07 29
iSa 09 09 59
iSS 09 10 22
iLi 09 12 53

		microns	sec
P	E	1.9	5
P	Z	3.6	5
P	Z'	0.7	0.8
PP	E	2.4	3
PP	Z	2.3	2
PP	Z'	2.9	2.0
S	E	4.1	13
S	N	3.5	5
M	E	18	8
M	N	61	14
M	Z	46	14

D = 4450 km = 40°.
Ki iP 09 01 24.8 C
iPP 09 02 56
iS 09 07 29
iSS 09 10 29
iLi 09 13 41
iLgl 09 14 42

		microns	sec
P	E	3.3	6
P	N	1.0	6
P	Z	4.0	5
P	Z'	1.4	1.0
PP	E	3.6	9
PP	Z	4.1	9
S	E	5.3	11
S	N	1.9	7
M	E	44	14
M	N	25	8
M	Z	57	12

D = 4500 km = 40½°.
Sk iP 09 01 46.4 C
iPP 09 03 27.2
Um iP 09 01 17.7 C
iPP 09 02 50
iS 09 07 14
iSa 09 09 38
iSS 09 10 05
Ka iP 09 01 30 C
iPP 09 03 11
Sinkiang (h = 30 km).
Magn. = 6.7 (Up,Ki).
An excellent example of higher-mode surface waves (or channel waves).

" 29 Up iP 15 44 19.8
iPP 15 48 24
iSKS 15 54 56

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Aug. 29 cont. Up

		microns	sec
P	Z	1.3	7
PP	E	1.5	7
PP	Z	4.0	8
SKS	E	4.2	12
M	E	11	24
M	N	11	25
M	Z	20	23

D = 11220 km = 101°.

Ki	iP	15 44 20.9
	iPP	15 48 26
	iSKS	15 54 55
	iPS	15 57 33
	iPKKP	16 00 32.9

		microns	sec
P	E	0.7	7
P	Z	2.3	8
P	Z'	0.1	1.0
PP	E	2.7	7
PP	Z	5.3	8
SKS	E	7.4	11
PKKP	Z'	0.1	1.2
M	E	31	26
M	N	19	25
M	Z	39	24

D = 11220 km = 101°.

Sk	eP	15 44 08
	iPKKP	16 00 41.1
Um	iP	15 44 22.7 D
	i	15 48 06.0
	iPP	15 48 30
	iSKS	15 55 00
Ka	iP	15 44 09
	i	15 44 24
	ePP	15 48 09

Peru (h = 25 km).
Magn. = 7.0 (Up,Ki).
Pronounced G-wave recorded; SS (at Um) exhibits SV-motion as a very significant pulse-like wave. The shock mechanism has thus permitted the recording both of strong SH- and SV-motion at our stations.

" 29 Up iP 20 44 08.1 C

" 29 Up eL 22 05

		microns	sec
M	N	1.2	24
M	Z	1.1	23

Ki eL 22 02

		microns	sec
M	E	1.5	20
M	N	0.8	20

1963 Aug. 29 cont. Ki

		microns	sec
M	Z	2.1	20

Tonga Islands (h = 30 km).

" 30 Up iP 00 30 12.9
Ki iP 00 30 07.8
i! 00 30 23.9
Sk eP 00 30 27
i 00 30 39.0
Um eP 00 30 07
i! 00 30 23.1
Java (h = 30 km).

" 30 Up iP 04 53 53.8
iPP 04 55 33.5
iLi 05 05 14
iLg1 05 07 12

		microns	sec
M	E	1.2	11
M	N	2.3	7
M	Z	1.9	10

Ki iP 04 53 42.5
iS 04 59 17.0

		microns	sec
P	Z'	0.1	0.7
M	E	1.5	11
M	N	0.9	11
M	Z	2.2	12

D = 4150 km = 37½°.
Sk iP 04 54 10.1
ePP 04 55 47
i 04 59 46.5
eLg1 05 07 47
Um iPP 04 55 08.1
eS 04 59 29
Ka eP 04 54 06
China - Kazakh (h = 30 km).

" 30 Ki iP 07 18 21.1 D
i 07 18 29.6
i(S) 07 20 23.7

		microns	sec
P	Z'	0.1	0.7

Sk iP 07 18 25.9 D
iS 07 20 14.2
D = 1100 km = 10°.
Um iP 07 18 55.8
iS 07 21 05.6
D = 1350 km = 12°.
Jan Mayen (h = 30 km).

" 30 Ka iPKP 14 11 31
Tonga Islands (h = 30 km).

" 31 Up iP 00 57 48.5 D

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963						
Aug.	31	Up	i(Sg)	06	16	21.7
		Ki	e(Sg)	06	17	54
		Sk	e(Sg)	06	16	40
"	31	Ki	iP	08	42	08.7
		Sk	eP	08	42	32
			iPP	08	44	05.5
		Um	iP	08	42	10.1
		Ka	iP	08	42	19
		Tien - Shan.				
"	31	Up	iP	12	58	55.8
		Um	iP	12	58	36.1
		Ryukyu Islands (h = 30 km).				
"	31	Up	iP	16	40	36.7
			iPcP	16	41	06.7
		Ki	iP	16	39	50.0
		Um	iP	16	40	10.7
		Sakhalin (h = 70 km).				
"	31	Up	iPKP	21	44	28.5
		Ki	iSKP	21	46	55.4
		Um	iSKP	21	47	06.6
		Ka	iPKP	21	44	42.3 C
		Fiji Islands (h = 540 km).				

Markus Båth
March 14, 1964

Seismological Institute
Uppsala

P R E L I M I N A R Y

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, G Ö T E B O R G,

U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E; h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E; h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E; h = 11 m

S E P T E M B E R 1 - 30, 1963

1963 Sep. 1

Up	iPKP	11 49 30.5	

Chile (h = 30 km).

" 2

Up	iP	01 42 42.2	
	i	01 42 47.3	
Ki	iP	01 42 50.1	C
	i	01 42 56.2	
	iPP	01 44 43.9	
		microns sec	
	P	Z' 0.2 1.0	
	M	N 1.3 18	
Sk	iP	01 43 09.6	C
Um	eP	01 42 40	
	e	01 42 54	
Ka	iP	01 42 54	

India (h = 40 km).

" 2

Ki	iP	05 50 08.9	

" 2

Ki	iP	11 54 13.0	C
Um	iP	11 54 33.2	C

Kurile Islands (h = 30 km).

" 2

Up	iS	14 33 43	
		microns sec	
	M	E 0.8 18	
	M	N 0.9 17	
	M	Z 1.4 18	
Ki		---	
		microns sec	
	M	E 1.3 15	
	M	N 0.6 15	
	M	Z 1.9 15	
Um	iP	14 23 09.7	
	eS	14 33 25	

Gulf of California (h = 30 km).

1963 Sep. 2

Um	iP	19 45 30.0	

Japan (h = 30 km).

" 2

Up	iP	22 35 43.8	

India (h = 220 km).

" 2

Ki	iPKP	22 57 05.4	
Um	iPKP	22 57 13.7	

New Zealand (h = 30 km).

" 2

Up	eP	23 55 59	
		microns sec	
	M	E 0.6 17	
	M	N 1.4 17	
	M	Z 1.2 19	
Ki	iP	23 55 12.3	
	iPcP	23 55 56.8	
		microns sec	
	M	E 1.2 14	
	M	N 1.0 20	
	M	Z 1.9 15	
Sk	eP	23 55 48	
Um	iP	23 55 33.2	
Ka	iP	23 56 16.3	

Kurile Islands (h = 30 km).

" 3

Ki	iP	05 08 10.4	C
Um	iP	05 08 31.9	

Kurile Islands (h = 30 km).

" 3

Um	iP	05 14 33.4	

Japan (h = 30 km).

" 3

Up	iP	05 40 38.3	
	i	05 40 42.7	
Ki	iP	05 39 52.2	
Sk	iP	05 40 26.7	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. 3 cont.

	Um	iP	05 40 12.7
	Ka	iP	05 41 00.3

Kurile Islands (h = 30 km).

" 3	Ki	eP	09 16 11
	Um	eP	09 16 18

(Iceland).

" 3	Up	iP	09 18 11.6	
			microns	sec
		M	E 0.4	19
		M	N 0.4	15
		M	Z 0.6	19
	Ki	iP	09 17 58.0	
			microns	sec
		P	Z' 0.1	2.0
		M	E 0.7	16
		M	N 0.4	14
		M	Z 1.0	14
	Sk	eP	09 17 29	
	Um	iP	09 18 06.5 C	

Iceland (h = 30 km).

" 3	Up	i(P)	15 18 26.4
" 3	Up	iP	18 25 35.9
	Ki	iP	18 26 50.5
	Sk	eP	18 26 16
	Um	iP	18 26 15.5 D
	Ka	iP	18 24 56.9 D

Greece.

" 3	Ki	iP	18 50 02.4 C
	Sk	iP	18 49 46.7

Colombia (h = 140 km).

" 4	Up	iP	05 12 07.8 D	
		i	05 12 09.5	
		i	05 12 27.1	
		iS	05 16 35	
			microns	sec
		P	N 0.5	4
		P	Z' 0.2	0.8
		S	E 0.4	3
		S	N 0.8	4
		M	E 2.9	17
		M	N 2.6	16
		M	Z 2.6	14
		D = 2800 km = 25°.		
	Ki	iP	05 13 17.5 D	
		iS	05 18 34	
			microns	sec
		P	N 0.3	6
		P	Z 0.5	5
		P	Z' 0.2	1.2
		S	E 0.7	5

1963 Sep. 4 cont.

	Ki		microns	sec
		S	N 0.6	7
		M	E 7.1	15
		M	N 3.7	15
		M	Z 4.4	18
		D = 3600 km = 32½°.		
	Sk	iP	05 12 32.8 D	
	Um	iP	05 12 45.2 D	
		e	05 13 25	
		iS	05 17 35	
	Ka	iP	05 11 32.0 D	
		i	05 13 17.8	

Algeria (h = 40 km).
Magn. = 5.7 (Up,Ki).

" 4	Up	eP	08 43 01

Algeria (h = 30 km).

" 4	Up	iP	13 39 05.4 D	
		iS	13 44 39	
			microns	sec
		P	E 0.8	3
		P	N 2.2	3
		P	Z' 2.7	2.0
		S	E 1.3	7
		S	N 5.8	8
		M	E 12	22
		M	N 25	20
		M	Z 26	20
		D = 3950 km = 35½°.		
	Ki	iP	13 38 16.3 D	
		iS	13 43 10	
			microns	sec
		P	E 2.3	5
		P	N 2.2	5
		P	Z 4.6	5
		P	Z' 3.4	2.2
		S	E 8.9	18
		S	N 6.8	11
		M	E 21	16
		M	N 14	17
		M	Z 31	15
		D = 3300 km = 29½°.		
	Sk	iP	13 38 27.1	
	Um	iP	13 38 43.2 D	
		iS	13 43 59	
	Ka	iP	13 39 25.0	
		i	13 39 27.1	
		iPP	13 40 54.0	

Baffin Island (h = 30 km).
Magn. = 6.5 (Up,Ki).
P is exceptionally long-period, 2.0-2.5 sec on the short-period records. S is very pronounced and of simple appearance on long-period records, and

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. 4 cont. therefore this case could be used for comparing focal mechanism solutions based on P, on S and on surface waves.

" 4 Um iP 17 40 26.3

" 4 Up iP 18 46 45.5 C
microns sec
P Z' 0.1 0.5
Ki iP 18 46 38.2 C
microns sec
P Z' 0.1 0.8
Sk iP 18 47 00.5 C
Um iP 18 46 37.4 C
Ka iP 18 46 53 C
Burma (h = 150 km).
Magn. = 5.8 (Up,Ki).

" 5 Ki iSn 05 21 42.3
iSg 05 22 05.8
Probably northwest Russia.
Explosion?

" 6 Ki iP 00 57 12.1

" 6 Up iP 01 53 07.6 C
Ki iP 01 52 48.7

" 6 Up iP 06 14 58.1
iS 06 24 05
microns sec
P Z' 0.2 1.0
M E 2.9 13
M N 4.9 13
M Z 5.7 14
D = 7700 km = 69½°.
Ki iP 06 14 21.2 C
i 06 14 23.8
i 06 14 30.2
ePa 06 18 17
eS 06 22 58
eSS 06 27 07
microns sec
P Z' 0.4 1.0
S N 0.4 8
M E 5.6 15
M N 4.2 12
M Z 6.7 13
D = 7050 km = 63½°.
Sk eP 06 14 55
Gb iP 06 15 21
Um iP 06 14 35.7
iS 06 23 24
eSS 06 27 36

1963 Sep. 6 cont. Sea of Japan (h = 30 km). Magn. = 6.0 (Up,Ki).

" 6 Remark: Microseisms originating in the southern Baltic are very strong at Karlskrona in the morning of Sep. 6. They are noticeable up to Umeå, but the decrease in amplitude is quite remarkable. The periods are 2-3 sec.

" 6 Ki iP 08 23 24.0 C
Mindanao (h = 50 km).

" 6 Up iPKP 10 35 09.4
Ki iPKP 10 34 59.8
iSKP 10 37 41.2
microns sec
SKP Z' 0.1 1.3
Sk iSKP 10 37 56.8
Gb iPKP 10 35 16.9 D
Um iSKP 10 37 51.9
Kermadec Islands
(h = 500 km).

" 6 Up iSg 17 07 37.4
i 17 07 50.0
Ki e 17 10 09
e(Sg) 17 10 21
Sk iSg 17 09 33.3
Um iPn 17 07 20.5
iSn 17 08 05.2
iSg 17 08 23.3
D = 410 km = 3.7°.
Off southwest coast of Finland, 60.2°N, 22.0°E.
Origin time = 17 06 21.
Explosion?

" 6 Sk iP 20 42 09.2
Vancouver Island
(h = 30 km).

" 6 Up eP 21 07 48
Ki iP 21 06 53.2
Sk iP 21 07 23.7 C
Um iP 21 07 20.9
Aleutian Islands
(h = 30 km).

" 7 Up e(P) 01 27 57
iP 01 28 01.3 C
iS 01 37 06
iSS 01 41 42

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. 7 cont.

Up			microns	sec
	P	Z'	0.3	1.5
	M	E	3.2	17
	M	N	4.7	14
	M	Z	5.4	17
	D = 7650 km = 69°.			
Ki	i(P)	01 27 23.7		
	iP	01 27 26.1		
	i	01 27 33.6		
	ePa	01 31 27		
	eSS	01 40 10		
		microns	sec	
	P	Z'	0.3	1.1
	M	E	5.0	15
	M	N	4.1	12
	M	Z	7.9	13
Sk	i(P)	01 27 57.2		
	iP	01 27 59.5		
Gb	iP	01 28 26.2 C		
Um	i(P)	01 27 38.6		
	iP	01 27 41.0 C		
	eS	01 36 26		
	eSS	01 40 38		
	D = 7350 km = 66°.			

Sea of Japan (h = 30 km).
Magn. = 6.0 (Up,Ki).
The first P-phase, denoted (P), precedes P by about 2.4 sec and is of much smaller amplitude, probably a foreshock.

" 7 Ka iPKP 02 49 15.8 C
Tonga Islands (h = 30 km).

" 7 Ki eSn 05 23 15
iSg 05 23 32.6
D = 480 km = 4.3°.
Sk eSg 05 26 10
Um iSn 05 23 59.4
iSg 05 24 38.9
D = 690 km = 6.2°.
Northwest Russia, 67.8°N, 31.9°E.
Origin time = 05 21 14.
Explosion?

" 7 Up iP 07 24 38.6

			microns	sec
	P	Z'	0.1	0.8
	M	E	0.6	15
	M	N	1.4	18
	M	Z	1.2	19
Ki	iP	07 23 52.8		
	iPcP	07 24 36.0		
		microns	sec	
	P	Z'	0.1	1.0

1963 Sep. 7 cont.

Ki			microns	sec
	M	E	1.1	15
	M	N	0.8	18
	M	Z	1.9	15
Sk	iP	07 24 28.2		
Gb	iP	07 25 00.1		
Um	iP	07 24 13.2 C		
Ka	iP	07 25 02.0		

Kurile Islands (h = 30 km).
Magn. = 5.8 (Up,Ki).

" 7 Up iP 09 02 53.8
i(S) 09 12 20

			microns	sec
	P	Z'	0.1	1.3
	M	E	2.0	21
	M	N	1.9	23
	M	Z	3.8	25
Ki	iP	09 03 24.5 C		
	eSKS	09 13 41		
		microns	sec	
	SKS	N	0.5	10
	M	E	3.0	19
	M	N	1.2	17
	M	Z	2.0	17
Sk	eP	09 02 57		
Gb	eP	09 02 24		
Um	iP	09 03 01.8		
	iSKS	09 13 08		

Ascension Island (h = 30 km).
Magn. = 5.7 (Up,Ki).

" 7 Up iP 12 54 16.4 C

			microns	sec
	P	Z'	0.1	0.6
	M	E	0.6	21
	M	N	1.1	21
	M	Z	1.7	21
Ki	iP	12 53 20.9		
	i	12 53 22.5		
		microns	sec	
	P	Z'	0.2	1.0
	M	E	0.8	19
	M	N	0.5	18
Sk	iP	12 53 59.5		
Gb	iP	12 54 37.8		
Um	iP	12 53 47.3		
Ka	iP	12 54 41.7		
	i	12 55 23.1		

Kamchatka (h = 110 km).
Magn. = 6.2 (Up,Ki).

" 7 Ki iP 18 26 36.8 D

" 7 Up iP 22 13 10.7 C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. 7 cont.	Up		microns sec		
		P	Z' 0.2	0.8	
	Ki	iP	22 12 37.8	C	
			microns sec		
		P	Z' 0.1	0.8	
	Sk	iP	22 13 07.0	C	
		iPP	22 16 08.9		
	Gb	iP	22 13 29		
	Um	iP	22 12 52.1	C	
	Ka	iP	22 13 27	C	
		i	22 13 48		
	Bonin Islands (h = 50 km).				
	Magn. = 5.9 (Up,Ki).				
" 8	Up	iPKP	01 07 03.6	C	
			microns sec		
		PKP	Z' 0.1	0.9	
		M	N 1.0	20	
		M	Z 1.3	20	
	Ki	ePKP	01 06 50		
		eSS	01 28 07		
			microns sec		
		M	E 0.5	16	
		M	N 0.6	19	
		M	Z 1.2	19	
	Sk	iPKP	01 06 55.2	C	
	Gb	iPKP	01 07 14	C	
	Um	iPKP	01 06 53.9		
		iPKS	01 10 34		
		eSS	01 28 35		
	Ka	iPKP	01 07 17		
		i	01 07 29		
	Kermadec Islands (h = 60 km).				
" 8	Ki	eSn	04 53 10		
		iSg	04 53 31.0		
	Um	iSg	04 54 25.9		
	Northwest Russia. Explosion?				
" 8	Up	iSKP	05 55 09.8		
	Ka	iPKP	05 51 42	D	
	Fiji Islands (h = 280 km).				
" 8	Um	iP	13 25 12.3		
" 8	Up	iPKP	13 26 11.2		
	Kermadec Islands (h = 30 km).				
" 8	Um	iP	17 11 06.9	D	
" 8	Up	iPKP	20 08 54.3	PO"D	
		i	20 09 37.1		
		iSKP	20 11 46.6		
		iPKS	20 12 36		

1963 Sep. 8 cont.	Up		microns sec		
		PKP	Z' 0.4	0.7	
		SKP	Z' 0.2	1.0	
	Ki	e(PKP)	20 08 35		PO"
		i	20 08 36.8		P1"
		iPKP	20 08 45.6		P"
		iSKP	20 11 24.7		
			microns sec		
		PKP	Z' 0.1	0.9	
		SKP	Z' 0.3	1.3	
	Sk	i(PKP)	20 08 47.6		PO"D
		iPKP	20 08 56.3		P"
		iSKP	20 11 40.1		
	Gb	iPKP	20 09 05.4		P"C
		i	20 09 07.4		
		i	20 10 08.4		
		ipPKP	20 11 12.1		
		iSKP	20 11 56.1		
	Um	iPKP	20 08 42.5		PO"
		iSKP	20 11 35.0		
		iPKS	20 12 27		
		i	20 14 30		
	Ka	iPKP	20 09 07.1		P"C
		i	20 09 09.1		
		ipPKP	20 11 17.1		
		iSKP	20 11 57.3		
	Fiji Islands. h = 560 km (Gb,Ka). Another example of multiple PKP-phases; the notation after Payo Subiza & Båth (Geophys. Journ., in press) being indicated to the right of resp. times. Note that PO" seems to have dilatation, but P" compression.				
" 8	Up	iPKP	23 45 43.4		
	Sk	ePKP	23 45 39		
	Um	iPKP	23 45 33.3		
	Kermadec Islands (h = 310 km).				
" 9	Up	iPKP	03 04 23.2		
		iSKS	03 11 11		
		ePKKP	03 15 00		
		eSS	03 21 01		
			microns sec		
		M	E 1.4	19	
		M	N 3.3	18	
		M	Z 2.9	18	
	(D = 12800 km = 115°).				
	Ki	iPKP	03 04 13.8		
		i	03 07 34.7		
		iPKKP	03 15 22.0		
		i	03 15 30.4		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. 9 cont.

Ki
microns sec
M E 3.7 20
M N 2.9 20
M Z 5.5 18
(D = 12100 km = 109°).
Sk iPKP 03 04 22.9
iPKKP 03 15 04.5
Gb iPKP 03 04 35.4
Um iPKP 03 04 16.7
iPP 03 04 58
iPKKP 03 15 19.6
eSS 03 20 35
Ka iPKP 03 04 34.6
ePKKP 03 14 58
New Britain (h = 30 km).
Magn. = 6.2 (Up,Ki).

" 9 Ki iP 12 34 09.0
Mariana Islands
(h = 80 km).

" 9 Up ePKP 21 30 51
Um iPKP 21 30 39.3 C
Kermadec Islands
(h = 30 km).

" 9 Up iP 21 50 03.3 C
Ki iP 21 50 13.0
Sk eP 21 50 29
Um iP 21 50 02.2
West Pakistan (h = 30 km).

" 9 Sk e(P) 22 25 46

" 10 Ki iPKP 01 28 35.5
Sk ePKP 01 28 46
Um ePKP 01 28 44
New Hebrides Islands
(h = 60 km).

" 10 Ki iPn 06 38 04.6
iSn 06 38 59.3
i 06 39 17.6
iSg 06 39 22.5
D = 490 km = 4.4°.
Sk eSg 06 41 52
Um iSn 06 39 45.4
iSg 06 40 23.2
D = 700 km = 6.3°.
Northwest Russia,
67.9°N, 32.0°E.
Origin time = 06 36 56.
Explosion?

" 10 Up iPKP 06 43 39.4
microns sec
PKP Z' 0.1 0.8

1963 Sep. 10 cont.

Ki iPKP 06 43 29.0
Sk ePKP 06 43 33
Gb iPKP 06 43 48.0
Ka iPKP 06 43 49.2
Fiji Islands (h = 520 km).

" 10 Ki iP 11 38 51.0 C
Kenai Peninsula
(h = 30 km).

" 10 Up iP 13 14 20.5
Ki iP 13 15 32.0
Sk iP 13 15 06.2 C
Dodecanese Islands
(h = 50 km).

" 10 Up iP 17 11 56.7
Ki iP 17 11 04.0
microns sec
P Z' 0.1 1.1
Sk iP 17 11 32.4
Gb iP 17 12 07.8
Um iP 17 11 25.1
i 17 11 31.0
i 17 11 42.5
Alaska (h = 30 km).

" 10 Up ---
microns sec
M E 0.6 21
M N 2.0 24
M Z 2.1 25
Ki iPKP 19 33 30.4
ePKS 19 36 51
microns sec
PKS N 0.3 9
M E 1.2 21
M N 1.0 22
M Z 2.4 23
Um iPKP 19 33 37.5
ePP 19 36 08
iPKS 19 37 13
Tonga Islands (h = 30 km).
Magn. = 5.9 (Up,Ki).

" 11 Up iP 02 19 50.8
Ki iP 02 19 12.7
Idaho (h = 15 km).

" 11 Ki i(P) 12 49 41.1
Um i(P) 12 51 39.8
i 12 51 51.5

" 11 Ki i(P) 17 16 19.6
Um e(P) 17 16 07
i 17 16 19.3

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Sep. 11 Up iPKP 22 40 17.0
i 22 40 25.6
i 22 41 09.5
Ki iPKP 22 39 56.5
Sk iPKP 22 40 12.6
Gb iPKP2 22 40 44
Um iPKP 22 40 07.7 C
Kermadec Islands
(h = 20 km).

" 12 Ki iPKS 03 34 23.6
microns sec
PKS Z' 0.1 1.2
Um iPKP 03 31 00.6
iPKS 03 34 31.4
Loyalty Islands
(h = 50 km).

" 12 Up iP 08 24 33.8
i 08 24 35.9
eS 08 29 13
microns sec
P Z' 0.1 0.7
M E 0.4 12
M N 0.8 13
M Z 0.8 13
D = 2950 km = 26½°.
Ki iP 08 25 34.1 C
microns sec
P Z' 0.1 1.0
M E 0.6 15
M N 0.4 13
M Z 0.9 13
Sk iP 08 25 14.0 C
Gb iP 08 24 33.7 C
Um iP 08 25 00.2 C
Ka iP 08 24 09 C
Cyprus (h = 60 km).
Magn. = 5.6 (Up,Ki).

" 12 Up iP 10 10 35.3 C
Um iP 10 10 09.9
Kurile Islands (h = 60 km).

" 12 Up iP 13 21 00.3
Ki iP 13 21 32.5
Gb iP 13 20 31.7
Um iP 13 21 19.8
North Atlantic Ocean
(h = 30 km).

" 12 Up iP 20 48 09.6 C

" 13 Ki iP 11 03 45.4 C
Mexico (h = 30 km).

1963
Sep. 13 Up iP 17 11 49.1 C
microns sec
P Z' 0.2 0.8
Ki iP 17 11 15.0 C
microns sec
P Z' 0.3 1.0
Sk iP 17 11 22.8 C
Gb iP 17 11 48.6 C
Um iP 17 11 33.9 C
Ka iP 17 12 01.6 C
Nevada. Underground nuclear explosion.
This test would most likely provide the most reliable and complete check so far available of P-wave travel times to large distances.

" 13 Up iP 19 05 33.7

" 13 Up iPKP 21 29 42.4
Um iPKP 21 29 32.2
Kermadec Islands.

" 13 Up iPKP 21 30 46.5
Sk ePKP 21 30 43
Um iPKP 21 30 37.4
Kermadec Islands
(h = 30 km).

" 13 Up iP 23 12 37.7 C
microns sec
P Z' 0.1 0.8
Ki iP 23 11 44.5 C
microns sec
P Z' 0.1 1.2
Sk iP 23 12 16.2
Gb iP 23 12 51.8 C
Um iP 23 12 10.6
Aleutian Islands
(h = 220 km).
Magn. = 5.6 (Up,Ki).

" 13 Up iPKP2 23 53 29.6
Um iPKP 23 53 09.4 C
Kermadec Islands
(h = 15 km).

" 14 Up ePKP2 00 57 56
Um iPKP 00 57 35.0
i 00 57 45.1
Kermadec Islands
(h = 30 km).

" 14 Up iP 02 25 29.7 C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. 14 cont.

Up P Z' 0.1 0.9 microns sec
Ki iP 02 25 07.5 C
P Z' 0.1 1.0 microns sec
Gb iP 02 25 47.1 C
Um iP 02 25 14.6 C
Ka iP 02 25 40.4 C
Formosa (h = 90 km).
Magn. = 5.6 (Up,Ki).

" 14 Up iPKP 04 12 05.6
PKP Z' 0.1 1.0 microns sec
M E 1.4 19
M N 3.9 21
M Z 3.4 21
Ki iPKP 04 11 47.3
M E 2.5 23 microns sec
M N 1.4 21
M Z 3.4 22
Sk iPKP 04 11 59.7 C
Gb iPKP 04 12 10.6
Um iPKP 04 11 51.0
i 04 11 54.7
Ka ePKP 04 12 15
Kermadec Islands
(h = 30 km).
Magn. = 6.2 (Up,Ki).

" 14 Um iP 06 55 43.1
Japan (h = 50 km).

" 14 Up iP 07 29 16.0
P Z' 0.1 0.7 microns sec
Ki iP 07 28 48.8
P Z' 0.3 1.0 microns sec
Sk iP 07 29 13.4
Um iP 07 29 00.3
Ka iP 07 29 30.1
Mariana Islands
(h = 610 km).
Magn. = 6.2 (Up,Ki).

" 14 Um iP 09 38 55.2 C
Volcano Islands
(h = 40 km).

" 14 Up iPg 12 35 46.2
iSg 12 36 56.5
D = 610 km = 5.5°.
Ka eP* 12 34 49
iPg 12 34 55.9

1963 Sep. 14 cont.

Ka iSg 12 35 34.3
D = 330 km = 3.0°.
South coast of the Baltic, near Kaliningrad, 54.6°N, 20.1°E.
Origin time = 12 33 57.
Explosion?

" 14 Up iPg 13 49 16.0
iSg 13 50 26.3
D = 610 km = 5.5°.
Ka eP* 13 48 19
iPg 13 48 25.4
iSn 13 48 50.9
iSg 13 49 04.2
D = 330 km = 3.0°.
South coast of the Baltic, near Kaliningrad, 54.6°N, 20.1°E.
Origin time = 13 47 26.
Explosion?

" 14 Up iPg 15 43 04.7
iSg 15 44 16.3
D = 610 km = 5.5°.
Ka iP* 15 42 07
iPg 15 42 15
iSn 15 42 43
iSg 15 42 54
D = 330 km = 3.0°.
South coast of the Baltic, near Kaliningrad, 54.6°N, 20.1°E.
Origin time = 15 41 16.
Explosion?
This and the two preceding events are characterized by an unusual property: Pg has much larger amplitudes than Sg, which is probably due to source properties.

" 15 Up iPKP 01 05 58.1
iPP 01 07 40
iPKS 01 09 38
iPPP 01 10 17
iSKKS 01 14 37
i 01 17 20
iSKSP 01 17 41
PKP Z' 0.2 1.3 microns sec
PP Z 5.4 7
M E 47 21
M N 110 23
M Z 120 23
(D = 13900 km = 125°).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. 15 cont.

Ki	iPKP	01 05 42.2	
	i	01 06 27	
	iPP	01 06 54	
	iPKS	01 09 18	
	iSKKS	01 13 55	
	iPKKP	01 16 04.8	
	iSKSP	01 16 35	
	i	01 16 44	
		microns	sec
	PKP Z'	0.1	1.2
	PP Z	12	9
	PKS Z	15	9
	M E	70	22
	M N	44	19
	M Z	140	24
	(D = 13100 km = 118°).		
Sk	iPKP	01 05 55.7	
Gb	iPKP	01 06 03	
	i	01 06 12	
	i	01 06 18	
	iPP	01 08 08	
Um	iPKP	01 05 45.4	
	i	01 05 50.9	
	i(PP)	01 07 12	
	iSKKS	01 14 15	
	i(PS)	01 16 59	
Ka	iPKP	01 06 13	

Santa Cruz Islands
(h = 40 km).
Magn. = 7.5 (Up,Ki).

" 15 Um iPKP 02 21 40.8
Kermadec Islands
(h = 30 km).

" 15 Ki iP 22 12 26.7 D
Alaska (h = 120 km).

" 16 Up iP 00 18 41.3 C
Ki iP 00 18 24.3 C
Um iP 00 18 26.7 C
Formosa (h = 30 km).

" 16 Um iP 06 46 18.6
Sea of Okhotsk (h = 430 km).

" 16

Ki	iP	16 17 30.4	
	i	16 18 33.9	
	iS	16 19 38.9	
	D = 1300 km = 11½°.		
Sk	iP	16 18 24.9	
Gb	eP	16 19 33	
Um	iP	16 18 24.5	

Svalbard (h = 30 km).

" 16 Up iSg 18 15 11.7

1963 Sep. 16 cont.

Ka	iPg	18 12 58	
	iSg	18 13 08	

South Baltic. Explosion?

" 16 Um iPKP 20 24 18.1
Santa Cruz Islands
(h = 30 km).

" 16 Up iP 23 16 59.8

" 17

Up	iPKP	19 39 08.6	
	iPP	19 40 48.4	
	i	19 50 25	
	iSKSP	19 50 49	
		microns	sec
	PKP Z	1.0	4
	PKP Z'	0.8	2.0
	PP E	1.5	10
	PP N	2.4	6
	PP Z	13	15
	PP Z'	0.3	2.0
	M E	67	21
	M N	160	23
	M Z	180	22
	(D = 13900 km = 125°).		
Ki	eP	19 35 25	
	iPKP	19 38 57.6	C
	iPP	19 40 03.5	
	iPKKP	19 49 24.1	
	iSKSP	19 49 53	
		microns	sec
	P Z	1.1	7
	PKP Z	1.7	5
	PKP Z'	0.5	2.0
	PP E	2.9	8
	PP N	2.4	7
	PP Z	9.2	8
	M E	100	23
	M N	92	22
	M Z	140	22
	(D = 13100 km = 118°).		
Sk	iPKP	19 39 09.1	
Gb	iPKP	19 39 14.3	
	iPP	19 41 14.5	
	i	19 42 17.8	
Um	iP	19 35 36	
	iPKP	19 38 58.8	
	i	19 39 03.7	
	iPP	19 40 37.0	
	e	19 42 00	
	i(PS)	19 50 13	
Ka	iPKP	19 39 20.5	
	iPP	19 41 33.1	

Santa Cruz Islands
(h = 15 km).
Magn. = 7.5 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep.	17	Up	iP	20 39 20.5	C
"	17	Ki	iP	21 26 46.0	
		Java (h = 30 km).			
"	18	Ki	eP	07 06 36	
			i	07 07 08.0	
		Um	iP	07 07 18.8	
"	18	Up	iPg	09 43 33.2	
			i	09 43 44.0	
			iSg	09 43 47.1	
			microns	sec	
			Sg Z'	1.0 0.5	
			D = 130 km = 1.2°.		
		Sk	e(Lgl)	09 46 00	
		Gb	i(Lgl)	09 45 23.7	
		Um	iPg	09 44 38.6	
			iSg	09 45 38.6	
			D = 500 km = 4.5°.		
		Ka	eSg	09 45 15	
		Central Baltic, 59.3°N, 19.6°E.			
		Origin time = 09 43 09.			
		Explosion?			
"	18	Up	iP	15 48 33.3	
			i	15 49 09.7	
			iPP	15 49 39.1	
		Ki	eP	15 48 59	
			e	15 49 54	
			iPP	15 50 18.1	
			microns	sec	
			M E	0.8 12	
			M N	0.5 12	
			M Z	0.8 12	
		Sk	i	15 50 11.1	
		Gb	eP	15 48 54	
			e	15 49 58	
		Um	iP	15 48 39.0	
		Ka	iPP	15 49 41	
			i	15 51 08	
		Turkmenia (h = 30 km).			
"	18	Up	iP	17 02 47.2	C
			i	17 02 51.3	
			iS	17 06 28.2	
			iLgl	17 08 32	
			microns	sec	
			P E	0.4 3	
			P N	2.5 4	
			P Z	2.3 4	
			P Z'	0.4 0.8	
			S E	6.6 9	
			S N	24 12	
			S Z	18 11	
			S Z'	0.2 0.9	
1963 Sep. cont.	18	Up	microns	sec	
			M E	54 17	
			M N	66 16	
			M Z	60 16	
			D = 2200 km = 20°.		
		Ki	iP	17 03 57.3	
			i	17 06 09	
			iS	17 08 36	
			iSa	17 09 07	
			eLi	17 11 50	
			iLgl	17 12 27	
			microns	sec	
			P N	1.3 14	
			P Z	2.4 13	
			P Z'	0.4 1.2	
			S E	3.1 11	
			S N	23 20	
			M E	67 13	
			M N	43 17	
			M Z	52 15	
			D = 3050 km = 27½°.		
		Sk	iP	17 03 33.1	
			i	17 03 44.2	
			iLgl	17 11 00.5	
		Gb	iP	17 02 45.7	
			i	17 02 55.3	
		Um	iP	17 03 21.5	C
			iS	17 07 33	
		Ka	iP	17 02 20	
			i	17 02 28	
			iLg2	17 08 14	
		Turkey (h = 30 km).			
		Magn. = 6.1 (Up,Ki).			
		The phase arriving 8-11 sec after P is of much larger amplitude than P (Sk,Gb, Ka).			
		This earthquake would probably provide a good opportunity to collate methods of fault-plane solutions based on P and on S, because the S-waves are of simple appearance and very well developed.			
"	19	Gb	iPKP	09 18 08.9	D
		Fiji Islands (h = 560 km).			
"	19	Up	iP	23 52 06.4	
		Sk	iP	23 52 50.2	C
		Um	iP	23 52 48.9	C
		Greece.			
"	20	Up	iP	03 07 29.8	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. cont.	20	Ki		---	
				microns sec	
			M	E 2.7 24	
			M	N 1.4 19	
		Sk	iP	03 06 38.4	
		Gb	iP	03 07 54.3	
		Um	iP	03 06 41.7	
		Ka	eP	03 08 09	
		Svalbard (h = 30 km).			
"	20	Um	iP	10 30 17.6	
"	20	Um	iP	11 33 52.5	
"	20	Sk	e(P)	14 27 51	
"	20	Sk	iP	19 15 48.0 C	
		Molucca Sea (h = 100 km).			
"	21	Up	iP	00 51 11.2	
			i	00 51 15.2	
		Sk	iP	00 51 22.8 C	
		Tsinghai (h = 30 km).			
"	21	Up	iP	03 21 56.3 C	
"	21	Up	iP	18 35 32.4	
			i	18 35 35.6	
		Gb	eP	18 35 47	
			i	18 35 55.1	
		Um	iP	18 35 18.8	
		Ryukyu Islands (h = 30 km).			
"	21	Up	eP	20 41 14	
"	22	Up	iP	02 59 48.9 D	
			ipP	03 00 16.1	
				microns sec	
			P	Z' 0.1 0.8	
		Gb	iP	03 00 04.5	
		Um	iP	02 59 22.2	
		Ka	iP	03 00 13.0	
		Aleutian Islands.			
		h = 110 km (Up).			
"	22	Up		---	
				microns sec	
			M	E 1.4 24	
			M	N 2.1 21	
			M	Z 3.3 25	
		Sk	iPKP	03 15 40.7	
		Um	iPKP	03 15 36.5	
			iPKS	03 19 11	
		Fiji Islands (h = 30 km).			
"	22	Up	iP	03 36 28.6	
1963 Sep. cont.	22	Um	iP	03 36 24.7 C	
		Ka	iP	03 36 34.4	
		Hindu Kush (h = 150 km).			
"	22	Up	iP	10 48 26.9 C	
		Gb	iP	10 48 41.6	
		Um	iP	10 48 40.2	
		Iran (h = 30 km).			
"	22	Gb	iP	12 34 13.5	
"	22	Um	iPKP	19 41 08.5	
		Tonga Islands (h = 25 km).			
"	22	Up	iP	22 37 06.8 C	
		Sk	iP	22 37 46.4 C	
		Gb	iP	22 36 57.3 C	
		Um	iP	22 37 44.5	
		Ka	iP	22 36 28.9 C	
		Ionian Sea (h = 30 km).			
"	23	Up	iP	00 04 38.3 D	
			i	00 04 44.1	
"	23	Up	ePKP	02 04 17	
		Sk	iPKP	02 04 10.5 C	
		Um	iPKP	02 04 04.5	
		(Kermadec Islands).			
"	23	Up	iP	06 52 25.6 D	
		Um	iP	06 52 46.2	
		Ka	iP	06 52 04.7	
		Rhodesia (h = 30 km).			
"	23	Up	iP	09 13 45.9 D	
			eS	09 23 33	
				microns sec	
			P	Z 1.4 4	
			P	Z' 0.6 1.2	
			S	E 0.5 5	
			M	E 1.7 22	
			M	N 1.3 16	
			M	Z 1.6 20	
			D = 8500 km = $76\frac{1}{2}^{o}$.		
		Ki	eS	09 25 11	
			e	09 25 42	
				microns sec	
			M	E 2.4 17	
			M	N 1.2 17	
			M	Z 3.4 17	
		Sk	iP	09 14 09.8	
		Gb	iP	09 13 38.2	
		Um	iP	09 14 06.5	
			iS	09 24 14	
		Ka	iP	09 13 23.7 D	
		Rhodesia (h = 30 km).			
		Magn. = 6.1 (Up,Ki).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963					
Sep.	23	Um	iP	09 18 49.7	C
"	23	Um	iP	14 53 56.1	
		California (h = 15 km).			
"	23	Up	iP	15 14 12.8	
		Sk	iP	15 14 41.2	
		Um	iP	15 14 33.1	
			i	15 14 37.6	
		Rhodesia (h = 30 km).			
"	23	Up	iP	17 13 34.8	
				microns sec	
			P	Z' 0.1 0.5	
		Sk	iP	17 13 15.3	D
		Um	iP	17 13 08.9	
		Ka	iP	17 13 57	D
			i	17 14 05	
		Aleutian Islands			
		(h = 30 km).			
"	23	Up	iP	18 40 59.1	
		Ka	iP	18 40 45	
		Persian Gulf (h = 40 km).			
"	23	Up	iP	22 35 27.1	D
				microns sec	
			P	Z' 0.1 1.2	
		Um	iP	22 35 47.8	D
		Ka	iP	22 35 05	
		Rhodesia (h = 30 km).			
"	23	Um	iP	22 48 23.9	
"	24	Up	iP	02 15 18.7	C
			iPP	02 15 41.0	
			iS	02 19 00.5	
			eSS	02 19 36	
			iLg1	02 21 11	
			iLg2	02 21 38	
				microns sec	
			M	E 1.1 10	
			M	N 1.6 16	
			M	Z 1.4 15	
			D = 2200 km = 20°.		
		Ki		---	
				microns sec	
			M	E 1.9 16	
			M	N 1.3 18	
			M	Z 2.0 17	
		Sk	iP	02 16 06.3	
		Gb	iP	02 15 17.0	C
		Um	iP	02 15 53.4	
			iS	02 20 14.2	
		Ka	iP	02 14 48	
		Turkey (h = 30 km).			

1963					
Sep.	24	Up	iP	09 25 26.8	
				microns sec	
			P	Z' 0.1 1.0	
		Sk	eP	09 25 48	
		Um	iP	09 25 47.3	
		Ka	iP	09 25 05	C
		Rhodesia (h = 30 km).			
"	24	Up	iP	09 41 15.0	C
"	24	Up	iP	16 44 05.6	C
			i	16 47 38.7	
			iSKS	16 54 34	
			iS	16 55 42	
				microns sec	
			P	Z' 0.3 1.5	
			SKS	E 2.7 10	
			S	N 1.4 9	
			M	E 4.0 23	
			M	N 7.2 22	
			M	Z 17 27	
		(D = 11650 km = 105°).			
		Ki	ePKP	16 48 18	
			iSKS	16 54 44	
			eS	16 55 49	
			iSP	16 57 28	
				microns sec	
			PKP	E 0.7 7	
			PKP	Z 1.5 5	
			SKS	E 5.9 11	
			SKS	N 1.0 9	
			S	N 1.0 7	
			M	E 11 24	
			M	N 6.2 23	
			M	Z 12 23	
		(D = 11650 km = 105°).			
		Sk	iP	16 43 54.9	C
			iPP	16 47 57.0	
		Gb	iP	16 43 50.4	
			i	16 43 53.3	
		Um	iP	16 44 10.2	
			iPKP	16 48 18.2	
			eSKS	16 54 40	
		Ka	iP	16 43 53.0	
			i	16 47 15.2	
		Peru (h = 80 km).			
		Magn. = 6.6 (Up,Ki).			
"	24	Sk	eP	17 00 12	
"	25	Um	iP	01 00 10.0	
		Honduras (h = 30 km).			
"	25	Up	iP	07 15 44.3	D
				microns sec	
			P	Z' 0.1 0.5	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Sep. 25 cont. Ki ---

			microns	sec
	M	E	1.2	18
	M	N	0.4	13
	M	Z	0.8	13

Sk eP 07 16 07
Um iP 07 16 04.6 D
eS 07 26 13
Ka iP 07 15 20.0
Rhodesia (h = 30 km).

" 25 Up i(P) 12 09 48.9

			microns	sec
	(P)	Z'	0.1	0.7

Probably local explosion.

" 25 Up i(P) 12 27 12.4

			microns	sec
	(P)	Z'	0.1	0.7

Probably local explosion.

" 25 Up iP 21 37 08.7 C

" 26 Up iP 04 30 52.2
Sk iP 04 30 25.4 D
Um iP 04 30 27.3 D
Kodiak Island (h = 30 km).

" 26 Up iP 05 39 14.8 D
ipP 05 39 28.1

			microns	sec
	P	Z'	0.7	0.8

Sk iP 05 38 53.9
Gb iP 05 39 30.8
i 05 39 31.5
ipP 05 39 43.5
Um iP 05 38 46.1
ipP 05 39 00.7
eS 05 47 32
Aleutian Islands.
h = 50 km (Up,Gb,Um).

" 26 Um iP 06 07 27.1

" 26 Up iP 06 51 13.2
Sk iP 06 50 46.2 C
Kodiak Island (h = 30 km).

" 26 Um iP 07 02 23.8

" 26 Up iPg 09 45 03.1 C
iSg 09 45 04.6
Probably local explosion.

" 26 Up iPg 10 04 49.7
iSg 10 04 51.2
Probably local explosion.

1963 Sep. 26 Up iPg 10 42 14.6 C
iSg 10 42 16.1
Probably local explosion.
The appearance of these local explosions is quite different from the two reported for Sep. 25. The periods for the explosions on Sep. 26 are shorter, around 0.4 sec.

" 26 Up iP 22 40 01.8 C

" 27 Up eP 12 28 38

" 27 Um iP 16 37 49.4 D
Japan (h = 80 km).

" 27 Sk iP 17 18 14.7 C
West Pakistan (h = 90 km).

" 28 Up iP 06 10 48.4 C
Sk iP 06 11 03.8
Um iP 06 10 41.1
Burma (h = 110 km).

" 28 Up iPKP 07 17 07.2 D
i 07 17 14.0

			microns	sec
	PKP	Z'	0.1	0.5

Sk iPKP 07 17 01.9
Gb iPKP 07 17 15.3
Um iPKP 07 16 56.8
Kermadec Islands
(h = 460 km).

" 28 Up iP 18 55 24.9
Ki iP 18 55 23.7
Sumatra (h = 30 km).

" 29 Ki iPg 04 59 11.3
iSn 04 59 38.4
iSg 04 59 50.8
D = 330 km = 3.0°.
Um eSg 05 00 27
North Finland?

" 29 Ki eSn 05 19 27
iSg 05 19 48.7
Um eSg 05 20 37
Northwest Russia. Explosion?

" 29 Up iPKP 10 26 10.6 C
Kermadec Islands
(h = 120 km).

" 29 Up iP 10 47 19.9 C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Sep. 29 Ki iP 10 47 29.1 C
cont. Um iP 10 47 18.3 C
Hindu Kush (h = 210 km).

" 29 Up iP 13 41 01.6
iPP 13 41 27.0
microns sec
M E 1.8 19
M N 1.8 18
Ki iP 13 42 08.0 D
microns sec
P Z' 0.1 1.0
M E 1.1 10
Sk iP 13 41 45.9
Um iP 13 41 28.1
Turkey (h = 30 km).

" 29 Up eP 14 21 44
microns sec
P Z' 0.1 1.3

" 29 Up iP 15 39 08.2
Ki iP 15 39 15.3
Sk iP 15 39 33.5 C
Um iP 15 39 05.2 C
iPP 15 40 40.3
Hindu Kush (h = 150 km).

" 29 Up iP 19 40 51.5
Ki iP 19 41 22.5
Arabian Sea (h = 30 km).

" 29 Ki iP 19 47 53.5
Mindanao (h = 120 km).

" 29 Ki iP 20 42 52.2
Um iP 20 43 04.8
Volcano Islands
(h = 330 km).

" 29 Up iP 22 21 48.0 C
i 22 21 56
iS 22 26 07
microns sec
P Z' 0.2 1.0
S E 1.0 5
S N 1.0 4
M N 1.1 18
M Z 1.4 18
D = 2650 km = 24°.
Ki iP 22 23 00.2 C
microns sec
P Z' 0.2 1.0
Sk iP 22 22 23.5 C
Gb iP 22 21 32.6

1963
Sep. 29 Um iP 22 22 24.2
cont. i 22 22 33.3
iS 22 27 06
Ionian Sea (h = 50 km).
Magn. = 5.6 (Up,Ki).

" 29 Sk iP 22 56 25.0
Um iP 22 56 40.8
Guatemala (h = 60 km).

" 30 Ki iP 03 59 30.3
Colombia (h = 30 km).

Markus Båth
March 20, 1964

Seismological Institute
Uppsala

PRELIMINARY SEISMOLOGICAL BULLETIN

UPPSALA, KIRUNA, SKALSTUGAN, GÖTEBORG, UMEÅ and KARLSKRONA

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

OCTOBER 1 - 31, 1963

1963 Oct. 1

Up	iP	05 12 39.3	
Ki	eP	05 12 30	
Sk	iP	05 12 31.6	

Mariana Islands (h = 230 km).

" 1

Ki	iP	05 13 42.5	
		microns	sec
	P	Z' 0.2	2.0
Um	iP	05 14 26.5	

Arctic Ocean (h = 30 km).

" 1

Up	iP	17 26 58.3	
Ki	iP	17 28 12.2	
Sk	iP	17 27 37.0	C

Greece (h = 110 km).

" 1 Up iP 20 36 59.9

" 2 Up iP 03 27 02.9

" 2 Up ---

		microns	sec
	M	E 0.8	20
	M	N 1.2	20
	M	Z 1.6	20
Ki	eSS	06 26 23	
		microns	sec
	M	E 1.1	20
	M	N 0.9	19
	M	Z 2.1	20
Um	iPKP	06 06 45.2	
	ePKS	06 10 11	

Tonga Islands (h = 30 km).
Magn. = 5.7 (Up, Ki).

" 2 Um iP 15 39 43.8 D

1963 Oct. 2

Up	iP	21 10 33.4	C
		microns	sec
	P	Z' 0.1	0.5
	M	N 0.7	14
	M	Z 0.6	13
Ki	iP	21 11 42.7	C
		microns	sec
	M	E 0.4	15
	M	N 0.5	14
	M	Z 1.0	14
Sk	iP	21 11 12.1	C
Gb	iP	21 10 23.0	C
Um	iP	21 11 07.0	

Crete (h = 70 km).

" 3

Up	iSg	02 08 19.3	
Ki	iPn	02 06 18.9	
	iPg	02 06 27.1	
	iSg	02 07 07.1	

D = 330 km = 3.0°.

Sk	e	02 07 41	
	iSg	02 07 52.4	
Um	iPg	02 05 55.4	C
	iSg	02 06 13.8	
	i	02 06 20.8	

D = 160 km = 1.4°.

Gulf of Bothnia,
65.0°N, 22.2°E.
Origin time = 02 05 28.

" 3

Up	iP	05 44 08.8	
Ki	iP	05 43 46.0	
Um	iP	05 43 54.0	C

Taiwan (h = 60 km).

" 3 Um i(P) 12 14 08.5 D

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 3 Up iPKP 16 07 13.0 C
microns sec
M E 0.8 20
M N 1.9 19
M Z 2.0 21
Ki iPKP 16 07 25.1
iPKS 16 10 48
microns sec
PKS E 0.4 7
PKS N 0.3 6
M E 1.4 21
M N 1.3 20
M Z 2.3 21
Um ePKP 16 07 17
Sandwich Islands
(h = 50 km).
Magn. = 5.9 (Up,Ki).

" 3 Up iP 23 36 05.5 C
iS 23 45 32
i 23 46 02
iLi 00 00 20
i 00 02 02
iLgl 00 02 48
microns sec
P E 0.2 3
P N 0.3 3
P Z 0.7 3
P Z' 0.4 1.5
S E 1.1 6
M E 12 19
M N 25 19
M Z 27 17
D = 8150 km = $73\frac{1}{2}^{o}$.
Ki iP 23 35 30.6 C
i(pP) 23 35 41.6
eS 23 44 26
iLi 23 58 24
eLgl 00 00 35
microns sec
P E 0.6 7
P N 0.3 5
P Z 1.4 8
P Z' 0.9 2.5
S E 1.5 6
S N 0.8 9
M E 30 18
M N 17 17
M Z 37 17
D = 7550 km = 68^{o}.
Sk iP 23 36 03.9
Gb iP 23 36 25.7
i(pP) 23 36 37.8
Um eP 23 35 45 C
i(pP) 23 35 56.8
iPP 23 38 20
iPa 23 40 09

1963 Oct. 3 cont. Ka iP 23 36 32
Japan (h = 30 km).
Magn. = 6.4 (Up,Ki).
The higher modes (or channel waves) are very well developed (Up,Ki). This demonstrates that the Korea Peninsula is a good transmitter of these waves, whereas they are usually blocked by the Japanese Sea. P(Z') exhibits unusually long periods; may be an interesting case for spectral analysis!

" 4 Ki iP 00 38 49.2
Japan (h = 20 km).

" 4 Up eL 04 01
microns sec
M N 1.0 20
M Z 1.0 20
Ki eL 03 58
microns sec
M E 0.7 19
M N 0.5 20
M Z 1.0 20
Tonga Islands (h = 30 km).

" 4 Ki i(Sg) 05 18 22.9
Um i(P) 05 19 57.0 C

" 4 Sk iP 08 47 20.9
Mexico (h = 40 km).

" 4 Up iP 13 38 49.7
Ki iP 13 39 19.3
microns sec
M E 0.6 15
M N 0.4 15
Sk iP 13 39 20.1
Um iP 13 39 00.3
Arabian Sea (h = 30 km).

" 4 Ki e 15 57 13
i 15 57 31.3
eSg 15 57 47

" 4 Up iP 17 06 46.3
i 17 07 05.1
Ki iP 17 07 54.4
Sk eP 17 07 23
Crete (h = 30 km).

" 4 Ki iP 21 17 32.8

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct.	4	Ki	i(P)	22 51 02.9	
			Seismic?		
"	5	Ki	iPKP	02 14 31.7	
			Tonga Islands (h = 80 km).		
"	5	Up	i(P)	03 14 11.0	
"	5	Up	iP	04 33 22.8	
		Um	eP	04 32 52	
			Japan (h = 30 km).		
"	5	Up	iP	04 45 24.7	
		Ki	iP	04 46 34.2	
		Sk	iP	04 46 02.1	
		Ka	iP	04 44 52	
			Crete (h = 30 km).		
"	5	Ki	ePg	06 52 18	
			eSn	06 52 40	
			iSg	06 52 56.3	
		Sk	i	06 53 01.6	
"	5	Up	iP	07 43 37.7 C	
		Ki	iP	07 43 05.6	
		Um	iP	07 43 20.1 C	
			Japan (h = 450 km).		
"	5	Up	iP	09 21 15.9	
				microns sec	
			P	Z' 0.1 1.1	
"	5	Up	iP	09 23 32.0	
"	5	Up	iP	14 15 56.5 D	
"	5	Up	iP	15 06 56.3 C	
			eS	15 14 13	
				microns sec	
			P	Z' 0.1 1.3	
			S	N 3.8 16	
			M	E 2.9 17	
			M	N 2.6 17	
			M	Z 3.6 22	
			D = 5800 km = 52°.		
		Ki	iP	15 07 40.3	
			iPa	15 11 14	
			iS	15 15 41	
			ePS	15 15 55	
				microns sec	
			P	Z' 0.1 1.5	
			S	E 0.6 12	
			M	E 4.3 17	
			M	N 5.2 19	
			M	Z 5.8 15	
			D = 6450 km = 58°.		
1963 Oct. cont.	5	Sk	iP	15 07 29.7	
		Gb	eP	15 06 56	
		Um	iP	15 07 08.4	
			ePP	15 09 21	
			eS	15 14 55	
			French Somaliland		
			(h = 30 km).		
			Magn. = 5.6 (Up,Ki).		
"	5	Up	iP	17 06 51.4	
				microns sec	
		M	E	0.6 14	
		M	N	0.7 14	
		M	Z	0.9 15	
		Ki	iP	17 07 29.5	
				microns sec	
		M	E	0.8 14	
		M	N	0.4 14	
		M	Z	1.2 15	
		Um	iP	17 07 09.3 C	
			Rhodesia (h = 30 km).		
"	5	Up	e(P)	18 20 17	
"	5	Up	iP	20 30 48.0 C	
		Ki	iP	20 30 00.6	
			ipP	20 30 27.6	
			Aleutian Islands.		
			h = 110 km (Ki).		
"	6	Up	iP	00 01 42.2	
		Ki	eP	00 00 51	
			Kurile Islands (h = 50 km).		
"	6	Ki	iSn	04 36 07.1	
			iSg	04 36 27.2	
		Sk	eSg	04 39 01	
			Probably northwest Russia.		
			Explosion?		
"	6	Ki	iPg	05 35 56.8 C	
			iSg	05 36 52.0	
			D = 470 km = 4.2°.		
		Sk	e(Sg)	05 39 45	
		Um	iSn	05 37 38.2	
			eSg	05 38 10	
			Northwest Russia,		
			69°N, 31½°E.		
			Origin time = 05 34 33.		
			Explosion?		
"	6	Up	iP	17 44 33.1 D	
"	7	Sk	eP	12 32 32	
"	7	Up	iPKP	13 32 48.5	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 7 cont.	Up	iSKP		13 35 40.1	
			microns	sec	
		PKP	Z' 0.1	0.8	
	Ki	ePKP		13 32 30	
		iSKP		13 35 18.9	
			microns	sec	
		SKP	Z' 0.2	1.5	
	Sk	ePKP		13 32 45	
		eSKP		13 35 33	
	Gb	iPKP		13 32 59.1	
		ipPKP		13 35 08.1	
		iSKP		13 35 48.3	
	Um	iPKP		13 32 37.6	
		ipPKP		13 34 50.1	
		iSKP		13 35 29.4	
	Fiji Islands (h = 550 km). At Ki, Um and Sk the times for PKP above refer to weak arrivals, followed within a few seconds by stronger phases. These weak arrivals are missing at Up and Gb.				
" 7	Up	iP		23 44 02.1	
		i		23 44 25.5	
			microns	sec	
		M	E 2.0	18	
		M	N 5.7	20	
		M	Z 1.0	13	
	Ki	iP		23 43 31.2 C	
		eLgl		00 01 42	
			microns	sec	
		M	E 1.0	14	
		M	N 1.0	14	
		M	Z 1.0	14	
	Sk	iP		23 44 05.8	
	Um	iP		23 43 42.1	
	Mongolia (h = 30 km).				
" 8	Up	ePKP		00 36 14	
		i		00 36 18.1	
		iPKS		00 39 44	
			microns	sec	
		PKS	N 0.5	6	
		M	E 1.1	22	
		M	N 2.8	23	
		M	Z 2.2	22	
	(D = 15100 km = 136°).				
	Ki	iPKP		00 36 02.8	
		i		00 36 21.7	
		e(PP)		00 37 56	
		e(PKS)		00 39 18	
			microns	sec	
		(PP)	Z 0.5	7	
		(PKS)	N 0.3	7	

1963 Oct. 8 cont.	Ki		microns	sec	
		M	E 2.2	20	
		M	N 1.6	20	
		M	Z 2.1	20	
	(D = 14200 km = 128°).				
	Sk	ePKP		00 36 13	
	Um	i(PKP)		00 36 01.1	
		iPKP		00 36 10.6	
		i		00 36 29.6	
		i(PP)		00 38 20	
		iPKS		00 39 32	
		e(PS)		00 48 18	
	Samoa Islands (h = 30 km). Magn. = 6.1 (Up,Ki).				
" 8	Up	iP		03 01 09.4 D	
		ipP		03 01 35.8 C	
			microns	sec	
		P	Z' 0.1	0.6	
		pP	Z' 0.1	0.6	
	Ki	iP		03 00 59.8	
		ipP		03 01 26.2	
			microns	sec	
		P	Z' 0.1	1.0	
	Sk	iP		03 01 23.7	
		ipP		03 01 50.0	
	Gb	iP		03 01 30.7	
		ipP		03 01 57.2	
	Um	iP		03 00 59.4 D	
		ipP		03 01 25.9 C	
	Assam. h = 110 km (Up,Ki, Sk,Gb,Um). The second phase, appearing 26.4 sec after P, is most likely pP and not P of a new shock. It has about the same amplitude as P and exactly opposite phase. This entails a focal depth of 110 km rather than 24 km as given by USCGS.				
" 8	Up	iP		05 45 11.0	
		i		05 45 16.0	
			microns	sec	
		P	Z' 0.1	0.8	
	Ki	iP		05 46 25.8	
	Sk	iP		05 45 51.0	
		i		05 45 58.7	
	Um	iP		05 45 50.3	
	Greece (h = 30 km).				
" 8	Ki	iP		10 57 50.4	
		i		10 57 54.4	
		i(SS)		11 01 58.9	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. cont.	8	Ki		microns sec	
			P	Z' 0.1	0.8
		Sk	iP	10 58 50.5	
			i	10 59 57.8	
		Um	iP	10 58 24.7	
			i	10 58 27.6	
		Kara Sea (h = 25 km).			
		The second phase (i at Ki and Um) is of considerably larger amplitude than iP.			
"	8	Up	i(Sg)	11 03 25.7	
		Sk	e	11 05 10	
			i(Sg)	11 05 31.9	
		Um	i(Pg)	11 03 32.3	
			i(Sg)	11 04 14.2	
		Central Baltic, southwest of Finland.			
		Explosion?			
"	9	Up	iP	04 42 21.4	C
		Ki	iP	04 42 54.4	C
		Ka	iP	04 41 57	C
		Turkey (h = 40 km).			
"	9	Ki	iPKP	05 32 36.5	
		Tonga Islands (h = 30 km).			
"	9	Up	iP	06 15 44.4	C
			i	06 16 29.6	
"	9	Sk	iP	08 01 00.7	C
"	9	Up	iP	20 41 08.4	
"	9	Up	eL	21 48	
				microns sec	
			M	N 4.4	26
			M	Z 5.3	23
		Ki	eL	21 53	
				microns sec	
			M	E 3.0	25
			M	N 1.8	23
		Longarone, Italy.			
		Magn. = 5.0 (Up,Ki).			
		Avalanche of soil into the lake at the Vajont dam. No short-period records obtained, only remarkably long-period Rayleigh waves of relatively short duration.			
"	11	Um	iSKP	00 22 30.1	
		Fiji Islands (h = 440 km).			

1963 Oct.	11	Ki	eL	10 58	
				microns sec	
			M	E 1.0	16
			M	N 1.3	18
			M	Z 1.6	15
		Mexico (h = 30 km).			
"	11	Um	iP	14 50 26.2	
			i	14 50 35.0	
"	11	Up	i	16 40 49.6	
			iSg	16 41 06.4	
				microns sec	
			Sg	Z' 0.2	0.5
		Sk	eSn	16 41 56	
			iSg	16 42 21.0	
		D = 550 km = 4.9°.			
		Gb	iPg	16 40 01.6	
			iSg	16 40 15.8	
		D = 120 km = 1.1°.			
		Um	iSg	16 42 58.0	
		Lake Vener, Sweden, 58.8°N, 13.0°E.			
		Origin time = 16 39 39.			
		Felt.			
"	12	Ki	iP	10 35 38.4	
		Aleutian Islands (h = 30 km).			
"	12	Up	iP	11 37 56.6	D
			iPa	11 42 32	
			iS	11 46 55	
			i(ScS)	11 48 16	
				microns sec	
			P	N 1.5	4
			P	Z 3.1	5
			P	Z' 0.4	0.6
			S	E 15	23
			M	E 57	20
			M	N 98	19
			M	Z 110	19
		D = 7550 km = 68°.			
		Ki	iP	11 37 09.9	
			i	11 39 01	
			iS	11 45 42	
			i	11 47 24	
			i	11 49 58	
			iP'P'	12 06 31.9	
				microns sec	
			P	E 4.3	16
			P	N 3.3	16
			P	Z 12	17
			P	Z' 0.7	1.5
			S	E 18	19
			S	N 26	26

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 12 cont.

Ki microns sec
P'P' Z' 1.8 3
M E 150 19
M N 88 19
M Z 140 19
D = 6850 km = 61½°.
Sk iP 11 37 45.5 D
i 11 38 29.6
Gb iP 11 38 17.4 D
Um iP 11 37 31.1 D
ePa 11 41 39
iS 11 46 01
i 11 46 45
Kurile Islands (h = 40 km).
Magn. = 6.8 (Up,Ki).

" 12 Up iP 11 52 36.6
microns sec
P Z' 0.1 0.8
Um iP 11 52 12.4
Kurile Islands (h = 40 km).

" 12 Up iP 12 03 58.0
Um iP 12 03 32.4
Kurile Islands (h = 30 km).

" 12 Up iP 12 04 47.3
microns sec
P Z' 0.1 0.6
Kurile Islands.

" 12 Up iP 12 13 20.3
Kurile Islands (h = 40 km).

" 12 Up iP 12 43 38.2
Kurile Islands (h = 40 km).

" 12 Up iP 13 18 07.0
Ki eP 13 17 20
Um iP 13 17 42.0
Kurile Islands (h = 50 km).

" 12 Up iP 13 34 31.1
Kurile Islands (h = 50 km).

" 12 Up iP 13 40 35.8 C
Kurile Islands (h = 50 km).

" 12 Up iP 14 06 06.1
Kurile Islands (h = 40 km).

" 12 Up iP 16 22 53.5 C
microns sec
P Z' 0.1 0.5
Ki eP 16 22 10
Um iP 16 22 28.9
Kurile Islands (h = 60 km).

" 12 Up iP 16 39 07.9
Kurile Islands (h = 50 km).

1963 Oct. 12

Up iP 18 16 47.4
Kurile Islands (h = 50 km).

" 12 Up iP 18 59 32.7 C
Um iP 18 59 08.7
Kurile Islands (h = 50 km).

" 12 Up iP 20 08 00.1
Ki eP 20 07 13
Kurile Islands (h = 50 km).

" 12 Ki iP 21 29 09.5 C
Mariana Islands (h = 640 km).

" 12 Up iP 22 12 57.9
Ki iP 22 12 15.4
Kurile Islands (h = 50 km).

" 12 Up iP 22 18 29.3
Kurile Islands (h = 40 km).

" 13 Ki iP 00 43 56.4

" 13 Up iP 01 37 36.2 C
microns sec
P Z' 0.1 0.7
Ki iP 01 36 49.7
Gb iP 01 37 55.8
Um iP 01 37 10.4
Kurile Islands (h = 30 km).

" 13 Up iP 01 45 55.8
Um iP 01 45 31.5 D
Kurile Islands (h = 30 km).

" 13 Ki iP 02 22 36.8
Um i(P) 02 23 11.0 C
Kurile Islands (h = 50 km).

" 13 Up iP 04 16 51.4
Um eP 04 16 15
Kurile Islands (h = 30 km).

" 13 Up iP 05 22 52.1 C
Ki iP 05 22 48.1
Um iP 05 22 53.7
Costa Rica (h = 60 km).

" 13 Up iP 05 28 53.0 C
ipP 05 29 06.2
i 05 37 21
iS 05 38 08
i(P'P') 05 57 59.2

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 13 cont.

Up
microns sec
P E 50 30
P N 68 30
P Z 23 10
pP Z' 1.2 0.9
S E 64 17
(P'P') Z' 2.0 2.2
M E 600 (20)
M N 950 (20)
M Z 1630 (20)
D = 7550 km = 68°.

Ki iP 05 28 06.9 C
i 05 28 13.8
iPcP 05 29 01
iPa 05 32 35
i 05 37 02
microns sec
P E 5.2 9
P N 6.6 10
P Z 19 9
P Z' 1.5 1.0
M E 480 (20)
M N 720 (20)
M Z 1450 (20)
D = 6800 km = 61°.

Sk iP 05 28 48.4
iPcP 05 29 18.5

Gb iP 05 29 15.2 C
i 05 29 21.4

Um iP 05 28 27.7 C
i 05 28 34.6

Ka eP 05 29 15
i 05 29 22

Kurile Islands. h = 50 km (Up). Magn. = 7.6 (Up,Ki). The body waves give a magnitude of only 7.4, whereas the surface waves give 8.1. The P-wave spectrum contains some very large periods, around 30 sec, clearly exhibited on long-period Benioff records at Up. The P-wave shows multiplicity and the wave arriving 6-7 sec after iP (Ki,Gb,Um,Ka) has an amplitude 7-8 times as large as for the initial iP. Mantle Rayleigh waves were recorded for about 24 hours after the main shock, especially on Umeå long-period records.

" 13 Up iP 05 35 43.0

1963 Oct. 13 cont.

Up
microns sec
P Z' 0.4 0.7
(Kurile Islands).

" 13 Up iP 05 41 04.8 C
microns sec
P Z' 0.1 0.7
Kurile Islands (h = 40 km).

" 13 Up iP 05 43 25.6

" 13 Up iP 05 47 38.1 C
microns sec
P Z' 0.2 0.5
Ki iP 05 46 50.8
microns sec
P Z' 0.2 1.5
Gb iP 05 47 59.1 C
Um iP 05 47 10.4
Kurile Islands.
Origin time = 05 36 36.
Magn. = 6.2 (Up,Ki).
Approximate origin times are given in the following sequence of Kurile Islands earthquakes only for cases which are not given in the USCGS determinations.

" 13 Up iP 05 52 01.3 C
microns sec
P Z' 0.1 0.5
Ki iP 05 51 43.3 C

" 13 Up iP 05 53 01.3
microns sec
P Z' 0.1 0.5
Ki iP 05 52 18.0
Kurile Islands (h = 60 km).

" 13 Up iP 05 54 52.1
microns sec
P Z' 0.1 0.6

" 13 Ki iP 05 56 30.5 C

" 13 Up iP 05 59 59.2 C

" 13 Up i(P) 06 00 12.4 C

" 13 Up iP 06 01 03.2
microns sec
P Z' 0.1 0.6

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 13 Up i(P) 06 01 18.5
microns sec
(P) Z' 0.1 0.6

" 13 Up iP 06 03 20.1
i 06 03 23.6

" 13 Ki iP 06 07 19.5 C

" 13 Ki iP 06 13 14.0

" 13 Ki iP 06 15 37.8
microns sec
P Z' 0.3 0.8
Kurile Islands (h = 60 km).

" 13 Ki i(P) 06 15 53.1
microns sec
(P) Z' 0.4 1.0

" 13 Up iP 06 19 58.9 C
microns sec
P Z' 0.2 0.7
Gb iP 06 20 19.2 C
ipP 06 20 31.2
Kurile Islands. h = 50 km (Gb).

" 13 Up iP 06 23 18.6 C
Kurile Islands (h = 40 km).

" 13 Up iP 06 26 59.3 C
Ki iP 06 26 12.6 C
Kurile Islands.
Origin time = 06 15 58.

" 13 Up iP 06 32 02.5
Kurile Islands.

" 13 Up iP 06 34 44.7
Ki iP 06 33 49.9 C
Kurile Islands (h = 40 km).

" 13 Up iP 06 36 38.1

" 13 Ki iP 06 39 35.2
Um iP 06 39 56.1 C
Kurile Islands.
Origin time = 06 29 20.

" 13 Up iP 06 39 47.6 C

" 13 Up iP 06 52 48.6
Ki iP 06 52 03.0
Um iP 06 52 22.7 C
Kurile Islands.
Origin time = 06 41 47.

1963
Oct. 13 Up iP 06 54 47.7
Um iP 06 54 22.3
Kurile Islands.
Origin time = 06 43 46.

" 13 Up iP 06 57 44.8
microns sec
P Z' 0.2 1.0
Gb iP 06 58 06.2
ipP 06 58 19.3
Um iP 06 57 20.3
Ka iP 06 58 06
Kurile Islands. h = 50 km (Gb).

" 13 Up iP 06 59 24.3
microns sec
P Z' 0.1 0.8
Ki iP 06 58 37.1
microns sec
P Z' 0.3 1.0
Gb iP 06 59 46.6
Um iP 06 58 57.6
Kurile Islands (h = 60 km).

" 13 Up iP 07 07 05.0

" 13 Up iP 07 09 22.0

" 13 Up iP 07 09 35.7
Um iP 07 09 10.8
Kurile Islands.
Origin time = 06 58 34.

" 13 Up iP 07 14 18.0
Sk eP 07 14 10
Um iP 07 13 52.6
Kurile Islands.
Origin time = 07 03 16.

" 13 Up iP 07 14 21.0
microns sec
P Z' 0.4 0.9
Ki iP 07 13 31.2 D
microns sec
P Z' 0.2 1.0
Sk iP 07 14 11.4
Gb iP 07 14 42.3
Um iP 07 13 57.1 D
Ka iP 07 14 43
Kurile Islands (h = 50 km).
Magn. = 6.4 (Up,Ki).

" 13 Up iP 07 19 04.7
Ki iP 07 18 17.7
Um iP 07 18 39.8
Kurile Islands.
Origin time = 07 08 03.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct.	13	Up	iP	07 20 18.5	C
"	13	Um	iP	07 22 39.0	C
"	13	Up	iP	07 24 20.0	
		Um	iP	07 23 54.0	
		Kurile Islands.			
		Origin time = 07 13 18.			
"	13	Up	iP	07 27 40.5	D
		Um	iP	07 27 14.8	D
		Kurile Islands (h = 60 km).			
"	13	Up	iP	07 27 59.1	
		Ki	iP	07 27 10.9	
		Um	iP	07 27 32.8	
		Kurile Islands.			
		Origin time = 07 16 56.			
"	13	Up	iP	07 30 12.0	
		Kurile Islands (h = 40 km).			
"	13	Up	i(P)	07 30 26.2	
		Could possibly be pP of preceding shock.			
"	13	Up	iP	07 31 56.1	
"	13	Up	iP	07 32 37.9	
"	13	Up	iP	07 33 35.3	C
"	13	Up	iP	07 36 32.7	
"	13	Up	iP	07 37 48.7	
"	13	Up	iP	07 39 30.0	D
		Ki	iP	07 38 43.0	
		Um	iP	07 39 04.5	D
		Kurile Islands.			
		Origin time = 07 28 28.			
"	13	Um	iP	07 41 13.5	
"	13	Up	iP	07 42 52.6	D
		Ki	eP	07 42 09	
		Gb	iP	07 43 13.3	
		Kurile Islands (h = 40 km).			
"	13	Up	i(P)	07 43 06.4	
		Could possibly be pP of preceding shock.			
"	13	Up	iP	07 46 35.9	
		Ki	iP	07 45 49.8	C
		Um	iP	07 46 11.1	
		Kurile Islands (h = 50 km).			
1963 Oct.	13	Up	iP	07 47 45.1	
		Ki	iP	07 46 57.7	
		Um	iP	07 47 18.9	
		Kurile Islands.			
		Origin time = 07 36 43.			
"	13	Up	iP	07 56 52.3	D
		Kurile Islands.			
"	13	Up	iP	07 57 25.2	
		Um	iP	07 56 59.6	
		Kurile Islands.			
		Origin time = 07 46 23.			
"	13	Up	iP	07 59 25.9	
		Kurile Islands (h = 30 km).			
"	13	Ki	iP	07 59 43.5	
"	13	Up	iP	08 06 57.1	
		Um	iP	08 06 31.8	
		Kurile Islands.			
		Origin time = 07 55 55.			
"	13	Up	iP	08 09 53.7	
"	13	Up	iP	08 10 13.9	
"	13	Up	iP	08 10 32.9	
"	13	Ki	iP	08 12 20.2	
		Um	iP	08 12 41.6	C
		Kurile Islands.			
		Origin time = 08 02 05.			
"	13	Up	iP	08 13 25.1	
		Kurile Islands.			
"	13	Up	i(P)	08 14 10.6	
"	13	Up	iP	08 17 35.4	
		Ki	iP	08 16 51.8	
		Um	iP	08 17 10.1	C
		Kurile Islands (h = 40 km).			
"	13	Up	iP	08 18 21.0	
		Um	iP	08 17 54.4	
		Ka	iP	08 18 42	C
		Kurile Islands.			
		Origin time = 08 07 19.			
"	13	Up	iP	08 19 48.0	
		Um	iP	08 19 22.2	
		Kurile Islands.			
		Origin time = 08 08 46.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 13 Up iP 08 20 43.6
Um iP 08 20 18.1 C
Kurile Islands.
Origin time = 08 09 42.

" 13 Up iP 08 22 34.3
i 08 22 37.9
microns sec
P Z' 0.1 0.8
Ki iP 08 21 47.4 D
microns sec
P Z' 0.1 1.0
Sk iP 08 22 26.7 D
Gb iP 08 22 59.0 D
Kurile Islands (h = 60 km).
Magn. = 5.8 (Up,Ki).

" 13 Up i(P) 08 22 50.6
microns sec
(P) Z' 0.1 0.6
Ka i(P) 08 23 11
Kurile Islands.
Origin time = 08 11 49.
Could instead possibly be
pP of preceding shock.

" 13 Up iP 08 30 15.0
Ki iP 08 29 28.9
Um iP 08 29 50.2
Kurile Islands (h = 40 km).

" 13 Up iP 08 41 43.8
Ki iP 08 40 57.3
Um iP 08 41 18.8
Kurile Islands.
Origin time = 08 30 42.

" 13 Gb iP 08 48 29.2
Ka iP 08 48 30
Kurile Islands (h = 50 km).

" 13 Up iP 08 50 26.4
ipP 08 50 38.6
Um iP 08 50 01.0
Kurile Islands. h = 50 km (Up).
Origin time = 08 39 24.

" 13 Up iP 08 50 53.7
Kurile Islands (h = 40 km).

" 13 Up iP 08 53 33.7

" 13 Up iP 08 57 27.2

" 13 Up iP 08 58 38.4 C

1963 Oct. cont. 13 Ki iP 08 57 51.4
Um iP 08 58 14.0
Kurile Islands.
Origin time = 08 47 36.

" 13 Um iP 09 01 15.3

" 13 Up iP 09 01 19.7
ipP 09 01 33.6
Kurile Islands. h = 60 km
(Up).

" 13 Up iP 09 05 09.8
Kurile Islands.

" 13 Up iP 09 21 17.5
Um iP 09 20 52.8
Kurile Islands (h = 40 km).

" 13 Up iP 09 23 02.6 C
ipP 09 23 15.0
microns sec
P Z' 0.1 0.9
Ki iP 09 22 15.6
microns sec
P Z' 0.1 1.0
Um iP 09 22 37.2
ipP 09 22 49.3
Kurile Islands.
h = 50 km (Up,Um).
Magn. = 5.8 (Up,Ki).

" 13 Up iP 09 27 25.1 C
Ki iP 09 26 38.4
Sk eP 09 27 20
Um iP 09 26 59.6
Kurile Islands (h = 50 km).

" 13 Up iP 09 28 41.5 D
Ki iP 09 27 55.2
Um iP 09 28 15.9
Kurile Islands.
Origin time = 09 17 40.

" 13 Up iP 09 33 44.6
Ki iP 09 32 57.7
Um iP 09 33 19.0
Kurile Islands (h = 50 km).

" 13 Um iP 09 34 11.8

" 13 Up iP 09 38 19.4
Um iP 09 37 54.0
Kurile Islands (h = 40 km).

" 13 Up iP 09 42 17.0

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 13 Um iP 09 54 19.9

" 13 Up iP 09 56 07.2
Ki iP 09 55 20.0
Kurile Islands.
Origin time = 09 45 05.

" 13 Gb iP 09 55 45.6

" 13 Up iP 09 55 53.6
Kurile Islands (h = 50 km).

" 13 Up iP 10 02 08.0
Ki iP 10 01 21.0
Um iP 10 01 42.5
Kurile Islands.
Origin time = 09 51 06.

" 13 Up iP 10 07 43.3
ipP 10 07 55.4
Ki iP 10 06 55.9
ipP 10 07 08.8
Um iP 10 07 16.6
ipP 10 07 29.5
Kurile Islands.
h = 50 km (Up,Ki,Um).

" 13 Up iP 10 12 14.8
Ki iP 10 11 28.9 C
Um iP 10 11 49.4 C
Kurile Islands (h = 60 km).

" 13 Up iP 10 17 28.1
ipP 10 17 38.7
microns sec
M E 2.5 19
M N 2.4 17
M Z 2.7 17
Ki iP 10 16 40.6
ipP 10 16 52.0
microns sec
M E 3.0 15
M Z 1.7 14
Um iP 10 17 01.0
Ka i(P) 10 18 01
Kurile Islands.
h = 40 km (Up,Ki).
Magn. = 5.7 (Up,Ki).

" 13 Up iP 10 18 44.4

" 13 Up iP 10 21 28.6
Ki eP 10 20 44
Kurile Islands (h = 50 km).

1963
Oct. 13 Up iP 10 40 29.3 D
Kurile Islands.

" 13 Up eP 10 44 58
Ki iP 10 44 13.3
Um iP 10 44 34.1
Kurile Islands (h = 50 km).

" 13 Up iP 10 58 13.2
Ki iP 10 57 27.5
Um iP 10 57 47.0
Kurile Islands (h = 40 km).

" 13 Up iP 11 26 39.4
Ki eP 11 25 54
Um iP 11 26 15.0 C
Kurile Islands (h = 50 km).

" 13 Up iP 11 33 58.5
Ki iP 11 33 11.5
Um iP 11 33 33.7
Kurile Islands (h = 60 km).

" 13 Up iP 11 46 18.5
Ki iP 11 45 35.0
Um iP 11 45 52.8
Kurile Islands (h = 25 km).

" 13 Up iP 11 46 38.4
Kurile Islands.

" 13 Up iP 11 50 01.1 C
Um iP 11 49 35.9
Kurile Islands (h = 25 km).

" 13 Um iP 11 58 36.5

" 13 Up iP 12 08 20.1
Kurile Islands (h = 50 km).

" 13 Up iP 12 09 55.7

" 13 Up iP 12 16 50.4
Ki iP 12 16 04.8
Um iP 12 16 25.2
ipP 12 16 36.2
Kurile Islands.
h = 40 km (Um).

" 13 Up iP 12 31 51.1
Kurile Islands (h = 50 km).

" 13 Up iP 12 40 37.0
microns sec
P Z' 0.1 0.6

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 13 cont.

Ki iP 12 39 49.8
microns sec
P Z' 0.2 1.0
Sk iP 12 40 25.6 C
Um iP 12 40 11.8
Kurile Islands (h = 30 km).

" 13 Up iP 12 45 19.5
Ki iP 12 44 35.4
Um iP 12 44 54.7
Kurile Islands (h = 25 km).

" 13 Up iP 12 51 39.5
Ki iP 12 50 52.7
Um iP 12 51 14.4 C
Kurile Islands (h = 50 km).

" 13 Up iP 12 53 12.4 C
microns sec
P Z' 0.3 0.8
M N 3.1 17
M Z 2.2 17
Ki iP 12 52 26.0
ipP 12 52 40.0
microns sec
P Z' 0.1 1.0
M E 3.2 17
M Z 1.8 16
Sk iP 12 53 02.5
Gb iP 12 53 33.0 C
Um iP 12 52 46.8
ipP 12 52 59.3
Ka iP 12 53 35.3 C
Kurile Islands.
h = 50 km (Ki,Um).
Magn. = 5.9 (Up,Ki).

" 13 Up iP 13 03 26.6
Kurile Islands (h = 30 km).

" 13 Up iP 13 04 59.0
Um iP 13 04 35.0
Kurile Islands (h = 25 km).

" 13 Up iP 13 09 19.3 C
microns sec
P Z' 0.2 0.6
M E 2.7 20
M N 7.5 17
M Z 4.5 20
Ki iP 13 08 32.5
ipP 13 08 47.7
microns sec
P Z' 0.1 1.0
pP Z' 0.2 1.0
M E 5.0 18
M Z 6.9 17

1963 Oct. 13 cont.

Sk iP 13 09 07.8
ipP 13 09 22.8
Gb iP 13 09 42.4
ipP 13 09 57.1
Um iP 13 08 53.9
Ka iP 13 09 42.7
Kurile Islands.
h = 60 km (Ki,Sk,Gb).
Magn. = 6.0 (Up,Ki).

" 13 Ki iP 13 15 11.1
Kurile Islands (h = 30 km).

" 13 Up iP 13 16 23.6

" 13 Up iP 13 18 02.7

" 13 Up iP 13 31 58.3
microns sec
P Z' 0.1 0.6
Ki iP 13 31 12.0
Um iP 13 31 33.0 D
Ka iP 13 32 22.2
Kurile Islands (h = 60 km).

" 13 Up iP 13 52 43.8
Kurile Islands (h = 50 km).

" 13 Up iP 14 04 09.6
Kurile Islands (h = 40 km).

" 13 Up iP 14 05 26.1
ipP 14 05 38.9
Ki iP 14 04 39.2
microns sec
P Z' 0.1 1.0
M E 1.3 17
Um iP 14 05 00.8 C
Kurile Islands.
h = 50 km (Up).

" 13 Up iP 14 14 57.3
Ki iP 14 14 11.6 C
Um iP 14 14 32.5
Kurile Islands (h = 25 km).

" 13 Up iP 14 25 42.4
Kurile Islands (h = 40 km).

" 13 Up iP 14 37 11.7
microns sec
P Z' 0.1 1.0
M E 1.5 20
M N 2.6 16
M Z 1.6 17
Ki iP 14 36 25.2

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 13 cont.

Ki microns sec
M E 2.0 19
M Z 2.0 17
Gb iP 14 37 33.1
Um iP 14 36 46.2
Ka iP 14 37 35.8
Kurile Islands (h = 50 km).
Magn. = 5.6 (Up,Ki).

" 13 Up iP 14 39 20.2 D
Kurile Islands.

" 13 Up iP 16 00 55.9
Kurile Islands (h = 50 km).

" 13 Up iP 16 10 48.2 C
i 16 20 42
e(Sa) 16 27 39
microns sec
P N 0.5 4
P Z' 0.3 0.7
M E 5.4 25
M N 13 19
M Z 14 19
Ki iP 16 10 01.7
iS 16 18 19
microns sec
P Z' 0.2 1.0
S E 0.9 13
M E 5.0 16
M Z 11 20
D = 6700 km = 60½°.
Sk iP 16 10 38.6 C
iPcP 16 11 07.5
Gb iP 16 11 10.4
Um iP 16 10 23.2 C
iPa 16 14 16
iS 16 18 50
i 16 19 22
Ka iP 16 11 13.6 C
Kurile Islands (h = 40 km).
Magn. = 6.3 (Up,Ki).

" 13 Sk iP 16 15 59.4 C

" 13 Ki iP 16 22 47.0
Kurile Islands (h = 30 km).

" 13 Up iP 16 39 57.1
Ki iP 16 39 11.1
Um iP 16 39 32.1
Kurile Islands (h = 40 km).

" 13 Up iP 16 43 40.0
Ki iP 16 42 54.7
Um iP 16 43 12.5
Kurile Islands (h = 40 km).

1963 Oct. 13

Ki iP 16 57 49.3
Sk iP 16 57 46.8 C
Um iP 16 57 59.6
Mexico (h = 50 km).

" 13 Up iP 17 00 42.5
Ki eP 16 59 56
Um iP 17 00 17.7
Kurile Islands (h = 40 km).

" 13 Um iP 17 28 58.7 D

" 13 Up iP 17 36 58.0 C
Ki iP 17 36 11.2
Um iP 17 36 32.6 C
Kurile Islands (h = 50 km).

" 13 Up iP 17 42 19.5
microns sec
M E 3.6 16
M N 5.4 18
M Z 6.5 17
Ki eP 17 41 31
iPa 17 44 44
microns sec
M E 3.7 15
M Z 8.4 17
Um iP 17 41 54.3 D
Kurile Islands (h = 50 km).
Magn. = 5.9 (Up,Ki).

" 13 Up iP 18 07 30.1
Kurile Islands (h = 50 km).

" 13 Up iP 18 21 59.0
Ki iP 18 21 13.2 D
Um iP 18 21 34.2
ipP 18 21 46.0
Kurile Islands.
h = 50 km (Um).

" 13 Up iP 18 22 44.3

" 13 Up iP 18 24 45.1 D
microns sec
P Z' 0.1 0.6
M E 2.4 18
M N 2.0 17
M Z 1.7 18
Ki iP 18 23 59.2
microns sec
M E 1.4 16
M Z 1.8 16
Gb iP 18 25 06.8
Um iP 18 24 19.8
ipP 18 24 33.9

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 13 Kurile Islands.
cont. h = 60 km (Um).
Magn. = 5.6 (Up,Ki).

" 13 Up iP 18 25 56.8 C
Ki iP 18 25 14.2 C
Sk eP 18 25 45
Um iP 18 25 31.0
Kurile Islands (h = 50 km).

" 13 Up iP 18 45 29.2
Kurile Islands (h = 30 km).

" 13 Up iP 18 48 15.2

" 13 Up iP 18 56 33.4
Kurile Islands.

" 13 Up iP 19 22 21.8 C
Kurile Islands (h = 25 km).

" 13 Up iP 19 37 02.6
Ki iP 19 36 15.2 D
Um iP 19 36 37.3
Kurile Islands (h = 30 km).

" 13 Up iP 19 38 35.0
microns sec
P Z' 0.1 0.6
M N 2.1 21
M Z 1.7 18
Ki iP 19 37 47.1 C
microns sec
P Z' 0.2 1.0
M E 2.3 19
M Z 2.2 18
Sk iP 19 38 23.6 C
Gb iP 19 38 56.1 C
Um iP 19 38 09.0
Ka iP 19 38 56
Kurile Islands (h = 50 km).
Magn. = 5.8 (Up,Ki).

" 13 Ki iP 19 41 48.5

" 13 Up iP 19 52 19.2
microns sec
P Z' 0.1 0.6
Ki iP 19 51 32.0
microns sec
P Z' 0.1 1.0
Um iP 19 51 53.8 C
Kurile Islands (h = 50 km).
Magn. = 5.9 (Up,Ki).

1963
Oct. 13 Ki iP 20 05 11.3
Kurile Islands (h = 40 km).

" 13 Up iP 20 22 21.8 C

" 13 Up iP 20 25 13.0
Kurile Islands (h = 25 km).

" 13 Up iP 20 38 37.5
Ki iP 20 37 49.9
Sk eP 20 38 24
Um iP 20 38 12.5
Kurile Islands (h = 30 km).

" 13 Up iP 20 46 50.2
Kurile Islands (h = 30 km).

" 13 Um iP 21 09 24.8

" 13 Up iP 21 46 37.5
ipP 21 46 50.4
Ki iP 21 45 49.6
microns sec
P Z' 0.1 1.0
Um iP 21 46 11.5
ipP 21 46 24.3
Kurile Islands.
h = 50 km (Up,Um).

" 13 Up iP 21 59 02.3
Kurile Islands (h = 50 km).

" 13 Up iP 22 00 58.2
Ki iP 22 00 11.1
Um iP 22 00 32.0
Kurile Islands (h = 50 km).

" 13 Up iP 22 06 04.1 D
microns sec
P Z' 0.3 0.9
M E 2.4 21
M N 2.1 21
M Z 1.9 15
Ki iP 22 05 17.1
microns sec
P Z' 0.4 1.0
M E 2.6 15
M Z 1.8 16
Sk iP 22 05 52.9
Gb iP 22 06 24.6 D
Um iP 22 05 39.0 D
i 22 05 42.7
Ka iP 22 06 27
Kurile Islands (h = 50 km).
Magn. = 6.1 (Up,Ki).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 13 Up iP 22 07 42.1

" 13 Up iP 22 13 57.5
microns sec
P Z' 0.1 0.8
Ki iP 22 13 11.2 D
Sk iP 22 13 46.3
Gb iP 22 14 18.6 D
Um iP 22 13 32.5
Kurile Islands (h = 50 km).

" 13 Up iP 22 36 37.6
Kurile Islands (h = 50 km).

" 13 Up iP 22 40 51.2
Um iP 22 40 25.7
Kurile Islands (h = 40 km).

" 13 Ki iP 23 15 44.9
Kurile Islands (h = 30 km).

" 13 Up iP 23 19 50.6
Kurile Islands (h = 50 km).

" 13 Up iP 23 26 38.5
Um iP 23 26 13.0
Kurile Islands.
Origin time = 23 15 37.

" 13 Up iP 23 36 03.3
microns sec
P Z' 0.1 1.0
Ki iP 23 35 16.2
Um iP 23 35 37.5
Kurile Islands (h = 50 km).

" 14 Up iP 00 03 24.9 D
microns sec
P Z' 0.1 0.5
M E 6.6 16
M N 13 18
M Z 9.8 18
Ki eP 00 02 39
eS 00 11 06
microns sec
P Z 0.7 7
S E 1.6 12
S Z 1.5 13
M E 9.1 15
M Z 11 16
D = 6900 km = 62°.
Um iP 00 02 58.6
ipP 00 03 09.5
e 00 11 44
Kurile Islands. h = 40 km (Um).
Magn. = 6.1 (Up,Ki).

1963 Oct. 14 Ki iP 00 03 11.5 C
microns sec
P Z' 0.1 1.2
Sk iP 00 03 55.4
(Kurile Islands).

" 14 Up iP 00 14 03.8
Ki eP 00 13 15
Um iP 00 13 41.4
Kurile Islands (h = 60 km).

" 14 Ki iP 00 29 44.3
Kurile Islands (h = 50 km).

" 14 Up iP 01 02 56.2
Ki iP 01 02 10.2
ipP 01 02 19.7
Um iP 01 02 31.2
Kurile Islands.
h = 40 km (Ki).

" 14 Ki iP 01 19 39.8
microns sec
M E 1.2 14
Kurile Islands (h = 40 km).

" 14 Up iP 01 30 18.7
i 01 30 22.7
i 01 30 35.1
Kurile Islands (h = 60 km).

" 14 Up iP 01 32 50.1 D
Sk iP 01 33 02.4

" 14 Ki iP 02 01 04.7
Kurile Islands (h = 50 km).

" 14 Up iP 02 11 44.6
microns sec
P Z' 0.1 0.5
Sk iP 02 12 00.4
Assam (h = 30 km).

" 14 Ki iP 03 32 10.1
Kurile Islands (h = 50 km).

" 14 Up iP 03 42 06.5
Ki iP 03 41 19.8
Um eP 03 41 40
Kurile Islands (h = 25 km).

" 14 Up iP 04 17 00.3
Ki iP 04 16 13.1
Um iP 04 16 34.6
Kurile Islands (h = 50 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 14 Up iP 04 22 15.6 C
microns sec
M E 4.6 20
M N 6.5 18
M Z 5.2 18
Ki iP 04 21 28.9
ipP 04 21 40.7
microns sec
P Z 0.8 6
M E 6.6 20
M Z 3.0 17
Sk iP 04 22 04.1
Gb iP 04 22 35.9 C
Um iP 04 21 49.9 C
Kurile Islands.
h = 50 km (Ki).
Magn. = 6.1 (Up,Ki).

" 14 Up iP 04 24 03.7
microns sec
P Z' 0.1 0.5
Ki iP 04 23 17.0
Gb iP 04 24 25.6
Um iP 04 23 38.5 C
Kurile Islands (h = 40 km).

" 14 Up iP 05 35 14.1 C
Ki iP 05 34 28.0 C
ipP 05 34 42.0
microns sec
M E 1.1 15
Sk eP 05 35 04
Um iP 05 34 48.6
ipP 05 35 03.3
Kurile Islands.
h = 60 km (Ki,Um).

" 14 Ki iP 06 36 14.1 C
i 06 36 26.9
Sk iP 06 36 46.8
Um iP 06 36 33.4
i 06 36 40.7
ipP 06 36 53.3
Aleutian Islands.
h = 80 km (Um).

" 14 Up iP 06 40 03.4
Ki iP 06 39 16.0
Um iP 06 39 40.9
Kurile Islands (h = 40 km).

" 14 Up iP 07 09 36.9

" 14 Up iP 07 27 06.5
Ki iP 07 26 11.2
Kurile Islands (h = 50 km).

1963
Oct. 14 Up iP 08 05 36.0 C
ipP 08 05 50.2
microns sec
P Z' 0.1 0.5
Ki iP 08 04 48.8
Sk eP 08 05 24
Kurile Islands.
h = 70 km (Up).

" 14 Ki iP 09 39 18.8
Um iP 09 39 40.9
Kurile Islands (h = 40 km).

" 14 Ki iP 10 34 49.5
Kurile Islands (h = 40 km).

" 14 Ki eP 11 33 24
Um iP 11 33 50.8 C
Kurile Islands (h = 50 km).

" 14 Up iP 13 32 44.5 C
ipP 13 32 59
eS 13 41 42
microns sec
P Z' 0.5 0.5
S E 0.8 6
M E 3.8 20
M N 11 23
M Z 11 23
D = 7600 km = $68\frac{1}{2}^{\circ}$.
Ki iP 13 31 57.9 C
eS 13 40 14
microns sec
P Z' 0.5 1.0
S E 1.4 10
S N 0.9 9
M E 6.3 15
M N 6.7 17
M Z 9.3 17
D = 6800 km = 61°.
Sk iP 13 32 33.1 C
ipP 13 32 48.1
Gb iP 13 33 05.5 C
ipP 13 33 20.3
Um iP 13 32 19.3 C
iS 13 40 56
Ka iP 13 33 04
ipP 13 33 19
Kurile Islands.
h = 60 km (Up,Sk,Gb,Ka).
Magn. = 6.3 (Up,Ki).

" 14 Up iP 14 04 17.8
Ki iP 14 03 32.2
Kurile Islands (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 14 Up iP 15 33 14.7 C

" 14 Up iP 18 01 13.2 C
microns sec
P Z' 0.2 0.7
Ki iP 18 00 26.2 C
microns sec
P Z' 0.2 1.0
Sk iP 18 01 02.8
Gb iP 18 01 33.5 C
Um iP 18 00 47.9
ipP 18 01 01.3
Kurile Islands.
h = 50 km (Um).
Magn. = 6.3 (Up,Ki).

" 14 Up iP 18 07 18.8
Um iP 18 06 53.3
Kurile Islands (h = 30 km).

" 14 Up iP 18 36 07.0
i 18 36 32.0

" 14 Ki iP 18 45 11.1
Sumatra (h = 30 km).

" 14 Ki iP 19 48 11.1 D

" 14 Up iP 20 39 29.4

" 14 Up eP 20 46 26

" 14 Up iP 21 18 58.2
Kurile Islands (h = 50 km).

" 14 Up iP 21 20 08.5 D
microns sec
P Z' 0.1 0.5
Ki iP 21 20 15.1 D
microns sec
P Z' 0.1 1.0
Sk iP 21 20 33.1
iPP 21 22 16.1
Gb iP 21 20 30.0 D
Um iP 21 20 05.4 D
Pamir. Magn. = 6.0 (Up,Ki).

" 14 Up iP 22 46 41.3
i 22 46 45.4
Ki iP 22 45 46.7 C
ipP 22 45 58.7
Kurile Islands.
h = 50 km (Ki).

" 14 Ki iP 23 12 49.6 D
Sinkiang (h = 70 km).

1963
Oct. 15 Up iP 00 58 47.8 C
Kurile Islands (h = 40 km).

" 15 Up iP 01 00 02.6 C
i(PcP) 01 00 32.0
microns sec
P Z' 0.1 0.5
Ki iP 00 59 29.5 C
microns sec
P Z' 0.1 1.0
Sk iP 00 59 59.1
Um iP 00 59 42.6

" 15 Sk iP 01 03 00.2

" 15 Up iP 04 25 35.3
Ki iP 04 25 34.6
Um iP 04 25 32.1
Sumatra (h = 140 km).

" 15 Up iP 04 56 10.8

" 15 Up iP 05 07 26.7 D
Kurile Islands (h = 50 km).

" 15 Up eL 07 27
microns sec
M E 1.6 11
M N 3.6 18
M Z 4.3 17
Ki eL 07 23
microns sec
M E 4.4 13
M N 2.8 14
M Z 3.4 17

" 15 Up iP 08 11 12.4
microns sec
P Z' 0.1 1.0
Ki iP 08 10 26.2
microns sec
P Z' 0.1 1.0
Sk iP 08 11 01.1
Gb iP 08 11 33.2
Kurile Islands (h = 40 km).
Magn. = 5.8 (Up,Ki).

" 15 Up iP 09 13 06.2
microns sec
M E 1.3 17
M N 1.4 18
M Z 2.6 20
Ki eP 09 12 19
microns sec
M E 2.2 16

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 15 cont.

Ki microns sec
M N 1.4 16
M Z 3.1 16
Sk eP 09 12 55
Kurile Islands
(h = 40 km).

" 15 Ki iP 09 40 14.4 C
microns sec
P Z' 0.2 1.0
Um iP 09 40 27.4

" 15 Up iP 09 43 06.8
iPcP 09 43 32.6
microns sec
P Z' 0.1 0.6
Ki iP 09 42 20.8
Sk eP 09 42 55
Um iP 09 42 41.9
Kurile Islands
(h = 40 km).

" 15 Up iP 10 03 30.2 C
iS 10 06 50
iX 10 07 07
microns sec
P E 1.2 6
P N 1.8 6
P Z 2.4 7
P Z' 0.4 1.5
S E 1.8 7
S N 2.1 7
M E 7.2 19
M N 12 12
M Z 9.2 17
D = 1950 km = 17½°.
Ki iP 10 02 58.2 C
eS 10 06 02
microns sec
P E 4.9 7
P Z 3.7 6
P Z' 1.4 1.5
S E 3.0 10
S N 12 18
M E 30 16
M N 15 14
M Z 22 14
D = 1650 km = 15°.
Sk iP 10 02 36.7
i(Lgl) 10 06 27.5
Gb iP 10 03 23.4
i 10 03 27.9
Um iP 10 03 15.1 C

1963 Oct. 15 cont.

Um i 10 03 19.8
eS 10 06 06
iX 10 06 28
D = 1800 km = 16°.
Iceland
(h = 30 km).
Magn. = 5.8 (Up,Ki).
The phase marked X (Up,Um) has a group velocity of 4.26 km/sec. There is a clear train of higher mode Rayleigh waves, about ½-1 min in duration, especially clear at Up and Um. This is remarkable considering the paths, which cross over deep ocean. Another interesting feature is that the particle motion is progressive elliptic. The fundamental mode surface waves exhibit the typical features described by M. Båth and A. Vogel, Geof. pura e appl. 39:35-54, 1958.

" 15 Up iP 10 58 11.4
microns sec
P Z' 0.1 0.7
Ki iP 10 57 24.6 C
Sk iP 10 58 01.0
Gb iP 10 58 32.9 C
Um iP 10 57 46.9
Kurile Islands
(h = 50 km).

" 15 Up iP 12 04 46.4 D
ipP 12 04 58.4
microns sec
P Z' 0.1 0.9
M E 1.3 17
M N 1.4 18
M Z 1.7 18

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 15 cont.

Ki iP 12 03 58.8
microns sec
P Z' 0.3 1.0
M E 2.1 17
M N 0.9 17
M Z 2.2 18
Gb iP 12 05 07.1 D
Um iP 12 04 20.8
Kurile Islands.
h = 50 km (Up).

" 15 Up eP 12 14 50
Ki iP 12 14 02.7
microns sec
P Z' 0.3 1.0
Sk eP 12 14 40
Um iP 12 14 24.4
ipP 12 14 36.8
Kurile Islands.
h = 50 km (Um).

" 15 Ki iP 12 33 52.3

" 15 Ki iP 13 05 22.6

" 15 Um iP 15 17 20.5

" 15 Ki iP 16 09 33.7

" 15 Ki iP 16 40 54.7

" 15 Up iP 17 26 58.6
Ki eP 17 26 12
Um iP 17 26 33.1 C
Kurile Islands (h = 50 km).

" 15 Up iP 18 05 05.6 D
Ki eP 18 04 17
Um iP 18 04 40.5 D
Kurile Islands (h = 30 km).

" 15 Up iP 18 34 57.0
microns sec
P Z' 0.1 0.5
M E 2.4 18
M N 2.4 17
M Z 2.7 17
Ki iP 18 34 10.6
microns sec
M E 5.9 17
M N 3.2 22
M Z 2.3 15
Sk iP 18 34 46.7
Gb iP 18 35 18.1
Um iP 18 34 32.3
eS 18 43 17

1963 Oct. 15 cont.

Kurile Islands (h = 40 km).
Magn. = 5.8 (Up,Ki).

" 15 Up iP 20 39 06.9 C
microns sec
P Z' 0.1 0.5

" 15 Up iP 20 52 27.3
microns sec
M E 1.2 16
M N 1.8 18
M Z 1.3 16
Ki eP 20 51 43
microns sec
M E 1.6 17
M N 1.6 20
Gb iP 20 52 50.6 D
Um iP 20 52 02.6
Kurile Islands (h = 50 km).

" 15 Up ---
microns sec
M N 2.0 20
Ki eP 21 58 41
microns sec
M E 1.8 18
M N 2.0 22
Um iP 21 58 47.3
Ceram (h = 25 km).

" 15 Up iP 22 52 37.7
Kurile Islands (h = 40 km).

" 15 Up iP 23 28 39.5

" 16 Up iP 00 57 04.0
Kurile Islands (h = 50 km).

" 16 Up iP 01 36 01.1
Ki iP 01 35 14.0
Um iP 01 35 35.4
Kurile Islands (h = 50 km).

" 16 Up iP 03 26 02.8
Um iP 03 25 37.1
Kurile Islands.
Origin time = 03 15 01.

" 16 Up iP 05 26 37.6 C
Ki iP 05 25 50.4 C
Um iP 05 26 11.7
Kurile Islands (h = 30 km).

" 16 Sk e 07 32 25
eSg 07 32 58
Um iSg 07 34 18.8

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 16 Up iP 08 44 41.3
Ki iP 08 43 53.2 D
microns sec
P Z' 0.1 1.0
Sk eP 08 44 32
Um iP 08 44 15.4
ipP 08 44 28.3
Kurile Islands.
h = 50 km (Um).

" 16 Ki iP 09 40 14.1
Um iP 09 40 36.3
Kurile Islands (h = 40 km).

" 16 Up iP 10 41 53.9
Ki iP 10 41 07.6
Um iP 10 41 28.8
Kurile Islands (h = 50 km).

" 16 Gb iPg 13 00 50.4 C
iSg 13 00 52.1
Local explosion.

" 16 Ki iP 13 01 17.0
Halmahera (h = 30 km).

" 16 Ki iP 15 50 15.6

" 16 Up iP 15 50 36.3
i 15 50 40.2
iPa 15 52 00
iPP 15 52 13.8
eS 15 56 30
iSa 15 58 44
iSS 15 59 38
iLgl 16 04 28
microns sec
P E 1.1 4
P Z 1.4 3
P Z' 0.3 1.0
PP Z 4.0 8
PP Z' 0.5 1.1
S E 1.3 7
M E 27 17
M N 66 15
M Z 36 14
D = 4450 km = 40°.
Ki iP 15 50 41.7
eSS 15 59 46
microns sec
P Z' 0.6 1.0
M E 47 11
M N 40 12
M Z 50 13
Sk iP 15 51 01.7
i 15 51 04.7
iPP 15 52 43.1

1963 Oct. 16 cont. Gb iP 15 51 04.0
iPP 15 52 38.6
Um iP 15 50 31.2
i 15 50 36.7
iPP 15 52 03.7
iS 15 56 30
Tadzhik (h = 30 km).
Magn. = 6.4 (Up,Ki).
Well developed higher mode surface waves on long-period records.

" 16 Up iP 17 11 48.5 C
Ki iP 17 11 12.1 C
Sk iP 17 11 22.8
Um iP 17 11 34.0 C
Nevada. Underground nuclear explosion.

" 16 Up iP 18 16 37.8
i 18 16 41.8

" 16 Up iP 19 10 08.3
Ki iP 19 10 38.5
Sk iP 19 10 41.5
Um iP 19 10 20.0
Iran (h = 30 km).

" 16 Ki iP 20 38 46.5
Um iP 20 38 45.5
Tadzhik (h = 70 km).

" 16 Up iP 21 41 52.2 C
i(PP) 21 44 18.1
microns sec
P Z' 0.2 0.5
Ki iP 21 41 05.5
microns sec
P Z' 0.3 1.0
Sk eP 21 41 39
Gb iP 21 42 12.5
Um iP 21 41 26.8 C
ipP 21 41 48.6
Kurile Islands.
h = 90 km (Um).
Magn. = 6.4 (Up,Ki).

" 17 Ki iP 03 17 36.6

" 17 Up iP 04 30 50.1
ipP 04 31 03.9
Ki iP 04 30 02.8
Um iP 04 30 24.0
ipP 04 30 38.5
Kurile Islands.
h = 60 km (Up,Um).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 17 Up iP 08 21 55.3
Kurile Islands (h = 50 km).

" 17 Ki iP 08 41 29.4 C
ipP 08 41 42.3
Um iP 08 41 51.8
ipP 08 42 03.7
Kurile Islands.
h = 50 km (Ki,Um).

" 17 Um iP 09 10 15.4

" 17 Ki iP 09 41 05.1 C
Sk eP 09 41 25
Um eP 09 40 54
Tadzhik (h = 40 km).

" 17 Up iP 10 27 47.8
Kurile Islands (h = 50 km).

" 17 Um iP 12 00 31.7

" 17 Um iP 13 10 56.2
i 13 12 37.2

" 17 Up iP 14 17 34.6 C
Um iP 14 17 09.5
Kurile Islands (h = 40 km).

" 17 Up iP 14 27 00.2
Ki iP 14 26 40.8
Um eP 14 26 48
Mindanao (h = 30 km).

" 17 Ki iP 14 32 22.8
Um iP 14 32 44.5
Kurile Islands (h = 50 km).

" 17 Up iP 15 14 12.3
Kurile Islands (h = 60 km).

" 17 Up iP 20 40 53.4 C

" 17 Up eP 22 46 40
Ki iP 22 45 52.0 C
Um iP 22 46 14.0
Kurile Islands (h = 30 km).

" 17 Up iP 23 35 32.0
i 23 35 33.2
i 23 35 35.0
i 23 38 42.7
e 23 44 47
i 23 45 45
microns sec
P Z 0.8 5
P Z' 0.2 0.7
M E 5.1 18

1963
Oct. 17 cont. Up
microns sec
M N 13 18
M Z 11 18
Ki iP 23 34 46.7
i 23 34 49.3
i 23 47 33
microns sec
M E 13 18
M N 8.5 18
M Z 15 19
Sk eP 23 35 23
i 23 35 24.7
Gb iP 23 35 54.5
i 23 35 57.4
Um iP 23 35 09.8
ePa 23 39 14
eS 23 43 37
Kurile Islands (h = 50 km).
Magn. = 6.1 (Up,Ki).

" 18 Up iP 00 05 55.8
Ki iP 00 05 11.6
Sk iP 00 05 46.4 C
Gb iP 00 06 17.8
Um iP 00 05 31.0 C
Kurile Islands (h = 50 km).

" 18 Up iP 02 10 38.6
Ki eP 02 09 51
Gb iP 02 10 59.9
Um iP 02 10 13.6
Kurile Islands (h = 50 km).

" 18 Up iP 04 12 22.0
ipP 04 12 34.4
Ki iP 04 11 35.4
Gb iP 04 12 44.3
Um iP 04 11 56.5
Kurile Islands.
h = 50 km (Up).

" 18 Up iP 05 27 05.2 C
Ki iP 05 26 22.2 C
Sk iP 05 26 58.6
Gb iP 05 27 26.8
Um iP 05 26 41.3
i(PcP) 05 27 12.1
Japan (h = 40 km).

" 18 Up iP 05 37 15.2
Ki iP 05 36 28.6
Um iP 05 36 50.0
Kurile Islands (h = 40 km).

" 18 Up iP 06 31 20.3
microns sec
P Z' 0.1 0.5
M N 1.1 18

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. cont.	18	Ki	iP	06 30 33.8		
		Sk	eP	06 31 10		
		Um	iP	06 30 55.5	D	
		Kurile Islands (h = 60 km).				
"	18	Ki	iP	07 15 23.9		
		Um	iP	07 15 45.0		
		Kurile Islands (h = 30 km).				
"	18	Ki	iP	08 05 24.3		
		Kurile Islands (h = 60 km).				
"	18	Up	iP	09 04 32.8		
				microns sec		
			M	E 1.8 19		
			M	N 4.0 18		
			M	Z 3.2 17		
		Ki	iP	09 03 44.8		
				microns sec		
			P	Z' 0.1 1.0		
			M	E 2.2 15		
			M	N 1.4 16		
			M	Z 3.5 16		
		Sk	eP	09 04 21		
		Gb	iP	09 04 52.8		
		Um	iP	09 04 05.7		
			eS	09 12 45		
		Kurile Islands (h = 60 km).				
		Magn. =5.7 (Up,Ki).				
"	18	Ki	iP	10 14 34.4		
		Um	iP	10 14 56.3		
		Kurile Islands (h = 30 km).				
"	18	Ki	iP	12 01 14.1		
"	18	Up	iP	15 34 05.3		
		Um	iP	15 34 48.0	C	
"	18	Up	eP	17 06 41		
		Ki	iP	17 07 52.1	D	
		Gb	iP	17 06 13.5	D	
		Um	iP	17 07 19.6		
		Ka	iP	17 06 03.5	D	
"	18	Up	iP	18 05 55.8		
			iPcP	18 06 22.4		
				microns sec		
			M	N 1.1 18		
			M	Z 1.6 20		
		Ki	eP	18 05 10	D	
				microns sec		
			M	N 1.0 20		
		Um	iP	18 05 31.4		
		Kurile Islands (h = 40 km).				
"	18	Up	iP	18 57 00.4		
		Kurile Islands (h = 50 km).				

1963 Oct.	18	Um	iP	19 36 37.4		
"	18	Up	iP	20 16 04.6		
			i	20 18 16.2		
				microns sec		
			M	E 0.6 17		
			M	N 2.0 20		
			M	Z 1.6 17		
		Ki	iP	20 15 17.6	D	
				microns sec		
			M	E 1.6 19		
			M	N 1.5 18		
			M	Z 1.5 17		
		Um	eP	20 15 37		
		Ka	iP	20 16 27.5		
		Kurile Islands (h = 40 km).				
"	18	Up	i(P)	20 32 05.5		
		Um	i(P)	20 33 47.5		
"	18	Up	iP	21 33 51.8		
			ipP	21 34 03.5		
				microns sec		
			P	Z' 0.1 0.5		
		Ki	iP	21 33 05.4	C	
				microns sec		
			P	Z' 0.1 1.0		
		Sk	iP	21 33 40.5		
		Gb	iP	21 34 12.9	C	
		Um	iP	21 33 26.8	C	
		Ka	iP	21 34 13.9		
			ipP	21 34 25.7		
		Kurile Islands.				
		h = 50 km (Up,Ka).				
		Magn. = 5.9 (Up,Ki).				
"	18	Up	iP	21 50 17.5		
		Sumatra (h = 30 km).				
"	18	Up	iP	23 03 47.7		
			ipP	23 04 00.0		
		Ki	iP	23 03 00.7		
		Kurile Islands (h = 40 km).				
"	18	Up	iP	23 54 34.7		
		Kurile Islands (h = 50 km).				
"	19	Up	iP	02 29 31.6		
			eS	02 38 29		
				microns sec		
			P	E 0.3 5		
			P	N 0.3 3		
			P	Z 0.7 3		
			P	Z' 0.3 0.8		
			S	N 0.7 11		
			M	E 3.0 25		
			M	N 4.1 17		
			M	Z 2.3 18		

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 19 cont.

Up D = 7500 km = 67½°.
Ki iP 02 28 44.7 D
iS 02 36 58
microns sec
P Z' 0.3 1.5
S E 1.0 6
S N 1.3 4
M E 2.8 15
M N 3.7 17
M Z 7.4 17
D = 6650 km = 60°.
Sk iP 02 29 20.7
ipP 02 29 33.5
iPcP 02 29 47.1
Gb iP 02 29 53.6 D
Um iP 02 29 05.8
ePa 02 33 08
iS 02 37 42
Ka iP 02 29 55.6 D
Kurile Islands.
h = 50 km (Sk).
Magn. = 6.2 (Up,Ki).

" 19 Up iP 03 13 39.4
Um iP 03 13 13.3
Kurile Islands (h = 30 km).

" 19 Up iP 03 25 58.0 C
ipP 03 26 10.3
microns sec
P Z' 0.1 0.9
Ki iP 03 25 09.7 C
Sk iP 03 25 45.8
i 03 26 08.8
Gb iP 03 26 19.2
Um iP 03 25 32.1 C
ipP 03 25 44.6
Ka eP 03 26 21
ipP 03 26 34.2
Kurile Islands.
h = 50 km (Up,Um,Ka).

" 19 Up iP 03 45 15.3
iS 03 54 09
microns sec
P Z 1.1 6
P Z' 0.3 0.9
S E 0.6 11
S N 1.0 10
M E 5.2 26
M N 5.8 17
M Z 3.4 18
D = 7500 km = 67½°.
Ki iP 03 44 28.2
i 03 44 55
eS 03 52 38
microns sec
P Z 1.7 5

1963 Oct. 19 cont.

Ki microns sec
P Z' 0.2 1.0
S E 1.8 13
S N 1.0 9
M E 4.7 18
M N 6.2 17
M Z 7.4 19
D = 6700 km = 60½°.
Sk iP 03 45 03.8
i 03 45 25.0
Gb iP 03 45 38.4
Um iP 03 44 48.6
i 03 44 51.4
iS 03 53 23
Ka eP 03 45 38
Kurile Islands (h = 30 km).
Magn. = 6.1 (Up,Ki).

" 19 Up iP 03 58 04.6 C
ipP 03 58 16.2
microns sec
P Z' 0.4 1.0
Ki iP 03 57 16.7
ipP 03 57 31.3
microns sec
P Z' 0.2 1.0
Sk iP 03 57 51.8 C
Gb iP 03 58 25.5
Um iP 03 57 38.7
Ka iP 03 58 26.9 C
Kurile Islands.
h = 50 km (Up,Ki).

" 19 Up iP 04 18 30.6 D
ipP 04 18 42.3
Kurile Islands.
h = 50 km (Up).

" 19 Up iP 05 52 16.7
Kurile Islands (h = 40 km).

" 19 Ki iP 06 53 32.6
Um iP 06 53 21.4
Kirghiz (h = 30 km).

" 19 Up iP 08 07 25.2
ipP 08 07 37.2
Kurile Islands.
h = 50 km (Up).

" 19 Up iP 09 15 15.3
Ki iP 09 14 56.3
Gb iP 09 15 35.3 C
Leyte, Philippine Islands
(h = 90 km).

" 19 Up iP 15 53 35.9 C
Kurile Islands (h = 40 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 19 Up iP 16 26 17.0 C
ipP 16 26 29.5
microns sec
P Z' 0.1 1.0
Ki iP 16 25 29.1 C
Gb iP 16 26 37.3
ipP 16 26 50.7
Um iP 16 25 51.1
ipP 16 26 03.9
Ka iP 16 26 39.0 C
ipP 16 26 51.9
Kurile Islands.
h = 50 km (Up,Gb,Um,Ka).
A focal depth of 120 km,
as given by USCGS, is not
confirmed by our observations.

" 19 Up iP 16 31 51.9 D
Gb iP 16 32 12.4
Um iP 16 31 26.9
Ka iP 16 32 13.7
Kurile Islands (h = 50 km).

" 19 Up iP 18 12 52.8
Ki iP 18 12 05.2 C
Um iP 18 12 27.7 C
ipP 18 12 40.3
Kurile Islands.
h = 50 km (Um).

" 19 Up iP 19 21 13.9
Ki iP 19 20 27.4
Um iP 19 20 48.5
Kurile Islands (h = 50 km).

" 19 Up eP 22 56 32

" 19 Up iP 23 22 41.8
microns sec
P Z' 0.1 0.5
Ki iP 23 21 52.8
Um iP 23 22 16.4
Ka iP 23 23 03.5
Kurile Islands (h = 30 km).

" 19 Up iP 23 55 31.4
ipP 23 55 45.7
Um iP 23 55 06.3
Kurile Islands.
h = 60 km (Up).

" 20 Up e(P) 00 14 54

" 20 Um i(P) 00 41 51.2
i 00 41 56.7

" 20 Up iP 00 53 43.1
Kurile Islands (h = 40 km).

1963
Oct. 20 Up iP 01 04 10.6
i 01 04 11.8
iX 01 04 15.9
iY 01 04 32.1
eS 01 13 21
iP'P' 01 32 29.8
i 01 32 54.1
microns sec
P E 2.9 13
P N 6.4 16
P Z 7.4 8
P Z' 0.7 1.2
S E 19 20
S N 28 20
P'P' Z' 0.6 2.0
M E 180 19
M N 250 21
M Z 250 20
D = 7650 km = 69°.
Ki iP 01 03 25.1
iX 01 03 30.5 D
i 01 04 38.9
iS 01 11 56
i 01 12 38
microns sec
P E 4.0 7
P N 3.6 10
P Z 14 11
P Z' 0.7 1.4
S E 19 12
S N 10 12
S Z 15 12
M E 240 20
M N 190 20
M Z 300 20
D = 6950 km = 62½°.
Sk iP 01 04 03.3
iY 01 04 26.1
Gb iP 01 04 31.7
iX 01 04 38.3
iY 01 04 52.8
Um iP 01 03 46.6
iX 01 03 50.8
iS 01 12 36
Ka iP 01 04 33.8
iX 01 04 39.9
Kurile Islands (h = 25 km).
Magn. = 7.0 (Up,Ki).
The magnitude calculated from the body waves is 6.9, from the surface waves 7.6, similarly to the main shock on Oct. 13. This is the largest aftershock and the magnitude is only 0.5-0.6 lower than for the main shock. Pasadena magnitudes, on the hand, give a difference of 1.4.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 20 cont. Complicated beginning with phases X and Y arriving on the average 5.5 and 21.8 sec after P. The amplitude is increasing in the order P - X - Y. Amplitudes given above for P actually refer to X. A phase corresponding to Y was also found on Oct. 19, 03 25 and 03 45, at Sk (see above).

" 20 Up iP 01 08 06.6
ipP 01 08 19.9
microns sec
P Z' 0.2 0.7
Ki iP 01 07 20.9
ipP 01 07 34.9
microns sec
P Z' 0.2 1.0
Um iP 01 07 41.7
ipP 01 07 55.2
Kurile Islands.
h = 50 km (Up,Ki,Um).
Magn. = 6.2 (Up,Ki).
Origin time = 00 57 05.

" 20 Up iP 01 16 14.0
i 01 16 23.7
Ka iP 01 16 34.6 C
ipP 01 16 45.6
Kurile Islands.
h = 40 km (Ka).
Origin time = 01 05 12.

" 20 Up iP 01 17 07.9
i 01 17 12.4

" 20 Up iP 01 17 37.4

" 20 Up iP 01 18 22.2
ipP 01 18 37.2
Ki iP 01 17 36.3
Um iP 01 17 57.3
ipP 01 18 10.4
Kurile Islands.
h = 60 km (Up,Um).

" 20 Up iP 01 23 28.2
Kurile Islands.

" 20 Up iP 01 25 05.5 C
Ki iP 01 24 18.6
Um iP 01 24 40.3 C
Kurile Islands (h = 50 km).

" 20 Up iP 01 27 10.4

1963
Oct. 20 Up iP 01 33 34.8 C
microns sec
P Z' 0.2 0.7
Ki iP 01 32 40.4
Sk iP 01 33 22.1
Gb iP 01 33 55.2
Um iP 01 33 08.7 C
Ka iP 01 33 57.1
Kurile Islands (h = 40 km).

" 20 Up iP 01 34 17.1
i 01 34 23.7
i 01 34 36.2
microns sec
P Z' 0.1 0.7
Gb iP 01 34 44.3
(Kurile Islands).

" 20 Up iP 01 37 54.3

" 20 Up iP 01 39 16.5

" 20 Up iP 01 42 39.4 D
ipP 01 42 52.1
Um iP 01 42 14.7
ipP 01 42 27.1
Kurile Islands.
h = 50 km (Up,Um).
Origin time = 01 31 37.

" 20 Up iP 01 43 55.6 D
Um iP 01 43 30.4 D
Kurile Islands.
Origin time = 01 32 53.

" 20 Up iP 01 48 19.3
i(pP) 01 48 33.6

" 20 Up iP 01 51 42.6
ipP 01 51 53.9
Kurile Islands.
h = 50 km (Up).

" 20 Up iP 01 52 12.9 C
microns sec
P Z' 0.1 1.0
Um iP 01 51 48.6
Ka iP 01 52 34.9
Kurile Islands.
Origin time = 01 41 12.

" 20 Up iP 01 53 38.3

" 20 Up eP 01 56 48
i(pP) 01 57 01.2
(Kurile Islands).

" 20 Up iP 02 00 08.6 C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 20 Up iP 02 01 54.2 D

" 20 Up iP 02 17 14.0
i 02 17 23.5

" 20 Up iP 02 18 13.5 C

" 20 Up iP 02 20 28.3
microns sec
P Z' 0.1 0.5
Ki iP 02 19 42.3
Sk iP 02 20 21.8
Um iP 02 20 03.0 D
Kurile Islands (h = 50 km).

" 20 Up iP 02 23 41.4
ipP 02 23 55.2
Um iP 02 23 15.6
Kurile Islands.
h = 60 km (Up).

" 20 Up i(P) 02 24 10.9

" 20 Up iP 02 31 36.5 C
Kurile Islands (h = 40 km).

" 20 Up iP 02 32 46.7
ipP 02 32 57.2
Kurile Islands.
h = 40 km (Up).
Origin time = 02 21 45.

" 20 Up iP 02 35 03.6

" 20 Up iP 02 38 14.0 C

" 20 Ki iP 02 54 10.9

" 20 Up eP 02 57 40
ipP 02 57 55.9
Kurile Islands.
h = 60 km (Up).
Origin time = 02 46 38.
A typical feature in many of these Kurile Islands shocks is that pP has a much larger amplitude than P.

" 20 Up iP 03 02 47.6
Um iP 03 02 23.0 C
Kurile Islands (h = 40 km).

" 20 Up iP 03 09 53.9
microns sec
P Z' 0.1 0.8
Ki iP 03 09 08.7
Um iP 03 09 27.0

1963 Oct. cont. 20 Ka iP 03 10 16.2 D
Kurile Islands (h = 60 km).

" 20 Up iP 03 11 27.8

" 20 Up iPKP 03 18 22.7 C
Gb iPKP 03 18 31.7
Um iPKP 03 18 16.7 C
Ka iPKP 03 18 34.2
Fiji Islands (h = 600 km).

" 20 Up iP 03 24 25.8
Kurile Islands (h = 40 km).

" 20 Up iP 03 27 44.6
Um iP 03 27 18.8
Kurile Islands (h = 30 km).

" 20 Up iP 03 41 44.1 C

" 20 Up iP 03 45 30.0
ipP 03 45 41.5
Ki iP 03 44 41.9
Um iP 03 45 04.5
ipP 03 45 16.0
Kurile Islands.
h = 50 km (Up,Um).
Origin time = 03 34 28.

" 20 Up iP 03 46 48.8
ipP 03 47 03.2
Kurile Islands.
h = 60 km (Up).
Origin time = 03 35 47.

" 20 Um iP 03 52 19.4
Kurile Islands (h = 50 km).

" 20 Up iP 04 06 26.4 D
Kurile Islands (h = 60 km).

" 20 Up iP 04 08 21.3
ipP 04 08 33.6
microns sec
P Z' 0.1 0.8
Ki iP 04 07 36.0
ipP 04 07 48.9
Gb iP 04 08 42.6
Um iP 04 07 56.9
Ka iP 04 08 43.6 C
ipP 04 08 55.6
Kurile Islands.
h = 50 km (Up,Ki,Ka).
Origin time = 03 57 20.

" 20 Up iP 04 10 09.5
Kurile Islands (h = 60 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 20 Up iP 04 13 12.6

" 20 Up iP 04 26 53.0 C

" 20 Up iP 04 42 37.8
ipP 04 42 48.8
Um iP 04 42 13.1 D
Kurile Islands.
h = 40 km (Up).

" 20 Up iP 04 51 07.4 D
Um iP 04 50 40.2
Kurile Islands (h = 50 km).

" 20 Up iP 04 57 58.7
ipP 04 58 11.6
Ki ipP 04 57 23.7
Um iP 04 57 33.0
Ka ipP 04 58 32.6
Kurile Islands.
h = 50 km (Up).

" 20 Up iP 05 03 30.9
ipP 05 03 44.1
Kurile Islands.
h = 50 km (Up).
Origin time = 04 52 29.

" 20 Up iP 05 09 54.7 C
Um iP 05 09 30.3
Kurile Islands (h = 50 km).

" 20 Up iP 05 10 33.2 C

" 20 Up iP 05 15 21.7

" 20 Up iP 05 31 18.6
Ki iP 05 30 32.3
Um iP 05 30 53.6 D
Kurile Islands (h = 50 km).

" 20 Up iP 05 36 27.8

" 20 Up iP 05 51 41.3 C
Ki iP 05 50 53.6
Um iP 05 51 16.0
Kurile Islands (h = 60 km).

" 20 Up iP 06 21 29.8 D
ipP 06 21 42.0
i(PcP) 06 21 52.2
microns sec
P Z' 0.1 0.6
Ki iP 06 20 44.2
ipP 06 20 56.8
microns sec
P Z' 0.2 1.0
Sk eP 06 21 21

1963
Oct. 20 Gb iP 06 21 50.5
cont. Um iP 06 21 05.2
ipP 06 21 17.6
Ka iP 06 21 51.7
ipP 06 22 05.0
Kurile Islands.
h = 50 km (Up,Ki,Um,Ka).

" 20 Up iP 06 49 53.3 D
Ki iP 06 49 07.1
Um iP 06 49 28.9
Kurile Islands (h = 50 km).

" 20 Up iP 07 17 08.3
ipP 07 17 20.4
Kurile Islands.
h = 50 km (Up).

" 20 Up iP 07 31 20.3
Um iP 07 30 55.1
Kurile Islands (h = 40 km).

" 20 Up iP 07 48 27.2

" 20 Up iP 08 37 14.3
Um iP 08 36 49.6 C
Ka eP 08 37 36
Kurile Islands (h = 30 km).

" 20 Up iP 09 21 45.7 D
microns sec
P N 0.6 6
P Z' 0.2 0.6
M E 3.6 19
M N 7.6 18
M Z 6.3 18
Ki iP 09 20 59.0
eS 09 29 20
microns sec
P Z' 0.1 1.0
S N 0.8 14
M E 5.6 18
M N 4.5 20
M Z 7.7 18
D = 6850 km = 61½°.
Sk iP 09 21 36.7
Gb iP 09 22 06.9
i(pP) 09 22 15.8
Um iP 09 21 20.5 D
iS 09 30 09
Ka iP 09 22 07.7
ipP 09 22 19.5
Kurile Islands.
h = 50 km (Ka).
Magn. = 6.1 (Up,Ki).

" 20 Up iP 11 12 56.5
i 11 13 04.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 20 cont.

Ka iP 11 12 32.8
i 11 13 08.7
Indian Ocean (h = 30 km).

" 20 Up eP 11 19 59
ipP 11 20 11.1
Kurile Islands.
h = 50 km (Up).

" 20 Up iP 11 26 31.8
Kurile Islands (h = 40 km).

" 20 Up iP 11 46 51.3
Kurile Islands (h = 50 km).

" 20 Up iP 12 03 20.4 C
iS 12 12 25

		microns	sec
P	Z	1.3	6
P	Z'	0.2	1.0
M	E	5.1	18
M	N	9.6	16
M	Z	9.2	17

D = 7600 km = $68\frac{1}{2}^{o}$.

Ki iP 12 02 33.6 C
i(S) 12 11 05

		microns	sec
P	Z'	0.2	1.0
(S)	E	1.6	12
M	E	8.4	16
M	N	8.6	21
M	Z	12	16

Gb iP 12 03 41.5 C
Um iP 12 02 55.1 C
iS 12 11 39
iScS 12 12 44
i 12 16 47
Ka iP 12 03 42.6 C
Kurile Islands (h = 50 km).
Magn. = 6.1 (Up,Ki).

" 20 Up iP 12 14 41.0
Kamchatka (h = 50 km).

" 20 Up iP 12 20 27.9
Ki iP 12 19 41.2
Kurile Islands (h = 50 km).

" 20 Up iP 13 07 08.8 C
i 13 07 21.3
iPcP 13 09 30.4

		microns	sec
P	Z'	0.1	0.8

Ki iP 13 08 14.6 C
i 13 08 20.5

		microns	sec
P	Z'	0.3	1.0

Sk iP 13 07 34.2 C

1963 Oct. 20 cont.

Gb iP 13 06 44.6
Um iP 13 07 44.5
Ka iP 13 06 35.5
Algeria (h = 0 km).
Underground nuclear explosion.

" 20 Up iP 13 32 11.8 C
Ki iP 13 31 25.4
Sk iP 13 32 01.2
Gb iP 13 32 31.9
Ka iP 13 32 34.0 C
Kurile Islands (h = 50 km).

" 20 Up iP 14 13 36.8
Kurile Islands (h = 50 km).

" 20 Up iP 15 22 28.3
ipP 15 22 40.5
Ki iP 15 21 41.4
Sk eP 15 22 16
Kurile Islands.
h = 50 km (Up).

" 20 Up iP 15 40 11.6
Ki iP 15 39 26.0
Kurile Islands (h = 50 km).

" 20 Up iP 15 51 24.0
i 15 51 39.8

" 20 Up iP 15 55 28.5
Kurile Islands (h = 50 km).

" 20 Up iP 16 01 22.9
i(pP) 16 01 35.4

" 20 Up iP 16 04 30.5 C
Kurile Islands (h = 50 km).

" 20 Up iP 16 11 16.6
Ki iP 16 10 29.2
Kurile Islands (h = 50 km).

" 20 Up iP 17 52 28.8

		microns	sec
P	Z'	0.1	0.7

Sk eP 17 52 20
Gb iP 17 52 49.7
Ka iP 17 52 51.4
Kurile Islands.

" 20 Up iP 17 52 36.8 C

		microns	sec
P	Z'	0.2	0.7
M	E	1.2	16
M	N	2.7	17
M	Z	1.6	17

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 20 cont.

Ki iP 17 51 51.3
microns sec
M E 2.4 18
M N 1.2 16
M Z 3.4 17
Sk iP 17 52 28.1
Gb iP 17 52 59.1
ipP 17 53 11.2
Um iP 17 52 12.2
Ka iP 17 52 59.3
ipP 17 53 11.6
Kurile Islands.
h = 50 km (Gb,Ka).
Origin time = 17 41 35.

" 20 Up iP 18 05 19.4

" 20 Ki iP 18 08 43.1

" 20 Up iP 18 09 59.0
ipP 18 10 11.7
microns sec
P Z' 0.1 0.8
M E 1.3 17
M N 2.0 17
M Z 1.6 17
Ki iP 18 09 15.0
i 18 09 23.6
microns sec
M E 1.6 16
M N 1.2 17
M Z 2.5 17
Sk eP 18 09 49
Gb iP 18 10 20.9
ipP 18 10 32.5
Um iP 18 09 34.8
Ka iP 18 10 21.7 C
ipP 18 10 34.0
Kurile Islands.
h = 50 km (Up,Gb,Ka).

" 20 Up iP 19 58 15.3
Kurile Islands (h = 50 km).

" 20 Up iP 21 19 20.4 D
iPcP 21 19 48.4
Kurile Islands (h = 40 km).

" 20 Up iP 22 00 04.1 C
ipP 22 00 33.7
Ki iP 21 59 59.6
Sk iP 22 00 19.6
Um iP 21 59 57.2
Ka iP 22 00 11.9
Burma. h = 120 km (Up).

" 20 Up iP 22 51 03.9
Kurile Islands (h = 40 km).

1963 Oct. 20 Up iP 22 58 55.5
Kurile Islands (h = 40 km).

" 21 Up iP 02 27 37.4
Kurile Islands (h = 70 km).

" 21 Up iP 03 25 56.1
Kurile Islands (h = 30 km).

" 21 Up iP 03 59 36.0
i 04 00 15.4

" 21 Up iP 05 56 38.0

" 21 Up iP 10 18 50.2 D
Ki eP 10 18 04
Kurile Islands (h = 60 km).

" 21 Ki iP 10 19 42.5
Kurile Islands (h = 60 km).

" 21 Up iP 13 20 05.4 D
i(pP) 13 20 15.1
microns sec
P Z' 0.1 1.0
Ki iP 13 19 17.6 D
ipP 13 19 30.5
microns sec
P Z' 0.2 1.0
Sk iP 13 19 54.6
Gb iP 13 20 26.1 D
ipP 13 20 38.0
Um iP 13 19 39.6
ipP 13 19 51.5
Ka eP 13 20 27
Kurile Islands.
h = 50 km (Ki,Gb,Um).

" 21 Ki iP 14 56 51.3
Tadzhik (h = 80 km).

" 21 Up iP 15 49 16.8
iPcP 15 49 44.1
microns sec
P Z' 0.1 0.5
Ki iP 15 48 31.0
Sk iP 15 49 06.3
Um iP 15 48 53.5
Ka eP 15 49 39
Kurile Islands (h = 60 km).

" 21 Um i(P) 17 20 42.2

" 21 Up iP 17 31 47.9 C
ipP 17 32 03.4
microns sec
P Z' 0.1 0.5
pP Z' 0.2 0.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. cont.	21	Ki	iP	17 31 04.0	C
			ipP	17 31 17.1	
				microns sec	
			P	Z' 0.1 1.0	
		Sk	iP	17 31 39.9	
		Gb	eP	17 32 08.7	
			ipP	17 32 24.7	
		Um	iP	17 31 23.8	C
			ipP	17 31 38.7	
		Ka	eP	17 32 12	
			ipP	17 32 25.3	
		Kurile Islands.			
		h = 60 km (Up,Ki,Gb,Um,Ka).			
		Magn. = 5.9 (Up,Ki).			
"	21	Up	i(P)	20 07 38.2	
"	21	Up	iP	20 50 42.9	
			ipP	20 50 57.0	
				microns sec	
			pP	Z' 0.1 0.6	
		Um	ipP	20 50 32.0	
		Kurile Islands.			
		h = 60 km (Up).			
"	21	Up	iP	21 31 38.0	
			i	21 32 13.0	
"	21	Up	iP	23 29 44.4	
			ipP	23 29 59.6	
				microns sec	
			P	Z' 0.1 0.7	
		Ki	iP	23 28 59.8	
			ipP	23 29 13.7	
		Um	iP	23 29 20.0	
		Kurile Islands.			
		h = 60 km (Up,Ki).			
"	21	Up	iP	23 40 24.5	
			ipP	23 40 39.2	
			iPcP	23 40 51.9	
				microns sec	
			P	Z' 0.1 0.5	
		Ki	iP	23 39 38.8	C
		Sk	eP	23 40 16	
		Um	iP	23 39 59.5	C
			ipP	23 40 14.6	
		Ka	iP	23 40 46.4	C
		Kurile Islands.			
		h = 60 km (Up,Um).			
"	21	Up	iP	23 44 15.6	
		Ka	iP	23 44 38.8	D
		Kurile Islands (h = 60 km).			
"	22	Up	iP	00 53 25.1	
"	22	Up	iP	01 13 51.6	C
1963 Oct. cont.	22	Ki	iP	01 13 34.0	
		Luzon (h = 15 km).			
"	22	Up	iP	02 40 12.3	C
		Ki	iP	02 39 26.0	
		Sk	eP	02 40 02	
		Um	iP	02 39 47.1	
		Kurile Islands (h = 50 km).			
"	22	Up	iP	03 28 13.9	
				microns sec	
			P	Z' 0.1 0.6	
			M	E 2.0 18	
			M	N 3.5 16	
			M	Z 4.0 16	
		Ki	iP	03 27 28.4	
				microns sec	
			M	E 3.9 15	
			M	N 1.4 16	
			M	Z 4.8 16	
		Sk	eP	03 28 06	
		Um	iP	03 27 49.3	
		Ka	iP	03 28 37.6	
		Kurile Islands (h = 50 km).			
		Magn. = 5.8 (Up,Ki).			
"	22	Up	iP	03 36 43.8	C
			ipP	03 36 58.1	
				microns sec	
			P	Z' 0.1 0.6	
		Ki	iP	03 35 57.7	
			ipP	03 36 12.2	
		Sk	iP	03 36 32.7	
			ipP	03 36 46.4	
		Um	iP	03 36 18.6	C
		Ka	iP	03 37 05.2	
			ipP	03 37 20.9	
		Kurile Islands.			
		h = 60 km (Up,Ki,Sk,Ka).			
"	22	Up	iP	04 40 09.9	
			ipP	04 40 21.0	
		Ki	iP	04 39 16.6	
			ipP	04 39 28.6	
		Sk	iP	04 39 58.3	
		Aleutian Islands.			
		h = 50 km (Up,Ki).			
"	22	Up	iP	05 00 17.3	
		Ka	iP	05 00 39.7	C
		Kurile Islands (h = 30 km).			
"	22	Up	iP	05 28 44.6	
"	22	Up	iP	08 20 22.1	D
		Ka	i(P)	08 19 33.4	
"	22	Up	iP	10 29 18.2	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. cont.	22	Up	ipP	10 29 32.7	
				microns	sec
			P	Z' 0.1	0.5
		Ki	iP	10 28 31.9	
			ipP	10 28 47.1	
		Um	iP	10 28 53.4	C
			ipP	10 29 07.8	
		Kurile Islands.			
		h = 60 km (Up,Ki,Um).			
"	22	Ki	iP	10 36 32.4	
		Kurile Islands (h = 50 km).			
"	22	Um	iP	12 14 52.9	
"	22	Ki	iP	12 15 45.3	
			iPcP	12 16 30.8	
		Kurile Islands (h = 30 km).			
"	22	Gb	iPg	12 20 42.8	C
			iSg	12 20 44.9	
		Local explosion.			
"	22	Ki	iP	12 29 34.5	
			ipP	12 29 46.6	
		Um	iP	12 29 55.7	
		Kurile Islands.			
		h = 50 km (Ki).			
"	22	Ki	iP	12 59 41.9	
		Kurile Islands (h = 50 km).			
"	22	Up	iP	16 11 43.9	
		Kurile Islands (h = 110 km).			
"	22	Up	iP	16 52 41.5	C
"	22	Up	iP	17 08 15.9	
		Ki	iP	17 09 25.1	
		Crete (h = 30 km).			
"	22	Up	iP	19 37 21.6	
		Um	iP	19 36 57.0	
		Kurile Islands (h = 30 km).			
"	23	Up	iP	00 17 10.0	
			i(PcP)	00 17 33.1	
		Ki	iP	00 16 23.0	D
			i	00 16 49.3	
		Gb	iP	00 17 30.6	
		Um	iP	00 16 44.1	
		Kurile Islands (h = 20 km).			
"	23	Up	iP	02 19 56.1	
"	23	Up	iP	05 43 33.6	
		Um	iP	05 43 08.6	D
		Kurile Islands (h = 50 km).			

1963 Oct.	23	Up	iP	08 26 15.4	
		Kurile Islands (h = 50 km).			
"	23	Up	iP	09 58 16.0	
			i	09 59 32.8	
				microns	sec
			P	Z' 0.1	0.9
			M	E 1.1	17
			M	N 1.6	20
			M	Z 1.4	18
		Ki	iP	09 57 33.4	
				microns	sec
			P	Z' 0.2	1.2
			M	E 2.7	18
			M	N 1.5	18
		Sk	iP	09 58 07.8	
		Gb	iP	09 58 37.7	
		Um	iP	09 57 52.9	
			ipP	09 58 04.8	
		Ka	iP	09 58 37.9	
		Japan. h = 50 km (Um).			
		Magn. = 5.8 (Up,Ki).			
"	23	Um	iP	11 00 53.6	C
		Kurile Islands (h = 50 km).			
"	23	Up	iP	11 29 19.5	D
			i	11 29 37.9	
		Kurile Islands (h = 50 km).			
"	23	Up	iP	18 45 39.4	
		Kurile Islands (h = 50 km).			
"	23	Up	i(P)	20 41 19.8	
"	23	Up	iP	21 29 22.6	
		Um	iP	21 28 58.4	C
		Kurile Islands (h = 40 km).			
"	23	Up	iP	22 22 23.3	
		Ki	eP	22 21 36	
		Um	iP	22 21 58.5	C
		Kurile Islands (h = 20 km).			
"	24	Up	iP	01 17 27.2	C
				microns	sec
			P	Z' 0.1	1.0
			M	E 2.4	18
			M	N 5.8	18
			M	Z 5.8	20
		Ki	iP	01 16 37.3	
				microns	sec
			M	E 3.1	16
			M	N 2.8	18
			M	Z 5.0	19
		Gb	iP	01 17 47.7	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 24 cont.

Um iP 01 17 01.5
Ka iP 01 17 49.6 C
Kurile Islands (h = 50 km).
Magn. = 5.8 (Up,Ki).

" 24 Up iP 03 44 16.9

" 24 Ki iP 07 09 06.9
Um iP 07 09 13.5
Babuyan Islands,
Philippines (h = 70 km).

" 24 Up iP 07 39 27.3 C
iPP 07 43 08.4
microns sec
P Z' 0.3 1.1
PP Z' 0.2 1.3
M E 1.7 18
M N 2.3 19
M Z 2.9 18
Ki iP 07 39 27.0
ipP 07 39 40.4
microns sec
P Z' 0.4 1.2
M E 3.3 19
M N 1.8 18
M Z 4.4 18
Sk iP 07 39 39.9 C
iPP 07 43 29.8
Gb iP 07 39 40.4
i 07 42 45.3
Um iP 07 39 24.3 C
iPP 07 43 03.8
Ka iPP 07 43 16.4
Sumatra. h = 50 km (Ki).
Magn. = 6.3 (Up,Ki).

" 24 Ki iP 08 14 02.3
Kurile Islands (h = 60 km).

" 24 Up iP 13 56 16.6
Ki iP 13 55 30.9
microns sec
P Z' 0.1 1.0
Um iP 13 55 51.8 D
Kurile Islands (h = 50 km).

" 24 Up iP 15 35 05.2
Kurile Islands (h = 50 km).

" 24 Up iP 20 14 57.7

" 24 Up iP 20 29 14.1 D

1963 Oct. 24 cont.

Up microns sec
P Z' 0.1 0.5
Ki iP 20 28 28.8
iPcP 20 29 09.7
Um iP 20 28 49.1
Ka iP 20 29 36.8
Kurile Islands (h = 40 km).

" 25 Up iP 01 19 33.2
Kurile Islands (h = 50 km).

" 25 Up i(P) 01 49 17.2

" 25 Up iP 03 55 20.8

" 25 Ka iP 04 48 13.7
e(S) 04 50 04
South coast of England.

" 25 Up iP 06 12 53.4
Um iP 06 12 31.9 C
Ka iP 06 13 16.4
Aleutian Islands
(h = 70 km).

" 25 Up iP 10 28 54.3
Ki iP 10 28 08.6
Um eP 10 28 29
Ka iP 10 29 17.2
Kurile Islands (h = 40 km).

" 25 Up iP 10 31 28.4

" 25 Um iP 11 23 38.2
Kurile Islands (h = 50 km).

" 25 Up iP 12 08 52.3 C
Kurile Islands (h = 70 km).

" 25 Up iP 12 44 05.6
i(pP) 12 44 22.0
Um iP 12 43 41.8
Kurile Islands (h = 50 km).

" 25 Up iP 16 52 50.4 D
Kurile Islands (h = 20 km).

" 25 Up iP 19 12 56.5
i(P) 19 13 40.3
Um iP 19 12 25.5
Kurile Islands (h = 30 km).

" 25 Ki eP 20 12 08
Mariana Islands (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct.	25	Up	i(P)	20 43 13.6	
"	25	Up	iP	22 51 15.3	C
			i	22 51 20.6	
		Sk	iP	22 51 28.4	
			i	22 51 32.8	
"	25	Up	iP	22 58 56.0	
				microns sec	
			P	Z' 0.1 0.6	
		Ki	iP	22 58 39.2	
		Sk	iP	22 59 08.9	
			i	22 59 13.9	
		Gb	iP	22 59 25.6	
		Um	iP	22 58 46.3	
		Ka	eP	22 59 15	
		Tsinghai (h = 30 km).			
"	26	Up	iP	04 06 37.1	C
			i	04 06 39.1	
			iPP	04 09 04.8	
				microns sec	
			P	Z' 0.1 0.5	
			M	E 1.9 20	
			M	N 5.7 19	
			M	Z 5.5 19	
		Ki	iP	04 05 52.3	
				microns sec	
			M	E 2.8 21	
			M	N 2.9 20	
			M	Z 3.9 18	
		Sk	eP	04 06 30	
		Gb	iP	04 07 00.8	
		Um	iP	04 06 14.2	
			eSS	04 19 14	
		Ka	iP	04 07 01.2	C
			i	04 07 43.3	
		Kurile Islands (h = 60 km).			
		Magn. = 5.8 (Up,Ki).			
"	26	Up	iP	05 12 39.2	
		Ki	i(pP)	05 12 05.1	
		Um	iP	05 12 12.7	C
		Kurile Islands (h = 40 km).			
"	26	Up	iP	06 10 43.1	
		Sk	eP	06 10 33	
		Gb	eP	06 11 01	
		Um	iP	06 10 17.4	
		Ka	iP	06 11 06.1	
		Kurile Islands (h = 60 km).			
"	26	Up	iP	06 36 02.3	D
		Kurile Islands (h = 60 km).			
"	26	Up	iP	06 38 52.4	C
		Kurile Islands (h = 60 km).			

1963 Oct.	26	Up	iP	07 06 50.1	
		Kurile Islands (h = 60 km).			
"	26	Up	iP	07 35 30.2	
		Aleutian Islands (h = 30 km).			
"	26	Up	iP	10 05 37.6	D
"	26	Up	iP	11 06 07.5	
"	26	Up	iP	11 32 46.2	
				microns sec	
			P	Z' 0.1 0.5	
			M	E 1.1 20	
			M	N 2.7 19	
			M	Z 2.4 19	
		Ki	iP	11 31 59.7	
				microns sec	
			P	Z' 0.1 1.2	
			M	E 2.1 17	
			M	N 1.0 16	
		Sk	iP	11 32 36.1	
		Gb	iP	11 33 09.0	
		Um	iP	11 32 21.0	
		Ka	iP	11 33 08.9	
		Kurile Islands (h = 60 km).			
		Magn. = 5.8 (Up,Ki).			
"	26	Up	iP	11 42 52.0	
				microns sec	
			P	Z' 0.1 0.6	
		Ki	iP	11 42 05.3	
		Um	iP	11 42 26.9	C
		Ka	iP	11 43 15.0	
		Kurile Islands (h = 60 km).			
"	26	Up	iP	11 44 18.2	
		Um	iP	11 43 53.8	
		Kurile Islands.			
		Origin time = 11 33 16.			
"	26	Um	iP	12 15 21.5	
"	26	Um	iP	14 55 22.5	C
"	26	Up	iP	17 11 41.6	
		Ki	iP	17 11 06.6	C
		Ka	iP	17 11 55.7	
		Nevada. Underground nuclear explosion.			
"	26	Up	iP	19 16 59.9	C
		Kurile Islands (h = 50 km).			
"	27	Up	iP	00 10 05.0	
		Ki	iP	00 09 19.5	
				microns sec	
			P	Z' 0.1 1.0	
		Kurile Islands (h = 30 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 27 Up iP 06 00 14.2
Kurile Islands (h = 20 km).

" 27 Up i(P) 07 31 45.1

" 27 Up eP 07 49 51

" 27 Gb iPKP 10 58 21.4
i(pPKP) 10 58 33.1
Tonga Islands (h = 40 km).

" 27 Up iP 13 10 53.1
ipP 13 11 04.5
Ki iP 13 10 44.3
Sk iP 13 11 06.5
i 13 11 14.4
Um eP 13 10 37
Sinkiang. h = 50 km (Up).

" 27 Up iPKP 18 44 10.3
Gb iPKP 18 44 20.1 C
Ka iPKP 18 44 22.2 C
Tonga Islands (h = 30 km).

" 27 Up iP 20 04 50.7
Kurile Islands (h = 70 km).

" 27 Up iP 20 16 37.5 C
iPcP 20 17 02.6
microns sec
P Z' 0.1 0.5
Ki iP 20 15 51.0 C
Sk eP 20 16 27
Um iP 20 16 12.3
Ka iP 20 17 00.4 C
Kurile Islands (h = 50 km).

" 28 Up iP 05 09 41.3
Ki iP 05 08 54.9
Um iP 05 09 15.5
Kurile Islands (h = 50 km).

" 28 Ki e(Sn) 05 32 32
i(Sg) 05 32 55.6

" 28 Um iP 05 49 22.2

" 28 Up iPKP 08 14 40.7
Gb iPKP 08 14 49.3 C
Ka iPKP 08 14 51.7 C
Tonga Islands (h = 30 km).

" 28 Up iP 08 40 15.4

" 28 Up iP 10 29 10.6
Ki iP 10 28 24.9 C
Kurile Islands (h = 50 km).

1963
Oct. 28 Up iP 12 13 49.2
iS 12 22 17
microns sec
P N 0.3 2
P Z 0.5 2
P Z' 0.2 0.7
S E 0.5 2
S N 1.0 3
M E 1.6 21
M N 2.3 22
M Z 3.0 23
D = 7050 km = $63\frac{1}{2}^{o}$.
Ki iP 12 12 55.9 C
iS 12 20 37
microns sec
P Z' 0.2 1.0
S N 0.4 8
M E 3.0 23
M N 1.4 17
M Z 2.7 15
D = 6200 km = 56^{o}.
Sk iP 12 13 32.9
Gb iP 12 14 10.1
Um iP 12 13 21.2 C
iS 12 21 24
Ka iP 12 14 13.0 C
iS 12 23 06.8
Kamchatka (h = 30 km).
Magn. = 6.2 (Up,Ki).
The comparatively small surface waves may indicate a depth slightly greater than normal.

" 28 Up iP 14 24 30.1
Ki iP 14 23 43.3 D
Kurile Islands (h = 50 km).

" 28 Up iP 18 16 10.4
Ki eP 18 15 23
Um iP 18 15 44.2
Kurile Islands (h = 60 km).

" 28 Up iP 20 11 25.5 C

" 28 Up iPKP 20 17 44.1 C
microns sec
PKP Z' 0.1 0.6
Gb iPKP 20 17 54.0 C
Um iSKP 20 20 26.5
Ka iPKP 20 17 55.8
Fiji Islands (h = 530 km).

" 28 Up iP 20 42 49.8

" 28 Up iP 20 48 20.6
microns sec
M E 0.6 17

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. cont.	28	Up			microns	sec
			M	N	1.1	18
			M	Z	1.4	18
		Ki	iP		20 47 09.8	
					microns	sec
			M	E	1.2	18
			M	N	0.7	17
		Ka	iP		20 48 40.1	
		Kurile Islands (h = 50 km).				
"	28	Up	iP		21 58 54.9	
		Ki	iP		21 58 03.8	
		Sk	eP		21 58 43	
		Kurile Islands (h = 110 km).				
"	29	Up	iP		02 34 56.1	
		Kurile Islands (h = 50 km).				
"	29	Up	iP		10 31 11.9	
"	29	Gb	iPg		15 15 41.7	C
			iSg		15 15 43.7	
		Local explosion.				
"	29	Up	iPKP		17 15 19.1	C
		Kermadec Islands (h = 70 km).				
"	29	Up	iSg		18 31 45.4	
		Ki	iPg		18 29 07.6	
			iSg		18 29 33.3	
					microns	sec
			Sg	Z'	0.5	0.5
			D = 220 km = 2.0°.			
		Sk	iSg		18 30 54.9	
		Um	iPg		18 29 09.7	C
			iSg		18 29 37.0	
			D = 230 km = 2.1°.			
		Ka	i(Sg)		18 33 47.0	
		Boden, North Sweden, 65.8°N, 21.5°E.				
		Origin time = 18 28 28.				
		Felt. Foreshock to the following.				
"	29	Up	iSg		18 31 49.3	
		Ki	iPg		18 29 11.4	
		Sk	iSn		18 30 39.2	
			iSg		18 30 58.4	
		Um	iSg		18 29 40.8	
		Ka	i(Sg)		18 33 51.5	
		Boden, North Sweden, 65.8°N, 21.5°E.				
		Origin time = 18 28 32.				
		Felt.				
"	29	Up	iP		20 37 16.5	
"	29	Up	iPKP		20 41 45.8	D

1963 Oct. cont.	29	Up	i		20 41 50.2	
					microns	sec
			PKP	Z'	0.1	1.0
		Um	iPKP		20 41 46.7	
		Kermadec Islands (h = 50 km).				
"	29	Up	iP		22 31 56.2	
			i		22 32 00.9	
			iLg1		22 47 06	
			iLg2		22 47 56	
					microns	sec
			M	E	2.1	14
			M	N	2.4	10
			M	Z	4.1	13
		Ki	iP		22 31 35.6	
					microns	sec
			P	Z'	0.1	1.2
			M	E	2.7	10
			M	N	3.9	17
			M	Z	3.0	10
		Sk	iP		22 32 09.7	
		Gb	eP		22 32 28	
		Um	iP		22 31 37.3	
			i		22 31 42.2	
			eSS		22 40 48	
			e		22 42 47	
		Ka	iP		22 32 21.9	
		Mongolia.				
"	29	Gb	iPKP		22 42 14.7	
		Tonga Islands (h = 30 km).				
"	29	Um	iP		22 45 50.2	D
		Yugoslavia.				
"	30	Up	iP		00 46 38.7	
		Um	iP		00 46 13.5	
		Kurile Islands (h = 60 km).				
"	30	Um	iP		02 41 39.8	
"	30	Um	i(P)		06 40 24.6	
"	30	Up	eSg		09 12 28	
		Ka	iPg		09 10 03.1	
			iSg		09 10 28.9	
			D = 220 km = 1.9°.			
		South Baltic, 54.8°N, 13.3°E.				
		Origin time = 09 09 26.				
		Explosion.				
		This is the first of a series of explosions in South Baltic on Oct. 30. They can be arranged into three groups, I, II and III, with the following characteristics.				
		I: average location 54.8°N, 13.3°E, duration 09.09-10.37, 14 events at				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 30 cont. regular intervals of 7 min. II: average location 54.6°N, 13.1°E (i.e. 28 km from location I), duration 13.02-13.54, 8 events at less regular intervals. III: average location 54.6°N, 13.1°E (same as II), duration 15.00-15.54, 5 events. This is all based on our records, and no direct information is available to us. Similar series of explosions in the South Baltic, at a distance of 1.9° from Ka, took place on Oct. 7, 8 and 17 (these could not be reported because of time signal failure at Ka).

" 30 Up eSg 09 19 25
Gb eSg 09 18 05
Ka iPg 09 17 01.4
iSg 09 17 28.1
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 09 16 25.
Explosion.

" 30 Up iSg 09 25 41.8
Gb iSg 09 24 32.5
Ka iPg 09 23 32.9
iSg 09 23 58.4
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 09 22 55.
Explosion.

" 30 Up iS* 09 32 30.2
iSg 09 32 47.9
Gb iSg 09 31 28.2
Ka iPg 09 30 24.3
iSg 09 30 49.6
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 09 29 47.
Explosion.

" 30 Up iSg 09 39 47.9
Gb iSg 09 38 19.2
Ka iPg 09 37 23.7
iSg 09 37 49.3
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 09 36 46.
Explosion.

" 30 Ka iPg 09 44 24.2
iSg 09 44 49.6
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 09 43 47.
Explosion.

" 30 Up iS* 09 53 21.7
iSg 09 53 39.6
Ka iPg 09 51 13.2
iSg 09 51 38.8
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 09 50 36.
Explosion.

" 30 Up iS* 10 00 28.5
iSg 10 00 43.3
Ka iPg 09 58 18.1
iSg 09 58 43.2
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 09 57 40.
Explosion.

" 30 Up iSg 10 07 31.6
Ka iPg 10 05 05.1
iSg 10 05 30.4
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 10 04 27.
Explosion.

" 30 Up iS* 10 14 00.6
iSg 10 14 15.8
Ka iPg 10 11 49.1
iSg 10 12 14.1
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 10 11 11.
Explosion.

" 30 Up iSg 10 20 37.2
Ka iPg 10 18 25.4
iSg 10 18 50.1
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 10 17 47.
Explosion.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Oct. 30 Up iSg 10 27 10.6
Ka iPg 10 24 47.1
iSg 10 25 12.6
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 10 24 10.
Explosion.

" 30 Ka iPg 10 31 02.1
iSg 10 31 27.4
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 10 30 24.
Explosion.

" 30 Ka iPg 10 37 20.6
iSg 10 37 46.0
D = 220 km = 1.9°.
South Baltic, 54.8°N, 13.3°E.
Origin time = 10 36 43.
Explosion.

" 30 Up iSg 13 04 50.3
Ka iPg 13 02 20.3
iSg 13 02 47.5
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 13 01 39.
Explosion.

" 30 Up iSg 13 13 20.8
Ka iPg 13 10 55.1
iSg 13 11 22.4
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 13 10 13.
Explosion.

" 30 Ka iPg 13 17 05.0
iSg 13 17 32.6
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 13 16 24.
Explosion.

" 30 Up iSg 13 25 43.9
Ka iPg 13 23 24.2
iSg 13 23 51.9
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 13 22 43.
Explosion.

1963 Oct. 30 Up iSg 13 37 44.9
Ka iPg 13 35 23.2
iSg 13 35 51.2
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 13 34 42.
Explosion.

" 30 Ka iPg 13 41 50.5
iSg 13 42 17.8
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 13 41 09.
Explosion.

" 30 Up iSg 13 51 11.2
Ka iPg 13 48 44.1
iSg 13 49 10.1
D = 230 km = 2.1°.
South Baltic 54.6°N, 13.1°E.
Origin time = 13 48 01.
Explosion.

" 30 Ka iPg 13 54 35.1
iSg 13 55 03.6
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 13 53 55.
Explosion.

" 30 Up iSg 15 03 18.5
Ka iPg 15 00 53.8
iSg 15 01 21.4
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 15 00 12.
Explosion.

" 30 Up iSg 15 20 37.3
Ka iPg 15 18 06.1
iSg 15 18 33.7
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 15 17 25.
Explosion.

" 30 Ka iPg 15 25 48.4
iSg 15 26 16.6
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 15 25 08.
Explosion.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Oct. 30 Ki iP 15 31 20.3
Um iP 15 31 41.4
Kurile Islands (h = 50 km).

" 30 Up iSg 15 36 40.3
Ka iPg 15 34 09.1
iSg 15 34 36.6
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 15 33 28.
Explosion.

" 30 Up iSg 15 57 04.0
Ka iPg 15 54 32.7
iSg 15 55 00.6
D = 230 km = 2.1°.
South Baltic, 54.6°N, 13.1°E.
Origin time = 15 53 52.
Explosion.

" 30 Ki eP 18 31 40
Sk iP 18 31 55.1
iS 18 33 39.9
D = 1080 km = 9.7°.
Um iP 18 32 17.9 C
N. Atlantic - Arctic Ocean (h = 30 km).

" 30 Up iP 22 53 36.7
Um iP 22 53 11.8
Kurile Islands (h = 30 km).

" 31 Sk e 01 03 36
e(Sg) 01 03 56

" 31 Up e(PKP) 03 37 01
i 03 39 37.6
e 03 40 01
iPKS 03 40 46
iSKKS 03 47 12

		microns	sec
PKS	N	0.7	5
M	E	1.7	18
M	N	2.8	20
M	Z	2.4	19

(D = 15800 km = 142°).
Ki iPP 03 39 20
ePKS 03 40 22
iSS 03 57 09

		microns	sec
PP	Z	1.0	9
PKS	E	0.7	11
PKS	N	0.8	8
PKS	Z	1.4	11
M	E	2.2	20
M	N	1.6	20
M	Z	2.8	18

(D = 14900 km = 134°).

1963
Oct. 31 Sk i(PKP) 03 37 17.8
cont. Gb iPKP 03 37 12.0
Um iPKP 03 37 09.9
i 03 39 33
ePP 03 39 45
ePKS 03 40 32
iSS 03 57 45
Ka iPKP 03 37 15.3 C
Tonga Islands (h = 30 km).
Magn. = 6.2 (Up,Ki).
It happens repeatedly that distances calculated from travel times in these distance ranges are about 2° smaller than those calculated from epicentral coordinates (all data on epicenter and origin time and depth based on USCGS determinations, and Jeffreys-Bullen's tables used).

" 31 Up iPKP 04 44 10.0
Gb iPKP 04 44 20.6 C
Um iPKP 04 44 08.4
Fiji Islands (h = 460 km).

" 31 Up i(P) 05 03 55.5

" 31 Up eP 10 04 45
Ki iP 10 05 20.2
Sk iP 10 05 20.6
Um eP 10 04 58
Iran (h = 40 km).

" 31 Up i 20 20 39.5

		microns	sec
M	E	0.4	14
M	N	0.8	10
M	Z	1.1	14

Ki ---

		microns	sec
M	E	1.1	1.0
M	N	0.5	11
M	Z	1.3	10

Hindu Kush (h = 110 km).

" 31 Up iP 20 42 21.7
i 20 42 46.1
i 20 42 58.7

" 31 Sk e(P) 22 17 55

Markus Båth
September 2, 1964

Seismological Institute
Uppsala

P R E L I M I N A R Y

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, G Ö T E B O R G,

U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E; h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E; h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E; h = 11 m

N O V E M B E R 1 - 30, 1963

1963 Nov.	1	Up	iSn	00 31 37.1	
		Sk	ePn	00 29 25	
			i	00 29 47.9	
			iSn	00 30 10.6	
			D = 420 km = 3.8°.		
		Gb	e(Sn)	00 31 00	
		Um	e	00 31 59	
			iS*	00 32 09.6	
		Off coast of Norway, 62.9°N, 4.7°E.			
		Origin time = 00 28 26.			
		Foreshock to the following earthquake.			
"	1	Up	iPn	01 36 03.9	
			iSn	01 37 25.5	
			i(Sg)	01 38 03.9	
			microns sec		
			(Sg) Z'	0.1 0.5	
			D = 780 km = 7.0°.		
		Ki	iPn	01 36 20.1 D	
			iSn	01 37 52.5	
			D = 910 km = 8.2°.		
		Sk	iPn	01 35 17.1	
			iSn	01 36 05.1	
			D = 420 km = 3.8°.		
		Gb	iSn	01 37 02.4	
			iSg	01 37 41.3	
			i	01 38 22.2	
			D = 680 km = 6.1°.		
		Um	iPn	01 36 05.8 D	
			iSn	01 37 28.4	
			iS*	01 37 58.9	
			D = 790 km = 7.1°.		
		Ka	iPn	01 36 24.6	
		Off coast of Norway, 62.9°N, 4.7°E.			
		Origin time = 01 34 18.			
1963 Nov.	1	Up	iP	04 03 01.8 C	
			ipP	04 03 12.2	
			microns sec		
			P Z'	0.1 0.5	
		Ki	iP	04 02 09.3 C	
			ipP	04 02 19.2	
			microns sec		
			P Z'	0.2 0.9	
		Sk	iP	04 02 45.0 C	
			ipP	04 02 55.5	
		Gb	iP	04 03 21.6 C	
			ipP	04 03 31.9	
		Um	iP	04 02 34.1 C	
			ipP	04 02 44.7	
		Ka	eP	04 03 26	
		Kamchatka, h = 40 km (Up,Ki,Sk,Gb,Um).			
		Magn. = 6.2 (Up,Ki).			
"	1	Ki	iSn	05 32 25.4	
			iSg	05 32 49.2	
		Possibly explosion in Northwest Russia.			
"	1	Up	eP	07 11 53	
		Ki	iP	07 12 29.9	
		Sk	eP	07 12 24	
		Um	iP	07 12 08.2 C	
		Gulf of Aden (h = 30 km).			
"	1	Up	iPKP	21 18 42.4	
			i	21 18 45.5	
		Ki	iPKP	21 18 35.8	
		Sk	ePKP	21 18 35	
			i	21 18 44.7	
		Gb	iPKP	21 18 53.4 D	
		Um	iPKP	21 18 31.3	
			i	21 18 39.5	
			iSKP	21 22 04.2	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. cont.	1	Ka	iPKP	21 18 56.1	D
		Tonga Islands (h = 70 km). This case well illustrates the caustic effect at 143° on the amplitudes of PKP. The amplitudes at Gb and Ka are 10-20 times those at the other four stations.			
"	1	Up	iP	22 52 17.5	
			i	22 52 19.6	
			iPcP	22 52 43.5	
			microns	sec	
			P Z'	0.1	0.7
		Ki	iP	22 51 34.4	
		Sk	iP	22 52 09.0	
			iPcP	22 52 37.7	
		Gb	iP	22 52 40.2	D
		Um	iP	22 51 54.5	D
		Ka	iP	22 52 41.0	
		Kurile Islands (h = 60 km).			
"	2	Up	iP	09 28 22.2	
			ipP	09 28 37.4	
		Ki	iP	09 27 36.1	
		Um	iP	09 27 57.4	C
		Kurile Islands. h = 60 km (Up).			
"	2	Up	iP	10 24 03.7	
		Aleutian Islands (h = 30 km).			
"	2	Up	iP	18 04 31.7	D
			ipP	18 04 45.0	
		Ki	iP	18 03 46.1	
			microns	sec	
			P Z'	0.2	1.5
		Sk	iP	18 04 20.8	
			ipP	18 04 34.6	
		Um	iP	18 04 06.8	
			ipP	18 04 20.3	
		Kurile Islands. h = 50 km (Up,Sk,Um).			
"	2	Up	i	22 57 05.9	
			iSg	22 57 10.5	
		Sk	eLgl	22 58 18	
		Gb	iPg	22 55 08.1	
			iSg	22 55 16.5	
		D = 70 km = 0.6°.			
		Ka	eSn	22 56 00	
			iSg	22 56 06.8	
		West coast of Sweden, near Varberg, 57.2°N, 12.2°E. Origin time = 22 54 57.			
"	3	Up	i(P)	00 30 37.6	D
			i	00 30 53.8	
1963 Nov. cont.	3	Ka	i(Pg)	00 28 10.3	C
			e(Sg)	00 29 05	
"	3	Up	eP	01 26 31	
			i	01 26 40.0	
		Ki	iP	01 25 39.8	
		Kurile Islands (h = 50 km).			
"	3	Up	iP	01 48 02.3	
		Kurile Islands (h = 30 km).			
"	3	Up	iP	02 26 11.8	
		Sk	iP	02 26 14.8	
		Formosa (h = 30 km).			
"	3	Up	iP	03 23 37.6	
			iPP	03 27 33.8	
			iSKS	03 34 10	
			iS	03 34 50	
			eY	03 36 07	
			microns	sec	
			P Z	0.9	10
			P Z'	0.1	1.0
			SKS E	2.2	10
			S N	0.8	5
			M E	13	21
			M N	11	20
			M Z	19	22
		D = 10650 km = 96°.			
		Ki	iP	03 23 40.7	
			iPP	03 27 35.0	
			iSKS	03 34 15	
			eY	03 36 21	
			microns	sec	
			P Z'	0.6	2.0
			SKS E	4.4	10
			SKS N	1.0	9
			M E	6.1	21
			M N	2.9	20
			M Z	9.4	22
		D = 10800 km = 97°.			
		Sk	iP	03 23 25.7	
			i	03 23 35.4	
			iX	03 26 39.5	
			iPP	03 27 21.7	
		Gb	iP	03 23 25.3	
			i	03 23 34.7	
		Um	iP	03 23 41.9	
			iX	03 26 57.4	
			iPP	03 27 34.5	
			eSKS	03 34 14	
			iY	03 36 20	
		Ka	iP	03 23 33.2	
			i	03 27 54.9	
		Peru-Ecuador (h = 30 km). Magn. = 6.4 (Up,Ki). First motion of P seems to be dilatation on short-period records (Ki,Gb,Um),			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. cont.	3		but compression on long-period records (Up,Um). X (at Sk,Um) and Y (at Up, Ki,Um) are not identified, the latter probably being PS.		
"	3	Sk	iP	03 40 34.5	
"	3	Up	iP	14 13 52.2	C
			i	14 13 56.9	
		Sk	eP	14 14 35	
		Um	eP	14 14 32	
		Greece. Origin time = 14 09 11.			
"	3	Up	iP	14 18 21.1	
		Sk	iP	14 19 09.0	
		Greece.			
"	3	Up	iP	14 36 22.0	C
		Sk	iP	14 37 05.2	
		Um	eP	14 37 03	
		Greece. Origin time = 14 31 42.			
"	3	Up	iP	14 40 40.4	C
				microns	sec
			P Z'	0.1	0.6
			M E	0.9	16
			M N	1.0	10
			M Z	0.9	10
		Ki	iP	14 41 55.5	
				microns	sec
			M E	1.7	16
			M N	0.4	13
			M Z	0.6	13
		Sk	iP	14 41 22.3	
			i	14 41 45.3	
		Gb	iP	14 40 29.6	
		Um	iP	14 41 19.6	C
		Ka	iP	14 40 02.4	
		Greece (h = 30 km).			
"	3	Um	iPKP	14 50 52.0	
		New Hebrides Islands (h = 50 km).			
"	3	Up	iP	16 03 55.2	
		Ki	iP	16 04 55.9	
		Sk	iP	16 04 30.5	
			i	16 04 37.5	
		Um	eP	16 04 37	
		Ka	iP	16 03 19.8	
		Ionian Islands (h = 30 km).			
"	3	Up	iP	19 34 01.7	
		Kurile Islands (h = 50 km).			
1963 Nov.	3	Up	iP	23 05 37.9	
			i	23 05 40.2	
			ipP	23 05 48.3	
		Gb	i(P)	23 06 09.7	
		Um	iP	23 05 12.8	
		Ka	iP	23 06 02.9	
		Kurile Islands. h = 40 km (Up).			
"	4	Up	iP	01 31 14.9	C
			i	01 31 18.4	
			iPP	01 35 46	
			iPa	01 41 42	
			iSKS	01 42 00	
			iPS	01 44 40	
			i	01 45 55.8	
				microns	sec
			P E	4.5	16
			P N	2.2	16
			P Z	13	16
			P Z'	0.3	0.8
			PP E	30	16
			PP N	7.0	14
			PP Z	45	15
			PP Z'	0.4	0.6
			SKS N	11	5
			M E	190	21
			M N	400	22
			M Z	280	24
		(D = 12000 km = 108°).			
		Ki	iP	01 30 59.7	
			ipP	01 31 17.0	
			iPP	01 35 19.8	
			i	01 36 17	
			i	01 36 33	
			iPa	01 41 17	
			iSKS	01 41 32	
			ePKKP	01 46 57	
				microns	sec
			P E	3.6	10
			P N	1.1	15
			P Z	7.4	8
			P Z'	0.9	1.0
			pP Z'	1.9	1.0
			PP E	8.3	9
			PP N	2.2	9
			PP Z	15	8
			PP Z'	5.1	2.5
			SKS N	26	7
			M E	230	21
			M N	270	22
			M Z	300	22
		(D = 11650 km = 105°).			
		Sk	iP	01 31 21.6	C
			i	01 31 25.9	
			i	01 35 29.4	
			iSKS	01 42 00.7	
			iPKKP	01 46 42.3	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. cont.	4	Gb	iP	01 31 31.7	
			i	01 31 35.3	
			iPP	01 36 06.5	
			iPS	01 45 18.0	
			ePKKP	01 46 50	
		Um	iP	01 31 05.0	C
			i	01 31 08.9	
			iPP	01 35 18.1	
			iPa	01 41 35.8	
			iSKS	01 41 54.1	
			iPS	01 44 34.1	
			i	01 46 02.0	
		Ka	iP	01 31 24.7	
			i	01 31 29.5	
			iPP	01 35 44.8	
			iSKS	01 42 06.7	
			iPS	01 45 02.3	

Banda Sea. h = 70 km (Ki).
Magn. = 7.9 (Up,Ki).
Well developed G-waves on long-period N-components.
Multiple P-phase with an average difference of 4.0 sec between the first and the second (larger) P.

"	4	Up	i(PKP)	01 34 49.8	
				microns	sec
			(PKP) Z'	0.2	0.6
		Ki	i(PKP)	01 34 23.5	
				microns	sec
			(PKP) Z'	0.3	1.0
		Sk	i(PKP)	01 34 55.7	
		Gb	i(PKP)	01 35 14.0	
		Um	i(PKP)	01 34 36	
		Ka	i(PKP)	01 35 00.1	

These phases could not be interpreted as belonging to the preceding shock, and therefore they probably represent another shock. However, no agreement is found with the New Hebrides Islands earthquake either, reported by USCGS.

"	4	Up	i(P)	02 14 09.6	
			i	02 14 21.8	
		Sk	eP	02 14 27	
		Gb	eP	02 14 37	
		Um	eP	02 14 08	
		Ka	iP	02 14 23.1	

Banda Sea.
Origin time = 02 00 13.

"	4	Um	eP	02 28 01	

Banda Sea (h = 80 km).

1963 Nov.	4	Um	iP	02 50 32.7	

Banda Sea (h = 130 km).

"	4	Ki	i(P)	06 19 07.5	
"	4	Up	iP	08 17 20.1	

Kurile Islands (h = 30 km).

"	4	Up	iP	08 47 04.5	

Kurile Islands (h = 30 km).

"	4	Up	iP	10 44 52.4	
"	4	Up	iP	15 49 34.5	
			i	15 49 41.0	
		Sk	iP	15 50 10.5	
		Um	iP	15 50 13.8	

Italy (h = 15 km).

"	4	Gb	iPKP	18 42 15.5	

Tonga Islands (h = 30 km).

"	4	Up	iP	21 19 42.5	
		Sk	iP	21 20 09.3	
		Um	iP	21 19 41.7	

Hindu Kush (h = 150 km).

"	5	Ki	iP	08 57 22.0	
		Um	iP	08 57 26.4	

Banda Sea (h = 110 km).

"	5	Up	iPKP	09 53 06.4	

Kermadec Islands (h = 90 km).

"	5	Ki	i(Sn)	13 54 28.6	
			iSg	13 54 43.1	
		Sk	iSg	13 57 10.9	
		Um	eSg	13 55 40	

Northwest Russia, 67,5°N, 31,8°E. Origin time = 13 52 21. Explosion?

"	5	Sk	iP	14 13 52.0	
"	5	Up	iPKP	16 21 51.1	

Fiji Islands (h = 60 km).

"	5	Up	iP	21 10 26.1	D

Kurile Islands (h = 30 km).

"	5	Up	i(P)	22 53 15.9	
			iP	22 53 28.0	
"	6	Up	eP	00 06 30	
		Ki	iP	00 06 14.6	
		Um	iP	00 06 20.5	

Molucca Passage (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov.	6	Up	eP	02 27 28	
			i	02 27 41.8	
			ePKP	02 31 54	
			iPP	02 32 03	
			eS	02 39 30	
			ePS	02 41 15	
				microns sec	
			PP N	0.6 6	
			PP Z	1.4 5	
			S N	1.4 18	
			M E	4.0 23	
			M N	10 24	
			M Z	10 22	
			(D = 12000 km = 108°).		
		Ki	iP	02 27 13.0	
			iPP	02 31 29	
			iS	02 38 54	
			iPS	02 40 24	
				microns sec	
			PP E	0.7 7	
			PP Z	1.5 7	
			S N	0.6 7	
			M E	9.5 18	
			M N	6.8 21	
			M Z	12 18	
			D = 11450 km = 103°.		
		Um	iP	02 27 20.6 C	
			iPP	02 31 44.9	
			iSKS	02 37 59	
		New Guinea (h = 30 km).			
		Magn. = 6.7 (Up,Ki).			
"	6	Up	iP	03 14 17.8	
				microns sec	
			M E	0.6 17	
			M N	1.8 18	
			M Z	1.3 16	
		New Guinea (h = 40 km).			
"	6	Ki	iPn	06 43 12.1	
			iSn	06 44 07.5	
			iSg	06 44 27.4	
			D = 490 km = 4.4°.		
		Sk	eSg	06 46 58	
		Um	iSn	06 44 52.5	
			iSg	06 45 26.0	
			D = 700 km = 6.3°.		
		Northwest Russia, 67.8°N, 32.0°E. Origin time = 06 42 02. Explosion?			
"	6	Up	iPKP	06 47 51.7	
			i	06 47 57.8	
				microns sec	
			PKP Z'	0.1 0.5	
		Sk	iPKP	06 47 46.9 C	

1963 Nov. cont.	6	Gb	iPKP	06 48 00.8	
		Um	iPKP	06 47 41.0	
			ipPKP	06 49 29.6	
		Ka	iPKP	06 48 14.4 C	
		Kermadec Islands.			
		h = 440 km (Um).			
"	6	Up	iP	09 35 49.2 C	
			i	09 35 51.0	
			i(PcP)	09 36 10.7	
				microns sec	
			P Z'	0.1 0.5	
		Ki	iP	09 35 01.5	
				microns sec	
			P Z'	0.3 1.2	
			M E	0.5 16	
			M N	0.4 16	
			M Z	1.0 20	
		Sk	iP	09 35 36.2	
		Gb	iP	09 36 13.8	
			iPcP	09 36 31.8	
		Um	iP	09 35 22.5	
			i	09 35 24.7	
		Ka	iP	09 36 17.5 C	
			iPcP	09 36 30.9	
		Kamchatka (h = 30 km).			
		Magn. = 6.2 (Up,Ki).			
		Multiple P-phase with a difference of 2 sec between the first small P and the second larger one (Up,Um). Such instances, which appear frequently, tend to limit the accuracy of epicenter determinations, as less sensitive stations will miss the first weak signal.			
"	6	Gb	iP	11 25 23.6 C	
"	6	Ki	iSn	13 53 55.7	
			iLg2	13 55 55.7	
		Sk	eLg2	13 57 18	
		Um	eSn	13 53 36	
			iLg2	13 55 30.4	
		Eastern part of European USSR, roughly at 58°N, 52½°E (by combination with Finnish data).			
"	6	Up	iP	15 05 16.6	
"	6	Up	i(P)	18 40 10.3	
"	6	Up	iPKP	18 43 40.8	
		Sk	iPKP	18 43 36.7 C	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. cont.	6	Um	iPKP	18 43 31.6	
		(Kermadec Islands).			
"	6	Up	iP	20 47 18.0	C
"	6	Up	iP	21 13 14.4	C
		Sk	iP	21 13 54.3	
		Greece (h = 100 km).			
"	6	Up	iPKP	22 34 31.7	C
			i	22 34 37.4	
		Sk	ePKP	22 34 26	
		Um	iPKP	22 34 20.7	
		(Kermadec Islands).			
"	7	Up	iP	00 03 17.6	
"	7	Up	eP	03 35 58	
		Kurile Islands (h = 40 km).			
"	7	Ki	iSn	04 35 40.5	
			iSg	04 35 59.2	
		Sk	eSg	04 38 30	
		Um	iSg	04 36 53.5	
		Northwest Russia, 67.4°N, 30.6°E. Origin time = 04 33 53. Explosion?			
"	7	Up	iP	09 33 57.2	C
		Ki	iP	09 33 11.6	
		Sk	eP	09 33 46	
		Kurile Islands (h = 50 km).			
"	7	Ki	iP	13 08 34.0	D
		Um	iP	13 08 53.4	
		Mariana Islands (h = 50 km).			
"	7	Gb	iPKP	16 13 18.2	
		Tonga Islands (h = 30 km).			
"	7	Gb	ePKP	17 54 31	
		Tonga Islands (h = 30 km).			
"	7	Ki	iP	20 48 09.8	
			microns	sec	
			P Z' 0.1	1.2	
		Kurile Islands (h = 30 km).			
"	8	Up	iP	08 19 07.4	
		Ki	iP	08 18 21.7	C
		Ka	iP	08 19 30.3	
		Kurile Islands (h = 40 km).			
"	8	Up	iP	10 11 13.7	
		Ki	iP	10 11 55.0	C
			microns	sec	
			P Z' 0.1	1.0	
1963 Nov. cont.	8	Sk	eP	10 11 29	
		Um	iP	10 11 33.9	
		Rhodesia (h = 30 km).			
"	8	Up	iP	11 33 32.7	
		Kurile Islands (h = 40 km).			
"	8	Up	iP	16 26 47.9	
		Ki	iP	16 26 30.8	
			microns	sec	
			P Z' 0.1	1.0	
		Um	iP	16 26 36.4	
		Molucca Passage (h = 220 km).			
"	8	Up	iP	23 55 16.9	
"	9	Up	i(P)	00 10 59.4	
"	9	Up	eP	02 52 25	
			microns	sec	
			M E 1.1	20	
			M N 1.9	23	
			M Z 1.8	19	
		Ki	eP	02 52 20	
			e(S)	02 57 21	
			microns	sec	
			(S) E 1.0	9	
			M E 1.7	15	
			M N 0.8	14	
			M Z 2.3	15	
		Sk	eP	02 51 56	
		Um	eP	02 52 31	
			eS	02 57 12	
		South of Iceland (h = 30 km).			
"	9	Um	iP	05 51 55.9	
"	9	Up	iP	09 02 16.5	
		Ki	iP	09 01 32.5	C
		Kurile Islands (h = 30 km).			
"	9	Ki	iP	12 40 04.1	C
"	9	Ki	i(P)	13 00 36.0	
			i	13 00 39.4	
		Probably local explosion.			
"	9	Up	iP	21 28 01.5	
			i	21 28 04.9	
			ipP	21 30 06.5	
			i	21 30 15.4	
			iPP	21 32 18.6	
			iSKS	21 37 42	
			iS	21 38 36	
			iPKKP	21 44 28.2	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. 9 cont.

Up
i 21 44 42.3
iP'P' 21 52 51.9

		microns	sec
P	Z	2.6	4
P	Z'	0.5	0.7
pP	Z'	0.8	1.0
PP	E	1.1	3
PP	Z	2.0	3
SKS	E	9.6	7
SKS	N	2.1	4
S	E	5.7	6
P'P'	Z'	1.9	2.5
M	E	14	24
M	N	14	24
M	Z	19	23

(D = 10950 km = 98½°).

Ki
iP 21 28 08.5
i 21 28 11.2
ipP 21 30 20.3
i 21 30 25.6
iPP 21 32 30
ipPP 21 34 23
i 21 36 41.0
iSKS 21 37 55
iS 21 38 49
eSP 21 40 25
ipS 21 41 37
iPKKP 21 44 35.2
iP'P' 21 52 46.9

		microns	sec
P	E	1.1	8
P	Z	3.9	9
P	Z'	1.6	1.3
PP	E	2.6	6
PP	Z	3.4	6
SKS	E	16	9
SKS	N	2.3	8
S	N	11	17
PKKP	Z'	0.3	1.0
P'P'	Z'	0.3	1.3
M	E	15	21
M	N	12	22
M	Z	27	25

(D = 11100 km = 100°).

Sk
iP 21 27 52.1
i 21 27 55.8
ipP 21 30 00.1
i 21 30 07.1
iPKKP 21 44 42.4
i 21 44 46.0
iP'P' 21 52 45.5
i 21 52 56.1

Gb
iP 21 27 46.5
i 21 27 50.0
ipP 21 29 55.2
iSKS 21 37 31.5
iPKKP 21 44 49.1

1963 Nov. 9 cont.

Gb
iP'P' 21 53 00.4

Um
iP 21 28 08.9
i 21 28 11.5
i 21 28 23.4
ipP 21 30 16.1
i 21 30 24.0
ipPP 21 34 15.0
isPP 21 35 13
iSKS 21 37 53
iSP 21 40 18
iPKKP 21 44 20.2
i 21 44 37.5
eP'P' 21 52 45
i 21 52 51.1

Ka
iP 21 27 56.3
i 21 27 58.0
i 21 28 07.6
ipP 21 30 05.3
i 21 30 10.8
iPP 21 32 03.0
iPKKP 21 44 44.9
iP'P' 21 52 57.7

Western Brazil. h = 600 km (Up,Ki,Sk,Gb,Um,Ka).
Magn. = 7.1 (Up,Ki).
The records are complicated by multiple phases with successively increasing amplitudes, especially for P (average interval = 3.0 sec between first and second phase) and pP (average interval = 6.9 sec).

" 9 Um iP 21 53 35.8

" 9 Up iP 21 55 11.4

		microns	sec
P	Z'	0.2	1.5

Sk iP 21 55 30.2
Um iP 21 55 08.9

" 9 Ki iP 22 10 15.7 C
Sk eP 22 09 57

" 10 Up iP 01 13 10.1
ipP 01 15 16.7
eSKS 01 22 41
iS 01 23 31

		microns	sec
P	Z'	0.1	1.0
SKS	E	1.5	9
S	E	1.4	6
S	N	0.7	7

(D = 10950 km = 98½°).

Ki eP 01 13 17
ipP 01 15 27.1

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. 10 cont.

Ki	ePP	01 17 26	
	iSKS	01 22 59	
	iSP	01 25 36	
	iPKKP	01 29 41.5	
		microns	sec
	P	Z 0.6	10
	P	Z' 0.2	1.0
	PP	E 0.8	5
	PP	Z 0.9	10
	SKS	E 2.7	8
	(D = 11100 km = 100°).		
Sk	iP	01 13 00.7	
	ipP	01 15 09.8	
	ePKKP	01 29 52	
Gb	iP	01 12 56.8	
	ipP	01 15 04.9	
Um	iP	01 13 17.5	
	ipP	01 15 24.5	
	iPP	01 17 18.6	
	ePKKP	01 29 39	
Ka	iP	01 13 02.2	
	ipP	01 15 13.8	

Western Brazil. h = 600 km
(Up,Ki,Sk,Gb,Um,Ka).
Magn. = 6.4 (Up,Ki).

" 10

Up	iP	05 08 55.2 C
Ki	iP	05 08 48.6 C
Sk	iP	05 09 10.8 C
Um	iP	05 08 46.8 C
	i	05 08 58.8
Ka	iP	05 09 04.4 C

India (h = 70 km).

" 10 Gb iP 05 40 33.9 C

" 10 Ki iP 07 46 31.6

" 10

Up	iP	09 01 05.8
Ki	eP	09 00 18

Kurile Islands (h = 50 km).

" 10

Up	iP	11 23 41.7
	i	11 24 30.8
Ki	iP	11 24 51.1 C

Aegean Sea (h = 30 km).

" 10 Up iP 14 55 24.8 C
Kurile Islands (h = 40 km).

" 10 Up iP 16 09 19.4
Kurile Islands (h = 40 km).

" 10

Up	iP	17 28 41.1 C
	i	17 28 44.8
	eS	17 37 43

1963 Nov. 10 cont.

Up	iScS	17 38 38	
		microns	sec
	P	Z 1.3	5
	P	Z' 0.2	0.7
	S	E 1.1	12
	S	N 2.1	15
	M	E 6.8	18
	M	N 15	18
	M	Z 11	19
	D = 7550 km = 68°.		
Ki	iP	17 28 00.4	
	eS	17 36 15	
		microns	sec
	P	Z 1.9	9
	P	Z' 0.1	1.0
	S	E 1.6	12
	S	N 0.6	13
	M	E 14	16
	M	N 11	17
	M	Z 23	17
	D = 6850 km = 61⅔°.		
Sk	iP	17 28 34.7	
Gb	iP	17 29 04.9	
	i	17 29 19.5	
Um	iP	17 28 21.1 C	
	iPP	17 30 44	
	ePa	17 32 11	
Ka	iP	17 29 05.6 C	
	i	17 29 09.7	

Kurile Islands (h = 40 km).
Magn. = 6.3 (Up,Ki).

" 10

Up	iP	18 42 09.3
Ki	eP	18 43 23
Sk	eP	18 42 50
	i	18 42 57.7
Um	iP	18 42 54.2 C
Ka	iP	18 41 36.5

Ionian Sea (h = 30 km).
Our observations are not well satisfied by the USCGS solution for this earthquake, a possible reason being greater focal depth than normal.

" 10

Up	iPKP	19 39 03.6	
		microns	sec
	PKP	Z' 0.1	0.5
Gb	iPKP	19 39 13.1 C	
	i	19 39 16.8	
Ka	iPKP	19 39 14.4 C	

South of Fiji Islands
(h = 610 km).

" 11 Up iP 00 21 30.5 D
Kurile Islands (h = 60 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. 11 Up iP 05 17 04.2
Kurile Islands (h = 40 km).

" 11 Up iP 10 00 41.8
Ki iP 09 59 55.8
Sk iP 10 00 30.6
Gb eP 10 01 04
Kurile Islands (h = 60 km).

" 11 Ki iP 10 15 32.3
i 10 15 44.1
Um eP 10 15 53
(Kurile Islands).

" 11 Ki iPKP 11 47 51.3
Tonga Islands (h = 190 km).

" 11 Um iP 11 56 31.7 C

" 11 Ki eSn 13 58 19
iSg 13 58 43.8
Possibly northwest Russia.

" 11 Ki iPKP 16 40 29.1
Easter Island (h = 30 km).

" 11 Sk iP 20 06 32.5 D
Western Brazil (h = 590 km).

" 12 Up iP 00 42 50.2
Kurile Islands (h = 30 km).

" 12 Up iS 07 16 18
Ki iP 07 12 59.0 C
microns sec
P Z' 0.3 0.7
Sk iP 07 12 34.6
Gb iP 07 11 52.3
Um iP 07 12 24.5
iPP 07 13 10.7
Ka iP 07 11 27.0
i 07 12 04.9
Turkey (h = 70 km).

" 12 Um iP 07 17 31.7

" 12 Up iP 08 07 54.2
Um iP 08 07 29.9 D
Kurile Islands (h = 50 km).

" 12 Up iP 08 44 15.9
Um iP 08 43 49.5 C
Kurile Islands (h = 50 km).

" 12 Up iP 13 11 00.7
Um iP 13 10 35.3
Kurile Islands (h = 50 km).

1963 Nov. 12 Ki iP 15 37 29.8 C
Sk iP 15 37 49.2
India (h = 30 km).

" 12 Up iPKP 18 01 36.0
Sk ePKP 18 01 26
Um iPKP 18 01 19.4
Kermadec Islands
(h = 60 km).

" 12 Up iP 20 44 59.4 D

" 13 Um eP 01 46 00
Japan (h = 110 km).

" 13 Um iP 05 12 56.6 C
Japan (h = 80 km).

" 13 Up iP 07 43 44.3
Kurile Islands (h = 40 km).

" 13 Ki iSKP 11 39 27.9
Um iSKP 11 39 38.7
Fiji Islands (h = 520 km).

" 13 Up iP 16 01 57.1
Kurile Islands (h = 30 km).

" 13 Ki iP 20 15 21.4
Gulf of California
(h = 15 km).

" 14 Up iPKP 00 39 43.9
Sk iPKP 00 39 37.2
Um iPKP 00 39 31.9 D
Kermadec Islands
(h = 40 km).

" 14 Ki iP 04 10 42.7
Um iP 04 10 55.0 C
e 04 11 35
Mariana Islands
(h = 180 km).

" 14 Ki iPKP 04 54 47.3
microns sec
PKP Z' 0.1 1.0
Sk iPKP 04 54 59.8 C
Um iPKP 04 54 52.9
New Hebrides Islands
(h = 30 km).

" 14 Ki iP 05 16 16.3
Um iP 05 16 45.6
Kurile Islands (h = 15 km).

" 14 Up iP 10 28 38.9

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. cont.

14 Ki iP 10 28 06.9
Um iP 10 28 21.0 D
Japan (h = 440 km).

" 14 Ki iPn 10 52 23.2
iSn 10 53 38.8
iSg 10 54 10.9
D = 680 km = 6.1°.
Um iSg 10 55 36.3
Arctic Ocean, off north coast of Kola Peninsula, 70.1°N, 36.3°E (by combination with Tromsö data).
Origin time = 10 50 50.
An event in nearly the same location was recorded on July 25, 1963, at 02 09.

" 14 Ki iPKP 14 20 17.6
New Hebrides Islands (h = 30 km).

" 14 Ki iPKP 14 24 34.2 D

		microns	sec
PKP	Z'	0.1	1.2

New Hebrides Islands (h = 30 km).

" 14 Ki iP 21 37 36.7
Kurile Islands (h = 50 km).

" 14 Ki iP 23 42 21.3

" 14 Ki iPKP 23 56 49.7
New Hebrides Islands (h = 30 km).

" 15 Up iP 00 55 54.9
Kurile Islands (h = 50 km).

" 15 Up iP 06 45 07.5 D
Ki eP 06 44 19
Um iP 06 44 41.3
Kurile Islands (h = 30 km).

" 15 Ki iP 15 27 07.4
Um iP 15 27 34.8
Unimak Island (h = 30 km).

" 15 Up iP 21 17 34.0 D
eS 21 26 34
iScS 21 27 46

		microns	sec
P	N	1.0	5
P	Z	1.4	4
P	Z'	0.4	0.6

1963 Nov. cont.

15 Up

		microns	sec
S	E	0.9	10
S	N	3.3	14
M	E	21	17
M	N	37	18
M	Z	31	19

D = 7600 km = 68½°.
Ki iP 21 16 48.8
eS 21 25 14

		microns	sec
P	N	0.8	6
P	Z	1.9	6
P	Z'	0.3	1.0
S	E	1.9	9
S	N	1.4	12
M	E	29	18
M	N	21	18
M	Z	34	17

D = 6850 km = 61½°.
Sk iP 21 17 23.7
Gb iP 21 17 54.5 D
Um iP 21 17 08.7
iPa 21 21 05
iS 21 25 43
iPS 21 26 00
Ka iP 21 17 56.4
Kurile Islands (h = 50 km).
Magn. = 6.5 (Up,Ki).

" 16 Up iP 02 41 07.0 C
ipP 02 41 22.3

		microns	sec
M	E	1.2	16
M	N	2.2	18
M	Z	1.6	17

Ki iP 02 40 21.8

		microns	sec
M	E	1.9	16
M	N	1.4	16
M	Z	3.0	17

Gb iP 02 41 27.8
Kurile Islands, h = 60 km (Up).

" 16 Up iP 06 39 01.2
Sk iP 06 39 42.6 D

" 16 Up iP 11 18 13.2 D

		microns	sec
P	Z'	0.1	0.5

Ki eP 11 18 02

		microns	sec
M	E	1.0	14

Sk iP 11 18 27.3
Gb iP 11 18 38.7 D
Burma (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. 16 Up iP 11 49 41.7
microns sec
P Z' 0.1 0.5
Ki iP 11 49 32.8 D
Sk iP 11 49 57.2 D
Assam (h = 40 km).

" 16 Ki i(P) 12 32 32.6
Local explosion.

" 16 Sk iP 18 06 13.3
Greece.

" 16 Up iPP 23 06 18
e 23 12 47
eSS 23 24 33
microns sec
M E 1.5 20
M N 3.2 22
M Z 3.6 22
Ki iPKP 23 02 43.0
iPKS 23 06 09
microns sec
PKS N 0.6 7
PKS Z 1.2 6
M E 2.6 19
M N 2.9 19
M Z 3.1 21
Sk iPKP 23 02 51.6 C
Gb iPKP 23 02 58.0
i 23 03 12.1
Um iPKP 23 02 49.4
Tonga Islands (h = 30 km).
Magn. = 6.1 (Up,Ki).

" 16 Ki ---
microns sec
M N 0.7 16
M Z 1.1 16
Gb iPKP 23 59 30.7
Tonga Islands (h = 30 km).

" 17 Up iP 00 58 49.3 C
i 01 00 22.0
iS 01 07 31
microns sec
P Z 1.3 3
P Z' 1.5 1.7
S E 5.6 15
S N 8.9 15
M E 24 20
M N 23 18
M Z 49 22
D = 7350 km = 66°.
Ki iP 00 59 20.4 C
iS 01 08 38
ePS 01 08 59

1963 Nov. cont. 17 Ki
microns sec
P Z 1.3 4
P Z' 1.0 1.8
S E 1.2 8
S N 4.9 11
M E 13 19
M N 8.8 18
M Z 24 20
D = 7900 km = 71°.
Sk iP 00 58 47.4 C
i 00 58 52.1
Gb iP 00 58 26.4 C
Um iP 00 59 08.0 C
i 00 59 11.1
iS 01 08 11
iSS 01 12 37
iSa 01 15 34
North Atlantic Ocean
(h = 30 km).
Magn. = 6.6 (Up,Ki).
The long-period N-component at Umeå exhibits another case of Sa followed by G, as described by Båth & Lopez Arroyo (Geofis. pura e appl., 56, 67-92, 1963).

" 17 Ki iP 08 03 30.6 D
Um iP 08 03 37.2
Mindanao (h = 30 km).

" 17 Um iP 17 21 56.9

" 18 Up iP 01 55 41.1
iPcP 01 56 09.1
Um iP 01 55 15.7
Sea of Okhotsk (h = 320 km).

" 18 Ki iSg 06 58 10.5
Um iSn 06 58 52.3
iSg 06 59 33.9
Northwest Russia.
Explosion?

" 18 Um iP 13 32 19.6

" 18 Ki iPKP 13 33 14.1
microns sec
PKP Z' 0.2 1.5
Sk ePKP 13 33 28
Um iPKP 13 33 25.1
Kermadec Islands
(h = 50 km).

" 18 Up iP 14 50 53.1 C
iS 15 01 11
microns sec
S E 2.9 13

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. 18 cont. Up

			microns	sec
S	N	6.4		13
M	E	11		20
M	N	24		19
M	Z	24		19

D = 9200 km = 83°.

Ki	iP	14 50 23.1	
	eS	15 00 19	
		microns	sec
P	Z'	0.4	1.5
S	N	2.8	9
M	E	24	15
M	N	23	17
M	Z	34	15

D = 8600 km = 77½°.

Sk	iP	14 50 31.3
Gb	iP	14 50 49.0 C
Um	iP	14 50 38.8 C
	iPP	14 53 41.1
	iS	15 00 48
Ka	iP	14 50 58.1
	i	14 51 06.0

Gulf of California (h = 15 km).
Magn. = 6.6 (Up,Ki).

" 18 Gb iPg 15 15 33.1 C
iSg 15 15 34.8
D = 10 km = 0.1°.
Local explosion?

" 19 Up iP 04 47 51.5 D
Ki iP 04 47 16.0 D

		microns	sec
P	Z'	0.1	1.2

Sk	iP	04 47 49.1
Gb	iP	04 48 13.4 D
Um	iP	04 47 30.9 D

Sea of Japan (h = 540 km).

" 19 Up iP 05 00 39.1
Gb i(P) 04 59 48.5

" 19 Ki ePKP 11 04 58
Gb iPKP 11 05 33.3
Loyalty Islands (h = 40 km).

" 19 Up iP 11 11 55.9

		microns	sec
P	Z'	0.1	1.0
M	E	1.2	16
M	N	1.8	15
M	Z	2.5	16

Ki	iP	11 11 08.9 C

		microns	sec
P	Z'	0.1	1.3

1963 Nov. 19 cont. Ki

		microns	sec
M	E	2.1	18
M	N	1.8	18
M	Z	3.4	17

Sk	iP	11 11 45.6 C
Gb	iP	11 12 17.1 C
Um	iP	11 11 31.0

Kurile Islands (h = 30 km).
Magn. = 5.6 (Up,Ki).

" 19 Up iP 17 49 06.3
i 17 49 24.8

		microns	sec
P	Z'	0.1	0.5

Ki	iP	17 48 12.7
Sk	iP	17 48 50.1
Gb	iP	17 49 27.7
Um	eP	17 48 38

Kamchatka (h = 40 km).

" 19 Ki eP 18 30 14
i 18 30 43.2
Sk eP 18 30 36
i 18 30 44.2
Sumatra (h = 40 km).

" 19 Up iP 18 34 58.8 C

" 20 Ki ---

		microns	sec
M	E	1.1	20
M	N	0.6	18

Gb	iPKP	12 19 30.6

Tonga Islands (h = 30 km).

" 20 Um iP 12 32 37.2
(Hindu Kush).

" 20 Up iPg 14 50 31.7
iSn 14 51 09.1
e(S*) 14 51 20
iSg 14 51 22.8

		microns	sec
Sg	Z'	0.1	0.5

D = 450 km = 4.0°.

Ki	i	14 54 56.6
	iSg	14 55 05.7
Sk	eS*	14 51 57
	eSg	14 52 14
Gb	iPg	14 49 27.6
	iSg	14 49 34.3
	i	14 49 44.2
	i	14 49 51.7

D = 90 km = 0.8°.

Um	e	14 53 04
	iSg	14 53 08.8

Skagerrack, 58.1°N, 10.7°E.
Origin time = 14 49 12.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. 20 Up iP 22 44 32.0
Kurile Islands (h = 50 km).

" 21 Up iP 05 53 36.1

" 21 Up i(P) 06 50 48.4 C

" 21 Up iP 13 17 42.3 D
Ki iP 13 16 55.6
Um iP 13 17 17.6
Kurile Islands (h = 40 km).

" 21 Up iP 18 54 40.2
i 18 54 46.5
Ki iP 18 55 19.8 C
Ascension Islands
(h = 30 km).

" 21 Up iP 19 07 12.5

" 21 Up iP 20 09 25.8 C
Kurile Islands (h = 40 km).

" 21 Up iP 21 12 24.9 C
iPcP 21 12 56.1
Ki iP 21 11 34.1
Sk eP 21 12 09
Kamchatka (h = 80 km).

" 22 Ki iP 00 31 20.9 C
Java (h = 320 km).

" 22 Ki iP 11 26 22.4 C
Sk iP 11 26 21.0
Mexico (h = 120 km).

" 22 Up iP 14 56 53.0
microns sec
P Z' 0.1 0.5
M E 3.7 18
M N 5.8 17
M Z 2.4 15
Ki iP 14 56 06.7
microns sec
M E 4.4 18
M N 2.3 17
M Z 7.7 18
Sk eP 14 56 41
i 14 57 27.2
Gb iP 14 57 15.3 C
i 14 57 29.0
Kurile Islands (h = 30 km).
Magn. = 5.8 (Up,Ki).

" 22 Up iP 15 33 09.1
Kurile Islands (h = 40 km).

1963 Nov. 22 Up iP 20 31 14.4 D
iS 20 35 36
Ki iP 20 32 16.6 C
microns sec
P Z' 0.1 1.5
Gb iP 20 31 20.5 D
Turkey (h = 30 km).

" 22 Up iP 21 46 46.9
Ki iP 21 47 46.8 D
Turkey (h = 20 km).

" 22 Up iP 22 06 34.4 C
i 22 06 39.9

" 23 Up iS 08 13 23
microns sec
M E 3.8 20
M N 6.5 20
M Z 6.7 19
Ki iP 08 02 39.3
microns sec
M E 5.9 14
M N 3.8 14
M Z 6.6 15
Gulf of California
(h = 15 km).
Magn. = 6.2 (Up,Ki).

" 23 Up i(P) 11 45 47.4 C

" 23 Up iP 12 11 29.3
microns sec
P Z' 0.1 0.5

" 23 Up iP 19 11 35.6
Ki iP 19 10 48.9 C
microns sec
P Z' 0.2 1.0
Sk iP 19 11 23.6 C
Kurile Islands (h = 50 km).

" 23 Up eP 22 38 38
Ki iP 22 37 02.3
microns sec
P Z' 0.1 1.0
Sk iP 22 37 49.5
Gb iP 22 38 59.0
Svalbard (h = 30 km).

" 24 Gb iPKP 05 28 14.9
Tonga Islands (h = 30 km).

" 24 Gb iPKP 05 32 55.0
Tonga Islands (h = 30 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963
Nov. 24 Sk ePKP 05 40 20
Tonga Islands (h = 30 km).

" 24 Up iP 11 17 39.9 D
microns sec
P Z' 0.3 0.5
Ki iP 11 17 07.3 D
microns sec
P Z' 0.3 0.7
Sk iP 11 17 36.1 D
iPP 11 20 39.2
Gb iP 11 17 57.5 D
Um iP 11 17 20.8 D
Ka iP 11 17 56.6 D
Japan (h = 260 km).
Magn. = 6.1 (Up,Ki).

" 24 Up iP 12 04 33.7 C
Kurile Islands (h = 40 km).

" 24 Up iP 18 07 02.0
Um iP 18 06 36.5
Kurile Islands (h = 50 km).

" 24 Up iP 18 20 03.2 D
Kurile Islands (h = 40 km).

" 24 Ki iP 19 33 25.1
Um iP 19 33 45.9
Kurile Islands (h = 30 km).

" 25 Ki iPg 04 31 03.7
iSg 04 31 41.7
D = 320 km = 2.9°.
Um i(Sg) 04 33 16.1
West coast of Norway, near
Lofoten (by combination
with Tromsö readings).
Origin time = 04 30 06.

" 25 Up iP 06 54 21.6
Ki iP 06 53 34.5
microns sec
P Z' 0.1 1.0
Sk iP 06 54 09.5
Um iP 06 53 55.7
Kurile Islands (h = 50 km).

" 25 Up iP 09 05 05.1
Kurile Islands (h = 30 km).

" 25 Up iP 10 13 24.9
ipP 10 13 37.3
microns sec
P Z' 0.1 0.8
Ki iP 10 12 37.9 D

1963
Nov. cont. 25 Ki microns sec
M E 1.2 18
M N 1.4 19
M Z 1.5 17
Sk eP 10 13 15
Gb iP 10 13 45.8 D
Um iP 10 12 59.8
Kurile Islands.
h = 50 km (Up).

" 25 Up iP 10 22 08.2 C
i 10 22 13.2
ipP 10 22 21.0
microns sec
P Z' 0.1 0.7
Ki iP 10 21 21.8
Sk eP 10 21 58
Gb iP 10 22 28.2 C
Um iP 10 21 43.1
ipP 10 21 55.2
Kurile Islands.
h = 50 km (Up,Um).

" 25 Up iP 11 41 31.0 C
Ki iP 11 40 44.7
Um iP 11 41 06.2
Kurile Islands (h = 50 km).

" 25 Um iP 16 42 40.1 C

" 25 Up iP 16 58 28.6
Ki iP 16 58 11.7
microns sec
M E 0.7 13
M N 0.8 16
M Z 0.9 13
Formosa (h = 30 km).

" 25 Um iP 18 34 00.2

" 26 Up iPKP 03 18 14.8
Gb iPKP 03 18 19.4 D
Kermadec Islands
(h = 50 km).

" 26 Ki e 09 14 41
eSg 09 15 02

" 26 Ki e(Pg) 09 30 15
iSg 09 30 49.5

" 26 Up iP 15 11 44.8

" 26 Up iP 16 25 34.9
microns sec
M E 0.7 13

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Nov. cont.

	26	Up			microns sec
			M	N	0.6 19
			M	Z	0.7 14
		Ki	iP		16 26 20.3
					microns sec
			M	E	0.6 12
		Sk	eP		16 25 55
		Crete (h = 30 km).			
"	26	Up	iP		20 32 50.8
		Ka	iP		20 32 43.0
"	26	Up	eL		23 45
					microns sec
			M	E	1.0 25
			M	N	0.7 18
		Fiji Islands (h = 30 km).			
"	27	Up	---		
					microns sec
			M	E	0.2 9
			M	N	1.3 13
		Ki	iP		08 02 45.9 C
		Sk	eP		08 03 09
		Kazakh SSR (h = 30 km).			
"	27	Up	iP		09 32 51.5
		Um	iP		09 32 25.5
		Kurile Islands (h = 50 km).			
"	27	Up	iP		14 12 34.4
		Ki	eP		14 12 11
		Molucca Passage			
		(h = 30 km).			
"	27	Up	iP		20 28 58.9
		Ki	iP		20 28 11.4 C
					microns sec
			P	Z'	0.1 0.8
		Um	iP		20 28 32.9 C
		Kurile Islands (h = 40 km).			
"	27	Up	iP		21 19 30.0 C
		Ki	iP		21 19 33.9 C
		Sk	iP		21 19 52.3
		Gb	iP		21 19 50.5 C
		Um	iP		21 19 26.9
		Ka	iP		21 19 35.5 C
		India (h =30 km).			
"	28	Up	iP		05 22 45.6
		Kurile Islands (h = 50 km).			
"	28	Sk	eP		08 13 52
"	28	Sk	iP		08 41 32.7

1963 Nov.

	28	Gb	iPg		12 13 09.4
			iSg		12 13 11.4
			D = 20 km = 0.2°.		
		Local explosion?			
"	28	Up	iP		15 23 59.3
					microns sec
			P	Z'	0.1 0.6
		Ki	iP		15 23 05.6 C
					microns sec
			P	Z'	0.1 1.0
		Sk	iP		15 23 39.5
		Gb	iP		15 24 17.0 C
		Um	iP		15 23 31.7
		Ka	eP		15 24 23 C
		Aleutian Islands			
		(h = 30 km).			
		Magn. = 5.9 (Up,Ki).			
"	28	Up	iPKP		18 32 49.3 D
		Kermadec Islands			
		(h = 590 km).			
"	28	Up	iP		23 29 27.5 C
		Kurile Islands (h = 30 km).			
"	29	Up	iP		03 23 43.0
"	29	Ki	e(Sn)		05 30 36
			e(Sg)		05 30 56
"	29	Up	iSg		09 16 58.5
					microns sec
			Sg	Z'	0.1 0.5
		Ki	eS*		09 19 24
			e(Sg)		09 19 53
		Sk	eSn		09 18 19
			eSg		09 18 55
		Um	i(Pn)		09 16 46.9
			iSg		09 17 50.5
		Baltic Sea, 60.4°N, 21.0°E.			
		Origin time = 09 16 02.			
		Explosion?			
"	29	Up	iP		15 02 03.1 C
			ipP		15 02 13.3
					microns sec
			pP	Z'	0.1 1.0
		Ki	iP		15 01 29.8
		Sk	iP		15 01 59.9
			ipP		15 02 10.0
		Gb	iP		15 02 20.1
			ipP		15 02 30.3
		Um	iP		15 01 44.9 C
			ipP		15 01 55.6
		Ka	iP		15 02 18.1

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963					
Nov. cont.	29	Ka	ipP	15 02 28.6	
		Bonin Islands. h = 40 km			
		(Up,Sk,Gb,Um,Ka).			
"	29	Up	iP	19 57 19.4	
				microns sec	
			P	Z' 0.1	0.6
		Ki	iP	19 56 33.5	
		Gb	iP	19 57 40.1	
		Um	iP	19 56 54.4	D
		Ka	eP	19 57 41	
		Kurile Islands (h = 50 km).			
"	29	Up	iP	20 03 15.9	
"	29	Up	iP	22 32 22.4	
		Um	iP	22 31 56.8	
		Kurile Islands (h = 30 km).			
"	30	Ki	iP	09 31 17.2	
"	30	Um	eP	10 01 23	
		Halmahera (h = 60 km).			
"	30	Up	iP	11 40 37.6	
		Sk	eP	11 40 18	
		Um	iP	11 40 10.1	C
		Aleutian Islands			
		(h = 30 km).			
"	30	Up	eP	20 23 30	
"	30	Up	iP	21 52 13.7	
			ipP	21 52 24.3	
		Ki	iP	21 52 15.4	
				microns sec	
			P	Z' 0.2	0.7
		Sk	iP	21 52 30.4	
			ipP	21 52 41.4	
		Gb	iP	21 52 41.2	
		Um	iP	21 52 11.2	
			ipP	21 52 24.2	
		Nicobar Islands. h = 50 km			
		(Up,Sk,Um).			

Markus Båth
October 24, 1964

P R E L I M I N A R Y

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, G Ö T E B O R G,

U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E;	h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E;	h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E;	h = 11 m

D E C E M B E R 1 - 31, 1963

1963 Dec.	1	Ki	iP	02 51 44.1	C
		Sk	eP	02 52 35	
"	1	Up	iP	04 34 33.9	D
		Ki	iP	04 33 49.0	D
		Sk	iP	04 34 31.1	D
		Ka	iP	04 34 58.9	
		Lake Baikal (h = 30 km).			
"	1	Up	iP	09 46 45.3	D
		Nicobar Islands (h = 25 km).			
"	1	Up	iP	16 08 13.6	
		Um	i(P)	16 07 58.7	
		Kurile Islands (h = 40 km).			
"	1	Up	iP	16 26 43.8	
		Ki	iP	16 26 14.9	
		Sk	iP	16 26 43.1	
		Gb	eP	16 27 03	
		Um	iP	16 26 25.9	
		Ryukyu Islands (h = 30 km).			
"	1	Um	iP	17 22 52.7	
			iSg	17 23 30.6	
"	1	Up	iP	17 55 36.6	D
		Kurile Islands (h = 40 km).			
"	1	Up	i(PKP)	23 43 21.4	
			i	23 43 25.4	
		Sk	e(PKP)	23 43 15	
		Um	i(PKP)	23 43 10.4	
"	2	Up	iP	06 51 58.6	C
			iS	06 54 27.3	
			iLg2	06 55 40	

1963 Dec. cont.	2	Up		microns	sec
			S	Z' 0.1	0.8
			M	E 2.4	5
			M	N 1.4	6
			M	Z 1.3	7
		D = 1350 km = 12°.			
		Ki	eP	06 53 41	
			iS	06 57 32.5	
			iLg1	06 59 44	
			iLg2	06 59 53.0	
				microns	sec
			M	E 1.6	11
		D = 2200 km = 20°.			
		Sk	iP	06 52 48.8	
			i	06 52 52.9	
			iLi	06 56 52.8	
			iLg2	06 57 44.1	
			i(PcP)	06 58 00.5	
		Gb	i	06 53 01.7	
			iS	06 53 20.1	
			iLi	06 53 48.7	
			iLg2	06 54 32.9	
		Um	iP	06 52 51.6	
			i	06 56 18.2	
			iLg1	06 57 37.4	
		Ka	eP	06 51 07	
			iLi	06 53 00.3	
			iLg2	06 53 29.7	
			i	06 53 50.1	
		Austria (h = 40 km).			
"	2	Up	iP	11 56 26.6	
		Ki	iP	11 55 36.5	
		Gb	iP	11 56 46.8	
		Ka	iP	11 56 49.5	
		Kurile Islands (h = 50 km).			
"	2	Sk	eP	13 03 05	
			i	13 03 08.0	

Seismological Institute
Uppsala

P R E L I M I N A R Y

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, G Ö T E B O R G, U M E Å and K A R L S K R O N A

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
Göteborg	(Gb):	57°41.9'N,	11°58.7'E; h = 66 m
Umeå	(Um):	63°48.9'N,	20°14.2'E; h = 16 m
Karlskrona	(Ka):	56°09.9'N,	15°35.5'E; h = 11 m

D E C E M B E R 1 - 31, 1963

1963					
Dec.	1	Ki	iP	02 51 44.1	C
		Sk	eP	02 52 35	
"	1	Up	iP	04 34 33.9	D
		Ki	iP	04 33 49.0	D
		Sk	iP	04 34 31.1	D
		Ka	iP	04 34 58.9	
		Lake Baikal (h = 30 km).			
"	1	Up	iP	09 46 45.3	D
		Nicobar Islands (h = 25 km).			
"	1	Up	iP	16 08 13.6	
		Um	i(P)	16 07 58.7	
		Kurile Islands (h = 40 km).			
"	1	Up	iP	16 26 43.8	
		Ki	iP	16 26 14.9	
		Sk	iP	16 26 43.1	
		Gb	eP	16 27 03	
		Um	iP	16 26 25.9	
		Ryukyu Islands (h = 30 km).			
"	1	Um	iP	17 22 52.7	
			iSg	17 23 30.6	
"	1	Up	iP	17 55 36.6	D
		Kurile Islands (h = 40 km).			
"	1	Up	i(PKP)	23 43 21.4	
			i	23 43 25.4	
		Sk	e(PKP)	23 43 15	
		Um	i(PKP)	23 43 10.4	
"	2	Up	iP	06 51 58.6	C
			iS	06 54 27.3	
			iLg2	06 55 40	

1963					
Dec. cont.	2	Up		microns	sec
			S	Z' 0.1	0.8
			M	E 2.4	5
			M	N 1.4	6
			M	Z 1.3	7
		D = 1350 km = 12°.			
		Ki	eP	06 53 41	
			iS	06 57 32.5	
			iLg1	06 59 44	
			iLg2	06 59 53.0	
			microns	sec	
			M	E 1.6	11
		D = 2200 km = 20°.			
		Sk	iP	06 52 48.8	
			i	06 52 52.9	
			iLi	06 56 52.8	
			iLg2	06 57 44.1	
			i(PcP)	06 58 00.5	
		Gb	i	06 53 01.7	
			iS	06 53 20.1	
			iLi	06 53 48.7	
			iLg2	06 54 32.9	
		Um	iP	06 52 51.6	
			i	06 56 18.2	
			iLg1	06 57 37.4	
		Ka	eP	06 51 07	
			iLi	06 53 00.3	
			iLg2	06 53 29.7	
			i	06 53 50.1	
		Austria (h = 40 km).			
"	2	Up	iP	11 56 26.6	
		Ki	iP	11 55 36.5	
		Gb	iP	11 56 46.8	
		Ka	iP	11 56 49.5	
		Kurile Islands (h = 50 km).			
"	2	Sk	eP	13 03 05	
			i	13 03 08.0	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 2 Up iP 21 00 40.6
i 21 00 46.5
iS 21 04 34

		microns	sec
P	N	1.6	3
P	Z	1.1	3
P	Z'	0.5	1.2
S	E	5.6	15
S	N	2.5	8
M	E	1.9	17
M	N	6.1	20
M	Z	5.8	20

D = 2350 km = 21°.

Ki iP 20 59 09.4
iS 21 01 37.0
i 21 01 51

		microns	sec
P	E	1.4	4
P	N	5.2	5
P	Z	3.8	5
P	Z'	2.9	2.0
S	E	7.5	12
M	E	5.6	20
M	N	8.3	20
M	Z	12	20

D = 1500 km = 13½°.

Sk iP 20 59 55.9
i 20 59 59.4
Gb iP 21 00 59.7
Um iP 20 59 58.7
i 21 00 09.0
iS 21 03 10
Ka iP 21 01 16.6
e 21 01 24
Svalbard (h = 30 km).
Magn. = 5.9 (Up).
The following two features deserve to be mentioned: 1) multiple P-phases (a common property for North Atlantic shocks); 2) existence of higher mode surface waves (part of the path is nearly tangential to the continental margin).

" 3 Up iP 00 03 38.2 D
iPcP 00 04 02.6
Ki iP 00 02 45.1
iPcP 00 03 29.7
Sk eP 00 03 16
iPcP 00 03 48.9
Gb iP 00 03 53.1
Um iPcP 00 03 45.5
Aleutian Islands
(h = 60 km).
The PcP-phases have larger

1963 Dec. 3 cont. amplitudes than the P-phases, especially at the nearer stations (Ki,Um,Sk).

" 3 Up iP 02 17 10.2 D

" 3 Up iP 03 55 38.1
Ki iP 03 54 51.1 C

		microns	sec
P	Z'	0.1	1.0

Um iP 03 55 12.5
Kurile Islands (h = 50 km).

" 3 Up iP 04 30 59.2 C
Ki iP 04 30 58.5
Sumatra (h = 50 km).

" 3 Up iP 05 20 19.4 C

		microns	sec
P	Z'	0.2	1.5
M	E	0.4	15
M	N	0.7	18
M	Z	0.6	18

Ki iP 05 19 31.4

		microns	sec
P	Z'	0.2	1.5
M	E	1.0	17
M	N	0.9	16
M	Z	1.8	17

Sk eP 05 20 15
Um iP 05 19 52.9 C
Kurile Islands (h = 40 km).
Magn. = 5.5 (Up,Ki).

" 3 Up iP 08 50 04.8 C
Ki iP 08 49 16.9 C
Um iP 08 49 39.0 C
Kurile Islands (h = 50 km).

" 3 Um iP 10 46 57.6

" 3 Up iPKP 14 51 49.7
Fiji Islands (h = 620 km).

" 3 Ki iP 16 06 41.5
Um iP 16 06 37.6
India.

" 3 Up ---

		microns	sec
M	E	0.8	21
M	N	1.1	18
M	Z	1.8	22

Ki ---

		microns	sec
M	E	1.4	19
M	N	0.9	21

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 3 cont.

Um iPKP 21 34 08.5
i 21 34 17.3
Santa Cruz Islands
(h = 30 km).
Magn. = 5.7 (Up,Ki).

" 3 Um iPKP 21 49 11.8
Santa Cruz Islands
(h = 40 km).

" 3 Up ---

		microns	sec
M	E	4.0	23
M	N	1.3	21
M	Z	5.8	22

Ki ePS 23 32 26

		microns	sec
M	E	4.3	24
M	N	1.0	20
M	Z	6.1	23

Um iSS 23 38 09
Chile (h = 20 km).
Magn. = 6.1 (Up,Ki).

" 4 Up iPKP 01 04 26.0
i 01 04 35.7
i 01 04 41.7

		microns	sec
PKP	Z'	0.1	0.9

Ki iPKP 01 04 11.1
Gb ePKP 01 04 29
i 01 04 33.5
Um iPKP 01 04 15.8
Kermadec Islands
(h = 30 km).

" 4 Up iP 01 38 34.4
ipP 01 38 47.1

		microns	sec
P	Z'	0.1	1.0
pP	Z'	0.2	1.0
M	E	1.9	17
M	N	3.1	19
M	Z	3.0	19

Ki iP 01 37 45.9

		microns	sec
P	Z'	0.6	2.3
M	E	4.5	23
M	N	3.9	18
M	Z	5.6	18

Gb iP 01 38 55.2
ipP 01 39 08.0
Um iP 01 38 08.3
ipP 01 38 21.4
iS 01 46 40
iSS 01 51 06

1963 Dec. 4 cont.

Ka iP 01 38 57.0
ipP 01 39 09.5
Kurile Islands. h = 50 km
(Up,Gb,Um,Ka).
Magn. = 5.9 (Up,Ki).

" 4 Ki iP 02 19 50.0

" 4 Ki eP 02 38 05
Ka iP 02 37 25.2
Iran (h = 50 km).

" 4 Up iP 02 54 27.4 C
ipP 02 54 40.2
iX 02 54 50.7

		microns	sec
pP	Z'	0.2	1.0
M	E	1.4	19
M	N	1.5	19
M	Z	1.7	18

Ki iP 02 53 39.0 C

		microns	sec
P	Z'	0.1	1.2
M	E	1.8	18
M	N	1.4	18
M	Z	2.5	18

Gb iP 02 54 48.5
ipP 02 55 02.1
iX 02 55 11.3
Um iP 02 54 02.1 C
ipP 02 54 14.5
Ka ipP 02 55 03.5
iX 02 55 13.5
Kurile Islands. h = 50 km
(Up,Gb,Um).
Magn. = 5.5 (Up,Ki).
The phase marked X (Up,Gb, Ka) is possibly P of another shock in the Kurile Islands.

" 4 Ki iP 03 07 33.5
Ceram (h = 30 km).

" 4 Up iP 04 49 20.9 C

" 4 Up iP 08 35 14.8

		microns	sec
P	Z'	0.3	1.0
M	E	0.9	19
M	N	1.1	18

Ki iP 08 34 27.5 C

		microns	sec
P	Z'	0.1	1.0
M	E	0.9	18
M	N	1.1	18
M	Z	1.9	20

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 4 cont. Gb iP 08 35 35.8
Ka iP 08 35 37.8 C
Kurile Islands (h = 30 km).
Magn. = 6.0 (Up,Ki).

" 4 Up iPg 13 16 02.8
iSg 13 16 56.0
i 13 17 03.1
D = 440 km = 4.0°.
Gb iPg 13 15 02.3
iSg 13 15 13.3
i 13 15 19.4
D = 90 km = 0.8°.
Um eSg 13 18 38
Ka ePg 13 15 48
iSg 13 16 32.7
D = 380 km = 3.4°.
Skagerrack, 58.3°N, 10.8°E.
Origin time = 13 14 44.

" 4 Up iP 15 55 50.2
ipP 15 56 03.1
microns sec
P Z' 0.1 1.0
Gb iP 15 56 11.3
Um iP 15 55 24.8 C
ipP 15 55 37.1
Ka iP 15 56 12.9 C
Kurile Islands, h = 50 km
(Up,Um).

" 4 Um iP 16 00 16.4
Kurile Islands (h = 30 km).

" 4 Up ---
microns sec
M E 1.8 23
M N 1.4 18
M Z 2.9 22
Ki ---
microns sec
M E 2.7 19
M N 1.1 23
M Z 1.5 18
Um i(PKP) 16 19 27.0
i 16 26 48
eSS 16 39 25
Ka i(PKP) 16 19 18.5
Easter Island (h = 30 km).
Magn. = 6.0 (Up,Ki).

" 4 Up iP 17 21 51.5
Um iP 17 21 47.9

" 5 Um i(P) 03 05 55.6
e 03 06 20
i(Sg) 03 06 42.5

1963 Dec. 5 Um iP 04 17 57.3
India (h = 30 km).

" 5 Um iPKP 04 42 48.3 C
Easter Island (h = 30 km).

" 5 Up i(P) 08 27 26.3

" 5 Ki eP 11 42 35
Um eP 11 42 34
i 11 42 43.0
i 11 43 02.7
Colombia (h = 30 km).

" 5 Ki iP 14 46 35.7

" 5 Um iP 15 55 50.5
Kurile Islands (h = 70 km).

" 6 Sk eP 03 11 44

" 6 Up iP 03 26 24.6 C
Ki iP 03 25 43.0 C
Sk iP 03 26 18.1
Um iP 03 26 01.0 D
Ka iP 03 26 45.9 C
Sikhota Alin, USSR
(h = 340 km).

" 6 Um iP 05 27 43.9
Kurile Islands (h = 60 km).

" 6 Sk eP 07 01 24

" 6 Up iP 07 02 51.0
Um iP 07 02 24.9
Kurile Islands (h = 50 km).

" 6 Up iP 08 46 16.9
California (h = 15 km).

" 7 Up iPKP 04 26 12.2
i 04 26 19.4
iSKP 04 29 01.1
microns sec
PKP Z' 0.1 0.5
Ki iPKP 04 26 04.0
iSKP 04 28 41.1
Sk ePKP 04 26 09
Gb iPKP 04 26 22.2
Um ePKP 04 26 05
i 04 26 10.6
iSKP 04 28 49.5
Ka iPKP 04 26 25.2 C
Fiji Islands (h = 550 km).
This case clearly
illustrates the caustic at

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 7 cont. 143° distance, the amplitudes of PKP at Gb and Ka being about 15 times those at Ki, Um, Sk and Up.

" 7 Up eP 05 51 12

" 7 Up iP 11 36 50.5
Kurile Islands (h = 60 km).

" 7 Up iP 15 14 03.5

" 7 Up iP 17 13 56.7
microns sec
P Z' 0.1 0.5

" 7 Up iPKP 17 56 43.7
microns sec
PKP Z' 0.1 0.9
Sk iPKP 17 56 36.7
Gb iPKP 17 56 52.1
Um iPKP 17 56 31.2
Kermadec Islands
(h = 210 km).

" 8 Up iP 08 04 14.3 D
microns sec
P Z' 0.2 1.0
Ki iP 08 03 26.2 D
Sk eP 08 04 01
Gb iP 08 04 35.0 D
Um iP 08 03 48.1 D
i 08 03 54.5
Kurile Islands (h = 20 km).

" 8 Up iP 11 14 05.9
Ki iP 11 14 40.4 D
Caucasus (not Turkmen SSR!).

" 8 Up iP 20 42 45.0
Ki iP 20 41 57.6
Um iP 20 42 19.5
Kurile Islands (h = 40 km).

" 8 Up iP 20 50 37.4
Ki iP 20 49 50.5 D
Um iP 20 50 11.7
Kurile Islands (h = 50 km).

" 9 Up iP 02 35 04.5
Ki iP 02 34 17.9
Um iP 02 34 39.0
Kurile Islands (h = 60 km).

" 9 Up iP 05 49 10.2 C
microns sec
P Z' 0.1 0.8

1963 Dec. 9 cont. Ki iP 05 48 17.5
microns sec
P Z' 0.1 1.0
Sk iP 05 48 45.0
Gb eP 05 49 23
Um iP 05 48 43.9
Alaska (h = 50 km).
Magn. = 5.8 (Up,Ki).

" 9 Up iP 08 45 01.8
ipP 08 45 13.5
Ki eP 08 44 17
ipP 08 44 30.8
Sk eP 08 44 53
Um ipP 08 44 52.9
Kurile Islands. h = 50 km
(Up,Ki).

" 9 Up iPKP 11 12 08.8
Ki iPKP 11 12 02.0
iSKP 11 14 46.5
Sk ePKP 11 12 07
iSKP 11 15 03.8
Gb iPKP 11 12 19.4 C
Um ePKP 11 12 03
i 11 12 09.4
iSKP 11 14 59.1
Ka iPKP 11 12 21.3
Fiji Islands (h = 440 km).
The amplitude of PKP at Ka (beyond the caustic at 143°) is about 5 times those at all the other stations.

" 9 Ki iP 11 35 07.9 C
Mindanao (h = 140 km).

" 9 Up iP 12 33 40.9
microns sec
P Z' 0.1 1.0
Ki iP 12 32 54.2
microns sec
P Z' 0.1 1.0
M E 0.6 16
M N 0.6 17
M Z 0.8 18
Sk eP 12 33 29
Gb iP 12 34 01.5
Um iP 12 33 15.3
Kurile Islands (h = 50 km).
Magn. = 5.8 (Up,Ki).

" 9 Up iP 12 40 00.0
Ki iP 12 39 12.7
Um iP 12 39 34.2
Kurile Islands (h = 50 km).

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 9 Ka iP 15 56 38.1

" 9 Up iP 18 09 27.1
Ki eP 18 09 39
Sk eP 18 09 53
Um iP 18 09 25.5 D
Ka iP 18 09 33.0
Hindu Kush (h = 160 km).

" 9 Gb i(P) 19 01 18.5 D

" 9 Up iPKP 19 36 20.3 D
microns sec
PKP Z' 0.1 0.5
Ka iPKP 19 36 32.0
Fiji Islands (h = 530 km).

" 9 Up iP 21 19 23.2
Kurile Islands (h = 50 km).

" 10 Up eP 00 42 51

" 10 Up iP 00 51 10.0

" 10 Up iP 03 44 49.8
iSKS 03 54 53
microns sec
M E 0.5 17
M N 1.4 23
Ki iP 03 44 36.1 C
iSKS 03 54 39
microns sec
SKS E 1.7 6
M E 0.8 19
M N 0.8 18
M Z 1.6 20
Sk eP 03 44 57
Um iP 03 44 40.7 C
iPP 03 49 02
iSKS 03 54 43
i 03 57 24
ipS 03 58 07
Banda Sea (h = 370 km).

" 10 Sk iP 06 30 43.1

" 10 Up iPKP 06 49 36.3 D
Ki iPKP 06 49 51.7
iSKP 06 53 01.5
microns sec
PKP Z' 0.4 1.5
SKP Z' 0.5 1.8
Sk ePKP 06 49 41
Um iPKP 06 49 44.1
Sandwich Islands
(h = 110 km).

" 10 Ki iP 09 23 09.2

1963 Dec. 10 Ki iP 09 38 47.9
Kurile Islands (h = 50 km).

" 10 Up iP 10 23 59.3 C
Ki iP 10 25 25.6 C
Um iP 10 24 47.9
Italy.

" 10 Gb iPg 12 44 09.1
iSg 12 44 11.7
D = 20 km = 0.2°.
Local explosion?

" 10 Ki eP 20 14 27
Leeward Islands
(h = 30 km).

" 11 Up iP 00 44 17.5

" 11 Up ---
microns sec
M E 0.7 23
M N 1.8 22
M Z 1.6 20
Ki ePKP 01 06 50
microns sec
M E 2.1 21
M N 1.3 20
M Z 3.9 22
Um iPKP 01 07 12.8
iPKS 01 10 16
Tonga Islands (h = 30 km).
Magn. = 6.0 (Up,Ki).

" 11 Up i(PKP) 02 49 25.9
Ki iPKP 02 49 25.0 C
iSKP 02 51 55.3
microns sec
PKP Z' 0.1 1.3
SKP Z' 0.1 1.3
Gb iPKP 02 49 37.2
Um iPKP 02 49 31.5
iSKP 02 52 08.9
Ka ePKP 02 49 40
Fiji Islands (h = 540 km).

" 11 Up iP 09 33 48.2
Ki iP 09 33 16.1
Kyushu, Japan (h = 170 km).

" 11 Up iP 17 19 12.4
ipP 17 19 28.8
microns sec
P Z' 0.2 0.5
M E 1.5 20
M N 2.2 18
M Z 1.4 18

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. cont. 11 Ki iP 17 18 19.6 D
microns sec
P Z' 0.1 1.0
M E 1.4 17
M N 1.5 17
M Z 2.5 18
Sk iP 17 18 51.7
Gb iP 17 19 28.1
ipP 17 19 44.6
Um iP 17 18 45.1
eS 17 27 28
e 17 27 59
Ka iP 17 19 35.8 D
ipP 17 19 51.6
Aleutian Islands.
h = 60 km (Up,Gb,Ka).
Magn. = 6.1 (Up,Ki).

" 11 Up iP 17 23 45.3 C
microns sec
P Z' 0.1 0.7
Ki iP 17 22 52.5
Aleutian Islands
(h = 30 km).

" 11 Up iP 17 25 37.3 C

" 11 Up iP 17 36 11.8
microns sec
P Z' 0.1 0.6
Ki eP 17 35 18
Aleutian Islands
(h = 30 km).

" 11 Up iP 17 54 18.4
Aleutian Islands
(h = 30 km).

" 11 Up iP 18 20 19.0 D
Ki iP 18 19 25.4
Aleutian Islands
(h = 30 km).

" 11 Up iP 18 39 47.9
Ki iP 18 38 54.7
Aleutian Islands
(h = 30 km).

" 11 Up iP 19 23 56.6 D
microns sec
P Z' 0.1 0.6
Ki iP 19 23 03.7 D
Sk eP 19 23 44
Gb iP 19 24 12.4
Aleutian Islands
(h = 50 km).

1963 Dec. 11 Up iP 19 39 01.7
Ki iP 19 38 08.5
Aleutian Islands
(h = 30 km).

" 11 Up iP 20 36 12.5
Aleutian Islands
(h = 30 km).

" 11 Up iP 20 38 06.8
This P occurs 01 54 after the preceding one (Aleutian Islands). A similar interval, 01 52, was found between the P at 17 23 45.3, Dec. 11, and its follower. The second phases cannot be interpreted as belonging to the first shocks (if they were pP this would lead to a very large depth, unknown in the Aleutians). It may be a pure coincidence, but an interesting one.

" 12 Ki ePn 12 37 24
iSn 12 38 10.0
iSg 12 38 22.8
D = 390 km = 3.5°.
Sk eSg 12 40 52
Um iSg 12 39 18.0
Northwest Russia, 67.2°N, 29.6°E. Origin time = 12 36 28. Explosion?

" 12 Up iP 23 35 22.3
Ki iP 23 34 37.0
Sk eP 23 35 11
Um iP 23 34 56.7
i(pP) 23 35 23.3
i 23 35 55.6
Kurile Islands (h = 90 km).

" 13 Up iP 02 58 54.2
Um iP 02 58 38.2
Ryukyu Islands (h = 110 km).

" 13 Um iP 06 41 40.7

" 13 Um i(P) 15 17 12.7

" 13 Um iP 15 42 07.3

" 13 Ki iP 21 39 32.7
i 21 40 00.6

" 14 Up iP 00 18 18.2

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 14 cont.

Up	ipP	00 18 31.2	
Sk	eP	00 18 10	
	ipP	00 18 24.1	
Gb	iP	00 18 15.1	

Brazil. h = 50 km (Up,Sk).

" 14

Up	iP	08 00 50.8	
		microns	sec
	P	Z' 0.1	0.6
Ki	iP	07 59 50.1	
	i	07 59 53.2	
		microns	sec
	P	Z' 0.3	0.8
Sk	iP	08 00 21.8	
Gb	iP	08 01 03.1	C
Um	iP	08 00 23.5	C
	ipP	08 00 45.1	
Ka	iP	08 01 15.3	

Alaska. h = 100 km (Um).
Magn. = 6.2 (Up,Ki).

" 14 Up iP 23 13 07.8 D

" 15 Up iP 03 31 23.8
Kurile Islands (h = 15 km).

" 15 Um iP 03 50 18.8 C
Aleutian Islands
(h = 25 km).

" 15 Ki eP 07 13 50
Ryukyu Islands (h = 30 km).

" 15

Up	iP	07 42 26.0	
Ki		---	
		microns	sec
	M	E 0.7	15
	M	N 1.3	17
	M	Z 0.5	12
Sk	iP	07 42 42.0	D
Um	iP	07 42 15.4	

Tibet (h = 30 km).

" 15

Up	iP	10 33 55.5
Um	iP	10 33 31.7

Kurile Islands (h = 50 km).

" 15 Up iP 15 05 00.2

" 15 Up iP 15 18 33.9
Sumatra (h = 70 km).

" 15

Up	iP	19 46 57.5 D
	ipP	19 49 19
	iPP	19 50 52
	ipPP	19 53 09
	isPP	19 54 08

1963 Dec. 15 cont.

Up	iSKS	19 56 28	
	iPKKP	20 03 54.8	
		microns	sec
P	Z'	0.3	0.5
PP	N	1.7	5
PP	Z	2.4	2
SKS	E	6.6	9
M	E	6.8	22
M	N	7.5	17
M	Z	6.3	18

(D = 10550 km = 95°).

Ki	iP	19 46 54.2	D
	ipP	19 49 16	
	isP	19 50 17	
	isPP	19 54 07	
	iSKS	19 56 25	
	i	20 00 50	
	iPKKP	20 03 57.1	
		microns	sec
P	Z	5.8	7
P	Z'	1.2	1.0
SKS	E	9.6	11
M	E	19	21
M	N	11	23
M	Z	11	20

(D = 10450 km = 94°).

Sk	iP	19 47 09.5	D
	i	19 48 14.0	
	iPP	19 51 01.7	
Gb	iP	19 47 11.2	
	ipP	19 49 23.5	
	isP	19 50 34.7	
	iPP	19 51 10.6	
	i	19 51 22.2	
Um	iP	19 46 53.3	D
	ipP	19 49 14.6	
	i	19 49 39.2	
	isP	19 50 14	
	iPP	19 50 54.7	
	ipS	19 59 57	
	iPKKP	20 03 57.5	
Ka	iP	19 47 01.8	
	i	19 49 54.0	
	isP	19 50 23.3	
	i(PP)	19 50 53.8	
	iPKKP	20 03 52.1	

Java Sea. h = 660 km
(Up,Ki,Gb,Um).
Magn. = 7.0 (Up,Ki).
The surface waves are
remarkably large,
considering the focal depth.

" 15 Sk e(P) 21 06 16

" 16

Up	iP	02 04 45.0	
		microns	sec
	P	Z' 0.1	0.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 16 cont.

	Up			microns	sec
		M	E	4.8	17
		M	N	9.6	19
		M	Z	7.3	19
	Ki	iP		02 04 42.3	
		i		02 04 48.0	
				microns	sec
		P	Z'	0.7	1.0
		M	E	18	19
		M	N	21	23
		M	Z	15	18
	Sk	eP		02 04 59	
	Gb	iP		02 05 08.9	
	Um	iP		02 04 41.5	C
		i		02 04 47.5	
		eSKS		02 15 14	
		eS		02 15 44	
		eSS		02 22 07	

Sumatra (h = 60 km).
Magn. = 6.4 (Up,Ki).

" 16	Up	iP	02 19 56.3	C
	Ki	iP	02 19 54.2	C
			microns	sec
		P	Z' 0.2	1.2
	Um	iP	02 20 00.9	

Sumatra (h = 30 km).

" 16	Up	iP	11 19 45.9	
			microns	sec
		P	Z' 0.1	0.7
	Ki	iP	11 19 00.6	
	Um	iP	11 19 21.4	C
	Ka	iP	11 20 09.1	

Sakhalin (h = 260 km).

" 16	Up	iP	13 52 59.3	
		iS	13 57 13.9	
		iSn	13 57 47.0	
			microns	sec
		P	N 3.6	5
		P	Z 2.4	5
		P	Z' 0.2	0.5
		S	E 2.5	9
		S	N 4.8	9
		M	E 13	14
		M	N 17	13
		M	Z 13	12
		D = 2550 km = 23°.		
	Ki	eP	13 54 12	
		i	13 55 28.8	
			microns	sec
		P	Z' 0.5	1.5
		M	E 24	17
		M	N 8.6	13
		M	Z 12	13

1963 Dec. 16 cont.

	Sk	iP	13 53 38.1	
		i	13 54 04.2	
	Gb	iP	13 52 45.3	
	Um	iP	13 53 37.6	
		i	13 53 50.6	
		iS	13 58 11	
		i	13 58 26	
	Ka	iP	13 52 21.9	
		eS	13 56 03	

Ionian Sea (h = 15 km).
Magn. = 6.0 (Up,Ki).

" 16	Ki	ePKP	14 37 23	
	Sk	ePKP	14 37 44	
	Ka	iPKP	14 37 52.9	

South of Australia
(h = 30 km).

" 16	Ki	iP	16 19 49.9	

Sumatra (h = 50 km).

" 17	Up	iP	00 37 03.3	
" 17	Up	iP	04 25 14.8	C

Volcano Islands
(h = 100 km).

" 17	Um	iPKP	08 52 32.0	

Kermadec Islands
(h = 380 km).

" 17	Um	eP	11 05 33	
	Ka	iP	11 05 42.3	

Hindu Kush (h = 200 km).

" 17	Um	eP	13 38 24	
" 17	Ki	iP	14 02 01.6	
" 17	Um	i(P)	16 15 59.8	C
" 17	Up	iP	23 33 06.7	
	Ki	iP	23 32 14.0	
		i(pP)	23 32 26.7	
			microns	sec
		P	Z' 0.1	1.0
	Sk	iP	23 32 43.2	
	Gb	iP	23 33 20.8	
	Um	iP	23 32 40.8	

Aleutian Islands
(h = 30 km).

" 18	Up	eP	00 46 54	
		iPKP	00 49 29.0	C
		i	00 52 40.6	
		iPP	00 52 52	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 18 cont.

Up iPKS 00 53 20
iSKKS 00 59 33
i(PcPPKP) 01 00 53.2
i 01 04 58
iSS 01 11 13

		microns	sec
PKP	E	7.5	16
PKP	N	12	15
PKP	Z	46	16
PKP	Z'	1.8	0.7
M	E	43	25
M	N	93	30
M	Z	49	24

(D = 16000 km = 144°).

Ki e(P) 00 46 53
e(PKP) 00 49 06
iPKP 00 49 14.9
iY 00 49 56
iX 00 51 48.3
iPKS 00 52 47
i 00 53 32
iSKKS 00 58 41
i(PcPPKP) 01 01 24.4
e(SS) 01 09 28

		microns	sec
PKP	N	1.8	16
PKP	Z	2.4	5
PKP	Z'	0.6	0.8
PKS	E	18	16
PKS	N	30	16
PKS	Z	9.9	10
M	E	19	20
M	N	31	22
M	Z	41	20

(D = 15100 km = 136°).

Sk iPKP 00 49 24.4
iX 00 51 45.1

Gb iPKP 00 49 37.5 C
i 00 49 39.2

Um iP 00 46 42 C
iPKP 00 49 16.5
i 00 49 18.0
iY 00 50 02.2
eX 00 52 00
iPP 00 52 37
iPKS 00 53 03.8
i 00 53 19.4
i(PcPPKP) 01 00 39.6

Ka iPKP 00 49 39.4
i(Y) 00 50 15.0

Tonga Islands (h = 50 km).
Magn. = 7.4 (Up,Ki).
The notations X (Ki,Sk,Um) and Y (Ki,Um,Ka) denote unidentified phases which may or may not belong to this earthquake, Up, Ki and Um have recorded a clear diffracted P; its period is around 30 sec and it shows up only on the long-period records.

1963 Dec. 18 cont.

" Up iP 03 01 30.9

		microns	sec
P	Z'	0.2	0.8

Ki iP 03 00 44.1

		microns	sec
P	Z'	0.2	0.9

Sk eP 03 01 20
Gb iP 03 01 52.0
Um iP 03 01 05.7
Ka iP 03 01 53.4
Kurile Islands (h = 30 km).
Magn. = 6.2 (Up,Ki).

" Up iP 03 20 02.1
Ki iP 03 19 14.4
Um iP 03 19 36.8 D
Kurile Islands (h = 50 km).

" Up iP 06 48 02.6 C
iLgl 07 02 45

		microns	sec
P	Z'	0.2	0.7
M	E	2.4	10
M	N	4.1	13
M	Z	2.5	10

Ki iP 06 47 53.0 C

		microns	sec
P	Z'	0.4	0.6
M	E	3.5	12
M	N	1.9	15
M	Z	4.0	13

Sk iP 06 48 19.6 C
Gb iP 06 48 28.4
Um iP 06 47 51.3 C
Ka iP 06 48 14.6 C
Sinkiang, China (h = 30 km).
Magn. = 6.5 (Up,Ki) from PZ' but only 5.5 from surface waves (Up,Ki). This could suggest a focal depth of around 75 km (see M. Båth: The problem of earthquake magnitude determinations, BCIS, A 19, 1956, p. 40).

" Up iPKP 12 41 27.6
Kermadec Islands (h = 130 km).

" Up iP 18 24 39.7

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. cont.	18	Up	ipP	18 24 51.9	
		Um	iP	18 24 16.0	
			ipP	18 24 31.3	
		Japan. h = 60 km (Up,Um).			
"	18	Ki	iP	19 40 16.2	
		Kurile Islands (h = 30 km).			
"	18	Up	iP	20 07 31.2	
"	19	Ki	iP	17 18 14.4	
		Peru (h = 60 km).			
"	19	Up	iP	18 48 54.9	C
		Ki	iP	18 50 02.5	
		Sk	eP	18 49 35	
		Crete (h = 30 km).			
"	19	Up	eP	22 46 00	
		Ki	iP	22 45 06.0	
		Sk	eP	22 45 37	
		Um	iP	22 45 32.8	D
			ipP	22 45 44.5	
		Aleutian Islands. h = 50 km (Um).			
"	20	Up	iP	00 58 16.9	
		Um	iP	00 57 50.8	
		Kurile Islands (h = 40 km).			
"	20	Up	i(P)	01 18 53.7	
			i	01 19 10.2	
"	20	Ki	iP	01 28 21.4	
			iSg	01 29 03.0	
"	20	Um	i(P)	04 19 09.9	
"	20	Up	iP	08 17 46.9	
"	20	Ki	iP	09 11 06.5	
		Um	iP	09 11 12.1	
		Banda Sea (h = 100 km).			
"	20	Up	i(P)	10 09 40.5	
"	20	Up	iP	13 06 50.9	
		Ki	iP	13 06 16.2	
"	20	Up	eP	14 08 08	
"	20	Ka	iP	14 57 40.3	
"	20	Up	iP	16 02 06.0	
		Ki	eP	16 02 22	
				microns	sec
			M E	0.6	17

1963 Dec. cont.	20	Ki		microns	sec
			M N	0.4	17
			M Z	0.7	17
		Gb	iP	16 02 11.1	
		Um	iP	16 02 15.5	
			iSKS	16 12 37	
		Indian Ocean (h = 30 km). Relatively long-period P on all Z' records (average = 1.7 sec).			
"	20	Um	iP	16 36 20.7	
		Indian Ocean (h = 30 km).			
"	20	Um	iP	16 58 31.5	
			i	16 58 41.8	
		Indian Ocean (h = 30 km).			
"	20	Up	eP	20 56 57	
			i	20 57 28.4	
"	20	Ki	iP	21 53 25.1	
			i	21 53 31.0	
"	21	Up	iP	01 59 06.5	C
"	21	Ki	iP	04 58 03.1	
		Um	iP	04 57 34.6	
		Iran (h = 50 km).			
"	21	Up	iPKP	12 53 36.4	
		Ki	iPKP	12 53 26.8	
		Um	ePKP	12 53 31	
			i	12 53 58.7	
		Ka	ePKP	12 53 46	
		Tonga Islands (h = 90 km).			
"	21	Up	iP	13 21 26.1	
			i	13 21 32.8	
			iS	13 31 32	
				microns	sec
			P Z'	0.2	0.8
			S E	0.9	7
			S N	1.0	7
			M E	1.8	19
			M N	3.2	20
			M Z	1.6	20
		D = 9050 km = $81\frac{1}{2}^{o}$.			
		Ki	iP	13 21 07.5	
			iS	13 31 03	
				microns	sec
			P Z'	0.2	1.0
			S E	1.1	7
			S N	0.7	7
			M E	2.7	19
			M N	4.8	22
			M Z	3.2	20
		D = 8650 km = 78^{o}.			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. cont.	21	Sk	eP	13 21 27	
			i	13 21 47.1	
		Gb	iP	13 21 43.3	
			i	13 22 13.9	
		Um	iP	13 21 12.6	
			iS	13 31 08	
		Ka	iP	13 21 37.0	
		Luzon (h = 50 km). Magn. = 6.1 (Up,Ki).			
"	21	Up	iP	16 35 08.5	
		Um	iP	16 34 47.2 D	
		Japan (h = 30 km).			
"	21	Um	iP	19 01 48.2	
"	22	Ki	iP	01 32 49.8	
		Mexico (h = 30 km).			
"	22	Up	iP	04 33 06.5	
"	22	Um	iP	10 50 34.7 C	
"	22	Um	iPKP	13 55 11.7	
		New Zealand (h = 80 km).			
"	22	Um	eP	15 50 22.8	
"	22	Up	iP	23 26 11.3 D	
		Ki	iP	23 26 14.9	
				microns sec	
			P	Z' 0.1 1.2	
		Sk	iP	23 25 59.4	
		Um	iP	23 26 15.4	
		Colombia (h = 150 km).			
"	23	Up	iP	08 01 20.5	
"	23	Up	iP	13 53 29.9 C	
		Kurile Islands (h = 30 km).			
"	23	Up	iPKP	18 17 58.1 C	
			ipPKP	18 18 36.3	
		Gb	iPKP	18 18 07.4	
		Ka	iPKP	18 18 07.7	
		Tonga Islands. h = 140 km (Up).			
"	23	Up	iP	18 50 47.1 C	
				microns sec	
			P	Z' 0.1 0.5	
		Sk	eP	18 50 36	
		Um	iP	18 50 21.5	
		Kurile Islands (h = 70 km).			
"	23	Up	i(P)	19 21 17.5	

1963 Dec.	24	Up	iP	02 36 59.7	
		Ki	iP	02 36 13.0	
				microns sec	
			P	Z' 0.1 1.3	
		Kurile Islands (h = 50 km).			
"	24	Up	iP	03 11 55.4 C	
			ipP	03 12 08.5	
			i	03 14 46.3	
				microns sec	
			P	Z' 0.1 0.5	
		Ki	iP	03 11 08.1 C	
				microns sec	
			P	Z' 0.1 1.0	
		Sk	eP	03 11 43	
		Gb	iP	03 12 16.5	
		Um	iP	03 11 29.5	
		Ka	iP	03 12 17.4	
		Kurile Islands. h = 50 km (Up). Magn. = 5.9 (Up,Ki).			
"	24	Up	iP	03 38 21.2	
				microns sec	
			P	Z' 0.1 0.6	
		Ki	iP	03 37 33.3	
				microns sec	
			P	Z' 0.1 1.0	
		Gb	iP	03 38 42.3	
		Um	iP	03 37 56.0	
		Kurile Islands (h = 50 km). Magn. = 5.9 (Up,Ki).			
"	24	Up	iP	13 07 10.5	
			ipP	13 07 27.3	
		Ki	iP	13 06 32.1	
		Sk	iP	13 07 05.2	
		Um	iP	13 06 48.6	
		Japan. h = 70 km (Up).			
"	24	Up	i(P)	23 40 43.1	
"	25	Up	i(P)	01 53 16.9	
"	25	Um	iP	06 34 37.0 C	
"	25	Up	iP	16 23 45.0 D	
		Tsinghai, China (h = 30 km).			
"	26	Ki	iP	01 43 56.3	
		Sumatra (h = 40 km).			
"	26	Um	iP	06 26 55.6	
"	26	Up	iP	08 02 11.1	
			iPP	08 02 20.5	
			iS	08 05 07.9	

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. 26 cont.

Up	iSS	08 05 40	
	iLi	08 06 20	
	iLg1	08 06 55	
	i(PcP)	08 07 06	
	iLg2	08 07 16	
		microns	sec
	P Z'	0.1	0.5
	PP Z'	0.2	0.6
	S Z'	0.3	0.7
	D = 1850 km = 16½°.		
Ki	iP	08 00 24.3	
	i	08 00 28.2	
	iS	08 01 56.8	
	iLg2	08 02 59	
		microns	sec
	P Z'	0.8	1.0
	M E	3.7	7
	M N	3.5	8
	M Z	4.3	6
	D = 950 km = 8½°.		
Sk	iP	08 01 29.1	
	i	08 01 38.4	
	iLg2	08 05 38.2	
Gb	iP	08 02 47.3	
	iLg1	08 08 34.5	
Um	iP	08 01 19.3	
	iS	08 03 31.0	
	eSS	08 03 47	
	iLg1	08 04 56	
Ka	iP	08 02 57.2	D
	i	08 03 03.3	
	iS	08 06 41.7	
	eLg1	08 09 12	

Svalbard (h = 30 km).
Clear channel waves (higher mode surface waves) are recorded at all our stations, all paths being on the continental side of the margin.

"	26	Up	i(P)	08 42 10.0
"	26	Ki	eP	08 52 03
		Um	eS	08 55 25

North of Iceland (h = 30 km).

"	26	Up	iP	10 57 32.3 D
		Ki	iP	10 56 46.2

Kurile Islands (h = 30 km).

"	26	Um	iP	11 07 17.3
"	26	Ki	eP	16 37 10

Molucca Sea (h = 70 km).

1963 Dec.

26	Up	iP	20 57 53.1	C
	Ki	iP	20 58 02.0	
	Sk	eP	20 58 18	
	Um	iP	20 57 51.6	
	Ka	iP	20 57 58.0	C

Hindu Kush (h = 140 km).

" 26	Up	iP	21 22 16.0	
	Ki	iP	21 21 23.4	
	Um	iP	21 21 49.9	C

Aleutian Islands (h = 30 km).

" 26	Ki	eP	23 26 12	

Arctic Ocean (h = 30 km).

" 27	Um	iP	12 59 15.9	

Kurile Islands (h = 30 km).

" 27	Um	iP	19 56 35.7	
" 28	Up	iP	01 51 25.6	
		ipP	01 52 12.3	
			microns	sec
		P Z'	0.1	0.5
	Ki	iP	01 51 34.7	
	Sk	iP	01 51 51.2	
	Gb	iP	01 51 46.8	
	Um	iP	01 51 23.8	C
		ipP	01 52 09.7	
	Ka	iP	01 51 28.7	

Hindu Kush. h = 220 km (Up,Um).

" 28	Um	i	06 12 04	
		ePS	06 14 10	
		iSS	06 20 15	
		eSSS	06 24 18	

New Ireland (h = 70 km).

" 28	Um	iP	07 39 16.8	
" 28	Up	iPKP	09 23 34.4	
		i	09 23 40.0	C
			microns	sec
		PKP Z'	0.4	0.7
		M N	1.7	21
		M Z	2.2	22
	Ki	iPKP	09 23 18.5	
		iPP	09 26 52.3	
			microns	sec
		PKP Z'	0.1	1.0
		PP Z'	0.3	1.4
	Sk	iPKP	09 23 31.0	C
		i	09 23 34.5	
		iPP	09 27 04.4	
	Gb	iP	09 23 47.9	C

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963 Dec. cont.	28	Um	iPKP	09 23 26.9	
			i	09 23 29.9	C
			i	09 23 52.2	
			iPP	09 26 59.6	
			iSS	09 45 44	
		Ka	iPKP	09 23 48.4	C
			iPKP2	09 24 24.5	
		Kermadec Islands (h = 30 km). Magn. = 6.3 (Up,Ki).			
"	28	Gb	eP	17 49 35	
"	28	Up	ePKP	18 17 40	
				microns	sec
			M E	2.1	22
			M N	2.2	18
			M Z	1.8	22
		Ki	ePKP	18 17 46	
				microns	sec
			M E	1.1	17
			M N	0.9	19
			M Z	1.7	19
		Um	iPKP	18 17 46.1	
			eSS	18 39 04	
		South Shetland Islands (h = 50 km). Magn. = 5.9 (Up,Ki).			
"	29	Up	iPKP	03 19 53.8	
			i	03 20 02.8	
				microns	sec
			PKP Z'	0.1	0.5
		Ki	i(PKP)	03 19 54.6	
		Sk	ePKP	03 19 48	
			i	03 19 53.0	
		Gb	i(PKP)	03 20 17.3	
		Um	iPKP	03 19 41.9	
			i	03 19 46.8	
			i	03 19 57.2	
		Ka	iPKP	03 20 07.9	
			i	03 20 18.9	
		Kermadec Islands (h = 30 km).			
"	29	Up	eP	07 52 35	
		Ki	eP	07 50 49	
			iS	07 52 40.8	
			D = 1100 km = 10°.		
		Um	iSS	07 55 01.1	
			iLgl	07 56 24.2	
		Svalbard (h = 30 km).			
"	29	Um	iP	11 41 58.6	
"	29	Ki	iSg	14 21 52.6	
		Sk	eSg	14 22 02	
1963 Dec. cont.	29	Um	eSg	14 22 27	
		Norway, 66½°N, 14 1/4°E. Origin time = 14 20 23.			
"	30	Ki	iP	01 27 30.3	
		Um	iP	01 27 44.6	
		Mariana Islands (h = 120 km).			
"	30	Up	iPKP	06 43 15.9	
		Kermadec Islands (h = 30 km).			
"	30	Up	iP	13 40 21.0	
			iPcP	13 40 47.6	
				microns	sec
			P Z'	0.1	0.7
			M E	1.8	19
			M N	4.1	20
			M Z	3.9	20
		Ki	iP	13 39 34.5	
				microns	sec
			M E	2.8	17
			M N	3.3	19
			M Z	6.1	18
		Sk	iP	13 40 11.1	
			iPcP	13 40 39.9	
		Um	iP	13 39 58.3	
			ipP	13 40 09.4	
			eS	13 48 27	
		Kurile Islands. h = 40 km (Um). Magn. = 5.8 (Up,Ki).			
"	30	Up	iP	15 17 06.7	C
		Ki	iP	15 16 49.0	C
				microns	sec
			P Z'	0.1	1.2
		Sk	iP	15 17 11.0	C
		Mindanao (h = 100 km).			
"	30	Up	iP	20 43 42.8	C
			ipP	20 43 57.4	
		Hokkaido, Japan. h = 60 km (Up).			
"	30	Up	iP	22 17 56.8	C
				microns	sec
			P Z'	0.1	0.6
		Ki	iP	22 17 58.3	C
				microns	sec
			P Z'	0.2	0.9
		Sk	iP	22 18 13.0	
		Um	iP	22 17 54.2	
		Nicobar Islands (h = 60 km). Magn. = 6.1 (Up,Ki).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå
Ka = Karlskrona

1963

Dec.	31	Up	iP	10 56 17.3	
		Kurile Islands (h = 50 km).			
"	31	Up	iP	12 10 47.5	
"	31	Ki	iP	15 24 41.5	
		Iran (h = 30 km).			
"	31	Um	eP	17 15 49	
"	31	Up	iPKP	17 56 22.1	
			e(PS)	18 07 45	
				microns sec	
			M E	12 20	
			M N	12 18	
			M Z	12 18	
		Ki	iPKP	17 56 36.3	D
			iPKS	17 59 58	
				microns sec	
			PKP Z'	0.5 1.5	
			PKS N	3.1 6	
			M E	10 18	
			M N	12 20	
			M Z	21 21	
		Um	iPKP	17 56 29.9	
			iPP	17 58 16	
			iSKS	18 03 18	
			i	18 06 13	
			i(PS)	18 08 16	
			iSS	18 15 03	
		Sandwich Islands			
		(h = 30 km).			
		Magn. = 6.8 (Up,Ki).			

Markus Båth
October 29, 1964