

Seismological Institute  
Uppsala

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

JANUARY 1 - 31, 1964

1964					1964				
Jan.	1	Um	iP	05 25 32.4	Jan.	1	Um	iS	17 45 57
			i	05 25 42.4		cont.		iSS	17 50 20
		Japan (h = 30 km).					Ka	eP	17 38 05
"	1	Ki	iP	12 35 46.0			Kurile Islands. h = 50 km		
		Um	eP	12 35 50			(Um).		
		Banda Sea (h = 100 km).					Magn. = 6.3 (Up, Ki).		
"	1	Ki	iPKP	16 08 50.5	"	1	Ki	iP	21 14 40.6
		Sandwich Islands					Um	iP	21 15 02.1
		(h = 30 km).					Kurile Islands (h = 40 km).		
"	1	Up	iP	17 37 41.2 C	"	1	Um	e	22 10 22
			eS	17 46 44				i(Sg)	22 10 34.0
				microns sec	"	1	Up	iP	22 53 24.9
		P	Z'	0.1 0.8			Ki	iP	22 52 38.1
		S	E	2.5 15					microns sec
		S	N	1.9 12			P	Z'	0.1 1.0
		M	E	11 17			Sk	iP	22 53 14.0
		M	N	7.5 17			Um	iP	22 52 59.9
		M	Z	7.1 20			Kurile Islands (h = 50 km).		
		D = 7550 km = 68°			"	1	Up	iP	23 51 41.7 D
		Ki	iP	17 36 54.9 C				ipP	23 51 53.9
			iS	17 45 10			Ki	iP	23 50 54.5
			iScS	17 46 43				ipP	23 51 06.9
				microns sec					microns sec
		P	Z	2.7 10			P	Z'	0.1 1.0
		P	Z'	0.4 0.8			Um	iP	23 51 15.9
		S	E	3.2 13				ipP	23 51 28.2
		S	N	1.9 12			Kurile Islands. h = 50 km		
		M	E	21 18			(Up, Ki, Um).		
		M	N	8.4 16	"	2	Up	iP	05 12 20.0 C
		M	Z	20 20					microns sec
		D = 6800 km = 61°					P	Z'	0.1 0.5
		Sk	iP	17 37 32.5 C			Ki	iP	05 11 26.7 C
		Gb	iP	17 38 03.4			Sk	iP	05 12 03.8
		Um	iP	17 37 16.3 C			Gb	iP	05 12 41.0
			ipP	17 37 29.6					
			iPa	17 41 19					

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964				1964					
Jan. cont.	2	Um Ka Kamchatka (h = 40 km).	iP iP iP	05 11 51.8 C 05 12 44.5	Jan.	4	Up Ki Um Formosa (h = 30 km).	iP iP eP iP	10 50 59.5 C 10 50 34.5 10 50 43
"	2	Up Ki Sk Gb Um Ka Kamchatka (h = 30 km).	eP i iP iP iP iP iP	05 31 20 05 31 26.1 05 30 25.7 05 31 02.8 C 05 31 40.4 05 30 51.4 05 30 56.7 05 31 44.8 C	"	4	Ki Up Um Kurile Islands. h = 60 km (Up,Um).	eP iP iP iP	12 51 25 12 51 31.7 16 28 19.0 16 28 33.1 16 27 54.2 16 28 08.3
"	2	Up Ki Sk Um Hindu Kush (h = 230 km).	iP iP iP iP	17 35 57.9 17 36 06.6 17 36 23.2 17 35 56.6	"	4	Up Formosa (h = 30 km).	iP	16 56 14.9 C
"	3	Ki Chile (h = 60 km).	iPKP i	05 39 02.0 05 39 05.9	"	5	Um Japan (h = 30 km).	iP	09 08 56.0 C
"	3	Up Ki Um Ka Hindu Kush (h = 120 km).	iP i iP iP iP	16 44 56.6 16 44 58.1 16 45 05.2 16 44 54.9 C 16 45 01.3	"	5	Up Ki Gb Um Ka Kermadec Islands (h = 30 km). The phase X appearing 25 sec after PKP (Up,Gb,Ka) could be pPKP or PKP of another shock in the same area.	iPKP i iX i iPKP i iPKP i iX iPKP i iX	10 31 28.5 D 10 31 40.5 10 31 53.5 10 32 01.9 microns sec PKP Z' 0.4 1.0 10 31 26.2 10 31 37.6 10 31 49.4 10 32 02.5 10 31 15.8 D 10 31 30.2 10 31 39.5 D 10 31 51.4 10 32 04.1
"	3	Up Ki Sk Gb Um Ka Aleutian Islands (h = 30 km).	iP P iP P iP iP eP	17 31 37.2 D microns sec Z' 0.2 0.9 17 30 44.1 microns sec Z' 0.1 1.0 17 31 18.2 17 31 55.8 17 31 09.8 17 32 01	"	5	Up Ki Sk Um Ka Aleutian Islands (h = 60 km).	iP iP e(P) iP iP	12 10 50.6 12 09 56.9 12 10 27 12 10 23.8 12 11 13.5
"	3	Um Aleutian Islands (h = 30 km).	iP	18 31 22.7	"	5	Up Ki Sk Um Ka Aleutian Islands (h = 60 km).	eP iP iP iP iP	15 04 49
"	3	Up Ki Gb Um Ka Fiji Islands (h = 520 km).	iPKP iSKP P eSKP iPKP iPKP iPKP	21 43 13.2 21 46 04.1 microns sec PKP Z' 0.1 0.6 21 45 41 21 43 23.0 21 43 07.8 C 21 43 13.8 21 43 25.4	"	5	Up Ki Sk Um Ka Aleutian Islands (h = 60 km).	iP iP e(P) iP iP	12 10 50.6 12 09 56.9 12 10 27 12 10 23.8 12 11 13.5

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1964				1964					
Jan.	5	Up	eL	17 50	Jan.	6	Up	iP	06 06 17.8
				microns sec					microns sec
			M	E 1.5 20				P	Z' 0.2 0.8
			M	N 1.9 19		Ki	iP	06 05 50.7 C	
			M	Z 3.0 23				microns sec	
								P	Z' 0.1 1.3
				Macquarie Island		Sk	iP	06 06 20.0 C	
				(h = 30 km).		Gb	iP	06 06 39.1 C	
"	5	Up	iP	18 01 44.8 C		Um	iP	06 06 00.9	
				Aleutian Islands			i	06 06 17.1	
				(h = 30 km).			iS	06 15 18	
"	5	Up	iP	18 47 14.2				Ryukyu Islands (h = 110 km).	
			ipP	18 47 52.9				Magn. = 5.8 (Up, Ki).	
				microns sec	"	6	Up	ePKP	14 50 05
			P	Z' 0.1 1.2			Sk	ePKP	14 49 55
		Ki	iP	18 47 20.7 C				e	14 50 05
		Sk	iP	18 47 05.2			Um	iPKP	14 49 48.5
		Gb	iP	18 47 01.0 C	"	6	Up	iP	15 14 50.5
		Um	iP	18 47 20.9				i	15 14 56.1
				Peru. h = 150 km (Up).				microns sec	
"	6	Up	ePKP	00 04 50				P	Z' 0.1 0.8
			i(PP)	00 05 26.3		Ki	iP	15 14 38.5	
			ePS	00 15 04			i	15 14 44.4	
			iPKKP	00 15 55.4		Sk	iP	15 15 07.6	
				microns sec		Um	iP	15 14 37.8 C	
			(PP) Z	1.5 6			i	15 14 43.6	
			M	E 4.1 18		Ka	iP	15 15 09.6	
			M	N 5.0 22				Sinkiang, China (h = 30 km).	
			M	Z 5.8 22	"	6	Up	iP	23 55 59.6 C
		Ki	e(PKP)	00 04 57				i	23 56 16
			iPKP	00 05 04.9				eS	00 04 36
			i(PKKP)	00 15 18.3				microns sec	
			ePS	00 16 16				P	Z' 0.1 0.5
				microns sec				S	N 0.8 13
			M	E 6.1 18				M	E 7.6 23
			M	N 5.0 18				M	N 14 22
			M	Z 5.4 17				M	Z 14 22
		Sk	ePKP	00 04 58				D = 7150 km = 64 $\frac{10}{2}$ .	
			i	00 05 07.4		Ki	iP	23 55 08.4 C	
			i(PKKP)	00 15 32.1				microns sec	
		Gb	i	00 05 18.8				E	11 21
			i	00 05 32				M	N 7.9 23
		Um	iPKP	00 05 01.7				M	Z 13 22
			iPP	00 05 56.4		Sk	iP	23 55 46.3	
			iSKKS	00 12 51		Gb	iP	23 56 21.5	
			e	00 13 37			i	23 57 25.5	
			i(PKKP)	00 15 36.4		Um	iP	23 55 33.9 C	
			iPS	00 15 39			iPcP	23 56 15.6	
			iSS	00 22 12			iPa	23 59 38	
		Ka	i(PKP)	00 04 55.7			iS	00 03 36	
				Prince Edward Islands				Ka	eP 23 56 24
				(h = 30 km).	"	7	Up	iP	00 58 35.8
				Magn. = 6.6 (Up, Ki).				i	00 58 56.9
					"	7	Up	iP	03 02 55.3 C

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1964					1964				
Jan. cont.	7	Sk	eP	03 02 55	Jan.	9	Gb	eP	03 03 13
		Um	iP	03 02 38.2 C					
"	7	Um	eP	03 48 33	"	9	Up	iP	03 10 23.4
"	7	Up	iP	05 00 42.0			Ki	iP	03 10 42.2
		Sk	eP	05 00 59					03 09 40.6
		Tibet (h = 50 km).							microns sec
"	7	Up	iP	08 57 29.7			Um	iP	P Z' 0.1 1.3
		Ki	iP	08 56 36.3				ipP	03 09 58.0
				microns sec			Japan. h = 60 km (Um).		03 10 13.6
				P Z' 0.1 1.0	"	9	Up	iP	18 42 49.9
		Um	iP	08 57 03.4 C				iS	18 51 42
		Aleutian Islands (h = 80 km).						iScS	18 52 43
"	7	Ki	iP	20 12 13.5 C					microns sec
		Tadzhik SSR (h = 30 km).						P	Z' 0.1 0.5
"	7	Up	eP	21 05 04				M	E 12 19
		Ki	iP	21 05 03.3 C				M	N 24 20
		Um	iP	21 05 01.3				M	Z 23 19
		Sumatra (h = 90 km).							D = 7550 km = 68°
"	8	Up	iP	10 13 58.2 C			Ki	iP	18 42 02.7
		Ontario-Quebec (h = 30 km).						eScS	18 52 07
"	8	Up	iPKP	12 17 55.5					microns sec
		Tonga Islands (h = 30 km).						P	Z' 0.1 1.0
"	8	Up	eP	13 53 28				M	E 17 17
		Ki	iP	13 52 35.2				M	N 22 19
		Sk	iP	13 53 09.6				M	Z 34 19
		Aleutian Islands (h = 30 km).					Sk	iP	18 42 41.0
"	8	Up	iP	20 08 54.8			Gb	iP	18 43 10.3 C
"	8	Up	iP	20 39 22.2 C			Um	iP	18 42 24.6 C
"	8	Up	iP	20 46 18.2				ipP	18 42 34.9
"	8	Up	eP	22 44 22.1				ePa	18 46 16
		Ki	eP	22 44 12				eS	18 50 51
		Celebes (h = 90 km).					Ka	iP	18 43 11.1
"	9	Up	iP	00 00 20.2			Kurile Islands, h = 40 km (Um). Magn. = 6.2 (Up, Ki).		
"	9	Up	eP	02 29 19	"	9	Up	iP	19 09 26.1 D
		i		02 29 22.0	"	10	Up	eP	00 19 28
"	9	Up	iP	02 32 58.0	"	10	Up	iP	03 39 16.3
		i		02 33 02.4			Greece (h = 15 km).		
				microns sec	"	10	Up	iP	05 01 56.3 C
		P	Z' 0.1 0.5				e(S)		05 11 18
									microns sec
							P	Z' 0.3 0.8	
							(S)	E 1.2 6	
							M	E 6.1 21	
							M	N 10 22	
							M	Z 9.1 23	
						Ki	iP	05 01 13.4 C	
							iS	05 09 40	
									microns sec
							P	Z' 0.6 0.9	
							S	N 1.3 9	



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1964				1964			
Jan. cont.	10	Ki		Jan. cont.	12	Um	iS 06 19 00
			microns sec			Ka	iP 06 11 27.4
		M	E 10 19			Aleutian Islands	
		M	N 8.8 19			(h = 30 km).	
		M	Z 9.7 18			Magn. = 5.8 (Up,Ki).	
			D = 6900 km = 62°.				
		Sk	iP 05 01 48.1 C		12	Up	i(P) 06 39 32.1
		Gb	iP 05 02 17.6 C		12	Up	iP 08 54 57.0
			i 05 02 32.1		12	Up	iP 12 52 40.4
		Um	iP 05 01 32.5 C				microns sec
			i(pP) 05 01 42.9				Z' 0.1 0.7
			iS 05 10 12			Ki	iP 12 53 20.8 C
		Ka	iP 05 02 15.9			Gb	iP 12 52 50.0
		Japan (h = 30 km).				Um	iP 12 52 56.2
		Magn. = 6.2 (Up,Ki).					i(pP) 12 53 09.6
"	10	Ka	iP 07 45 38.9			Ka	iP 12 52 28.8 C
"	10	Up	iP 11 03 44.7			Iran (h = 70 km).	
		Um	iP 11 03 19.2				
		Kurile Islands (h = 30 km).		"	13	Up	iP 02 07 17.3 D
"	10	Up	iP 12 07 34.1	"	13	Up	iPKP 06 24 27.0
		Kurile Islands (h = 60 km).				Kermadec Islands	
"	10	Up	iP 17 08 20.8			(h = 30 km).	
			microns sec	"	14	Up	iP 01 21 38.8
		M	E 1.5 20			Gb	iP 01 21 59.7
		M	N 3.1 19			Kamchatka (h = 50 km).	
		M	Z 3.4 18			Our two P waves arrive about	
		Ki	iP 17 07 35.8			15 seconds too early as	
		Gb	iP 17 08 42.3			compared with the USCGS	
			i 17 09 28.5			solution.	
		Um	eP 17 07 58	"	14	Up	iPKP 04 37 24.3
			i 17 08 16.8			Kermadec Islands	
		Ka	iP 17 08 44.7			(h = 90 km).	
		Kurile Islands (h = 50 km).					
"	11	Up	i(P) 11 56 25.3	"	14	Ka	ePg 06 46 21
"	11	Up	iP 14 20 52.7				iSg 06 46 28.3
		Japan (h = 110 km).					D = 70 km = 0.6°.
"	12	Up	iP 06 11 05.1			Explosion?	
			iS 06 19 54	"	14	Up	iP 09 02 51.7
			iScS 06 20 57				microns sec
			microns sec				Z' 0.1 0.5
		P	Z' 0.1 0.6			Ki	eP 09 02 05
		M	E 2.5 25			Um	iP 09 02 26.4
		M	N 2.8 20			Okhotsk Sea (h = 570 km).	
		M	Z 1.9 20				
			D = 7450 km = 67°.	"	14	Up	iPKP 10 39 26.7
		Ki	iP 06 10 11.9 D			Sk	iPKP 10 39 19.6
			microns sec			Kermadec Islands	
		P	Z' 0.1 1.1			(h = 200 km).	
		Sk	eP 06 10 42	"	14	Up	iSg 12 49 51.9
		Gb	iP 06 11 19.2 D				
		Um	iP 06 10 38.8				

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1964				1964			
Jan. cont.				Jan. cont.			
14	Ka	iPg	12 47 52.6	15	Up	iS	21 58 02
		iSg	12 47 57.8				microns sec
		iL	12 48 00.2			P	E 1.1 2
		D = 40 km = 0.4°.				P	N 1.3 2
"	14	Up	iP 15 19 05.6 C			P	Z 4.3 2
			microns sec			P	Z' 0.9 0.7
			Z' 0.1 0.6			S	E 3.2 4
		Ki	iP 15 18 47.8			M	E 6.5 19
		Um	iP 15 18 54.1			M	N 8.1 21
		Mindoro (h = 40 km).				M	Z 7.2 22
						D = 8800 km = 79°.	
"	14	Um	iP 15 39 12.6		Ki	iP	21 47 33.5 C
						iS	21 56 59
						i	21 57 19
"	14	Um	ePKP 15 56 30				microns sec
			eSKS 16 02 47			P	E 0.9 6
		New Britain (h = 170 km).				P	N 0.6 6
						P	Z 2.6 4
"	14	Um	iP 16 52 30.5			P	Z' 1.5 0.8
						S	E 9.2 7
"	14	Um	iP 18 29 20.7			S	Z 2.6 7
						M	E 16 18
"	14	Um	iP 19 03 33.4			M	N 11 17
			i 19 03 41.2			M	Z 26 18
						D = 8100 km = 73°.	
"	14	Um	iP 19 51 56.2		Sk	iP	21 48 03.2 C
						eS	21 57 57
"	15	Up	iP 01 03 55.5		Gb	iP	21 48 25.5 C
						iS	21 58 41.6
"	15	Up	i(P) 01 06 38.2			iPS	21 59 31.1
					Um	iP	21 47 47.8 C
"	15	Up	iP 02 34 47.1			ePP	21 50 55
		Kurile Islands (h = 50 km).				iS	21 57 23
					Ka	iP	21 48 24.0 C
"	15	Ki	iP 10 08 38.8		Japan (h = 70 km), Magn. = 6.9 (Up, Ki).		
"	15	Up	iP 18 39 39.4	"	15	Um	iP 23 47 31.4
"	15	Up	iPKP 19 05 49.1 C	"	16	Up	iP 02 16 34.3
			ipPKP 19 06 46.5	"	16	Um	i(P) 03 21 10.2
			microns sec	"	16	Ki	e(P) 05 32 53
			PKP Z' 0.1 0.5	"	16		iSg 05 33 48.1
		Sk	iPKP 19 05 41.9 C	"	16	Up	iP 11 00 50.9
		Gb	iPKP 19 05 57.7			Ki	iP 11 00 01.1
		Um	iPKP 19 05 37.0			Um	iP 11 00 24.6
			i 19 07 11.1			Kurile Islands (h = 200 km).	
		Kermadec Islands (h = 210 km).		"	16	Ka	iP 13 59 45.3
"	15	Ki	iP 21 36 40.8	"	16	Up	eP 16 11 49
		Sk	iP 21 36 09.3 C			Ki	eP 16 11 15
		Um	iP 21 36 34.5			Um	iP 16 11 34.4
		North Atlantic Ocean (h = 30 km).					
"	15	Up	iP 21 48 06.8 C				

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1964		1964	
Jan. cont.	16	Nevada, Underground nuclear explosion.	Jan. cont. 17
"	16	Up iP 17 03 21.6 microns sec P Z' 0.1 0.5	Ki iP 03 32 43.3 D iPP 03 34 28.6 P Z' 0.1 1.0
"	16	Um iP 23 20 47.5 Sea of Japan (h = 380 km).	Sk iP 03 33 00.5 ipP 03 33 22.3 iPP 03 34 46.6
"	17	Up iP 03 05 19.6 C microns sec P Z' 0.2 1.0 M E 0.3 17 M N 1.2 20 M Z 0.8 17	Gb iP 03 32 57.2 ipP 03 33 19.2 ePP 03 34 38
		Ki iP 03 04 32.7 C microns sec P Z' 0.2 1.0 M E 1.0 16 M N 0.7 16 M Z 2.5 20	Um iP 03 32 33.1 iPP 03 34 11.7 Ka iP 03 32 40.5 D ipP 03 33 01.5
		Sk iP 03 05 08.0	Hindu Kush, h = 100 km (Up, Sk, Gb, Ka). At several of our stations the P waves may be complicated by the PKP waves from the preceding shock.
		Gb iP 03 05 40.5	" 17 Up eSg 09 02 47 microns sec Sg Z' 0.1 0.5
		Um iP 03 04 54.3	Sk eSg 09 04 45
		i 03 06 21.0	Um iSg 09 05 00.3
		eS 03 13 29	Ka iPg 09 00 43.2
		e 03 17 03	iSg 09 00 48.7
		Ka iP 03 05 42.2	iL 09 00 51.1
		Kurile Islands (h = 60 km). Magn. = 6.1 (Up, Ki).	D = 40 km = 0.4°.
"	17	Up iPKP 03 13 47.5	South coast of Sweden, 56.1°N, 14.9°E.
		Um ePKP 03 13 40	Origin time = 09 00 36.
		Loyalty Islands (h = 30 km).	Explosion?
"	17	Up ---- microns sec M E 0.4 22 M N 1.0 20 M Z 1.0 20	" 17 Ka e(P) 09 03 51 i 09 04 00.0
		Ki ---- microns sec M E 1.2 18 M N 1.1 21 M Z 1.5 18	" 18 Um iPKP 07 29 31.5 Easter Island (h = 30 km).
		Sk iPKP 03 32 30.8	" 18 Up iP 12 12 30.5
		Um iPKP 03 32 26.3 D	" 18 Up iP 12 16 28.1 C iS 12 26 13
		Santa Cruz Islands (h = 230 km).	microns sec P E 0.9 3 P N 0.5 3 P Z 4.2 3 P Z' 1.2 1.0 S E 4.1 8 S N 9.3 11 M E 52 18 M N 99 17 M Z 41 14 D = 8500 km = 76½°.
"	17	Up iP 03 32 34.8 ipP 03 32 56.6 ePP 03 34 11 microns sec pP Z' 0.2 1.0	

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1964					1964				
Jan.	18	Ki	iP	12 16 05.4 C	Jan.	18	Magn.	= 5.8 (Up,Ki).	
cont.			iS	12 25 30	cont.				
				microns sec	"	19	Up	iPKP 07 08 48.8	
			P	E 2.2 7			Ki	ePKP 07 09 11	
			P	N 0.6 7			Um	iPKP 07 08 56.8 C	
			P	Z 5.6 7			Sandwich Islands		
			P	Z' 0.8 1.5			(h = 30 km).		
			S	E 8.8 10		"	19	Up	iP 08 59 08.7
			S	N 10 12				microns sec	
			M	E 64 13			M	E 1.2 16	
			M	N 47 15			M	N 1.3 16	
			M	Z 53 12			M	Z 1.1 18	
			D = 8050 km = 72 $\frac{1}{2}$ <sup>0</sup> .				Ki	iP 08 58 46.7 D	
		Sk	iP	12 16 32.1 C			microns sec		
		Gb	iP	12 16 47.3 C			M	E 1.9 17	
		Um	iP	12 16 12.2 C			M	N 1.4 16	
			iPP	12 19 02.2			M	Z 3.5 21	
			iPa	12 20 41			Formosa (h = 20 km).		
			iS	12 25 45			Magn. = 5.6 (Up,Ki).		
		Ka	iP	12 16 39.8		"	19	Ki	iP 09 22 12.7 C
		Formosa (h = 30 km).					microns sec		
		Magn. = 7.0 (Up,Ki).					P	Z' 0.3 0.9	
"	18	Up	iP	12 44 28.6			Sk	iP 09 22 11.3	
		Ki	iP	12 44 04.4			Um	iP 09 21 50.4 C	
			i	12 44 17.0				i	09 22 17.5
		Gb	iP	12 44 48.4				iPP	09 23 32.4
		Um	iP	12 44 12.9 C			Ka	iP 09 21 27.3	
		Formosa (h = 30 km).					Iran (h = 30 km).		
"	18	Up	iP	14 57 45.4 D		"	19	Up	iP 10 05 19.4
		Ki	iP	14 57 23.8			"	19	Ki
		Um	iP	14 57 30.8				iPn	12 53 29.3
		Batan Islands (h = 20 km).						iSn	12 54 17.9
"	18	Up	iP	15 22 19.5 C				iSg	12 54 32.2
"	18	Up	iPKP	19 03 34.0				D = 410 km = 3.7 <sup>0</sup> .	
				microns sec			Sk	eSg	12 57 28
			PKP	Z' 0.1 1.0			Um	eSn	12 55 27
		Gb	ePKP	19 03 45				iSg	12 56 01.0
		Kermadec Islands					Northwest Russia,		
		(h = 30 km).					69.1 <sup>0</sup> N, 30.0 <sup>0</sup> E.		
							Origin time = 12 52 31.		
							Explosion?		
"	18	Up	iP	22 47 34.8		"	19	Up	iP 16 24 38.2
				microns sec				Formosa (h = 30 km).	
		P	Z'	0.1 1.2		"	19	Up	iP 18 23 53.8
		Ki	iP	22 47 37.2 C			"	19	Um
				microns sec				iPKP	23 41 20.2 D
		P	Z'	0.1 1.0			Fiji Islands (h = 50 km).		
		Sk	iP	22 47 19.0		"	20	Up	iPKP 00 35 29.2
		Gb	i(pP)	22 47 44.9				Sk	iPKP 00 35 22.5
		Um	iP	22 47 39.7				Um	iPKP 00 35 17.2
			i	22 48 05.7			Kermadec Islands (h = 40 km).		
		Ka	i(pP)	22 47 58.3					
		Dominican Republic							
		(h = 100 km).							

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964				1964			
Jan.	20	Up	iP	04 59 58.2	Jan.	20	Loyalty Islands
		Ki	iP	04 59 40.4	cont.		(h = 140 km).
		Um	eP	04 59 47			(PKP) are small-amplitude
				Mindanao (h = 110 km).			forerunners, compared to
"	20	Up	eP	12 40 20			the large amplitude PKP
				microns sec			(see G. Payo Subiza and
			P	Z' 0.1 0.5			M. Båth, Geophys. Journ.,
							8:496-513, 1964).
"	20	Um	i(P)	15 09 42.7	"	20	Ka iP 19 31 29.5
"	20	Up	eP	15 51 30	"	20	Up iP 20 37 27.2
				Formosa (h = 50 km).	"	20	Up iP 20 50 22.5
"	20	Up	iP	16 52 08.0 C			Ki iP 20 50 02.9
"	20	Up	e(PKP)	17 27 35			Um iP 20 50 09.6
			iPKP	17 27 41.0			Luzon (h = 50 km).
			iSKP	17 30 58.7	"	20	Up iP 21 52 45.7
			iPKS	17 31 11	"	20	Up iPKP 23 26 06.2 C
				microns sec			microns sec
			PKP	Z' 0.2 1.0			PKP Z' 0.1 0.7
			SKP	Z 0.8 3			Sk iPKP 23 25 59.5 C
			SKP	Z' 0.2 1.0			Gb ePKP 23 26 18
			PKS	N 2.0 5			Um iPKP 23 25 54.0 C
			M	E 1.7 28			Ka ePKP 23 26 15
			M	N 5.5 26			Kermadec Islands
			M	Z 5.0 25			(h = 40 km).
				(D = 15350 km = 138°)	"	21	Up iP 11 40 35.1 D
		Ki	iPKP	17 27 28.4 D	"	21	Up iP 20 34 58.8 D
			iSKP	17 30 37.1	"	22	Ki e 04 12 44
			i	17 31 28			i(Sg) 04 13 04.4
			i	17 49 17			i(Sg) 04 13 45.4
				microns sec			Probably a near shock.
			PKP	Z' 0.7 1.1	"	22	Up iPKP 07 06 10.1
			SKP	Z 3.1 3			Um iPKP 07 05 52.3 D
			SKP	Z' 1.3 2.0			Kermadec Islands
			M	E 2.0 19			(h = 170 km).
			M	N 3.1 23	"	22	Up eP 09 36 16
			M	Z 3.5 23	"	22	Up iP 12 21 09.7
				(D = 14550 km = 131°)			microns sec
		Sk	i(PKP)	17 27 34.3			P Z' 0.1 0.6
			iPKP	17 27 38.1	"	22	Up iP 16 09 11.4 D
			iSKP	17 30 55.2			microns sec
		Gb	iPKP	17 27 42.6			P Z' 0.9 0.8
			iSKP	17 31 09.9			M N 1.7 17
		Um	i(PKP)	17 27 24.8			Ki iP 16 09 07.4 D
			iPKP	17 27 33.3			microns sec
			ePP	17 30 14			P Z' 0.7 1.0
			iSKP	17 30 47.6			
			e	17 36 40			
			iSKSP	17 39 46			
			i	17 42 54			
		Ka	e(PKP)	17 27 42			
			iPKP	17 27 48.1			
			iSKP	17 31 10.2			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964				1964						
Jan.	22	Sk	iP	16 09 27.3	D	Jan.	23	Ki	iP	15 27 21.2
cont.		Gb	iP	16 09 31.2	D	cont.		Um	iP	15 27 09.7
			ipP	16 09 52.5				Ka	iP	15 27 18.0
		Um	iP	16 09 04.7				Hindu Kush (h = 30 km).		
			iS	16 17 33.		"	23	Up	iP	20 28 51.9
		Ka	iP	16 09 19.4	D	"	24	Up	i(P)	00 44 25.2
			i	16 09 34.8		"	24	Up	eP	05 39 50
		Burma, h = 80 km (Gb).				"	24	Up	iP	13 58 17.4
		Magn. = 6.9 (Up, Ki).							P	Z' 0.2 0.8
"	22	Up	iP	20 41 24.8		"	24	Up	iP	17 27 44.1
"	22	Up	eP	22 36 37				ipP	17 29 41.6	
"	23	Up	ePKS	00 22 04				eS	17 35 51	
				microns sec		"	24	Up	iP	17 27 44.1
		PKS	E	1.0 6				ipP	17 29 41.6	
		PKS	N	1.4 7				eS	17 35 51	
		M	E	1.5 20				P	Z' 0.5 0.8	
		M	N	3.7 20				pP	Z' 0.6 1.6	
		M	Z	3.2 20			Ki	iP	17 27 09.1	
		Ki	iPKP	00 18 34.1				ipP	17 29 03.5	
			iPP	00 20 08				P	Z' 0.5 0.9	
				microns sec				pP	Z' 0.4 1.5	
		M	E	2.6 20			Sk	iP	17 27 41.8	
		M	N	1.7 20				ipP	17 29 39.0	
		M	Z	2.8 19			Gb	iP	17 28 06.1	
		Sk	iPKP	00 18 44.9				ipP	17 30 04.7	
		Gb	iPKP	00 18 59.0			Um	iP	17 27 22.7	
		Um	iPKP	00 18 39.6				ipP	17 29 19.7	
			i	00 18 51.4			Ka	iP	17 28 03.0	
			ePP	00 20 29				ipP	17 30 03.1	
			i	00 28 27			Sea of Japan, h = 600 km			
			iPS	00 30 17			(Up, Ki, Sk, Gb, Um, Ka).			
			iScSP	00 30 34			Magn. = 6.0 (Up, Ki).			
		New Hebrides Islands				"	24	Up	iP	21 42 27.2
		(h = 30 km).							P	Z' 0.1 0.9
		Magn. = 6.2 (Up, Ki).					Ki	iP	21 41 40.0	
"	23	Up	iP	03 38 33.9			Kurile Islands (h = 30 km).			
"		Um	iP	03 38 15.5	C	"	24	Up	iP	22 01 32.1
"	23	Up	iP	05 28 30.5	C	"	24	Up	iP	22 57 16.5
"		Um	iP	05 28 11.6	C			Ki	iP	22 57 12.3
		Japan (h = 480 km).					Java (h = 90 km).			
"	23	Ki	iP	09 22 27.6	D	"	25	Up	iPKP	12 28 48.8
		Kamchatka (h = 30 km).					Kermadec Islands			
"	23	Up	iP	13 55 10.3			(h = 15 km).			
				microns sec		"	25	Up	iP	13 15 01.9
			P	Z' 0.1 0.5						
		Um	iP	13 54 51.2						
		Bonin Islands (h = 420 km).								
"	23	Up	iP	15 27 12.6	C					



Up = Uppsala, Ki = Kiruna, Sk = Skalistugan, Gb = Göteborg, Um = Umeå  
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1964						1964						
Jan.	28	Ki	microns		sec	Jan.	30	Up	microns		sec	
cont.			S	E	13 10	cont.			S	N	3.2 9	
			S	N	10 9				M	E	2.4 13	
			M	E	35 10				M	N	5.4 11	
			M	N	28 11				M	Z	5.6 10	
			M	Z	58 15				D = 2650 km = 24°.			
			D = 4800 km = 43°.					Ki	iP	17 52 09.8		
		Sk	iP	14 17 06.6					eLi	18 00 42		
		Gb	iP	14 17 02.3 C					microns sec			
			ipP	14 17 45.5					P	Z'	0.2 1.1	
		Um	iP	14 16 39.6 C					M	E	5.5 8	
			ipP	14 17 19.0					M	N	1.5 14	
			iX	14 17 33					M	Z	3.5 10	
			ipPP	14 18 54				Sk	eP	17 51 47		
			isPP	14 19 06				Gb	eP	17 51 02		
			iS	14 22 29					i	17 51 10.2		
		Ka	iP	14 16 45.6 C				Um	iP	17 51 34.5		
			ipP	14 17 27.9					iS	17 56 08		
		Hindu Kush, h = 200 km						iSn	17 56 31			
		(Up, Ki, Gb, Um, Ka).					Ka	iP	17 50 34.8			
		Magn. = 6.9 (Up, Ki).					Turkey (h = 40 km).					
		The time difference between							Magn. = 5.5 (Up, Ki).			
		the unidentified phase X										
		(Ki, Um) and pP is 13-14 sec,					"	30	Up	iP	20 38 30.5	
		approximately the time										
		required for a P to traverse					"	31	Ki	iP	04 26 12.4	
		the crust twice.							Um	iP	04 26 41.9	
								Alaska (h = 30 km).				
"	28	Up	iP	18 14 44.2 D								
"	29	Um	iP	07 53 39.7			"	31	Up	iP	09 28 15.3	
"	29	Up	iP	09 00 43.9					Sk	eP	09 28 56	
		Ki	iP	09 00 28.2					Um	iP	09 28 49.9	
				microns sec						i(pP)	09 29 09.2	
			P	Z'	0.1 1.0				Ka	eP	09 27 39	
		Um	iP	09 00 33.6 C			"	31	Up	iP	12 17 53.7	
		Celebes Sea (h = 130 km).							Greece (h = 80 km).			
"	29	Um	iP	12 52 57.2 D								
"	30	Ki	iP	09 18 26.8					Markus Båth			
		Um	iP	09 18 36.6					November 28, 1964			
		Sulu Sea (h = 30 km).										
"	30	Up	iP	16 34 58.0 D								
"	30	Um	iP	17 32 33.8 D								
		Volcano Islands (h = 30 km).										
"	30	Up	iP	17 51 05.4								
			iS	17 55 31								
				microns sec								
			P	N	0.4 3							
			P	Z'	0.1 0.8							
			S	E	2.0 10							



Seismological Institute  
Uppsala

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

U P P S A L A , K I R U N A , S K A L S T U G A N , 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 <sup>0</sup> 51.5'N,	17 <sup>0</sup> 37.6'E;	h = 14 m
Kiruna	(Ki):	67 <sup>0</sup> 50.4'N,	20 <sup>0</sup> 25.0'E;	h = 390 m
Skalstugan	(Sk):	63 <sup>0</sup> 34.8'N,	12 <sup>0</sup> 16.8'E;	h = 580 m
Göteborg	(Gb):	57 <sup>0</sup> 41.9'N,	11 <sup>0</sup> 58.7'E;	h = 66 m
Umeå	(Um):	63 <sup>0</sup> 48.9'N,	20 <sup>0</sup> 14.2'E;	h = 16 m
Karlskrona	(Ka):	56 <sup>0</sup> 09.9'N,	15 <sup>0</sup> 35.5'E;	h = 11 m

F E B R U A R Y 1 - 29, 1964  
.....

1964	Feb.	1	Up	iP	01 58 52.3	1964	Feb.	1	Up	iP	11 38 02.4	
			Ki	iP	01 57 58.8				Um	iP	11 37 55.8	
					microns sec				Nepal (h = 30 km).			
				P	Z' 0.1 1.0			"	1	Up	iP	11 51 32.7 C
			Sk	eP	01 58 29			"	2	Um	iP	03 55 38.6
			Um	iP	01 58 26.0			"	2	Um	iP	05 38 01.5
				ipP	01 58 36.0					i		05 38 16.1
			Aleutian Islands.									
			h = 40 km (Um).									
"		1	Up	iP	02 45 19.7	"		2	Up	iP	06 32 23.4	
			Um	iP	02 44 57.0				Ki	iP	06 33 20.0	
			Japan (h = 30 km).						Um	iP	06 32 51.8	
"		1	Up	eSg	04 16 31	"		2	Um	iP	06 44 59.6	
				i	04 16 49.8				Panama (h = 40 km).			
			Ki	ePn	04 12 56			"	2	Up	iP	09 06 36.2
				i	04 13 20.8							
				iSn	04 13 41.6							
				iSg	04 13 58.8							
				D = 430 km = 3.9°.								
			Sk	iPg	04 13 13.2				M	E	6.4	17
				iSg	04 13 57.0				M	N	5.4	18
				D = 430 km = 3.9°.					M	Z	9.2	18
			Um	iPn	04 13 23.8 C				Ki	iP	09 06 12.8	
				i(Sn)	04 14 27.8							
				iS*	04 14 52.5							
				iSg	04 15 10.5							
				D = 670 km = 6.0°.								
			Atlantic Ocean, off									
			Norwegian coast, 67.7°N,									
			10.0°E (± 0.2°).									
			Origin time = 04 11 52.									
"		1	Up	iP	09 32 15.3	"		2	Um	iP	09 24 11.9	
			Ki	iP	09 31 42.4							
			Um	iP	09 31 56.3							
			Bonin Islands (h = 70 km).									
						"		2	Um	iP	23 12 25.1	
						"		2	Um	iP	23 51 11.5	

Up = Uppsala, Ki = Kiruna, Sk = Skalistugan, Gb = Göteborg, Um = Umeå  
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1964					1964				
Feb.	3	Um	iP	01 16 58.7	Feb.	5	Up		microns sec
"	3	Um	iP	01 34 40.3	cont.		M	N	5.8 18
"	3	Um	iP	04 46 56.6			M	Z	7.5 18
"	3	Um	iP	04 54 13.9		Ki	iP		11 41 04.4
"	3	Ki	iSn	05 45 37.8					microns sec
			iSg	05 46 00.4			P	Z'	0.1 1.2
			D = 530 km = 4.8°.				M	E	12 18
		Um	iSn	05 46 23.7			M	N	8.3 20
			iSg	05 47 10.3			M	Z	15 18
			D = 740 km = 6.7°.			Sk	eP		11 41 40
		Northwest Russia, 68.1°N, 33.0°E. Origin time = 05 43 25. Explosion?					Gb	iP	11 42 04.6
"	3	Sk	iP	15 13 05.1	"	5	Ki	i(PP)	11 56 18.3
"	3	Up	iP	19 05 19.3					microns sec
		Ki	iP	19 04 42.1				(PP)	Z' 0.1 1.0
		Kurile Islands (h = 30 km).							Fiji Islands (h = 410 km).
"	3	Up	iP	19 05 50.9	"	5	Up	i(P)	13 09 35.8
		Kurile Islands (h = 40 km). Agreement with the USCGS solution not quite satisfactory in this and the preceding case.							microns sec
"	3	Gb	iPKP	20 24 23.8 C				(P)	Z' 0.1 1.0
		South of Fiji Islands (h = 510 km).			"	5	Ki	i(Pg)	16 24 09.3
"	3	Ki	iP	21 15 14.0				iSg	16 24 58.0
		Um	iP	21 15 29.4			Um	iSg	16 26 41.6
		Japan (h = 50 km).							Probably northwest Russia.
"	4	Up	eP	01 04 14	"	6	Up	iP	04 48 13.6
"	4	Up	iP	10 13 09.2			Ki	iP	04 48 18.2
		Ki	iP	10 12 20.2					Colombia (h = 140 km).
		Um	iP	10 12 42.4	"	6	Ki	iP	07 53 45.3
		Kurile Islands (h = 40 km).							Aleutian Islands (h = 30 km).
"	4	Up	iP	20 35 46.1	"	6	Up	iP	13 18 00.1 C
				microns sec				i	13 18 03.3
			P	Z' 0.1 0.6				iS	13 26 39
"	5	Up	iP	11 41 43.9				i	13 26 43
				microns sec					microns sec
			P	Z 4.1 5				P	N 6.8 6
			P	Z' 0.1 0.8				P	Z 9.4 6
			M	E 6.1 20				P	Z' 1.8 1.5
								S	E 26 15
								S	N 39 15
								M	E 42 20
								M	N 110 23
								M	Z 96 22
									D = 7150 km = 64½°.
						Ki	iP		13 17 06.9 C
							i		13 17 09.9
							i		13 17 49
							iPa		13 20 27
							i		13 21 09

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1964				1964							
Feb.	6	Ki	iS	13 24 56	Feb.	6	Up	iP	19 23 42.3		
cont.			i	13 25 00			Um	iP	19 23 26.5		
				microns sec			Ryukyu Islands.				
			P	N 6.7 7			Origin time = 19 11 43.				
			P	Z 13 5		"	6	Up	iPKP	20 52 51.1	
			P	Z' 1.9 1.1				Sk	iPKP	20 52 37.0	
			S	E 40 15				Um	iPKP	20 52 32.3	
			S	N 9.3 10			Kermadec Islands				
			S	Z 20 13			(h = 30 km).				
			M	E 87 18		"	7	Ki	iP	00 20 21.6	
			M	N 100 21			Kodiak Island (h = 30 km).				
			M	Z 170 21		"	7	Ki	iP	01 57 25.3	
			D = 6300 km = 56 $\frac{1}{2}$ <sup>0</sup> .					iS	01 59 13.7		
		Sk	iP	13 17 34.6			Um	iP	01 58 23.2		
			i	13 17 37.2				iS	02 01 04.0		
		Gb	iP	13 18 13.0 C				i	02 01 20.3		
			i	13 18 15.9				i	02 02 41.7		
		Um	iP	13 17 34.5 C			Svalbard region (by				
			i	13 17 37.4			combination with readings				
			iS	13 25 52			from Finland, Norway and				
		Ka	iP	13 18 23.6			Greenland).				
			i	13 18 26.3			Origin time = 01 55 08.				
		Kodiak Island (h = 30 km).					Agreement between data not				
		Magn. = 7.1 (Up,Ki).					quite satisfactory.				
		P and S phases are multiple				"	7	Up	iP	08 46 16.1 C	
		with a small-amplitude P						Sk	iP	08 46 18.3	
		followed within an average					Ryukyu Islands (h = 50 km).				
		of 3 sec by a large-				"	7	Up	iP	13 10 07.0 C	
		amplitude P (Up,Ki,Sk,Gb,							microns sec		
		Um,Ka), the corresponding						P	Z' 0.2 1.1		
		interval for S being 4 sec						M	E 1.8 19		
		(Up,Ki).						M	N 2.4 20		
								M	Z 3.4 21		
"	6	Up	iP	13 24 20.5 C			Ki	iP	13 09 25.6		
				microns sec				ipP	13 09 36.8		
			P	Z' 0.2 1.0				microns sec			
		Ki	iP	13 23 27.0 C				P	Z' 0.2 1.0		
				microns sec				M	E 3.0 20		
			P	Z' 0.5 1.1				M	N 2.5 16		
		Sk	iP	13 23 54.3 C				M	Z 6.1 16		
		Gb	iP	13 24 33.1 C			Sk	iP	13 09 59.4 C		
		Um	iP	13 23 54.3 C			Gb	iP	13 10 27.6 C		
		Kodiak Island (h = 30 km).					Um	iP	13 09 43.8 C		
								ipP	13 09 55.6		
							Japan. h = 50 km (Ki,Um).				
							Magn. = 5.8 (Up,Ki).				
"	6	Up	iP	19 20 56.7		"	7	Up	iP	13 30 54.7	
				microns sec			"	7	Ki	iP	14 44 06.8
			M	E 1.6 17			"	7	Up	iP	19 04 10.3 D
			M	N 2.2 16							
			M	Z 2.0 13							
		Ki	iP	19 20 30.6							
				microns sec							
			M	E 1.4 11							
			M	N 1.5 14							
			M	Z 1.8 11							
		Um	iP	19 20 40.5 D							
		Ryukyu Islands (h = 30 km).									
		Magn. = 5.6 (Up,Ki).									



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

1964				1964			
Feb.				Feb.			
cont.	11	Kurile Islands (h = 130 km).		cont.	12	Up	microns sec
"	11	Up	iP 10 40 15.9 C			M	N 2.3 22
"	11	Up	iP 11 01 25.3 D			M	Z 2.3 23
"	11	Ka	iPg 14 35 28.0 iSg 14 35 29.5 D = 10 km = 0.1°.			Ki	---
			Local explosion?				microns sec
"	11	Up	iP 15 07 50.0			M	E 1.2 21
"	11	Um	iP 20 22 29.0			M	N 0.9 19
"	11	Up	iP 20 41 29.5			M	Z 1.0 18
"	11	Um	iPKP 21 48 30.5 Solomon Islands (h = 100 km).			Um	iSS 23 12 47 Samoa Islands (h = 30 km). Magn. = 6.0 (Up,Ki).
"	12	Ki	eP 08 26 08 Sk ePP 08 27 15 Turkmen SSR (h = 30 km).	"	12	Up	iP 23 59 31.7 D microns sec
"	12	Um	iP 08 53 16.4			P	Z' 0.1 1.3
"	12	Um	iP 18 01 49.4 Kurile Islands (h = 30 km).	"	13	Um	iP 01 53 52.1 Ryukyu Islands (h = 130 km).
"	12	Up	---	"	13	Up	eP 02 16 05 i(pP) 02 16 19.6 i 02 16 48.4
			microns sec			Ki	eP 02 15 39
		M	E 7.9 19			Gb	eP 02 16 40
		M	N 5.7 19			Um	iP 02 15 48.3
		M	Z 12 19				i(pP) 02 16 03.5
		Ki	ePS 20 59 43				Ryukyu Islands. h = 60 km (Up,Um).
			microns sec	"	13	Um	eP 05 10 05 i 05 10 17.0
		M	E 4.9 21	"	13	Um	iP 05 18 39.2
		M	N 6.3 20				Hindu Kush (h = 70 km).
		M	Z 4.1 18	"	13	Ki	iPn 05 50 40.1 iSn 05 51 35.2 iSg 05 51 58.6 D = 510 km = 4.6°.
		Um	iPS 21 00 09			Sk	eSg 05 54 32
			i 21 04 47			Um	iSn 05 52 20.6 iSg 05 53 01.0 D = 710 km = 6.4°.
			eSS 21 05 58				Northwest Russia, 67.8°N, 32.5°E. Origin time = 05 49 28. Explosion?
			i 21 09 54	"	13	Up	iP 08 11 21.6
			Admiralty Islands (h = 30 km). Magn. = 6.5 (Up,Ki).	"	13	Up	eP 10 14 29 microns sec
"	12	Up	i(P) 21 14 40.9			M	E 1.3 17
"	12	Um	iP 21 41 01.7			M	N 1.5 15
"	12	Up	iPKS 22 56 42 microns sec			M	Z 1.0 20
			PKS N 0.8 5				
			M E 1.1 19				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964						1964		
Feb.	13	Ki	iP	10 14 11.8	C	Feb.	14	Off west coast of Sweden, 58.2°N, 11.1°E (± 0.1°). Origin time = 10 25 44. Explosion?
cont.				microns sec		cont.		
		M	E	0.9	15			
		M	N	2.0	20			
		M	Z	1.1	13			
		Um	eP	10 14 14		"	14	Up iSg 10 35 35.8 microns sec
		Yunnan Province, China (h = 30 km).						Sg Z' 0.1 0.5
		Magn. = 5.5 (Up,Ki).						Sk eSg 10 36 27
"	13	Up	iP	14 00 49.6				Gb iPg 10 33 44.8
			iPP	14 02 23.1				iSg 10 33 53.4
				microns sec				iL 10 33 57.0
		P	Z'	0.1	1.0			D = 80 km = 0.7°.
		M	E	1.2	16			Um iSg 10 37 21.2
		M	N	2.2	11			Ka iSg 10 35 14.2
		M	Z	2.0	18			Off west coast of Sweden, 58.2°N, 11.1°E. Origin time = 10 33 29. Explosion?
		Ki	iP	14 00 52.5				
			iPP	14 02 27.9				
				microns sec				
		P	Z'	0.1	1.0	"	14	Up iSg 10 43 47.4
		M	E	1.0	11			Sk eSg 10 44 39
		M	N	3.4	13			Gb iPg 10 41 58.4
		Sk	iP	14 01 13.3				iSg 10 42 07.1
			iPP	14 02 56.0				iL 10 42 09.9
		Gb	eP	14 01 13				D = 80 km = 0.7°.
			iPP	14 02 55.0				Off west coast of Sweden, 58.2°N, 11.1°E. Origin time = 10 41 41. Explosion?
		Um	iP	14 00 44.6				
			i	14 00 50.8				
			isP	14 01 58.1				
			i	14 10 57				
		Ka	iP	14 00 59.4		"	14	Up iP 15 58 38.7
			iPP	14 02 33.5				Ki eP 15 59 14
		Tadzhik SSR (h = 140 km).						Sk eP 15 59 14
		Magn. = 5.7 (Up,Ki).						Gb eP 15 58 51
"	14	Ki	eP	07 06 59				Um eP 15 58 51
		Sk	iP	07 07 37.4				Ka iP 15 58 30.0
		Gb	iP	07 07 50.4				Iran (h = 50 km).
		Um	iP	07 07 07.9	C	"	14	Um iP 16 32 15.2 C
			i(pP)	07 07 20.6				
		Japan (h = 30 km).				"	14	Up iPKP 16 48 19.7 ePS 16 59 08 microns sec
"	14	Up	iP	08 34 30.2				M E 5.5 22
		Hindu Kush (h = 200 km).						M N 7.6 23
"	14	Up	iPg	10 26 59.6				M Z 9.8 23
			iSg	10 27 52.0				Ki ePKP 16 48 08 microns sec
				D = 440 km = 4.0°.				M E 8.4 23
		Sk	eSg	10 28 41				M N 10 24
		Gb	iPg	10 26 00.8				M Z 11 23
			iSg	10 26 09.6				Sk iPKP 16 48 20.7
			iL	10 26 13.2				Gb iPKP 16 48 27.5
				D = 80 km = 0.7°.				Um iP 16 44 25 D
		Um	iSg	10 29 34.9				Um iPKP 16 48 14.7
		Ka	iSg	10 27 27.3				

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1964				1964			
Month	Day	Station	Time	Month	Day	Station	Time
Feb.	14	Um	iPP 16 48 56	Feb.	16	Gb	iP 00 24 36.2
			eSKS 16 55 07				Um iP 00 24 39.3 C
			i 16 57 44				iPcP 00 26 49.7
			iPS 16 58 45				Ka iP 00 24 14.0 C
			ePKKP 16 59 08				Iran (h = 40 km).
			iSS 17 04 33				Magn. = 5.9 (Up,Ki).
			(D = 12450 km = 112°).				
			Ka ePKP 16 48 27				" 16 Um iPKP 01 56 15.6
			New Britain (h = 60 km).				New Hebrides Islands
							(h = 110 km).
"	14	Um	eP 20 10 30	"	16	Ki	eSn 04 57 02
"	15	Ki	ePn 05 34 53				iSg 04 57 23.4
			iSn 05 35 39.0			Sk	eSg 04 59 50
			iSg 05 35 57.6			Um	eS <sup>z</sup> 04 57 58
			D = 420 km = 3.8°.				iSg 04 58 15.6
		Sk	eSg 05 38 33			Northwest Russia,	
		Um	iSn 05 36 22.5			67.4°N, 31.4°E.	
			iSg 05 37 03.3			Origin time = 04 55 04.	
		Northwest Russia,				Explosion?	
		67.9°N, 30.5°E.		"	16	Up	iP 05 14 30.1
		Origin time = 05 33 52.				Um	iP 05 14 11.4 D
		Explosion?				Japan (h = 420 km).	
"	15	Up	i(P) 12 13 23.8 C	"	16	Up	iP 21 12 16.8
"	15	Up	eP 13 18 17			Ki	eP 21 11 32
		Ki	iP 13 17 26.2			Um	eP 21 11 51
			microns sec			Kurile Islands (h = 80 km).	
		P	Z' 0.1 1.0	"	16	Um	iPKP 21 53 08.0
		Gb	iP 13 18 33.7			New Britain (h = 50 km).	
		Um	iP 13 17 52.7	"	17	Um	iP 03 16 44.8
			iPcP 13 18 29.4	"	17	Up	iP 06 02 29.7
		Ka	iP 13 18 42.6			Ki	eP 06 02 02
		Aleutian Islands					microns sec
		(h = 50 km).				M	E 0.5 13
"	15	Up	iP 13 20 30.3			M	N 0.3 13
		Sk	iP 13 20 04.5			M	Z 0.5 12
		Um	iP 13 20 03.1			Um	eP 06 02 14
		Aleutian Islands.					i(pP) 06 02 27.6
"	15	Um	iPKP 22 20 37.7			Formosa (h = 30 km).	
		Solomon Islands		"	17	Ki	iP 12 23 51.6
		(h = 50 km).				Um	iP 12 23 13.0
"	16	Up	iP 00 24 25.1 C			Switzerland (h = 30 km).	
			i 00 24 44.8	"	17	Up	iP 15 18 39.4
			microns sec			Um	iP 15 18 22.8
		P	Z' 0.1 0.6			Japan (h = 70 km).	
		Ki	iP 00 25 03.9 C	"	17	Um	iSKP 17 04 04.2
			iPP 00 26 41.3			Fiji Islands (h = 550 km).	
			microns sec				
		P	Z' 0.1 0.9				
		Sk	iP 00 25 00.7 C				
			e 00 26 14				

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1964				1964			
Feb.	18	Um	ePKP 01 50 18 New Hebrides Islands (h = 80 km).	Feb.	19	Um	e 13 00 35 iSg 13 01 03.6
"	18	Up	iP 03 58 30.3 C i 03 58 35.6 microns sec P Z' 0.2 0.5 Ki iP 03 58 24.6 Sk iP 03 58 47.0 C Gb iP 03 58 50.9 C Um iP 03 58 22.5 C i 03 58 28.2 Ka iP 03 58 39.2 Bhutan (h = 30 km).	"	20	Up	iP 00 48 01.8 D
"	18	Up	iP 04 58 58.7 Um iP 04 58 42.1 C Mariana Islands (h = 80 km).	"	20	Up	iP 02 58 08.2 Aleutian Islands (h = 30 km).
"	18	Up	iPKP 05 01 32.9 Ki iPKP 05 01 18.2 D Sk iPKP 05 01 27.0 Um ePKP 05 01 25 Tonga Islands (h = 290 km).	"	20	Up	iP 03 37 52.3 C Gb iP 03 38 09.3 Um iP 03 37 24.7 Aleutian Islands (h = 30 km).
"	18	Up	iP 06 50 44.5 Kurile Islands (h = 30 km).	"	20	Up	iP 03 41 36.3 Um iP 03 41 08.5 (Aleutian Islands).
"	18	Ki	iP 12 26 51.2 C microns sec P Z' 0.1 1.1 Um eP 12 26 38 Azores (h = 30 km).	"	20	Up	iP 04 02 34.6 Um iP 04 02 07.5 C Aleutian Islands (h = 30 km).
"	18	Up	iP 17 15 32.7 microns sec P Z' 0.1 0.8 Ki iP 17 15 41.6 Sk iP 17 15 58.2 Um iP 17 15 30.9 Hindu Kush (h = 220 km).	"	20	Up	iP 08 46 28.0 microns sec P Z' 0.1 0.5 Ki iP 08 45 41.2 C Sk eP 08 46 17 C Gb iP 08 46 49.4 C Um iP 08 46 03.1 C iPcP 08 46 39.3 Ka iP 08 46 51.2 C Kurile Islands (h = 50 km).
"	18	Up	iP 22 54 52.3 i 22 55 01.4 Um eP 22 54 27 Kurile Islands (h = 40 km).	"	20	Up	iP 10 04 50.5 microns sec P Z' 0.1 0.5 M E 1.9 20 M N 2.2 18 M Z 2.7 17 Ki iP 10 04 03.7 microns sec M E 2.1 18 M N 1.9 18 M Z 2.4 16 Sk iP 10 04 40.1 Gb iP 10 05 12.3 i(pP) 10 05 21.8 Um iP 10 04 24.4 iS 10 12 57 iScS 10 14 21 Ka iP 10 05 13.3 Kurile Islands (h = 50 km).
"	19	Ki	iP 06 41 07.8 Azores (h = 30 km).	"	21	Um	iP 00 17 23.1
"	19	Ki	iP 09 29 00.9 Java (h = 50 km).				
"	19	Up	iPKP 10 17 06.7 Fiji Islands (h = 600 km).				



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1964				1964					
Feb. cont.	21	Um	i	00 17 38.3	Feb. cont.	23	Northwest Russia. Explosion?		
				Bonin Islands (h = 30 km).					
"	21	Ki	iP	17 22 18.1	"	23	Up	iP	07 14 50.8
		Um	eP	17 22 05					
				Azores (h = 30 km).	"	23	Ki	eP	19 48 20
									Azores (h = 30 km).
"	22	Up	iPKP	02 07 16.6	"	23	Up	iP	22 45 47.6 C
				microns sec			iS		22 49 37
			PKP	Z' 0.1 0.7			iLg2		22 52 41
		Ki	iPKP	02 06 45.9					microns sec
				microns sec			P	Z'	0.1 0.5
			PKP	Z' 0.1 1.0			S	E	0.6 6
		Sk	iPKP	02 06 59.2			S	N	1.3 8
		Gb	iPKP	02 07 31.7			M	E	8.0 14
		Um	iPKP	02 06 53.5			M	N	4.5 10
		Ka	iPKP	02 07 31.7			M	Z	4.5 16
				New Zealand (h = 200 km).					D = 2350 km = 21°.
"	22	Up	iP	08 36 33.3			Ki	iP	22 47 01.3
"	22	Up	iPKP	09 10 16.9 C				iPP	22 47 43.9
				microns sec				e(Sn)	22 52 10
			PKP	Z' 0.3 0.9				iLg2	22 56 39
		Ki	ePKP	09 09 55			M	E	6.2 15
		Sk	iPKP	09 10 09.8 C			M	N	2.5 12
		Gb	iPKP	09 10 25.5			M	Z	3.1 12
		Um	iPKP	09 10 03.8			Sk	iP	22 46 31.3
		Ka	iPKP	09 10 26.5 C			Gb	iP	22 45 39.4
				Kermadec Islands			Um	iP	22 46 25.2 C
				(h = 30 km).				iS	22 50 48
"	22	Up	iP	16 15 50.9 D				i	22 52 18
		Ki	iP	16 15 18.1			Ka	iP	22 45 11.6
		Um	iP	16 15 31.6					Aegean Sea (h = 30 km).
			ipP	16 17 07.4					Magn. = 5.4 (Up,Ki).
				Japan. h = 430 km (Um).	"	24	Up	iPKP	05 21 05.4
"	22	Up	iP	18 01 42.3					South of Fiji Islands
		Um	eP	18 01 14					(h = 290 km).
				Kurile Islands (h = 60 km).	"	24	Um	eP	08 03 14
"	22	Up	iP	21 28 15.4	"	24	Up	iP	10 04 14.1
		Ki	eP	21 27 50			i		10 04 20.5
		Sk	iP	21 28 18.8					microns sec
		Gb	iP	21 28 35.4			P	Z'	0.2 1.3
		Um	iP	21 27 59.9			Ki	iP	10 04 38.5
		Ka	iP	21 28 32.6				i	10 04 43.4
				Ryukyu Islands (h = 50 km).					microns sec
"	23	Um	iP	02 03 16.9			P	Z'	0.1 1.3
"	23	Ki	e(Sg)	05 03 52			Gb	iP	10 04 32.2
		Sk	e(Sg)	05 06 27			Um	eP	10 04 22
		Um	i	05 04 41.2				i	10 04 29.2
			iSg	05 04 56.9					Chagos Islands (h = 30 km).
									Magn. = 5.7 (Up,Ki).
									P is multiple, the first

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1964					1964				
Feb.	24	small-amplitude phase being followed within 6 sec (as average) by a larger-amplitude phase (Up,Ki,Um).			Feb.	24	Um	iS	23 40 15
cont.					cont.			iLi	23 42 50
							Aegean Sea (h = 15 km).		
"	24	Up	iP	11 37 21.0	"	25	Um	eSS	01 08 56
			iPP	11 37 50.4			Prince Edward Island (h = 30 km).		
		Ki	iP	11 38 26.2 C	"	25	Um	iPKP	03 27 53.2
				microns sec			South of Australia (h = 30 km).		
			P	Z' 0.1 1.0					
		Um	iP	11 37 55.1	"	25	Up	iP	04 15 36.2 D
		Turkey (h = 30 km).							microns sec
"	24	Up	iPKP	16 37 38.2				P	Z' 0.2 0.6
			i	16 37 44.8			Ki	iP	04 15 02.4 D
				microns sec					microns sec
			PKP	Z' 0.1 0.5				P	Z' 0.1 0.9
		Sk	iPKP	16 37 35.6			Sk	iP	04 15 33.3 D
		Um	iPKP	16 37 27.4				iPP	04 18 26.2
		Kermadec Islands (h = 380 km).					Gb	iP	04 15 55.8 D
"	24	Um	ePKP	19 03 13 D			Um	iP	04 15 16.7 D
		New Hebrides Islands (h = 170 km).					Ka	iP	04 15 53.9
"	24	Um	iPKP	20 18 14.8			South of Japan (h = 370 km).		
		New Hebrides Islands (h = 240 km).			"	25	Ki	iPn	05 50 18.6
"	24	Up	iP	21 07 47.4 C				iSn	05 51 14.2
		Um	iP	21 07 28.8				iSg	05 51 31.1
		South of Japan (h = 500 km).						D = 470 km = 4.2°.	
"	24	Sk	iP	23 12 22.2			Sk	e	05 53 33
		Aegean Sea (h = 60 km).						eSg	05 54 12
"	24	Sk	iP	23 26 50.2			Um	iSn	05 51 59.3
		Um	eP	23 26 45				iSg	05 52 42.7
		(Aegean Sea).					Northwest Russia, 68.0°N, 31.7°E. Origin time = 05 49 14. Explosion?		
"	24	Up	iP	23 35 08.4	"	25	Up	i(P)	15 07 07.7
				microns sec			Ki	iP	10 14 48.3
		M	E	2.1 16			Um	eP	10 15 08
		M	N	0.9 11			Kurile Islands (h = 50 km).		
		M	Z	0.9 10	"	25	Up	i(P)	16 20 19.6
		Ki		---	"	25	Up	iP	19 02 34.4
				microns sec	"	25	Up	iP	19 07 55.5
		M	E	1.3 12	"	25	Up	iP	20 39 45.9 C
		M	N	0.9 14					microns sec
		M	Z	1.4 13				P	Z' 0.1 0.5
		Sk	iP	23 35 51.4	"	25	Up	i(P)	20 42 03.0
		Um	iP	23 35 46.6 D					
			iPP	23 36 37					

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1964				1964			
Feb.	25	Up	iP 23 15 15.7 D	Feb.	27	Up	iP 01 16 45.4
"	25	Up	iPKP 23 43 12.8 i 23 43 17.0 microns sec PKP Z' 0.1 0.6	"	27	Sk	iP 01 42 58.6 (Greece).
		Sk	iPKP 23 43 05.9	"	27	Up	iP 02 43 38.3
		Gb	ePKP 23 43 25			Ki	eP 02 44 21
		Um	iPKP 23 43 00.0			Um	iP 02 43 50.1
		Kermadec Islands (h = 50 km).				i	02 43 58.6
"	25	Up	iPKP 23 50 23.2			Tanganyika (h = 30 km).	
		Kermadec Islands (h = 300 km).		"	27	Up	iP 09 09 50.5
"	26	Ki	iP 07 33 36.2 D iS 07 35 16.2 microns sec S Z' 0.1 0.7 D = 1000 km = 9°			Ki	eLgl 09 23 11 iP 09 09 41.8 microns sec M N 1.3 12 M Z 0.8 12
		Sk	eS 07 37 38			Sk	iP 09 10 09.2 C
			e 07 38 33			Um	eP 09 09 40
		Um	eP 07 34 30			ePP	09 11 02
			eS 07 36 48			Kazakh SSR (h = 30 km).	
		Svalbard (h = 30 km).		"	27	Ki	iP 11 48 03.8 D microns sec P Z' 0.1 1.0
"	26	Um	iPKP 09 11 21.4 i 09 11 33.1			Sk	iP 11 48 02.3
		Macquarie Island (h = 30 km).				Um	eP 11 48 14
"	26	Ki	iP 09 19 00.3			Mexico (h = 30 km).	
		Kodiak Island (h = 30 km).		"	27	Um	iP 13 49 46.9
"	26	Up	iP 09 24 38.5	"	27	Up	iP 14 21 35.0
		Ki	iP 09 25 12.7			Ki	eP 14 21 13
		Sk	iP 09 25 12.2	"	27	Up	iP 15 21 18.5 D
		Um	iP 09 24 50.8			✓ ipP	15 21 42
		Iran (h = 30 km).				iS	15 29 50
"	26	Up	eP 18 27 51			isS	15 30 31
		Ki	iP 18 27 31.5			i	15 31 05
			microns sec P Z' 0.1 1.0				microns sec P Z' 0.6 0.6 S E 1.7 6 S N 1.2 5 M E 2.2 19 M N 5.9 22 M Z 3.9 20 D = 7100 km = 64°
		Sk	iP 18 27 52.8			Ki	iP 15 21 13.8
		Um	iP 18 27 37.4			ipP	15 21 37.5
		Talaud Islands (h = 130 km).				iS	15 29 42
"	26	Up	iP 19 19 31.8 C			eP'P'	15 50 06
"	26	Um	iPKP 21 36 30.9				microns sec P Z' 0.4 0.9 pP Z 0.6 7 pP Z' 0.7 1.0 S E 2.3 8
		Tonga Islands (h = 30 km).					
"	26	Um	eP 23 03 32				

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

1964					1964					
Feb.	27	Ki		microns sec	Feb.	28	Ki		microns sec	
cont.			S	N 3.7 8	cont.			M	N 1.7 20	
			P'P'	Z' 0.1 1.7				M	Z 0.9 17	
			M	E 5.5 15				D = 7450 km = 67°.		
			M	N 6.7 20			Sk	iP	17 58 16.6	
			M	Z 8.1 18			Gb	iP	17 58 19.5	
			D = 7050 km = 63 1/2°.					i	17 58 33.1	
		Sk	iP	15 21 34.2 D			Um	iP	17 57 54.6	
			ipP	15 21 58.4				i	17 58 12.1	
		Gb	iP	15 21 37.9				iS	18 06 44	
			ipP	15 22 03.1			Ka	iP	17 58 07.7 D	
		Um	iP	15 21 11.2 D				i	17 58 17.4	
			ipP	15 21 35.7			Burma (h = 40 km). Magn. = 5.9 (Up, Ki).			
			iPa	15 25 15						
			iS	15 29 31						
		Ka	iP	15 21 25.9 D	"	28	Up	iP	20 43 59.8	
			ipP	15 21 49.8					microns sec	
		Burma. h = 100 km (Up, Ki, Sk, Gb, Um, Ka). Magn. = 6.5 (Up, Ki).						P	Z' 0.1 0.6	
		The S waves recorded by Um E and N are remarkable, as both show sharp onsets, but 7 sec apart (E 15 29 31, N 15 29 38). As the epicenter is almost due east of Um, E records almost pure SV and N almost pure SH. It could be that the early onset on Um E is due to transformation of S into P.				"	28	Um	iP	20 49 22.8
						"	28	Um	iP	20 59 06.3
								Mariana Islands (h = 30 km).		
"	28	Ki	iP	00 06 25.6	"	29	Up	iP	04 39 04.1	
		Um	iP	00 06 53.5				i	04 39 09.2	
		Alaska (h = 170 km).				Um	iP	04 38 42.2 D		
						Siberia (h = 30 km).				
"	28	Um	iP	02 34 06.2 C	"	29	Up	iP	07 14 59.9	
"	28	Ki	i(Sg)	03 41 12.0				ipP	07 15 27.0	
"	28	Um	iP	17 08 47.6			Ki	iP	07 14 12.3	
"	28	Up	iP	17 58 00.7			Gb	iP	07 15 20.8	
			i	17 58 08.0			Um	iP	07 14 34.1 D	
							Kurile Islands. h = 110 km (Up).			
					"	29	Ki	iP	09 05 03.4	
					"	29	Um	iP	13 34 05.6	
					"	29	Um	iP	14 16 17.0	
					"	29	Up	iP	15 31 52.9 D	
							iS	15 41 28		
									microns sec	
			P	Z' 0.1 0.6			P	Z' 0.1 1.2		
			M	E 1.1 27			M	E 1.8 19		
			M	N 3.1 25			M	N 1.7 17		
			M	Z 1.4 27			M	Z 2.4 15		
		Ki	iP	17 57 57.7			D = 8350 km = 75°.			
			iS	18 06 50			Ki	iP	15 31 15.2	
							iS	15 40 17		
									microns sec	
			P	Z' 0.2 1.1			S	E 0.9 10		
			S	N 0.5 9			S	N 0.3 10		
			M	E 1.1 17						

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964

Feb. 29 Ki microns sec  
cont. M E 5.0 14  
M N 4.3 17  
M Z 7.3 16  
D = 7650 km = 69°.  
Sk eP 15 31 46  
Gb iP 15 32 12.4  
Um iP 15 31 31.4 D  
iS 15 40 44  
iPS 15 41 32  
Ka iP 15 32 11.8  
Japan (h = 30 km). Magn. =  
5.9 (Up, Ki).

" 29 Up iP 19 54 10.6  
Ki iP 19 53 37.3  
Sk iP 19 54 07.1  
Gb iP 19 54 29.0  
Um iP 19 53 51.1  
South of Japan  
(h = 320 km).

Markus Båth  
December 5, 1964

Seismological Institute  
 Uppsala

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, 1964  
 .....

1964					1964					
Mar.	1	Up	iP	00 03 17.4	Mar.	1	Up	iP	08 14 09.1	
			iPP	00 07 19.3			Um	iP	08 13 57.3	
			iSKS	00 13 41			Luzon (h = 50 km).			
			iPKKP	00 19 36.6						
				microns sec		"	1	Up	iP	11 33 21.9
			SKS	E 0.8 6				Um	iP	11 32 57.1
		Ki	eP	00 03 14			Kurile Islands (h = 30 km).			
			iPP	00 07 17.1						
			iSKS	00 13 35		"	1	Up	iP	13 07 37.3
			iPKKP	00 19 39.4				Um	iP	13 07 26.9
				microns sec			Mindanao (h = 30 km).			
			SKS	E 2.1 7						
			M	E 0.5 14		"	2	Up	iP	12 51 54.4
			M	N 0.5 16				ipP	12 52 24.8	
			M	Z 0.9 15				Um	eS	13 02 01
		Sk	iP	00 03 28.4			Guatemala. h = 120 km (Up).			
			e	00 07 23						
			iPP	00 07 42.5		"	2	Up	iP	18 50 42.6
		Gb	iPP	00 07 38.5				Ki	iP	18 49 37.8
		Um	iP	00 03 11.5				Um	iP	18 49 56.3 C
			i	00 03 45.0			Japan (h = 30 km).			
			iPP	00 07 08.4						
			iSKS	00 13 35		"	2	Up	ePKP	19 51 46
			i	00 15 52				Ki	ePKP	19 51 39
			e	00 19 34				iPP	19 53 50.6	
			iPKKP	00 19 39.8				iSKP	19 54 52.0	
			iSS	00 21 26					microns sec	
		Ka	ePP	00 07 32				SKP	Z' 0.6 2.0	
			iPKKP	00 19 34.0			Gb	ePKP	19 51 55	
		Java (h = 70 km).					Um	e(PKP)	19 51 36	
								i	19 51 45.7	
"	1	Up	eP	01 34 23				iPKP	19 51 50.4	
								iSKP	19 55 03	
								i(sPKS)	19 56 03	
"	1	Ki	iPKP	02 58 45.8				e	20 00 57	
		Um	iPKP	02 58 51.5				eSKSP	20 04 12	
		Solomon Islands					Ka	ePKP	19 51 59	
		(h = 100 km).					Tonga Islands (h = 110 km).			



Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964				1964			
Mar. cont.	4	Ki	microns sec	Mar. cont.	5	Um	iSg 09 03 45.5
		M	E 0.3 8			Coast region of northwest Norway, near Bodö.	
		M	N 0.3 8				
		M	Z 0.4 8				
		Sk	eP 17 39 35	"	5	Ki	i(Sg) 10 23 03.9
			iLgl 17 48 21.0			i	10 23 20.1
		Gb	eP 17 39 12				
		Um	iP 17 39 03.7	"	5	Ki	i(PKP) 10 24 12.5
			iSn 17 44 09.0			Sk	iPKP 10 24 30.9
			iLgl 17 47 00			Um	iPKP 10 24 25.2
			iRg 17 49 06				eSS 10 42 37
		Ka	iP 17 38 02.8			Solomon Islands (h = 40 km).	
			iLi 17 42 45.7				
		Caucasus (h = 60 km).		"	5	Um	eP 15 08 47
"	4	Up	iP 21 37 13.9	"	5	Up	iP 20 47 00.9 C
		Ki	iP 21 38 23.6	"			
		Sk	iP 21 37 53.0	"	5	Ki	iP 22 37 23.3
		Gb	iP 21 37 04.5			Um	iP 22 37 49.7
		Um	iP 21 37 54.8			Aleutian Islands (h = 30 km).	
		Crete (h = 40 km).		"	6	Ki	i(P) 00 02 16.4
"	5	Um	iP 00 05 50.9	"	6	Up	iP 02 47 43.7
		Leyte, Philippine Islands (h = 90 km).				Ki	iP 02 47 01.4
"	5	Um	eP 00 14 00			Sk	eP 02 47 36
		i	00 14 11.9			Gb	ePcP 02 48 27
		Leyte (h = 40 km).				Um	iP 02 47 20.0 C
		Japan (h = 30 km).		"	6	Ki	iPg 06 51 44.4
"	5	Ki	iP 02 33 33.4			iSg	06 52 45.2
		Kamchatka (h = 60 km).					microns sec
"	5	Up	---			Sg	Z' 0.1 0.7
			microns sec			D = 520 km = 4.7°.	
		M	E 0.9 23	Sk	eX	06 53 05	
		M	N 1.1 21	Um	i	06 52 19.1	
		Ki	---			iPg	06 52 25.2
			microns sec			iS <sub>2</sub>	06 53 35.8
		M	E 0.9 22			iSg	06 53 49.1
		M	N 0.5 19			iX	06 54 10.9
		M	Z 1.3 20			D = 740 km = 6.7°.	
		Sk	iPKP 06 19 44.5			Atlantic Ocean, off Norwegian coast, 68.3°N, 8.0°E (by combination with Tromsö data). Origin time = 06 50 10. The phase X (Sk, Um) has a group velocity of 3.07-3.08 km/sec, possibly Rg. Agreement between data not quite satisfactory.	
		Um	iPKP 06 19 39.4				
			i 06 38 05				
			eSS 06 38 26				
		Indian Ocean (h = 40 km).		"	6	Up	iP 15 23 52.0 C
"	5	Up	iP 07 53 55.7 C				
		Um	iP 07 53 46.5				
		Japan (h = 90 km).					
"	5	Ki	iSg 09 02 38.3	"	6	Up	iP 15 23 52.0 C
		Sk	eSg 09 03 33				

cont.





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1964				1964					
Mar.	10	Ki	iP	12 20 32.0	Mar.	11	Up	iP	15 38 59.9
"	10	Up	eP	14 13 20	"	11	Ki	eP	18 34 23
			ipP	14 13 54.8					Japan (h = 30 km).
		Ki	iP	14 13 01.4 D	"	11	Up	iP	19 22 41.2
			ipP	14 13 33.9				i	19 26 22.9
				microns sec					Switzerland (h = 30 km).
			P	Z' 0.2 1.5	"	11	Up	iP	23 42 10.0 C
		Um	iP	14 13 07.2				iPP	23 43 50.3
			iSKS	14 23 32			Ki	iP	23 42 39.5
				Molucca Passage. h = 130 km				iPP	23 44 35.3
				(Up,Ki).					microns sec
"	10	Up	iP	14 38 05.9				M	E 0.7 15
		Um	iP	14 38 36.0				M	N 0.4 12
"	10	Up	iP	15 40 27.6				M	Z 1.0 14
"	11	Up	iP	00 14 16.6			Sk	iP	23 42 42.0
			i	00 14 23.6			Um	iP	23 42 19.3
			iSn	00 19 10				iS	23 48 40
			iLgl	00 22 00				iSS	23 51 53
				microns sec					D = 4800 km = 43°
			P	Z' 0.1 0.7			Ka	iP	23 42 14.5
			M	E 0.6 12					Iran (h = 40 km).
		Ki	iP	00 14 57.4	"	12	Up	iP	04 07 03.0 D
				microns sec				iS	04 16 42
			P	Z' 0.1 1.0					microns sec
			M	E 1.8 16				P	Z' 0.1 0.9
			M	N 0.9 13				M	E 0.8 18
			M	Z 1.6 14				M	N 0.7 18
		Sk	eP	00 15 11				M	Z 1.4 18
			i	00 15 30.0					D = 8450 km = 76°
		Gb	eP	00 14 28			Ki	iP	04 06 39.7
			i	00 14 34.0					microns sec
		Um	iP	00 14 30.9 C				M	E 0.7 15
			eSn	00 19 19				M	N 0.3 15
			eLi	00 21 36				M	Z 0.7 15
			eLgl	00 22 30			Sk	iP	04 07 06.6
		Ka	iP	00 14 09.4			Gb	iP	04 07 22.4
				Caucasus (h = 30 km).			Um	iP	04 06 47.8 D
				Magn. = 5.5 (Up,Ki).				iPa	04 11 38
"	11	Up	iP	01 19 32.9				iS	04 16 16
		Ki	eP	01 19 16				eSKS	04 16 42
		Um	iP	01 19 19.6					D = 8200 km = 74°
			iSKS	01 29 48					Formosa (h = 30 km).
				Molucca Passage (h = 60 km).	"	12	Gb	iPKP	04 49 10.5
"	11	Up	iP	06 49 56.3			Ka	iPKP	04 49 12.7
"	11	Up	iP	12 55 34.4					Fiji Islands (h = 380 km).
"	11	Up	iP	14 31 16.2	"	12	Ki	iSn	08 50 44.2
								iSg	08 50 58.9
									D = 410 km = 3.7°

cont.







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

1964					1964				
Mar. cont.	16	Ka	iP	01 14 46.5 C	Mar.	16	Ki	iPn	06 54 44.5
				Tsinghai, China (h = 30 km).				iSn	06 55 40.1
				Magn. = 6.7 (Up, Ki) from				iSg	06 56 02.6
				P-waves but only 5.7 (Up,				D = 490 km = 4.4°.	
				Ki) from surface waves,			Sk	eSg	05 58 33
				possibly suggesting			Um	iS*	05 56 41.0
				somewhat greater depth				iSg	05 57 02.6
				than normal.				Northwest Russia, 67.6°N,	
								32.0°E. Origin time =	
"	16	Up	iPg	01 59 22.1				06 53 37. Explosion?	
			i!	01 59 33.6					
			iSn	01 59 48.9	"	16	Up	iP	08 55 16.1 C
			iS*	01 59 59.7				microns sec	
			iSg	02 00 13.5				P Z' 0.3 0.7	
				microns sec			Sk	iP	08 55 05.7 C
				Sg Z' 0.8 1.0				iPP	08 57 27.9
				D = 400 km = 3.6°.			Gb	iP	08 55 37.5 C
		Ki	eSn	02 01 38			Um	iP	08 54 50.3 C
			iSg	02 02 26.5			Ka	iP	08 55 38.1 C
		Sk	iPn	01 58 58.1				Kurile Islands (h = 140 km).	
			iPg	01 59 04.4				The P-phases on the short-	
			i!	01 59 11.5				period vertical-component	
			iSn	01 59 28.5				records are followed by an	
			iSg	01 59 39.2				oscillatoric wave train of	
				D = 310 km = 2.8°.				very regular appearance,	
		Gb	eSn	01 59 48				lasting 3-5 min and slightly	
			iSg	02 00 09.1				decreasing in amplitude	
		Um	eP*	01 59 40				especially clear at Sk, Um,	
			iPg	01 59 50.8				Up.	
			iSn	02 00 29.6					
			iSg	02 00 58.7					
				D = 580 km = 5.2°.	"	16	Up	iP	09 25 56.3
		Ka	eS*	02 00 58	"	16	Ki	iPn	15 33 45 D
			iSg	02 01 14.6				iSn	15 34 33
			i	02 01 23.5				iSg	15 34 47
				Norway, 61.2°N, 10.7°E.				D = 410 km = 3.7°.	
				Origin time = 01 58 09.			Sk	eSg	15 37 38
				Felt at Lillehammer and			Um	iSn	15 35 43.5
				Ringebu. i! denotes a				iSg	15 36 20.8
				significant but unexplained				Northwest Russia, 69.1°N,	
				phase (Up, Sk).				30.0°E. Origin time =	
"	16	Up	iP	03 35 41.3				15 32 46. Explosion?	
			iPP	03 37 20.8				In the few cases where the	
				microns sec				first motion of Pn at Ki can	
			P	Z' 0.2 1.0				be read for these events in	
			PP	Z' 0.1 1.0				Northwest Russia, it has	
		Ki	iP	03 35 46.1				been a clear dilatation	
				microns sec				(this case and Mar 7, 1964,	
			P	Z' 0.1 1.0				14 48 and Mar 21, 1964,	
		Sk	iP	03 36 05.5				15 16) - indicating a	
		Gb	iP	03 36 03.7 C				certain directivity of the	
		Um	iP	03 35 37.4				(probably) explosive source.	
			iPP	03 37 10.5	"	16	Sk	i(Sg)	18 15 20
		Ka	iP	03 35 47.6				Presumably aftershock to the	
				Tadzhik SSR (h = 130 km).				earthquake in Norway, Mar. 16,	
				Magn. = 5.8 (Up, Ki).				1964, 01 58 09. Felt at Ringebu.	

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

1964				1964				
Mar.	16	Um	iP	18 47 09.0	Mar.	18	Ki	microns sec
"	16	Um	iP	20 02 51.3	cont.			P E 1.0 6
				Central Asia.				P N 1.8 6
"	16	Um	iP	20 52 04.0				P Z 3.7 6
				Puerto Rico (h = 30 km).				P Z' 1.1 0.9
"	16	Up	iPKP	21 57 56.3				S E 3.3 6
		Sk	iPKP	21 57 54				S N 1.2 7
		Gb	iPKP	21 58 04.9				M E 2.3 13
		Um	iPKP	21 57 43.1				M N 1.9 13
			iSKP	22 00 31.7				M Z 2.3 11
		Ka	iPKP	21 58 07.3				D = 6200 km = 56°.
				Fiji Islands (h = 580 km).	Sk	iP		04 46 51.6
"	17	Um	iP	02 15 01.2		ipP		04 48 22.0
				Kamchatka (h = 20 km).		eS		04 54 46
"	17	Up	iP	05 21 26.8	Gb	iP		04 47 27.0
"	17	Up	iP	12 12 53.3		ipP		04 48 58.9
		Ki	iP	12 13 28.6	Um	iP		04 46 37.9 D
		Sk	iP	12 13 41		ipP		04 48 02.6
		Um	iP	12 13 05.4		isP		04 48 44
				Iran (h = 30 km).		i		04 50 14
"	17	Ki	i(P)	17 40 02.2		ipPP		04 50 28
"	17	Up	iP	20 41 17.8		iS		04 54 08
"	18	Up	iP	02 51 07.0		iScS		04 55 41
		Um	iP	02 50 47.1		i		04 56 24
"	18	Up	iP	04 47 06.3 D		iP'P'		05 15 52.1
			iPcP	04 47 40.4	Ka	iP		04 47 30.2
			ipP	04 48 37		ipP		04 49 02.1
			iS	04 54 59				Okhotsk Sea. h = 430 km (Up, Ki,Sk,Gb,Um,Ka).
			i	04 57 41				Magn. = 6.4 (Up,Ki).
			iP'P'	05 15 44.2	"	18	Ki	ePg 05 21 50
								iSn 05 22 25.0
								iSg 05 22 48.8
								D = 490 km = 4.4°.
								Um eSg 05 23 46
								Northwest Russia, 67.6°N, 32.0°E. Origin time = 05 20 23. Explosion?
					"	18	Up	iP 16 46 47.8
							Sk	iP 16 47 32.7
							Um	iP 16 47 36.7
								Yugoslavia (h = 30 km).
					"	18	Up	iP 19 01 20.6
					"	19	Um	iP 02 35 09.8
					"	19	Um	e 03 20 28
								i(Sg) 03 20 39.0
					"	19	Ki	iSn 04 42 17.9
								iSg 04 42 36.0
							Sk	eSg 04 45 08
							Um	iSn 04 43 03.5

cont.

cont.

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

1964				1964				
Mar. cont.	19	Um	iSg i Northwest Russia, 67.6°N, 30.1°E. Origin time = 04 40 34. Explosion?	04 43 41.3 04 43 52.0	Mar.	19	Up	--- microns sec
								M E 0.7 18 M N 1.3 21 M Z 1.1 17
"	19	Up	iPKP	05 04 03.8			Ki	ePKP 22 03 07 microns sec
		Ki	iPKP	05 03 56.3				M E 0.8 19 M N 0.6 15
		Gb	iPKP	05 04 13.4			Sk	ePKP 22 03 17
		Um	iPKP	05 04 01.8			Um	e(PKP) 22 03 01
		Ka	iPKP	05 04 15.8				iPKP 22 03 13.9 iPKS 22 06 32 i 22 08 50.1 eSS 22 23 03
				Fiji Islands (h = 610 km). The amplitudes of PKP at Gb and Ka are 10-15 times those of the other stations (caustic effect).				Samoa Islands (h = 30 km).
"	19	Um	iP	08 15 54.1	"	20	Ki	eP 03 23 56 Iran (h = 40 km).
				Arabian Sea.				
"	19	Um	iP	08 30 35.1	"	20	Um	iP 06 09 21.7
"	19	Um	iPKP	09 01 53.8	"	20	Ki	iP 07 08 46.1 ipP 07 09 07.1
				Fiji Islands (h = 500 km).			Um	iP 07 08 48.3
"	19	Up	iP	09 51 52.3				Ecuador, h = 80 km (Ki).
			eS	09 59 25				
			i(PS)	09 59 37	"	20	Ki	eP 07 34 10
				microns sec				
			M	E 2.4 21	"	20	Um	iP 08 08 31.0
			M	N 2.0 20	"	20	Up	iP 12 54 25.8 C
			M	Z 3.8 23	"	20	Gb	iPg 15 15 06.3 iSg 15 15 08.5 D = 20 km = 0.2°.
				D = 5900 km = 53°.				Probably explosion.
		Ki	iP	09 52 26.4	"	20	Up	iP 19 11 13.9 D
			i(PS)	10 00 42				microns sec
				microns sec				P Z' 0.1 0.6 M N 1.6 20
			P	Z' 0.2 1.3			Ki	iP 19 11 08.2
			M	E 3.9 17			Sk	iP 19 11 29.8
			M	N 1.8 19			Um	iP 19 11 06.5 D
			M	Z 4.1 17			Ka	iP 19 11 22.6
		Um	iP	09 52 05.1				Burma (h = 90 km).
			i	09 55 51.7				
			eS	09 59 48				
				Arabian Sea (h = 30 km). Magn. = 5.7 (Up, Ki).				
"	19	Um	iP	11 15 31.1 C	"	21	Up	iP 03 55 49.2
				Japan (h = 370 km).				i 03 59 31.0
"	19	Up	iP	12 02 16.6				iPKP 03 59 45
				microns sec				iPP 04 00 19.2
			P	Z' 0.1 0.8				epPP 04 01 31
		Ki	iP	12 01 44.2 D				iX 04 02 06
		Gb	iP	12 02 34.4				iSKS 04 05 52
		Um	iP	12 01 58.2 D				i 04 06 38
				Bonin Islands (h = 450 km).				

cont.





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Ka = Karlskrona

1964				1964					
Mar.	21	Ki	iPKP	16 46 28.0	Mar.	22	Um	iP	10 25 16.6
cont.		Sk	iPKP	16 46 39.9					
		Gb	iPKP	16 46 56.4 C	"	22	Um	i(P)	12 28 48.8
		Um	iPKP	16 46 34.2					Mariana Islands (h = 530 km).
		Ka	iPKP	16 46 58.2 C					
		Kermadec Islands (h = 30 km).			"	22	Up	iP	13 51 22.8
"	22	Up	iP	01 03 02.1			Ki	iP	13 51 24.2
		Ki	iP	01 02 08.3			Sk	iP	13 51 38.1
		Sk	iP	01 02 45.4			Um	iP	13 51 19.6
		Gb	iP	01 03 22.5			Sumatra (h = 30 km).		
		Um	iP	01 02 33.5	"	22	Sk	iP	16 56 15.8
		Ka	iP	01 03 26.7	"	23	Um	iP	01 32 30.3
		Kamchatka (h = 30 km).			"	23	Um	eP	07 43 53
"	22	Ki	iSn	05 29 23.9			Hindu Kush (h = 140 km).		
			iSg	05 29 49.5	"	23	Um	iP	08 08 31.0
		Sk	eSg	05 32 13					
			e	05 32 21	"	23	Sk	iPKP	09 36 35.5
		Um	eSn	05 30 05			Um	iPKP	09 36 30.5
			iSg	05 30 39.2			Kermadec Islands (h = 460 km).		
		Northwest Russia, 67.4°N, 32.4°E. Origin time = 05 27 18. Explosion?			"	23	Ki	eP	09 53 55
"	22	Um	iP	05 45 49.4			Um	iP	09 54 16.0
		Ceram Sea (h = 30 km).					Kurile Islands (h = 30 km).		
"	22	Ki	iP	06 31 10.6	"	23	Up	iP	13 47 57.8 D
				microns sec			iPP	13 49 34	
			P	Z' 0.1 1.0			iSa	13 56 12	
		Um	iP	06 31 39.8			i(Sa)	13 57 48	
		Alaska (h = 60 km).							microns sec
"	22	Up	iP	07 18 55.8			P	Z' 0.1 0.5	
		Peru (h = 150 km).					PP	E 0.3 3	
"	22	Um	eP	08 46 32			PP	Z' 0.1 1.0	
"	22	Up		---		Ki	iP	13 48 01.7 D	
				microns sec			isP	13 48 49.8	
		M	E	1.4 19			i	13 50 26	
		M	N	0.9 18			eS	13 54 05	
		M	Z	1.4 18			eSa	13 57 08	
		Ki		---					microns sec
				microns sec			P	Z' 0.3 0.9	
		M	E	1.0 19			S	N 0.3 6	
		M	N	0.7 18			M	E 0.5 7	
		M	Z	1.1 17			M	N 0.6 15	
		Um	iPKP	08 53 58.3			M	Z 0.4 7	
			iPP	08 55 36		Sk	iP	13 48 21.7 D	
			ePS	09 05 38			iPP	13 50 04.2	
			iSS	09 12 17		Gb	iP	13 48 20.6 D	
		Chile (h = 30 km).				Um	iP	13 47 53.5 D	
		Magn. = 5.8 (Up,Ki).					iPP	13 49 29	
							iS	13 53 51	
							iSa	13 56 11	
							iSS	13 56 55	

cont.

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

1964					1964				
Mar.	23	Ka	iP	13 48 04.5 D	Mar.	25	Ki	iP	05 02 56.7 C
cont.			iPP	13 49 49.6	cont.		Sk	iP	05 03 29.4
				Hindu Kush (h = 130 km).			Gb	iP	05 03 55.8
				Magn. = 6.0 (Up, Ki).			Um	iP	05 03 13.1
				Well developed higher mode surface waves.					Japan (h = 60 km).
"	23	Ki	eP	22 40 31	"	25	Ki	iSn	06 01 44.1
		Um	iP	22 40 38.3				iSg	06 02 07.6
				Luzon (h = 30 km).			Sk	eSg	06 04 46
"	23	Um	ePKP	22 59 49			Um	iSn	06 02 38.4
			iPP	23 00 40.2				iSg	06 03 18.4
				Australia (h = 30 km).					Northwest Russia, 68.1°N, 32.4°E. Origin time = 05 59 43. Explosion?
"	24	Up	iP	02 10 50.1 D	"	25	Ki	iP	10 20 39.7
		Ki	iP	02 10 19.3			Sk	iP	10 20 24.0
		Sk	iP	02 10 47.5			Um	iP	10 20 41.4
		Um	iP	02 10 32.4 D					Colombia (h = 50 km).
				Volcano Islands (h = 180 km).	"	25	Ki	iPKP	15 51 29.3
"	24	Sk	iP	08 39 24.3			Um	iPKP	15 51 35.9
				Puerto Rico (h = 60 km).					Loyalty Islands (h = 30 km).
"	24	Up	iP	07 16 44.4	"	25	Up	iP	20 30 36.4
"	24	Up	i(P)	11 04 04.0			Ki	eP	20 30 35
							Um	iP	20 30 33.7
"	24	Ki	eP	14 55 02					Sumatra (h = 30 km).
				Mariana Islands (h = 50 km).	"	26	Ki	iP	01 28 40.5
"	24	Up	iP	20 44 17.2				i	01 28 50.9
		Ki	iP	20 43 30.4 D			Um	iP	01 28 45.4
		Um	iP	20 43 51.9 D					Panay (h = 50 km).
				Kurile Islands (h = 30 km).	"	26	Up		---
"	24	Um	iP	22 31 34.6					microns sec
			i(pP)	22 31 45.0			M	E	2.5 19
				Japan (h = 50 km).			M	N	2.5 18
"	25	Up	iP	02 54 49.9 C			M	Z	4.3 19
							Ki	eP	02 17 21
				microns sec				eSKS	02 27 51
		P	Z'	0.1 0.8					microns sec
		Ki	iP	02 54 11.2 C			SKS	E	1.0 6
		Sk	iP	02 54 44.2 C			SKS	N	0.5 7
		Gb	iP	02 55 10.7			M	E	2.8 17
		Um	iP	02 54 28.1 C			M	N	2.0 17
				Japan (h = 70 km).			M	Z	4.0 19
"	25	Ki	i(P)	03 16 00.6			Um	iP	02 17 29.9
"	25	Um	iP	04 38 25.2				i	02 17 59.8
"	25	Up	iP	05 03 35.7 C				iSKS	02 28 02
								ePS	02 29 47
				microns sec				iSS	02 34 46
		P	Z'	0.1 0.8				i	02 38 46
cont.									Mariana Islands (h = 30 km).
									Magn. = 5.9 (Up, Ki).

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

1964				1964					
Mar.	26	Ki Um Peru (h = 100 km).	iP iP iP	05 38 58.5 05 39 05.1	Mar.	26	Ki Um	i(P) e(Sg) i(Sg)	15 44 01.8 15 44 49 15 46 36.0
"	26	Up Ki Sk Um Luzon (h = 120 km). Magn. = 5.8 (Up,Ki).	iP i(sP) P iP iP iP	06 43 12.9 06 43 52.9 microns sec Z' 0.1 0.8 06 42 55.3 microns sec Z' 0.2 1.8 06 43 18.7 06 43 00.2	"	26	Up Ki Sk Um Japan (h = 30 km).	eP iP iP iP	19 13 30 19 48 47.0 19 48 05.7 19 48 39.1 19 48 23.9
"	26	Um Okhotsk Sea (h = 180 km).	iP	07 23 08.7	"	26	Up Ki Sk Um	iP ipP iP iP	21 40 13.7 C 21 40 27.7 21 40 15.1 21 40 29.6 C 21 40 43.3 21 40 10.9 C 21 40 25.2
"	26	Up Gb Um West of Portugal (h = 30 km).	iP i iP iP	07 49 33.4 07 49 40.1 07 49 14.5 07 49 52.2	"	26	Up Ki Sk Um	ipP iP iP ipP	Sumatra, h = 60 km (Up,Sk,Um).
"	26	Up Ki Sk Um Mindanao (h = 60 km). P is preceded by small- amplitude motion, especially clear at Um, where this starts at 09 28 13.	iP iP eP iP	09 28 37.0 D 09 28 22.6 microns sec Z' 0.1 1.0 09 28 43 09 28 26.4	"	27	Up Up Up Ki Sk Gb Um Ka	e(P) iP iP iP iP iP eP iP eP ipP	00 03 09 02 27 26.7 04 40 45.5 C 04 41 13.6 microns sec Z' 0.1 0.5 Z' 0.1 0.5 04 40 36.9 04 41 04.6 04 41 18.7 04 41 00.1 04 41 27.4 04 41 07 04 41 14.5 04 40 36.7 C 04 40 55 04 41 22.5
"	26	Ki Um Banda Sea (h = 160 km).	iP iP	12 29 29.6 12 29 34.5 C	"	27	Up Um Ka	ipP iP eP	Burma, h = 110 km (Up,Ki,Sk,Ka). The amplitude of pP is approximately twice the amplitude of P at all stations; at Up the amplitudes are 0.05 and 0.11 microns resp. of P and pP on Z'.
"	26	Up Ki Um Southwest of Galapagos Islands (h = 30 km). Magn. = 5.5 (Up,Ki).	--- M M M --- M M M iPS eSS	microns sec E 0.7 18 N 0.7 18 Z 0.9 18 --- E 1.1 20 N 0.9 19 Z 1.8 18 13 58 22 14 04 27	"	27	Um	eP	17 25 23 Costa Rica (h = 30 km).

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

1964					
Mar.	27	Up	iP	17 40 20.7	
		Um	iP	17 40 21.9	
				Costa Rica (h = 30 km).	
"	27	Um	iP	19 20 12.2	
				Hindu Kush (h = 210 km).	
"	27	Up	iPKP	20 40 37.7	
			iSKP	20 43 32.1	
				microns sec	
			PKP	Z' 0.2 0.9	
		Ki	i(PKP)	20 40 18.9	
			iPKP	20 40 27.8	
			iSKP	20 43 10.5	
				microns sec	
			SKP	Z' 0.1 1.3	
		Sk	e(PKP)	20 40 33	
			iPKP	20 40 37.9	
			iSKP	20 43 25.4	
		Gb	iPKP	20 40 47.8 C	
			epPKP	20 42 46	
			iSKP	20 43 39.1	
		Um	i(PKP)	20 40 26.4 C	
			iPKP	20 40 31.8	
			iSKP	20 43 19.9	
			iPKS	20 44 10	
			e	20 46 10	
			i	20 48 41.7	
		Ka	iPKP	20 40 50.2 C	
			ipPKP	20 42 55.3	
			iSKP	20 43 41.1	
				South of Fiji Islands.	
				h = 500 km (Gb,Ka).	
				As our stations are	
				distributed around the	
				caustic at around 143°,	
				the records display a	
				number of interesting	
				features, summarized in	
				the following table:	

Station	D	PKP-(PKP)	pPKP	SKP/PKP
		sec		ampl. ratio
Ki	134°	8.9	no	2.5
Um	139	5.4	no	2.2
Sk	141	5	no	2.3
Up	144	no	no	0.25
Gb	146	no	weak	0.27
Ka	147	no	strong	0.28

The double PKP-phase with (PKP) much weaker than PKP, is observed only within the shadow zone, (PKP) being identical with P'' at Ki and with P''<sub>1</sub> at Um, Sk (G. Payo Subiza &

cont.

1964					
Mar.	27	M. Båth, Geophys. J.,			
		cont.			
					8:496-513, 1964). pPKP
					emerges gradually beyond
					the shadow zone. The
					variation of the amplitude
					ratio SKP/PKP by a factor
					of 8 from within to
					outside the shadow zone
					is exclusively due to the
					amplitude variation of
					PKP, whereas SKP has
					practically constant
					amplitude over this
					distance range.
"	27	Up	iP	23 13 30.6	
			ipP	23 13 38.5	
				microns sec	
				pP	Z' 0.1 0.7
		Ki	iP	23 13 27.3	
		Sk	iP	23 13 48.6	
		Um	iP	23 13 23.9	
			ipP	23 13 32.5	
		Ka	iP	23 13 38.2	
				Bhutan. h = 30 km (Up,Um).	
"	28	Up	iP	03 46 10.9 C	
			i	03 46 16	
			iS	03 54 21	
				microns sec	
			P	E 38 16	
			P	N 190 14	
			S	E 430 16	
			S	N 260 11	
			M	E 2260 22	
				D = 6550 km = 59°.	
		Ki	iP	03 45 15.3 C	
				microns sec	
			P	E 37 12	
			P	N 50 15	
		Sk	iP	03 45 42.0 C	
		Gb	iP	03 46 22.5 C	
		Um	iP	03 45 44.1 C	
		Ka	iP	03 46 34.2 C	
				Alaska (h = 20 km).	
				Magn. = 8.5 (Up,Ki).	
				The amplitudes given for	
				Up refer in this case to	
				Wiechert. These amplitudes	
				should be multiplied by a	
				factor about 2 to be	
				converted to amplitudes on	
				long-period Benioff (Båth,	
				Geofisica pura e appl.,	
				43:108-130, 1959). Well	
				developed mantle Rayleigh	
				and especially Love waves	
				were recorded.	

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

1964					1964				
Mar.	28	Up	iP	05 27 21.8	Mar.	28	Um	iP	05 46 47.3
		Gb	iP	05 27 32.9					
		Alaska. This is the first aftershock which could be read reliably. Before that the traces are too entangled to permit reliable readings. - As we found a very large number of Alaska aftershocks, which were not reported by USCGS, we used other bulletins for some of the identification.			"	28	Ki	iP	05 46 49.3 C
					"	28	Ki	iP	05 47 22.0
								P	microns sec Z' 0.1 1.0
							Gb	iP	05 48 28.4 C
							Alaska.		
					"	28	Um	iP	05 49 41.5 D
					"	28	Up	iP	05 51 38.1
							Ki	iP	05 50 43.3
"	28	Ki	iP	05 28 54.3 C				ipP	05 50 49.4
		Alaska.							microns sec Z' 0.1 1.0
"	28	Ka	iP	05 30 44.7 C			Sk	iP	05 51 10.6
		Alaska.						i(pP)	05 51 14.8
"	28	Up	iP	05 33 42.8 C			Gb	iP	05 51 50.0
		Alaska.					Um	iP	05 51 11.6 D
							Alaska.		
"	28	Up	iP	05 41 23.6 D	"	28	Up	iP	05 52 37.9
		Ki	iP	05 40 29.1			Ki	iP	05 51 43.3
		Sk	iP	05 41 02.5				ipP	05 51 49.4
		Um	iP	05 41 01.8					microns sec Z' 0.1 1.0
		Alaska (h = 30 km).						pP	05 52 10.5
"	28	Ka	iP	05 42 45.4			Sk	iP	05 52 16.2
								ipP	05 52 49.8
"	28	Up	iP	05 43 56.6 C			Gb	iP	05 52 09.3
				microns sec			Um	iP	05 52 09.3
				P Z' 0.1 1.0			Alaska.		
		Ki	iP	05 43 00.9	"	28	Ki	iP	05 52 54.4
				microns sec			Um	iP	05 53 25.0 C
				P Z' 0.4 1.5			Alaska.		
		Sk	iP	05 43 27.7 C	"	28	Um	iP	05 54 22.5
		Gb	iP	05 44 08.0 C			Alaska.		
		Um	iP	05 43 30.3 C	"	28	Up	iP	05 54 58.1
		Ka	iP	05 44 20.2			Ki	iP	05 54 02.9 C
		Alaska (h = 20 km).					Gb	iP	05 55 09.6
		Magn. = 6.0 (Up,Ki).					Um	iP	05 54 30.9
"	28	Up	iP	05 46 03.3				ipP	05 54 37.7
				microns sec			Alaska (h = 30 km).		
				P Z' 0.2 1.0	"	28	Sk	iP	05 55 28.2
		Ki	iP	05 45 00.2					
				microns sec	"	28	Um	iP	05 55 46.1
				P Z' 0.8 1.3			Alaska.		
		Sk	iP	05 45 35.8 D	"	28	Up	eP	05 56 49
		Gb	iP	05 46 15.0 D			Ki	iP	05 55 55.0
				i 05 46 17.9			cont.		
		Um	iP	05 45 36.9 D					
		Ka	iP	05 46 26.3					
		Alaska (h = 30 km).							
		Magn. = 6.4 (Up,Ki).							

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

1964				1964				
Mar.	28	Ki	microns sec	Mar.	28	Ki	iP	06 03 25.1 D
cont.		P	Z' 0.1 1.0			Sk	iP	06 03 52.1
		Gb	iP 05 57 01.8			Um	iP	06 03 53.1 D
		Um	iP 05 56 23.5			Alaska.		
			iPcP 05 57 20.5					
		Alaska.		"	28	Ki	iP	06 05 38.7
						Alaska.		
"	28	Um	iP 05 56 03.3	"	28	Um	iP	06 06 41.1
"	28	Um	iP 05 59 21.8	"	28	Ki	iP	06 07 43.5
"	28	Up	iP 06 00 06.3			Um	iP	06 08 12.0
			ipP 06 00 13.9			Alaska.		
		Ki	iP 05 59 11.5 C	"	28	Ki	iP	06 08 44.3
			ipP 05 59 19.3			Um	iP	06 09 12.2
			microns sec				ipP	06 09 19.8
		P	Z' 0.1 0.6			Alaska. h = 30 km (Um).		
		pP	Z' 0.2 1.0	"	28	Up	iP	06 13 13.2
		Sk	iP 05 59 39.2 C			Ki	iP	06 12 11.7
			ipP 05 59 46.8			Sk	eP	06 12 40
		Gb	iP 06 00 17.7			Um	iP	06 12 40.7 D
			ipP 06 00 25.4			Alaska.		
		Um	iP 05 59 39.2 C	"	28	Ki	iP	06 12 54.0
			ipP 05 59 47.1			Um	iP	06 13 22.8
			iPcP 06 00 37.0			Alaska.		
		Ka	iP 06 00 29.7	"	28	Ki	iP	06 13 17.8
			ipP 06 00 36.2			Um	iP	06 15 02
		Alaska. h = 30 km (Up, Ki, Sk, Gb, Um, Ka). pP has larger amplitudes than P at all stations. This may sometimes lead to difficulties in phase identification, especially when the weaker P is missing and the record starts with the stronger pP. At Ki and Um, P starts with longer periods (1.0 sec), followed after 1.5-2 sec by shorter periods (0.6 sec).		"	28	Up	iP	06 15 04.8
						Gb	iP	06 16 12.1
				"	28	Alaska.		
				"	28	Ki	iP	06 15 05.2
								microns sec
						P	Z' 0.1 1.1	
						Um	iP	06 15 33.8
						Alaska.		
"	28	Ki	iP 05 59 38.0	"	28	Um	iP	06 15 14.6
"	28	Um	iP 06 02 04.9	"	28	Up	iP	06 18 49.2 C
			ipP 06 02 11.1					microns sec
		(Alaska).				P	Z' 0.2 1.0	
"	28	Up	iP 06 03 31.1 C			Ki	iP	06 17 53.5 C
			ipP 06 03 36.8				ipP	06 17 59.0
		Ki	iP 06 02 36.3					microns sec
			ipP 06 02 43.3			P	Z' 0.2 1.0	
		Gb	iP 06 03 42.8			Sk	iP	06 18 20.3 C
		Um	iP 06 03 04.8			Gb	iP	06 19 00.6 C
			ipP 06 03 11.4			Um	iP	06 18 22.6 C
		Alaska. h = 25 km (Up, Ki, Um).						

cont.

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

1964					1964				
Mar.	28	Ka	iP	06 19 12.4 C	Mar.	28	certain whether the maxima (M ENZ) listed for Ki belong to this shock or not.		
cont.		Alaska, h = 20 km (Ki). Magn. = 6.1 (Up,Ki).			cont.				
"	28	Up	iP	06 19 34.8	"	28	Sk	iP	06 39 31.7
		Sk	iP	06 19 19.6 C					
		Um	iP	06 19 20.0	"	28	Up	iP	06 42 41.5
		Alaska. Up may have recorded a different shock.					Ki	iP	06 41 44.4 C
								i	06 41 45.8
									microns sec
"	28	Up	iP	06 20 12.0 C				P	Z' 0.2 1.0
							Sk	iP	06 42 12.9
"	28	Up	iP	06 22 47.8 D			Gb	iP	06 42 53.1
		Um	iP	06 22 14.5			Um	iP	06 42 14.3 C
			ipP	06 22 21.3			Ka	iP	06 43 05.2 C
		Alaska, h = 30 km (Um).					Alaska (h = 30 km).		
"	28	Um	i(P)	06 23 08.8	"	28	Ki	iP	06 42 18.3 C
							Gb	eP	06 43 24
"	28	Up	i(pP)	06 26 05.0			Alaska.		
		Ki	iP	06 25 00.2	"	28	Um	iP	06 42 26.4
			ipP	06 25 06.7					
				microns sec					
			P	Z' 0.1 1.2	"	28	Sk	iP	06 43 11.3
		Um	iP	06 25 28.4			Um	iP	06 43 12.2
		Alaska, h = 25 km (Ki).					Alaska.		
"	28	Ki	iP	06 31 45.9	"	28	Ka	iP	06 45 38.0 C
		Alaska.			"	28	Ki	iP	06 45 51.0
"	28	Ki	iP	06 33 32.0	"	28	Up	iP	06 47 15.4
		Gb	iP	06 34 37.6				ipP	06 47 26.8
		Um	iP	06 34 00.6 C					microns sec
		Alaska (h = 15 km).						P	Z' 0.1 1.0
"	28	Ki	iP	06 38 38.3			Ki	iP	06 46 21.1
									microns sec
"	28	Up	iP	06 39 40.4				P	Z' 0.1 1.0
			ipP	06 39 46.5			Sk	iP	06 46 47.3
				microns sec			Gb	iP	06 47 27.5
			pP	Z' 0.1 1.0			Um	iP	06 46 49.2
		Ki	iP	06 38 45.9			Ka	iP	06 47 38.8
			ipP	06 38 52.4				ipP	06 47 47.8
				microns sec			Alaska, h = 40 km (Up,Ka). Magn. = 5.8 (Up,Ki).		
			pP	Z' 0.1 1.0	"	28	Um	iP	06 48 57.7
		M	E	73 17	"	28	Um	iP	06 49 58.6
		M	N	56 18				ipP	06 50 03.1
		M	Z	100 17			Alaska, h = 20 km (Um).		
		Sk	eP	06 39 06	"	28	Um	iP	06 50 23.0
			ipP	06 39 12.8	"	28	Ka	iP	06 50 24.9
		Gb	iP	06 39 51.4					
			ipP	06 39 59.0					
		Um	iP	06 39 14.1					
			ipP	06 39 20.4					
		Alaska, h = 25 km (Up,Ki, Sk,Gb,Um). It is not quite							

cont.



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

1964				1964						
Mar.	28	Up	iP	06 51 33.9	Mar.	28	Ka	iP	06 57 42.5	
		Sk	iP	06 51 05.9	cont.		Alaska.			
		Gb	iP	06 51 45.9		"	28	Ki	iP	06 57 12.7
			ipP	06 51 50.2		"	28	Ka	iP	07 00 33.2
		Um	iP	06 51 07.9		"	28	Up	iP	07 01 15.0
			ipP	06 51 12.6				Ki	iP	07 00 16.3
		Ka	iP	06 51 57.8				Sk	iP	07 00 47.7
			ipP	06 52 02.4				Gb	iP	07 01 26.4
		Alaska, h = 20 km (Gb,Um,Ka).						ipP	07 01 31.5	
"	28	Um	iP	06 51 21.8				Um	iP	07 00 48.6
"	28	Sk	iP	06 51 34.3				Ka	iP	07 01 37.8
		Um	iP	06 51 32.7				ipP	07 01 43.8	
		Ka	iP	06 52 19.2				Alaska, h = 25 km (Gb,Ka).		
			i	06 52 33.7		"	28	Up	iP	07 01 27.4
		Alaska.							microns sec	
"	28	Sk	iP	06 52 04.2				P	Z' 0.2 1.0	
		Um	iP	06 52 04.9			Ki	iP	07 00 26.5	
			ipP	06 52 09.7			ipP	07 00 32.8		
		Alaska, h = 20 km (Um).						microns sec		
"	28	Sk	iP	06 52 49.2				pP	Z' 0.3 1.2	
		Gb	iP	06 53 28.5			Sk	iP	07 01 00.4	
		Um	iP	06 52 50.5 D			Gb	iP	07 01 39.4	
		Alaska.					Um	iP	07 00 57.9	
"	28	Ki	iP	06 52 53.4			Ka	iP	07 01 50.0	
		Sk	iP	06 53 21.2			Alaska, h = 25 km (Ki).			
		Alaska.					Magn. = 6.2 (Up,Ki).			
"	28	Up	iP	06 54 15.5		"	28	Sk	iP	07 02 08.8
				microns sec			Gb	iP	07 02 49.9	
			P	Z' 0.9 1.5			Alaska.			
		Ki	iP	06 53 20.7 D		"	28	Up	iP	07 03 50.0
				microns sec				ipP	07 03 56.1	
			P	Z' 1.0 1.5					microns sec	
		Sk	iP	06 53 47.9 D				P	Z' 0.1 0.9	
		Gb	iP	06 54 27.5 D			Ki	iP	07 02 54.7	
		Um	iP	06 53 49.2			ipP	07 03 01.0		
		Ka	iP	06 54 39.1				microns sec		
		Alaska (h = 25 km).					P	Z' 0.2 1.4		
		Magn. = 6.7 (Up,Ki).					Sk	iP	07 03 21.8	
"	28	Ka	iP	06 53 56.1			ipP	07 03 27.8		
"	28	Gb	iP	06 54 02.9			Gb	iP	07 04 01.9	
"	28	Um	iP	06 54 54.5			ipP	07 04 07.9		
"	28	Um	iP	06 55 17.8			Um	iP	07 03 23.8	
"	28	Ki	iP	06 56 28.6			ipP	07 03 30.1		
				microns sec			Ka	iP	07 04 13.4	
			P	Z' 0.1 1.0			ipP	07 04 19.7		
		Alaska, h = 25 km (Up,Ki,Sk, Gb,Um,Ka).					Magn. = 5.9 (Up,Ki).			
"	28	Sk	iP	07 03 36.3		"	28	Sk	iP	07 03 36.3

cont.



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

1964				1964			
Mar. cont.	28	Um (Alaska).	iP 07 33 15.0	Mar. cont.	28	Sk Um	ipP 07 50 10.1 iP 07 50 01.4 ipP 07 50 10.5
"	28	Up Ki	iP 07 34 32.6 eP 07 33 37 ipP 07 33 44.5	"	28	Um Alaska.	iP 07 52 00.9 h = 30 km (Sk,Um).
"	28	Sk Um Ka	ipP 07 34 14.3 iP 07 34 07.1 iP 07 35 03.3	"	28	Up Ki Sk Gb Um Ka	iP 07 54 11.1 C iP 07 53 16.7 iP 07 53 42.8 C iP 07 54 23.0 iP 07 53 43.6 iP 07 54 34.5
"	28	Alaska.	h = 30 km (Ki).	"	28	Alaska.	
"	28	Sk	i(P) 07 35 01.7	"	28	Ki	i(P) 07 53 37.8
"	28	Um	iP 07 36 26.4 C	"	28	Up Ki	iP 07 58 10.4 iP 07 57 09.4
"	28	Ki Sk	iP 07 37 47.5 eP 07 38 15 ipP 07 38 21.5	"	28	Sk Um	ipP 07 57 16.4 iP 07 57 36.1 iP 07 57 37.4
"	28	Um	iP 07 38 16.0 ipP 07 38 22.5	"	28	Alaska.	h = 30 km (Ki,Um).
"	28	Alaska.	h = 25 km (Sk,Um).	"	28	Up	i(P) 07 58 59.2
"	28	Up Ki Sk Um	iP 07 40 53.0 iP 07 39 59.2 iP 07 40 26.0 iP 07 40 27.3	"	28	Up Ki Sk Gb Um Ka	iP 07 59 17.1 C iP 07 58 22.8 iP 07 58 50.0 C iP 07 59 29.0 iP 07 58 50.9 iP 07 59 40.6
"	28	Alaska.		"	28	Alaska.	h = 15 km).
"	28	Up	iP 07 40 55.9	"	28	Ki Sk Um Ka	iP 07 59 58.3 iP 08 00 25.0 iP 08 00 25.9
"	28	Ki	iP 07 40 01.8	"	28	Alaska.	
"	28	Sk Gb Um Ka	microns sec P Z' 0.2 1.0 iP 07 40 28.1 iP 07 41 07.2 D iP 07 40 29.6 iP 07 41 18.4	"	28	Up	iP 08 00 29.4
"	28	Alaska.	h = 15 km).	"	28	Up Ki Sk Um	iP 08 02 37.5 iP 08 01 43.8 iP 08 02 11.2 iP 08 02 12.0
"	28	Magn.	= 6.4 (Up,Ki).	"	28	Alaska.	h = 30 km).
"	28	Um	iP 07 45 51.4	"	28	Up Ki Sk Um	iP 08 04 31.1 ipP 08 04 38.5 iP 08 04 57.6 ipP 08 05 04.8 iP 08 05 00.2 ipP 08 05 06.3
"	28	Ki Sk Um	iP 07 48 18.9 eP 07 48 45 eP 07 48 47	"	28	Alaska.	h = 30 km (Ki,Sk,Um).
"	28	Alaska.		"	28	Ki	iP 08 04 31.1
"	28	Up	iP 07 49 48.7	"	28	Sk	iP 08 04 57.6
"	28	Up	ipP 07 49 54.8	"	28	Um	iP 08 05 00.2
"	28	Alaska.	microns sec Z' 0.2 1.3	"	28	Alaska.	h = 30 km (Ki,Sk,Um).
"	28	Sk	iP 07 50 03.3 D	"	28	Alaska.	h = 30 km (Ki,Sk,Um).
cont.				"	28	Alaska.	h = 30 km (Ki,Sk,Um).

Up = Uppsala, Ki = Kiruna, Sk = Skalistugan, Gb = Göteborg, Um = Umeå  
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1964				1964					
Mar.	28	Up	eP	08 09 57	Mar.	28	Ka	iP	08 42 54.7
		Ki	iP	08 09 06.7	cont.		Alaska (h = 15 km).		
		Um	iP	08 09 34.8 C	"	28	Up	iP	08 44 06.4
		Alaska (h = 25 km).						ipP	08 44 12.6
"	28	Up	iP	08 10 57.0					microns sec
		Um	iP	08 10 06.9				pP	Z' 0.3 1.2
		Could be two different shocks.					Ki	iP	08 43 11.7
								ipP	08 43 17.4
"	28	Um	iP	08 11 03.0					microns sec
			ipP	08 11 09.2				P	Z' 0.1 1.2
		(Alaska).						pP	Z' 0.4 1.2
"	28	Up	iP	08 15 23.8			Sk	iP	08 43 38.5
		Ki	iP	08 14 27.3				ipP	08 43 44.6
		Um	iP	08 14 56.4			Gb	iP	08 44 18.0
		Alaska.						ipP	08 44 23.9
"	28	Up	iP	08 15 39.6			Ka	iP	08 44 30.4
		Ki	iP	08 14 42.7				ipP	08 44 36.3
		Um	iP	08 15 10.9			Alaska, h = 25 km (Up, Ki, Sk, Gb, Ka).		
		Alaska. An alternative interpretation would be that these phases are pP of the preceding shock, which would mean a focal depth of 60 km.			"	28	Up	iP	08 47 29.4
"	28	Ki	iP	08 17 35.1			Ki	iP	08 46 24.1
		Um	eP	08 18 03			Sk	eP	08 46 50
		Alaska.					Um	iP	08 46 52.4
"	28	Um	eP	08 22 53			Alaska.		
		Alaska (h = 30 km).			"	28	Ki	iP	08 46 38.8
"	28	Ki	iP	08 24 13.7			Sk	eP	08 47 05
		Um	iP	08 24 42.3			Alaska.		
		Alaska.			"	28	Up	iP	08 49 38.3
"	28	Um	iP	08 25 20.2			Alaska.		
		Alaska.			"	28	Up	iP	08 50 19.5
"	28	Up	iP	08 37 39.5					microns sec
		Ki	iP	08 36 37.5				P	Z' 0.1 0.9
		Alaska.					Ki	iP	08 49 24.9 D
"	28	Up	iP	08 38 32.7					microns sec
		Alaska.						P	Z' 0.2 1.0
"	28	Ki	iP	08 39 16.1			Sk	iP	08 49 51.7 D
		Um	iP	08 39 44.8			Gb	iP	08 50 30.7 D
		Alaska (h = 30 km).						ipP	08 50 36.9
"	28	Up	iP	08 42 31.3 C			Um	iP	08 49 53.2 D
		Ki	iP	08 41 36.0			Ka	iP	08 50 42.7 D
		Sk	iP	08 42 01.7			Alaska, h = 25 km (Gb). Magn. = 5.9 (Up, Ki).		
		Alaska.			"	28	Ki	iP	08 50 25.9
"	28	Up	iP	08 42 01.7			Sk	iP	08 50 41.4
		Alaska.					Um	iP	08 50 42.0
		Alaska.			"	28	Up	iP	08 50 57.9

cont.



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Ka = Karlskrona

1964				1964			
Mar.	28			Mar.	28		
cont.		Ki	microns sec	cont.		Um	iP 09 44 57.7
		P	Z' 0.1 1.0			Alaska.	
		Sk	iP 09 23 37.6	"		Um	iP 09 51 23.2
			ipP 09 23 48.7			(Alaska).	
		Gb	iP 09 24 17.4	"		Um	iP 09 53 45.7
			ipP 09 24 29.4				
		Um	iP 09 23 38.6 D	"		Up	iP 09 55 20.0
			ipP 09 23 50.1			Ki	iP 09 54 24.3 C
		Ka	iP 09 24 28.9				microns sec
			epP 09 24 39			P	Z' 0.1 1.0
		Alaska. h = 40 km (Up, Ki, Sk, Gb, Um, Ka).				Sk	iP 09 54 51.5 C
"	28	Um	iP 09 27 26.7			Gb	iP 09 55 31.5
"	28	Up	iP 09 28 17.0			Um	iP 09 54 53.0 C
		Ki	iP 09 27 23.3			Ka	iP 09 55 43.4
		Sk	iP 09 27 50.1 C			Alaska (h = 30 km).	
		Gb	iP 09 28 29.2	"	28	Up	iP 09 56 26.5
		Um	iP 09 27 51.5 C			i	09 56 31.4
		Ka	iP 09 28 40.5			Sk	iP 09 55 46.6
		Alaska (h = 25 km).		"	28	Up	iP 10 03 00.5
"	28	Ki	iP 09 28 11.3			eS	10 11 12
		Um	iP 09 28 39.6				microns sec
		Alaska.				P	N 0.6 4
"	28	Ki	iP 09 29 39.5			P	Z 0.9 5
		Um	iP 09 30 07.9			S	N 0.6 6
			ipP 09 30 14.7			M	E 3.2 19
		Alaska. h = 30 km (Um).				M	N 5.0 19
"	28	Ki	iP 09 30 22.8			M	Z 5.4 17
"	28	Um	iP 09 33 23.3			D = 6650 km = 60°.	
		Alaska.				Ki	iP 10 02 05.1
"	28	Ki	eP 09 35 17			iS	10 09 36
		Um	iP 09 35 45.0				microns sec
		Alaska (h = 30 km).				P	Z' 0.4 2.2
"	28	Ki	iP 09 41 11.2			S	N 1.6 7
		Alaska.				M	E 4.4 17
"	28	Up	iP 09 44 30.4			M	N 7.5 23
		Ki	iP 09 43 36.4			M	Z 11 23
			microns sec			D = 5850 km = 52 1/2°.	
		P	Z' 0.1 1.0			Sk	iP 10 02 31.9 C
		Sk	iP 09 44 03.4 C			Gb	iP 10 03 12.2
		Gb	iP 09 44 42.8 C				ipP 10 03 20.7
		Um	iP 09 44 04.4 C			Um	iP 10 02 34.1
		Ka	iP 09 44 54.8			Ka	iP 10 03 24.3
		Alaska (h = 20 km).					ipP 10 03 32.6
"	28	Ki	iP 09 44 29.8			Alaska. h = 30 km (Gb, Ka).	
		Sk	iP 09 44 57.2			Magn. = 6.0 (Up, Ki).	
cont.						P and pP have unusually long periods on Z', around 2 sec.	
"	28	Up	iP 10 07 41.2	"	28	Up	iP 10 07 41.2
		Ki	iP 10 06 45.6			Ki	iP 10 06 45.6
		Sk	eP 10 07 13			Sk	eP 10 07 13
cont.				cont.			



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1964				1964				
Mar. cont.	28	Sk	iP	10 45 35.8	Mar.	28	Ki i(P)	11 13 48.0
			eP'P'	11 15 15.5			Sk iP	11 14 08.6
		Gb	iP	10 46 15.2 D			Um iP	11 14 10.0
			ipP	10 46 22.7			ipP	11 14 17.2
			iP'P'	11 15 00.8			Alaska. h = 30 km (Um).	
		Um	iP	10 45 37.6 D	"	28	Ki iP	11 16 35.4
			iS	10 53 49.8			Um iP	11 17 04.2
			iP'P'	11 15 12.4			Alaska (h = 30 km).	
		Ka	i(P)	10 46 24.3	"	28	Up iP	11 18 31.6 D
			iP	10 46 27.0			microns sec	
			ipP	10 46 34.2			P Z' 0.2 1.2	
			iPP	10 48 54.4			Ki iP	11 17 35.8
			iP'P'	11 14 57.5			microns sec	
		Alaska. h = 30 km (Gb,Ka).					P Z' 0.4 1.2	
		Magn. = 6.5 (Up,Ki).					Sk iP	11 18 02.8
"	28	Up	iP	10 54 03.1			Gb iP	11 18 43.1
		Alaska.					Um iP	11 18 05.0 D
"	28	Um	iP	10 55 26.7			Ka iP	11 18 56.3
"	28	Um	iP	10 59 15.7			Alaska (h = 15 km).	
		Alaska (h = 15 km).					Magn. = 6.2 (Up,Ki).	
"	28	Ki	iP	11 02 54.2	"	28	Up iP	11 19 18.1
		Gb	eP	11 03 54			microns sec	
		Um	iP	11 03 22.7			P Z' 0.1 1.0	
		Alaska (h = 20 km).					Ki iP	11 18 30.4
"	28	Ki	eP	11 06 26			microns sec	
		Sk	iP	11 06 51.9			P Z' 0.1 1.1	
		Um	eP	11 06 54			Sk iP	11 19 01.4
		Alaska (h = 30 km).					(Alaska). Magn. = 5.8 (Up, Ki).	
"	28	Up	iP	11 09 39.5	"	28	Ki iP	11 20 29.4
		Ki	iP	11 08 45.0	"	28	Ki iP	11 24 07.7
			ipP	11 08 51.0			Sk iP	11 24 32.3
		microns sec					Alaska.	
			P Z' 0.1 1.0					
		Sk	iP	11 09 12.1 C	"	28	Ki iP	11 25 42.3
		Gb	iP	11 09 51.5 C			Sk iP	11 25 06.4
		Um	iP	11 09 13.3			(Alaska).	
		Ka	iP	11 10 02.1	"	28	Up iP	11 35 28.2
		Alaska. h = 25 km (Ki).					Ki iP	11 34 34.0 C
"	28	Up	iP	11 12 26.3			microns sec	
"	28	Up	iP	11 12 38.8			P Z' 0.1 0.9	
		Ki	iP	11 11 45.0			Sk iP	11 35 01.2 C
		Sk	iP	11 12 12.3			ipP	11 35 10.7
		Gb	iP	11 12 51.9			Gb iP	11 35 41.0
		Um	iP	11 12 14.7			Um iP	11 35 02.2 C
		Alaska (h = 30 km).					Ka iP	11 35 51.5
"	28	Um	iP	11 12 37.2			Alaska. h = 40 km (Sk).	



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1964					1964				
Mar.	28	Up	iP	11 42 32.4 D	Mar.	28	Up	iP	12 00 19.6 C
		Ki	iP	11 41 37.6				ipP	12 00 26.7
		Sk	iP	11 42 03.6		Ki	iP	iP	11 59 25.3
		Gb	iP	11 42 43.4				ipP	11 59 32.2
		Um	iP	11 42 05.7					microns sec
		Ka	iP	11 42 54.5				P	Z' 0.2 1.1
		Alaska (h = 20 km).				Sk	iP	iP	11 59 51.6
								ipP	11 59 58.4
"	28	Up	iP	11 43 25.2		Gb	iP	iP	12 00 31.0
			ipP	11 43 54.7				ipP	12 00 37.7
			i	11 47 11.6		Um	iP	iP	11 59 53.4
			i	11 47 16.3				ipP	11 59 59.9
			iPP	11 47 21.2		Ka	iP	iP	12 00 43.1
			iSKS	11 53 46		Alaska. h = 30 km (Up, Ki, Sk, Gb, Um).			
				microns sec					
			pP	Z' 0.5 2.0	"	28	Ki	iP	12 00 14.3
			PP	Z' 0.2 1.4	"	28	Up	iP	12 13 19.7 D
			SKS	E 1.1 5				ipP	12 13 28.3
			M	E 2.2 17		Ki	iP	iP	12 12 24.7
			(D = 10800 km = 97°).						microns sec
		Ki	iP	11 43 11.3				P	Z' 0.2 1.5
			ipP	11 43 41.9		Sk	iP	iP	12 12 50.8
			iSKS	11 53 27		Gb	iP	iP	12 13 31.0
				microns sec				ipP	12 13 40.2
			P	Z' 0.2 1.4		Um	iP	iP	12 12 53.3
			pP	Z' 0.6 1.6		Ka	iP	iP	12 13 41.9
			SKS	E 2.9 7		Alaska. h = 40 km (Up, Gb).			
			M	N 3.6 18					
			(D = 10450 km = 94°).		"	28	Ki	iP	12 13 21.7
		Sk	iP	11 43 30.7			Um	iP	12 13 49.5
			ipP	11 44 01.0		Alaska.			
			i	11 46 46.2	"	28	Up	iP	12 14 21.1
			iPP	11 47 33.3	"	28	Up	iP	12 17 24.0
		Gb	iP	11 43 38.6			Ki	iP	12 16 29.5
			ipP	11 44 10.1			Um	iP	12 16 56.9
		Um	iP	11 43 14.8		Alaska.			
			ipP	11 43 45.7	"	28	Up	iP	12 21 01.5
		Ka	iP	11 43 31.7				ipP	12 21 08.4
			ipP	11 44 03.6		Ki	iP	iP	12 20 08.2
			iPP	11 47 41.9				ipP	12 20 14.5
		Celebes. h = 120 km (Up, Ki, Sk, Gb, Um, Ka). Magn. = 6.2 (Up, Ki).							microns sec
		pP(Z') is relatively long-period on all our stations, the average being 1.9 sec, whereas the average period for P(Z') is 1.3 sec. The ground amplitude of pP(Z') is on the average 2.9 times the amplitude of P(Z').						P	Z' 0.1 1.0
						Sk	iP	iP	12 20 35.3
						Gb	iP	iP	12 21 13.8
								ipP	12 21 20.7
						Um	iP	iP	12 20 35.6
								ipP	12 20 42.0
"	28	Ki	iP	11 51 37.8		Alaska. h = 25 km (Up, Ki, Gb, Um).			
		Sk	iP	11 52 05.0					
		Alaska.							



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1964				1964					
Mar. cont.	28	Sk Um	iP iP ipP	12 49 22.2 12 49 22.6 12 49 29.1	Mar.	28	Ki Alaska.	iP 13 47 51.9	
		Alaska. h = 25 km (Um).			"	28	Um Alaska.	iP 13 52 19.4	
"	28	Ki	eP	12 57 43	"	28	Ki	iP	13 53 40.9
		Alaska (h = 30 km).					Sk	iP	13 54 07.8
"	28	Ki	iP	12 59 36.9			Um	iP	13 54 08.3
		Alaska.					Alaska (h = 25 km).		
"	28	Ki	iP	13 03 27.3	"	28	Gb	iP	13 55 09.7
		Um	iP	13 03 56.3			Um	iP	13 54 32.1
		Alaska.					Alaska.		
"	28	Ki	iP	13 09 35.0	"	28	Um	iP	13 55 41.9
		Um	iP	13 10 09.1			Alaska.		
		Alaska.			"	28	Up	iP	13 58 08.5
"	28	Up	iP	13 11 18.7				ipP	13 58 12.0
			ipP	13 11 24.6			Ki	eP	13 57 11
		Ki	iP	13 10 23.5			Sk	iP	13 57 37.1
			ipP	13 10 30.0			Gb	iP	13 58 17.1
				microns sec			Um	iP	13 57 38.1
			pP	Z' 0.4 1.5			Alaska. h = 15 km (Up).		
		Sk	iP	13 10 50.8	"	28	Ki	iP	14 02 43.3
		Gb	iP	13 11 29.9				ipP	14 02 50.3
		Um	iP	13 10 52.0					microns sec
			ipP	13 10 58.4				P	Z' 0.1 1.0
		Ka	iP	13 11 42.9			Sk	iP	14 03 10.4
			ipP	13 11 48.9				ipP	14 03 18.1
		Alaska. h = 25 km (Up, Ki, Um, Ka).				Gb	iP	14 03 49.2	
"	28	Ki	iP	13 21 19.3		Um	iP	14 03 11.2	
		Um	iP	13 21 48.0			ipP	14 03 17.9	
		Alaska.				Alaska. h = 30 km (Ki, Sk, Um).			
"	28	Up	iP	13 27 14.6	"	28	Ki	iP	14 03 36.3
							Um	iP	14 04 04.9
		Alaska.				Alaska.			
"	28	Up	iP	13 37 43.0	"	28	Um	iP	14 04 34.6
		Ki	iP	13 36 47.0	"	28	Up	iP	14 12 28.4 C
				microns sec					microns sec
			P	Z' 0.1 1.0					Z' 0.1 0.6
		Sk	eP	13 37 13		Ki	iP	14 11 34.3 C	
		Gb	iP	13 37 54.1			ipP	14 11 42.4	
		Um	iP	13 37 15.8				microns sec	
		Alaska (h = 15 km).					P	Z' 0.2 0.8	
"	28	Um	iP	13 37 38.1		Sk	iP	14 12 01.7 C	
"	28	Um	iP	13 40 58.4		Gb	iP	14 12 40.7 C	
			ipP	13 41 03.8		Um	iP	14 12 02.4 C	
		(Alaska).				Ka	iP	14 12 51.8 C	

cont.

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

1964					1964				
Mar.	28	Alaska. h = 30 km (Ki).			Mar.	28	Gb	ip	14 57 13.1
cont.		Magn. = 6.0 (Up,Ki).			cont.			ipP	14 57 22.6
"	28	Ki	iP	14 23 06.9			Um	iP	14 56 35.3
		Um	iP	14 23 36.1			Alaska. h = 40 km (Gb).		
		Alaska.			"	28	Up	iP	14 57 39.1 C
"	28	Ki	iP	14 27 42.2			iS	15 05 51	
		Sk	iP	14 28 08.4			eP'P'	15 27 15	
		Gb	iP	14 28 48.0			microns sec		
		Um	iP	14 28 10.3			P	N	1.5 6
		Alaska (h = 20 km).					P	Z	1.3 4
"	28	Ki	iP	14 30 26.3			P	Z'	0.3 1.2
		Um	iP	14 30 54.9			S	E	2.0 9
		Alaska.					S	N	3.5 10
"	28	Um	eP	14 41 28			P'P'	Z'	0.2 1.6
"	28	Up	iP	14 43 35.5 C			M	E	3.7 .18
		Ki	iP	14 42 40.6 C			M	N	5.1 18
			ipP	14 42 48.4			M	Z	6.6 16
		Sk	iP	14 43 07.6			D = 6600 km = 59 1/2°.		
			ipP	14 43 15.6		Ki	iP	14 56 45.1	
		Gb	iP	14 43 47.5			eS	15 04 07	
		Um	iP	14 43 08.8			iSa	15 08 33	
			ipP	14 43 16.9			microns sec		
		Alaska. h = 30 km (Ki,Sk, Um).					P	N	1.6 8
"	28	Ki	iP	14 48 25.0			P	Z	3.8 8
		Sk	iP	14 48 49.7			P	Z'	0.3 1.1
		Alaska.					S	E	5.9 11
"	28	Ki	i(P)	14 48 38.8			S	N	3.4 9
"	28	Ki	eP	14 51 02			D = 5800 km = 52°.		
		Um	iP	14 51 30.8		Sk	iP	14 57 11.5	
		Alaska.					iP'P'	15 27 25.2	
"	28	Up	iP	14 56 44.7 C		Gb	iP	14 57 50.2	
		Ki	iP	14 55 45.4			iP'P'	15 27 09.5	
			ipP	14 55 50.9			i	15 27 28.7	
		Sk	eP	14 56 13		Um	iP	14 57 13.3	
			ipP	14 56 17.8			eP'P'	15 27 13	
		Gb	eP	14 56 57			i	15 27 24.1	
		Um	iP	14 56 18.2		Ka	iP	14 58 03.4	
		Alaska. h = 20 km (Ki,Sk).				Alaska (h = 10 km). Magn. = 6.4 (Up,Ki).			
"	28	Up	iP	14 57 01.1	"	28	Up	iP	14 59 18.0 C
		Ki	iP	14 56 07.2			iS	15 07 35	
				microns sec			iP'P'	15 28 52.8	
			P	Z' 0.1 1.0			microns sec		
		Sk	iP	14 56 34.1			P	N	1.0 5
							P	Z	1.2 4
							P	Z'	0.2 1.0
							S	N	1.4 6
							D = 6650 km = 60°.		
						Ki	iP	14 58 22.1	
							iS	15 05 46	
							iSa	15 10 07	
							microns sec		
							P	N	1.7 7
cont.					cont.				

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

1964				1964				
Mar.	28	Ki	microns sec	Mar.	28	Gb	iP	15 37 39.3 C
cont.			P Z 2.7 8	cont.		Um	iP	15 37 01.0
			P Z' 0.8 1.5			Alaska (h = 30 km).		
			S E 4.2 10	"	28	Ki	iP	15 40 14.3
			S N 3.5 7			Alaska.		
			M E 8.6 16	"	28	Um	iP	15 43 51.5
			M N 6.8 16			Alaska.		
			M Z 8.7 18	"	28	Ki	iP	15 44 06.2
			D = 5800 km = 52°.			Alaska (h = 30 km).		
		Sk	iP 14 58 48.5	"	28	Up	iP	15 46 40.0
			eP'P' 15 29 00			Ki	iP	15 45 45.8
		Gb	iP 14 59 28.6				ipP	15 45 52.1
			eP'P' 15 28 47					microns sec
		Um	iP 14 58 51.7					P Z' 0.1 1.2
			e(P'P')			Sk	eP	15 46 12
			15 28 52			Um	iP	15 46 13.7
			iP'P' 15 29 00.9				ipP	15 46 21.2
		Ka	iP 14 59 40.7					Alaska. h = 30 km (Ki,Um).
			Alaska (h = 10 km).	"	28	Um	iP	15 49 50.3
			Magn. = 6.4 (Up,Ki).			Alaska (h = 30 km).		
"	28	Up	iP 15 10 55.3	"	28	Up	iP	15 54 07.3
		Ki	iP 15 10 01.1			Ki	eP	15 53 14
		Sk	iP 15 10 28.0			Um	iP	15 53 41.4
		Gb	iP 15 11 06.9			Alaska (h = 30 km).		
		Um	iP 15 10 29.3 D	"	28	Ki	iP	15 55 18.8
		Ka	iP 15 11 18.7			Um	iP	15 55 46.6
		Alaska.				Alaska.		
"	28	Ki	i(P) 15 10 18.0	"	28	Up	iP	16 02 05.3
"	28	Um	iP 15 17 13.5			Ki	iP	16 01 10.8
		Alaska.				Gb	iP	16 02 17.3
"	28	Um	iP 15 20 03.9			Um	iP	16 01 39.1
			ipP 15 20 12.3			Alaska (h = 20 km).		
		Alaska.		"	28	Um	iP	16 05 07.8
"	28	Ki	iP 15 29 55.3			Alaska (h = 10 km).		
		Sk	iP 15 30 22.8	"	28	Ki	iP	16 14 04.4
		Um	iP 15 30 23.7			Um	iP	16 14 32.6
			ipP 15 30 30.6				ipP	16 14 38.1
		Alaska. h = 30 km (Um).				Alaska. h = 20 km (Um).		
"	28	Up	iP 15 32 39.6 C	"	28	Up	iP	16 19 10.5
		Ki	iP 15 31 44.5			Alaska.		
		Sk	iP 15 32 11.3	"	28	Um	iP	16 19 29.1
		Um	iP 15 32 13.3			Alaska.		
		Alaska (h = 15 km).		"	28	Ki	iP	16 20 25.9
"	28	Um	iP 15 36 36.4			Alaska.		
		Alaska.				Alaska.		
"	28	Up	iP 15 37 27.8			Alaska.		
		Ki	iP 15 36 32.1			Alaska.		
		Sk	iP 15 36 58.7			Alaska.		
cont.				cont.				

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

1964					1964				
Mar.	28	Um	iP	16 20 54.7	Mar.	28	Um	iP	17 24 20.2
cont.		Alaska.							
"	28	Ki	eP	16 26 50	"	28	Ki	iP	17 24 10.8
		Sk	iP	16 27 17.9			Ka	iP	17 25 35.9
		Um	iP	16 27 19.2			Alaska (h = 30 km).		
		Alaska.			"	28	Um	iP	17 36 19.7
							Alaska.		
"	28	Ki	eP	16 31 19	"	28	Ki	iP	17 45 55.5
		Um	iP	16 31 46.9			Sk	iP	17 46 22.3
		Alaska.						ipP	17 46 27.8
"	28	Ki	eP	16 35 46			Um	iP	17 46 23.7
			ipP	16 35 54.6			Alaska. h = 20 km (Sk).		
		Sk	e(P)	16 36 26	"	28	Up	iP	17 49 41.2
		Um	eP	16 36 13			Um	iP	17 49 14.9
			ipP	16 36 18.7			Alaska.		
		Alaska. h = 30 km (Ki,Um).							
"	28	Up	iP	16 38 26.2	"	28	Ki	iP	17 56 23.9
		Ki	iP	16 37 31.0			Sk	iP	17 56 57.6
		Sk	iP	16 37 57.8				ipP	17 57 06.3
		Um	iP	16 37 59.9			Um	iP	17 56 52.9
		Alaska.					Alaska. h = 30 km (Sk).		
"	28	Up	iP	16 54 45.5 C	"	28	Up	iP	18 00 13.1
			ipP	16 54 52.0				ipP	18 00 19.8
		Ki	iP	16 53 50.4 C			Ki	iP	17 59 19.3
			ipP	16 53 57.0				ipP	17 59 25.8
				microns sec			Sk	iP	17 59 46.1
			P	Z' 0.1 1.0				ipP	17 59 52.4
		Sk	iP	16 54 16.5			Um	iP	17 59 47.5 D
			ipP	16 54 22.9				ipP	17 59 53.9
		Gb	iP	16 54 56.7 C			Alaska. h = 25 km (Up,Ki, Sk,Um).		
			ipP	16 55 03.3					
		Um	iP	16 54 19.2 C	"	28	Ki	iP	18 00 22.3
			ipP	16 54 25.6	"	28	Sk	iP	18 00 36.1
		Ka	iP	16 55 08.7				ipP	18 00 43.7
		Alaska. h = 25 km (Up,Ki, Sk,Gb,Um).					(Alaska).		
"	28	Ki	iP	16 57 27.3	"	28	Um	iP	18 02 48.5
		Sk	iP	16 57 53.3	"	28	Um	iP	18 12 36.5
		Um	iP	16 57 55.2			Alaska.		
		Alaska.			"	28	Up	iP	18 13 57.8
"	28	Sk	iP	17 03 05.1				ipP	18 14 02.5
		Um	iP	17 03 08.4					microns sec
"	28	Um	iP	17 08 11.8				pP	Z' 0.1 1.1
"	28	Um	iP	17 15 42.5				M	N 0.8 20
"	28	Um	iP	17 23 23.4				M	Z 0.9 19
							Ki	iP	18 13 04.2
							i		18 13 08.5

cont.

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

1964				1964					
Mar.	28	Ki	eS	18 21 09	Mar.	28	Um	iP	19 33 12.9
cont.				microns sec	"	28	Ki	iP	19 38 27.2
			pP	Z' 0.1 1.4			Um	eP	19 38 53
			M	E 1.0 19			Alaska (h = 20 km).		
			M	N 1.3 20	"	28	Um	iP	19 39 31.8
			M	Z 1.9 20	"	28	Up	i(P)	19 55 40.8
		Sk	iP	18 13 30.5			Ki	iP	19 55 00.2
			ipP	18 13 35.2			Um	iP	19 55 27.7
		Gb	i(pP)	18 14 13.4			Alaska (h = 20 km).		
		Um	iP	18 13 31.4	"	28	Ki	iP	20 14 47.9
			ipP	18 13 36.3			Um	iP	20 15 16.6
		Ka	e(pP)	18 14 25			Alaska (h = 30 km).		
		Alaska. h = 20 km (Up,Ki, Sk,Um).			"	28	Up	iP	20 25 00.7
"	28	Up	iP	18 16 39.6	"	28	Ki	iP	20 24 37.9
		Ki	iP	18 15 45.1	"	28	Um	iP	20 35 15.7
		Sk	iP	18 16 12.1	"	28	Up	iP	20 39 13.2
		Um	iP	18 16 13.3			iPa	20 42 58	
		Alaska.					e	20 47 00	
"	28	Um	iP	18 22 07.8			iS	20 47 27	
		Alaska.					iScS	20 49 05	
"	28	Ki	iP	18 33 44.9			i	20 49 58	
		Um	iP	18 34 04.3			e(P'P')	21 08 32	
		(Alaska).					iP'P'	21 08 43.3	
"	28	Um	iP	18 35 55.3			microns sec		
"	28	Ki	iP	18 49 35.1			P	N	2.0 3
		Um	iP	18 50 01.9			P	Z	3.0 3
		Alaska.					P	Z'	1.0 1.0
"	28	Ki	iP	18 56 13.3			S	N	4.9 10
		Alaska (h = 20 km).					P'P'	Z'	0.1 1.5
"	28	Up	iP	19 12 31.4			M	E	12 22
		Ki	iP	19 11 37.9			M	N	14 19
		Um	iP	19 12 06.4			M	Z	18 23
		Alaska (h = 15 km).					D = 6650 km = 60°.		
"	28	Ki	iP	19 13 01.2		Ki	iP	20 38 17.7	C
		Alaska.					iPP	20 40 24	
"	28	Sk	eP	19 17 23			iS	20 45 45	
"	28	Ki	iP	19 20 20.8			iScS	20 48 12	
		Um	iP	19 20 49.2			microns sec		
		Alaska.					P	E	1.0 5
"	28	Ki	iP	19 30 34.4			P	N	3.8 10
			ipP	19 30 44.9			P	Z	7.4 9
		Sk	i(pP)	19 31 11.8			P	Z'	1.5 1.0
		Um	iP	19 31 03.1			PP	N	4.1 11
			ipP	19 31 13.1			PP	Z	7.1 11
		Alaska. h = 40 km (Ki,Um).					S	E	4.2 9
"	28	Ki	iP	19 30 34.4			S	N	7.1 10
			ipP	19 30 44.9			S	Z	3.4 8
		Sk	i(pP)	19 31 11.8			M	E	20 16
		Um	iP	19 31 03.1			M	N	27 21
			ipP	19 31 13.1			M	Z	39 20
		Alaska. h = 40 km (Ki,Um).			cont.				

Up = Uppsala, Ki = Kiruna, Sk = Skalistugan, Gb = Göteborg, Um = Umeå  
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1964				1964			
Mar. cont.	28	Ki	D = 5800 km = 52°.	Mar.	28	Up	iP 22 19 52.1
		Sk	iP 20 38 44.1			Ki	iP 22 19 06.9
			iS 20 46 36.4			Um	eP 22 19 35
			e(P'P') 21 08 39			Alaska (h = 30 km).	
			iP'P' 21 08 50.0	"	28	Ki	iP 22 22 51.2
		Gb	iP 20 39 24.2 D			Um	iP 22 23 23.7
			iP'P' 21 08 40.6			Alaska (h = 25 km).	
		Um	iP 20 38 46.3 D	"	28	Up	iP 22 26 26.5
			i(P'P') 21 08 40.5			Ki	iP 22 25 31.5
			iP'P' 21 08 50.2			Um	iP 22 26 00.0
		Ka	iP 20 39 35.5			Alaska (h = 30 km).	
		Alaska (h = 40 km).					
		Magn. = 6.8 (Up,Ki).					
"	28	Um	iP 20 50 17.3 C	"	28	Ki	iP 22 31 11.0
		Alaska.				Um	iP 22 31 39.6
"	28	Um	i(P) 20 51 05.9			Alaska (h = 15 km).	
"	28	Um	iP 20 53 03.9	"	28	Up	iP 22 39 06.6
"	28	Um	iP 20 57 51.3			ipP	22 39 12.1
		Alaska.					microns sec
"	28	Um	iP 21 04 47.5			M	E 1.1 22
		Alaska.				M	N 1.9 19
"	28	Um	iP 21 14 16.6			M	Z 1.4 18
			ipP 21 14 24.0			Ki	iP 22 38 11.7
		(Alaska).				ipP	22 38 18.1
"	28	Ki	iP 21 24 41.0				microns sec
		Sk	iP 21 25 08.0			P	Z' 0.1 1.1
		Um	iP 21 25 09.8			M	E 1.2 18
		Alaska (h = 25 km).				M	N 1.2 20
"	28	Ki	iP 21 38 07.1			M	Z 1.3 18
		Um	iP 21 38 46			Sk	iP 22 38 38.2
		eS	21 46 36			ipP	22 38 45.1
		Alaska.				Gb	iP 22 39 18.2
"	28	Um	iP 21 40 07.8			ipP	22 39 24.4
		Alaska.				Um	iP 22 38 39.9
"	28	Ki	iP 21 47 05.9			ipP	22 38 46.4
		i	21 47 17.3			Ka	iP 22 39 29.1
		Alaska (h = 20 km).				ipP	22 39 35.5
"	28	Up	iP 22 08 24.6			Alaska. h = 25 km (Up,Ki,Sk, Gb,Um). Magn. = 5.6 (Up,Ki). In this case P and pP are of comparable amplitude and of opposite phase. Variations of the amplitude and phase relationships of P and pP as well as of the first motion of P among the Alaska after-shocks reflect corresponding variations in the orientation of the fault planes and the slip motions.	
		Ki	iP 22 07 30.4	"	28	Up	i(P) 22 39 19.8
		Sk	iP 22 07 57.1				
		Um	iP 22 07 58.4				
		Alaska (h = 30 km).					
"	28	Um	iP 22 12 22.9				





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

1964				1964				
Mar.	29	Up	microns sec	Mar.	29	Sk	iP	01 40 19.8
cont.		M	N 0.8 19				ipP	01 40 27.1
		Ki	iP 01 18 48.4 D				(Alaska).	
			eScS 01 28 52	"	29	Up	iP	01 42 47.5
			eSa 01 30 34					
			microns sec	"	29	Um	iP	01 47 14.4
		P	Z' 0.6 1.4	"	29	Um	iP	01 49 19.9
		M	E 0.7 15	"	29	Up	iP	01 58 51.5 C
		M	N 0.9 19					microns sec
		M	Z 1.4 19					Z' 0.1 1.0
		Sk	iP 01 19 15.2 D			Ki	iP	01 57 57.3 C
		Gb	iP 01 19 55.7					microns sec
			ipP 01 20 02.7					Z' 0.2 1.0
		Um	iP 01 19 17.1 D			Sk	iP	01 58 24.4 C
		Ka	iP 01 20 06.9			Gb	iP	01 59 03.4 C
			ipP 01 20 12.8			Um	iP	01 58 25.2 C
			Alaska. h = 25 km (Gb,Ka).			Ka	iP	01 59 13.7
			Magn. = 6.4 (Up,Ki).					Alaska (h = 20 km). Magn. =
			Exceptionally small surface					5.9 (Up,Ki).
			waves at Up and Ki.					
"	29	Up	iP 01 21 21.4	"	29	Gb	i(P)	01 59 27.2
"	29	Um	iP 01 29 05.2	"	29	Ki	eP	02 02 14
"	29	Ki	iP 01 31 56.9			Um	iP	02 02 41.4
		Um	iP 01 32 27.1					Alaska.
			Alaska.	"	29	Ki	eP	02 15 05
"	29	Ki	iP 01 32 24.3					Alaska.
"	29	Up	iP 01 39 57.2 D	"	29	Up	iP	02 18 13.2 C
			ipP 01 40 04.3			Ki	iP	02 17 19.3
			microns sec			Sk	iP	02 17 46.2 C
		P	Z' 0.2 1.0			Gb	iP	02 18 25.1 C
		M	N 0.7 17			Um	iP	02 17 47.3 C
		Ki	iP 01 39 03.1 D					Alaska (h = 20 km).
			ipP 01 39 10.4	"	29	Ki	eP	02 23 17
			microns sec			Um	eP	02 23 45
		P	Z' 0.3 1.0				ipP	02 23 51.4
		M	Z 1.0 16					Alaska. h = 25 km (Um).
		Sk	iP 01 39 29.7 D	"	29	Up	iP	02 26 48.4
		Gb	iP 01 40 09.2				ipP	02 26 54.5
			ipP 01 40 16.2			Ki	iP	02 25 52.7
		Um	iP 01 39 31.3			Sk	iP	02 26 19.3 C
			ipP 01 39 37.9				ipP	02 26 26.0
			iP'P' 02 09 11.2			Gb	iP	02 26 58.3
		Ka	iP 01 40 20.8			Um	iP	02 26 20.8
			ipP 01 40 27.2				ipP	02 26 28.5
			Alaska. h = 30 km (Up,Ki,					Alaska. h = 30 km (Up,Sk,Um).
			Gb,Um,Ka). Magn. = 6.3	"	29	Up	iP	02 29 25.8 C
			(Up,Ki).	cont.				
			Exceptionally small surface					
			waves at Up and Ki.					

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

1964					1964					
Mar.	29	Ki	iP	02 28 30.9	Mar.	29	Ki	eP	03 34 30	
Cont.		Sk	iP	02 28 56.9			Um	eP	03 35 03	
		Gb	iP	02 29 37.4			Alaska (h = 15 km).			
		Um	iP	02 28 59.1 C		"	29	Ki	iP	03 42 53.9
		Alaska (h = 20 km).						Sk	iP	03 43 21.5
"	29	Up	iP	02 30 28.5			Alaska.			
			i	02 30 41.5		"	29	Up	iP	03 48 36.3 C
		Ki	iP	02 29 35.2				Ki	iP	03 47 40.9 C
		Um	iP	02 30 03.5					ipP	03 47 52.8
		Alaska.								microns sec
"	29	Up	iP	02 35 53.3				P	Z' 0.1 1.0	
		Ki	iP	02 34 58.9 D			Sk	iP	03 48 07.7 C	
				microns sec				ipP	03 48 19.5	
			P	Z' 0.1 1.2			Gb	iP	03 48 48.4	
			M	N 0.6 16				ipP	03 48 59.8	
		Sk	iP	02 35 25.7			Um	iP	03 48 09.7 C	
		Gb	iP	02 36 05.0				ipP	03 48 21.1	
		Um	iP	02 35 27.1			Alaska. h = 50 km (Ki,Sk,Gb,Um).			
		Alaska (h = 20 km).				"	29	Sk	iP	03 59 37.5
"	29	Sk	i(P)	02 36 18.5		"	29	Up	iP	04 02 35.1
"	29	Ki	eP	02 41 12				Ki	iP	04 01 39.9
			ipP	02 41 17.5				Um	iP	04 02 08.6
		Um	eP	02 41 39			Alaska (h = 15 km).			
		Alaska. h = 20 km (Ki).				"	29	Um	eP	04 08 02
"	29	Up	iP	03 06 47.7			Alaska.			
		Um	iP	03 06 20.6		"	29	Ki	eP	04 10 35
		Alaska.						Um	iP	04 11 03.2
"	29	Um	iP	03 11 08.0			Alaska (h = 15 km).			
		Alaska.				"	29	Up	iP	04 22 19.8
"	29	Up	iP	03 17 24.9				ipP	04 22 23.8	
			ipP	03 17 32.0						microns sec
			i	03 17 38.7						Z' 0.2 1.2
				microns sec			Ki	iP	04 21 24.8	
				Z' 0.1 0.5				ipP	04 21 29.0	
		Ki	pP	03 16 30.1						microns sec
			ipP	03 16 35.9						Z' 0.5 1.5
				microns sec			Sk	iP	04 21 50.9	
			P	Z' 0.1 1.0			Gb	iP	04 22 30.7	
		Sk	iP	03 16 56.8				ipP	04 22 35.2	
			ipP	03 17 03.4			Um	iP	04 21 53.3	
		Gb	iP	03 17 37.2				iS	04 29 38	
			ipP	03 17 43.3			Ka	ipP	04 22 47.4	
		Um	iP	03 16 58.3			Alaska. h = 15 km (Up,Ki;Gb).			
			ipP	03 17 04.9		"	29	Ki	iP	04 23 37.4
		Ka	iP	03 17 47.7						microns sec
			ipP	03 17 54.8						Z' 0.1 1.0
		Alaska. h = 25 km (Up,Ki,Sk,Gb,Um,Ka).					Sk	iP	04 24 06.2	
							Um	iP	04 24 07.2	
							Alaska.			

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

1964				1964					
Mar.	29	Up	iP	04 25 33.5	Mar.	29	Up	iP	05 42 39.0
"	29	Up	eP	04 51 27	"	29	Up	iP	05 48 15.8
		Ki	iP	04 51 07.3			Ki	iP	05 47 21.5
		Um	eP	04 51 19				ipP	05 47 28.4
"	29	Up	iP	05 02 19.9					microns sec
		Ki	iP	05 01 25.9				pP	Z' 0.1 0.8
			i	05 01 31.4			Sk	iP	05 47 48.7 C
		Sk	iP	05 01 52.8			Gb	iP	05 48 28.2
			ipP	05 02 03.9			Um	iP	05 47 49.9
		Gb	eP	05 02 32				ipP	05 47 56.8
		Um	iP	05 01 53.9 D					Alaska. h = 30 km (Ki,Um).
				Alaska. h = 40 km (Sk).	"	29	Ki	eP	05 58 55
"	29	Ki	iP	05 09 35.4				ipP	05 59 03.2
		Um	eP	05 10 04			Um	iP	05 59 24.0
				Alaska (h = 40 km).				ipP	05 59 31.5
									Alaska. h = 30 km (Ki,Um).
"	29	Up	iP	05 18 56.1	"	29	Ki	iP	06 01 22.9
		Ki	iP	05 18 01.7			Sk	iP	06 01 55.5
			i	05 18 14.3			Um	iP	06 01 52.3
		Sk	iP	05 18 28.9				ipP	06 01 56.9
		Um	iP	05 18 29.9					Alaska. h = 20 km (Um).
				Alaska (h = 20 km).	"	29	Ki	iP	06 01 56.1
"	29	Up	iP	05 31 33.2			Sk	iP	06 02 28.7
			ipP	05 31 42.0					Alaska.
		Ki	e(pP)	05 30 44	"	29	Up	iP	06 15 16.9 C
		Sk	e(pP)	05 31 09				i	06 15 19.4
		Um	eP	05 31 03				i(pP)	06 15 24
			ipP	05 31 12.2				iS	06 23 52
				Alaska. h = 40 km (Up,Um).					microns sec
"	29	Up	i	05 39 36.0				P	N 0.5 4
			iSg	05 40 25.8				P	Z 0.8 4
		Ki	iPn	05 36 11.3				P	Z' 0.6 1.7
			iSn	05 37 08.8				S	E 0.7 5
			iSg	05 37 28.9				S	N 1.2 6
				D = 500 km = 4.5°.				M	E 2.7 18
		Sk	eSn	05 39 03				M	N 6.5 18
			i	05 39 58.0				M	Z 5.8 20
			iSg	05 40 05.7					D = 7100 km = 64°.
				D = 1020 km = 9.2°.			Ki	iP	06 14 22.9 C
		Um	ePn	05 36 35				iS	06 22 12
			iSn	05 37 50.4					microns sec
			iSg	05 38 24.1				P	N 0.9 6
				D = 690 km = 6.2°.				P	Z 1.7 6
				Northwest Russia, 67.4°N,				P	Z' 0.4 1.0
				32.3°E. Origin time =				S	E 4.2 17
				05 35 01. Explosion?				S	N 2.3 10
"	29	Ki	i(P)	05 37 36.4				S	Z 1.8 11
		Um	iP	05 38 03.8				M	E 7.6 16
			i	05 38 17.6				M	N 5.0 20
				(Alaska).				M	Z 9.5 20
									D = 6200 km = 56°.

cont.

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

1964				1964					
Mar.	29	Sk	iP	06 14 50.4 C	Mar.	29	Ki	iP	07 02 58.3 C
cont.		Gb	iP	06 15 28.6	cont.			ipP	07 03 06.6
			ipP	06 15 38.3					microns sec
		Um	iP	06 14 50.6 C				P	Z' 0.4 1.0
			iS	06 23 04			Sk	iP	07 03 25.9
		Ka	iP	06 15 39.2			Gb	iP	07 04 04.9
			ipP	06 15 48.2			Um	iP	07 03 26.5 C
		Alaska. h = 40 km (Gb,Ka).					Alaska. h = 30 km (Ki).		
		Magn. = 6.3 (Up,Ki).							
		At all our stations the P(Z')		"	29	Ki	iP		07 12 20.8
		spectrum is dominated by two		"	29	Up	iP		07 15 30.0
		periods (averages 2.1 and					ipP		07 15 38.7
		0.6 sec), the longer period				Ki	iP		07 14 34.8
		starting on the average					ipP		07 14 42.4
		2.5 sec before the short				Sk	iP		07 15 01.8
		period-motion. Compare					ipP		07 15 10.5
		similar remark to Mar. 28,				Gb	iP		07 15 41.6
		06 00.					ipP		07 15 50.5
"	29	Up	iP	06 22 50.3		Um	iP		07 15 03.3
		Ki	iP	06 21 55.8			ipP		07 15 11.7
		Sk	iP	06 22 23.2		Alaska. h = 30 km (Up,Ki,Sk, Gb,Um).			
		Um	iP	06 22 24.0					
		Alaska.		"	29	Ki	iP		07 18 46.5
"	29	Up	iP	06 39 57.1		Um	iP		07 19 15.2
		Sk	iP	06 39 28.7		Alaska.			
		Gb	iP	06 40 08.4	"	29	Up	iP	07 28 35.1
			ipP	06 40 14.7		Ki	iP		07 27 40.6
		Um	iP	06 39 30.1		Sk	iP		07 28 07.9
			ipP	06 39 37.0		Gb	iP		07 28 46.9
		Alaska. h = 25 km (Gb,Um).				Um	iP		07 28 08.9
"	29	Um	iP	06 44 32.7		Alaska (h = 25 km).			
"	29	Ki	iP	06 45 38.9	"	29	Ki	iSn	07 46 11.6
		Alaska.					iSg		07 46 29.7
"	29	Ki	iP	06 47 28.7		Um	eSn		07 46 50
		Um	iP	06 47 56.8			iSg		07 47 24.9
		Alaska (h = 20 km).				Northwest Russia. Explosion?			
"	29	Ki	iP	06 48 02.9	"	29	Up	iP	07 47 55.7
"	29	Ki	iP	06 50 43.5		Ki	iP		07 47 02.9
		Um	iP	06 51 11.5			ipP		07 47 10.1
		Alaska.				Alaska. h = 30 km (Ki).			
"	29	Ki	iP	06 58 15.5	"	29	Up	iP	07 49 24.1
			ipP	06 58 22.6	"	29	Um	iP	07 49 42.2
		Um	iP	06 58 43.9		Alaska (h = 20 km).			
			ipP	06 58 50.5	"	29	Ki	e	07 50 47
		Alaska. h = 30 km (Ki,Um).					i		07 51 27.3
"	29	Up	iP	07 03 52.2			i(Sg)		07 51 35.3
cont.						Um	iSg		07 52 25.6
						Probably northwest Russia. Explosion?			

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

1964				1964					
Mar.	29	Sk	iB	07 59 46.3	Mar.	29	Up	eP	09 26 15
"	29	Up	iP	08 03 20 C			Ki	iP	09 25 19.3 C
		Ki	iP	08 02 25.8 C					microns sec
				microns sec					Z' 0.2 1.0
			P	Z' 0.4 1.0			Sk	iP	09 25 46.0 C
			M	E 0.9 15			Gb	iP	09 26 25.4
			M	N 0.6 15			Um	iP	09 25 47.5 C
			M	Z 0.6 13			Alaska (h = 15 km).		
		Sk	iP	08 02 53.4 C	"	29	Up	i(P)	09 26 34.1
		Gb	iP	08 03 31.9	"	29	Ki	iP	09 31 21.6
		Um	iP	08 02 53.8			Um	iP	09 31 44.4
		Ka	eP	08 03 42			Alaska (h = 30 km).		
		Alaska (h = 25 km).							
"	29	Up	iP	08 06 21.4	"	29	Ki	iP	09 50 19.7
			i	08 06 35.5			Sk	iP	09 50 45.8
"	29	Um	eP	08 11 10			Um	iP	09 50 48.4
		Alaska.							
"	29	Ki	iP	08 15 39.6	"	29	Up	iP	09 55 14.7
		Sk	iP	08 16 06.5			Ki	iP	09 54 20.1
		Um	iP	08 16 07.6			Sk	iP	09 54 47.9
		Alaska (h = 25 km).					Um	iP	09 54 48.1
		Alaska.					Alaska.		
"	29	Up	iP	08 18 24.0	"	29	Up	iP	10 18 08.0 C
		Ki	iP	08 17 29.9				i	10 18 10.2
		Sk	iP	08 17 56.7				iPcP	10 18 56.4
		Um	iP	08 17 57.7					microns sec
		Alaska (h = 20 km).							Z' 0.2 1.0
"	29	Um	iP	08 24 35.3			Ki	iP	10 17 12.7 C
		Alaska.						i	10 17 14.8
								iS	10 24 38
"	29	Up	iP	08 41 35.1					microns sec
		Ki	iP	08 40 39.9					Z' 0.4 1.3
		Um	iP	08 41 08.6				S	N 0.7 7
		Alaska (h = 15 km).						M	N 0.7 18
								M	Z 1.4 19
"	29	Um	iP	08 47 39.5					D = 5850 km = 52 1/2°.
		Alaska.					Sk	eP	10 17 40
								i	10 17 41.5
"	29	Ki	iP	08 59 37.9				iPcP	10 18 39.9
		Sk	iP	09 00 04.9			Gb	iP	10 18 20.1
		Um	iP	09 00 05.7			Um	iP	10 17 41.5
		Alaska (h = 30 km).						iPcP	10 18 41.6
								iS	10 25 31
"	29	Um	iP	09 09 46.7				eP'P'	10 47 44
		Alaska (h = 20 km).					Ka	iP	10 18 34.0
							Alaska (h = 20 km). Magn. = 6.3 (Up,Ki).		
"	29	Up	iP	09 17 16.7			Exceptionally small surface waves at Ki.		
		Ki	iP	09 16 22.2			At Up, Ki, Sk, Gb, Um, the P(Z') phase starts with a		
		Sk	iP	09 16 49.5					
		Um	iP	09 16 50.1					
		Alaska (h = 15 km).							

cont.



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

1964				1964							
Mar.	29	Sk	iP	15 01 07.5	Mar.	29	Up	iP	16 51 06.1		
		Um	iP	15 01 09.3				e	16 58 59		
		Alaska (h = 20 km).							microns sec		
"	29	Up	iP	15 18 00.2 C				P	N 0.5 4		
		Sk	iP	15 17 34.8				P	Z 0.8 4		
		Gb	iP	15 18 12.8				P	Z' 0.6 1.8		
			ipP	15 18 22.6				M	E 1.9 20		
		Um	iP	15 17 34.2				M	N 4.1 17		
		Alaska. h = 40 km (Gb).				Ki	iP		16 50 11.4 D		
							iS		16 57 38		
									microns sec		
"	29	Ki	iP	15 40 04.6				P	N 0.5 7		
		Sk	iP	15 40 31.5				P	Z 1.1 6		
		Um	iP	15 40 32.7				P	Z' 0.5 1.8		
		Alaska (h = 30 km).						S	E 1.1 8		
"	29	Ki	iP	15 40 31.4				S	N 1.8 7		
		Um	iP	15 40 59.7				M	E 4.5 22		
		Alaska.						M	N 3.3 18		
								M	Z 4.1 16		
"	29	Ki	iP	15 49 16.9				D = 5900 km = 53°.			
		Sk	iP	15 49 35.2			Sk	iP	16 50 36.4		
		Alaska (h = 25 km).				Gb	iP	16 51 17.4 D			
"	29	Ki	iP	16 18 23.6				i	16 51 51.5		
		Sk	iP	16 18 49.7			Um	iP	16 50 39.8		
		Gb	iP	16 19 30.1				i	16 58 13		
			ipP	16 19 33.4				iS	16 58 31		
		Um	iP	16 18 52.3			Ka	iP	16 51 29.2		
		Alaska. h = 15 km (Gb).					Alaska (h = 15 km). Magn. = 6.1 (Up,Ki).				
"	29	Up	iP	16 26 35.6			The period of P(Z') is relatively large at all our stations, 1.8 sec in average. Compare similar remarks to Mar. 28, 07 25, 10 02 and Mar. 29, 06 14.				
			ipP	16 26 44.1			"	29	Up	iP	16 55 36.9
		Ki	iP	16 25 41.6					Ki	iP	16 54 44.8
			ipP	16 25 48.4					Sk	iP	16 55 10.8
		Sk	iP	16 26 07.6					Gb	iP	16 55 50.7
			ipP	16 26 15.4					Um	iP	16 55 13.3
		Um	iP	16 26 09.6				Alaska (h = 20 km).			
			ipP	16 26 16.5							
		Alaska. h = 30 km (Up,Ki, Sk,Um).				"	29	Up	iP	17 03 29.2 C	
"	29	Up	iP	16 28 32.1					ipP	17 03 33.5	
		Ki	iP	16 27 36.6 C						microns sec	
										Z' 0.1 1.0	
		Sk	iP	16 28 01.6					pP	Z' 0.1 1.1	
		Gb	iP	16 28 43.4							
		Um	iP	16 28 05.7			Ki	iP	17 02 34.5 C		
		Alaska (h = 15 km).					ipP	17 02 38.6			
								microns sec			
"	29	Up	iP	16 43 51.6					p	Z' 0.2 1.0	
		Ki	iP	16 42 58.2			Sk	iP	17 03 00.5 C		
		Sk	iP	16 43 24.1				ipP	17 03 04.6		
		Um	iP	16 43 26.0			Gb	iP	17 03 40.7 C		
		Alaska (h = 30 km).					ipP	17 03 45.8			

cont.



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

1964					1964				
Mar.	29	Um	iP	17 03 02.8 C	Mar.	29	Ki	iP	19 18 13.1
cont.		Ka	iP	17 03 53.2	cont.		Sk	iP	19 18 40.3
		Alaska. h = 20 km (Up,Ki, Sk,Gb).					Um	iP	19 18 41.6
							Alaska (h = 15 km).		
"	29	Up	eP	17 20 35	"	29	Ki	iP	19 40 57.9
		Sk	iP	17 20 44.8			Alaska (h = 15 km).		
"	29	Ki	iP	17 35 49.3	"	29	Sk	e(Sg)	19 54 25
		Alaska (h = 30 km).							
"	29	Ki	iP	18 02 13.1 D	"	29	Sk	eP	19 55 34
				microns sec			Alaska (h = 30 km).		
			P	Z' 0.2 2.0	"	29	Ki	iP	21 06 31.1
		Sk	iP	18 02 39.0			Alaska.		
		Gb	iP	18 03 19.9	"	29	Ki	iP	21 48 23.8
		Um	iP	18 02 42.3			Sk	iP	21 48 50.7
		Alaska (h = 15 km).					Alaska.		
"	29	Up	iP	18 05 36.7	"	29	Up	iPKP	21 59 12.0
		Ki	iP	18 04 41.4			iPKKP 22 09 32.7		
		Sk	iP	18 05 07.3			microns sec		
		Gb	iP	18 05 47.9 D			M	N	0.9 22
			iPcP	18 06 27.8			M	Z	0.6 20
		Um	iP	18 05 10.0			Ki	iPKP	21 59 00.5
		Alaska (h = 15 km).					iPKKP 22 09 54.5		
"	29	Ki	iP	18 46 43.0			microns sec		
		Sk	iP	18 47 09.7			M	E	1.0 23
		Um	iP	18 47 11.1			M	N	0.7 20
		Alaska.					M	Z	1.3 20
"	29	Up	eP	18 58 54			Sk	iPKP	21 59 11.1
			iS	19 08 03			i		22 01 47.9
				microns sec			Gb	iPKP	21 59 19.8
		M	E	1.1 22			Solomon Islands (h = 70 km).		
		M	N	1.2 20	"	29	Ki	iP	22 44 46.8
		M	Z	2.3 23			Um	iP	22 45 15.6
		Ki	eP	18 59 32			Alaska (h = 15 km).		
				microns sec	"	29	Ki	iP	22 56 27.0
		M	E	2.3 22			Alaska (h = 15 km).		
		M	N	1.4 18	"	29	Ki	iP	23 10 17.3
		M	Z	1.1 17			(Alaska).		
		Sk	eP	18 59 01	"	29	Ki	iP	23 18 04.7
			i	18 59 11.5			ipP 23 18 10.0		
		Um	iP	18 59 11.4			Sk	iP	23 18 37.2
			iS	19 08 49			Alaska. h = 20 km (Ki).		
			eScS	19 09 20	"	29	Ki	iP	23 25 18.7
		Atlantic Ocean. Magn = 5.6 (Up,Ki).					Sk	iP	23 25 43.7 C
"	29	Ki	eP	19 07 47			Alaska.		
		Alaska (h = 15 km).			"	29	Ki	iP	23 25 18.7
"	29	Up	iP	19 19 08.0			Sk	iP	23 25 43.7 C
cont.							Alaska.		



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

1964					1964				
Mar.	30	Gb	iP	02 52 41.3	Mar.	30	Up	eS	07 27 44
cont.			ipP	02 52 48.6	cont.				microns sec
		Um	iP	02 52 03.7				P	N 1.4 5
		Alaska. h = 30 km (Ki,Sk,Gb).						P	Z 1.7 5
"	30	Ki	iP	02 55 48.6				P	Z' 0.5 1.7
		Alaska.						S	E 1.9 8
"	30	Ki	iP	03 21 56.9				S	N 0.6 6
		Sk	eP	03 22 24				M	E 6.1 19
		Alaska (h = 30 km).						M	N 8.4 19
"	30	Up	iP	03 32 34.9				M	Z 7.5 21
		Ki	iP	03 33 43.0			Ki	iP	07 18 44.0 C
		Sk	iP	03 33 12.2				iS	07 26 09
			i	03 33 13.6				iSa	07 30 36
			i	03 33 23.4					microns sec
		Gb	iP	03 32 24.7 D				P	N 1.6 6
		Um	iP	03 33 19.4				P	Z 3.2 5
			i	03 33 54.9				P	Z' 0.6 1.5
		Ka	iP	03 32 01.1 D				S	E 3.5 9
		Crete.						S	N 4.9 12
"	30	Ki	iP	03 43 36.0				M	E 7.1 20
		Alaska.						M	N 14 20
"	30	Up	iP	03 45 14.4				M	Z 22 20
		Um	iP	03 44 48.7					D = 5850 km = 52 1/2°.
		Alaska (h = 30 km).					Sk	iP	07 19 10.7
"	30	Ki	iP	04 03 41.9				eS	07 26 49
		Alaska.						iP'P'	07 49 21.7
"	30	Ki	iP	04 41 45.9			Gb	iP	07 19 50.5
		Alaska.					Um	eP	07 19 12 C
"	30	Ki	iP	04 49 24.3				i	07 24 12.6
		Alaska.						iS	07 26 56
"	30	Up	iP	05 04 20.7			Ka	iP	07 20 03.9
			i	05 04 36.5			Alaska (h = 15 km).		
		Ki	iP	05 03 29.5			Magn. = 6.4 (Up,Ki).		
		Sk	iP	05 04 19.4			At all our stations P(Z')		
"	30	Up	iP	05 24 53.8			starts with a small-amplitude		
		Ki	iP	05 23 59.5			compressional motion (period =		
		Sk	iP	05 24 26.7			1.0 sec) followed after 2.1		
			ipP	05 24 32.9			sec by a large-amplitude		
		Um	eP	05 24 27			dilatational motion (period =		
		Alaska. h = 25 km (Sk).					1.7 sec). Compare similar		
"	30	Ki	iP	06 04 17.0			remarks to Mar. 28, 12 30,		
		Alaska.					and Mar. 29, 10 17.		
"	30	Up	iP	07 19 39.0 C			Oscillatory motion after S,		
			iPcP	07 20 26.5			lasting for several minutes,		
cont.					"	30	Up	iP	08 07 02.6
							Ki	iP	08 06 08.1
									microns sec
							P	Z' 0.1 1.0	
					cont.				

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

1964					1964				
Mar.	30	Sk	iP	08 06 35.9	Mar.	30	Up		microns sec
cont.		Gb	iP	08 07 14.3	cont.		S	E	0.3 6
		Um	iP	08 06 36.1			M	E	0.8 18
				Alaska (h = 20 km).			M	N	0.7 18
"	30	Um	iP	08 44 39.0			M	Z	0.9 18
				Alaska (h = 20 km).		Ki	iP	D = 7100 km = 64°.	
"	30	Ki	eP	09 02 56			P	Z'	0.1 0.8
		Um	iP	09 03 24.3			M	E	1.5 23
				Alaska (h = 30 km).			M	N	1.4 18
"	30	Ki	eP	09 32 12			M	Z	1.7 19
		Sk	iP	09 32 39.5		Sk	iP	11 58 46.0	
		Um	iP	09 32 44.1		Gb	iP	11 59 23.9	
				Alaska (h = 30 km).		Um	iP	11 58 45.8	
"	30	Ki	iP	10 06 36.0			iS	12 06 54	
		Sk	iP	10 07 02.0			e	12 07 27	
		Gb	iP	10 07 43.2		Ka	iP	11 59 35.9	
		Um	iP	10 07 05.1		Alaska (h = 20 km).			
				Alaska (h = 15 km).		Magn. = 5.6 (Up,Ki).			
"	30	Ki	iP	10 15 44.6	"	30	Up	iP	12 15 46.6
		Sk	eP	10 15 56			Ki	iP	12 14 51.3
		Um	iP	10 16 22.4				i	12 14 54.2
"	30	Ki	iP	10 24 58.5				P	Z' 0.1 1.1
				Alaska (h = 15 km).		Sk	iP	12 15 21.2	
"	30	Up	iP	10 41 24.1		Gb	eP	12 15 59	
		Ki	iP	10 40 28.1			i	12 16 01.9	
				microns sec		Um	iP	12 15 20.2	
			P	Z' 0.1 1.0			i	12 15 23.6	
		Um	iP	10 40 55.9		Alaska (h = 25 km).			
				Alaska (h = 30 km).	"	30	Up	iP	12 24 48.7
"	30	Ki	iP	11 08 48.8				ipP	12 24 56.2
			P	Z' 0.1 1.7		Ki	iP	12 23 53.6	
		Um	iP	11 09 16.0				ipP	12 24 01.3
				Alaska (h = 25 km).		Sk	iP	12 24 21.1	
"	30	Ki	iP	11 14 55.2				ipP	12 24 27.8
		Um	iP	11 15 23.6		Gb	eP	12 25 00	
				Alaska (h = 15 km).			ipP	12 25 07.7	
"	30	Up	iP	11 45 12.8		Um	iP	12 24 22.3	
		Ki	iP	11 44 17.1			ipP	12 24 29.0	
		Sk	iP	11 44 44.0		Alaska. h = 30 km (Up,Ki,Sk, Gb,Um).			
		Um	iP	11 44 45.5	"	30	Ki	iP	12 31 54.7
				Alaska (h = 25 km).		Alaska (h = 20 km).			
"	30	Up	iP	11 59 12.6 C	"	30	Ki	iP	12 47 32.9
			iS	12 07 45				i(pP)	12 47 45.1
				microns sec		Sk	eP	12 47 59	
			P	Z' 0.1 0.7			e(pP)	12 48 10	
cont.						Um	eP	12 48 01	
						Alaska. h = 50 km (Ki,Sk).			



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

1964				1964					
Mar. cont.	30	Um	iP	15 47 25.2	Mar.	30	Up	iP	17 03 39.5
			i	15 47 30.5				eS	17 12 24
			i	15 47 37.0					microns sec
"	30	Ki	iP	15 55 51.7				P	Z' 0.1 1.0
		Alaska (h = 30 km).						S	N 0.6 6
"	30	Up	iP	16 14 39.5				M	N 0.9 17
		Ki	iP	16 13 45.7 C			Ki	M	Z 1.1 17
		Sk	iP	16 14 13.2					17 02 45.5 D
		Um	iP	16 14 13.7					microns sec
		Alaska.						P	Z' 0.2 1.1
"	30	Up	iP	16 19 58.3 C			Sk	iP	17 03 12.3 D
			iS	16 28 31			Gb	iP	17 03 50.5
			iScS	16 29 49			Um	iP	17 03 12.6
				microns sec			Ka	iP	17 04 01.4
		P	N	1.0 5			Alaska (h = 15 km). Magn. = 5.9 (Up,Ki).		
		P	Z	1.3 4	"	30	Up	iP	17 14 55.3
		P	Z'	0.8 1.7				eP	17 13 55
		S	E	0.6 7			Sk	eP	17 14 27
		S	N	0.7 5			Um	eP	17 14 26
		M	E	2.5 19			Alaska (h = 30 km).		
		M	N	2.7 19	"	30	Up	iP	17 32 06.3
		M	Z	2.9 18			Ki	iP	17 31 10.7
		D = 7100 km = 64°.					Sk	iP	17 31 37.0
		Ki	iP	16 19 03.9 C			Gb	iP	17 32 18.0
			ipP	16 19 10.0			Um	iP	17 31 39.8
			iS	16 26 50			Alaska (h = 15 km).		
				microns sec	"	30	Up	iP	17 51 07.1
		P	N	0.7 5			Ki	iP	17 50 10.1
		P	Z	1.2 5				i	17 50 32.6
		P	Z'	0.7 1.5			Sk	iP	17 50 38.3
		S	E	1.2 10			Gb	iP	17 51 19.2
		S	N	0.9 7			Um	iP	17 50 39.8
		M	E	1.4 17			Alaska (h = 40 km).		
		M	N	4.7 20	"	30	Um	iPKP	19 01 27.2
		M	Z	6.3 20			Tonga Islands (h = 30 km).		
		D = 6200 km = 56°.			"	30	Ki	iP	19 27 26.2
		Sk	iP	16 19 30.8 C			Sk	eP	19 27 52
		Gb	iP	16 20 09.7			Um	iP	19 27 56.1
		Um	iP	16 19 32.3 C			Alaska (h = 15 km).		
			iPP	16 21 47.4	"	30	Ki	iP	19 31 34.2
			iS	16 27 42			Aleutian Islands (h = 30 km).		
			i	16 32 16	"	30	Ki	eP	19 54 26
		Ka	iP	16 20 21.0 C			Alaska.		
			ipP	16 20 26.8	"	30	Ki	iP	20 04 43.6
		Alaska. h = 25 km (Ki,Ka).					Sk	iP	20 05 10.3
		Magn. = 6.2 (Up,Ki).					Um	iP	20 05 12.2
"	30	Up	iP	16 48 33.7			Alaska (h = 30 km).		
		Ki	iP	16 47 37.6	"	30	Up	iP	20 42 55.8
				microns sec			cont.		
		P	Z'	0.1 1.0					
		Sk	iP	16 48 05.2					
			iPcP	16 49 05.6					
		Gb	iP	16 48 45.4					
		Um	iP	16 48 06.2					
		Alaska (h = 15 km).							



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

1964					1964				
Mar.	31	Ki	iP	01 50 01.6	Mar.	31	Ki	iP	07 18 18.2
				Alaska (h = 15 km).			Sk	iP	07 18 44.5
							Um	iP	07 18 46.1
"	31	Ki	iP	02 07 23.7					Alaska (h = 20 km).
		Um	eP	02 07 51	"	31	Ki	iP	07 24 21.0
				Alaska (h = 20 km).					Alaska (h = 30 km).
"	31	Sk	iP	02 41 45.5	"	31	Ki	iP	08 50 01.8
"	31	Up	iP	02 54 06.1			Sk	iP	08 50 29.2
		Ki	iP	02 53 11.9 C			Um	iP	08 50 30.8
			ipP	02 53 19.8					Alaska (h = 40 km).
				microns sec	"	31	Gb	i(P)	09 03 21.7
			P	Z' 0.1 1.0	"	31	Up	iP	09 12 21.9 C
		Sk	iP	02 53 39.3 C				iS	09 21 16
			ipP	02 53 49.0					microns sec
		Um	iP	02 53 40.0 C					P Z 0.5 3
				Alaska. h = 40 km (Ki,Sk).					P Z' 0.4 1.5
"	31	Ki	iP	02 54 41.3					S E 0.6 6
		Sk	iP	02 55 07.8					S N 0.7 6
		Gb	eP	02 55 47					M E 3.5 17
			ipP	02 55 52.0					M N 10 23
		Um	iP	02 55 10.1					M Z 11 23
				Alaska. h = 20 km (Gb).					D = 7450 km = 67°.
"	31	Um	iP	04 14 33.7			Ki	iP	09 11 35.1
				Alaska (h = 20 km).				iS	09 19 50
"	31	Up	iP	04 30 21.9					microns sec
		Ki	iP	04 29 26.0					P N 0.4 5
				microns sec					P Z 0.8 5
			P	Z' 0.2 1.4					P Z' 0.4 1.5
		Sk	iP	04 29 51.9					S E 1.7 9
		Gb	iP	04 30 32.5					M E 7.8 17
		Um	iP	04 29 54.2					M N 12 22
			ipP	04 30 52.9					M Z 18 22
		Ka	iP	04 30 44.7					D = 6650 km = 60°.
				Alaska (h = 5 km).			Sk	iP	09 11 52.5
"	31	Up	eP	04 56 27				ip'P'	09 41 08.3
			ipP	04 56 36.7			Gb	iP	09 12 27.3 C
		Ki	iP	04 55 32.8			Um	iP	09 12 00.4 C
			ipP	04 55 41.7				iS	09 20 33
		Sk	iP	04 55 59.5				ip'P'	09 41 03.1
			ipP	04 56 08.4			Ka	iP	09 12 40.5
		Um	iP	04 56 00.8					Vancouver Island (h = 15 km).
			ipP	04 56 09.5					Magn. = 6.1 (Up,Ki).
				Alaska. h = 40 km (Up,Ki,Sk,Um).	"	31	Up	iP	09 38 24.0
"	31	Up	iP	05 47 15.3				i	09 38 28.2
"	31	Ki	e(P)	05 52 00.1			Ki	iP	09 39 33.2
		Sk	eP	05 52 21			Um	iP	09 38 58.2
				Alaska (h = 30 km).					Turkey (h = 60 km).
"	31	Ki	eP	05 52 00.1	"	31	Ki	eP	09 51 51
"	31	Ki	iP	10 02 01.5	"	31	Ki	iP	10 02 01.5
				Alaska (h = 15 km).					Alaska (h = 15 km).



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

1964						1964					
Mar.	31	Ki	eP	10 22 51		Mar.	31	Sk	iP	12 03 17.8	
				Alaska (h = 20 km).		cont.		Gb	iP	12 03 56.4	
								Um	iP	12 03 18.3	
"	31	Up	iP	11 13 50.3					iS	12 11 30	
			ipP	11 13 55.2				Ka	iP	12 04 07.0	
		Ki	iP	11 12 55.2						Alaska (h = 25 km).	
			ipP	11 13 01.1						Magn. = 5.6 (Up,Ki).	
				microns sec		"	31	Up	iP	12 04 14.7 C	
			pP	Z' 0.1 1.0					iS	12 12 50	
		Sk	iP	11 13 22.2						microns sec	
			ipP	11 13 27.7						P	Z' 0.1 0.9
			iPcP	11 14 16.2						M	E 0.7 16
		Gb	iP	11 14 01.9						M	N 1.0 17
		Um	iP	11 13 23.8						M	Z 1.1 18
			ipP	11 13 28.2							D = 7100 km = 64°.
				Alaska. h = 20 km (Up,Ki, Sk,Um).				Ki	iP	12 03 20.8 C	
									e(S)	12 11 18	
"	31	Up	iP	11 28 46.4						microns sec	
		Ki	iP	11 27 45.9						P	Z' 0.1 1.0
		Sk	iP	11 28 13.6						M	E 0.8 17
		Um	eP	11 28 13						M	N 1.8 21
			ipP	11 28 22.1						M	Z 1.1 17
				Alaska. h = 40 km (Um).				Sk	iP	12 03 47.7	
"	31	Ki	iP	11 28 29.2				Gb	iP	12 04 26.2	
		Sk	iP	11 28 54.7				Um	iP	12 03 48.6	
		Gb	iP	11 29 35.3 C				Ka	iP	12 04 36.8	
		Um	iP	11 28 57.5					ipP	12 04 42.0	
				Alaska (h = 15 km).						Alaska. h = 20 km (Ka).	
										Magn. = 5.5 (Up,Ki).	
"	31	Ki	iP	11 34 20.1		"	31	Ki	eP	12 24 08	
				Alaska (h = 30 km).							
"	31	Up	iP	12 03 06.5		"	31	Um	iP	12 29 38.9	
		Ki	iP	12 02 12.1 C							
				microns sec							
			P	Z' 0.1 1.0							
		Sk	ip	12 02 39.1							
		Gb	iP	12 03 18.1							
		Um	iP	12 02 39.7 C							
				Alaska (h = 25 km).							
"	31	Up	iP	12 03 44.4 C		"	31	Um	i(P)	12 56 05.6	
			eS	12 12 17							
				microns sec							
			P	Z' 0.1 0.9							
			S	E 0.2 5							
				D = 7050 km = 63 1/2°.							
		Ki	iP	12 02 50.4							
			eS	12 10 38							
				microns sec							
			P	Z 0.4 6							
			P	Z' 0.1 1.0							
			S	E 0.3 7							
				D = 6200 km = 56°.							
						"	31	Ki	eP	13 03 13	
								Sk	iP	13 03 44.9	
								Um	iP	13 03 45.6	
										Alaska (h = 30 km).	
						"	31	Um	iP	14 23 05.0	
						"	31	Up	iP	16 25 12.7 C	
						"	31	Ki	iP	16 41 37.4	
								Sk	iP	16 42 04.0	
								Um	iP	16 42 05.2	
										Alaska (h = 30 km).	

cont.

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

1964						1964				
Mar.	31	Up	iP	16 53	51.5	Mar.	31	Um	iP	21 43 39.8
			i(PcP)	16 54	32.9	"	31	Ki	iP	23 00 07.9
		Ki	iP	16 52	56.6			Sk	iP	23 00 35.6
			ipP	16 53	02.1			Um	iP	23 00 35.9
		Sk	epP	16 53	29			Alaska (h = 30 km).		
		Gb	iP	16 54	03.8					
		Um	iP	16 53	25.2	"	31	Up	iP	23 46 59.3
			ipP	16 53	30.5			Ki	iP	23 46 04.2
		Alaska. h = 20 km (Ki,Um).						Sk	iP	23 46 30.5 C
"	31	Up	iSKP	17 25	41.3			Gb	iP	23 47 10.6
		Sk	iSKP	17 25	36.4			Um	iP	23 46 33.1
		Um	eSKP	17 25	28				iPcP	23 47 30.2
		Fiji Islands (h = 540 km).						Alaska (h = 30 km).		
"	31	Um	iP	18 30	32.6					
		Alaska (h = 30 km).								
"	31	Ki	iP	18 39	44.1					
		Alaska (h = 30 km).								
"	31	Up	iP	18 47	36.1					
		Ki	iP	18 46	41.6					
				microns sec						
			P	Z'	0.2 1.5					
		Sk	iP	18 47	07.6					
		Gb	iP	18 47	48.4					
		Um	iP	18 47	10.0					
			iPcP	18 48	08.5					
		Ka	iP	18 48	00.3					
		Alaska (h = 30 km).								
"	31	Um	eP	20 39	38					
		Alaska (h = 30 km).								
"	31	Um	iP	21 11	25.1					
		Alaska.								
"	31	Up	iP	21 14	19.5					
		Ki	iP	21 13	25.5					
				microns sec						
			P	Z'	0.1 1.0					
		Sk	iP	21 13	51.8					
		Gb	iP	21 14	31.0					
		Um	iP	21 13	53.4					
		Alaska (h = 20 km).								
"	31	Ki	iP	21 21	52.9					
			ipP	21 21	57.3					
		Sk	iP	21 22	19.6					
		Um	iP	21 22	20.9					
		Alaska (h = 30 km).								
"	31	Ki	eP	21 30	15					
		Sk	iP	21 30	45.2					
		Um	iP	21 30	45.4					
		Alaska (h = 15 km).								

Markus Båth  
 February 13, 1965

Seismological Institute  
 Uppsala

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

A P R I L 1 - 30, 1964  
 .....

1964	Apr.	1	Up	iP	00 11 13.9 C	1964	Apr.	1	Up	microns sec
			Ki	iP	00 10 19.0				cont.	M Z 0.8 17
				ipP	00 10 27.0					D = 7000 km = 63°.
					microns sec					Ki eP 03 32 49
				P	Z' 0.1 1.0					ipP 03 32 55.9
			Sk	iP	00 10 45.4 C					eS 03 40 29
			Gb	iP	00 11 25.3 C					microns sec
			Um	iP	00 10 47.3					pP Z' 0.1 1.0
			Alaska. h = 30 km (Ki).							S E 0.5 11
"		1	Ki	iP	00 45 56.3					M E 0.8 19
			Sk	iP	00 46 24.9					M N 1.3 20
			Um	eP	00 46 25					M Z 1.6 20
			Alaska.							D = 6100 km = 55°.
"		1	Up	iP	01 31 06.1					Sk eP 03 33 16
			Ki	iP	01 30 10.6					ipP 03 33 23.6
			Um	iP	01 30 39.5					Gb eP 03 33 56
			Alaska.							ipP 03 34 02.6
"		1	Up	iP	02 04 18.5					Um iP 03 33 16.3
			Ki	eP	02 03 22					ipP 03 33 24.8
			Um	iP	02 03 46.8					iS 03 41 20
				ipP	02 03 52.3					iPS 03 41 37
			Alaska. h = 20 km (Um).							Ka ipP 03 34 14.1
"		1	Up	iP	03 15 53.9					Alaska. h = 30 km
			Ki	iP	03 14 58.6 C					(Up, Ki, Sk, Gb, Um)
			Sk	iP	03 15 25.5					Magn. = 5.5 (Up, Ki).
			Um	iP	03 15 27.5 C					The second phase,
			Alaska.							interpreted as pP, has an
"		1	Up	iP	03 33 45.1					amplitude which is 5-7
			✓ ipP		03 33 49.7					times the amplitude of P
			iS		03 42 09					at our stations. In such
					microns sec					cases there is naturally
			S	E	0.3 6					a great risk that pP may
			M	E	0.8 20					be misread as P at less
			M	N	1.0 16					sensitive stations.
cont.						"		1	Gb	e(P) 04 28 28
						"		1	Ki	iP 04 42 00.8
										ipP 04 42 07.1
						cont.				



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

1964					1964						
Apr.	1	Ki	iP	17 32 52.9 C	Apr.	2	Gb	iP	01 23 59.5		
		Sk	iP	17 33 20.5				iPP	01 27 02.6		
		Um	iP	17 33 20.7 C			Um	iP	01 23 41.1 D		
		Alaska (h = 20 km).						ipP	01 23 59.0		
"	1	Ki	iP	18 57 39.3				iScS	01 33 26		
		Alaska (h = 30 km).						iSKS	01 33 35		
"	1	Ki	iP	20 16 59.2			Ka	iP	01 23 47.7		
		Sk	iP	20 17 26.1			Sumatra. h = 70 km (Sk,Um).				
		Um	iP	20 17 26.8			Magn. = 6.5 (Up,Ki).				
		Alaska (h = 30 km).					The period of S at Up is remarkably long.				
"	1	Up	iP	20 23 25.7			Exceptionally large surface waves in relation to the body waves, considering the focal depth.				
		Ki	iP	20 22 31.5 C							
				microns sec			"	2	Um	iP	02 25 12.8
		P	Z'	0.1 1.4					Alaska (h = 30 km).		
		M	E	0.5 15			"	2	Up	iP	03 21 40.4 C
		M	N	0.3 16					Ki	eP	03 21 41
		Sk	iP	20 22 58.1					Um	iP	03 21 36.7
		Gb	iP	20 23 36.5					Sumatra (h = 110 km).		
			i(pP)	20 23 45.1			"	2	Um	iP	04 00 30.9
		Um	iP	20 22 59.2					Alaska (h = 30 km).		
		Alaska (h = 20 km).					"	2	Up	iP	04 56 14.4
"	1	Um	iP	22 10 45.4					Sk	iP	04 56 22.3
		Alaska (h = 20 km).							Gb	iP	04 56 02.5
"	2	Up	iP	01 23 44.3 D					Um	eP	04 56 35
			iS	01 33 28					South Atlantic Ocean (h = 30 km).		
			iScS	01 33 37			"	2	Um	iP	07 51 42.8
			iSKS	01 33 46					Celebes (h = 80 km).		
				microns sec			"	2	Um	i(P)	08 35 30.0
		P	E	0.5 5			"	2	Ki	ipP	09 14 20.7
		P	Z	1.1 5					Sk	ipP	09 14 48.0
		P	Z'	0.2 0.8					Um	iP	09 14 41.7
		S	N	11 20						ipP	09 14 48.7
		SKS	E	0.9 5					Alaska. h = 30 km (Um).		
		M	E	61 20			"	2	Up	iP	10 08 25.6 C
		M	N	52 20						microns sec	
		M	Z	71 18					Ki	iP	10 07 31.6 C
		(D = 8650 km = 78°).								microns sec	
		Ki	iP	01 23 45.6 D					P	Z'	0.2 1.1
			iScS	01 33 43					M	E	0.6 15
			iSKS	01 33 46					M	N	0.4 14
				microns sec					Sk	iP	10 07 58.3 C
		P	E	1.1 5					i		10 08 59.2
		P	N	0.3 5					Gb	iP	10 08 37.8 C
		P	Z	2.0 5							
		P	Z'	0.9 2.0							
		SKS	E	3.9 10							
		M	E	67 17							
		M	N	61 19							
		M	Z	72 16							
		Sk	eP	01 24 00 D							
			ipP	01 24 18.0							

cont.

cont.

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

1964					1964				
Apr.	2	Um	iP	10 07 59.2 C	Apr.	2	Gb	iP	16 10 10.1
cont.			iS	10 16 11	cont.		Um	iP	16 09 38.2
		Ka	iP	10 08 48.6 C				i	16 09 42.8
		Alaska (h = 20 km).						iSKS	16 19 51
"	2	Um	i(P)	10 24 00.1				i	16 20 27
"	2	Up	eP	11 08 27			Ka	iP	16 10 04.3
		Um	eP	11 07 54			Mindanao (h = 180 km).		
		Alaska (h = 25 km).					Magn. = 6.2 (Up,Ki).		
"	2	Up	iP	11 51 24.6			P is multiple, with a		
				microns sec			small-amplitude phase		
			P	Z' 0.1 1.0			followed after 4.6 sec on		
		Ki	iP	11 50 30.5			the average by an 8 times		
				microns sec			larger P, the latter		
			P	Z' 0.2 1.5			amplitude given above. At		
			M	E 0.6 17	"	2	Um	iP	18 27 31.0
			M	N 0.7 20			Alaska (h = 30 km).		
		Sk	iP	11 50 56.5	"	2	Up	iP	18 35 28.0
		Gb	iP	11 51 36.6			Ki	iP	18 34 33.0
		Um	iP	11 50 58.5					microns sec
			iS	11 59 01				P	Z' 0.1 1.2
		Ka	iP	11 51 48.3			Sk	iP	18 34 58.9
		Alaska (h = 20 km).					Gb	iP	18 35 39.1
"	2	Sk	iP	12 20 54.6			Um	iP	18 35 01.3
"	2	Sk	iP	12 29 11.7			Alaska (h = 40 km).		
		Um	iP	12 29 13.8	"	2	Ki	iP	19 47 29.5
		Alaska (h = 30 km).					Sk	eP	19 47 56
"	2	Sk	iP	12 33 39.1			Um	iP	19 47 58.5
"	2	Ki	iP	13 37 52.9			Alaska (h = 15 km).		
		Um	iP	13 38 21.3	"	2	Up	iP	19 50 26.7
		Alaska (h = 20 km).					Ki	iP	19 49 31.0
"	2	Up	iP	16 09 49.1			Sk	iP	19 49 57.2
		i		16 09 54.2			Gb	eP	19 50 37
				microns sec			Um	iP	19 50 00.3 C
			P	Z' 0.1 0.9				ipP	19 50 04.9
			M	E 0.9 23			Alaska, h = 20 km (Um).		
			M	N 1.0 17	"	2	Ki	iPn	20 14 38.6
			M	Z 0.8 17				iSg	20 15 15.5
		Ki	iP	16 09 33.4				D = 260 km = 2.3°.	
		i		16 09 37.8			Sk	e(Sn)	20 15 32
		eS		16 20 02				iS <sup>x</sup>	20 15 48.8
		i		16 20 18				iSg	20 15 58.1
				microns sec				D = 400 km = 3.6°.	
			P	Z' 0.4 1.1			Um	i(Pn)	20 15 06.1
			M	E 1.4 22				iSn	20 15 49.6
			M	N 0.8 15				iSg	20 16 11.3
			M	Z 0.7 13				D = 460 km = 4.1°.	
		Sk	iP	16 09 54.6			Nordlands Fylke, Norway,		
		i		16 09 58.7			67.2°N, 14.8°E.		
							Origin time = 20 13 58.		

cont.

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

1964					1964					
Apr.	2	Um	iP	20 19 23.5	Apr.	3	Up	iP	04 24 49.5 D	
				Alaska (h = 10 km).				iS	04 34 51	
"	2	Ki	iP	21 11 50.9					microns sec	
"	2	Um	iP	22 17 02.4				P	Z' 0.2 0.5	
				Alaska (h = 10 km).				S	E 0.3 3	
"	2	Up	eP	22 44 37				S	N 0.4 3	
			eS	22 52 48				M	E 0.7 18	
				microns sec				M	N 0.9 18	
			S	E 0.6 6				M	Z 1.3 25	
			M	E 0.6 16					(D = 9000 km = 81°).	
			M	N 0.9 22			Ki	iP	04 24 50.8 D	
			D = 6650 km = 60°.					ipP	04 25 06.9	
		Ki	eP	22 43 47				iS	04 34 55	
			iS	22 51 06					microns sec	
				microns sec				P	Z' 0.8 1.5	
			S	E 1.2 8				S	E 2.2 10	
			S	N 0.4 7				S	N 1.7 7	
			M	E 0.9 15				M	E 2.3 22	
			M	N 1.0 20				M	N 0.7 18	
			M	Z 1.9 20				M	Z 2.6 23	
			D = 5900 km = 53°.				Sk	iP	04 25 05.3 D	
		Sk	eP	22 44 08				ipP	04 25 21.3	
		Gb	eP	22 44 50			Gb	iP	04 25 04.4	
		Um	iP	22 44 11.3				ipP	04 25 20.2	
			eS	22 51 53			Um	iP	04 24 46.9 D	
			iScS	22 53 56				ipP	04 25 02.5	
				Alaska (h = 20 km),				iS	04 34 45	
				Magn. = 5.4 (Up, Ki),				iSS	04 39 48	
"	2	Ki	eP	23 39 06			Ka	iP	04 24 54.0	
		Um	iP	23 39 35.6				ipP	04 25 09.1	
				Alaska (h = 15 km).					Sumatra, h = 60 km	
"	2	Ki	iPKP	23 46 54.9					(Ki, Sk, Gb, Um, Ka),	
				Sandwich Islands					Magn. = 6.3 (Up, Ki).	
				(h = 30 km).	"	3	Up	iP	05 01 54.4	
"	3	Up	iP	00 47 54.4					Alaska (h = 30 km).	
		Ki	iP	00 46 59.9	"	3	Um	iP	05 05 18.2	
			ipP	00 47 09.3					Japan (h = 30 km).	
		Gb	iP	00 48 05.8	"	3	Um	iP	06 05 34.1	
		Um	iP	00 47 28.1 C	"	3	Ki	iP	06 32 19.2	
			ipP	00 47 37.8				Um	iP	06 32 47.7
				Alaska, h = 40 km (Ki, Um).						Alaska (h = 30 km).
"	3	Um	iP	01 24 21.7	"	3	Up	iP	08 48 50.1 D	
				Alaska (h = 30 km).				iS	08 56 54	
"	3	Ki	e(Sg)	02 59 43					microns sec	
		Um	i(P)	02 59 33.3				P	Z' 0.4 1.5	
			iSg	03 00 17.3				S	N 0.5 9	
"	3	Um	iP	03 35 53.0				M	E 0.5 19	
								M	N 0.9 18	
								M	Z 0.9 18	
									D = 6650 km = 60°.	
							Ki	iP	08 47 56.3	

cont.





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

1964					
Apr.	3	Sk	iP	22 43 05.1	
cont.		Gb	iP	22 43 45.1	
		Um	iP	22 43 06.5 D	
			iPP	22 45 14	
			iS	22 50 39	
			i	22 51 04.0	
			iP'P'	23 13 41.4	
		Ka	iP	22 43 58.1	
		Alaska (h = 40 km).			
		Magn. = 6.3 (Up,Ki).			
		The Galitzin records at Ki exhibit a multiple S-phase on the N-component with a smaller and less definite arrival about 10 sec before a definite S. As the epicenter is due north of Ki, this could be due to a partial transformation of SV into P at the base of the crust below Ki. Similar observations are made at Up and Um. Compare a similar remark in our bulletin for Feb. 27, 1964, 15 21.			
"	4	Up	iP	01 46 07.8 C	
"	4	Um	eP	02 08 23	
		Alaska (h = 30 km).			
"	4	Up	iP	02 45 59.4	
		Um	iP	02 45 34.2 C	
		Kurile Islands (h = 60 km).			
"	4	Up	iP	04 45 02.3 D	
		Ki	iP	04 44 06.9	
				microns sec	
		P	Z'	0.1 0.8	
		Sk	iP	04 44 33.4	
		Gb	iP	04 45 12.8	
		Um	iP	04 44 35.9 D	
		Ka	iP	04 45 25.8	
		Alaska (h = 5 km).			
"	4	Up	iP	05 04 02.6 C	
			iPP	05 06 23.9	
			iS	05 12 10	
			eP'P'	05 33 32	
				microns sec	
		P	N	0.7 5	
		P	Z	1.3 6	
		P	Z'	0.8 2.2	
		S	E	0.4 6	
		S	N	1.1 11	
		M	E	1.6 17	

cont.

1964					
Apr.	4	Up		microns sec	
cont.		M	N	3.6 22	
		M	Z	3.6 22	
		D = 6600 km = 59 $\frac{1}{2}$ <sup>0</sup> .			
		Ki	iP	05 03 07.5 C	
			eS	05 10 31	
				microns sec	
		P	E	0.3 6	
		P	N	1.0 6	
		P	Z	1.6 7	
		P	Z'	0.8 2.0	
		S	E	1.1 8	
		S	N	1.1 10	
		M	E	3.4 18	
		M	N	2.5 17	
		M	Z	5.1 20	
		D = 5800 km = 52 <sup>0</sup> .			
		Sk	iP	05 03 34.1	
		Gb	iP	05 04 14.2	
		Um	iP	05 03 36.4 C	
			iPP	05 05 48	
			iS	05 11 24	
			eP'P'	05 33 41	
		Ka	iP	05 04 27.3	
		Alaska (h = 40 km).			
		Magn. = 6.2 (Up,Ki).			
		PZ' has an unusually long period at all our stations, the average being 2.0 sec.			
"	4	Up	iP	05 21 02.1	
			ipP	05 21 09.5	
		Ki	eP	05 20 04	
			ipP	05 20 15.4	
		Sk	iP	05 20 32.3	
			ipP	05 20 41.6	
		Gb	eP	05 21 11	
			ipP	05 21 20.9	
		Um	iP	05 20 33.6	
			ipP	05 20 43.7	
		Alaska. h = 40 km			
		(Up,Ki,Sk,Gb,Um).			
		The phase interpreted as pP has an amplitude roughly 5 times the amplitude of P.			
"	4	Ki	iPn	06 04 25.8 D	
			iSn	06 05 21.2	
			iSg	06 05 44.1	
		D = 500 km = 4.5 <sup>0</sup> .			
		Sk	e	06 08 00	
			eSg	06 08 14	
			i	06 08 23.7	
		Um	iSn	06 06 06.2	
			iSg	06 06 46.3	

cont.

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

1964					1964				
Apr. cont.	4	Um	D = 700 km = 6.3° Northwest Russia, 67.8°N, 32.3°E. Origin time = 06 03 16. Explosion?		Apr. cont.	4	Alaska. h = 20 km (Gb). Magn. = 6.0 (Up, Ki).		
"	4	Up	iP	07 00 51.4 C	"	4	Ki iP 08 58 12.9 Sk iP 08 58 39.9 Alaska.		
"	4	Up	iP	07 03 28.7	"	4	Up ✓ iP 09 21 24.5 C iS 09 29 56 eP'P' 09 50 19		
		Ki	iP	07 02 33.4 C					
			eS	07 09 55					
				microns sec					
		P	Z'	0.1 1.0			P	N	0.4 2
		M	N	0.4 18			P	Z	0.8 3
		M	Z	0.5 15			P	Z'	0.3 0.7
				D = 5800 km = 52°.			S	E	1.5 8
		Sk	iP	07 02 59.4			S	N	0.8 5
		Gb	iP	07 03 39.6 C			M	E	1.8 19
		Um	iP	07 03 02.1			M	N	5.0 19
				Alaska (h = 15 km).			M	Z	4.5 20
									D = 7050 km = 63½°.
"	4	Up	iP	07 09 00.1			Ki	iP	09 20 30.2 C
		Ki	iP	07 09 01.7				ipP	09 20 36.6
				Sumatra (h = 160 km).				iS	09 28 14
"	4	Up	iP	08 51 02.1					microns sec
			iS	08 59 37					P
				microns sec					Z'
		P	N	0.4 4					0.4 0.8
		P	Z	0.6 4					pP
		P	Z'	0.1 0.6					Z'
		S	E	1.8 8					0.7 1.5
		S	N	1.0 6					S
		M	E	2.8 21					E
		M	N	3.4 21					1.1 9
		M	Z	3.4 21					S
				D = 7100 km = 64°.					N
		Ki	iP	08 50 06.8 C					2.5 12
			eS	08 57 53					M
				microns sec					E
		P	N	0.6 6					4.5 20
		P	Z	0.9 6					M
		P	Z'	0.2 0.8					N
		S	E	4.6 14					5.9 21
		S	N	1.0 9					M
		M	E	3.7 20					Z
		M	N	5.9 21					9.9 21
		M	Z	7.8 21					D = 6150 km = 55½°.
				D = 6200 km = 56°.					Sk
		Sk	iP	08 50 34.0					iP
		Gb	iP	08 51 13.9					09 20 57.2 C
			ipP	08 51 19.1					ipP
		Um	iP	08 50 35.1 C					09 21 03.9
			iS	08 58 45					Gb
			iP'P'	09 20 05.1					iP
		Ka	iP	08 51 25.8					09 21 35.8 C
									ipP
									09 21 43.1
									Um
									iP
									09 20 58.3 C
									ipP
									09 21 05.1
									iP'P'
									09 50 31.4
									i
									09 50 44.9
									Ka
									iP
									09 21 47.4 C
									ipP
									09 21 54.9
									Alaska, h = 30 km
									(Ki, Sk, Gb, Um, Ka).
									Magn. = 6.2 (Up, Ki).
									This is a clear case when
									P and pP have the <u>same</u>
									phase at our stations (the
									focal mechanism being such
									that the resp. waves leave
									the focus with opposite
									phase).
									"
									4
									Sk
									iP
									09 59 27.2
									Alaska (h = 30 km).

cont.



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

1964  
Apr. 4 this is taken as  $M_1$ , then  
cont.  $M - M_1 = 8.5 - 7.2 = 1.3$ .  
If this will prove to  
have more general validity,  
this would mean a  
significant generalization  
of this rule. See also  
remark next shock.

" 4 Up iP 18 10 14.9 C  
iS 18 18 46  
eP'P' 18 39 14  
microns sec  
P Z 2.2 7  
P Z' 0.2 0.8  
S E 4.8 9  
S N 3.6 5  
M N 25 18  
M Z 21 17

D = 7100 km =  $64^\circ$ .  
Ki iP 18 09 20.8 C  
iS 18 17 07

microns sec  
P Z 2.9 7  
P Z' 0.6 1.0  
S E 4.9 10  
M N 19 16  
M Z 31 16

D = 6200 km =  $56^\circ$ .  
Sk iP 18 09 48.2 C  
eP'P' 18 39 24

Gb iP 18 10 27.2 C  
iS 18 19 12.7

Um iP 18 09 48.8 C  
iP'P' 18 39 23.0

Ka iP 18 10 37.8 C  
iS 18 19 36.2

Alaska (h = 25 km).  
Magn. = 6.5 (Up, Ki).

The marked increase in  
seismic activity in Alaska  
one week after the main  
shock on Mar. 28, has a  
striking similarity to the  
pattern exhibited by the  
Kurile Islands earthquakes  
in Oct. 1963 (with largest  
activities concentrated to  
Oct. 13 and Oct. 20, 1963),  
a mere coincidence or not?

" 4 Up iP 18 26 25.2  
microns sec  
P Z' 0.1 0.6  
Ki iP 18 25 31.6 C

cont.

1964  
Apr. 4 Ki microns sec  
cont. P Z' 0.2 0.9  
Sk iP 18 25 58.6  
ipP 18 26 05.6  
Gb iP 18 26 37.8 C  
Um iP 18 25 59.2  
ipP 18 26 06.2  
Ka iP 18 26 48.5  
i(pP) 18 26 57.8  
Alaska. h = 30 km (Sk, Um).

" 4 Up iP 18 51 58.3  
Ki iP 18 51 03.6  
Sk iP 18 51 31.2  
Um iP 18 51 32.3  
Alaska (h = 30 km).

" 4 Up ---  
microns sec  
M E 0.8 18  
M N 1.4 18  
M Z 1.1 17  
Ki eP 20 10 54  
ipP 20 10 59.3  
microns sec  
M E 0.9 20  
M N 1.5 19  
M Z 1.4 17  
Um iP 20 11 27.8  
Alaska. h = 20 km (Ki).

" 4 Up iP 21 51 07.9  
Ki iP 21 50 46.1  
eS 22 01 14

microns sec  
P Z' 0.2 1.5  
S N 0.6 11  
M N 1.5 19  
D = 9450 km =  $85^\circ$ .  
Um iP 21 50 50.4  
Negros, Philippine Islands  
(h = 30 km).

" 4 Up iP 22 27 04.6  
iS 22 35 18

microns sec  
S N 1.0 10  
M E 0.8 18  
M N 1.0 17  
M Z 1.1 18  
D = 6700 km =  $60\frac{1}{2}^\circ$ .  
Ki iP 22 26 10.5  
i(S) 22 33 30  
iS 22 33 37  
microns sec  
P Z 0.5 7

cont.



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

1964					1964				
Apr.	5	Sk	iP	01 56 08.0	Apr.	5	Ki	ePKP	11 37 51
cont.		Um	iP	01 55 51.9			Sk	iPKP	11 37 44.6 D
		Japan (h = 70 km).					Um	iPKP	11 37 50.7 D
							Off coast of Chile.		
"	5	Up	iP	02 46 14.9	"	5	Sk	eP	13 54 21
		Ki	iP	02 45 20.5			Alaska (h = 30 km).		
		Sk	eP	02 45 46					
		Gb	iP	02 46 26.5	"	5	Up	iP	15 31 45.4
		Um	iP	02 45 48.7			Ki	iP	15 30 50.7
		Alaska (h = 15 km).					Um	iP	15 31 19.2
"	5	Ki	eP	03 57 31			Alaska (h = 30 km).		
				microns sec	"	5	Up	iP	15 55 33.4
		M	N	0.5 17					
		Sk	iP	03 57 58.0	"	5	Um	iP	16 59 00.6
		Um	iP	03 57 59.6			Alaska (h = 20 km).		
		Alaska (h = 25 km).			"	5	Ki	iP	17 50 23.5
"	5	Ki	eP	04 21 00			Sk	iP	17 50 49.8
		Um	iP	04 21 28.5			Um	iP	17 50 50.8
		Alaska (h = 15 km).					Alaska (h = 10 km).		
"	5	Up	iP	07 23 56.0 C	"	5	Up	iP	17 52 14.4
		Ki	iP	07 23 01.8 C			Ki	iP	17 51 20.9
		Sk	iP	07 23 29.0 C			Sk	iP	17 51 46.3
		Gb	iP	07 24 08.5			Gb	iP	17 52 25.1
		Um	iP	07 23 30.1			Um	iP	17 51 49.1
		Alaska (h = 25 km).					Ka	iP	17 52 38.3
"	5	Ki	iP	07 38 15.0 C			Alaska (h = 15 km).		
		Sk	iP	07 38 41.4	"	5	Up	iP	19 38 22.2 C
		Um	iP	07 38 41.4			eS		19 46 28
		Alaska (h = 15 km).							microns sec
"	5	Up	iP	08 23 36.1			P	Z'	0.3 1.5
		Ki	iP	08 22 42.1			M	E	0.7 19
		Sk	iP	08 23 09.5			M	N	0.9 17
		Gb	iP	08 23 49.3			M	Z	0.9 18
		Um	iP	08 23 09.7			D = 6650 km = 60°.		
		Alaska (h = 15 km).					Ki	iP	19 37 27.3 C
"	5	Up	iP	09 09 36.6			iS		19 44 48
			ipP	09 09 42.9			e		19 49 10
		Ki	iP	09 08 43.1					microns sec
		Sk	iP	09 09 10.5			P	Z'	0.5 1.5
		Gb	iP	09 09 44.8			S	E	0.4 7
		Um	iP	09 09 10.5			S	N	0.5 6
		Alaska (h = 15 km).					M	E	0.6 15
"	5	Up	iSg	11 36 42.2			M	N	0.6 17
		Ki	eSg	11 38 26			M	Z	1.3 14
		Sk	iSg	11 38 30.1			D = 5800 km = 52°.		
		Um	eSn	11 36 18			Sk	iP	19 37 53.2 C
			iSg	11 36 42.8			Gb	iP	19 38 33.3 C
		Possibly Gulf of Finland.					Um	iP	19 37 55.7 C
							i(S)		19 45 31
							iS		19 45 43

cont.

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

1964				1964			
Apr. cont.	5	Ka iP	19 38 45.8 C	Apr.	6	Up iP	16 21 51.5
		Alaska (h = 15 km). Magn. = 6.2 (Up,Ki). The relatively weak surface waves could be due to somewhat greater focal depth or to weak radiation in our direction, depending on focal mechanism.					microns sec
						P	Z' 0.1 0.5
						Ki iP	16 21 05.4 D
						Sk iP	16 21 40.1
						Gb iP	16 22 12.5
						Um iP	16 21 25.7
						Ka iP	16 22 14.2
						Kurile Islands (h = 30 km).	
"	5	Up iP	20 01 08.9	"	6	Um iP	17 19 40.7
		Sk iP	20 00 41.9				
		ipP	20 00 48.0	"	6	Up ipP	17 46 02.3
		Um iP	20 00 42.9 C			Ki iP	17 45 02.3
		ipP	20 00 48.8			ipP	17 45 06.9
		Alaska. h = 25 km (Sk,Um).					microns sec
"	5	Up iP	22 42 24.7			Sk pP	Z' 0.1 1.0
		Kermadec Islands (h = 30 km).				eP	17 45 28
"	5	Um i(P)	23 09 22.0			ipP	17 45 34.1
"	5	Ki iP	23 55 53.6			Gb iP	17 46 09.5
"	6	Um iP	03 14 27.0			ipP	17 46 14.1
"	6	Um iP	05 07 33.9			Um iP	17 45 31.2
		Alaska (h = 30 km).				ipP	17 45 36.1
"	6	Up iP	08 31 52.2 C			Alaska. h = 20 km (Ki,Sk,Gb,Um). In this case the P-amplitude is much smaller than pP at our stations and P may easily be overlooked and pP misread as P.	
		Ki iP	08 30 57.4	"	6	Up eP	18 14 28
		Sk iP	08 31 24.5			Ki iP	18 13 34.6
		Um iP	08 31 25.6			Sk iP	18 14 01.3 C
		Alaska (h = 5 km).				Gb iP	18 14 40.1
"	6	Um iP	09 27 02.8			Um iP	18 14 02.4
		Kurile Islands (h = 30 km).				Alaska (h = 20 km).	
"	6	Ki eP	10 51 48	"	6	Ki iP	19 50 24.9
		Um eP	10 52 19			Sk eP	19 50 50
		Gb eP	10 52 56			Um iP	19 50 51.7
		Alaska (h = 15 km).				Alaska (h = 25 km).	
"	6	Ki iP	11 08 42.9	"	6	Um e(P)	20 32 15
		Sk iP	11 09 09.9	"	6	Ki iP	23 07 27.0
		Gb iP	11 09 48.8			Um iP	23 07 54.4
		Alaska (h = 30 km).				ipP	23 08 04.4
"	6	Up eP	13 55 53			Alaska. h = 40 km (Um).	
		Ki eP	13 55 02	"	7	Up	---
		Um iP	13 55 29.5				microns sec
		Aleutian Islands (h = 120 km).				M	N 0.8 20
"	6	Um i(P)	16 19 43.8	cont.		Ki iP	01 52 51.3

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

1964				1964			
Apr. cont.			microns sec	Apr.			
7	Ki	M	E 0.9 20	7	Um	iP	13 57 14.2
		M	N 0.5 17	"	7	Ki	iPn 14 55 59.8
		M	Z 1.0 18				iSg 14 56 32.5
	Um	eP	01 53 17				D = 220 km = 2.0°.
		eS	02 01 19		Sk	ePn	14 56 35
	Alaska (h = 30 km).					iSg	14 57 49.3
							D = 490 km = 4.4°.
"	7	Ki	eP 04 02 54		Um	iPn	14 56 36.9
		Um	iP 04 03 25.4			iSg	14 57 51.1
		ipP	04 03 36.1				D = 490 km = 4.4°.
	Alaska. h = 40 km (Um).				Nordlands Fylke, Norway, 67.8°N, 15.5°E. Origin time = 14 55 26.		
"	7	Up	iP 04 45 36.4	"	7	Sk	iP 16 29 39.4
		Ki	iP 04 44 41.5			Um	iP 16 29 45.1
		Um	iP 04 45 10.8			Alaska (h = 30 km).	
		ipP	04 45 16.7				
	Alaska. h = 25 km (Um).						
"	7	Up	iP 05 05 02.3	"	7	Ki	eP 16 37 48
		Ki	iP 05 04 07.4			Sk	iP 16 38 14.8
		Sk	iP 05 04 36.0 C			Alaska (h = 30 km).	
		Gb	iP 05 05 15.6				
		Um	iP 05 04 35.7	"	7	Up	i(pP) 18 12 55.4
	Alaska (h = 30 km).					Ki	iP 18 11 55.6 C
"	7	Sk	iP 07 44 22.9			Sk	eP 18 12 22
"	7	Ki	iP 08 12 37.7				ipP 18 12 29.3
	Alaska (h = 30 km).					Gb	i(pP) 18 13 08.9
"	7	Sk	iP 08 39 46.9			Um	iP 18 12 23.0
"	7	Um	iPKP 09 15 33.3				ipP 18 12 30.9
	New Hebrides Islands (h = 260 km).					Ka	i(pP) 18 13 20.2
"	7	Ki	iP 09 47 09.5			Alaska. h = 30 km (Sk, Um). In this case the amplitude ratio P/pP exhibits a fairly clear decrease with increasing epicentral distance over the range covered by our stations (the focal mechanism probably being the main reason for this).	
"	7	Ki	e(P) 10 14 12				
			e(Sg) 10 15 06	"	7	Ki	eP 18 26 54
"	7	Um	i(P) 13 23 02.8			Um	iP 18 27 22.2 D
"	7	Up	iP 13 31 36.0 C			Alaska (h = 30 km).	
		ePP	13 35 31	"	7	Up	iP 19 39 01.0 D
	Ki	iP	13 31 23.0 C				ipP 19 39 10.2
			microns sec				
		P	Z' 0.2 1.0				
		M	E 0.4 17				
		M	N 0.7 21		Ki	iP	19 38 07.8 D
	Sk	iP	13 31 43.0 C				
	Um	iP	13 31 26.8 C				
		iPP	13 35 21.7				
	Ka	iP	13 31 45.7 C		Sk	iP	19 38 34.4
	Celebes (h = 150 km).					ipP	19 38 43.7

cont.



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

1964					1964				
Apr. cont.	7	Gb	iP	19 39 13.0 D	Apr. cont.	8	Ki	iSg	05 50 26.5
			ipP	19 39 22.2				D = 470 km = 4.2°.	
		Um	iP	19 38 35.7			Sk	eSg	05 53 00
		Ka	iP	19 39 24.5			Um	iSn	05 50 53.8
			ipP	19 39 33.3				iSg	05 51 31.3
		Alaska, h = 40 km (Up, Sk, Gb, Ka).						D = 680 km = 6.1°.	
		Magn. = 6.0 (Up, Ki).					Northwest Russia, 67.9°N, 31.5°E. Origin time = 05 48 09. Explosion?		
"	7	Up	iP	20 01 10.4 C	"	8	Um	iP	06 56 54.5
		Ki	iP	20 01 17.0 C			Japan (h = 30 km).		
		Um	iP	20 01 07.3					
		Ka	iP	20 01 16.3 C					
		Pamir.							
"	7	Ki	iP	23 35 49.9 C	"	8	Up	iP	08 20 06.2
		Um	iP	23 36 15.6			i		08 20 09.8
		Aleutian Islands (h = 50 km).							microns sec
"	8	Sk	eP	00 23 30			P	Z'	0.1 1.0
		Alaska (h = 30 km).					M	N	0.5 18
"	8	Um	iP	00 27 26.8			M	Z	1.4 21
"	8	Up	iP	00 46 47.3 C			Ki	iP	08 20 29.0 D
		Ki	iP	00 45 52.8			eS		08 30 39
		Sk	eP	00 46 20					microns sec
			ipP	00 46 26.0			P	Z'	0.1 1.2
		Gb	i(pP)	00 47 05.2			S	E	0.3 6
		Um	iP	00 46 20.5			S	N	0.5 10
		Alaska, h = 25 km (Sk).					M	E	0.8 19
"	8	Um	iP	00 59 06.1			M	N	1.0 20
"	8	Um	iP	01 24 06.6			M	Z	1.3 18
"	8	Up	iP	02 15 04.5 C					D = 9100 km = 82°.
				microns sec			Sk	eP	08 20 32
		P	Z'	0.1 0.8	"	8	Gb	iP	08 20 15.1
		Ki	iP	02 14 16.5			Um	iP	08 20 14.6 D
		Sk	iP	02 14 51.9 C			Ka	iP	08 20 01.1
		Gb	iP	02 15 25.2			Chagos Islands (h = 30 km). Magn. = 5.9 (Up, Ki).		
		Um	iP	02 14 38.2 C					
		Ka	iP	02 15 27.3					
		Kurile Islands (h = 40 km).							
"	8	Up	iP	02 21 33.7 C	"	8	Ki	iP	10 03 20.4
		Ki	iP	02 20 45.5			Sk	iP	10 03 45.1
		Um	iP	02 21 07.7				ipP	10 03 52.8
		Kurile Islands (h = 40 km).					Um	iP	10 03 49.0
"	8	Um	iP	04 09 38.7			Alaska, h = 30 km (Sk).		
		Alaska (h = 30 km).			"	8	Up	iP	11 09 05.0
"	8	Ki	iPn	05 49 13.6			iScS		11 18 57
			iSn	05 50 08.4			i		11 19 16
cont.									microns sec
							P	Z	0.9 6
							M	E	5.3 21
							M	N	13 23
							M	Z	13 25
							Ki	iP	11 08 18.4
							ePa		11 12 04
							iS		11 16 28
									microns sec
							P	E	0.4 7
					cont.				



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

1964						1964				
Apr.	9	Ki		microns	sec	Apr.	10	Alaska.	h = 25 km	(Gb,Um).
cont.			M	E	0.5 16	cont.		Magn.	= 6.0	(Up,Ki).
			M	N	0.5 13		"	10	Um	eP 03 21 16
			M	Z	0.9 15		"	10	Ki	eP 12 15 43
		Sk	iP		13 15 54.5		"	10	Alaska	(h = 25 km).
			ipP		13 16 03.6		"	10	Um	iP 18 05 00.1
		Gb	iP		13 16 34.5		"	10	Alaska	(h = 30 km).
		Ka	iP		13 16 47.3 D					
		Alaska, h = 40 km (Sk).								
"	9	Ki	eP		13 32 01	"	10	Up	iP 19 16 01.7	
		Gb	eP		13 33 06			Ki	iP 19 15 04.5	
		Alaska (h = 30 km).								
"	9	Ki	iP		16 20 54.1					
		Sk	eP		16 21 23					
		Um	iP		16 21 24.4					
		Alaska (h = 30 km).								
"	9	Um	iP		17 24 19.7					
		Alaska (h = 30 km).								
"	9	Up	iP		18 28 30.9	"	10	Up	iP 21 54 16.1 D	
		Sk	eP		18 28 24			ipP	21 54 20.6	
		Um	iP		18 28 18.2 C			iS	22 02 30	
		Ka	iP		18 28 40.2					
"	9	Up	iP		20 57 29.1					
"	9	Um	iP		21 57 52.4					
		Central Asia.								
"	10	Up	iP		01 18 18.8 D					
			eP'P'		01 47 30					
					microns sec					
			P	N	0.3 5					
			P	Z'	0.2 1.1					
			M	E	0.5 17					
			M	N	0.9 17					
		Ki	iP		01 17 24.2					
					microns sec					
			P	Z'	0.4 1.2					
			M	E	0.6 16					
			M	N	0.9 19					
			M	Z	1.1 17					
		Sk	iP		01 17 51.1					
		Gb	iP		01 18 30.3					
			ipP		01 18 36.0					
			i(P'P')		01 47 03.5					
			i		01 47 35.7					
		Um	iP		01 17 52.4					
			ipP		01 17 58.9					
			eS		01 25 57					
			iP'P'		01 47 41.6					
		Ka	iP		01 18 42.2					
cont.						"	11	Up	iPKP 01 23 34.0 C	
						cont.				



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

1964					1964				
Apr.	12	Up	iP	01 22 24.7	Apr.	12	Up	eP	02 16 27
				Kamchatka (h = 30 km).					Alaska (h = 20 km).
"	12	Up	iP	01 35 01.2 C	"	12	Ki	iPKP	06 19 35.5
			iS	01 43 36			Sk	iPKP	06 19 47.5
			iP'P'	02 03 52.3			Um	iPKP	06 19 42.3
				microns sec					New Hebrides Islands
		P	N	1.1 5					(h = 30 km).
		P	Z	1.4 3					
		P	Z'	0.7 1.0	"	12	Up	iP	07 43 29.4
		S	E	1.8 8					Alaska (h = 25 km).
		S	N	1.7 6					
		M	E	6.1 19	"	12	Up	iP	09 45 13.7
		M	N	8.1 20					microns sec
		M	Z	9.5 21			P	Z'	0.1 1.0
				D = 7100 km = 64°.			Ki	iP	09 44 20.6 D
		Ki	iP	01 34 07.1 C					microns sec
			eS	01 41 48			P	Z'	0.1 1.0
				microns sec			Sk	iP	09 44 47.2 D
		P	N	1.6 6			Gb	iP	09 45 26.0 D
		P	Z	3.1 6			Um	iP	09 44 47.5
		P	Z'	1.8 1.8				iS	09 52 59
		S	E	3.7 10			Ka	iP	09 45 37.3
		S	N	2.6 9					Alaska (h = 20 km).
		M	E	6.1 18					Magn. = 5.8 (Up,Ki).
		M	N	14 20	"	12	Up	iPKP	11 30 36.2 D
		M	Z	20 21					microns sec
				D = 6200 km = 56°.					PKP Z' 0.2 0.6
		Sk	iP	01 34 33.9 C			Ki	iPKP	11 30 16.3
		Gb	iP	01 35 13.1				iSKP	11 33 46.5
		Um	iP	01 34 35.2 C					microns sec
			iS	01 42 43					PKP Z' 0.2 1.4
			iP'P'	02 04 09.4			Sk	iPKP	11 30 31.5
		Ka	iP	01 35 24.0 C			Gb	iPKP	11 30 43.8
				Alaska (h = 20 km).			Um	iPKP	11 30 23.7
				Magn. = 6.5 (Up,Ki).				i	11 30 26.6
				PZ' is multiple with a				iSS	11 52 36
				small phase followed after			Ka	ePKP	11 30 47
				2 sec by a much larger one.				i	11 31 04.5
									Kermadec Islands
"	12	Up	iP	01 35 57.6					(h = 90 km).
				microns sec					
		P	Z'	0.8 1.7	"	12	Up	iP	12 11 15.4 C
		Ki	iP	01 35 05.8				i	12 11 22.0
				microns sec				iLg1	12 18 50
		P	Z'	0.7 1.8				iLg2	12 19 07
		Sk	iP	01 35 32.9					
		Gb	iP	01 36 11.7					
		Um	iP	01 35 32.4					
		Ka	iP	01 36 21.3					
				Alaska. Magn. = 6.5 (Up,Ki).					
				This shock, which occurred					
				approx. 58 sec after the					
				previous one and was of					
				the same magnitude, has					
				not been reported by USCGS.					

cont.

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

1964					1964				
Apr.	12	Up		microns sec	Apr.	12	Ki	iP	15 17 09.7 C
cont.			P	Z' 0.1 1.0					Alaska (h = 20 km).
			M	E 0.7 13		"	12	Up	iP
			M	N 0.8 14				Ki	iP
			M	Z 1.0 13					17 32 05.3
		Ki	iP	12 11 55.7 C					17 31 09.9
			iX	12 18 23.6					microns sec
				microns sec					Z' 0.1 1.1
			P	Z' 0.1 0.9			Sk	iP	17 31 35.8
			M	E 1.5 16			Gb	iP	17 32 15.9
			M	N 1.1 16			Um	iP	17 31 38.9
			M	Z 2.2 15				eS	17 39 21
		Sk	iP	12 11 52.9			Ka	iP	17 32 28.2
		Gb	iP	12 11 28.4					Alaska (h = 20 km).
		Um	iP	12 11 29.4 C		"	12	Um	iP
			iX	12 17 12.4					20 38 47.3
		Ka	iP	12 11 06.8 C					Alaska (h = 30 km).
				Caucasus (h = 30 km).		"	12	Ki	eP
				Magn. = 5.4 (Up,Ki).					21 11 49
				The phase marked X (on Ki		"	13	Up	iP
				and Um Z') has a group				Ki	iP
				velocity of 4.25 km/sec.				Sk	iP
"	12	Up	iP	12 46 52.6				Gb	iP
		Ki	iP	12 45 58.2				Um	iP
		Sk	iP	12 46 24.7					iSn
		Um	iP	12 46 26.2					i
		Ka	iP	12 47 15.5					01 27 20.4
				Alaska (h = 39 km).					Caspian Sea (h = 30 km).
"	12	Up	iP	12 58 30.1		"	13	Up	iPKP
				microns sec				Gb	iPKP
			M	E 0.5 14				Um	iPKP
			M	N 1.5 19					iSKP
			M	Z 1.1 17					03 24 23.4
		Ki	iP	12 57 37.0					South of Fiji Islands
				microns sec					(h = 360 km).
			P	Z' 0.1 1.0		"	13	Up	iP
			M	E 0.8 14					03 29 52.4 C
			M	N 1.4 18					microns sec
			M	Z 2.3 14				Ki	iP
		Sk	eP	12 58 04					03 29 47.5 C
			ipP	12 58 09.0					microns sec
		Um	iP	12 58 03.9					Z' 0.1 1.0
				Alaska. h = 20 km (Sk).			Sk	iP	03 30 09.7
							Um	iP	03 29 44.9 C
							Ka	iP	03 30 01.0
									Bhutan (h = 50 km).
"	12	Up	iP	14 45 36.2					Magn. = 6.0 (Up,Ki).
		Ki	iP	14 44 40.0		"	13	Up	iP
				microns sec					07 31 40.5
			P	Z' 0.1 1.0		"	13	Up	iP
		Sk	iP	14 45 08.2					08 33 27.6
		Gb	iP	14 45 49.0					iS
		Um	iP	14 45 09.4					08 36 08
		Ka	iP	14 46 00.5					iLg2
				Alaska (h = 30 km).					08 38 00
									i(PcP)
									08 38 40
									microns sec
									P N 1.3 3

cont.

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

1964					1964				
Apr.	13	Up		microns sec	Apr.	13	Up	iP	12 36 02.1
cont.			P	Z 0.8 3				eS	12 44 22
			P	Z' 0.1 0.5					microns sec
			S	E 1.2 5			S	E	0.5 7
			S	Z 2.5 8			S	N	1.1 6
			M	E 66 16			M	E	1.1 19
			M	N 59 13			M	N	2.4 20
			M	Z 59 10			M	Z	1.9 20
				D = 1600 km = 14 1/2°.			Ki	iP	12 35 16.9
		Ki	iP	08 35 03.8				eS	12 42 38
			iS	08 39 11					microns sec
			iLg1	08 41 46			S	N	1.0 9
			iLg2	08 42 22			M	E	1.3 16
				microns sec			M	N	2.3 20
			P	N 1.9 9			M	Z	6.3 22
			P	Z 1.7 8			Sk	iP	12 35 37.9
			P	Z' 0.4 1.5			Um	iP	12 35 42 C
			S	E 4.5 10				iS	12 43 33
			S	N 4.5 8					Alaska. Magn. = 5.8 (Up,Ki)
			S	Z 7.4 10			"		
			M	E 27 6			13	Up	eP 14 15 24
			M	N 26 11				Ki	iP 14 14 28.9
			M	Z 34 11					microns sec
				D = 2500 km = 22 1/2°.				P	Z' 0.2 1.2
		Sk	iP	08 34 18.7			Sk	iP	14 14 55.5
		Gb	iP	08 33 11.0			Gb	iP	14 15 34.7
			iLg2	08 37 24.5			Um	iP	14 14 56.2
		Ka	iP	08 32 40.2			Ka	iP	14 15 46.8 C
				Yugoslavia (h = 30 km).					Alaska (h = 25 km).
				Magn. = 6.0 (Ki).			"		
				Well developed higher			13	Up	iP 16 24 36.6 C
				mode surface waves.					microns sec
"	13	Um	iP	08 57 16.2 C				M	E 0.6 16
			ipP	08 58 30.1				M	N 0.8 20
				Bonin Islands.				M	Z 0.8 17
				h = 310 km (Um).			Ki	iP	16 23 42.5
"	13	Up	iP	11 37 23.7					microns sec
			i	11 37 35.1				M	E 0.8 17
"	13	Ki	iP	11 39 37.9				M	N 0.8 18
		Um	iP	11 39 44.7				M	Z 1.5 18
				Mindanao (h = 110 km).			Sk	eP	16 24 09
"	13	Up	eP	12 35 43			Um	iP	16 24 08.8 C
		Ki	eP	12 34 53				ipP	16 24 15.9
				microns sec				iS	16 32 28
			P	Z' 0.2 1.5					Alaska. h = 30 km (Um).
		Sk	eP	12 35 13			"		
			ipP	12 35 18.0			13	Ki	iP 17 52 30.3
		Gb	iP	12 35 59.3				Um	iP 17 52 59.6
		Um	iP	12 35 16.8					Alaska (h = 40 km).
			iS	12 43 14			"		
				Alaska. h = 20 km (Sk).			13	Um	eP 18 24 04
									Alaska (h = 20 km).
"	13	Up	iP	12 35 43			"		
		Ki	iP	12 34 53			13	Up	iP 19 27 17.3 C
				microns sec				Ki	iP 19 26 20.0
			P	Z' 0.2 1.5					cont.
		Sk	eP	12 35 13					
			ipP	12 35 18.0					
		Gb	iP	12 35 59.3					
		Um	iP	12 35 16.8					
			iS	12 43 14					
				Alaska. h = 20 km (Sk).					

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

1964					1964					
Apr.	13	Ki	ipP	19 26 27.5	Apr.	14	Up	iP	06 39 49.3	
cont.				microns sec			Ki	iP	06 41 02.4	
			P	Z' 0.1 1.0			Sk	iP	06 40 23.0	
		Sk	iP	19 26 47.3 C			Gb	iP	06 39 27.0	
		Gb	iP	19 27 26.3			Um	iP	06 40 27.0	
		Um	iP	19 26 47.8			Ka	iP	06 39 09.9 D	
			ipP	19 26 55.1			Tyrrhenian Sea (h = 310 km).			
		Ka	iP	19 27 37.3		"	14	Sk	iP	07 23 43.9
		Alaska. h = 30 km (Ki,Um).								
"	13	Up	iP	20 49 33.9	"	14	Ki	iP	08 08 32.0	
"	13	Up	iP	21 35 56.9 D					microns sec	
			ipP	21 36 07.3				P	Z' 0.1 1.2	
				microns sec			Sk	eP	08 08 58	
			P	Z' 0.1 0.7			Um	iP	08 09 01.2	
		Ki	iP	21 35 01.8 D			Alaska (h = 30 km).			
				microns sec	"	14	Um	ipKP	09 17 57.6	
			P	Z' 0.2 1.0			New Hebrides Islands			
		Sk	iP	21 35 29.7 D			(h = 30 km).			
		Gb	iP	21 36 09.0 D	"	14	Um	iP	09 28 10.8	
			ipP	21 36 20.3	"	14	Um	iP	09 58 28.1	
		Um	iP	21 35 30.4 D			Alaska (h = 25 km).			
		Ka	iP	21 36 19.8	"	14	Up	iP	16 05 05.3	
			ipP	21 36 30.4				ipP	16 05 14.4	
		Alaska. h = 40 km (Up,Ki,Ka).							microns sec	
		Magn. = 6.0 (Up,Ki).							Z' 0.1 0.5	
"	13	Up	eP	21 53 22			Ki	iP	16 04 09.8	
				microns sec				ipP	16 04 18.3	
		M	E	0.3 16					microns sec	
		M	N	0.9 23					Z' 0.4 1.3	
		M	Z	1.0 20			Sk	iP	16 04 36.4	
		Ki	iP	21 52 27.3				ipP	16 04 45.6	
				microns sec			Gb	iP	16 05 17.2	
		M	N	0.9 19				ipP	16 05 25.0	
		M	Z	1.4 19			Um	iP	16 04 38.9	
		Sk	iP	21 52 52.3			Ka	iP	16 05 29.9	
		Um	iP	21 52 57.6 C				ipP	16 05 38.6	
		Ka	iP	21 53 44.9			Alaska. h = 30 km (Up,Ki, Sk,Gb,Ka).			
		Alaska (h = 30 km).					The amplitude of pP is about 5 times the amplitude of P (on our Z' records).			
"	14	Up	eP	01 15 09	"	14	Ka	iP	16 16 10.4	
				microns sec			Alaska (h = 30 km).			
		M	N	0.9 23						
		M	Z	1.1 23						
		Ki	iP	01 14 18.4						
		Um	iP	01 14 40.0						
		Kurile Islands (h = 60 km).								
"	14	Um	e(P)	04 06 49	"	14	Up	eP	17 09 25	
			iSg	04 07 10.7			Ki	iP	17 08 28.3	
"	14	Um	iP	04 51 45.7			Sk	eP	17 09 04	
							Gb	iP	17 09 37.2	
							Ka	iP	17 09 48.8	
							Alaska (h = 40 km).			



Up = Uppsala, Ki = Kiruna, Sk = Skalistugan, Gb = Göteborg, Um = Umeå  
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1964	Apr.	14	Ki	iP	21 42 37.0	1964	Apr.	15	Up	eS	15 49 50	
					Alaska (h = 40 km).		cont.			iPS	15 50 03	
										eP'P'	16 10 12	
"		14	Up	iP	22 39 37.4						microns sec	
			Ki	eP	22 38 40					P	N 0.8 5	
			Sk	iP	22 39 08.3					P	Z 1.6 5	
			Gb	iP	22 39 48.7					P	Z' 0.4 1.0	
			Ka	iP	22 40 00.4					S	N 1.7 7	
					Alaska (h = 25 km).					M	E 2.3 20	
										M	N 5.0 19	
"		14	Up	iP	23 05 51.1 C					M	Z 3.9 20	
				eP'P'	23 34 57						D = 7050 km = 63 1/2°.	
					microns sec			Ki	iP	15 40 22.2 C		
				P	Z' 0.1 0.6				ipP	15 40 32.0		
				M	E 1.1 20				iS	15 48 08		
				M	N 3.2 20					microns sec		
				M	Z 2.3 18					P	Z 2.1 6	
			Ki	iP	23 04 55.7					P	Z' 0.8 1.1	
				eS	23 12 38					S	E 2.0 8	
					microns sec					M	E 2.8 18	
				P	Z' 0.2 1.0					M	N 4.4 21	
				S	N 0.8 9					M	Z 7.0 20	
				M	E 1.2 18						D = 6150 km = 55 1/2°.	
				M	N 2.7 20			Sk	iP	15 40 49.4 C		
				M	Z 7.1 21			Gb	iP	15 41 28.4 C		
			Sk	iP	23 05 23.9				ipP	15 41 39.7		
			Gb	iP	23 06 03.3			Um	iP	15 40 50.0 C		
				ipP	23 06 08.2				iS	15 49 00		
			Um	iP	23 05 25.0				iP'P'	16 10 13.5		
				iS	23 13 22				i	16 10 28.0		
			Ka	iP	23 06 14.4			Ka	iP	15 41 39.2 C		
					Alaska. h = 20 km (Gb).				ipP	15 41 50.7		
					Magn. = 5.8 (Up,Ki).					Alaska. h = 40 km (Ki,Gb,Ka).		
										Magn. = 6.3 (Up,Ki).		
"		15	Ki	i(Sn)	05 13 08.8	"		15	Ki	iPn	15 49 36.6	
				iSg	05 13 27.4					iSn	15 50 25.5	
"		15	Up	iP	08 33 49.5					iSg	15 50 40.6	
			Ki	iP	08 32 57.8						D = 420 km = 3.8°.	
					microns sec			Sk	e(Sg)	15 53 19		
				P	Z' 0.1 1.0			Um	iSn	15 51 38.4		
			Sk	iP	08 33 24.3				iSg	15 52 09.1		
			Gb	eP	08 34 03					Northwest Russia, 69°N, 30°E.		
			Ka	iP	08 34 15.2					Origin time = 15 48 37.		
					Alaska (h = 15 km).					Explosion?		
"		15	Up	iP	09 51 56.6	"		15	Up	iP	16 46 12.8	
"		15	Ki	iP	12 23 59.3				✓	ipP	16 46 19.2	
"		15	Ki	iPKP	15 22 16.4					iS	16 46 22.4	
			Um	iPKP	15 22 21.3 C						microns sec	
					New Zealand (h = 30 km).						pP	Z' 0.3 0.8
								Ki	iP	16 46 13.2		
									iS	16 46 22.9		
"		15	Up	iP	15 41 16.3 C						microns sec	
cont.										sP	Z' 0.1 1.0	
										M	N 3.0 20	
						cont.						

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964					1964				
Apr.	15	Sk	iP	16 46 31.6	Apr.	16	Ki	eP	01 15 23
cont.			isP	16 46 41.1	cont.			iS	01 24 19
		Gb	eP	16 46 37					microns sec
			i	16 46 40.9			S	N	0.7 10
		Um	iP	16 46 08.4 C			M	E	4.8 16
			ipP	16 46 14.8			M	N	3.4 16
			isP	16 46 18.0			M	Z	9.4 15
		Ka	iP	16 46 18.2			D = 7400 km = 66 1/2°.		
			isP	16 46 27.8		Gb	eP		01 16 24
		India - East Pakistan.				Um	iP		01 15 41.6 C
		h = 25 km (Up,Ki,Sk,Um,Ka).					iS		01 24 49
		In this interpretation the					iSS		01 29 12
		amplitude ratios of sP:pP:P				Ka	iP		01 16 23.5 C
		are about 4.5:2:1. In USCGS'				Japan (h = 40 km).			
		interpretation sP has							
		obviously been taken to be pP. "				16	Up	eSKP	02 58 21
"	15	Up	iPKP	17 12 33.9 C		Ki	iSKP		02 57 57.1
		Ki	iPKP	17 12 02.3		Sk	ePKP		02 54 53
		Sk	ePKP	17 12 16			iSKP		02 58 15.1
		Um	iPKP	17 12 10.8 C		Um	iPKP		02 54 52.1
		New Zealand (h = 40 km).					iSKP		02 58 08.7
						Loyalty Islands (h = 110 km).			
"	15	Up	iP	20 41 06.2 C	"	16	Up	iP	03 30 12.6
		Ki	iP	20 40 11.5 C		Ki	iP		03 29 17.9
			ipP	20 40 20.3		Sk	eP		03 29 46
				microns sec		Um	iP		03 29 46.8
		P	Z'	0.1 1.0		Ka	eP		03 30 37
		Sk	iP	20 40 39.3 C		Alaska (h = 10 km).			
		Gb	iP	20 41 18.2	"	16	Up	iP	06 32 32.9
		Um	iP	20 40 39.8 C		Ki	iP		06 31 46.5
		Ka	iP	20 41 29.5					microns sec
		Alaska. h = 40 km (Ki).					P	Z'	0.1 0.9
"	15	Up	iP	20 59 08.2 D		Sk	iP		06 32 22.3
		Ki	eP	21 00 22		Gb	iP		06 32 53.7
			i	21 00 33.0		Um	iP		06 32 07.8 C
		Sk	iP	20 59 51.6 D		Ka	iP		06 32 55.4
		Gb	eP	20 58 58		Kurile Islands (h = 30 km).			
		Um	iP	20 59 46.3	"	16	Um	i	07 14 57.6
		Ka	iP	20 58 31.8			i(Sg)		07 15 41.3
		Aegean Sea (h = 120 km).			"	16	Ki	iP	07 46 58.4
"	15	Um	iP	22 45 03.9			ipP		07 47 04.2
		Yugoslavia (h = 30 km).				Alaska. h = 25 km (Ki).			
"	16	Ki	eP	00 14 47	"	16	Up	iP	09 13 22.7 C
		Alaska (h = 20 km).			"	16	Um	i(P)	10 26 52.2
"	16	Up	iP	01 16 04.0 C	"	16	Ki	iP	12 05 25.9
			eS	01 25 30		Um	iP		12 05 54.9
				microns sec		Alaska (h = 30 km).			
		S	E	1.0 11	"	16	Up	iP	12 21 32.3
		M	E	3.2 17	cont.				
		M	N	2.3 19					
		M	Z	3.2 17					
		D = 8100 km = 73°.							







Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964						1964						
Apr.	18	Ki	iP	07 55	23.1	Apr.	18	Um	iP	16 31	09.0	
		Sk	iP	07 55	50.8	cont.		Mariana Islands (h = 300 km).				
		Um	eP	07 55	51							
		Alaska (h = 30 km).										
"	18	Up	iP	07 57	26.0	"	18	Sk	iP	17 42	14.6	
		Ki	iP	07 56	31.6 C			Alaska (h = 30 km).				
				microns sec								
			P	Z'	0.1 1.0		18	Ki	iP	19 34	40.1	
		Sk	iP	07 56	57.7 C			Um	iP	19 35	08.0	
		Gb	iP	07 57	37.4			Alaska (h = 30 km).				
		Um	iP	07 56	59.7 C		18	Um	iP	19 59	25.2	
			ipP	07 57	09.7							
		Ka	iP	07 57	48.9 C		18	Up	iP	20 18	54.6	
		Alaska. h = 40 km (Um).						Ki	iP	20 18	00.6	
				microns sec								
"	18	Up	iP	08 10	04.7				P	Z'	0.1 1.0	
				microns sec				Sk	iP	20 18	28.5	
			M	E	0.8 15			Gb	iP	20 19	06.7	
			M	N	0.8 14			Um	iP	20 18	28.7 C	
			M	Z	2.0 16			Ka	iP	20 19	17.8	
		Ki	eP	08 09	33			Alaska (h = 15 km).				
				microns sec								
			M	E	1.0 19		"	18	Up	iP	20 19	31.7
			M	N	0.8 17			Um	iP	20 19	05.8	
			M	Z	1.5 18			Alaska.				
		Sk	iP	08 10	04.1		"	18	Up	iP	20 26	48.7
		Um	iP	08 09	45.9				ipP	20 26	58.9	
		Ryukyu Islands (h = 30 km).							ipcP	20 27	33	
				microns sec					iS	20 35	25	
"	18	Gb	iPg	11 22	37.1			S	E	0.3 6		
			iSg	11 22	38.5			S	N	0.8 8		
			D = 10 km = 0.1°.					M	E	1.4 19		
		Local blast?						M	N	1.5 19		
"	18	Up	iP	12 05	20.6			M	Z	1.7 18		
				microns sec				D = 7100 km = 64°.				
			P	Z'	0.1 0.6			Ki	iP	20 25	54.4	
"	18	Um	iP	12 08	19.6			eS	20 33	41		
		Kurile Islands (h = 30 km).							microns sec			
"	18	Um	iP	13 20	48.1			P	N	0.4 8		
"	18	Um	iP	13 52	57.6			P	Z'	0.1 1.0		
"	18	Ki	eP	15 24	11			S	E	0.7 8		
			ipP	15 24	18.5			S	N	1.1 8		
		Sk	epP	15 24	46			M	E	1.4 19		
		Um	iP	15 24	39.7			M	N	2.0 22		
			ipP	15 24	46.8			M	Z	3.1 22		
		Alaska. h = 30 km (Ki,Um).						D = 6200 km = 56°.				
"	18	Ki	iP	16 30	56.8			Sk	iP	20 26	21.9	
		Sk	iP	16 31	22.6				ipP	20 26	32.4	
cont.								Gb	iP	20 27	01.2	
								Um	iP	20 26	22.6	
									ipP	20 26	33.0	
									iS	20 34	36	
								cont.				

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

1964				1964					
Apr. cont.	18	Ka	iP	20 27 11.9	Apr.	19	Up	---	
			i(pP)	20 27 19.6				microns sec	
		Alaska. h = 40 km (Up,Sk, Um,Ka). Magn. = 5.9 (Up,Ki).					M	E 1.0 20	
							M	N 1.1 21	
							M	Z 1.6 20	
"	18	Um	iP	21 58 04.5		Ki	ePKP	05 32 14	
							iPKS	05 35 48	
"	18	Ki	iPn	22 07 55.0				microns sec	
			iSn	22 08 21.7			PKP	Z' 0.4 1.8	
			iSg	22 08 23.8			PKS	E 0.4 8	
			D = 210 km = 1.9°.				M	E 1.6 21	
		Sk	iSg	22 09 27.5			M	N 1.3 23	
		Um	iSg	22 09 34.2			M	Z 1.6 20	
		Nordlands Fylke, Norway, 67.3°N, 15.6°E. Origin time = 22 07 21.				Sk	ePKP	05 32 06	
						Gb	ePKP	05 32 05	
						Um	iPKP	05 32 13.8	
							iPKS	05 35 39	
"	18	Um	iP	23 47 46.1			eSS	05 52 30	
		Alaska (h = 20 km).				Ka	e(PKP)	05 32 06	
						Off coast of Chile (h = 30 km).			
"	19	Um	iPKP <sub>2</sub>	04 05 37.5					
		South Pacific Ocean (h = 30 km).				"	19	Ki	eP
								06 43 27	
								Alaska (h = 15 km).	
"	19	Up		---		"	19	Um	iP
				microns sec				10 39 39.9	
		M	E	0.5 18		"	19	Um	iP
		M	Z	0.9 18				11 16 20.6	
		Um	iPKP	04 15 40.0				Colombia (h = 110 km).	
		Tonga Islands (h = 50 km).				"	19	Sk	e
								11 38 38	
"	19	Ki	eSn	04 21 35				i(Sg)	11 38 50.5
			iSg	04 21 55.8			Um	i(Sg)	11 38 34.2
			D = 460 km = 4.1°.			"	19	Up	iPKP
		Sk	eSg	04 24 23				14 31 35.2	
		Um	eP <sup>x</sup>	04 21 22				microns sec	
			eSn	04 22 18			M	E 1.1 20	
			iSg	04 22 57.1			M	N 1.0 20	
			D = 640 km = 5.8°.				M	Z 1.7 21	
		Northwest Russia, 67.5°N, 31.0°E. Origin time = 04 19 41. Explosion?				Ki	ePKP	14 31 44	
							iPKS	14 35 28	
							eSS	14 53 06	
"	19	Ki	iSn	04 36 09.9				microns sec	
			iSg	04 36 31.1			PKS	N 0.3 9	
			D = 460 km = 4.1°.				PKS	Z 0.5 6	
		Sk	iSg	04 39 01.4			M	E 3.3 24	
		Um	e	04 37 05			M	N 1.1 21	
			iSg	04 37 23.7			M	Z 4.3 23	
		Northwest Russia, 67.4°N, 31.0°E. Origin time = 04 34 16. Explosion?				Sk	ePKP	14 31 40	
						Gb	ePKP	14 31 29	
						Um	iPKP	14 31 44	
							e	14 34 20	
							iPKS	14 35 26	
							iSS	14 52 22	
						Ka	ePKP	14 31 29	
		South Shetland Islands (h = 30 km).							

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Ka = Karlskrona

1964					1964				
Apr.	19	Ki	eP	19 00 18	Apr.	20	Up		microns sec
			epP	19 00 25				P	Z 1.9 2
								P	Z' 0.4 0.5
								S	E 0.8 6
			pP	Z' 0.1 1.0				M	E 1.1 19
		Sk	epP	19 00 54				M	N 3.2 22
		Um	iP	19 00 46.1				M	Z 3.4 21
			ipP	19 00 56.2			Ki	iP	12 05 53
				Alaska. h = 40 km (Um).				iS	12 13 06
"	20	Up	iP	03 44 50.1 C					microns sec
		Ki	iP	03 43 55.4				P	E 0.7 5
		Sk	iP	03 44 20.9				P	N 1.8 3
		Gb	iP	03 45 00.5				P	Z 2.4 4
		Um	iP	03 44 23.7				S	E 2.3 8
			ipP	03 44 28.1				S	N 2.0 8
			iS	03 52 11				M	E 2.1 18
		Ka	iP	03 45 13.1				M	N 4.8 23
			ipP	03 45 17.9				M	Z 12 24
				Alaska. h = 20 km (Um,Ka).			Sk	iP	12 06 20.7
"	20	Up	iP	12 06 35.4 D			Gb	iP	12 07 01.3
			ipP	12 06 46.9				eP'P'	12 36 14
			iS	12 14 32			Um	iP	12 06 24.0
								eP'P'	12 36 27
				microns sec					Alaska. Magn. = 6.7 (Up,Ki).
			P	N 1.0 3					The records of this and the
			P	Z 1.6 3					preceding shock are tangled
			P	Z' 0.7 1.2					up and have generally not
			S	E 0.7 6					been distinguished as due to
			S	N 0.6 6					two separate shocks. A
				D = 6450 km = 58°.					detailed analysis of both
		Ki	iP	12 05 38.7 D					long- and short-period
			ipP	12 05 48.3					records demonstrates that
			iPP	12 07 40					these really are two shocks,
			iS	12 12 50					with a time difference close
									to 15 sec. The second shock
				microns sec					is slightly larger than the
			P	N 1.1 6					first one. USCGS reports only
			P	Z 2.3 5					the preceding shock.
			P	Z' 1.4 1.2					
			S	E 2.0 8					
			S	N 1.2 8					
				D = 5600 km = 50 1/2°.	"	20	Up	eP	15 50 22
		Sk	iP	12 06 06.3				ipP	15 50 30.8
		Gb	iP	12 06 47.0			Ki	iP	15 49 24.8
		Um	iP	12 06 08.4 D					microns sec
			ipP	12 06 19.3				P	Z' 0.1 1.0
			iS	12 13 43			Sk	eP	15 49 52
		Ka	iP	12 06 59.3 D				epP	15 50 02
			ipP	12 07 09.0			Gb	ipP	15 50 42.4
				Alaska. h = 40 km (Up,Ki,			Um	iP	15 49 53.6
				Um,Ka). Magn. = 6.4 (Up,Ki).			Ka	eP	15 50 43
"	20	Up	iP	12 06 51.0 C				ipP	15 50 55.1
			iS	12 14 50					Alaska. h = 40 km (Up,Sk,Ka).
			eP'P'	12 36 31					
				microns sec	"	20	Up	iP	16 28 25.9 C
			P	N 1.5 3			Ki	iP	16 27 30.6 C
									microns sec
								P	Z' 0.1 1.2

cont.

cont.



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

1964						1964				
Apr. cont.	20	Ki		microns sec		Apr. cont.	21	Um	iP	05 11 00.9
			M	E 0.8 18					iS	05 18 35
			M	N 0.8 20					iScS	05 20 38
			M	Z 1.3 20				Ka	iP	05 11 52.1
		Sk	iP	16 27 56.6 C					i(sP)	05 12 08.3
		Gb	iP	16 28 37.2				Alaska (h = 40 km).		
		Um	iP	16 27 59.4 C				Magn. = 5.7 (Up,Ki).		
				iS 16 35 42						
		Ka	iP	16 28 49.2 C		"	21	Ki	i(P)	08 12 16.3
		Alaska (h = 15 km).							iSg	08 12 46.8
"	20	Um	iP	17 20 41.2		"	21	Up	i(P)	15 13 22.9
"	20	Up	iP	18 42 49.2				Ki	e(P)	15 12 38
		Ki	iP	18 43 59.8		"	21	Ki	iP	19 10 30.6
		Sk	eP	18 43 33				Ka	iP	19 11 48.2
		Gb	eP	18 42 43				Kamchatka (h = 30 km).		
		Um	iP	18 43 24.5		"	21	Ki	iPn	20 18 10.9
		Ka	eP	18 42 21					iSn	20 18 59.8
		Crete (h = 80 km).							iSg	20 19 15.4
"	20	Ki	iP	22 43 38.8					D = 420 km = 3.8°.	
				microns sec				Sk	eSg	20 21 29
			P	Z' 0.1 1.0				Um	iPn	20 18 48.9
		Sk	eP	22 43 49					iSn	20 20 07.4
		Um	iP	22 43 36.6					iS <sup>x</sup>	20 20 22.1
		Sumatra (h = 30 km).							iSg	20 20 42.6
									D = 710 km = 6.4°.	
"	21	Up	eP	03 09 50				Northwest Russia, 68.8°N, 30.4°E.		
"	21	Ki	iP	04 51 26.9				Origin time = 20 17 11.		
		Um	iP	04 51 15.2				Explosion?		
		Mexico (h = 70 km).				"	22	Up	eP	09 52 40
"	21	Up	iP	05 11 28.6 D				Ki	eP	09 52 42
			iS	05 19 28					eS	09 57 22
				microns sec					D = 3100 km = 28°.	
			P	Z' 0.1 1.0				Sk	eP	09 52 08
			S	N 0.4 6				Gb	iP	09 52 17.5
			M	N 1.1 22				Um	iP	09 52 42.4
			M	Z 1.5 23					iS	09 57 28
			D = 6450 km = 58°.					North Atlantic Ocean		
		Ki	iP	05 10 32.0				(h = 30 km).		
			eS	05 17 44		"	22	Up	eP	09 53 17
				microns sec						microns sec
			P	Z' 0.3 1.0					M	E 0.7 16
			S	E 0.5 8					M	N 0.9 17
			S	N 0.8 9					M	Z 1.0 16
			M	E 0.8 18				Ki	eS	09 57 57
			M	N 1.1 21						microns sec
			M	Z 2.1 21					M	E 1.8 15
			D = 5600 km = 50 1/2°.						M	N 0.5 13
		Sk	iP	05 10 59.4					M	Z 2.5 15
		Gb	iP	05 11 40.3				Sk	eP	09 52 44
			i(sP)	05 11 56.2						
cont.						cont.				

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

1964					1964				
Apr.	22	Gb	iP	09 52 53.2	Apr.	23	Ki	eP	02 02 20
cont.		Um	iP	09 53 13.3	cont.				microns sec
				North Atlantic Ocean.				M	E 1.2 21
				There are <u>two</u> shocks about				M	N 0.6 18
				35 sec apart, and not one,				M	Z 0.6 16
				in about the same position			Gb	iP	02 03 19.6
				in the North Atlantic. USCGS			Um	iP	02 02 36.4
				reported only the preceding					South of Japan (h = 30 km).
				shock, but not this one,	"	23	Up	iP	03 23 51.3
				which is slightly larger.			Ki	iP	03 22 59.5
"	22	Um	i(P)	14 17 33.6			Gb	iP	03 24 02.4
"	22	Up	iP	15 08 23.6			Um	iP	03 23 24.8
			ipP	15 08 31.9					Alaska (h = 40 km).
		Sk	eP	15 08 48	"	23	Up	iP	03 47 08.1
		Gb	iP	15 08 40.2				i	03 47 25.4
		Um	iP	15 08 19.8 C				i	03 47 46.7
		Ka	iP	15 08 27.9				iPKP	03 51 25.1
			ipP	15 08 36.7				iPP	03 51 52
				Andaman Islands.				ePKKP	04 02 30
				h = 30 km (Up,Ka).				i	04 02 45.5
"	22	Up	iPKP	20 19 18.7 C					microns sec
			iSKP	20 22 32.0				PP	E 1.4 6
				microns sec				PP	N 0.7 7
			PKP	Z' 0.1 0.5				PP	Z 5.6 9
			SKP	Z' 0.1 0.8				M	E 12 23
		Ki	iPKP	20 19 05.4 C				M	N 15 19
				microns sec				M	Z 13 19
			PKP	Z' 0.2 0.7					(D = 11800 km = 106°).
		Sk	iPKP	20 19 16.1 C			Ki	iP	03 46 50.9 C
		Gb	iPKP	20 19 25.4 C				i	03 50 44.9
		Um	i(PKP)	20 19 02.8				ePKP	03 51 13
			iPKP	20 19 11.6				iPP	03 51 25
		Ka	iPKP	20 19 25.7				i	03 53 13
			iSKP	20 22 45.9				i	03 53 34
				New Hebrides Islands				iSKS	03 57 23
				(h = 120 km).				iS	03 58 32
"	22	Ki	iP	20 38 39.9				iPKKP	04 02 44.0
				microns sec				iSS	04 05 34
			P	Z' 0.1 1.0					microns sec
		Gb	iP	20 39 46.1				P	E 0.8 6
		Um	iP	20 39 08.4 D				P	Z 2.4 7
		Ka	iP	20 39 58.0				P	Z' 0.2 1.5
				Alaska (h = 30 km).				PP	E 6.2 8
"	22	Ki	iPKP	23 22 40.8 D				PP	N 1.7 8
		Sk	iPKP	23 22 51.6				PP	Z 11 8
		Um	iPKP	23 22 46.9 D				SKS	E 4.1 6
				New Hebrides Islands				SKS	N 1.2 6
				(h = 220 km).				S	N 2.2 8
"	23	Up	iP	02 03 01.1				PKKP	Z' 0.1 1.0
cont.								M	E 16 20
								M	N 15 19
								M	Z 20 21
									(D = 11500 km =
									103 1/2°).
					cont.				

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

1964						1964				
Apr.	23	Sk	i	03 47 26.0		Apr.	23	Sk	iP	15 06 28.7
cont.			iPKKP	04 02 31.5		cont.			ipP	15 06 35.7
			i	04 02 42.0				Gb	iP	15 07 07.8 D
		Gb	eP	03 47 27				Um	iP	15 06 29.7 D
			e	03 50 11				Ka	iP	15 07 19.2
			i	03 51 26.7				Alaska. h = 30 km (Sk).		
			ePKKP	04 02 21				Magn. = 5.8 (Up,Ki).		
		Um	iP	03 46 56.6 C		"	23	Um	iP	16 51 21.7
			i	03 47 08.3						
			iPKP	03 51 11						
			iPP	03 51 20.9		"	23	Up	iP	20 57 59.3
			i	03 55 32					i	20 58 07.5
			i	03 57 07				Luzon (h = 50 km).		
			iSKS	03 57 28						
			iS	03 58 26		"	23	Up	iP	21 19 12.8
			iPKKP	04 02 37.2						microns sec
		Ka	i(P)	03 47 34.5				M	E	0.7 18
		Aru Islands (h = 30 km).						M	N	0.6 15
		Magn. = 7.2 (Up,Ki).						M	Z	0.9 18
"	23	Up	iP	05 39 58.5			Ki	iP		21 18 19.8
"	23	Up	iP	10 33 00.2						microns sec
"	23	Um	iPKP	10 51 20.8				M	E	0.9 20
		Solomon Islands						M	N	1.3 17
		(h = 60 km).						M	Z	1.4 17
"	23	Um	iP	12 19 19.3			Sk	iP		21 18 55.5
"	23	Up	iP	14 29 10.1			Gb	iP		21 19 32.9
			i	14 29 17.2			Um	iP		21 18 45.2 D
			e(S)	14 33 48				eS		21 26 52
				microns sec			Ka	iP		21 19 37.3
			M	E 0.8 15			Kamchatka (h = 30 km).			
			M	N 1.0 19		"	24	Up	iP	00 53 05.0
			M	Z 1.4 22				Ki	iP	00 52 11.9 C
		Ki	eP	14 30 09						microns sec
				microns sec				P	Z'	0.1 1.0
			M	E 1.2 18			Sk	eP		00 52 48
			M	N 0.8 17			Gb	iP		00 53 25.2
			M	Z 1.0 18			Um	iP		00 52 37.0
		Gb	eP	14 29 18			Ka	eP		00 53 29 0
			i	14 29 25.8			Kamchatka (h = 30 km).			
		Um	iP	14 29 39.5		"	24	Up	iP	03 54 47.2
			eS	14 34 27				Gb	iP	03 54 30.1
			i	14 34 44				Ka	iP	03 54 05.8
		Ka	iP	14 28 54.2			Greece (h = 90 km).			
		Turkey (h = 60 km).				"	24	Up	iP	04 01 10.3
"	23	Up	iP	15 06 56.2				eS		04 09 21
				microns sec						microns sec
			P	Z' 0.2 1.2			S	N	0.9 11	
		Ki	iP	15 06 01.4			M	N	0.8 19	
				microns sec			M	Z	1.0 21	
			P	Z' 0.1 1.3			D = 6650 km = 60°.			
cont.							Ki	iP		04 00 16.6
								iS		04 07 46
						cont.				

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

1964					1964							
Apr.	24	Ki		microns sec	Apr.	24	Um	i	06 20 23			
cont.			S	N 0.6 9	cont.			iS	06 22 17			
			M	E 0.8 17				i(SP)	06 24 04			
			M	N 0.9 19				iPS	06 24 31			
			M	Z 1.4 21				i	06 28 03			
				D = 5850 km = 52 1/2°.				iSS	06 30 05			
		Gb	iP	04 01 21.7			Ka	ePKP	06 14 40			
		Um	iP	04 00 44.7				i	06 15 27.8			
			ePa	04 04 26				iPP	06 15 42.7			
			iS	04 08 42				New Guinea (h = 110 km).				
		Ka	iP	04 01 33.0 C				Magn. = 6.9 (Up,Ki).				
				Alaska (h = 30 km).								
"	24	Ki	eP	04 32 43	"	24	Up	iP	09 18 33.8 D			
		Um	iP	04 33 10.2								
				Alaska (h = 20 km).			24	Up	iP	14 52 55.9		
								iS	15 03 15			
"	24	Up	iP	06 10 42.1			Ki	iP	14 52 47.1 C			
			ePKP	06 14 36					microns sec			
			iPP	06 15 23.5				P	Z' 0.2 1.4			
			iS	06 22 47			Sk	iP	14 52 38.4			
			iSP	06 24 43			Um	iP	14 52 53.9			
			iPKKP	06 25 28.3				ipP	14 53 32.9			
				microns sec				iS	15 03 04			
			PP	N 0.4 4				isS	15 04 04			
			PP	Z 1.2 4				i	15 04 27			
			PP	Z' 0.4 1.5			Ka	iP	14 52 56.6			
			S	N 3.3 11				El Salvador. h = 150 km (Um).				
			M	E 17 23				On Um Press-Ewing records				
			M	N 21 19				the Rayleigh waves are				
			M	Z 24 23				practically limited to one				
				(D = 12450 km = 112°).				pulse with a period of about				
		Ki	eP	06 10 15				50 sec.				
			i	06 11 17.4			"	24	Ki	iPn	17 28 32.6	
			iPKP	06 14 24.4						iSn	17 29 13.4	
			iPP	06 14 39						iSg	17 29 28.8	
			ipPP	06 15 06						D = 370 km = 3.3°.		
			iSKS	06 20 44				Sk	eSg	17 32 13		
			i	06 24 26				Um	iSg	17 31 01.4		
			iS	06 22 05						Northwest Russia, 68.9°N,		
			iSS	06 29 38						28.9°E. Origin time =		
				microns sec						17 27 39. Explosion?		
			P	Z' 0.1 1.0				"	24	Up	iP	20 21 48.5 C
			SKS	E 2.3 6								
			S	N 4.1 10				"	25	Up	iP	01 16 50.3
			M	E 20 22								Turkey (h = 40 km).
			M	N 22 22				"	25	Up	iP	02 26 42.2
			M	Z 16 23								
				(D = 11900 km = 107°).				"	25	Up	iP	07 35 08.1 D
		Sk	ePKP	06 14 34								
		Gb	iPKP	06 14 40.7				"	25	Up	iP	09 53 33.9
			iPP	06 15 40.0								
		Um	iP	06 10 23.5 C				"	25	Up	iP	09 52 39.3
			iPKP	06 14 18.2								
			iPP	06 14 53				cont.				

cont.

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

1964					1964				
Apr. cont.	25	Ki		microns sec	Apr. cont.	25	Ka	eP	18 50 06
			P	Z' 0.1 1.0				ipP	18 50 18.7
		Sk	iP	09 53 04.9			Ryukyu Islands. h = 50 km		
		Gb	iP	09 53 44.9 C			(Up,Ki,Gb,Um,Ka).		
		Um	iP	09 53 07.8			In this case the amplitude		
			eS	10 00 43			of pP is 5-8 times the		
		Ka	iP	09 53 57.0 C			amplitude of P on our Z'		
		Alaska (h = 30 km).					records.		
"	25	Ki	iP	10 44 37.1 C	"	26	Up	eP	01 37 27
"	25	Up	eP	12 03 51			Ki	eP	01 38 28
"	25	Up	iP	12 49 36.1			Sk	eP	01 38 06
				microns sec			Crete (h = 70 km).		
			M	E 1.5 20	"	26	Up	iP	14 12 35.3 C
			M	N 1.0 20			Ki	iP	14 12 34.0 C
			M	Z 1.2 15					microns sec
		Ki	iP	12 50 42.3				P	Z' 0.1 1.0
				microns sec			Sk	iP	14 12 48.4 C
			P	Z' 0.1 0.8			Um	iP	14 12 32.0 C
			M	E 0.9 12			Sumatra (h = 90 km).		
		Sk	iP	12 50 15.3	"	26	Up	iPKP	15 10 32.2
		Gb	iP	12 49 30.6				iSKP	15 13 26.4
		Um	iP	12 50 07.2 D			Ki	iPKP	15 10 23.6
		Ka	iP	12 49 04.6				iSKP	15 13 02.7
		Dodecanese Islands					Sk	iSKP	15 13 19.7
		(h = 30 km).					Gb	iPKP	15 10 40.7
"	25	Um	iP	12 56 58.4 C				iSKP	15 13 34.9
"	25	Gb	iP	16 20 17.9			Um	e(PKP)	15 10 21
		Alaska (h = 30 km).						iPKP	15 10 31.1
"	25	Up	iP	18 49 52.1				iSKP	15 13 14.7
			i	18 49 56.5			Ka	iPKP	15 10 41.4
			ipP	18 50 04.6				i	15 10 57.7
				microns sec				iSKP	15 13 36.7
			pP	Z' 0.4 0.7	"	26	Up	iPKP	22 53 43.4
			M	E 1.6 17			Um	iPKP	22 53 51.0
			M	N 1.4 18			South of Sandwich Islands		
			M	Z 2.2 17			(h = 30 km).		
		Ki	iP	18 49 26.9	"	27	Up	iP	01 49 45.7
			ipP	18 49 38.7			Ki	iP	01 49 45.6 D
				microns sec				i	01 49 47.3
			pP	Z' 0.4 1.1				eS	02 00 17
			M	E 2.1 18					microns sec
			M	N 0.6 14				P	Z' 0.1 1.0
			M	Z 1.9 20				M	E 0.9 18
		Sk	e(P)	18 50 01				M	N 0.7 20
			ipP	18 50 06.4				M	Z 1.1 17
		Gb	iP	18 50 11.8				D = 9450 km = 85°.	
			ipP	18 50 24.3			Sk	iP	01 50 01.0
		Um	iP	18 49 36.3				i	01 50 16.5
			ipP	18 49 48.2			Um	iP	01 49 43.3
cont.								iS	02 00 06
							Sumatra (h = 30 km).		

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

1964					
Apr.	27	Up	ePKP	07 04 47	
				microns sec	
			M	E 2.3 20	
			M	N 2.8 20	
			M	Z 4.3 19	
		Ki	iPKP <sub>2</sub>	07 04 50.9	
			iPP	07 08 38	
			eSS	07 28 28	
				microns sec	
			PKP <sub>2</sub>	Z' 0.1 1.5	
			M	E 6.3 22	
			M	N 4.4 21	
			M	Z 11 21	
		Sk	e(PKP)	07 04 55	
			e	07 05 06	
		Um	iPKP	07 04 35.3	
			i	07 04 53.1	
				Balleny Islands (h = 30 km).	
"	27	Um	i(P)	10 58 21.0	
"	27	Um	iP	12 19 03.9	
				Atlantic Ocean (h = 30 km).	
"	27	Um	iP	13 56 40.8	
"	27	Gb	iP	14 53 45.8	
		Um	eP	14 52 04	
"	27	Ki	iP	20 34 15.3	
				Alaska (h = 30 km).	
"	28	Up	eP	00 51 09	
"	28	Up	iP	02 44 30.6	
		Sk	iP	02 44 21.1	
		Um	iP	02 44 14.6	
"	28	Up	eP	06 06 39	
		Um	iP	06 06 58.9	
		Ka	eP	06 06 16	
"	28	Up	iP	12 31 30.2	
			i	12 31 45.3	
		Ki	eP	12 30 37	
		Sk	eP	12 31 01	
				Alaska (h = 30 km).	
"	28	Sk	iP	13 40 07.5	
"	28	Ki	iP	13 43 44.9	
		Sk	eP	13 44 10	
			ePcP	13 45 00	
		Um	iP	13 44 12.7	
				Alaska (h = 30 km).	

1964					
Apr.	28	Up	iP	18 34 28.6 C	
		Ka	iP	18 34 37.4 C	
				Pamir (h = 150 km).	
"	28	Up	i(P)	22 41 25.6	
"	28	Ki	iP	23 05 53.1 C	
		Sk	iP	23 06 19.9 C	
				Alaska (h = 30 km).	
"	29	Up		---	
				microns sec	
			M	E 1.1 19	
			M	N 1.1 18	
			M	Z 0.7 14	
		Ki	iP	02 22 27.9	
			eLg2	02 48 28	
				microns sec	
			M	E 0.9 18	
			M	N 0.6 15	
			M	Z 0.9 13	
		Sk	eP	02 23 00	
		Um	iP	02 22 39.8	
			i	02 22 44.7	
			eSS	02 36 17	
				Japan (h = 30 km).	
"	29	Up	iP	04 25 47.7 C	
			iS	04 29 36	
			eLg2	04 32 43	
			i	04 33 25	
				microns sec	
			P	Z' 0.2 0.6	
			S	E 1.4 6	
			S	N 1.7 7	
			S	Z 2.7 11	
			M	E 12 13	
			M	N 9.3 11	
			M	Z 8.4 10	
				D = 2350 km = 21°.	
		Ki	iP	04 27 01.2	
			i	04 27 27.3	
			iS	04 31 53	
			eSa	04 32 17	
			iLg2	04 36 41	
			iL(3.25)	04 37 21	
			iRg	04 38 23	
				microns sec	
			P	Z' 0.2 1.5	
			S	N 0.7 10	
			M	E 10 13	
			M	N 6.8 12	
			M	Z 7.2 10	
				D = 3150 km = 28 1/2°.	
		Sk	iP	04 26 30.9	

cont.

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

1964					1964						
Apr.	29	Gb	iP	04 25 38.4	Apr.	30	Ki	iP	04 10 35.0		
cont.		Um	iP	04 26 25.4 C				ipP	04 10 43.8		
			iS	04 30 41			Sk	iP	04 10 58.0		
		Ka	iP	04 25 10.0 C				ipP	04 11 07.5		
			i	04 25 17.6			Um	ipP	04 11 09.4		
			iS	04 28 38.4					Alaska. h = 40 km (Ki,Sk).		
				Aegean Sea (h = 30 km).		"	30	Um	iP	04 23 25.1	
				Magn. = 5.5 (Up,Ki).		"	30	Ki	iP	05 41 25.0	
				Well developed higher				Sk	iP	05 41 51.6	
				mode surface waves.				Um	iP	05 41 52.7	
"	29	Up	iP	17 04 44.9 C						Alaska (h = 30 km).	
			iPP	17 05 09.9			"	30	Ki	iP	11 59 45.5
			iS	17 08 37				Um	iP	12 00 13.6	
			i	17 12 22						Alaska (h = 30 km).	
				microns sec		"	30	Up	iP	15 06 04.7 C	
			P	Z' 0.1 0.7				Ki	iP	15 05 43.3	
			M	E 3.6 15				Sk	iP	15 06 09.5	
			M	N 2.0 10				Um	iP	15 05 50.4 C	
			M	Z 1.6 10						Luzon (h = 50 km).	
				D = 2350 km = 21°.		"	30	Up	ePKP	16 22 04	
		Ki	iP	17 05 58.5					iPP	16 23 03	
				microns sec						microns sec	
			M	E 2.9 13				M	E	1.3 23	
			M	N 1.3 9				M	N	2.3 22	
			M	Z 1.3 9				M	Z	1.8 22	
		Sk	iP	17 05 28.0			Ki	iPKP	16 21 57.8		
		Gb	iP	17 04 35.8					microns sec		
		Um	iP	17 05 22.4				M	E	3.0 25	
			iS	17 09 42				M	N	1.6 22	
		Ka	iP	17 04 09.2				M	Z	6.4 27	
				Aegean Sea (h = 30 km).			Sk	ePKP	16 22 08		
"	29	Ki	iPKP	17 56 47.4 C			Um	iPKP	16 21 58.1		
		Um	iPKP	17 56 39.5				i	16 22 01.4		
			i	17 56 49.4				iPP	16 22 41		
				East of Sandwich Islands				iSP	16 32 07		
				(h = 30 km).					New Ireland (h = 80 km).		
"	29	Um	iP	19 10 03.3		"	30	Ki	iP	17 35 44.3	
"	29	Um	iP	19 16 20.5						microns sec	
			i	19 16 30.4				P	Z' 0.1 1.2		
"	29	Um	iP	19 28 12.5			Sk	iP	17 36 08.4		
"	30	Sk	iP	00 35 58.4			Um	iP	17 36 16.0		
				Alaska (h = 30 km).					Alaska (h = 30 km).		
"	30	Up	i(P)	03 20 06.6		"	30	Up	iP	18 16 13.4 D	
"	30	Sk	iP	03 59 12				Sk	iP	18 16 56.0	
		Sk	iP	03 59 35.5				Um	iP	18 16 52.3	
		Um	iP	03 59 40.1						Aegean Sea (h = 120 km).	
				Alaska (h = 20 km).		"	30	Up	iP	20 17 34.0 C	
										microns sec	
								P	Z' 0.1 0.5		







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

1964						1964					
May	4	Sk	iP	09 25 42.1		May	5	Sk	iP	14 46 29.5	
		Um	iP	09 26 32.7		cont.		Um	iP	14 46 01.2	
				(Norwegian Sea).						Sinkiang, China	
										(h = 30 km).	
"	4	Up	iP	12 15 04.8 C		"	5	Up	iP	16 24 08.6	
			ipP	12 15 18.4				Ki	eP	16 23 10	
				microns sec				Sk	eP	16 23 35	
			P	Z' 0.1 1.0				Um	iP	16 23 43.8	
		Ki	iP	12 14 09.6 C						Alaska (h = 25 km).	
			ipP	12 14 22.8							
				microns sec							
			P	Z' 0.2 1.0		"	5	Ki	i(Sg)	17 54 17.2	
		Sk	iP	12 14 36.7				Sk	e	17 54 24	
		Gb	iP	12 15 16.5 C					i(Sg)	17 56 13.6	
		Um	iP	12 14 38.2 C				Um	i	17 57 03.4	
				Alaska. h = 50 km (Up,Ki).					e	17 57 20	
				Magn. = 5.8 (Up,Ki).						(Norwegian Sea).	
"	4	Um	eP	17 19 09		"	5	Up	i(PKP2)	18 23 23.1	
"	4	Ki	iPKP	17 24 18.3 C				Um	iPKP	18 22 57.9	
				Bouvet Island (h = 30 km).						New Zealand (h = 180 km).	
"	5	Up	iP	00 51 07.7 C		"	5	Ki	iP	22 50 43.8	
"	5	Ki	iP	02 13 52.3				Sk	iP	22 51 21.6	
		Sk	iP	02 14 12.4				Um	iP	22 50 58.1	
		Um	iP	02 14 22.2						These readings, which seem	
				Alaska (h = 30 km).						reliable, do not agree with	
"	5	Ki	eP	02 41 54		"	6	Up	iPKP	04 46 00.9	
				Alaska (h = 15 km).						microns sec	
"	5	Ki	eP	05 34 08						M N 0.7 18	
			i	05 34 12.7				Ki	ePKP	04 46 16	
				Tien-Shan.				Sk	ePKP	04 46 04	
"	5	Up	iP	08 12 45.8 D				Um	iPKP	04 46 06.7	
				microns sec					i	04 46 15.7	
			M	E 1.1 20						Sandwich Islands	
			M	N 1.5 24		"	6	Um	iP	06 27 25.1	
			M	Z 1.6 20						(h = 30 km).	
		Ki	eP	08 11 54		"	6	Um	iP	06 58 55.7	
				microns sec		"	6	Up	i	07 13 10.9	
			M	E 0.8 19					iSg	07 13 13.8	
			M	N 1.2 19						microns sec	
			M	Z 1.5 18						Sg Z' 0.1 0.5	
		Sk	eP	08 12 34				Ki	iSg	07 14 29.3	
			ePcP	08 13 04				Sk	iPn	07 10 58.7	
		Um	iP	08 12 20.7					iSn	07 11 28.8	
				Kurile Islands (h = 40 km).					iSg	07 11 45.8	
				Magn. = 5.3 (Up,Ki).						D = 310 km = 2.8°.	
"	5	Up	iP	14 46 20.7				Gb	i(Lgl)	07 12 39.4	
			i	14 46 27.1				Um	i	07 13 27.6	
		Ki	iP	14 45 59.6					iSg	07 13 36.0	
cont.						cont.					

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

1964					1964					
May	6	Ka	i	07 13 41.3	May	6	Sk	iP	15 36 39.5 C	
cont.			iLgl	07 13 58.3	cont.		Gb	iP	15 37 19.0 C	
				Ålesund area, Norway,			Ka	iP	15 37 29.9 C	
				62.2°N, 7.2°E.					Alaska (h = 15 km).	
				Origin time = 07 10 12.					Magn. = 6.0 (Up, Ki).	
"	6	Up		---	"	6	Up	iP	17 22 18.7 C	
				microns sec					microns sec	
		M	E	1.0 18			M	E	0.7 16	
		M	N	1.0 20			M	N	0.7 17	
		M	Z	1.1 18			Ki	iP	17 21 38.7	
		Ki	iPKP	08 29 30.0					microns sec	
			ePS	08 40 29			M	E	1.1 20	
				microns sec			M	N	0.6 16	
		M	E	1.2 18			M	Z	1.1 15	
		M	N	0.8 17			Sk	eP	17 22 12	
		M	Z	1.5 18				e(pP)	17 22 23	
		Sk	iPKP	08 29 40.8					Japan (h = 30 km).	
				Solomon Islands (h = 40 km).	"	6	Up	iP	20 51 26.8 C	
				Magn. = 5.7 (Up, Ki).				i(pP)	20 51 33.9	
"	6	Up	iSn	11 22 46.9					microns sec	
			iS <sup>X</sup>	11 22 54.0				(pP) Z'	0.1 1.0	
			iSg	11 23 02.8			Ki	eP	20 51 05	
			D = 410 km = 3.7°.				Sk	iP	20 51 20.8 C	
		Sk	iSg	11 24 55.8			Gb	iP	20 51 35.8	
		Ka	eSg	11 24 18				i	20 51 48.6	
				Gulf of Finland,			Ka	iP	20 51 37.0	
				59.6°N, 24.7°E.				i	20 51 49.0	
				Origin time = 11 21 00.	"	6	Up	iP	20 56 12.6 C	
				Explosion?			Ki	iP	20 55 25.5	
"	6	Ki	iP	11 45 56.5					microns sec	
				Hindu Kush (h = 250 km).			P	Z'	0.1 0.9	
"	6	Up	iP	15 37 07.1 C					Kurile Islands (h = 40 km).	
			iPa	15 40 52	"	7	Up	iPKP	00 53 32.5	
			iS	15 45 40			Ki	iPKP	00 53 29.0	
				microns sec			Ka	iPKP	00 53 45.4	
		P	N	0.5 5					Fiji Islands (h = 300 km).	
		P	Z	0.5 3	"	7	Up	iP	04 13 28.2	
		P	Z'	0.4 1.6					microns sec	
		S	N	0.7 7				P	Z'	0.1 0.5
		M	E	1.8 19			Ki	iP	04 12 35.4	
		M	N	2.6 21				iPcP	04 13 20.7	
		M	Z	1.7 18			Sk	eP	04 13 09	
				D = 7100 km = 64°.					Aleutian Islands.	
		Ki	iP	15 36 12.9 C	"	7	Up	iP	05 56 07.7 D	
			eS	15 44 02				ipP	05 56 18	
			iScS	15 46 02				eS	06 04 44	
				microns sec					microns sec	
		P	Z	0.9 5			P	N	0.5 3	
		P	Z'	0.3 1.5			P	Z	1.6 3	
		M	E	2.7 22			P	Z'	1.0 1.5	
		M	N	3.3 21			S	E	6.5 14	
		M	Z	4.4 20						
				D = 6200 km = 56°.	cont.					

cont.

cont.



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

1964				1964												
May	7	Up	iP	12 23	10.2	D	May	8	Up	iPKP	03 55	46.8				
	"	7	Up	iP	17 49	15.1					Kermadec Islands (h = 40 km).					
			Ki	iP	17 49	25.1			"	8	Up	iPKP	04 17	35.6	D	
			Sk	iP	17 49	41.6						Kermadec Islands (h = 50 km).				
	"	7	Ki	eP	19 21	50			"	8	Ki	iP	09 32	47.8		
			Alaska (h = 15 km).								Sk	eP	09 33	17		
	"	7	Up	iP	20 23	52.8	C		"	8	Ki	iP	10 41	23.9		
			iPP	20 26	28.0					"	8	Up	iP	16 32	19.7	C
			iS	20 32	59							iS	16 40	59		
			eP'P'	20 52	04							microns sec				
											P	Z'	0.1	0.8		
											S	E	0.8	7		
											M	E	1.7	18		
											M	N	1.9	19		
											M	Z	2.2	22		
											D = 7100 km = 64°.					
										Ki	iP	16 31	25.9	C		
											iS	16 39	12			
											microns sec					
											P	N	0.4	7		
											P	Z	1.1	6		
											P	Z'	0.2	0.8		
											S	E	0.7	7		
											M	E	1.7	17		
											M	N	2.3	20		
											M	Z	2.8	19		
											D = 6200 km = 56°.					
										Sk	iP	16 31	53.0	C		
											ipP	16 32	00.4			
										Gb	iP	16 32	31.9			
											ipP	16 32	38.8			
										Ka	iP	16 32	43.1	C		
										Alaska. h = 30 km (Sk, Gb).						
										Magn. = 5.9 (Up, Ki).						
	"	7	Up	iPKP	23 32	09.6	C		"	8	Up	iP	21 44	36.4		
			Ki	iPKP	23 31	49.0					i	21 44	39.9			
			Sk	iPKP	23 32	04.4					microns sec					
			Gb	iPKP	23 32	17.5					P	Z'	0.2	1.2		
			Ka	iP	20 24	13.4	C				M	E	2.6	22		
				iPP	20 26	45.8					M	N	2.0	20		
			Japan (h = 30 km).								M	Z	1.8	19		
			Magn. = 6.5 (Up, Ki).							Ki	iP	21 43	40.7			
											i	21 43	44.9			
											iS	21 51	04			
											microns sec					
											P	Z'	0.3	1.2		
											S	E	0.9	4		
											M	E	2.3	16		

cont.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964  
 May 8 Ki microns sec  
 cont. M N 2.6 14  
 M Z 3.2 17  
 D = 5650 km = 51°  
 Sk iP 21 44 06.4  
 i 21 44 10.7  
 Gb iP 21 44 46.6  
 i 21 44 51.1  
 Ka iP 21 44 58.6  
 i 21 45 03.0  
 Alaska (h = 35 km).  
 Magn. = 5.8 (Up, Ki).  
 The P-phase is multiple,  
 the second phase appearing  
 on the average 4.2 sec  
 after the first one, with  
 similar pulse shape but  
 with an amplitude which is  
 on the average 2.5 times  
 the first. If the second  
 phase were a pP, then the  
 focal depth would be only  
 about 15 km.

" 8 Ki iP 21 59 07.3 C  
 Molucca Passage  
 (h = 30 km).

" 8 Up iP 22 02 49.1  
 iS 22 05 21  
 i 22 05 58  
 microns sec  
 S Z' 0.1 0.5  
 D = 1600 km = 14½°  
 Ki iP 22 01 43.9 D  
 i 22 01 52.5  
 iS 22 03 45.5  
 eT 22 09 26  
 i 22 09 40.6  
 i(PcS) 22 11 30.7

microns sec  
 P Z' 0.6 0.9  
 D = 1100 km = 10°  
 Sk iP 22 01 49.0 D  
 iS 22 03 38.6  
 Ka iP 22 03 27.1 D  
 Jan Mayen (h = 25 km).

Due to the relative proximity  
 of the source, the amplitudes  
 of PZ' exhibit pronounced  
 source effects, the amplitude  
 ratio for Ki:Sk:Ka being  
 about 4.7:1.8:1.

" 8 Up iP 23 51 44.2  
 i 23 51 46.1  
 cont.

1964  
 May 8 Up microns sec  
 cont. P Z' 0.3 1.3  
 M E 1.7 18  
 M N 1.8 18  
 M Z 1.8 19  
 Ki iP 23 50 49.9  
 eS 23 59 09  
 iPS 23 59 21  
 microns sec  
 P Z' 0.3 1.1  
 S N 0.6 9  
 M E 2.8 18  
 M N 1.4 18  
 M Z 2.5 18  
 D = 6700 km = 60½°  
 Sk iP 23 51 23.2 D  
 Gb iP 23 52 01.4  
 Ka iP 23 52 07.0  
 Aleutian Islands  
 (h = 20 km).  
 Magn. = 5.9 (Up, Ki).

" 9 Up eP 00 04 30  
 Ki iP 00 03 49.5 C  
 Japan (h = 50 km).

" 9 Ki iP 00 25 32.4  
 Aleutian Islands  
 (h = 30 km).

" 9 Up iP 02 13 27.7 C  
 iP'P' 02 41 40.8

microns sec  
 P Z' 0.2 1.0  
 M N 1.1 18  
 Ki iP 02 12 35.1 C

microns sec  
 P Z' 0.4 1.0  
 M E 1.2 18  
 M N 0.7 18  
 M Z 1.4 19

Sk iP 02 13 05.3  
 Gb iP 02 13 42.8  
 Ka iP 02 13 50.9

Aleutian Islands  
 (h = 25 km).

" 9 Up iP 07 14 33.3 D

" 9 Up iP 07 54 18.8  
 Ki iP 07 54 57.1  
 Iran (h = 30 km).

" 9 Up iP 08 38 43.7

" 9 Up iP 14 01 10.9  
 Mindanao (h = 60 km).

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

1964				1964						
May	9	Up	iP	15 21 15.3	May	11	Up	ePKP	00 29 28	
			i	15 21 20.8			Sk	ePKP	00 29 22	
		Ki	iP	15 20 34.4 C			Um	iPKP	00 29 14.2	
		Um	iP	15 20 52.4						
		Sea of Japan (h = 25 km).				"	11	Up	eP	02 26 57
							Ki	iP	02 26 01.1	
"	9	Up	iPKP	18 35 19.8					microns sec	
		Ki	iPKP	18 35 05.7				P	Z' 0.1 1.0	
		Sk	iPKP	18 35 17.4			Sk	iP	02 26 28.5	
		Um	iPKP	18 35 12.3			Um	iP	02 26 31.0	
		New Hebrides Islands (h = 40 km).					Alaska (h = 30 km).			
"	9	Up	iP	20 03 22.0		"	11	Up	iPKP	05 47 46.8
		Sk	iP	20 02 59.5			Um	iSKP	05 50 30.0	
		Um	eP	20 02 59			Fiji Islands (h = 510 km).			
		Alaska (h = 30 km).				"	11	Up	iP	06 15 23.0
"	10	Up	iP	01 33 41.5				i	06 15 31.6	
		Um	iP	01 33 21.8 D			Ki	iP	06 15 54.2	
							Sk	iP	06 15 56.3 C	
"	10	Up	iP	05 51 47.4				i	06 16 10.2	
			iPP	05 54 49.8			Um	iP	06 15 33.4 C	
		Ki	iP	05 51 12.9				iPP	06 17 17.7	
				microns sec				iPcP	06 17 27.0	
		M	E	1.0 19			Ka	iP	06 15 28.1	
		M	N	0.9 19			Iran (h = 60 km).			
		M	Z	1.9 20		"	11	Ki	iP	10 13 23.6
		Sk	iP	05 51 43.7			Um	iP	10 13 44.7	
		Gb	iP	05 52 06.0				i	10 13 57.6	
		Um	iP	05 51 28.0			Kurile Islands (h = 30 km).			
			iS	06 01 09		"	11	Ki	e(Pn)	11 25 53
		Ka	iP	05 52 04.5				iSn	11 26 22.2	
		Bonin Islands (h = 60 km).						iSg	11 26 35.3	
"	10	Up	iP	06 40 12.5		"	11	Gb	iPKP	14 58 33.7
		Ki	iP	06 39 19.8			Ka	iPKP	14 58 36.6 C	
				microns sec			Tonga Islands (h = 50 km).			
			P	Z' 0.1 1.0		"	11	Ki	iP	15 10 21.1
		Um	iP	06 39 46.0			Talaud Islands (h = 60 km).			
		Aleutian Islands (h = 40 km).				"	11	Ki	iP	17 05 35.2
"	10	Um	iPKP	06 46 13.1			Um	iP	17 05 40.5	
		New Ireland (h = 80 km).					Celebes Sea (h = 570 km).			
"	10	Up	iP	10 57 02.8 C		"	11	Ki	iP	18 32 22.3
		Sk	iP	10 56 56.9			Alaska (h = 30 km).			
		Um	iP	10 56 32.8		"	11	Ki	iP	20 19 47.7
			ipP	10 56 39.8			Alaska (h = 30 km).			
		Japan. h = 30 km (Um).				"	12	Up	iPKP	01 56 24.1
"	10	Um	iP	11 49 42.1			Fiji Islands (h = 610 km).			
		Aleutian Islands (h = 40 km).				"	12	Ki	eP	02 13 49
"	10	Um	iP	14 56 55.7			Alaska (h = 25 km).			

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964					1964				
May	12	Up	iP	11 27 44.4	May	12	Up		microns sec
		Um	iP	11 27 25.0 D			M	N	3.4 19
		South of Japan					M	Z	6.5 22
		(h = 25 km).				Ki	iP		18 26 21.8
"	12	Ki	iP	11 56 41.8			ipP		18 26 29.1
			ipP	11 56 47.6			eS		18 34 05
				microns sec					microns sec
			pP	Z' 0.1 1.4			P	N	1.0 6
		Um	iP	11 57 10.2			P	Z	2.0 6
			ipP	11 57 15.8			P	Z'	0.4 1.0
		Alaska. h = 25 km (Ki,Um).					S	E	1.5 9
"	12	Up	iPg	14 51 23.4			S	N	3.3 17
			iSg	14 51 38.7			M	E	8.7 24
			iSn	14 51 41.5			M	N	11 21
				microns sec			M	Z	13 22
			Sn	Z' 0.1 0.5		Sk	iP		18 26 48.3
			D = 130 km = 1.2°.				ipP		18 26 55.5
		Sk	eLgl	14 54 00		Gb	iP		18 27 28.2
		Ka	eSn	14 52 21			ipP		18 27 34.9
			iSg	14 52 36.3		Um	iP		18 26 50.1
			D = 320 km = 2.9°.				ipP		18 26 57.0
		The Baltic Sea,					ePP		18 29 08
		58.7°N, 18.3°E.					iS		18 35 00
		Origin time = 14 51 00.				Ka	iP		18 27 39.3
		Underwater explosion?					ipP		18 27 45.9
"	12	Up	iP	15 13 55.0					Alaska. h = 30 km
"	12	Up	iP	17 05 52.6					(Up,Ki,Sk,Gb,Um,Ka).
		Ki	iP	17 04 57.9					Magn. = 6.3 (Up,Ki).
		Sk	iP	17 05 24.1					This interpretation differs
		Gb	iP	17 06 03.4					from the one by USCGS, who
		Um	iP	17 05 26.6 C					instead assumed the P of
		Ka	eP	17 06 19					this shock to be pP of the
		Alaska (h = 30 km).							preceding one. The PZ'-
"	12	Up	iP	18 27 13.5 C	"	12	Up	iP	18 32 52.6
		Ki	iP	18 26 19.6 C			Ki	iP	18 31 58.4
		Sk	iP	18 26 46.1					microns sec
		Gb	eP	18 27 25				P	Z' 0.2 1.0
		Um	iP	18 26 47.6 C			Sk	iP	18 32 25.0
		Ka	eP	18 27 35			Gb	iP	18 33 04.0
		Alaska.					Um	iP	18 32 26.6
"	12	Up	iP	18 27 16.4			Ka	iP	18 33 15.6
			ipP	18 27 23.0			Alaska.		
			iS	18 35 50	"	12	Ki	iP	18 38 39.6
				microns sec			Sk	iP	18 39 06.7
		P	N	1.2 6			Alaska (h = 20 km).		
		P	Z	1.9 6	"	12	Ki	iP	23 47 04.1
		P	Z'	0.2 1.0			Alaska (h = 20 km).		
		S	E	2.9 13	"	12	Um	iP	23 52 02.9
		S	N	1.1 6			Alaska (h = 25 km).		
		M	E	2.7 18					

cont.





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

1964						1964					
May	14	Up	iPKP	01 25 05.5		May	16	Up		microns sec	
		Sk	iPKP	01 25 03.4		cont.		P	Z'	0.1 0.5	
		Um	iPKP	01 24 55.7							
		Kermadec Islands (h = 310 km).				"	16	Up	iP	08 11 40.3	
"	14	Ki	iPg	09 21 29.5 C		"	16	Up	iP	08 28 54.3	
			iSn	09 21 52.6		"	16	Up	iP	08 46 29.8 C	
			iSg	09 22 02.6						microns sec	
			D = 290 km = 2.6°.					P	Z'	0.4 1.0	
		Sk	eSg	09 24 44			Ki	iP		08 46 38.0	
		Um	iSg	09 24 16.6						microns sec	
		Off coast of northern Norway, 70.5°N, 21.0°E. Origin time = 09 20 37.						P	Z'	0.2 1.0	
"	14	Um	iP	12 43 44.1			Gb	iP		08 46 51.5	
"	14	Up	iPKP	13 43 17.3				iPP		08 48 35.5	
		Um	iPKP	13 43 06.5 C			Um	iP		08 46 27.8 C	
		Kermadec Islands (h = 30 km).						iPP		08 47 57.7	
"	14	Up	iP	17 05 15.4 C			Ka	iP		08 46 34.8 C	
		Sk	iP	17 05 55.8			Hindu Kush (h = 120 km). Magn. = 6.2 (Up,Ki).				
"	14	Gb	iPKP	20 19 23.1		"	16	Up	iP	10 02 28.4	
		Ka	iPKP	20 19 25.5 D			Ki	iP		10 01 34.4	
		Fiji Islands (h = 610 km).					Um	iP		10 02 01.6	
"	15	Up	iP	01 18 18.9			Aleutian Islands (h = 30 km).				
		Sk	iP	01 19 01.2		"	16	Ki	iP	10 36 50.9	
		Libya (h = 30 km).					Alaska (h = 40 km).				
"	15	Up	iP	23 44 23.5		"	16	Ki	iP	14 54 22.1	
"	16	Up	iP	06 07 52.5 C			Alaska (h = 30 km).				
			iPP	06 08 58.0		"	16	Up	iPKP	16 27 35.2	
			microns sec							microns sec	
			P	Z' 0.1 0.6						PKP Z' 0.4 1.5	
			PP	Z' 0.1 0.5						M E 1.4 18	
		Ki	iP	06 07 37.1 C						M N 1.6 20	
			microns sec							M Z 2.0 21	
			P	Z' 0.3 0.5			Ki	ePKP		16 27 24	
		Sk	iP	06 08 08.0 C				microns sec			
			iPP	06 09 22.4				M	E	1.5 18	
			i	06 09 29.5				M	N	2.0 20	
		Gb	iP	06 08 21.1				M	Z	2.3 19	
			iPP	06 09 46.0			Sk	ePKP		16 27 33	
		Um	iP	06 07 37.6			Gb	iPKP2		16 27 57.4	
		Ka	iP	06 08 08.1			Um	iPKP		16 27 25.0	
			i	06 09 12.7				e		16 37 50	
		Kazakh SSR, Magn. = 6.2 (Up,Ki). Underground explosion.						iSS			16 49 48
"	16	Up	iP	07 08 24.5			Ka	iPKP2		16 28 09.7	
cont.							Kermadec Islands (h = 30 km). Magn. = 6.0 (Up,Ki).				
						"	16	Up	iPKP	16 29 42.7	
								Um	iPKP	16 29 28.0	
							Kermadec Islands.				

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

1964					1964				
May	16	Um	iP	16 33 37.9	May	17	Up	iPKP	18 45 44.9
			i	16 33 53.6				i	18 45 51.1
"	16	Um	iP	17 36 04.9 D			Um	iPKP	18 45 31.3
				Sea of Japan (h = 430 km).					Kermadec Islands
									(h = 60 km).
"	16	Up	iP	17 47 40.5	"	17	Up	iP	19 21 49.5 C
							Um	iP	19 21 24.0
"	17	Up	eP	01 00 23					Kurile Islands
			eS	01 08 41					(h = 30 km).
				microns sec					
			S	N 1.2 10	"	17	Up	iP	19 34 07.5
			M	E 2.0 18				i	19 34 11.9
			M	N 5.1 21				iX	19 34 20.2
			M	Z 3.9 20				iS	19 40 28
				D = 6650 km = 60°.					microns sec
		Ki	iP	00 59 27.7				P	E 0.5 4
			eS	01 07 07				P	Z' 0.3 1.0
				microns sec				S	E 6.0 16
			P	Z' 0.2 1.7				S	N 5.7 16
			S	E 1.2 10				M	E 11 21
			S	N 1.0 7				M	N 11 16
			M	E 2.9 21				M	Z 17 21
			M	N 6.0 22					D = 4650 km = 42°.
			M	Z 7.1 21			Ki	iP	19 34 38.1 D
				D = 5900 km = 53°.				iS	19 41 18
		Sk	iP	00 59 53.6				iSS	19 44 44
		Um	iP	00 59 57					microns sec
			eS	01 07 52				P	E 0.7 5
			iSS	01 11 53				P	Z 0.9 5
				Alaska (h = 40 km).				P	Z' 0.8 1.5
				Magn. = 5.9 (Up,Ki).				S	E 2.1 9
"	17	Um	iP	01 32 06.3				S	N 3.4 11
"	17	Up	iP	04 52 35.0 D				M	E 6.7 17
		Ki	iP	04 51 42.0				M	N 16 20
				microns sec				M	Z 6.5 16
			P	Z' 0.2 1.0					D = 5050 km = 45½°.
		Sk	iP	04 52 10.6			Sk	eP	19 34 02
		Gb	iP	04 52 46.9				i	19 34 08.4
		Um	iP	04 52 09.1 D			Gb	iP	19 33 45.8
		Ka	iP	04 52 57.2			Um	iP	19 34 27.6 D
				South of Alaska				iS	19 40 59
				(h = 30 km).				iSS	19 43 58
"	17	Up	e(P)	11 54 05			Ka	iP	19 33 58.8
		Um	iP	11 53 40.9				iPP	19 35 25.5
"	17	Up	iPKP	17 25 14.1					North Atlantic Ocean
			i	17 25 20.6					(h = 30 km).
		Ki	ePKP	17 24 52					Magn. = 6.3 (Up,Ki).
		Sk	ePKP	17 25 11					PZ' exhibits complicated
		Um	iPKP	17 25 02.4 C					beginnings, especially at
				Kermadec Islands					Up, where the initial
				(h = 30 km).					small-amplitude P is
									followed after 4.4 sec by
									a much larger P; the phase
									marked X (at Up) is a
									clear high-frequency onset

cont.



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

1964					1964				
May	19	Ki		microns sec	May	19	Up	iP	15 48 03.3 C
cont.			M	Z 1.5 8				P	microns sec
				D = 1100 km = 10 <sup>0</sup> .				P	Z' 0.1 1.0
		Sk	iP	06 12 28.0			Ki	iP	15 47 08.7
			i	06 12 36.9					microns sec
			iLg1	06 16 38.1				P	Z' 0.1 1.2
		Gb	eP	06 13 46			Sk	iP	15 47 35.8 C
			iLi	06 19 27.6			Gb	iP	15 48 15.0
			iLg1	06 20 02.6			Um	iP	15 47 35.4 C
		Um	iP	06 12 19.5				eS	15 55 43
			i	06 12 25.5			Ka	iP	15 48 26.2 C
			eS	06 14 50					Alaska (h = 25 km).
			i	06 15 13					Magn. = 5.7 (Up,Ki).
		Ka	iP	06 13 52.2	"	19	Um	iP	23 03 43.3
			iLg1	06 20 13.1	"	19	Sk	eP	23 15 15
			iLg2	06 20 53.7	"	19	Up	eP	23 16 58
				Svalbard (h = 30 km).				i	23 17 05.9
				At Ki the phase at 06 18 17				e(PP)	23 20 43
				marks the initiation of a				eSKS	23 27 24
				very regular wave train				eS	23 28 07
				lasting about 45 sec, with					microns sec
				initial group velocity of				SKS	E 0.3 7
				nearly 2.0 km/sec and with				M	E 1.7 18
				nearly constant period =				M	N 3.0 24
				3.8 sec and with typical				M	Z 2.4 19
				Rayleigh-wave particle					
				motion.			Ki	iP	23 16 58.3
"	19	Up	iP	10 50 22.0				iPP	23 20 40
			iPcP	10 50 47.5				iSKS	23 27 33
				microns sec					microns sec
			M	E 0.4 23				SKS	E 1.1 7
			M	N 1.1 19				M	E 6.5 24
			M	Z 1.6 20				M	N 3.4 24
		Ki	eP	10 49 36				M	Z 6.7 24
				microns sec					D = 10450 km = 94 <sup>0</sup>
			M	E 0.8 19			Sk	eP	23 16 47
			M	N 1.0 20			Gb	eP	23 16 45
			M	Z 1.1 19			Um	iP	23 16 59.3
		Sk	eP	10 50 11				i	23 19 35
			ePcP	10 50 37				iPP	23 20 43
		Gb	iP	10 50 42.8				iSKS	23 27 29
		Um	iP	10 49 56.0				iS	23 28 14
			iPcP	10 50 29.4				iPS	23 29 34
		Ka	iP	10 50 44.3			Ka	eP	23 16 49
				Kurile Islands (h = 30 km).					Ecuador (h = 50 km).
"	19	Up	iP	13 29 26.0	"	19	Up	iP	23 32 50.1
				Alaska (h = 30 km).			Sk	eP	23 32 36
"	19	Up	eP	13 44 43			Gb	iP	23 33 11.4
"	19	Sk	iP	14 52 13.5			Um	iP	23 32 22.0
		Um	iP	14 52 15.2			Ka	iP	23 33 13.7
		Ka	iP	14 53 06.1 C					Kurile Islands (h = 50 km).
				Alaska (h = 30 km).	"	20	Up	iP	02 51 05.8
					cont.				



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

1964									1964										
May	21	Up	iP	11 51 51.5	D				May	21	Ka	iP	22 44 45.8						
		Ki	iP	11 51 07.9	D				cont.				Caribbean Sea (h = 30 km).						
		Sk	iP	11 51 43.1									Magn. = 5.5 (Ki).						
		Um	iP	11 51 26.3	D					"	21	Up	iP	23 21 49.1					
		Ka	iP	11 52 12.5								Sk	eP	23 21 39					
		Japan (h = 90 km).											iPcP	23 22 06.7					
"	21	Ki	eP	13 41 00								Um	iP	23 21 23.8					
		Alaska (h = 30 km).										Ka	iP	23 22 11.6					
													iPcP	23 22 29.7					
"	21	Up	iP	15 46 18.1								Kurile Islands							
			eS	15 54 31								(h = 50 km).							
				microns sec						"	22	Up	iPKP	00 46 34.5					
		M	E	0.9	19							Ki	iPKP	00 46 14.6	C				
		M	N	1.2	20									microns sec					
		M	Z	1.0	20									PKP	Z'	0.1	1.0		
		D = 6850 km = $61\frac{1}{2}^{\circ}$ .											Sk	iPKP	00 46 29.5	C			
		Ki	iP	15 45 19.9								Um	iPKP	00 46 21.4	C				
			i	15 45 21.9									i	00 46 24.8					
			eS	15 52 43								Ka	i(PKP)	00 46 59.7					
				microns sec								Kermadec Islands							
		P	Z'	0.1	1.0							(h = 60 km).							
		M	E	1.5	20						"	22	Um	iP	00 51 37.4				
		M	N	1.2	22														
		M	Z	2.2	23							"	22	Ki	iP	02 45 42.9			
		D = 5950 km = $53\frac{1}{2}^{\circ}$ .											"	22	Sk	iPKP	05 18 52.2		
		Sk	eP	15 45 48											eSKP	05 21 48			
			i	15 45 50.4										Um	iSKP	05 21 40.5			
		Gb	eP	15 46 29										Loyalty Islands					
			i	15 46 31.8										(h = 140 km).					
		Um	iP	15 45 50.9								"	22	Um	iP	05 20 28.0			
			iS	15 53 42										Canary Islands					
		Ka	iP	15 46 42.9										(h = 30 km).					
		Alaska (h = 15 km).												"	22	Sk	iP	05 46 14.7	
		Magn. = 5.5 (Up, Ki).														Um	iP	05 46 36.5	
"	21	Up	iP	18 27 24.3											Canary Islands				
														(h = 30 km).					
"	21	Up	iP	22 40 18.3									"	22	Sk	iP	05 46 14.7		
		Ki	iP	22 39 24.2											Um	iP	05 46 36.5		
		Alaska (h = 40 km).													Canary Islands				
														(h = 30 km).					
"	21	Up	iP	22 44 44.5								"	22	Up	iP	07 12 02.9			
		Ki	iP	22 44 37.2															
			iPP	22 47 36.2										"	22	Ki	iP	10 16 33.9	
			eS	22 54 35												Celebes Sea (h = 200 km).			
				microns sec										"	22	Sk	iP	10 31 54.4	
		P	Z'	0.1	1.5									"	22	Up	iP	---	
		S	E	0.4	8											microns sec			
		M	E	0.8	18											M	E	0.9	16
		M	N	0.4	18											M	N	1.6	16
		M	Z	0.8	18											M	Z	1.3	17
		D = 8800 km = $79^{\circ}$ .														Ki	e	13 05 57	
		Sk	iP	22 44 25.9												cont.			
		Um	iP	22 44 43.8															
			iS	22 54 48															
			eSS	22 59 58															

cont.

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

1964						1964					
May	22	Ki		microns sec		May	23	Um	iP	11 24 00.1	
cont.			M	E 1.4 17							
			M	N 1.5 17		"	23	Up	iP	11 33 57.8 D	
			M	Z 1.6 16						microns sec	
"	22	Sk	iP	14 20 12.7					P	Z' 0.6 0.6	
				Mindanao (h = 120 km).				Ki	iP	11 33 26.1 D	
										microns sec	
"	22	Up	iP	16 13 40.6					P	Z' 0.4 0.8	
		Ki	iP	16 13 39.6				Sk	iP	11 33 54.5 D	
		Sk	eP	16 13 54					iPP	11 36 59.7	
		Um	iP	16 13 36.9				Gb	iP	11 34 15.9 D	
"	23	Ki	iP	00 21 51.3				Um	iP	11 33 39.8 D	
		Ka	eP	00 20 59					iS	11 42 48	
			i	00 21 06.0				Ka	iP	11 34 13.9 D	
				Arabian Sea (h = 30 km).					iPP	11 37 29.2	
								Bonin Islands (h = 410 km).			
								Magn. = 6.4 (Up,Ki).			
"	23	Up	iP	00 26 25.1 C		"	23	Um	iP	12 38 27.9	
			iS	00 34 01							
				microns sec		"	24	Up	iP	00 09 55.6 D	
			M	E 0.4 22				Ki	iP	00 09 56.8 D	
			M	N 0.6 19				Sk	iP	00 10 16.1	
				D = 5900 km = 53°.				Gb	iP	00 10 16.4	
		Ki	iP	00 26 59.0				Um	iP	00 09 51.0	
			eS	00 35 02				Ka	iP	00 10 01.8	
				microns sec						Nepal (h = 30 km).	
			S	E 0.4 8		"	24	Ki	iP	00 49 36.2	
			S	N 0.3 7				Sk	iP	00 50 01.9	
			M	E 0.7 17				Gb	eP	00 50 39	
			M	N 0.4 18				Um	iP	00 50 04.5	
			M	Z 1.0 18				Ka	iP	00 50 54.8	
				D = 6450 km = 58°.					i	00 51 13.3	
		Sk	iP	00 26 56.2						Alaska (h = 15 km).	
		Gb	eP	00 26 33		"	24	Up	iPKP	04 32 28.1	
		Um	iP	00 26 37.9					iPKS	04 36 10	
			ipP	00 26 44.2						microns sec	
			iS	00 34 24						PKS N 0.4 4	
		Ka	iP	00 26 13.4				Ki	ePKP	04 32 23	
			ipP	00 26 19.7					i	04 32 39.8	
				Arabian Sea.				Sk	ePKP	04 32 20	
				h = 25 km (Um,Ka).					i	04 32 29.3	
"	23	Ki	iP	06 39 08.2				Gb	iPKP	04 32 37.7 D	
				Alaska (h = 20 km).					ipPKP	04 32 47.8	
"	23	Sk	iP	07 00 32.3				Um	iPKP	04 32 25.6	
"	23	Ki	iSn	08 11 00.2					iPKS	04 36 00	
			iSg	08 11 20.7				Ka	iPKP	04 32 40.5 D	
				Possibly northwest Russia.				Tonga Islands (h = 30 km).			
"	23	Ki	eSn	09 25 39		"	24	Ki	iPn	05 47 20.7 C	
			iSg	09 25 58.1					iSn	05 48 16.2	
				Possibly northwest Russia.					iSg	05 48 36.3	
									D = 490 km = 4.4°.		
"	23	Um	iP	11 11 54.9		cont.		Sk	eSg	05 51 07	



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

1964					1964				
May	24	Um	iSn	05 49 02.3	May	24	Ki		microns sec
cont.			iSg	05 49 48.7	cont.			S	E 0.9 6
				D = 710 km = 6.4°.				S	N 0.4 9
				Northwest Russia,				M	E 2.5 16
				68.0°N, 32.0°E.				M	N 2.5 16
				Origin time = 05 46 12.				M	Z 3.6 15
				Explosion?					D = 7650 km = 69°.
"	24	Ki	iSn	06 01 56.4			Sk	iP	10 42 59.7
			iSg	06 02 22.9			Gb	iP	10 43 24.1 C
			Sk	eSg 06 04 17				ipP	10 43 35.2
				Northwest Russia,			Um	iP	10 42 43.8 C
				68°N, 32°E.				ipP	10 42 54.2
				Origin time = 05 59 55.				iS	10 52 02
				Explosion?				iSS	10 56 28
"	24	Ki	eSn	06 05 43			Ka	iP	10 43 22.8
			iSg	06 06 06.2				ipP	10 43 34.3
			Sk	eSg 06 08 33					Japan. h = 40 km
			Um	iSg 06 06 57.1					(Up, Gb, Um, Ka).
				Northwest Russia,					Magn. = 5.9 (Up, Ki).
				68°N, 32°E.	"	24	Up	iP	14 44 51.1
				Origin time = 06 03 40.			Ki	iP	14 44 15.2
				Explosion?			Sk	eP	14 44 47
"	24	Ki	iP	07 01 56.8 C			Gb	eP	14 45 12
		Gb	iP	07 03 03.5			Um	iP	14 44 30.8
		Um	iP	07 02 24.8					Japan (h = 30 km).
		Ka	iP	07 03 14.8	"	24	Up	iP	16 43 37.7 C
				Alaska (h = 20 km).					microns sec
"	24	Ki	iP	09 14 32.3				P	Z' 0.1 0.5
		Sk	iP	09 14 59.8			Ki	iP	16 43 46.7 C
				Alaska (h = 30 km).			Sk	iP	16 44 03.3
"	24	Up	iP	10 26 27.6			Um	iP	16 43 36.1
		Ki	eP	10 25 35			Ka	iP	16 43 42.2
		Sk	eP	10 25 59					Hindu Kush (h = 160 km).
		Gb	eP	10 26 38	"	24	Um	iP	19 38 05.4
		Ka	iP	10 26 51.5					Japan (h = 100 km).
				Alaska (h = 15 km).	"	24	Ki	iP	21 04 23.2
"	24	Up	iP	10 43 04.7 C			Um	iP	21 04 49.7
			ipP	10 43 15.2					Aleutian Islands
			iS	10 52 40					(h = 60 km).
				microns sec	"	24	Ki	iPKP	21 16 33.6
			P	Z' 0.1 0.9			Um	iPKP	21 16 39.7 C
			S	E 0.8 9					New Hebrides Islands
			M	E 1.9 20					(h = 30 km).
			M	N 2.1 21	"	24	Up	e(PKP)	22 42 07
			M	Z 2.0 16				iPKP	22 42 19.5
				D = 8350 km = 75°.					microns sec
		Ki	iP	10 42 27.5 C				PKP	Z' 0.2 0.8
			e	10 50 50			Ki	iPKP	22 41 48.4
			iS	10 51 30					microns sec
				microns sec				PKP	Z' 0.1 1.2
			P	Z 0.5 4			Sk	iPKP	22 42 01.7
cont.					cont.				

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

1964				1964					
May cont.	24	Gb	iPKP	22 42 34.6	May	25	Up	eP	20 28 21
		Um	iPKP	22 41 56.6 C			Ki	iP	20 29 38.0
		Ka	iPKP	22 42 34.3			Sk	iP	20 28 59.8
		New Zealand (h = 150 km).					Gb	eP	20 28 06
"	25	Um	iP	01 44 54.5			Um	iP	20 29 02.9
		Ionian Sea (h = 80 km).							
"	25	Up	iPKP	05 19 21.5	"	25	Up	iP	20 36 08.0
		Sk	ePKP	05 19 15			i		20 36 14.6
			i	05 19 28.6			P	Z'	0.1 0.5
		Gb	iPKP	05 19 29.7					
		Um	iPKP	05 19 09.9 D					
		Kermadec Islands (h = 30 km).			"	26	Up	iP	05 43 45.7
"	25	Sk	i(Sg)	11 03 08.7			Ki	iP	05 42 50.4
"	25	Ki	eP	11 08 52			Sk	iP	05 43 16.3
		Aleutian Islands (h = 30 km).					Gb	iP	05 43 56.6
"	25	Up	eP	14 04 17			Um	iP	05 43 19.7
		Um	iP	14 05 13.3			Ka	iP	05 44 08.9
"	25	Um	iP	15 10 41.9			Alaska (h = 30 km).		
"	25	Um	iP	18 00 00.1	"	26	Ki	iP	09 53 31.6
"	25	Up	iP	19 56 56.5			Um	iP	09 53 43.3
		iSKS		20 07 21			Mariana Islands (h = 90 km).		
		iS		20 07 38	"	26	Up	iP	11 14 29 C
		microns sec					✓	e	11 14 39
		S	N	0.6 6				e(PKP)	11 17 49
		M	E	1.0 18				iPKP	11 17 51.5
		M	N	2.8 23				iPP	11 19 22
		M	Z	1.8 19				ipPP	11 19 50
		D = 9850 km = 88½°.						iSKP	11 21 15.4
Ki		eP		19 57 05				iSKS	11 24 35
		eS		20 07 57				i	11 26 10
		microns sec						iPKKP	11 27 54.4
		S	N	0.9 8				i(PS)	11 29 17
		M	E	2.0 16				microns sec	
		M	N	3.3 18				PKP	Z 4.1 6
		M	Z	2.0 18				PKP	Z' 0.4 0.6
		D = 10000 km = 90°.						PP	E 1.1 6
Sk		eP		19 57 17				PP	N 1.2 5
		ipP		19 57 25.4				PP	Z' 0.7 1.2
Gb		iP		19 57 07.6				SKP	Z' 0.2 0.7
		ipP		19 57 16.2				SKS	E 7.9 12
Um		iP		19 56 59.5				SKS	N 17 14
		iSKS		20 07 25				PKKP	Z' 0.2 0.8
		iS		20 07 44				M	E 46 23
Ka		eP		19 56 55				M	N 110 24
		i		19 56 56.7				M	Z 88 19
		Indian Ocean.						(D = 13550 km = 122°).	
		h = 30 km (Sk, Gb).					Ki	eP	11 15 02
		Magn. = 6.0 (Up, Ki).						i(PKP)	11 17 52.8
								iPKP	11 18 06.8
								ipPKP	11 18 40
								iPP	11 20 45
								iSKP	11 21 19

cont.

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

1964					
May	26	Ki	iSKS	11 25 06	
cont.			i	11 27 02	
				microns sec	
			PKP E	1.3 6	
			PKP N	2.0 8	
			PKP Z	19 7	
			PKP Z'	6.7 1.5	
			PP E	5.6 9	
			PP N	8.2 10	
			SKP E	26 14	
			SKP N	27 13	
			SKP Z	42 8	
			SKP Z'	5.5 1.5	
			SKS N	16 10	
			M E	81 19	
			M N	83 18	
			M Z	140 18	
				(D = 14450 km = 130°).	
		Sk	i(PKP)	11 17 52.1	
			iPKP	11 17 57.2	
			iPP	11 19 38.7	
			iPKS	11 21 27.0	
		Gb	ePKP	11 17 46	
			ipPKP	11 18 22.2	
			i	11 19 08.4	
			iPP	11 19 29.5	
			i	11 21 08.0	
		Um	iP	11 14 43 C	
			i	11 15 05.8	
			i(PKP)	11 17 54.8	
			iPKP	11 18 02.9 C	
			ipPKP	11 18 34.6	
			iPP	11 19 55.2	
			iPKS	11 21 26.1	
		Ka	eP	11 14 03	
			i	11 14 17.5	
			e(PKP)	11 17 41	
			iPKP	11 17 48.2	
			iPP	11 19 02.1	
			iSKP	11 21 12.6	
			iPKKP	11 28 17.0	

Sandwich Islands.  
h = 130 km (Ki, Gb, Um).  
Magn. = 7.3 (Up, Ki).  
The surface waves are remarkably large, considering the focal depth. The diffracted P is very clear especially on long-period records and has a period about 26 sec. (PKP) is consistently of much smaller amplitude than PKP on the Z'-records. The shock is of pronounced long-period character,

cont.

1964					
May	26				e.g. the surface waves
cont.					have their largest
					amplitudes among very
					long periods. This
					earthquake is interesting
					also by the fact that it
					was followed by an
					aftershock sequence,
					unlike most shocks at
					intermediate or greater
					depths.
		"	26	Um iP	12 05 06.9
					Panama (h = 25 km).
		"	26	Ki eP	13 32 12
					Tien-Shan.
		"	26	Up iP	14 50 53.5
		"	26	Ki iPKP	16 01 30.7
					Sandwich Islands
					(h = 80 km).
		"	26	Up iP	18 15 57.1
		"	27	Ki ePKP	00 02 21
					Sandwich Islands
					(h = 150 km).
		"	27	Up iPKP	01 15 20.5
				iSKP	01 18 43.0
				iPKKP	01 25 25.5
				iSP	01 26 37
					microns sec
				M E	0.9 19
				M N	0.9 18
				M Z	1.1 18
		Ki	iPKP	01 15 35.6 C	
			iX	01 17 41.5	
			i(SKP)	01 18 42.5	
			iPKS	01 18 56	
					microns sec
				PKP Z'	0.8 1.5
				(SKP) Z'	0.2 1.8
				PKS E	0.7 6
				PKS N	0.6 7
				M E	1.4 19
				M N	1.5 19
		Sk	iPKP	01 15 26.0	
			iPP	01 16 58.5	
			iPKS	01 18 47.5	
		Gb	iPKP	01 15 15.7	
			e	01 16 23	
		Um	iPKP	01 15 28.7 C	
			iPP	01 17 19.9	
			e	01 26 51	

cont.









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

1964

May 31 Um iP 10 41 47.2  
Dominican Republic  
(h = 80 km).

" 31 Up iP 13 29 37.1 C  
i 13 29 40.6  
Ki iP 13 29 17.1  
microns sec  
M E 0.4 12  
Um iP 13 29 21.9  
Ka iP 13 29 51.3  
Kansu, China (h = 30 km).

" 31 Up ---  
microns sec  
M E 1.8 23  
M N 1.6 20  
M Z 1.6 20  
Ki ---  
microns sec  
M E 2.0 23  
M N 1.3 20  
M Z 3.5 23  
Um iSS 17 53 32  
New Hebrides Islands  
(h = 70 km).

Markus Båth  
April 23, 1965



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, 1964  
.....

1964	June	1	Um	e(Sg)	03 23 29	1964	June	1	cases, which are quite frequent, can easily account for so-called "inconsistent" first P-wave motions.	
"	"	1	Ki	iP	04 46 20.7 C	cont.				
"	"	1	Ki	iPKP	06 23 42.4	"	2	Up	iP	14 06 31.8
			Sk	iPKP	06 23 53.8	"	2	Up	iP	16 19 30.5
			Um	iPKP	06 23 48.8				iS	16 27 38
			New Nebrides Islands (h = 180 km).							microns sec
"	"	1	Up	iP	11 26 31.2 C				P	Z' 0.1 1.0
"	"	1	Up	iP	11 33 04.7 C				D = 6650 km = 60°.	
			Ki	iP	11 32 19.3			Ki	iP	16 18 35.7
			Sk	eP	11 32 54				eS	16 26 11
			Um	iP	11 32 39.8				eSa	16 30 50
			Ka	iP	11 33 26.9				microns sec	
			Kurile Islands (h = 30 km).						P	Z' 0.1 1.0
"	"	1	Um	iPKP	13 36 37.8				S	N 0.4 8
			Tonga Islands (h = 40 km).						M	E 0.6 17
"	"	1	Up	iP	16 15 51.2 C				M	N 0.7 20
"	"	1	Up	iP	18 42 16.3 D				M	Z 0.7 15
					microns sec				D = 5900 km = 53°.	
				P	Z' 0.1 0.6			Sk	iP	16 19 01.0
			Ki	iP	18 41 31.0			Um	iP	16 19 03.8
			Sk	iP	18 42 06.7 D				iS	16 26 53
			Gb	eP	18 42 41 D			Ka	eP	16 19 59
			Um	iP	18 41 51.2 D			Alaska (h = 15 km).		
			Ka	iP	18 42 37.8			Magn. = 5.6 (Up,Ki).		
			Japan (h = 30 km).			"	2	Up	eP	16 39 48
			At Um (and perhaps Up) the clear dilatation seems to be preceded by a small compression, whereas at Sk and Gb only the dilatational motion can be seen. Such						ipP	16 39 52.0
								Ki	eP	16 38 56
									i	16 39 20.3
								Sk	eP	16 39 20
								Um	iP	16 39 25.9 C
								Alaska. h = 15 km (Up).		
						"	2	Up	eP	20 55 44
								Japan (h = 40 km).		

cont.

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

1964					1964				
June	2	Ki	ipPKP	23 31 24.7	June	3	Ki		microns sec
			ipPKP	23 31 46.4	cont.		P	Z'	0.1 1.5
		Um	epPKP	23 31 53			Sk	eP	14 13 18
		New Hebrides Islands.						ipP	14 13 23.6
		h = 90 km (Ki).					Gb	e(P)	14 14 05
"	3	Up	iP	02 59 26.3 D				i(pP)	14 14 09.0
				microns sec			Um	iP	14 13 21.3
			P	Z' 0.2 0.6				ipP	14 13 25.1
		Ki	iP	02 59 17.6 D				iS	14 21 12
			iS	03 07 27			Ka	iP	14 14 11.3
			isS	03 08 15				ipP	14 14 15.7
				microns sec			Alaska. h = 20 km (Up,Sk, Gb,Um,Ka).		
			P	Z' 0.1 1.0					
			S	E 0.4 9	"	3	Um	iP	17 56 18.4
			M	E 0.6 17	"	3	Um	ipPKS	18 17 00
			M	N 0.7 18			Tonga Islands (h = 30 km).		
			M	Z 0.7 17					
				D = 6700 km = 60 $\frac{1}{2}$ <sup>0</sup> .	"	4	Sk	ipPKP	00 35 28.2
		Sk	iP	02 59 40.7 D			Um	ipPKP	00 35 19.0
			isP	03 00 21.8				i	00 35 22.0
		Um	iP	02 59 17.3 D			Kermadec Islands (h = 30 km).		
			ipP	02 59 45					
			iS	03 07 22	"	4	Ki	iP	01 53 41.1 C
			isS	03 08 07			Formosa (h = 30 km).		
		Ka	iP	02 59 35.4 D	"	4	Up	iP	02 17 21.2
		Burma. h = 110 km (Ki,Sk,Um).			"	4	Up	iP	03 04 42.8
		Magn. = 5.9 (Up,Ki).						iLgl	03 18 06
"	3	Ki	ipPg	10 46 00.5	"	4			microns sec
			iSg	10 46 36.3			P	Z'	0.1 0.5
				D = 300 km = 2.7.			M	E	1.3 17
		This and the following four events are explosions (probably underwater) off the Norwegian coast, N-NNW of Kiruna.					M	N	1.1 18
"	3	Ki	ipPg	10 59 57.5			M	Z	1.0 20
			iSg	11 00 30.9			Ki	iP	03 04 54.3
				D = 290 km = 2.6.			e		03 17 54
"	3	Ki	ipPg	11 00 54.9					microns sec
			iSg	11 01 26.7			M	E	0.8 11
				D = 270 km = 2.4.			M	N	0.7 13
"	3	Ki	ipPg	12 15 59.0			M	Z	1.1 11
			iSg	12 16 31.3			Sk	iP	03 05 09.9
				D = 280 km = 2.5.			Um	iP	03 04 42.2 D
"	3	Ki	ipPg	12 24 59.0 C	"	4		iS	03 10 47
			iSg	12 25 30.7				iSS	03 13 27
				D = 270 km = 2.4.				iLgl	03 17 33
"	3	Up	iP	14 13 49.3			Ka	iP	03 04 46.9
			ipP	14 13 52.5			Hindu Kush (h = 30 km).		
				microns sec					
			pP	Z' 0.1 1.0	"	4	Up		---
		Ki	iP	14 12 53.4					microns sec
							M	E	0.6 21
							M	N	0.7 22
							M	Z	1.4 21
							Ki	iP	04 41 30.9
							eS		04 52 04
									microns sec
							S	E	0.7 9

cont.

cont.

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

1964					1964				
June	4	Ki		microns sec	June	5		value (see Båth & Lopez	
cont.			S	N 0.3 7	cont.			Arroyo, Geofis. pura e	
			M	E 0.9 20				appl., 56:67-92, 1963).	
			M	N 0.6 16		"	5	Up	iPKP 01 22 54.0 C
			M	Z 0.8 16				Kermadec Islands (h = 30 km).	
				D = 9500 km = $85\frac{1}{2}^{\circ}$ .					
		Sk	iP	04 41 28.4		"	5	Up	iP 02 44 12.0 C
		Um	iP	04 41 39.8 C				ipP	02 44 24.2
			iS	04 52 13					microns sec
			eScS	04 52 35				P	Z' 0.1 0.6
				Mexico (h = 20 km).				Ki	iP 02 43 59.3 C
"	4	Sk	iPg	10 28 14.6					microns sec
			iSg	10 28 33.7				P	Z' 0.1 1.2
"	4	Up		---				Sk	iP 02 44 28.0
				microns sec				Um	iP 02 43 59.4 C
			M	E 0.8 20					ipP 02 45 33.5
			M	N 0.8 20					iLgl 02 58 17
			M	Z 1.3 20				Ka	iP 02 44 25.0
		Ki	ePS	11 45 34					Sinkiang, China.
				microns sec					h = 60 km (Up).
			M	E 0.8 19					Magn. = 5.8 (Up, Ki).
			M	N 0.8 20		"	5	Up	iP 04 11 54.7
			M	Z 1.3 20				Ki	iP 04 11 23.3
				New Britain (h = 50 km).				Sk	iP 04 11 52.0
"	4	Up	iP	19 47 00.2				Um	iP 04 11 36.8
		Sk	iP	19 47 43.9					ipP 04 11 46.6
		Um	iP	19 47 43.9 D					Bonin Islands.
				Greece.					h = 40 km (Um).
"	5	Up	iP	00 17 24.7		"	5	Ki	iP 04 51 07.4
			iS	00 21 48					North Atlantic Ocean
			iSa	00 22 06					(h = 30 km).
				microns sec		"	5	Um	iP 08 48 25.9
			M	E 0.9 22					Kurile Islands (h = 30 km).
			M	N 1.1 22					
			M	Z 0.7 15					
				D = 2900 km = $26^{\circ}$ .		"	5	Up	iP 10 00 37.7 C
		Ki	iP	00 18 08.5				ipP	10 00 42.2
			eSa	00 24 10				eS	10 08 38
				microns sec					microns sec
			M	E 0.8 11				pP	Z' 0.1 1.1
			M	N 0.6 11				M	E 0.4 20
			M	Z 0.9 11				M	N 0.5 18
								M	Z 0.6 19
		Sk	eP	00 18 02					D = 6600 km = $59\frac{1}{2}^{\circ}$ .
		Um	eP	00 17 41				Ki	iP 09 59 42.8 C
			i	00 18 12.2				eS	10 07 03
			eS	00 22 23					microns sec
			iSa	00 22 58				P	Z' 0.2 1.0
		Ka	iP	00 17 11.4				S	E 0.4 11
			iPP	00 17 54.6				S	N 0.4 9
				Turkey (h = 30 km).				M	E 0.6 17
				The group velocities of Sa				M	N 0.8 20
				are 4.71 km/sec (Up),				M	Z 1.4 19
				4.67 km/sec (Ki), 4.67 km/sec					D = 5800 km = $52^{\circ}$ .
				(Um), i.e. somewhat higher				Sk	iP 10 00 09.0 C
				than a typical continental				ipP	10 00 13.5

cont.

cont.



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

1964					1964				
June	7	Up	ipP	15 01 13.1	June	9	Gb	eP	02 38 37
cont.		Ki	iP	15 00 22.5	cont.		Um	iP	02 39 39.8
			ipP	15 00 34.7				eS	02 44 32
		Sk	iP	15 00 54.9				e	02 45 02
		Gb	eP	15 01 25				D = 3300 km = 29 $\frac{1}{2}$ <sup>0</sup> .	
			epP	15 01 36				Spain (h = 30 km).	
		Um	iP	15 00 39.0	"	9	Ki	eP	09 33 28
			ipP	15 00 50.5			Um	iP	09 33 56.9
		Ka	iP	15 01 19.8				ipP	09 34 09.1
			ipP	15 01 33.8				Alaska. h = 50 km (Um).	
		Japan. h = 50 km (Up,Ki, Gb,Um,Ka).			"	9	Up	iPKP	21 26 30.2
"	7	Up	iP	20 41 54.4			Um	iPKP	21 26 19.4
			i	20 41 55.2	"	10	Up	iPKP	09 13 48.6
			microns sec					i	09 13 54.4
		P	Z'	0.1 1.0				microns sec	
		M	E	1.3 23				PKP	Z' 0.1 0.6
		M	N	1.3 21			Sk	iPKP	09 13 43.0
		M	Z	1.3 20			Gb	ePKP	09 13 58
		Ki	iP	20 41 07.6			Ka	iPKP	09 13 59.1
			e	20 46 17	"	10	Up	iP	18 05 15.5 C
			microns sec					microns sec	
		M	E	0.9 15				P	Z' 0.1 1.0
		M	N	0.8 17			Ki	iP	18 05 04.9 C
		M	Z	1.6 16				microns sec	
		Um	iP	20 41 29.8				P	Z' 0.1 1.0
			iPa	20 45 55			Sk	iP	18 05 29.7
		Kurile Islands (h = 30 km).					Um	iP	18 05 04.6
"	8	Up	iPKP	02 45 00.5 D				i	18 05 10.1
		Gb	ePKP	02 45 15			Ka	iP	18 05 25.9
		Ka	iPKP	02 45 13.8			Tibet (h = 70 km).		
		Tonga Islands (h = 550 km).					Magn. = 5.7 (Up,Ki).		
"	8	Up	iP	04 33 30.8	"	10	Ki	iPKP	19 32 48.7
		Ki	iP	04 32 37.7			Sk	iPKP	19 33 00.2
		Aleutian Islands (h = 25 km).					Um	iPKP	19 32 48.6
"	8	Ki	iP	16 55 23.2 C				i	19 32 55.5
		Turkey.					New Hebrides Islands (h = 50 km).		
"	8	Ki	iP	18 20 47.5	"	10	Up	iP	20 01 40.5
"	8	Up	iP	19 11 28.5			Ki	iP	20 01 38.8
			microns sec					P	Z' 0.1 0.8
"	8	Up	iP	23 06 11.2			Sk	iP	20 01 53.0
		Ki	iP	23 05 43.0			Um	iP	20 01 37.1
			ipP	23 06 36.2			Java (h = 80 km).		
		Um	iP	23 05 55.1	"	10	Up	iP	22 29 54.3 C
			ipP	23 06 51.3				ipP	22 30 27.1
		Mariana Islands. h = 220 km (Ki,Um).						iPP	22 34 10
"	9	Ki	---					iSKS	22 40 18
			microns sec					iS	22 40 58
		M	E	0.8 14				esS	22 42 14
		M	N	0.7 13				microns sec	
		M	Z	1.1 13				P	Z' 0.2 1.0

cont.

cont.

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

1964				1964			
June	10	Up	microns sec	June	10	Ki	microns sec
cont.			PP Z 0.3 4	cont.			M E 0.4 14
			SKS E 1.1 4				M N 0.5 16
			S E 1.0 5				M Z 0.5 15
			S N 0.4 4			Sk	eP 23 34 56
			M E 1.7 22				i 23 35 36.1
			M N 1.9 23			Um	iP 23 34 54.3
			M Z 2.2 17			Ka	iP 23 35 58.4
			(D = 10650 km = 96°).			Alaska (h = 30 km).	
		Ki	iP 22 29 36.3 C	"	11	Ki	iP 03 20 24.6
			ipP 22 30 11.3				microns sec
			ePP 22 33 31				P Z' 0.1 1.5
			eSKS 22 39 56			Um	eP 03 20 54
			iS 22 40 22			Ka	iP 03 21 51.2
			esS 22 41 39			Bering Strait (h = 30 km).	
			microns sec				
			P Z 0.8 4	"	11	Um	iP 04 10 26.3
			P Z' 0.3 1.0				i 04 12 41.2
			pP Z' 0.6 1.1				
			SKS E 3.7 7	"	11	Ki	iPKP 11 14 07.5
			SKS N 1.0 6			Sandwich Islands	
			S N 0.7 7			(h = 30 km).	
			M E 3.3 21	"	11	Up	ePS 17 29 55
			M N 2.6 23				microns sec
			M Z 4.9 21				M E 1.9 20
			(D = 10200 km = 92°).				M N 2.6 21
		Sk	iP 22 29 58.5 C				M Z 3.2 20
			i 22 30 25.3			Ki	e 17 19 53
		Gb	eP 22 30 10 C				eSKS 17 26 23
			ePP 22 34 19				microns sec
		Um	iP 22 29 42.3 C				SKS E 0.5 8
			i 22 30 04.6				M E 2.9 21
			iPP 22 33 29.2				M N 1.1 21
			iSKS 22 40 06				M Z 3.2 20
			isS 22 41 45			Um	iPP 17 20 22
		Ka	iP 22 30 03.9				iSKS 17 26 35
			i 22 30 28.6				iPS 17 29 27
			Taland Islands,				i(SS) 17 35 30
			h = 150 km (Up,Ki).				New Guinea (h = 20 km).
			Magn. = 6.4 (Up,Ki).				Magn. = 6.1 (Up,Ki).
			pP-P from Up and Ki suggest	"	11	Ki	iP 17 36 38.2
			a depth of 135 km, whereas			Alaska (h = 30 km).	
			sS-S from the same stations	"	11	Up	iP 18 04 47.4 D
			would give 170 km. The long-			Indian Ocean (h = 30 km).	
			period records show between	"	11	Up	iP 18 43 24.9 D
			S and the fundamental surface			Ki	iP 18 42 50.0 D
			waves trains of higher-mode			Sk	iP 18 43 21.0
			surface waves (or shear-			Um	iP 18 43 04.8 D
			coupled waves), which are of			Japan (h = 330 km).	
			interest considering the path,"	"	11	Up	iP 19 12 03.7
			although they appear as more				
			or less discontinuous patches				
			of wave trains.				
"	10	Up	iP 23 35 22.7	"	11	Up	iP 19 12 03.7
cont.		Ki	iP 23 34 26.3				



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

1964					1964				
June	13	Ki		microns sec	June	13	68.1°N, 31.3°E.		
cont.			M	E 0.3 8	cont.		Origin time = 07 19 00.		
			M	N 0.2 9			Explosion?		
			M	Z 0.4 10					
		Um	iP	03 30 28.7 C	"	13	Up	iP	08 35 18.8
			iLgl	03 38 17				iPcP	08 35 36.7
			i	03 39 31					microns sec
		Ka	iP	03 30 08.3			M	E	1.1 22
		Caucasus.					M	N	1.4 22
							M	Z	1.4 21
"	13	Up	iP	04 31 30.9			Ki	iP	08 35 20.7
			i	04 31 40.2				i(PcP)	08 35 43.0
				microns sec					microns sec
			M	E 0.6 22			M	E	1.2 18
			M	N 1.0 20			M	N	0.8 19
			M	Z 0.9 18			M	Z	2.3 19
		Ki	iP	04 30 37.4			Sk	eP	08 35 54
			eS	04 38 29			Um	iP	08 35 15.5
				microns sec				iPcP	08 35 34.2
			M	E 1.1 20			Ka	iP	08 35 23.4
			M	N 0.8 20				iPcP	08 35 40.5
			M	Z 1.8 21					Andaman Islands (h = 30 km).
				D = 6350 km = 57°.					
		Sk	eP	04 31 14	"	13	Up	iP	08 38 30.1 C
		Gb	eP	04 31 52				iPcP	08 38 58.0
			e	04 32 00			Ki	iP	08 37 42.4
			e	04 32 05			Sk	eP	08 38 18
		Um	iP	04 31 05.2			Um	iP	08 38 03.5
			i	04 31 11.1				i(PcP)	08 38 32.0
			eS	04 39 22					Kurile Islands (h = 30 km).
		Ka	iP	04 31 55.3 C					
		Aleutian Islands (h = 30 km).			"	13	Up	iP	08 39 35.9 C
"	13	Up	eL	06 01					microns sec
				microns sec				P	Z' 0.1 0.8
			M	E 0.4 20			Ki	iP	08 38 48.2 C
			M	N 0.8 20					microns sec
			M	Z 1.0 20				P	Z' 0.1 0.8
		Ki	eL	06 01			Sk	iP	08 39 24.1
				microns sec			Gb	eP	08 39 57 C
			M	E 0.6 20			Um	iP	08 39 10.4 C
			M	N 0.5 20			Ka	iP	08 39 58.4 C
			M	Z 1.3 20					Kurile Islands (h = 30 km).
		New Guinea (h = 30 km).							Magn. = 5.8 (Up,Ki).
"	13	Ki	iPn	07 20 04.3 D	"	13	Up	iLgl	10 14 06.2
			i(Sn)	07 20 59.8			Gb	iPg	10 12 05.6
			iSg	07 21 14.0			Ka	e(P*)	10 12 47
				D = 460 km = 4.1°.				iLgl	10 13 42.4
		Sk	eSn	07 22 55					Skagerrack, 58 1/4 N, 9°E.
			iSg	07 23 52.4					Origin time = 10 11 34.
				D = 980 km = 8.8°.					This is the first in a
		Um	iSn	07 21 44.8					series of five events on
			iSg	07 22 24.4					June 13, probably
				D = 690 km = 6.2°.					underwater explosions.
		Northwest Russia,							The agreement between the
cont.									readings is not quite





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1964	June	14	Up	iP	09 14 14.0	1964	June	15	Ki	iPKP	00 15 31.7 C		
	"	14	Up	iP	12 21 01.5 D					Sandwich Islands	(h = 30 km).		
				iS	12 25 28		"	15	Up	iP	00 17 38.6		
				i	12 25 33					eS	00 27 35		
					microns sec						microns sec		
				P	E 0.6 4					P	Z 0.7 7		
				P	N 1.4 6					P	Z' 0.1 1.0		
				P	Z 2.2 7					S	E 0.4 8		
				P	Z' 0.2 0.6					S	N 0.6 10		
				S	E 6.6 8					M	E 6.1 20		
				S	N 8.7 8					M	N 11 19		
				M	E 5.1 17					M	Z 7.5 21		
				M	N 7.5 17						D = 8900 km = 80°.		
				M	Z 5.7 15				Ki	iP	00 17 37.9		
					D = 2850 km = 25½°.					ePa	00 23 54		
			Ki	iP	12 21 55.4 D					iS	00 27 40		
				iS	12 27 02						microns sec		
				iSa	12 27 55					P	E 0.7 7		
				i	12 29 32					P	N 0.2 7		
					microns sec					P	Z 1.4 8		
				P	N 0.4 4					P	Z' 0.2 1.5		
				P	Z 0.4 7					S	E 1.7 13		
				P	Z' 0.2 1.0					S	N 0.9 11		
				S	E 3.4 8					M	E 18 22		
				M	E 11 17					M	N 11 21		
				M	N 6.8 15					M	Z 23 23		
				M	Z 9.4 15						D = 8900 km = 80°.		
					D = 3500 km = 31½°.				Sk	eP	00 17 54		
			Sk	iP	12 21 41.3 D				Gb	eP	00 17 53		
			Gb	iP	12 21 08.0 D					i	00 19 19.6		
			Um	iP	12 21 23.9				Um	iP	00 17 32.2 C		
				i	12 21 59.2					i	00 17 52		
				i	12 25 51					iS	00 27 30		
				iS	12 26 03				Ka	iP	00 17 43.9		
				iSn	12 26 49.4					i	00 18 12.5		
			Ka	iP	12 20 43.8						Sumatra (h = 30 km).		
					Turkey (h = 10 km).						Magn. = 6.0 (Up,Ki).		
					Magn. = 5.8 (Up,Ki).				"	15	Ki	iP	01 19 12.1
					Well developed higher-mode						i	01 20 35.8	
					surface waves.							Indonesia.	
	"	14	Up	iP	12 43 29.5				"	15	Up	iP	04 31 00.0
				i	12 43 32.7								
			Ki	iP	12 44 23.8				"	15	Ki	iP	09 37 35.1
				i	12 44 41.8							Alaska (h = 30 km).	
			Ka	iP	12 43 11.7				"	15	Up	iP	11 04 13.8
					Turkey (h = 30 km).						Ki	iP	11 03 33.9 C
	"	14	Up	iP	16 33 02.8								microns sec
				i	16 33 26.7						P	Z' 0.1 1.0	
	"	14	Up	iP	16 47 02.9						M	E 0.4 14	
	"	14	Ki	iP	17 29 53.1						M	N 0.3 13	
					Alaska (h = 30 km).						M	Z 0.4 13	
									Sk	iP	11 04 08.4 C		

cont.



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1964				1964						
June	16	Up	iP	04 28 53.6 C	June	16	Up	iP	05 33 25.7	
				microns sec			Ki	iP	05 32 45.9	
			P	Z' 0.1 0.9			Um	iP	05 33 03.1 C	
		Ki	iP	04 28 14.0 C			Japan (h = 15 km).			
				microns sec		"	16	Up	iP	05 46 53.4
			P	Z' 0.1 1.0					microns sec	
		Sk	iP	04 28 47.8 C				P	Z' 0.1 0.5	
		Gb	iP	04 29 14.0		"	16	Ki	iP	05 48 05.5
		Um	iP	04 28 30.7 C		"	16	Up	iP	05 50 37.0
		Ka	iP	04 29 13.9 C				Um	iP	05 50 14.7 D
		Japan (h = 15 km).					Japan (h = 40 km).			
		Magn. = 5.7 (Up,Ki).				"	16	Up	iP	05 57 52.4
"	16	Ki	iP	04 34 20.0			Ki	iP	05 57 12.6 C	
		Japan. Origin time =					Um	iP	05 57 30.2	
		04 23 48.					Japan (h = 30 km).			
"	16	Up	iP	04 43 07.1		"	16	Up	iP	06 28 23.6
		Sk	iP	04 43 01.7			Ki	iP	06 27 44.2	
		Japan. Origin time =					Um	iP	06 28 00.9	
		04 31 55.					Japan (h = 30 km).			
"	16	Up	eP	04 46 44		"	16	Up	iP	07 04 21.4
		Ki	iP	04 46 08.7				iS	07 13 26	
		Japan (h = 30 km).							microns sec	
"	16	Um	iP	04 47 16.5				P	Z' 0.4 1.5	
		Japan. Origin time =						M	E 8.1 16	
		04 36 28.						M	N 5.7 16	
"	16	Up	iP	04 52 01.0				M	Z 8.6 16	
		Um	eP	04 51 39				D = 7900 km = 71°.		
		Japan (h = 30 km).					Ki	iP	07 03 41.8	
"	16	Up	iP	04 57 50.2				iS	07 12 18	
		Ki	iP	04 57 10.1					microns sec	
		Japan (h = 30 km).						P	Z 1.1 5	
"	16	Up	iP	05 01 49.9				P	Z' 0.1 1.1	
			i	05 01 54.9				S	E 1.6 6	
		Japan (h = 30 km).						S	N 0.9 8	
"	16	Up	iP	05 04 25.9				M	E 15 15	
		Um	iP	05 04 03.4 D				M	N 8.9 15	
		Japan (h = 20 km).						M	Z 21 16	
"	16	Um	iP	05 06 41.3				D = 7150 km = 64 1/2°.		
		Japan (h = 20 km).					Sk	iP	07 04 14.2	
"	16	Ki	iP	05 09 20.1			Gb	iP	07 04 39.1	
		Japan (h = 30 km).					Um	iP	07 03 57.8	
"	16	Ka	iP	05 13 01.3 C			Ka	eP	07 04 41	
		Japan (h = 30 km).					Japan (h = 15 km).			
"	16	Um	iP	05 22 24.9			Magn. = 6.2 (Up,Ki).			
		Japan (h = 30 km).				"	16	Up	iP	07 20 15.9 C
							Ki	iP	07 19 35.9	
							Sk	eP	07 20 10	
							Um	iP	07 19 53.7	
							Japan (h = 30 km).			



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1964					1964					
June cont.	19	Um	eS	01 00 02	June	19	Um	iP	21 18 13.9	
		Ka	iP	00 54 42.8			Japan (h = 30 km).			
			iPP	00 55 04.4		"	20	Ki	iP	11 01 58.4
			eS	00 58 11		"	20	Um	iP	11 45 18.9
		Turkey (h = 30 km).				"	20	Up	iP	11 48 29.4
"	19	Up	iP	03 17 28.2 D		"	20	Up	iP	11 52 34.9
			i	03 17 31.4		"	20	Up	iP	11 52 34.9
"	19	Up	iP	07 15 23.0 C		"	20	Up	iP	17 10 19.7 C
			i	07 15 26.4		"	20	Ki	iP	17 09 38.3 C
"	19	Up	iP	10 16 49.8 C		"	20	Um	iP	17 09 56.3 C
				microns sec		"	20	i	17 10 10.7	
			P	Z' 0.1 1.0			Japan (h = 40 km).			
		Ki	eP	10 16 09 C		"	21	Up	iP	01 43 45.3 C
				microns sec				i	01 43 47.1	
			P	Z' 0.1 1.0					microns sec	
			M	E 1.1 15				P	Z' 0.1 0.5	
			M	N 1.0 15				M	E 0.6 22	
			M	Z 1.1 15				M	N 1.2 23	
		Sk	iP	10 16 44.3				M	Z 1.0 20	
		Gb	eP	10 17 15			Ki	iP	01 42 53.8	
		Um	iP	10 16 27.3 C				i	01 42 55.2	
			iS	10 25 16					microns sec	
			eSS	10 29 40				M	E 1.0 21	
		Japan (h = 30 km).						M	N 0.7 21	
		Magn. = 5.7 (Up,Ki).						M	Z 1.2 22	
"	19	Up	iP	10 46 25.5			Sk	iP	01 43 30.5	
			i	10 46 30.4			Gb	eP	01 44 10	
			eS	10 56 10				e	01 44 11	
				microns sec				ePcP	01 44 35	
			P	Z' 0.2 1.4			Um	eP	01 43 18 C	
			S	E 0.4 8				i	01 43 55.9	
			M	E 1.0 13				iPcP	01 44 04.7	
			M	N 1.2 15				iPa	01 47 05	
			M	Z 1.8 14				i	01 47 24	
				D = 8550 km = 77°.			Ka	iP	01 44 09.2	
		Ki	eP	10 46 01			Kamchatka (h = 50 km).			
			eS	10 55 29		"	21	Up	iPKP	03 51 57.4 C
				microns sec				i	03 52 03.5	
			S	E 0.7 8			Sk	iPKP	03 51 51.5	
			M	E 1.9 14			Um	iPKP	03 51 46.3 D	
			M	N 1.1 12		"	22	Ki	e	00 38 35
			M	Z 2.3 12				eSS	00 54 46	
				D = 8100 km = 73°.					microns sec	
		Sk	eP	10 46 32				M	E 0.6 18	
		Gb	iP	10 46 50.4				M	N 0.7 18	
		Um	iP	10 46 12.7				M	Z 1.0 18	
			iS	10 55 36			Um	ePP	00 37 54	
		Formosa (h = 30 km).						iPKS	00 38 59	
		Magn. = 5.7 (Up,Ki).					Samoa Islands (h = 30 km).			
"	19	Gb	iP	11 52 27.6 C						

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1964	June	22	Up	iP	02 32 00.2	1964	June	22	Up	iP	21 36 02.1
			Ki	iP	02 31 22.0					ipP	21 36 15.3
			Sk	iP	02 31 54.8						microns sec
			Gb	eP	02 32 22					P	Z' 0.2 0.6
			Um	iP	02 31 39.2 C					pP	Z' 0.2 0.6
				ipP	02 31 53.4				Ki	iP	21 35 44.1 C
					Japan. h = 60 km (Um).					ipP	21 35 57.9
											microns sec
"		22	Up		---					pP	Z' 0.1 0.9
					microns sec					M	E 0.9 22
				M	E 0.7 19					M	N 0.5 16
				M	N 1.4 23					M	Z 1.8 21
				M	Z 2.0 24				Sk	iP	21 36 07.4
			Ki	eFS	03 33 11					ipP	21 36 20.9
					microns sec				Gb	eP	21 36 20
				M	E 2.3 22					epP	21 36 33
				M	N 1.7 20				Um	iP	21 35 50.5
				M	Z 2.8 21					ipP	21 36 03.7
			Sk	ePKP	03 22 24					iS	21 45 57
			Um	ePKP	03 22 18						Luzon. h = 50 km (Up,Ki,Sk, Gb,Um).
				ePP	03 23 51				"	22	Ki eP 22 14 12
				iSKS	03 29 09						Hindu Kush.
				iSKKS	03 30 37				"	23	Up iP 01 37 34.7 C
				ePS	03 33 19						iPa 01 41 53
					Solomon Islands (h = 70 km).						iS 01 46 30
"		22	Sk	iP	04 38 55.3						iScS 01 47 24
"		22	Up	iP	07 23 29.0						iP'P' 02 05 43.8
"		22	Gb	ePKP	08 01 34						microns sec
					Fiji Islands (h = 80 km).					P	E 3.2 3
"		22	Ka	iPKP	08 40 46.5					P	N 8.3 3
					Chile (h = 30 km).					P	Z 17 3
"		22	Up	iPKP	13 59 18.7 C					P	Z' 0.8 0.5
					microns sec					S	E 3.5 4
				PKP	Z' 0.1 1.0					S	N 6.4 3
			Gb	iPKP	13 59 27.4 C					P'P'	Z' 0.9 2.5
				i	13 59 32.7					M	E 2.3 18
			Um	iSKP	14 02 31.8					M	N 40 25
			Ka	iPKP	13 59 30.6					M	Z 37 18
					Fiji Islands (h = 120 km).						D = 7650 km = 69°.
"		22	Sk	iPKP	14 36 21.0				Ki	iP	01 36 49.1 C
			Um	iPKP	14 36 16.3					iS	01 45 06
					Santa Cruz Islands					isS	01 45 31
					(h = 140 km).					iP'P'	02 06 08.5
"		22	Ka	iP	16 18 37.0						microns sec
"		22	Um	iP	19 20 51.8					P	E 4.7 6
					Hindu Kush (h = 210 km).					P	N 4.6 6
										P	Z 13 6
										P	Z' 4.6 1.0
										S	E 21 11
										S	N 3.4 9
										P'P'	Z' 0.7 2.5
										M	E 53 20

cont.

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1964				1964			
June	23	Ki		June	23	Ki	iP 08 51 56.3
cont.			microns sec				Alaska (h = 30 km).
		M	N 35 18				
		M	Z 110 22				
			D = 6900 km = 62°.	"	23	Up	eSn 11 22 31
		Sk	iP 01 37 24.9 C				iLgl 11 22 48.6
			i 01 44 59.3			Sk	eLgl 11 24 33
			iS 01 46 15.1			Um	iLgl 11 23 14.0
			eP'P' 02 05 44				iSg 11 23 21.9
		Gb	eP 01 38 00 C				e 11 23 53
			eS 01 47 16				Gulf of Finland, 60°N, 25°E.
		Um	iP 01 37 09.6 C				Origin time = 11 20 55.
			i 01 45 14				Probably underwater explosion.
			eS 01 45 38				
			e 02 05 40	"	23	Ki	iP 19 23 23.6
			iP'P' 02 05 56.1			Sk	eP 19 23 40
		Ka	iP 01 37 55.8 C			Um	eP 19 23 29
			iS 01 47 10.2				Talau Islands (h = 30 km).
			Kurile Islands (h = 80 km).	"	24	Um	iP 05 30 41.0
			Magn. = 7.6 (Up,Ki).	"			
			On the long-period records,	"	24	Up	iLgl 12 21 32.9
			S initiates a wave train			Sk	iLgl 12 22 39.9
			with periods about 40 sec			Gb	iPg 12 19 33.2
			and lasting 3-4 min.				iSg 12 19 39.3
"	23	Sk	iP 02 14 15.3				iT 12 19 56.6
		Um	iP 02 14 01.7				D = 50 km = 0.5°.
			Kurile Islands.			Ka	ePg 12 20 13
			Origin time = 02 03 28.				iSg 12 20 46.5
							D = 290 km = 2.6°.
"	23	Ki	iP 02 29 04.5				Kattegatt, off west coast of
		Sk	iP 02 29 34.8				Sweden, 57.3°N, 11.4°E.
		Gb	eP 02 30 18				Origin time = 12 19 22.
		Um	iP 02 29 32.3				Underwater explosion?
			Unimak Island (h = 30 km).				The T-phase at Gb is of
							remarkable strength and this
"	23	Up	iP 04 43 39.9 D				is the first time such a phase
		Ki	iP 04 43 39.7				has been observed at Gb.
		Sk	iP 04 43 56.4	"	24	Up	---
		Um	iP 04 43 36.1 D				microns sec
			Andaman Sea (h = 30 km).			M	E 0.9 19
						M	Z 1.0 21
"	23	Up	iP 05 36 21.8 D			Ki	---
		Ki	iP 05 35 27.1				microns sec
		Sk	iP 05 35 57.9			M	E 0.6 16
		Gb	eP 05 36 38 D			M	N 0.4 15
		Um	iP 05 35 55.3			M	Z 0.8 14
			i(pP) 05 36 06.9			Um	e 13 21 06
			i 05 37 13.9	"	24	Up	iP 14 33 35.5
		Ka	iP 05 36 44.5				
			Unimak Island (h = 60 km).	"	24	Ki	iPn 17 05 47.7 C
"	23	Sk	iP 06 43 21.2				iSn 17 06 36.5
		Um	iP 06 43 24.7				iSg 17 06 51.6
			Adriatic Sea.				D = 420 km = 3.8°.

cont.



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1964					1964				
June	24	Sk	eSg	17 09 35	June	26	Um	i	07 11 48.9
cont.		Um	iSn	17 07 44.2	cont.			iSn	07 12 00.0
			eSg	17 08 20				iSg	07 12 16.8
				Northwest Russia, 68.8°N,					D = 480 km = 4.3°
				30.3°E. Origin time =					Coast of Norway, near Bodö,
				17 04 47. Explosion?					67.4°N, 14.2°E.
"	24	Ki	eP	23 54 04					Origin time = 07 10 00.
			i	23 54 06					This solution, based only on
"	25	Ki	iP	11 32 11.0					our station data, is in good
				microns sec					agreement with Norwegian and
			P	Z' 0.1 1.0					Finnish data (only with a slight
		Um	iP	11 32 39.8					revision of their phase
				Alaska (h = 70 km).	"	26	Up	iLg1	07 39 11.5
"	25	Up	iSg	13 50 14.5			Ka	ePg	07 37 00
		Ki	e	13 50 16				iSg	07 37 11.4
			iSg	13 50 48.0					D = 100 km = 0.9°
		Sk	iSg	13 51 23.8					South Baltic, 55.3°N, 15.5°E.
		Um	eS*	13 49 20					Origin time = 07 36 42.
			iSg	13 49 34.0					Explosion?
				Lake Ladoga, USSR, 61.6°N,					Solution obtained by combination
				30.8°E. Origin time =					with readings at Kongsberg. It
				13 46 37. Explosion?					is remarkable that in this and
"	26	Ki	iPKP	01 51 49.7					some other similar cases (e.g.
				Sandwich Islands (h = 60 km).					June 23, 11 20, June 24, 12 19
"	26	Ki	iP	04 56 32.9					and the series of five
		Sk	iP	04 57 06.8					explosions on June 13) the
		Um	iP	04 56 50.1					largest amplitudes at greater
				Japan (h = 20 km).	"	26	Sk	iPKP	13 28 19.6
"	26	Ki	eSn	05 23 16			Um	iPKP	13 28 15.4
			eSg	05 23 35					New Hebrides Islands
				Possibly northwest Russia.					(h = 650 km).
"	26	Ki	iP	05 37 39.7	"	26	Ki	iPKP	13 51 32.1
				Alaska (h = 30 km).					Solomon Islands (h = 15 km).
"	26	Up	iSn	07 13 24.1	"	27	Up	iP	02 36 41.0
			i	07 13 31.1				ipP	02 36 48.0
			iSg	07 14 06.2				iSa	02 45 32
				D = 830 km = 7.5°				iLg1	02 50 34
		Ki	ePn	07 10 44					microns sec
			iPg	07 10 47.8					P
			iSn	07 11 16.0					Z' 0.1 1.5
			iSg	07 11 23.5					pP
				D = 280 km = 2.5°					Z' 0.2 1.4
		Sk	iPg	07 11 10.9 C					M
			iSg	07 12 02.9					E 1.4 18
				D = 410 km = 3.7°					M
		Um	iPn*	07 11 08.9			Ki	iP	02 36 38.0
			iP*	07 11 13.9				ipP	02 36 46.0
								e	02 47 52
								eLg1	02 50 44
									microns sec
									pP
									Z' 0.1 0.8
									M
									E 2.5 17

cont.

cont.

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1964					1964				
June cont.	27	Ki		microns sec	June cont.	28	Up		microns sec
			M	N 1.0 15				M	N 5.3 20
			M	Z 2.8 16				M	Z 4.3 19
		Sk	iP	02 37 09.2			Ki	eSKS	13 16 23
		Gb	eP	02 37 06					microns sec
		Um	iP	02 36 32.6 C				M	E 5.4 22
			i(pP)	02 36 43.5				M	N 2.3 17
			ePP	02 38 07				M	Z 7.0 20
			eS	02 42 46			Um	iPP	13 10 30
			iLgl	02 49 54				iSKS	13 16 37
		Ka	iP	02 36 57.4				ePS	13 19 41
		Sinkiang, China.						iPPS	13 20 49
		h = 30 km (Up,Ki,Um).						iSS	13 25 36
		Magn. = 5.5 (Up,Ki).						New Ireland (h = 5 km).	
"	27	Um	iP	09 02 52.2	"	28	Up	iPKP	15 10 49.8
		Honduras (h = 30 km).						iSKP	15 13 56.3
"	27	Ka	iPKP	12 02 43.3					microns sec
		Tonga Islands (h = 600 km).						PKP	Z' 0.1 0.5
"	27	Up	eP	16 55 38			Ki	iPKP	15 10 36.0
		Ki	iP	16 56 16.8 C					microns sec
				microns sec				PKP	Z' 0.1 1.0
			M	E 0.9 20			Sk	iPKP	15 10 46.2
			M	N 1.2 22			Gb	iPKP	15 10 59.6
		Um	iS	17 05 54			Um	iPKP	15 10 41.9
		Ka	iP	16 55 22.2			Ka	iPKP	15 10 56.5
		Ascension Island (h = 30 km).						iSKP	15 14 04.8
"	27	Up	iP	19 44 37.1			New Hebrides Islands (h = 220 km).		
"	27	Um	iP	22 06 09.0	"	28	Gb	eP	15 18 28
		Kurile Islands (h = 30 km).			"	28	Up	iP	15 28 53.3
"	28	Ki	ePg	04 37 45					microns sec
			iSg	04 38 11.9				P	Z' 0.1 0.5
		Um	iSn	04 38 43.2			Ki	eP	15 29 45
			iSg	04 39 02.8			Um	eP	15 29 23
		Probably northern Finland.					Southwest of Portugal (h = 30 km).		
"	28	Up	iP	11 20 56.6	"	28	Up	iP	17 18 08.5
			i	11 21 00.6			Ki	iP	17 18 36.5
		Ki	iP	11 21 57.7			North Atlantic Ocean (h = 30 km).		
				microns sec					
			P	Z' 0.1 1.0	"	28	Up	iP	17 38 53.0
		Sk	iP	11 21 36.5					microns sec
		Gb	iP	11 20 54.5				P	Z' 0.1 1.0
		Um	iP	11 21 24.0				M	E 0.8 17
		Ka	iP	11 20 30.9				M	N 1.1 21
		Cyprus (h = 80 km).						M	Z 1.6 17
"	28	Up		---			Ki	iP	17 39 33.6
				microns sec					microns sec
			M	E 2.2 19				P	Z' 0.2 1.5
cont.					cont.				

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

1964					1964				
June	28	Ki		microns sec	June	29	Ki	iP	10 52 19.5
cont.			M	E 2.5 23				ipP	10 52 28.1
			M	N 1.8 23			Um	iP	10 52 47.9
			M	Z 1.1 19			Alaska. h = 30 km (Ki).		
		Gb	eP	17 38 37	"	29	Up	iP	20 49 21.1
		Um	iP	17 39 13.5	"	30	Up	ePKP	05 46 47
		Ka	iP	17 38 34.0				i	05 46 51.6
			ipP	17 38 40.7			Sk	iPKP	05 46 40.4
		North Atlantic Ocean.					Um	iPKP	05 46 33.5
		h = 25 km (Ka).						ipPKP	05 47 42.0
		Magn. = 5.7 (Up,Ki).					Kermadec Islands (h = 210 km).		
"	28	Up	iP	18 33 38.4 C	"	30	Ki	iP	05 56 10.0
		Ki	iP	18 32 45.6 C			Alaska (h = 30 km).		
		Sk	iP	18 33 13.7	"	30	Up	iP	10 28 55.1
		Um	iP	18 33 12.5				i	10 29 08.0
			ipP	18 33 24.8			Ki	iP	10 28 08.6 C
		Unimak Island.					Um	iP	10 28 30.3
		h = 50 km (Um).					Ka	eP	10 29 17
"	28	Up	iP	19 19 23.3			Kurile Islands (h = 30 km).		
		Ki	iP	19 18 28.2	"	30	Up	iP	12 32 55.1
			ipP	19 18 35.5				iLi	12 35 45.7
				microns sec				iLg2	12 36 43
			Pm	Z' 0.1 1.0			Ki	eP	12 34 36
			M	N 0.6 15				iLg2	12 40 59
		Sk	iP	19 18 55.0				iRg	12 41 58
		Gb	iP	19 19 34.7					microns sec
		Um	iP	19 18 56.7			M	E	0.7 10
			ipP	19 19 04.0			M	N	0.7 13
		Ka	iP	19 19 46.2			M	Z	0.5 10
		Alaska. h = 30 km (Ki,Um).					Sk	iP	12 33 43.1
"	28	Up	iP	19 43 26.9 D				iLi	12 37 36.2
"	29	Up	ePKP	00 05 21				iLg2	12 38 37.3
		Um	iPKP	00 05 08.6 C			Gb	iP	12 34 08.2
		Kermadec Islands (h = 30 km).						i	12 35 36.0
"	29	Up	iP	07 31 20.0				i	12 36 07.1
			i	07 31 55.8			Um	iP	12 33 48.4 D
				microns sec			Ka	iP	12 32 05.6
			P	Z' 0.1 0.6				iLg2	12 34 37.7
		Ki	iP	07 30 23.0			Austria (h = 30 km).		
				microns sec	"	30	Up	e(P)	14 00 01
			P	Z' 0.1 1.0				ipP	14 03 45.9
		Sk	iP	07 30 51.0 C				iSKS	14 10 28
		Gb	iP	07 31 30.6				eS	14 11 06
		Um	iP	07 30 52.0				iSS	14 18 09
			epP	07 31 04					microns sec
		Ka	iP	07 31 44.2			PP	E	0.9 8
		Alaska. h = 50 km (Um).					PP	N	0.6 6
		Magn. = 5.8 (Up,Ki).					PP	Z	1.7 7
							SKS	E	0.9 7

cont.

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

1964  
 June 30 Up  
 cont.

			microns	sec
	S	N	6.6	15
	M	E	10	19
	M	N	16	21
	M	Z	18	21
	(D = 10800 km = 98°).			
Ki	iP		13 59	43.2
	iPP		14 03	29
	e		14 04	28
	iSKS		14 10	20
	iS		14 10	51
	iPS		14 12	22
	iSS		14 17	27
			microns	sec
	P	Z	1.1	6
	P	Z'	0.3	1.5
	PP	E	1.5	8
	PP	Z	1.5	6
	SKS	E	2.0	7
	S	N	5.3	14
	M	E	24	20
	M	N	18	20
	M	Z	31	23
	D = 10550 km = 95°.			
Sk	e(P)		14 00	21
	iPP		14 04	14.3
Gb	iPP		14 04	25.2
	i		14 04	53.0
Um	iP		13 59	46.9
	iPP		14 03	35
	iSKS		14 10	24
	iS		14 10	48
	iSS		14 17	38
Ka	iP		14 00	07.3
	iPP		14 04	22.7
	Celebes (h = 40 km).			
	Magn. = 6.6 (Up, Ki).			

" 30 Up iP 15 58 43.0  
 microns sec  
 P Z' 0.1 1.0  
 Ki iP 15 57 56.5  
 Gb iP 15 59 02.5  
 Um iP 15 58 17.5 C  
 Ka iP 15 59 05.9  
 Kurile Islands (h = 30 km).

" 30 Up iP 15 59 39.4 C  
 iScS 16 09 35  
 microns sec  
 P Z' 0.2 1.0  
 M E 2.3 20  
 M N 5.1 18  
 M Z 2.9 18

cont.

1964  
 June 30 Ki iP 15 58 52.5 C  
 cont. iScS 16 08 41  
 microns sec  
 P Z' 0.2 1.0  
 M E 3.0 16  
 M N 3.6 18  
 M Z 6.8 17  
 Sk iP 15 59 27.8  
 Gb iP 15 59 58.5 C  
 ipP 16 00 10.5  
 Um iP 15 59 13.6 C  
 Ka iP 16 00 01.0 C  
 ipP 16 00 14.5  
 Kurile Islands. h = 50 km (Gb, Ka).  
 Magn. = 6.0 (Up, Ki).  
 This is the largest aftershock  
 after the main shock on June 23.  
 The magnitude difference  $M - M_1 = 7.6 - 6.0 = 1.6$ , i.e. slightly  
 greater than average. A possible  
 reason is that  $M - M_1$  increases  
 with focal depth. The average  
 value 1.2 should then apply  
 only to shallow shocks.

" 30 Up iP 18 58 21.7  
 Ki iP 18 57 35.4  
 Kurile Islands (h = 30 km).  
 " 30 Ki iP 20 00 43.5  
 Um iP 20 00 49.2 C  
 Celebes (h = 30 km).

" 30 Up iP 20 18 31.5 C  
 iPcP 20 19 00.5  
 ipP 20 19 54.7  
 iS 20 26 35.0

microns sec  
 P Z' 0.4 0.8  
 (D = 7300 km = 65 1/2°).  
 Ki iP 20 17 46.2 C  
 ipP 20 19 06.3  
 eS 20 25 21  
 eScS 20 27 00

microns sec  
 P Z' 0.5 1.0  
 S E 0.7 12  
 M E 0.8 19  
 M N 0.8 18  
 (D = 6650 km = 60°).  
 Sk iP 20 18 21.7 C  
 iPP 20 20 46.4  
 Gb iP 20 18 49.5 C  
 i 20 19 58.7  
 esP 20 21 08

cont.

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

1964

June 30	Um	iP	20 18 06.6 C
cont.		i	20 18 08.5
		i	20 20 07
		iS	20 25 58
		iScS	20 27 20
	Ka	iP	20 18 53.5 C
		ipP	20 20 19.6
		isP	20 21 16.6

Sea of Okhotsk. h = 380 km

(Up,Ki,Gb,Ka).

Magn. = 6.2 (Up,Ki).

Markus Båth  
April 27, 1965

Seismological Institute  
Uppsala

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

JULY 1 - 31, 1964

1964	July	1	Ki	eL	00 02		1964	July	1	Um	iP	08 10 48.5		
					microns sec									
				M	E 0.5 16		"		1	Up	iLg1	08 45 48.5		
				M	N 0.4 15					Sk	eSn	08 46 06		
				Celebes (h = 60 km).								iLg1	08 46 57.7	
												D = 1020 km = 9.2°.		
"		1	Up	iP	02 58 20.5 C					Um	iSn	08 44 48.4		
				iPP	03 00 46.4						iS <sup>x</sup>	08 45 02.5		
					microns sec						iLg1	08 45 12.1		
				P	Z' 0.1 1.2							D = 650 km = 5.9°.		
				M	E 0.6 16							Lake Ladoga, USSR,		
				M	N 0.9 18							61.4°N, 31.8°E.		
				M	Z 0.9 14							Origin time = 08 42 10.		
			Ki	iP	02 57 33.9 C							Explosion?		
				iS	03 05 49					"	1	Up	iP	09 57 44.1
					microns sec									
				P	Z' 0.1 1.3									
				M	E 0.7 17									
				M	N 0.5 17									
				M	Z 1.1 17									
				D = 6600 km = 59½°.							Ki	iP	09 56 57.5	
			Sk	eP	02 58 09						e(S)	10 05 29		
				iPP	03 00 31.6							microns sec		
			Um	iP	02 57 55.4						M	E 1.8 18		
				iS	03 06 20						M	N 2.0 20		
			Ka	iP	02 58 43.1						M	Z 2.8 19		
			Kurile Islands (h = 30 km).								Sk	eP	09 57 34	
			Magn. = 5.6 (Up, Ki).								Um	iP	09 57 18.6 C	
											iS	10 06 00		
"		1	Um	iP	06 11 16.9					Ka	iP	09 58 06.5		
												Kurile Islands		
"		1	Ki	iP	06 14 59.5							(h = 80 km).		
			Sk	iP	06 15 26.4					"	1	Up	iP	10 03 34.1
			Um	iP	06 15 28.9							Ki	iP	10 02 47.4 C
			Alaska (h = 20 km).									Sk	eP	10 03 23
"		1	Um	iP	07 27 36.5						Um	iP	10 03 08.6	
			Japan (h = 70 km).									ipP	10 03 21.1	

cont.

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

1964				1964					
July cont.	1	Ka	iP	10 03 56.2	July cont.	1	Ka	eLgl	21 42 06
			ipP	10 04 09.1				D = 1090 km = 9.8°.	
		Kurile Islands. h = 50 km (Um,Ka).					Lake Ladoga, USSR, 61.4°N, 31.8°E. Origin time = 21 36 58. Explosion?		
"	1	Up	eP	12 12 38			It appears to be quite a general rule that, at a few hundred kilometers distance, the most prominent phase is Lgl if the source is an (underwater) explosion. Compare remark to June 26, 1964, 07 39.		
"	1	Up	iP	13 42 01.3					
		Ki	iP	13 41 08.1 C					
			P	Z' 0.1 1.0					
		Sk	iP	13 41 38.7					
			iPcP	13 42 13.5					
		Um	iP	13 41 35.2					
			ipP	13 41 45.3					
		Aleutian Islands. h = 40 km (Um).			"	1	Up	iP	22 57 59.0 D
							ePP	23 00 53	
								microns sec	
							P	Z' 0.2 1.0	
"	1	Ki	iP	13 46 27.9			Ki	iP	22 57 24.6 D
		Molucca Passage (h = 30 km).						iPP	23 00 00.0
								microns sec	
							P	Z' 0.1 1.0	
"	1	Up	iPKP	16 24 10.7			Sk	iP	22 57 55.8
		Um	iPKP	16 23 57.5				iPP	23 00 46.2
		Ka	ePKP	16 24 22			Gb	iP	22 58 18.3
		Kermadec Islands (h = 30 km).					Um	iP	22 57 39.4 D
								ipP	22 58 19.0
"	1	Um	iP	18 21 05.0				iPP	23 00 25.2
								eS	23 07 02
"	1	Ki	eP	20 18 33			Ka	iP	22 58 16.8 D
								iPP	23 01 23.1
			P	Z' 0.1 1.5			South of Japan, h = 160 km (Um). Magn. = 5.7 (Up,Ki).		
		Um	iS	20 25 42					
			iSS	20 29 15					
		North Atlantic Ocean (h = 30 km).			"	1	Um	iSKS	23 13 47
								ipS	23 15 41
								eSP	23 16 39
"	1	Up	iSn	21 40 02.5			Peru (h = 140 km).		
			iLgl	21 40 35.6					
				D = 790 km = 7.1°.					
		Ki	ePn	21 39 08	"	1	Um	i(SKP)	23 26 24.3
			iPg	21 39 46.4			New Guinea (h = 180 km).		
			iS <sup>x</sup>	21 40 56.9					
			iLgl	21 41 12.9	"	2	Up	iP	01 29 07.0
				D = 900 km = 8.1°.				ipP	01 29 12.5
		Sk	iPn	21 39 20.5			Ki	iP	01 28 12.0 C
			eSn	21 41 01			Sk	iP	01 28 39.0
			iLgl	21 41 47.0				ipP	01 28 43.2
				D = 1020 km = 9.2°.			Gb	iP	01 29 18.5
		Gb	eLgl	21 42 26				ipP	01 29 23.9
		Um	iP <sup>x</sup>	21 38 37.0			Um	iP	01 28 41.1
			iSn	21 39 38.0				ipP	01 28 46.0
			iLgl	21 39 59.1				eS	01 36 22
				D = 650 km = 5.9°.				iPS	01 36 37
		Ka	ePn	21 39 26			Ka	iP	01 29 30.5

cont.

cont.

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

1964 July cont.	2	Ka	ipP	01 29 35.5	1964 July cont.	2	Up	iS	17 23 55
				Alaska, h = 20 km (Up,Sk,Gb,Um,Ka).					microns sec
"	2	Ki	eP <sup>x</sup>	04 19 27				M	E 0.7 24
			eSn	04 20 05				M	N 1.1 18
			eSg	04 20 24				M	Z 2.0 16
				D = 390 km = 3.5°.					D = 7650 km = 69°.
		Um	iPg	04 19 14.9		Ki	eS		17 22 33
			iSg	04 19 46.4					microns sec
				D = 270 km = 2.4°.				S	E 0.3 8
				Coast of Finland, near Oulu, 65.0°N, 25.2°E. Origin time = 04 18 27.				S	N 0.4 11
								M	E 0.8 14
								M	N 1.0 17
								M	Z 1.1 17
"	2	Ki	e	05 05 17		Um	iS		17 23 18
			i(Sn)	05 06 14.7					Off coast of Washington State, USA (h = 30 km).
			eSg	05 06 28	"	2	Up	iP	17 28 43.6
"	2	Ki	iP	05 16 30.6					microns sec
			i	05 16 36.1				M	N 1.0 17
		Ka	iP	05 16 55.1				M	Z 1.4 18
				Macassar Strait (h = 130 km).		Sk	eP		17 28 21
									Off coast of Washington (h = 15 km).
"	2	Up	iPg	11 21 17.6	"	2	Up	iP	17 51 16.4
			iLgl	11 21 29.9	"	3	Ki	iP	05 17 56.5
			iSg	11 21 36.2			Sk	iP	05 17 55.7 C
				microns sec					Mexico (h = 100 km).
			Sg	Z' 0.1 0.5	"	3	Ki	iP	08 27 10.0
				D = 120 km = 1.1°.			Um	iP	08 27 26.9
		Sk	eLgl	11 23 50					Japan (h = 30 km).
		Um	iP <sup>x</sup>	11 22 26.7	"	3	Ki	iP	14 18 46.7 C
			iLgl	11 23 31.0			Sk	iP	14 19 05.1
				D = 550 km = 5.0°.					Kashmir (h = 90 km).
		Ka	eP <sup>x</sup>	11 21 52	"	3	Ki	iP	19 28 22.4 C
			iLgl	11 22 30.9			Um	iP	19 27 56.2 C
				D = 340 km = 3.1°.				i	19 28 00.1
				Baltic Sea, off coast of Sweden, 58.9°N, 18.3°E. Origin time = 11 20 57. Probably underwater explosion. Compare remark to July 1, 21 40. Comparing amplitudes on Z' we find for Up that Sg > Lgl whereas at the other more distant stations Lgl > Sg, indicating different attenuation for Lgl and Sg.					Ethiopia (h = 60 km).
"	2	Ki	iP	12 24 23.5	"	3	Um	eP	20 35 16
				Molucca Sea (h = 160 km).	"	3	Ki	iP	22 37 00.2
"	2	Up	iP	17 14 45.9	"	4	Up	iP	04 43 03.7 C
cont.									microns sec
								P	Z' 0.1 0.6
"	2	Ki	iP	12 24 23.5	"	4	Up	iP	11 02 57.3
				Molucca Sea (h = 160 km).				iSKS	11 13 32
"	2	Up	iP	17 14 45.9					microns sec
cont.								M	E 0.4 16



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

1964					1964				
July	4	Up		microns sec	July	4	Um	iSn	23 05 34.4
cont.			M	N 1.2 20	cont.			i(S <sup>x</sup> )	23 05 49.2
			M	Z 1.4 21				iSg	23 06 10.5
		Ki	iP	11 02 31.5				D = 720 km = 6.5°.	
			eSKS	11 13 05				Northwest Russia,	
			eS	11 13 23				69.0°N, 30.2°E.	
				microns sec				Origin time = 23 02 36.	
			P	Z' 0.2 1.0				Explosion?	
			S	E 0.9 7				This event, like the other	
			S	N 0.5 8				similar events in northwest	
			M	E 1.2 21				Russia, produce the largest	
			M	N 0.8 18				amplitudes in the Sg phase	
			M	Z 1.3 20				at our stations. The	
			D = 10100 km = 91°.					evidence is that the	
		Sk	iP	11 02 55.6				assumption of Lgl instead	
		Um	iP	11 02 41.6				of Sg gives no satisfactory	
			iSKS	11 13 10				solution. Combining this	
			i	11 15 01				result with statements made	
		Mariana Islands						under June 26, 07 39, July	
		(h = 30 km).						1, 21 40 and July 2, 11 21,	
		Magn. = 6.0 (Up, Ki).						we arrive at the following	
"	4	Up	eP	11 15 33				tentative rule: At a few	
			eS	11 19 00				hundred kilometers distance,	
				microns sec				explosions on land produce	
			S	E 0.3 7				the largest amplitudes in	
			M	E 2.2 12				Sg, whereas underwater	
			N	N 1.2 12				explosions have the largest	
			M	Z 1.2 8				amplitudes in Lgl. However,	
			D = 2050 km = 18½°.					there are clear exceptions,	
		Ki	iP	11 16 54.6				and the matter remains to	
				microns sec				be clarified.	
			M	E 3.3 17					
			M	N 1.0 13					
		Sk	iP	11 16 20.7	"	5	Um	iP	00 24 42.7
		Um	iP	11 16 12.8					
			iS	11 20 12					
		Ka	iP	11 14 57.7 C	"	5	Up	iP	03 23 28.1
		Bulgaria (h = 10 km).							
"	4	Ki	iSg	14 00 15.7	"	5	Up	iP	03 24 30.1
		Sk	eSg	14 00 19				eS	03 32 33
		Um	iSg	14 00 40.9				D = 6550 km = 59°.	
		Nordlands Fylke, Norway,					Ki	iP	03 23 34.7
		66.3°N, 14.6°E.						eS	03 30 54
		Origin time = 13 58 48.							microns sec
"	4	Um	iP	15 07 34.2				S	E 0.4 7
								M	E 0.6 17
"	4	Up	iP	15 50 47.2				M	N 0.4 21
								M	Z 0.8 22
"	4	Um	iP	19 27 05.0				D = 5650 km = 51°.	
"	4	Ki	iPn	23 03 38.2			Sk	eP	03 24 04
			iPg	23 03 47.2			Gb	iP	03 24 41.2
			iSn	23 04 26.6			Um	iP	03 24 03.4
			iSg	23 04 42.0				ipP	03 24 11.9
			D = 420 km = 3.8°.					iS	03 31 45
		Sk	eSg	23 07 29			Ka	iP	03 24 53.9
		Um	iPn	23 04 15.8			Alaska. h = 30 km (Um).		
cont.					"	5	Up	iP	04 58 15.5 D
					cont.				

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

1964					1964				
July	5	Up		microns sec	July	5	Sk	iP	19 20 10.1
cont.		M	N	0.8 13	cont.			ipP	19 20 21.2
		M	Z	0.8 13			Gb	eP	19 20 20
		Ki		---				epP	19 20 30
				microns sec			Um	iP	19 20 18.9 D
		M	E	0.6 15				iS	19 30 35
		M	N	0.5 16				iSS	19 35 41
		M	Z	0.9 17			Ka	iP	19 20 39.7
		Sk	iP	04 58 54.5 D				ipP	19 20 50.5
		Um	iP	04 59 05.7					Gulf of California.
		Ka	iP	04 57 38.1					h = 40 km (Ki,Sk,Gb,Ka).
				Ionian Sea.					Magn. = 6.3 (Up,Ki).
"	5	Up	iP	12 47 24.9					On Z' the amplitude ratio
		Ki	iP	12 46 32.7					pP/P varies between 1 and
				Aleutian Islands					5 with a systematic
				(h = 30 km).					relation between this value
"	5	Up	iP	16 57 28.6					and the direction from the
"	5	Ki	iP	18 08 07.1					source: the smallest value
		Sk	iP	18 08 35.1	"	5	Up	iP	23 46 58.3 C
		Um	iP	18 08 36.7				eS	23 55 59
				Alaska (h = 25 km).				i	23 57 09
"	5	Up	eP	19 20 34					microns sec
		i		19 20 40.1				P	Z 1.3 5
		ePP		19 23 47				P	Z' 0.2 0.6
		iS		19 30 56				M	E 14 20
		iSS		19 36 23				M	N 21 17
				microns sec				M	Z 22 19
		P	N	0.3 6					D = 7550 km = 68°.
		P	Z	0.6 5			Ki	iP	23 46 12.2 C
		P	Z'	0.4 1.7				ePa	23 50 14
		S	E	1.6 10				iS	23 54 28
		S	N	6.6 12				iScS	23 55 59
		M	E	9.9 17					microns sec
		M	N	12 20				P	E 0.4 8
		M	Z	16 19				P	N 0.6 8
				D = 9500 km = 85½°.				P	Z 1.5 6
		Ki	eP	19 20 04				P	Z' 0.1 1.2
			ipP	19 20 14				S	E 3.9 17
			i	19 20 22.6				S	N 1.2 15
			eS	19 29 56				M	E 29 16
			iSKS	19 30 12				M	N 15 16
				microns sec				M	Z 34 18
		P	Z'	0.4 1.8					D = 6700 km = 60½°.
		pP	E	0.3 6			Sk	iP	23 46 48.1
		pP	N	0.3 5				iPcP	23 47 28.0
		pP	Z	0.9 6				i	23 47 44.6
		S	E	2.4 12			Gb	iP	23 47 20.4 C
		SKS	N	2.5 11			Um	iP	23 46 33.6 C
		M	E	25 16				iPP	23 49 10
		M	N	19 17				iPa	23 50 27
		M	Z	30 18				iS	23 55 11
				D = 8850 km = 79½°.				iPS	23 55 32
cont.							Ka	iP	23 47 21.2
									Kurile Islands (h = 50 km).
									Magn. = 6.3 (Up,Ki).

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

1964  
July 5 Up iP 23 50 08.6  
                  microns sec  
          P Z' 0.2 0.8  
Ki iP 23 49 21.1  
Gb iP 23 50 28.4  
Um iP 23 49 43.6  
Ka iP 23 50 30.3  
   ipP 23 50 44.7  
Kurile Islands.  
h = 60 km (Ka).

" 5 Up iP 23 50 48.1 C  
                  microns sec  
          P Z' 0.1 0.7

" 6 Um iP 02 20 42.3  
Gulf of California  
(h = 30 km).

" 6 Up iP 02 27 08.7  
   i 02 27 13  
   i 02 27 27.8  
   iPP 02 30 19.8  
   iS 02 37 29  
   iSS 02 43 01  
                  microns sec  
   P Z' 0.4 1.5  
   S E 3.4 11  
   S N 14 11  
   M E 13 19  
   M N 32 16  
   M Z 24 17  
   D = 9450 km = 85°.  
Ki iP 02 26 44.8  
   i 02 27 02.0  
   iS 02 36 42  
                  microns sec  
   P E 0.4 5  
   P Z 1.3 4  
   P Z' 0.4 1.3  
   S E 3.7 10  
   S N 6.3 11  
   M E 77 16  
   M N 51 17  
   M Z 98 16  
   D = 8900 km = 80°.  
Sk iP 02 26 46.8  
   i 02 26 48.8  
   i 02 26 55.5  
Gb iP 02 27 08.1  
Um iP 02 26 59.6  
   iPa 02 33 27  
   iSKS 02 37 07  
   iS 02 37 13  
Ka iP 02 27 18.2  
Gulf of California  
(h = 30 km).

cont.

1964  
July 6 Magn. = 6.6 (Up, Ki).  
cont. On Z' the P phases are  
characterized by relatively  
long periods and gradual  
amplitude increase with  
several successive onsets.  
The period increases along  
the P wave train (over an  
interval about 20 sec long).

" 6 Up iP 02 38 08.1  
Ki iP 02 37 41.7  
Sk iP 02 37 52.6  
Um iP 02 37 56.1  
   ipP 02 38 04.0  
Ka iP 02 37 19.9  
Gulf of California.  
h = 30 km (Um).

" 6 Up iP 03 21 14.4  
Ki iP 03 20 19.0  
Sk eP 03 20 47  
Um iP 03 20 47.0  
(Alaska).

" 6 Up iP 03 31 28.4 C  
Ki iP 03 30 34.1  
Sk iP 03 31 01.2  
Gb iP 03 31 40.0  
Um iP 03 31 02.4 C  
   ipP 03 31 08.9  
Ka iP 03 31 50.9  
Alaska, h = 25 km (Um).

" 6 Up iP 07 34 49.3 D  
   ipP 07 35 14  
   iS 07 45 16  
   iP'P'P' 08 21 23.8  
                  microns sec  
   P E 0.9 5  
   P N 2.0 6  
   P Z 4.7 6  
   P Z' 0.6 1.0  
   S E 13 8  
   S N 13 8  
   M E 43 22  
   M N 50 23  
   M Z 81 23  
   D = 9650 km = 87°.  
Ki iP 07 34 33.7 D  
   ipP 07 34 58  
   iS 07 44 53  
   eP'P' 08 00 47  
   eP'P'P' 08 21 27  
                  microns sec  
   P E 7.2 6  
   P N 3.8 6

cont.

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

1964				1964			
July	6	Ki	microns sec	July	6	Ki	microns sec
cont.				cont.			
			P Z 19 6				pP Z' 0.2 1.0
			P Z' 3.6 1.5		Sk	iP	10 21 43.1
			S E 36 9			iPP	10 23 28.6
			S N 32 9		Gb	iP	10 21 39.6
			M E 81 23			ipP	10 22 02.7
			M N 28 19			isP	10 22 16.0
			M Z 80 22			iPP	10 23 25.2
			D = 9350 km = 84°.		Um	iP	10 21 14.3
		Sk	iP 07 34 31.5 D			i	10 21 21.4
		Gb	iP 07 34 44.2 D			ipP	10 21 38.1
			ipP 07 35 09.7		Ka	iP	10 21 22.7 D
			epS 07 45 21			ipP	10 21 45.9
		Um	iP 07 34 44.3 D			isP	10 21 58.6
			iPP 07 38 11			iPP	10 23 03.6
			i 07 44 39			Hindu Kush, h = 110 km (Up, Ki, Gb, Um, Ka).	
			iSKS 07 44 55		"	Ki	iP 10 51 01.1
			iS 07 45 09		6	Sk	iP 10 50 57.9
			ipS 07 45 22.5			i	10 51 12.9
		Ka	eP'P'P' 08 21 33		Um	iP	10 51 10.9
			iP 07 34 55.5 D			i	10 51 31.9
			ipS 07 45 48.0			Mexico (h = 110 km).	
			eP'P'P' 08 21 38			Ki	iP 14 33 35.7
			Mexico, h = 100 km		"		iPP 14 37 54.7
			(Up, Ki, Gb).		6	Sk	iPP 14 38 04.0
			Magn. = 7.3 (Up, Ki).			Um	iP 14 33 40.6 C
			The records are of long-			ePP	14 37 56
			period character, both			Banda Sea (h = 100 km).	
			among surface waves and		"	Um	iP 14 49 25.6
			between P and S. This is		"	Ki	eP 20 11 19
			the second time good records		6		iS 20 12 44.0
			of P'P'P' have been obtained				eT 20 16 20
			at Swedish stations (the				i 20 16 53.4
			earlier case was May 24,			Norwegian Sea, 73½°N, 9°E.	
			1959, at 19 30, also for an			Origin time = 20 09 34.	
			earthquake in Mexico). Our			Solution obtained by	
			distances are just outside			combination with Norwegian	
			the shadow-zone for P'P'P'			data.	
			and therefore favourable,				
			but inside the shadow-zone			Ki	eT 20 30 01
			for P'P'.		6		i 20 30 35.2
"	6	Ki	iP 07 52 45.0			Norwegian Sea, 73½°N, 9°E.	
"	6	Ki	iP 07 53 05.5			Origin time = 20 23 20.	
"	6	Up	iP 10 21 17.4 D			Solution obtained by	
			ipP 10 21 40			combination with Finnish	
			iPP 10 22 54			data.	
			microns sec				
			P Z' 0.1 0.6			Ki	iP 20 49 00.5
		Ki	iP 10 21 25.0		6		eS 20 50 26
			ipP 10 21 48.3				eT 20 53 54
			eLi 10 33 49				i 20 54 27.7
			eLgl 10 35 22				
			i 10 35 51				
cont.				cont.			

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

1964 July cont.	6	Sk	eP	20 49 39	1964 July cont.	7	68.3°N, 31.8°E. Origin time = 06 30 06. Explosion?			
			iS	20 51 26.1		"	7	Ki	eT	06 50 18
				Norwegian Sea, 73½°N, 9°E. Origin time = 20 47 18. Solution obtained by combination with Finnish and Norwegian data.					i	06 50 50.8
"	6	Ki	iP	23 15 19.2				Um	i	06 51 43.6
			eT	23 20 24					i	06 51 52.9
			i	23 20 45.2					eT	06 53 02
		Sk	iP	23 16 01.1	"	7	Up	iPKP	07 57 35.7 C	
			eS	23 17 47					microns sec	
				Norwegian Sea, 73½°N, 9°E. Origin time = 23 13 40. Solution obtained by combination with Finnish and Norwegian data. In this series of shocks in the Norwegian Sea, the T phases are better developed at Ki than the P phases.			Ki	iPKP	07 57 25.5 C	
									iSKP	08 00 07.2
"	7	Up	iP	01 39 33.5					microns sec	
				Kurile Islands (h = 30 km).			Sk	ePKP	07 57 27	
								i	07 57 36.0	
"	7	Ki	eP	04 07 11				iSKP	08 00 22.4	
			eT	04 12 02			Gb	iPKP	07 57 46.2 C	
			i	04 12 48.7			Um	iPKP	07 57 29.8	
		Sk	iP	04 07 50.2				iSKP	08 00 17.3	
			eS	04 09 37			Ka	iPKP	07 57 48.0 C	
			eT	04 14 53					Fiji Islands (h = 460 km).	
		Um	iP	04 08 04.9						
			eS	04 10 25	"	7	Um	iP	08 19 03.4 C	
			i	04 10 37						
			iT	04 14 51.4			Up	i(P)	10 53 38.8 D	
				Norwegian Sea (h = 30 km). The T phases are remarkably strong at Ki and Um but much weaker at Sk.					microns sec	
								(P)	Z' 0.1 0.6	
							Ka	i(P)	10 53 50.9	
"	7	Ki	eP	04 48 49						
			iT	04 53 57.9			Up	iP	13 56 19.9	
			i	04 54 26.7			Ki	iP	13 55 34.2	
				Norwegian Sea.				ipP	13 55 37.7	
"	7	Ki	iPn	06 31 16.3			Sk	eP	13 55 52	
			iPg	06 31 28.2			Um	iP	13 56 01.4	
			iSn	06 32 11.9					Off coast of Oregon. h = 15 km (Ki).	
			iSg	06 32 30.8						
				D = 490 km = 4.4°.	"	7	Um	iP	14 03 04.2	
		Sk	eSg	06 35 05				e	14 05 07	
		Um	iSn	06 32 57.5					Yugoslavia (h = 40 km).	
			iSg	06 33 47.2	"	7	Ki	i(PKP)	15 16 09.8	
				Northwest Russia,			Sk	i(PKP)	15 16 25.0	
							Um	i(PKP)	15 16 20.0	
cont.					"	7	Up	iP	15 26 07.2 C	
							Sk	i(P)	15 24 48.2	
					"	7	Up	iP	21 20 31.1	
							Ki	iP	21 20 37.7	
							Sk	iP	21 20 56.7	
					cont.					



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

1964						1964					
July	9	Ki		microns sec		July	9	Ki		microns sec	
cont.			P	Z' 0.1 1.0		cont.			P	Z' 0.1 1.0	
			M	E 1.0 19				Sk	iP	12 13 45.8	
			M	N 0.8 18				Gb	iP	12 14 13.0	
			M	Z 1.5 18				Um	iP	12 13 30.0	
		Sk	iP	05 59 35.3				Ka	iP	12 14 10.1	
		Um	iP	05 59 16.0 C				Japan (h = 50 km).			
			eS	06 09 15				Magn. = 5.9 (Up, Ki).			
		Ka	iP	05 59 40.2 C		"	9	Up	eP	12 41 20	
			ipP	05 59 51.3							
		Luzon. h = 40 km (Ka).									
"	9	Up	iP	10 48 17.5 D		"	9	Up	e(P)	15 16 19	
									i	15 17 19.4	
									i(Sg)	15 17 22.3	
											microns sec
"	9	Up	i(PKP)	11 41 27.5					(Sg)	Z' 0.2 0.5	
			iPKP	11 41 30.2							
			iPKS	11 45 11							
				microns sec		"	9	Up	eP	16 55 40	
			PKP	Z' 0.2 0.6					e(PKP)	16 58 36	
			M	E 2.2 23					iPKP	16 58 45.8	
			M	N 8.1 23					iSKP	17 02 00.2	
			M	Z 6.5 22					iPKS	17 02 12	
		Ki	e(PKP)	11 41 11					ipPKS	17 02 42	
			iPKP	11 41 19.0					iX	17 11 06.8	
			iPP	11 43 52							microns sec
			iPKS	11 44 49							
				microns sec							
			PKP	Z' 0.1 1.0					PKP	N 1.1 4	
			PKS	E 0.8 7					PKP	Z 3.6 3	
			PKS	N 1.0 9					PKP	Z' 0.3 0.5	
			M	E 4.5 22					SKP	E 2.9 5	
			M	N 2.3 20					SKP	N 5.2 4	
			M	Z 6.1 23					SKP	Z 19 5	
		Sk	iPKP	11 41 23.2					SKP	Z' 0.4 0.5	
		Gb	i(PKP)	11 41 36.9					PKS	E 11 5	
			iPKP	11 41 39.0					PKS	N 21 5	
		Um	i(PKP)	11 41 17.7					M	E 6.5 20	
			iPKP	11 41 26.2					M	N 22 21	
			iPP	11 44 15					M	Z 28 24	
			iPKS	11 44 57					(D = 14550 km = 131°).		
		Ka	i(PKP)	11 41 39.1				Ki	iP	16 55 07 C	
			iPKP	11 41 42.1					i(PKP)	16 58 30.7	
		Tonga Islands (h = 40 km).							iPKP	16 58 34.7 C	
		Magn. = 6.5 (Up, Ki).							iPP	17 00 15	
		Multiple PKP phases, (PKP)							eSKS	17 05 20	
		being of much smaller							i	17 07 01	
		amplitude than PKP. The							iS	17 08 06	
		time difference PKP-(PKP)							iPKKP	17 08 22.2	
		has a tendency to decrease							iSP	17 10 02	
		with distance over our							i	17 15 45	
		range of stations.									microns sec
									P	Z 0.5 5	
									PKP	E 0.6 4	
									PKP	Z 6.2 5	
									PKP	Z' 2.6 1.5	
									PP	E 2.0 7	
									PP	Z 6.0 8	
									SKS	E 4.0 8	
"	9	Up	iP	12 13 50.8							
				microns sec							
			P	Z' 0.1 0.6							
		Ki	iP	12 13 13.7							
cont.						cont.					





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

1964					1964						
July	11	Ki	eP	12 04 10	July	11	Gb	iP	20 35 55.5 C		
cont.				microns sec	cont.		Um	iP	20 35 18.0		
			M	E 0.3 16				iS	20 43 07		
		Ka	iP	12 03 10.4			Ka	iP	20 36 07.0 C		
		Atlantic Ocean					Alaska (h = 40 km).				
		(h = 30 km).					Magn. = 5.7 (Ki).				
"	11	Ki	iP	15 48 37.4	"	11	Ki	iP	20 35 37.2		
		Mindanao (h = 150 km).					Sk	iP	20 36 04.9		
							Gb	iP	20 36 45.9		
"	11	Up	iP	17 48 39.1 C			Alaska.				
			i	17 52 37.6							
				microns sec	"	12	Up	iP	01 00 41.9		
		M	E	0.4 15			Ki	iP	01 01 22.8 C		
		M	N	1.0 19			Um	iP	01 01 02.4		
		M	Z	0.9 14							
		Ki	iP	17 48 10.4 C	"	12	Up	iP	01 56 43.1 C		
			iS	17 50 58.0				iPP	01 59 20.6		
			eSS	17 51 13				iS	02 05 55		
				microns sec					microns sec		
		P	Z'	0.4 1.3			P	E	0.2 3		
		M	E	2.0 19			P	Z	0.6 4		
		M	N	0.7 16			P	Z'	0.2 1.0		
		M	Z	2.8 19			PP	Z'	0.1 1.4		
		D = 1700 km = 15 $\frac{1}{2}$ $^{\circ}$ .					S	E	1.0 9		
		Sk	iP	17 47 46.6			M	E	1.9 20		
			iS	17 50 28.7			M	N	2.9 18		
			iSS	17 50 47.7			M	Z	2.6 14		
		Um	iP	17 48 27.3 C			D = 7900 km = 71 $^{\circ}$ .				
			eS	17 51 30			Ki	iP	01 56 03.2 C		
		Ka	iP	17 48 57.0 C				iS	02 04 43		
		Iceland (h = 20 km).							microns sec		
							P	E	0.4 5		
"	11	Um	iP	19 06 27.7			P	N	0.3 5		
		Mariana Islands					P	Z	1.1 5		
		(h = 60 km).					P	Z'	0.1 1.0		
							S	E	2.1 8		
"	11	Up	iP	20 35 44.1 C			S	N	0.7 10		
			iS	20 44 02			M	E	5.8 14		
				microns sec			M	N	5.7 13		
		M	E	0.6 17			M	Z	5.1 15 $^{\circ}$ .		
		M	N	1.4 18			D = 7200 km = 65 $^{\circ}$ .				
		M	Z	1.1 17			Sk	eP	01 56 37 C		
		D = 6650 km = 60 $^{\circ}$ .						ipP	01 56 40.8		
		Ki	iP	20 34 49.3 C			Gb	eP	01 57 05		
			eS	20 42 17			Um	iP	01 56 20.7 C		
				microns sec				ipP	01 56 24.3		
		P	Z	0.4 4				iS	02 05 12		
		P	Z'	0.1 1.2			Ka	iP	01 57 02.7 C		
		S	E	0.4 10				ipP	01 57 06.3		
		S	N	0.4 8			Japan. h = 15 km (Sk, Um, Ka).				
		M	E	1.1 17			Magn. = 6.1 (Up, Ki).				
		M	N	1.8 21							
		M	Z	3.9 22			"	12	Um	iP	09 10 25.1
		D = 5800 km = 52 $^{\circ}$ .					Alaska (h = 30 km).				
		Sk	iP	20 35 15.3 C			"	12	Up	iP	13 52 49.5 D
cont.					cont.						



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

1964					
July	13	Up		microns sec	
cont.			M	N 0.7 17	
			M	Z 0.9 18	
				D = 7200 km = 65°.	
		Ki	iP	21 13 45.4	
			eS	21 23 03	
				microns sec	
			P	Z' 0.1 1.0	
			M	E 0.6 17	
			M	N 0.4 15	
			M	Z 1.6 22	
				D = 7850 km = 70 $\frac{1}{2}$ °.	
		Sk	iP	21 13 12.3	
		Gb	iP	21 12 48.7	
		Um	iP	21 13 31.9	
			iS	21 22 35	
			iSS	21 26 38	
		Ka	iP	21 12 53.9	
			i	21 12 56.0	
				North Atlantic Ocean	
				(h = 30 km).	
				Magn. = 5.6 (Up, Ki).	
"	13	Um	iP	22 07 14.1	
		Ka	iP	22 07 22.5	
				Hindu Kush (h = 120 km).	
"	14	Um	ePS	00 12 39	
				Prince Edward Islands	
				(h = 30 km).	
"	14	Up	iP	01 12 19.1	
		Sk	iP	01 12 34.3	
		Um	iP	01 12 08.4	
"	14	Ki	iP	02 05 52.9	
				Iran.	
"	14	Ki	eP	04 14 13	
				Aleutian Islands.	
"	14	Up	eP	05 32 20	
		Ki	eP	05 31 27	
		Sk	iP	05 31 52.0	
		Um	iP	05 31 55.2	
		Ka	iP	05 32 43.9	
				Alaska (h = 10 km).	
"	14	Up	iPn	05 35 26.4 C	
			i	05 35 34	
			iSn	05 36 30.2	
			i	05 36 33	
			iLgl	05 37 09	

cont.

1964					
July	14	Up		microns sec	
cont.			Pn	Z' 0.3 0.5	
			Sn	Z' 0.3 0.5°.	
				D = 680 km = 6.1°.	
		Ki	iPn	05 36 49.2	
			iLgl	05 40 19.3	
		Sk	ePn	05 35 38	
			iPg	05 36 09.6	
			iSn	05 36 53.4	
			iLgl	05 37 32.8	
		Gb	iP <sup>x</sup>	05 34 38.4 C	
			iPg	05 34 46.0	
			eSg	05 35 24	
		Um	iPn	05 36 08.4	
			i	05 36 16.3	
			iSn	05 37 45.2	
			eLgl	05 38 43	
			e	05 38 11	
			iRg	05 39 34	
		Ka	iPn	05 35 07.3 C	
			iP <sup>x</sup>	05 35 14.6	
			i	05 35 22.1	
			iS <sup>x</sup>	05 36 10.2	
			iLgl	05 36 25.1	
			iSg	05 36 31.7	
				North Sea, between Denmark	
				and Norway (h = 40 km).	
				At the shortest distance	
				(Gb, 290 km) Sg has the	
				largest amplitudes; at	
				the next distance (Ka,	
				520 km) Sg and Lgl are	
				about equal, and at all	
				larger distances, Lgl	
				dominates.	
"	14	Up	iP	10 06 36.4	
				microns sec	
			M	E 0.6 20	
			M	Z 1.2 19	
		Ki	iP	10 06 41.6	
				microns sec	
			M	E 0.7 23	
			M	Z 0.9 23	
		Um	iP	10 06 42.1	
			eS	10 16 02	
		Ka	eP	10 06 33	
				Puerto Rico (h = 50 km).	
"	14	Um	iP	12 57 46.3	

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

1964					1964						
July	14	Up	iP	12 59 01.3	July	14	Up	iS	23 17 31		
		Ki	eP	12 58 22	cont.			D = 6700 km = 60 $\frac{1}{2}$ <sup>0</sup> .			
		Sk	eP	12 58 35			Ki	iP	23 08 22.8		
		Um	iP	12 58 44.0				eS	23 15 47		
		Off northern California (h = 30 km).							microns sec		
"	14	Up	iP	14 08 53.5 C			P	Z' 0.1 1.5			
				microns sec			S	N 0.3 9			
		P	Z' 0.1 0.6				M	E 0.3 13			
		Ki	iP	14 07 59.6			M	N 0.4 14			
			iPcP	14 08 59.6			D = 5900 km = 53 <sup>0</sup> .				
				microns sec			Sk	iP	23 08 47.9 C		
		P	Z' 0.1 1.0					ipP	23 08 52.9		
		Sk	iP	14 08 36.5			Gb	iP	23 09 28.1 C		
			iPcP	14 09 20.6				ipP	23 09 32.6		
		Gb	iP	14 09 14.2 C			Um	iP	23 08 51.0 C		
		Um	iP	14 08 25.0 C				i	23 09 02.0		
			iPcP	14 09 13.6				iS	23 16 42		
		Ka	iP	14 09 17.7 C			Ka	iP	23 09 39.8		
			i	14 09 38.3				ipP	23 09 45.9		
		Kamchatka (h = 40 km). Magn. = 5.9 (Up, Ki).					Alaska. h = 20 km (Sk, Gb, Ka).				
"	14	Um	iP	15 50 53.4	"	14	Um	iPKP	23 31 45.6		
							Kermadec Islands (h = 80 km).				
"	14	Up	iP	17 30 21.7 D	"	15	Um	iP	03 17 06.5		
		Um	iP	17 29 56.3							
		Kurile Islands (h = 30 km).					"	15	Um	iP	06 41 21.6
"	14	Up	ePKP	18 58 17	"	15	Um	iP	07 12 24.8		
		Ki	ePKP	18 58 14				e	07 14 00		
		Sk	ePKP	18 58 30			"	15	Up	iP	07 36 59.7
		West of Macquarie Island (h = 40 km).								microns sec	
"	14	Up	iP	23 09 17.0			P	Z' 0.1 1.0			
cont.					cont.						

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

1964 July cont.	15	Ki	iP	07 36 06.7 C	1964 July	16	Ki	iPn	05 28 58.8
				microns sec				iSn	05 29 55.1
			P	Z' 0.3 1.1				iSg	05 30 11.7
		Sk	iP	07 36 37.1 C			Sk	eSg	05 32 44
		Gb	iP	07 37 14.4 C			Um	eSn	05 30 45
		Um	iP	07 36 33.2 C				iSg	05 31 27.8
		Ka	iP	07 37 22.8 C				Northwest Russia, 68.4°N, 30.6°E. Origin time = = 05 28 00. Explosion?	
		Aleutian Islands (h = 30 km).			"	16	Up	iP	09 30 56.5
							Um	iP	09 30 37.4
							South of Japan (h = 460 km).		
"	15	Sk	iPKP	08 43 41.1	"	16	Up	iP	10 48 23.2
		Um	iPKP	08 43 36.3			Ka	iP	10 48 46.6 C
		Santa Cruz Islands (h = 130 km).					Kurile Islands (h = 30 km).		
"	15	Up	iP	09 54 36.3	"	16	Up	eP	16 18 32
			eS	09 59 08			Ki		---
				microns sec					microns sec
		S	N	0.3 5			M	E	0.6 20
		M	E	0.4 13			M	Z	0.7 17
		M	N	0.5 16			Um	iP	16 18 38.4
				D = 2900 km = 26°.			Ka	iP	16 18 21.5
		Ki		---			Indian Ocean (h = 30 km).		
				microns sec	"	16	Up	iP	17 45 22.3 C
		M	E	0.8 16				i	17 45 23.3
		M	N	0.3 13					microns sec
		M	Z	0.6 13			M	E	0.4 15
		Sk	eP	09 54 58			M	N	0.5 12
		Gb	eP	09 54 09			M	Z	0.7 14
		Um	iP	09 55 19.8			Ki	iP	17 46 24.4
		Ka	iP	09 54 04.2 C					microns sec
		Algeria (h = 40 km).						P	Z' 0.1 1.0
"	15	Um	iP	13 03 41.7			Gb	eP	17 45 19
"	15	Up	i(P)	14 59 55.8			Um	iP	17 45 49.4
							Ka	iP	17 45 07.8
							Turkey (h = 60 km).		
"	15	Up	iP	19 07 27.6 C	"	16	Up	eSg	18 44 22
				microns sec			Ka	eP	18 42 22
		P	Z'	0.1 0.5				iSg	18 42 50.0
		Sk	iP	19 07 17.5				eL	18 44 07
		Gb	iP	19 07 48.4 C			A remarkable train (L) of surface waves of low velocity at Ka, possibly a T phase.		
		Um	iP	19 07 02.9					
		Ka	iP	19 07 49.6 C					
		Kurile Islands (h = 30 km).							
"	16	Up	iSKP	05 13 46.9	"	17	Up	iP	02 39 09.6 C
		New Hebrides Islands (h = 120 km).						ipP	02 39 43
								iS	02 43 00.7
								i(pS)	02 43 45

cont.

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

1964	July	17	Up		microns	sec
cont.				P	Z'	0.6 0.6
				S	E	3.5 5
				S	N	10 8
				S	Z	3.3 5
				M	E	4.9 10
				M	N	5.5 7
				M	Z	4.8 7
			Ki	iP		02 40 20.5 C
				isP		02 41 13
				iS		02 45 05
				isS		02 46 03
				i		02 46 34
				iLi		02 49 39
				iLgl		02 50 24
					microns	sec
				P	Z'	0.3 1.0
				S	N	2.2 9
				M	E	13 16
				M	N	6.2 15
				M	Z	6.9 16
			Sk	iP		02 39 49.8 C
				ipP		02 40 21.8
			Gb	iP		02 38 59.2 C
				iS		02 42 45.0
			Um	iP		02 39 44.3
				ipP		02 40 17.8
				iS		02 43 57
				isS		02 44 55
			Ka	iP		02 38 35.1 C
				iS		02 41 58.2

Greece.  $h = 170$  km (Up,Ki, Sk,Um). Magn. = 6.2 (Up,Ki). sS at Um has a remarkably large amplitude on all three long-period components, compared to the other phases.

"	17	Up	iP		02 46 22.5 D
			iS		02 50 04.6
				microns	sec
			P	Z'	0.3 0.8
			S	E	5.2 7
		Ki	iP		02 46 44.9
			iS		02 50 40.0
				microns	sec
			S	Z'	0.8 2.0
		Sk	iP		02 46 34.9
		Gb	iP		02 46 20.1 D
		Um	iP		02 46 32.0
		Ka	iP		02 46 14.2

"	17	Up	iP		04 51 51.1 D
			iX		04 51 55.5
			iY		04 52 07.3

cont.

1964	July	17	Up		microns	sec
cont.				P	Z'	0.2 0.7
				M	N	1.0 20
				M	Z	1.3 20
			Ki	iP		04 50 59.7 D
				iX		04 51 04.7
				iY		04 51 16.1
					microns	sec
				P	Z'	0.4 1.0
				M	E	1.6 21
				M	N	0.7 18
				M	Z	1.7 19
			Sk	iP		04 51 35.9 D
				iX		04 51 42.0
				iY		04 51 52.3
			Gb	iP		04 52 11.0 D
				iX		04 52 16.8
				iY		04 52 27.8
			Um	iP		04 51 24.1 D
				iX		04 51 28.3
				iY		04 51 38.6
			Ka	iP		04 52 14.1 D
				iX		04 52 20.1
				iY		04 52 31.4

Kurile Islands.  
Magn. = 6.3 (Up,Ki).  
There are three very distinct phases, P, X, Y, on all our Z'-records, roughly of equal amplitude, the average time differences being  $X - P = 5.3$  sec and  $Y - X = 11.0$  sec. One interpretation would be that P is a foreshock, and that X is P of a new shock with Y as pP. This gives a focal depth of about 40 km.

"	17	Up	iPKP		05 13 29.6
		Gb	iPKP		05 13 40.3
		Um	iSKP		05 16 12.8
		Ka	iPKP		05 13 42.3

South of Fiji Islands  
( $h = 500$  km).

"	17	Um	iP		15 27 26.6
"	17	Gb	iPKP		19 28 44.6

Tonga Islands ( $h = 90$  km).

"	17	Up	iP		22 01 00.0
			i		22 01 04.5
			i		22 01 14.1
		Um	iP		22 00 35.0

cont.

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

1964					1964				
July	17	Um	i	22 00 49.5	July	18	Up	D = 2650 km = 24°.	
cont.				Kurile Islands (h = 40 km).	cont.		Ki	iP	03 46 36.2
				Remarkably enough, Up Z'				iS	03 51 38
				exhibits the same sequence				ePcS	03 53 06
				of arrivals as for the				i	03 53 21.4
				shock July 17, 04 51.					
									microns sec
"	17	Up	iP	23 05 41.6				P	Z' 0.1 0.6
			ipP	23 05 48.0				S	E 0.6 5
				microns sec				M	E 4.3 24
			P	Z' 0.2 1.0				M	N 0.4 9
			M	E 0.5 18				M	Z 0.6 12
			M	N 0.7 18			Sk	iP	03 46 07.7
			M	Z 0.9 18				i(sP)	03 46 47.2
		Ki	iP	23 04 56.3			Gb	iP	03 45 20.8
				microns sec				isP	03 45 51.1
			P	Z' 0.1 1.2			Um	iP	03 46 00.5
			M	E 0.6 18				ipP	03 46 46
			M	N 0.5 17				eS	03 50 31
			M	Z 1.1 17			Ka	iP	03 44 56.4 C
		Sk	iP	23 05 32.0				ipP	03 45 12.8
		Gb	iP	23 06 03.7				isP	03 45 24.8
		Um	iP	23 05 17.3				iS	03 48 43.5
			ePS	23 14 21				i	03 51 59.0
		Ka	iP	23 06 04.6 C					Dodecanese Islands.
			i	23 06 28.8					h = 100 km (Up,Gb,Ka).
				Kurile Islands. h = 25 km (Up).					Magn. = 5.7 (Up,Ki).
				Magn. = 5.8 (Up,Ki).	"	18	Up	iP	12 59 12.3
"	18	Ki	i	00 20 39.6			Ki	eP	12 58 58
			iSg	00 21 08.0			Um	iP	12 59 02.8 C
		Um	iSg	00 22 04.4				isP	12 59 37.8
									Celebes (h = 100 km).
"	18	Um	iP	00 46 38.8	"	18	Up	iP	17 41 12.6
"	18	Ki	ePn	01 06 41			Gb	iP	17 41 33.7
			eSn	01 08 11					Kamchatka (h = 100 km).
			iSg	01 08 55.6	"	18	Up	iP	18 32 04.8 C
			D = 820 km = 7.4°.		"	18	Up	iP	20 16 13.8
"	18	Ki	eP	03 21 23					Kurile Islands (h = 30 km).
				Alaska (h = 30 km).	"	18	Up	iP	23 46 22.5
"	18	Up	iP	03 45 28.7			Ki	iP	23 45 27.8
			ipP	03 45 43.8			Sk	iP	23 45 53.3
			isP	03 45 54.6			Gb	iP	23 46 33.1 C
			iS	03 49 37			Um	iP	23 45 56.9
			iScP	03 52 34.7				iS	23 53 56
			iScS	03 56 20			Ka	iP	23 46 45.5 C
				microns sec					Alaska (h = 30 km).
			sP	Z' 0.1 0.6	"	19	Up	iP	03 57 17.4
			S	E 0.6 4	"	19	Up	iP	06 06 53.3 C
			S	N 0.7 4			✓	i!	06 07 13.8
			M	E 0.4 8				iPn	06 07 58.8
			M	N 0.8 10					
			M	Z 0.8 10					
cont.					cont.				







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

1964				1964					
July	21	Up	eP	13 25 49	July	22	Ki eP	10 45 49	
			i(pP)	13 25 59.4			Gulf of California		
			eSKS	13 36 00			(h = 30 km).		
				microns sec		"	22	Ki iP	18 00 27.6
			M	E 0.8 18			Alaska (h = 30 km).		
			M	N 1.5 19		"	22	Um iP	20 46 19.8
			M	Z 1.1 17		"	22	Ki iP <sup>x</sup>	21 09 16.3
		Ki	iP	13 25 26.4 C				iSn	21 09 54.7
			eSKS	13 35 44				iSg	21 10 03.7
				microns sec				D = 370 km = 3.3°.	
			P	Z' 0.2 1.3			Sk	eSg	21 11 25
			SKS	E 0.4 9			Um	iPg	21 09 03.9
			SKS	N 0.3 9				iSg	21 09 35.7
			M	E 3.1 18				D = 270 km = 2.4°.	
			M	N 2.6 21			Gulf of Bothnia, near		
			M	Z 4.1 18			Finnish coast, 65.2°N,		
		Sk	eP	13 25 52			25.0°E. Origin time =		
		Um	iP	13 25 31.7			= 21 08 17.		
			iSKS	13 35 53		"	23	Um i(P)	02 15 15.8 D
			eSS	13 41 36		"	23	Um iP	05 10 27.1 D
		Ka	eP	13 25 56			Costa Rica (h = 110 km).		
		Panay (h = 30 km).				"	23	Um iP	06 47 24.8
		Magn. = 6.1 (Ki).						i	06 47 30.7
"	21	Um	iP	20 43 52.3	"	23	Um eP	09 33 34	
"	21	Up	iPKP	21 20 26.1 C	"	23	i(S)	09 42 40	
		Ki	iP	21 16 10.3	"	23	Ki eP	09 51 57	
			e	21 19 43			eS	10 01 21	
				microns sec				microns sec	
			M	E 0.8 21			M	E 0.6 17	
			M	N 0.7 23			M	N 0.5 20	
			M	Z 1.0 20			M	Z 0.7 17	
		Sk	iPKP	21 20 23.7			D = 8100 km = 73°.		
		Gb	iPKP	21 20 33.5			Sk	iP	09 51 23.7
		Um	iP	21 16 21.7			Um	iP	09 51 36.2
			iPKP	21 20 18.2			Atlantic Ocean (h = 30 km).		
			e	21 21 00		"	23	Um iP	13 25 34.9
			eSKS	21 27 11		"	23	Um iP	13 28 16.1
			i	21 30 28		"	23	Ki iP	14 28 34.6
		Ka	iPKP	21 20 32.3			Um	iP	14 29 02.7
		New Britain (h = 60 km).						ipP	14 29 11.1
"	22	Ki	iPKP	01 25 50.6			Alaska. h = 30 km (Um).		
		Um	iPKP	01 25 48.2		"	23	Um iP	15 36 49.2
		Chile (h = 30 km).						i	15 37 06.2
"	22	Ki	eP	01 59 14		"	23	Ki iP	14 28 34.6
"	22	Up	iP	04 49 28.6		"	23	Um iP	14 29 02.7
		Ki	iP	04 50 07.3 C				ipP	14 29 11.1
		Sk	iP	04 50 07.1			Alaska. h = 30 km (Um).		
		Um	iP	04 49 45.4		"	23	Um iP	15 36 49.2
		Ka	iP	04 49 28.3				i	15 37 06.2
		Iran (h = 60 km).							

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

1964	July	23	Ki	iP	16 05 33.0	1964	July	24	Ki		microns sec
					Alaska (h = 20 km).					S	E 4.4 12
"		23	Um	iP	16 59 33.8					S	N 2.2 10
"		23	Up	iP	19 18 09.6 D					M	E 16 21
					microns sec					M	N 16 17
					Z' 0.1 0.5					M	Z 26 18
			Ki	iP	19 17 14.0 D						D = 6650 km = 60°.
				ipP	19 17 21.4				Sk	iP	07 01 34.8 C
					microns sec				Gb	eP	07 02 09 C
					Z' 0.2 1.0				Um	iP	07 01 21.6 C
			Sk	iP	19 17 41.2 D					iPa	07 05 12
			Gb	iP	19 18 21.4 D					iS	07 09 51
				ipP	19 18 28.1					ePS	07 10 15
			Um	iP	19 17 42.8 D				Ka	iP	07 02 10.3 C
				iPcP	19 18 39.6						Kurile Islands (h = 30 km).
			Ka	iP	19 18 33.2 D						Magn. = 6.7 (Up,Ki).
				ipP	19 18 40.4						The phase appearing on Up N
					Alaska. h = 30 km (Ki,Gb,Ka).						16 sec before S is worth
					Magn. = 6.0 (Up,Ki).						noting. A similar case is
											observed below, July 24,
											13 36.
"		23	Up	i(PKP)	19 36 47.9	"		24	Sk	iP	07 08 49.9
					Argentina (h = 130 km).				Um	iP	07 08 36.8
"		23	Ki	iP	20 53 19.4						Kurile Islands.
"		24	Um	iP	01 38 35.1						Origin time = 06 58 08.
"		24	Sk	iP	01 52 00.3						Approximate origin times in
			Um	eP	01 52 15						this sequence are given
					Guatemala (h = 70 km).						only when USCGS has no
"		24	Um	iP	03 30 15.7 D	"		24	Up	iP	07 14 43.6 D
"		24	Up	iP	07 01 47.7 C						
				ePa	07 06 07						
				i	07 10 25						
				eS	07 10 41						
					microns sec	"		24	Ki	iP	07 45 25.8
					N 0.9 2						Alaska (h = 25 km).
					Z 1.9 2						
					Z' 1.5 1.0	"		24	Up	iP	08 23 33.2 C
					S E 1.6 9					ePa	08 27 42
					S N 2.2 10					iS	08 32 25
					M E 15 26						microns sec
					M N 11 19					P	E 1.7 7
					M Z 10 19					P	N 5.5 9
					D = 7500 km = 67 1/2°.					P	Z 11 9
			Ki	iP	07 00 58.6 C					P	Z' 1.0 1.0
				iS	07 09 15					S	E 9.3 14
					microns sec					S	N 8.5 10
					E 0.8 6					M	E 35 18
					P N 1.5 7					M	N 75 17
					P Z 3.2 7					M	Z 71 17
					P Z' 0.8 1.5						D = 7450 km = 67°.

cont.

cont.



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

1964					1964				
July	24	Um	iP	11 07 42.8	July	24	Um	iP	12 47 18.5
"	24	Up	iP	11 08 14.0	cont.				Kurile Islands.
				microns sec					Origin time = 12 36 49.
			P	Z' 0.1 1.0	"	24	Up	iP	13 36 12.9 C
		Ki	iP	11 07 47.5 C				e	13 44 49
				microns sec				eS	13 45 03
			P	Z' 0.2 1.0					microns sec
		Sk	iP	11 08 11.7 C			P	N	0.5 4
		Um	iP	11 07 58.7 C			P	Z	1.0 4
		Mariana Islands (h = 40 km).					P	Z'	0.4 0.7
		Magn. = 6.1 (Up,Ki).					S	E	0.2 5
							S	N	0.9 9
"	24	Up	iP	12 20 22.9			M	E	3.6 26
			ipP	12 20 27.8			M	N	3.4 19
				microns sec			M	Z	2.6 20
			P	Z' 0.1 0.6			D = 7500 km = 67 1/2°.		
		Ki	iP	12 19 34.0		Ki	iP		13 35 24.0 C
		Sk	iP	12 20 09.8			iS		13 43 40
			ipP	12 20 14.7					microns sec
		Gb	iP	12 20 43.9			P	E	0.5 7
		Um	iP	12 19 56.1			P	N	0.6 7
		Kurile Islands.					P	Z	1.2 6
		h = 20 km (Up,Sk).					P	Z'	0.9 2.2
							S	E	1.1 11
"	24	Up	iP	12 46 54.6			S	N	0.6 9
				microns sec			M	E	4.5 20
			P	Z' 0.2 0.7			M	N	3.6 22
			M	E 1.0 26			M	Z	9.2 21
			M	N 1.1 18			D = 6650 km = 60°.		
			M	Z 1.1 18		Sk	iP		13 36 00.3 C
		Ki	iP	12 46 06.2		Gb	iP		13 36 33.4 C
				microns sec		Um	iP		13 35 46.6 C
			M	E 0.6 15			iPa		13 39 48
			M	N 0.8 18			eS		13 44 11
			M	Z 1.6 20		Ka	iP		13 36 35.7 C
		Sk	iP	12 46 42.5 D		Kurile Islands (h = 30 km).			
		Gb	iP	12 47 14.9		Magn. = 6.2 (Up,Ki).			
		Um	iP	12 46 28.9					
		Ka	iP	12 47 18.4 D	"	24	Um	iPKP	14 06 22.6
		Kurile Islands (h = 30 km).					Solomon Islands (h = 60 km).		
"	24	Up	iP	12 47 15.9	"	24	Um	iP	14 23 41.4
				microns sec	"	24	Up	iP	14 36 54.4
			P	Z' 0.1 0.8					microns sec
		Gb	iP	12 47 36.5				P	Z' 0.1 1.0
		Um	iP	12 46 49.8		Ki	iP		14 36 05.4
		Kurile Islands.				Sk	iP		14 36 41.3
		Origin time = 12 36 21.				Gb	iP		14 37 15.2
"	24	Up	iP	12 47 44.1		Um	iP		14 36 28.0
				microns sec			ipP		14 36 33.5
			P	Z' 0.1 1.0		Kurile Islands.			
		Sk	iP	12 47 31.1		h = 20 km(Um).			
		Gb	eP	12 48 05					

cont.

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

1964					1964				
July	24	Up	iP	14 58 38.8	July	24	Um	iPa	17 17 22
			i	14 58 43.3	cont.			iS	17 21 41
		Ki	iP	14 57 49.9			Ka	iP	17 14 05.1 C
		Sk	iP	14 58 25.4 C			Kurile Islands (h = 30 km).		
		Um	iP	14 58 12.3			Magn. = 6.6 (Up,Ki).		
			i	14 58 21.7	"	24	Up	iP	17 16 29.9
		Kurile Islands (h = 30 km).			"	24	Up	iP	17 16 55.9
"	24	Up	iP	15 42 33.2					microns sec
"	24	Up	iP	16 33 03.0 C				P	Z' 0.2 1.0
"	24	Up	iP	16 45 22.6 C			Sk	iP	17 16 43.3
				microns sec			Gb	iP	17 17 16.8
			P	Z' 0.1 0.6			Um	iP	17 16 30.0
		Ki	iP	16 44 33.8			Ka	iP	17 17 17.7 C
				microns sec			Kurile Islands.		
			M	E 0.4 14			Origin time = 17 06 01.		
			M	N 0.5 17	"	24	Um	iP	17 20 10.8
		Sk	iP	16 45 09.7 C	"	24	Up	iP	17 28 27.5 D
		Gb	iP	16 45 43.5			Kurile Islands (h = 30 km).		
		Um	iP	16 44 56.5 C	"	24	Up	iP	18 01 37.3 C
			iS	16 53 29					microns sec
		Ka	iP	16 45 46.6				P	Z' 0.1 0.6
		Kurile Islands (h = 30 km).					Ki	iP	18 00 48.5
"	24	Up	iP	17 13 42.6 C			Sk	iP	18 01 24.5
			iS	17 22 32			Gb	iP	18 01 58.4
			iScS	17 23 36			Kurile Islands.		
				microns sec			Origin time = 17 50 42.		
			P	N 1.2 4	"	24	Um	iP	18 58 54.4
			P	Z 2.0 4	"	24	Up	iP	19 00 58.5 C
			P	Z' 0.9 0.9					microns sec
			S	E 0.4 4				P	Z' 0.1 1.0
			S	N 2.8 10			Ki	iP	19 00 09.8 C
			M	E 16 25			Sk	iP	19 00 45.8 C
			M	N 13 19			Gb	iP	19 01 19.5
			M	Z 19 17			Um	iP	19 00 32.0 C
			D = 7500 km = 67 1/2°.				Ka	eP	19 01 22
		Ki	iP	17 12 54.2 C			Kurile Islands (h = 30 km).		
			iS	17 21 08	"	24	Up	iP	19 02 58.6
				microns sec					microns sec
			P	E 1.1 4				P	Z' 0.1 1.0
			P	N 1.2 8			Ki	iP	19 02 09.9
			P	Z 3.4 8			Sk	iP	19 02 45.9
			P	Z' 1.4 2.5			Gb	iP	19 03 19.1
			S	E 2.9 13			Um	iP	19 02 32.6 C
			S	N 2.2 11			Kurile Islands (h = 30 km).		
			M	E 23 22	"	24	Up	iP	19 06 10.1 C
			M	N 17 22				ipP	19 06 21.0
			M	Z 37 21					
			D = 6650 km = 60°.						
		Sk	iP	17 13 29.9 C					
		Gb	iP	17 14 03.0 C					
			i	17 14 04.3					
		Um	iP	17 13 17.0 C					
cont.					cont.				

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

1964				1964			
July				July			
cont.	24	Up	microns sec	25	Ki	eP	04 35 35
		P	Z' 0.1 0.8	"	25	Up	iP 07 23 46.7
		Ki	iP 19 05 21.3	"	25	Up	ePKP 12 39 15
		Sk	iP 19 05 56.8			i	12 39 26.4
		Gb	iP 19 06 31.0			Ki	iPKP 12 39 09.3
		Um	iP 19 05 44.1 C			i	12 39 17.9
		Kurile Islands.				iSKP	12 42 11.4
		h = 40 km (Up).				SKP	Z' 0.1 1.8
"	24	Um	iP 19 46 49.5		Um	ePKP	12 39 16
		East of Japan (h = 70 km).				iSKP	12 42 24.8
"	24	Up	iP 19 57 08.0 C		Ka	ePKP	12 39 24
"	24	Um	iP 20 29 40.3		Tonga Islands (h = 210 km).		
		i	20 29 47.8	"	25	Up	iP 18 15 06.9
"	24	Ki	iP 20 33 21.0			ipP	18 15 18.6
		eS	20 36 53			microns sec	
		microns sec				P	Z' 0.1 1.0
		M	E 0.3 13		Ki	iP	18 14 18.7
		M	N 0.3 15		Sk	iP	18 14 54.5
		M	Z 0.8 16			ipP	18 15 05.5
		Sk	iP 20 34 09.6		Gb	eP	18 15 28
		Um	iP 20 34 05.2 C		Um	iP	18 14 40.6
		Svalbard (h = 30 km).				i	18 14 46.5
"	24	Up	eP 22 05 19		Ka	eP	18 15 31
		Ki	iP 22 04 23.9		Kurile Islands.		
		Sk	iP 22 04 51.9		h = 50 km (Up,Sk).		
		Um	iP 22 04 52.7	"	25	Up	eP 19 45 51
		Alaska (h = 10 km).				ePP	19 50 34
"	24	Up	iP 22 22 33.1			eSKKS	19 57 30
		microns sec				ePS	20 00 06
		P	Z' 0.1 0.9			microns sec	
		Ki	iP 22 21 44.5		M	E	3.1 20
		Sk	iP 22 22 19.8		M	N	5.0 22
		Gb	iP 22 22 53.9		M	Z	6.8 21
		Um	iP 22 22 06.7		Ki	ePKP	19 49 49
		Ka	iP 22 22 55.9			iPP	19 50 53
		Kurile Islands (h = 30 km).				eSKS	19 56 41
"	25	Up	iP 01 43 45.1			eS	19 58 41
		Ki	iP 01 42 52.5			ePS	20 00 34
		Gb	iP 01 44 05.4			microns sec	
		Um	iP 01 43 16.7		PP	Z	0.9 8
		Kamchatka (h = 70 km).			SKS	E	0.7 10
"	25	Up	iP 02 26 58.8		S	N	0.3 9
		i(pP)	02 27 12.0		M	E	4.8 20
		Ki	iP 02 26 10.5		M	N	2.1 19
		Sk	iP 02 26 45.9 C		M	Z	7.8 23
		Um	iP 02 26 33.1		(D = 13000 km = 117°).		
		Kurile Islands (h = 30 km).			Um	iP	19 46 00
"	25	Up	iP 04 06 47.9 C	cont.		ePKP	19 49 45
						i	19 50 18
						iPP	19 50 48.9
						iPS	20 00 25

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

1964				1964			
July	cont.			July			
25	Ka	ePP	19 50 17	26	Up	iP	11 55 56.9
		Chile (h = 25 km).			Ki	iP	11 55 03.0
		Magn. = 6.4 (Up,Ki).			Um	iP	11 55 29.4
"	25	Up	eSKS		Aleutian Islands (h = 100 km).		
			21 53 35	"	26	Um	iP
			microns sec				13 54 49.1
		M	E 1.1 22	"	26	Ki	iP
		M	N 1.1 22			Sk	iP
		M	Z 1.9 23			Gb	iP
		Ki	eP			Um	iP
			21 42 49			Ecuador (h = 40 km).	
			i(pP)			26	Up
			21 43 02.8				iP
			iSKS				i
			21 53 20				microns sec
			microns sec				Z' 0.2 0.7
			(pP) Z' 0.2 1.5				18 45 30.8 C
			M E 2.1 21				18 45 43.4
			M N 1.8 23				P Z' 0.2 0.7
			M Z 3.1 22				18 44 42.7 C
			Halmahera (h = 20 km).				microns sec
			Magn. = 5.8 (Up,Ki).				P Z' 0.1 0.9
"	26	Ki	iSn				M E 0.4 14
			04 27 44.6				M N 0.4 18
			iSg				M Z 0.7 17
			04 28 05.3				Sk iP
		Sk	eSg				18 45 18.2
			04 30 36				Gb iP
		Um	iSg				18 45 51.5
			04 29 00.5				Um iP
			Northwest Russia,				i
			67.5°N, 30.4°E.				18 45 09.3
			Origin time = 04 26 00.				Ka iP
			Explosion?				18 45 53.5
"	26	Ki	iSn				Kurile Islands (h = 30 km).
			04 57 48.0				Magn. = 6.0 (Up,Ki).
			eSg				
			04 58 08				
		Sk	eSg				
			05 00 39				
		Um	eSg				
			04 59 03				
			Northwest Russia,				
			67.5°N, 30.4°E.				
			Origin time = 04 56 00.				
			Explosion?				
"	26	Ki	iSn				
			05 33 45.3				
			iSg				
			05 34 08.8				
		Um	iSn				
			05 34 26.0				
			iSg				
			05 35 01.4				
			Northwest Russia,				
			67.5°N, 30.4°E.				
			Origin time = 05 32 00.				
			Explosion?				
"	26	Gb	iPKP				
			06 47 06.3				
			Fiji Islands (h = 560 km).				
"	26	Um	iP				
			09 33 05.8				
			i				
			09 33 17.1				
"	26	Up	iP				
			11 55 31.9 D				
		Ki	iP				
			11 54 40.1				

cont.





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

1964					1964						
July	28	Ki	i	18 59 44.3	July	28	Um	iS	21 59 06		
cont.			i	18 59 48.3	cont.		Ka	iP	21 50 12.0		
			e	19 08 09			Andaman Islands (h = 30 km).				
			iSS	19 22 12			Magn. = 6.6 (Up,Ki).				
				microns sec							
			PKP	Z 1.2 6	"	28	Sk	iP	21 50 51.3		
			PKP	Z' 0.6 1.5			Um	iP	21 50 26.1		
			M	E 4.5 20	"	28	Up	iP	22 57 32.4 C		
			M	N 3.0 20	"	28	Up	iP	22 57 59.9		
			M	Z 9.4 22				ipP	22 58 03.9		
		Sk	iPKP	18 59 53.5					microns sec		
			i	18 59 58.2					Z' 0.1 1.0		
		Gb	iPKP	18 59 51.2 C			Ki	iP	22 57 56.5		
			i	19 00 49.3					microns sec		
		Um	iPKP	18 59 42.4				P	Z' 0.1 1.5		
			i	18 59 47.5			Sk	iP	22 58 15.2		
			i	19 01 23			Um	iP	22 57 53.3		
			iSS	19 22 15				ipP	22 57 58.9		
		Ka	iPKP	18 59 47.9			Ka	iP	22 58 05.6 C		
			i	18 59 51.6			Andaman Islands.				
		Southwest of Tasmania					h = 25 km (Up,Um).				
		(h = 30 km).									
		Magn. = 6.3 (Up,Ki).					"	29	Up	iP	13 27 43.8 C
		PKP is multiple with small-					"	29	Up	iP	19 04 00.5
		amplitude precursors									
		followed by large-amplitude					"	30	Um	iP	04 29 26.7 D
		phases.					"	30	Up		----
"	28	Ki	eP	21 22 01						microns sec	
"	28	Up	iP	21 50 05.4				M	E	1.6 17	
			eS	21 59 36				M	N	1.7 17	
			i	22 00 46				M	Z	2.9 18	
				microns sec			Ki		----		
			P	Z' 0.3 1.1					microns sec		
			S	E 1.2 6				M	E	4.3 18	
			M	E 10 23				M	N	2.3 17	
			M	N 21 18				M	Z	8.7 18	
			M	Z 17 23			Um	iP	05 28 51.1		
			D = 8050 km = 72 1/2°.					eSKS	05 39 20		
		Ki	iP	21 50 03.1			Costa Rica (h = 40 km).				
			iS	21 59 23			"	30	Up	iP	13 30 49.9 D
				microns sec			"	30	Up	iPP	13 32 51.2
			P	E 1.1 5			Solomon Islands (h = 80 km).				
			P	Z 2.4 5			"	30	Um	iP	23 03 35.8
			P	Z' 0.2 1.4			Andaman Islands (h = 30 km).				
			S	E 3.3 7			"	30	Up	iP	04 12 37.1
			S	N 1.2 8						microns sec	
			M	E 41 20						Z' 0.1 0.6	
			M	N 13 17			Ki	iP	04 12 01.8		
			M	Z 54 19							
			D = 7950 km = 71 1/2°.								
		Sk	iP	21 50 21.4							
		Gb	iP	21 50 23.5							
		Um	iP	21 50 00.9							
			i	21 58 53							
cont.					cont.						

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

1964				1964					
July cont.	31	Sk Um	iP iP	04 12 33.4 04 12 16.3	July	31	Sk Um	iP iP	17 21 46.9 17 22 15.8
				South of Japan (h = 200 km).	"	31	Um	eP	18 35 31
"	31	Up	iP ipP	04 16 09.7 D 04 16 24.7	"	31	Ki	iPn iSn iSg	20 12 53.3 20 13 41.6 20 13 54.1
				microns sec Z' 0.4 1.3					D = 390 km = 3.5°.
		Ki	iP ipP	04 15 23.1 D 04 15 38.1					Probably northwest Russia. Origin time = 20 12 00. Explosion?
				microns sec Z' 0.3 1.0	"	31	Up	iP	20 53 22.2 D
		Sk	iP	04 15 58.4					microns sec Z' 0.1 0.5
		Gb	iP ipP	04 16 30.3 D 04 16 45.2			Ki	iP	20 52 35.6
		Um	iP ipP	04 15 44.4 D 04 15 57.8			Um	iP	20 52 56.1
		Ka	iP ipP	04 16 31.8 D 04 16 46.6					Sea of Okhotsk (h = 380 km).
				Kurile Islands. h = 60 km (Up,Ki,Gb,Um,Ka). Magn. = 6.4 (Up,Ki).	"	31	Ki	iP i	21 26 44.1 C 21 26 53.1
"	31	Up	ePP ePS	06 11 57 06 21 34					microns sec Z' 0.2 1.5
				microns sec			M	E	0.8 14
			M	E 5.7 21			M	N	0.8 12
			M	N 12 22			M	Z	0.6 12
		Ki	ePKP iPP	06 10 44 06 11 21.0			Sk	iP	21 27 40.9
				microns sec			Um	iP	21 27 28.0
			M	E 13 21				iS	21 31 38
			M	N 10 23					Arctic Ocean (h = 30 km).
			M	Z 16 22	"	31	Ki	eP	21 35 09
		Um	iPKP i iPP eSKS iPS	06 10 51.2 06 11 23 06 11 37.6 06 17 31 06 20 50	"	31	Up	eP i e(S)	23 51 37 23 52 08.7 23 56 28
				microns sec					microns sec Z' 0.1 1.3
				New Britain (h = 60 km). Magn. = 6.7 (Up,Ki).				(S)	E 0.6 11
"	31	Up	iPKP	06 45 18.1 C			M	E	1.0 18
				microns sec			M	N	2.0 20
			PKP	Z' 0.1 0.5			M	Z	2.7 21
		Um	iPKP ipPKP iSKP	06 45 06.5 06 46 45.6 06 48 08.6			Ki	iP iS	23 50 18.2 C 23 53 55
				microns sec					microns sec
				South of Fiji Islands. h = 400 km (Um).				P	N 2.0 6
"	31	Um	iP	08 46 39.6 C				P	Z 1.4 6
								P	Z' 0.3 1.2
"	31	Ki	iP	15 04 40.6 C				S	E 3.2 11
				Halmahera (h = 25 km).				S	N 1.0 5
								M	E 2.7 14
								M	N 1.4 15
								M	Z 2.4 16
									D = 2100 km = 19°.
							Sk	iP	23 51 08.4

cont.

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

1964

July	31	Um	iP	23 51 01.5
cont.			i	23 52 10
			iS	23 55 11
		Ka	iP	23 52 18.7

Arctic Ocean (h = 10 km).  
Magn. = 5.8 (Ki).

Markus Båth  
May 13, 1965

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

AUGUST 1 - 31, 1964  
.....

1964					1964				
Aug.	1	Ki	iP	00 07 30.1	Aug.	2	Up	iP	00 50 47.1
			iS	00 08 45.1					
			eT	00 12 37	"	2	Ki	iPKP	02 39 14.5
			i	00 13 14.5			Sandwich Islands		
			D = 800 km = 7°.				(h = 90 km).		
		Sk	iP	00 08 06.0					
		Um	iP	00 08 17.4	"	2	Up	iP	03 14 50.6
		Norwegian Sea		(h = 30 km).			Ki	iP	03 13 56.1
									microns sec
"	1	Ki	iP	00 54 43.5 C			P	Z' 0.1	1.0
		Sk	iP	00 54 59.5			Sk	iP	03 14 24.1
		Um	iP	00 54 32.3			Alaska (h = 30 km).		
		Ka	iP	00 54 38.9 C	"	2	Ki	ePn	05 05 50
		Hindu Kush		(h = 150 km).			iSn	05 06 45.6	
							eSg	05 07 05	
"	1	Ki	iP	01 02 33.1 D			Probably northwest Russia.		
			iS	01 03 49.0			Explosion?		
			eT	01 07 36	"	2	Up	iPP	18 32 46.7
			i	01 08 18.0					microns sec
			D = 800 km = 7°.				PP	Z' 0.1	1.0
		Sk	iP	01 03 08.8			Peru-Bolivia (h = 5 km).		
			eS	01 04 51	"	2	Up	iS	08 55 23
			D = 1050 km = 9½°.						microns sec
		Um	iP	01 03 20.3			S	E 0.3	5
		Norwegian Sea		(h = 30 km).			M	E 0.8	18
"	1	Ki	ePn	05 12 05			M	N 1.0	17
			iSn	05 13 00.3			M	Z 1.1	18
			iSg	05 13 22.7			Ki	iP	08 45 54.0
			D = 500 km = 4.5°.				iS	08 53 41	
		Um	iSg	05 14 45.1					microns sec
		Northwest Russia,					P	Z' 0.1	1.0
		Origin time = 05 10 54.					S	E 1.1	13
		Explosion?					M	E 1.5	20
"	2	Ki	iP	00 25 12.9			M	N 1.2	19
		Kamchatka		(h = 30 km).			M	Z 2.3	19
							D = 6200 km = 56°.		

cont.





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

1964						1964				
Aug.	5	Up	i	11 25 24.9		Aug.	5	Gb	iPKP	11 25 25.3 D
cont.			i(pPKP)	11 26 34		cont.			i	11 25 33.3
			i	11 35 22.0					i	11 25 45.1
			i	11 35 38.5					i(pPKP)	11 26 34.7
				microns sec				Um	iPKP	11 25 13.8
			PKP N	0.5 3					ipPKP	11 26 08
			PKP Z	1.8 3					ipp	11 28 28.6
			PKP Z'	0.5 0.5					i	11 34 56
			M E	1.7 22					iSS	11 47 07
			M N	2.1 25				Ka	iPKP	11 25 25.6 D
			M Z	1.5 23					i	11 25 33.9
				(D = 16650 km = 150°).					i	11 25 46.2
		Ki	iPKP	11 25 03.0					i	11 26 47.6
			iPP	11 28 20.5						
			iSKP	11 28 41						
			e(SKKS)	11 34 38						
				microns sec						
			PKP Z	1.1 5						
			PKP Z'	0.3 1.7						
			PP Z'	0.2 1.4						
			SKP E	0.9 4						
			SKP N	0.4 9						
			M E	0.8 16						
			M N	0.9 21						
			M Z	1.7 23						
				(D = 16000 km = 144°).						
		Sk	iPKP	11 25 16.8						
			i	11 25 31.8						
			ipPKP	11 26 15.5						
			e	11 35 23						

cont.

Station	Distance	Long period	Short period	Interval
	deg	sec	sec	sec
Ki	144	no separation	observable	
Um	146	"	"	"
Sk	149	2.0	(1.5)	2.6
Up	150	2.0	0.5	5.1
Gb	154	2.0	0.8	8.0
Ka	154	2.0	1.5	8.3

The long-period PKP may be related to the  $P_L''$  phase, reported by G. Payo Subiza and M. Båth (Geophys. J., 8:496-513, 1964), but here observed for a different distance range.

South of Kermadec Islands (h = 240 km). PKP exhibits an interesting multiplicity on the Z' records in the way that over the range of our stations (144°-154°) a long-period component (period = 2.0 sec) gradually emerges and precedes more short-period components (period = 0.5-1.5 sec) at the more distant stations, as summarized in the following table:



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

1964					1964				
Aug.	5	Up	iPKP	22 42 06.3	Aug.	6	Ki	iP	16 06 15.4
			i	22 42 09.7				eS	16 07 56
			i	22 42 18.4				eT	16 13 49
			iPP	22 44 01				i	16 14 36.9
				microns sec				D = 1000 km = 9°	
			PKP	Z' 0.2 1.4			Sk	eP	16 07 08
			M	E 3.6 21			Gb	iP	16 08 22.7
			M	N 3.4 21			Um	iP	16 07 07.2
			M	Z 7.5 21				Svalbard (h = 30 km).	
				(D = 14100 km = 127°).					
		Ki	iPKP	22 42 18.2	"	6	Up	iPKP	17 21 53.6
			i	22 42 27.0			Ki	iPKP	17 21 45.7
			iPP	22 44 25				eSKP	17 24 21
			iPKS	22 45 41			Gb	iPKP	17 22 03.6
				microns sec			Um	iPKP	17 21 47.9
			PKP	Z 1.2 5				i	17 21 53.3
			PKP	Z' 0.7 1.4				iSKP	17 24 32.0
			PP	E 1.5 6			Ka	iPKP	17 22 05.8
			PP	N 0.4 6				South of Fiji Islands	
			PP	Z 2.3 6				(h = 500 km).	
			PKS	E 2.7 6					
			PKS	N 0.7 6			"	6	Up
			M	E 7.0 24				iP	18 35 17.6 C
			M	N 1.5 19				ipP	18 35 27.1
			M	Z 7.8 23				iS	18 43 50
				(D = 14450 km = 130°).				ePS	18 44 04
		Sk	iPKP	22 42 09.1					microns sec
		Gb	iPKP	22 42 04.6				P	Z' 0.1 1.0
		Um	iPKP	22 42 16.3 D				M	E 0.8 17
			iPP	22 44 13				M	N 1.1 18
			iPKS	22 45 33				M	Z 1.2 19
			iSKKS	22 51 13			Ki	iP	18 34 22.9
			iSKSP	22 54 21				eS	18 42 08
			iSS	23 01 38					microns sec
		Chile (h = 30 km).						P	Z' 0.1 0.9
		Magn. = 6.7 (Up, Ki).						S	E 0.8 9
"	6	Up	iP	02 44 50.9 C				S	N 0.7 8
				microns sec				M	E 1.5 20
			P	Z' 0.2 0.8				M	N 1.5 17
		Ki	iP	02 44 19.1 C				M	Z 1.8 18
				microns sec				D = 6150 km = 55½°.	
			P	Z' 0.1 1.0			Sk	iP	18 34 50.1 C
		Sk	iP	02 44 50.2 C			Gb	iP	18 35 29.1 C
		Gb	iP	02 45 11.0 C			Um	iP	18 34 51.3 C
		Um	iP	02 44 32.4				iS	18 43 01
			ipP	02 45 19.9				eScS	18 44 37
		Ka	iP	02 45 07.9			Ka	iP	18 35 39.9 C
		Japan, h = 190 km (Um).						Alaska, h = 40 km (Up).	
		Magn. = 5.8 (Up, Ki).						Magn. = 5.6 (Up, Ki).	
"	6	Ki	iP	13 20 35.5				PZ' is multiple at all our	
		Alaska (h = 30 km).						stations, the first P	
								(times given above) being	
								followed after 1.6 sec by	
								a generally greater onset.	

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

1964				1964						
Aug.	7	Up	iP	05 47 53.0	Aug.	7	Sk	iP	15 43 40.8	
		Ki	iP	05 46 59.4 C	cont.		Gb	iP	15 43 49.4	
				microns sec			Um	iP	15 43 55.1	
			P	Z' 0.1 1.0			Guatemala (h = 90 km).			
		Sk	iP	05 47 26.2 C		"	7	Ki	eP	17 26 17
			ipP	05 47 33.1				Sk	iP	17 27 04.7
		Gb	iP	05 48 05.5 C			Greenland Sea (h = 30 km).			
			ipP	05 48 12.3		"	7	Up	iP	19 06 55.9
		Um	iP	05 47 27.5 C						
		Ka	iP	05 48 16.5		"	8	Up	iP	09 59 03.2
		Alaska. h = 30 km (Sk, Gb).						Ki	iP	09 58 09.2
"	7	Ki	iP	08 15 44.6 C				Sk	iP	09 58 36.6
		Sk	iP	08 16 18.0			Alaska (h = 30 km).			
		Um	iP	08 16 02.0 C		"	8	Up	iP	13 20 11.9
			ipP	08 16 10.3				i		13 20 24.4
		Japan. h = 30 km (Um).						i		13 24 56.0
"	7	Up	iPg	10 23 05.6			Ki	eP	13 21 49	
			iSg	10 23 27.1			Sk	e	13 27 07	
				microns sec			Um	eP	13 21 23	
			Sg	Z' 0.1 0.5			e		13 26 30	
				D = 180 km = 1.6°		"	8	Up	iP	14 58 31.1
		Sk	e(Lgl)	10 25 48				Ki	iP	14 58 19.7 C
		Um	iSg	10 25 24.8				ipP		14 58 28.3
		Ka	iSn	10 24 03.1			Sk	iP	14 58 47.7	
			iSg	10 24 13.5			Gb	iP	14 58 56.8	
				D = 340 km = 3.1°			Um	iP	14 58 19.1	
		The Baltic Sea, 58.5°N, 19.3°E. Origin time = 10 22 34. Underwater explosion? Indication of Lgl begins to emerge at 600-700 km distance.					Ka	iP	14 58 43.6 C	
							Sinkiang, China. h = 30 km (Ki).			
"	7	Up	iPg	10 23 47.5		"	8	Up	iP	15 11 24.6 D
			iSg	10 24 08.1				i		15 11 33.5
				microns sec				ipP		15 11 50.4
			Sg	Z' 0.1 0.5					microns sec	
				D = 180 km = 1.6°				P	Z' 0.7 0.8	
		Um	iSg	10 26 05.2			Ki	iP	15 10 49.6 D	
		Ka	iSn	10 24 44.9			e		15 20 37	
			iSg	10 24 54.8					microns sec	
				D = 340 km = 3.1°			P	Z 0.6 4		
		The Baltic Sea, 58.5°N, 19.3°E. Origin time = 10 23 15. Underwater explosion?					P	Z' 0.5 1.1		
							M	E 0.4 17		
"	7	Up	iP	13 50 00.5			M	N 0.7 20		
"	7	Ki	iP	15 43 47.6			M	Z 0.7 17		
				microns sec			Sk	iP	15 11 20.6 D	
		M	E	0.6 15			ipP		15 14 09.5	
		M	N	0.4 15			Gb	iP	15 11 43.8 D	
		M	Z	0.7 15			ipP		15 12 11.5	
cont.							Um	iP	15 11 04.8 D	
							ipP		15 13 46.1	
							iPa		15 15 26	
							i		15 21 12	
							Ka	iP	15 11 41.7 D	

cont.

cont.

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

1964					1964				
Aug.	8	Ka	ipP	15 12 09.2	Aug.	10	Up	D = 7900 km = 71°.	
cont.			iPP	15 14 45.1	cont.		Ki	iP	01 21 32.4
				South of Japan.				eS	01 30 48
				h = 110 km (Up, Gb, Ka).					microns sec
				Magn. = 6.4 (Up, Ki).				P	Z' 0.1 1.5
"	8	Up	eP	15 57 47				S	E 0.4 12
			iPP	16 01 12.4				S	N 0.3 10
		Ki	iP	15 57 40.6				M	E 0.6 21
			i	15 58 07.0				M	N 0.4 18
			eSKS	16 07 56				M	Z 1.6 22
				microns sec					D = 7950 km = 71½°.
			P	Z' 0.1 1.5			Sk	iP	01 21 12.6
			M	E 0.5 18				iP'P'	01 49 25.9
			M	N 0.7 20			Gb	eP	01 21 13
			M	Z 0.7 17			Um	iP	01 21 34.0
		Sk	eP	15 57 31				i	01 21 40.3
			ePP	16 00 46				iS	01 30 54
		Um	iP	15 57 46.5			Ka	iP	01 21 24.2
			i	15 58 09.7					Mona Passage (h = 30 km).
			i	16 00 23.0	"	10	Sk	iP	07 50 25.7
			iSKS	16 08 07	"	10	Up	iP	17 10 32.2
		Ka	iP	15 58 10.9			Ki	iP	17 10 43.2 D
				Nicaragua (h = 60 km).					microns sec
"	8	Up	eP	20 18 44				P	Z' 0.1 0.9
		Ki	iP	20 18 42.6			Sk	iP	17 10 21.2 D
				microns sec			Gb	eP	17 10 12
			P	Z' 0.1 1.6			Um	iP	17 10 40.6
		Sk	eP	20 18 22				i	17 11 04.7
		Gb	iP	20 18 29.3 C			Ka	iP	17 10 24.6
		Um	iP	20 18 46.4					Venezuela (h = 50 km).
		Ka	iP	20 18 41.1	"	10	Up	iP	18 03 00.5 C
				Haiti (h = 10 km).				iPcP	18 03 26.3
"	9	Up	iP	05 30 01.2 D			Ki	eP	18 02 11
		Ki	iP	05 29 10.4 D					microns sec
		Gb	eP	05 30 22				M	E 0.4 17
		Um	iP	05 29 33.9				M	N 0.4 15
				Sea of Okhotsk (h = 510 km).				M	Z 0.3 14
"	9	Um	iP	14 30 44.7			Sk	iP	18 02 49.4
"	9	Ki	iP	20 19 55.8			Gb	iP	18 03 21.2
				microns sec			Um	iP	18 02 34.8 C
			M	E 0.5 18			Ka	iP	18 03 22.5 C
			M	Z 0.8 18					Kurile Islands (h = 40 km).
		Um	eSKS	20 30 32	"	10	Sk	eP	18 26 48
				Molucca Sea (h = 60 km).			Um	iP	18 26 18.5
"	10	Up	iP	01 21 28.8					Iran (h = 15 km).
			eS	01 30 42	"	10	Up	iP	18 34 39.9 C
				microns sec			Gb	eP	18 35 02
			M	E 0.5 18	"	10	Up	iP	20 27 55.8
			M	N 0.7 18			Ki	iP	20 27 08.6
			M	Z 1.1 18			Sk	eP	20 27 45
cont.					cont.				

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

1964				1964			
Aug. cont.				Aug.			
10	Gb	iP	20 28 16.6 C	12	Up	iP	19 33 25.3
	Um	iP	20 27 29.3			eS	19 38 54
	Ka	iP	20 28 17.7				microns sec
	Kurile Islands (h = 30 km).					M	E 0.8 20
"	10	Up	iP 20 50 29.7			M	N 0.9 18
"	10	Um	iPKP 21 58 37.4			M	Z 0.7 15
	Solomon Islands (h = 110 km).					D = 4000 km = 36°.	
"	11	Up	iPKP 02 13 21.0		Ki	iP	19 34 05.7
		Gb	iPKP 02 13 27.3			eS	19 40 13
		Um	iPKP 02 13 15.0			eSS	19 43 22
		Ka	iPKP 02 13 27.4				microns sec
	Solomon Islands (h = 430 km).					S	E 0.3 6
"	11	Ki	eSn 05 25 03			M	E 0.7 15
			iSg 05 25 20.4			M	N 0.6 14
		Um	eSg 05 26 27			M	Z 0.6 12
	Northwest Russia.					D = 4550 km = 41°.	
	Origin time = 05 22 52.				Sk	iP	19 34 01.7
	Explosion?				Gb	iP	19 33 36.2
"	11	Ki	iP 13 47 15.1		Um	iP	19 33 40.8
	Nicobar Islands (h = 30 km).					i(pP)	19 33 52.7
"	12	Up	iP 02 42 10.3			iPP	19 35 06
		Ki	eP 02 42 45			iS	19 39 29
	Iran (h = 40 km).					iSS	19 42 11
"	12	Up	iP 06 02 11.1		Ka	iP	19 33 14.4
		Gb	i(P) 06 02 42.8			Iran (h = 30 km).	
"	12	Up	iP 07 02 22.4 C	"	13	Up	iP 00 45 30
			ipP 07 02 53.8			epP	00 46 59
			microns sec			ePKP	00 49 13
		P	Z' 0.3 0.6			iPP	00 50 21.8
	Ki	iP	07 01 32.8 C			iPKKP	00 59 43.3
			microns sec			iSKKP	01 02 53.4
		P	Z' 0.1 0.5			eSS	01 05 58
	Sk	iP	07 02 09.5				microns sec
		iPP	07 04 26.1			PKP	Z' 0.1 0.5
	Gb	iP	07 02 43.1 C			PP	E 0.6 6
		isP	07 03 22.6			PP	N 1.0 5
	Um	iP	07 01 55.8 C			PP	Z 3.5 7
		isP	07 02 35.9			PP	Z' 0.2 1.3
		eS	07 10 07			PKKP	Z' 0.1 0.6
	Ka	iP	07 02 45.8 C			M	E 1.7 18
	Kurile Islands.					M	N 4.0 18
	h = 120 km (Up, Gb, Um).					M	Z 3.9 20
	Magn. = 6.2 (Up, Ki).					(D = 12800 km = 115°).	
"	12	Ki	e 16 35 30				
			iSg 16 35 52.8		Ki	iP	00 45 02.6
						iPKP	00 49 04.4
						iPP	00 49 37
						i(pp)	00 49 47.1
						epS	00 58 33
						iPKKP	01 00 01.7
						i	01 00 15.8
							microns sec
						PP	E 1.1 6
						PP	N 0.6 7

cont.

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

1964				1964				
Aug.	13	Ki	microns sec	Aug.	13	Up	iP	18 38 06.2
cont.			PP Z 2.1 7			Ki	eS	18 49 09
			(PP) Z' 0.7 1.8					microns sec
			M E 4.8 20				M E 0.6 20	
			M N 2.7 20				M N 0.3 16	
			M Z 5.1 18				M Z 0.6 16	
			(D = 12200 km = 110°).			Um	iP	18 38 29.4
		Sk	eP 00 45 28			Ascension Island (h = 30 km).		
			iPKP 00 49 11.9					
			iPP 00 50 23.3					
			iPKKP 00 59 45.1					
		Gb	ePKP 00 49 19	"	14	Um	iP	03 24 44.4
			i 00 49 21.7					
			i 00 49 47.3					
			iPP 00 50 33.9	"	14	Um	e(Sg)	15 00 27.6
			ePKKP 00 59 29					
			i 00 59 33.2					
		Um	eP 00 45 16	"	14	Ka	iP	15 55 32.5
			i 00 45 23.5					
			ipP 00 46 38					
			iPKP 00 49 06.2	"	14	Up	e(P)	17 00 11
			iPP 00 49 50				i	17 04 46.0
			i(PP) 00 50 00.3					
			ipS 00 58 52	"	14	Up	iP	20 45 52.0
			ePKKP 00 59 46					
			i 00 59 53.3					
			iSS 01 04 53	"	14	Up	iP	21 38 28.3
		Ka	iPKP 00 49 19.6				eS	21 47 15
			iPP 00 50 39.5					microns sec
		Solomon Islands (h = 380 km).					S	N 0.7 14
		Magn. = 6.8 (Up, Ki).					M	E 1.4 24
		At Ki and Um, PPZ' shows a clear onset 10 sec after PP on the long-period records.					M	N 2.0 20
							M	Z 2.5 22
							D = 7350 km = 66°.	
"	13	Ki	iP 04 42 07.7 C			Ki	iP	21 39 01.4
			iPP 04 46 26.7					microns sec
		Banda Sea (h = 130 km).					M	E 1.1 20
							M	N 0.5 17
"	13	Up	iP 06 04 23.5				M	Z 1.5 18
"	13	Um	iP 10 06 09.8			Sk	iP	21 38 29.4
"	13	Um	iP 10 25 44.4			Gb	iP	21 38 05.6
"	13	Um	iP 10 25 44.4			Um	eP	21 38 50
"	13	Um	iP 10 25 44.4				iS	21 47 55
"	13	Um	iP 10 25 44.4				iSS	21 52 19
"	13	Ki	eP 10 44 49			Ka	iP	21 38 20.2
			microns sec			Atlantic Ocean (h = 30 km).		
			M E 0.3 15					
			M N 0.5 12	"	15	Ki	iSn	05 09 51.7
			M Z 0.8 12				iSg	05 10 09.4
		Sk	iP 10 44 17.3				D = 500 km = 4.5°	
		Um	eP 10 44 10			Um	iSn	05 10 35.9
		Crete (h = 30 km).		cont.				

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

1964 Aug. cont.	15	Um	iSg	05 11 15.6	1964 Aug.	17	Up	eP	00 23 09
				D = 720 km = 6.5°				i	00 23 23.2
				Northwest Russia,					microns sec
				68.0° N, 32.3° E.				M	E 0.6 12
				Origin time = 05 07 41.				M	N 0.6 13
				Explosion?				M	Z 0.5 15
							Ki	iP	00 24 14.8
									microns sec
"	16	Ki	eP	11 51 26				M	E 1.7 19
		Um	iP	11 51 33.1				M	N 0.7 11
			i	11 51 46.0				M	Z 0.7 11
				Japan			Sk	iP	00 23 46.4
				(h = 70 km).			Um	eP	00 23 45
								eS	00 28 51
							Ka	iP	00 22 26.9
								i	00 22 34.6
"	16	Ki	iP	12 47 10.2					Crete
				Alaska					(h = 20 km).
				(h = 60 km).					
"	16	Up	iP	16 00 14.1	"	17	Ki		---
				Iran					microns sec
				(h = 30 km).				M	E 0.5 14
								M	N 0.2 10
								M	Z 0.5 14
							Sk	iP	09 12 23.7
							Um	iS	09 17 42
"	16	Up	iP	21 34 53.3 C					North Atlantic Ocean
			i	21 37 10.5					(h = 40 km).
			iSn	21 40 29.4					
		Ki	iP	21 35 24.6 C					
			iPn	21 36 24.3					
			eSn	21 42 12					
		Sk	iP	21 35 27.7					
			iPP	21 36 39.4					
		Gb	iP	21 35 10.2 C	"	17	Up	iP	12 02 16.4
		Um	iP	21 35 01.9			Ki	iP	12 01 29.0
			i	21 35 13.1					microns sec
			iSn	21 41 16.4				M	E 0.3 18
			i	21 42 07.2				M	N 0.5 20
		Ka	iP	21 34 48.6 C				M	Z 0.9 19
				Caspian Sea			Gb	iP	12 02 36.9
				(h = 30 km).			Um	iP	12 01 50.1
				Clear Sn waves are recorded			Ka	iP	12 02 38.7 C
				on Z', especially at Up, Ki,					Kurile Islands
				Um, in the distance range					(h = 30 km).
				of about 29°-33°, the					
				average group velocity of					
				the first onset being					
				4.60 km/sec. Ki Z' in	"	17	Ki	iPKP	12 02 56.7
				addition has a clear Pn,	cont.				
				velocity = 8.09 km/sec.					

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

1964  
 Aug. 17 Ki iSKP 12 05 21.0  
 cont. Um iPKP 12 03 03.1  
 iSKP 12 05 33.2  
 Ka iPKP 12 03 11.7

Fiji Islands  
 (h = 650 km).

" 17 Up iP 14 53 02.9 C  
 Ki iP 14 52 56.7 C  
 Sk iP 14 53 18.7  
 Um iP 14 52 55.0  
 Ka iP 14 53 10.9 C

Burma-India  
 (h = 180 km).

" 17 Up iP 15 05 02.0 C  
 microns sec  
 P Z' 0.1 0.9  
 Ki iP 15 04 18.4 C  
 microns sec  
 P Z' 0.1 1.0  
 Sk iP 15 04 53.4  
 Gb iP 15 05 23.1 C  
 Um iP 15 04 36.8  
 eS 15 13 13  
 Ka iP 15 05 23.0 C

Japan  
 (h = 30 km).

Magn. = 5.7 (Up, Ki).

" 17 Up iP 15 18 35.0 C  
 iS 15 21 31  
 i 15 21 57  
 microns sec  
 P N 0.6 3  
 P Z' 0.2 1.0

cont.

1964  
 Aug. 17 Up microns sec  
 cont.  $\Delta = 14.5^\circ$  M E 1.5 20  
 5.13 M N 4.9 20  
 $\frac{0.58}{4.55}$  M Z 5.5 21  
 D = 1550 km =  $14^\circ$   
 Ki iP 15 17 12.3 C  
 i 15 17 22.4  
 iS 15 18 37.9  
 i 15 18 45  
 iT 15 22 32.5  
 i 15 23 06.8  
 i 15 23 28.4

microns sec

P E 1.1 9  
 P N 1.1 10  
 P Z 0.9 9  
 P Z' 0.1 0.7  
 S E 1.7 9  
 S Z' 0.3 0.9  
 M E 11 17  
 M N 6.3 20  
 M Z 16 18

D = 830 km =  $7.5^\circ$ .

Sk iP 15 17 25.4  
 eS 15 19 16  
 i(T) 15 27 25.8  
 Gb iP 15 18 53.1  
 i 15 18 59.5  
 iS 15 22 09.9  
 Um iP 15 17 54.8  
 iS 15 19 50.4  
 Ka iP 15 19 16.1 C  
 iS 15 22 35.7

Norwegian Sea

(h = 30 km).

" 17 Ki eP 16 40 53  
 microns sec  
 M E 0.6 17  
 M Z 0.8 18  
 Sk iP 16 41 18.1

cont.

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

1964					1964				
Aug. cont.	17	Um	iP	16 41 36.8	Aug.	18	Um	iP	00 38 33.7
				Jan Mayen (h = 30 km).					Yugoslavia (h = 30 km).
"	17	Up	iP	16 49 40.1 C	"	18	Ki	iP	00 40 14.2 C
				microns sec				ipP	00 40 52.6
			P	Z' 0.1 0.8					Peru-Brazil.
		Ki	iP	16 48 47.1 C					h = 150 km (Ki).
				microns sec	"	18	Up	iP	04 46 47.9
			P	Z' 0.1 0.7			Ki	eP	04 46 04
		Sk	iP	16 49 20.6					Japan (h = 30 km).
		Gb	iP	16 49 57.1	"	18	Up	i	05 01 46
		Um	iP	16 49 12.6				iPP	05 04 19
		Ka	iP	16 50 03.5				iSKS	05 10 13
				Aleutian Islands (h = 40 km).				iPKKP	05 13 50
				Magn. = 5.8 (Up,Ki).					microns sec
"	17	Ki	eP	21 43 17				M	E 1.5 20
			iS	21 44 39.0				M	N 2.0 20
			eT	21 49 10				M	Z 4.5 23
				microns sec			Ki	iPKP	05 03 40.5
			M	E 0.5 16				iPP	05 04 38.6
			M	Z 0.6 16				iSKS	05 10 28
		Sk	iP	21 43 39.5				iS	05 12 26
			iS	21 45 22.6				iPKKP	05 14 15.9
		Um	iP	21 43 59.7					microns sec
		Ka	iP	21 45 22.3				PP	Z 0.6 5
				Norwegian Sea (h = 30 km).				SKS	E 0.5 7
"	17	Ki	iP	21 51 55.1				S	N 0.3 8
		Um	iP	21 52 21.4				M	E 2.5 21
			ipP	21 52 30.8				M	N 1.5 19
				Aleutian Islands.				M	Z 3.5 21
				h = 40 km (Um).					(D = 12800 km = 115°).
"	17	Up	iPKP	22 22 00.6			Sk	iPKKP	05 14 30.6
		Gb	iPKP	22 22 10.5			Um	iPP	05 04 33
				South of Fiji Islands				iSKS	05 10 23
				(h = 30 km).				eS	05 12 20
								ePKKP	05 14 03
								iSS	05 20 27
"	17	Up	iP	22 35 36.2 D					Chile (h = 10 km).
		Ki	eP	22 36 44					Magn. = 6.2 (Up,Ki).
		Gb	iP	22 35 47.7	"	18	Um	e(P)	05 18 33
				Crete.				iSg	05 18 54.9
"	17	Up	eP	22 53 14	"	18	Up	eP	11 20 56
		Ki	eP	22 53 34			Ki	iP	11 21 19.8 C
				microns sec			Sk	eP	11 21 19
			M	E 0.4 14			Um	iP	11 21 04.0
			M	N 0.2 12					Indian Ocean (h = 30 km).
			M	Z 0.5 14	"	18	Up	iP	15 36 30.1
		Sk	iP	22 52 53.5			Ki	iP	15 37 02.3
		Gb	iP	22 52 49.8					microns sec
				North Atlantic Ocean				P	Z' 0.1 1.2
				(h = 40 km).					

cont.



Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964						1964						
Aug. cont.	18	Sk	eP	15 37 18		Aug. cont.	19	Iran.	h = 50 km (Up).			
		Um	iP	15 36 43.5					Magn. = 5.8 (Up,Ki).			
				Indian Ocean (h = 30 km).					Well developed higher mode surface waves. At Um and Ki, SS may be mixed up with Sa and no clear separation is possible.			
"	18	Ki	iP	15 41 11.9		"	19	Up	iP	15 27 41.2 C		
"	18	Up	iP	16 16 21.2 D					ePP	15 29 16		
				microns sec					e(SS)	15 36 38		
			P	Z' 0.1 0.5						microns sec		
"	19	Ki	eP	03 44 49					P	Z' 0.1 0.6		
		Sk	eP	03 45 13					M	E 1.3 17		
			iS	03 46 52.9					M	N 3.2 20		
		Um	iP	03 45 32.9					M	Z 2.9 22		
				Norwegian Sea.				Ki	iP	15 28 18.7 C		
"	19	Up	iP	09 40 36.9					ePP	15 30 07		
			ipP	09 40 46.6					eS	15 34 49		
			eS	09 46 35					eSS	15 37 57		
			iSa	09 49 08						microns sec		
			eSS	09 49 23					P	E 0.3 7		
				microns sec					P	N 0.3 7		
			P	Z' 0.1 0.6					P	Z 0.4 7		
			S	E 0.5 11					PP	N 0.4 7		
			M	E 1.1 20					PP	Z 0.4 8		
			M	N 2.4 20					S	N 0.3 7		
			M	Z 4.5 23						microns sec		
				D = 4350 km = 39°.					M	E 4.7 19		
		Ki	iP	09 41 14.3 C					M	N 2.3 20		
			ipP	09 43 05.7					M	Z 2.8 16		
			iS	09 47 46						D = 4900 km = 44°.		
			eSS	09 50 52				Sk	iP	15 28 16.5 C		
			iScS	09 51 15.3				Gb	iP	15 27 52.3 C		
				microns sec					i(pP)	15 28 06.9		
			P	E 0.4 5				Um	iP	15 27 55.1 C		
			P	N 0.3 7					ipP	15 29 30		
			P	Z 0.6 4					ePcS	15 33 45		
			P	Z' 0.1 1.0					eS	15 34 05		
			PP	N 0.5 5					iSS	15 37 07		
			PP	Z 0.5 5				Ka	iP	15 27 30.8 C		
			PP	Z' 0.1 1.0					Iran (h = 50 km).			
			S	E 0.7 10					Magn. = 5.7 (Up,Ki).			
			S	N 0.4 6				"	19	Up	iP	22 47 43.1
			S	Z 0.7 9						Ki	iP	22 48 21.1
			M	E 4.0 16							microns sec	
			M	N 2.2 13						M	E 0.6 18	
			M	Z 6.1 18						M	N 0.4 14	
				D = 4900 km = 44°.						M	Z 0.7 17	
		Sk	iP	09 41 12.0 C				Sk	eP	22 48 18		
		Gb	iP	09 40 47.8 C				Gb	iP	22 47 54.0		
		Um	iP	09 40 50.4 C				Um	iP	22 47 59.2		
			ipP	09 42 28					iS	22 54 07		
			iS	09 47 00					iSS	22 57 03		
			iSS	09 50 00								
		Ka	eP	09 40 26								

cont.

cont.

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Ka = Karlskrona

1964						1964				
Aug. 19	Ka	iP	22 47 32.6	C		Aug. 20	Ki		microns	sec
cont.	Iran	(h = 60 km).						S	Z	1.0 7
"	20	Up	iP	02 11 30.8				M	E	2.1 18
			iPP	02 11 45.3				M	N	1.9 15
			iS	02 14 29				M	Z	3.1 18
								D = 1900 km = 17°.		
							Sk	eP		03 59 57
							Gb	iP		04 00 24.8
								i		04 00 29.5
							Um	eP		04 00 33
								i		04 00 40.3
								iS		04 03 53
							Ka	eP		04 00 54
							Iceland (h = 30 km).			
							Magn. = 5.1 (Up, Ki).			
							The doubling of the P phases (on Z') is quite typical for Icelandic earthquakes, at least as recorded at our stations. In this case this feature is particularly clear at Gb and Um (a small forerunner followed by a larger phase after about 5-7 sec).			
						"	20	Up	iP	04 30 03.1
									i	04 30 19.7
								Ki	iP	04 30 04.4
								Sk	eP	04 30 21
								Um	iP	04 30 00.4
								Sumatra (h = 90 km).		
						"	20	Up	iP	05 16 18.5 C
										microns sec
								M	N	0.8 20
								M	Z	0.8 23
							Ki	iP		05 16 55.5 C
								iPP		05 18 38.6
										microns sec
								M	E	1.0 19
								M	N	0.5 17
								M	Z	1.0 18
							Sk	iP		05 16 53.0 C
							Gb	iP		05 16 29.2 C
							Um	iP		05 16 31.9 C
								iS		05 22 43
								iSS		05 25 46
								i		05 27 29
							Ka	iP		05 16 07.9 C
							Iran (h = 50 km).			
						"	20	Up	iP	05 47 14.6 C
										microns sec
								P	Z'	0.1 0.6
cont.						cont.				

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

1964					1964				
Aug. 20	Up		microns sec		Aug. 20	Ki		microns sec	
cont.		M	E 0.7 18				P	Z' 0.1 1.2	
		M	N 1.2 20				M	E 2.5 16	
		M	Z 1.5 23				M	N 0.9 16	
	Ki	iP	05 47 52.0 C				M	Z 2.8 16	
		iPP	05 49 38.0				D = 830 km = 7.5°.		
		eSS	05 57 43			Sk	iP	16 32 15.6	
		e	05 59 31				iS	16 33 57.5	
			microns sec			Gb	eP	16 33 38	
		P	Z 0.4 5			Um	iP	16 32 35.6 D	
		P	Z' 0.3 1.5				i	16 34 05.6	
		PP	Z 0.4 4			Ka	iP	16 33 55.8 C	
		M	E 0.9 15			Norwegian Sea (h = 30 km).			
		M	N 1.7 15		"	20	Up	iP	21 04 43.9
		M	Z 2.5 18					microns sec	
	Sk	iP	05 47 49.6 C				P	Z' 0.1 0.5	
		iPcP	05 49 45.7						
	Gb	iP	05 47 25.4 C		"	20	Ki	iP	23 02 47.7
	Um	iP	05 47 28.3				Iran (h = 80 km).		
		eS	05 53 35						
		eSS	05 56 26		"	21	Up	eP	08 06 46
	Ka	iP	05 47 04.3 C				iPP	08 08 14	
		iPP	05 48 49.8				eS	08 12 43	
	Iran (h = 50 km).							microns sec	
	Magn. = 5.8 (Up,Ki).						M	E 0.5 18	
"	20	Up	---				M	N 0.9 21	
			microns sec				M	Z 1.0 21	
		M	N 0.5 18				D = 4400 km = 39 1/2°.		
	Ki	iP	10 33 07.5 C			Ki	iP	08 07 20.0 C	
		eT	10 39 28				eSS	08 17 03	
			microns sec					microns sec	
		M	E 0.7 17				M	E 1.9 20	
		M	N 0.4 17				M	N 0.8 18	
		M	Z 1.1 17				M	Z 0.9 17	
	Sk	iP	10 33 22.2			Sk	iP	08 07 17.7	
		iS	10 35 00.5			Um	iP	08 06 56.8	
	Um	iP	10 33 42.5				iS	08 13 07	
	Norwegian Sea (h = 30 km).						iSS	08 16 09	
"	20	Um	iPS 13 17 27			Ka	iP	08 06 36.6	
	Indian Ocean (h = 30 km).						i	08 06 46.2	
						Iran (h = 50 km).			
"	20	Up	iP 16 33 14.5		"	21	Um	iP 16 30 55.6	
			microns sec						
		P	Z' 0.1 1.0		"	21	Up	eP 16 54 29	
		M	E 0.4 19				i	16 54 42.2	
		M	N 1.0 17					microns sec	
		M	Z 1.4 18				M	N 0.7 18	
	Ki	iP	16 31 51.7 D			Ki	eP	16 55 21	
		eS	16 33 14			Sk	eP	16 55 32	
		eT	16 37 38			Gb	iP	16 54 40.8	
		i	16 38 37.0				e	16 54 52	
			microns sec				i(PP)	16 55 09.8	
		P	E 0.3 8			Um	iP	16 54 47.0	
		P	N 0.3 9				iPP	16 55 26.8	
cont.					cont.				

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

1964				1964				
Aug. cont.	21	Um Ka	eS iP iPP	16 59 26 16 54 16.8 C 16 54 46.4	Aug.	23	Up	---
			Turkey (h = 40 km).					microns sec
"	21	Ki	e(P)	19 22 29				M E 2.3 20
"	21	Sk Um	eP eP i	23 34 36 23 34 48 23 37 38.1				M N 3.6 22
"	22	Ki	iP	03 15 04.6				M Z 5.2 20
				microns sec				Ki iPP 15 42 54
			M E 0.6 14					ePS 15 52 11
			M N 0.3 13					microns sec
			M Z 0.6 13					M E 5.1 19
		Sk	iP	03 15 10.7				M N 2.1 19
		Um	iP	03 15 23.0				M Z 6.3 20
				Gulf of California				Um iPP 15 43 13
				(h = 15 km).				iPPP 15 45 40
"	22	Up Ki	iP iP	17 10 14.0 17 10 37.5				eSKS 15 49 30
				microns sec				iPS 15 52 47
			M E 0.3 13					New Britain (h = 60 km).
		Sk	iP	17 09 52.3	"	23	Um	iP 22 35 27.5
		Gb	iP	17 09 49.6	"	24	Ki	iP 08 42 17.9
		Ka	iP	17 10 08.9			Um	iP 08 42 19.7
			i	17 10 12.5				Mona Passage (h = 180 km).
				North Atlantic Ocean	"	24	Um	iP 10 50 26.6
				(h = 30 km).				Ecuador (h = 170 km).
"	22	Ki	i	17 33 54	"	24	Um	iP 13 51 43.6
				microns sec	"	24	Ki	iP 17 39 22.3 C
			M E 0.9 18				Sk	iP 17 39 42.6
			M N 0.7 18				Um	iP 17 39 26.4 C
			M Z 1.0 18					Celebes (h = 130 km).
		Sk	eP	17 29 04	"	24	Up	iP 20 06 33.9
		Um	eP	17 29 37			Ki	eP 20 06 16
			i	17 30 18.9			Sk	iP 20 06 40.7
"	22	Up	eP	18 15 33				Mindoro (h = 30 km).
"	23	Ki	eP	03 01 21	"	24	Ki	iP 21 29 21.9
		Sk	eP	03 00 53			Um	iP 21 30 04.3
		Um	iP	03 01 23.8 C				Arctic Ocean (h = 10 km).
				North Atlantic Ocean	"	24	Sk	iP 21 47 53.6
				(h = 30 km).			Um	eP 21 47 49
"	23	Ki	eP	04 52 54 D				Ionian Sea.
		Sk	iP	04 52 25.9	"	24	Up	iP 22 07 12.0 C
		Um	iP	04 52 56.3				microns sec
				North Atlantic Ocean				M E 0.5 19
				(h = 30 km).				M N 1.0 17
								M Z 0.8 17
								Ki iP 22 06 16.4 C
								microns sec
								P Z' 0.3 1.5

cont.

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

1964					1964				
Aug. 24	Ki		microns sec		Aug. 25	Um	i	11 21 50	
cont.		M	E 0.8 16		cont.		iS	11 22 29	
		M	N 1.3 20			Ka	eP	11 16 49	
		M	Z 2.8 21			Dodecanese Islands			
	Sk	iP	22 06 43.6			(h = 50 km).			
	Gb	iP	22 07 24.0 C			Magn. = 5.3 (Up,Ki).			
	Um	iP	22 06 45.6 C						
		ipP	22 06 53.5		"	25	Ki	iP	11 49 29.9 C
		iS	22 14 45			Dodecanese Islands			
	Ka	iP	22 07 35.8 C			(h = 40 km).			
	Alaska. h = 30 km (Um).				"	25	Up	iP	13 54 15.6 D
"	25	Ki	iP 07 14 46.1				iPa	13 55 22	
	Dodecanese Islands						iPP	13 55 34	
	(h = 10 km).						i	13 58 52	
"	25	Up	---				iS	13 59 53	
			microns sec				iSS	14 02 16	
		M	E 0.6 17						microns sec
		M	N 1.0 17			P	N	2.6 3	
		M	Z 0.9 18			P	Z	2.8 3	
	Ki	iP	08 11 30.6 D			P	Z'	0.6 1.0	
			microns sec			PP	Z	4.7 5	
		M	E 0.6 17			S	E	2.7 5	
	Dodecanese Islands					S	N	7.5 6	
	(h = 50 km).					M	E	63 23	
"	25	Up	iP 11 17 14.9			M	N	63 23	
		iPP	11 17 43			M	Z	30 16	
		eS	11 21 35			D = 3950 km = 35 1/2°.			
			microns sec			Ki	iP	13 53 06.9	
		PP	N 0.4 4				iPa	13 53 35	
		S	N 1.1 9				iS	13 57 52	
		M	E 7.2 19						microns sec
		M	N 5.7 19			P	E	2.0 9	
		M	Z 11 15			P	N	3.6 10	
		D = 2800 km = 25°.				P	Z	6.8 10	
	Ki	iP	11 18 18.1 D			P	Z'	1.3 1.0	
		eS	11 23 33			S	E	18 11	
		eLi	11 27 30			S	N	20 12	
		iLg2	11 29 22			M	E	52 11	
			microns sec			M	N	56 15	
		P	Z' 0.1 1.0			M	Z	63 13	
		S	E 0.7 10			D = 3050 km = 27 1/2°.			
		S	N 0.6 8			Sk	iP	13 53 52.7	
		M	E 5.8 18			Gb	iP	13 54 40.3	
		M	N 2.5 14				iPP	13 56 19.1	
		M	Z 3.8 12			Um	iP	13 53 39.1 D	
		D = 3550 km = 32°.					iPP	13 54 28.2	
	Sk	eP	11 17 50			Ka	eP	13 54 48	
		i	11 17 58.0				i(P)	13 56 15.1	
	Gb	iP	11 17 09.9			Arctic Ocean (h = 50 km).			
		i(pP)	11 17 24.4			Magn. = 6.6 (Up,Ki).			
	Um	eP	11 17 43			Well developed higher mode			
		iPP	11 18 25.7			surface waves.			
cont.					"	25	Sk	eSg	14 04 48
					cont.				

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

1964					1964				
Aug. 25	Um	iPg	14 02 50.3 D		Aug. 25	Sk	i(P)	17 53 44.3	
cont.		iSg	14 03 00.7		cont.	"	25	Up	---
		iRg	14 03 06.0						microns sec
			D = 90 km = 0.8°.						M E 0.9 16
			Gulf of Bothnia, 64.3°N,						M N 1.0 17
			21.7°E. Origin time =						M Z 0.9 14
			14 02 35. Probably underwater			Ki	iP	18 02 05.8	
			explosion.						microns sec
"	25	Sk	eSg 14 07 02		"	25	Ki	eP 19 27 01	
		Um	iPg 14 05 02.8 D						M E 0.8 17
			iSg 14 05 13.1						
			iRg 14 05 18.4						
			D = 90 km = 0.8°.						
			Gulf of Bothnia, 64.3°N,						
			21.7°E. Origin time =			"	25	Ki eP 21 00 12	
			14 04 47. Probably underwater						Dodecanese Islands
			explosion.						(h = 70 km).
"	25	Ki	eSg 14 31 26		"	26	Up	eP 03 24 26 C	
		Sk	eSg 14 31 39						microns sec
		Um	iPg 14 29 40.5 D						P Z' 0.1 1.2
			iSg 14 29 50.6						M E 0.6 16
			iRg 14 29 55.1						M N 0.7 17
			D = 90 km = 0.8°.						M Z 1.1 17
			Gulf of Bothnia, 64.3°N,						Ki eP 03 24 42
			21.7°E. Origin time =						microns sec
			14 29 25. Probably underwater						M E 0.7 15
			explosion.						M N 0.3 12
									M Z 0.8 14
"	25	Ki	eSg 14 33 30				Sk	iP 03 24 04.8	
		Sk	eSg 14 33 39				Gb	eP 03 24 02	
		Um	iPg 14 31 41.0				Ka	iP 03 24 20.3	
			iSg 14 31 51.3						North Atlantic Ocean
			iRg 14 31 55.7						(h = 30 km).
			D = 90 km = 0.8°.						
			Gulf of Bothnia, 64.3°N,			"	26	Up	iP 05 50 41.8
			21.7°E. Origin time =						iPcP 05 51 10.1
			14 31 25. Probably underwater						Ki iP 05 49 54.8
			explosion.						microns sec
"	25	Up	iP 14 43 00.7						P Z' 0.1 1.1
			microns sec						Um iP 05 50 15.9
			M E 8.5 18						Sea of Okhotsk (h = 310 km).
			M N 11 15			"	26	Ka	i(P) 23 18 45.0
		Ki	iP 14 44 02.0						
			iLg2 14 55 16			"	26	Ki	iP 23 54 36.5
			microns sec						Alaska (h = 20 km).
			P Z' 0.1 0.8						
		Sk	eP 14 43 39			"	27	Up	iP 01 47 02.6
			i 14 44 04.2						Ki iP 01 46 32.3 C
		Gb	iP 14 42 55.7 C						iP 01 46 43.5
			i(PP) 14 43 44.4						microns sec
		Um	iP 14 43 28.3						P Z' 0.1 0.9
		Ka	iP 14 42 35.9						M E 0.4 16
			iPP 14 43 03.5						cont.
			Dodecanese Islands (h = 25 km).						

$\Delta = 26.6^\circ$

$\frac{5.56}{4.35}$   
 $\frac{1.19}{4.35}$

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

1964				1964			
Aug.	27		microns sec	Aug.	27	Up	microns sec
cont.		Ki		cont.		Up	
		M	N 0.5 16			S	E 0.2 5
		M	Z 0.5 17			S	N 0.9 9
		Sk	iP 01 46 58.8 C			M	E 7.3 17
			ipP 01 47 10.5			M	N 5.8 17
		Um	iP 01 46 45.2 C			M	Z 7.4 14
			ipP 01 46 56.3			D = 2900 km = 26°.	
		Volcano Islands. h = 45 km (Ki,Sk,Um).				Ki	iP 19 38 28.1 C
"	27	Ka	i(P) 05 46 54.1			i	19 38 30.1
"	27	Ki	iP 10 02 11.1			iS	19 43 45
		Um	iP 10 02 41.0			i	19 46 36
		Yukon (h = 30 km).				iScS	19 48 57
"	27	Ki	iP 10 40 28.0 C			microns sec	
		Alaska (h = 110 km).				P	Z' 0.1 0.8
"	27	Up	iP 12 06 16.6			S	E 0.7 7
		Ki	iP 12 06 50.8 C			S	N 0.6 8
			microns sec			M	E 4.5 10
		P	Z' 0.1 1.0			M	N 1.6 10
		Sk	iP 12 06 51.2			M	Z 2.5 10
		Gb	iP 12 06 29.8			D = 3600 km = 32 1/2°.	
		Um	iP 12 06 28.7			Sk	eP 19 38 05
		Ka	eP 12 06 08			i	19 38 15.1
		Iran (h = 70 km).				Gb	eP 19 37 24
"	27	Up	iP 13 04 31.4			Um	iP 19 38 04.5
			microns sec				iPP 19 38 46
		M	E 0.4 15			i	19 42 41
		M	N 0.7 12			Ka	iP 19 37 02.6
		Ki	iP 13 05 04.7			Dodecanese Islands (h = 30 km).	
			microns sec			Magn. = 5.3 (Up,Ki).	
		P	Z' 0.1 0.9	"	28	Um	iP 01 21 55.6 C
		M	E 0.8 14	"	28	Ka	iP 04 41 06.7 C
		M	N 0.6 15	"	28	Up	iPKP 04 53 40.0
		M	Z 1.1 15				iSKP 04 56 30.6
		Sk	iP 13 05 04.9			Ki	ePKP 04 53 30
		Gb	iP 13 04 43.5			i	04 53 35.3
		Um	iP 13 04 42.3			iSKP	04 56 05.9
			eS 13 11 00			microns sec	
			iSS 13 14 03			SKP	Z' 0.3 1.5
		Ka	iP 13 04 22.5			Sk	ePKP 04 53 35
		i	13 04 37.9				iSKP 04 56 22.9
		Iran (h = 30 km).				Gb	iPKP 04 53 49.7
"	27	Ki	iP 15 50 07.2				iSKP 04 56 39.0
		Sumatra (h = 510 km).				Um	iPKP 04 53 33.6
"	27	Up	iP 19 37 28.3			i	04 53 41.5
			i 19 37 47.6				iSKP 04 56 18.0
			e 19 41 28			Ka	iPKP 04 53 52.0 C
			iS 19 41 52				iSKP 04 56 39.9
cont.						Fiji Islands (h = 580 km).	
				"	28	Up	iP 12 11 07.3
							i 12 11 15.0
							eS 12 15 07
				cont.			

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

1964				1964			
Aug. 28	Up		microns sec	Aug. 29	Up	iP	04 18 19.2
cont.		M	E 0.4 10		Ki	iP	04 17 24.3
		M	N 0.5 10		Sk	iP	04 17 53.0
		M	Z 0.5 10		Gb	iP	04 18 32.2 C
			D = 2400 km = 21 1/2°.		Um	iP	04 17 52.8 C
	Ki	eP	12 12 21				Alaska (h = 80 km).
			microns sec	" 29	Ki	iP	05 22 31.1
		M	E 1.4 17				microns sec
		M	N 0.5 17			P	Z' 0.1 1.0
		M	Z 1.0 12			M	E 0.6 14
	Sk	iP	12 11 47.5			M	N 0.8 14
	Um	iP	12 11 47.4			M	Z 1.6 16
	Ka	eP	12 10 30		Sk	iP	05 22 42.3
		i	12 10 38.6			eS	05 24 31
			Ionian Sea (h = 60 km).		Gb	iP	05 24 01.1
" 28	Ka	iP	13 06 41.4 C			i	05 24 05.2
" 28	Up	iP	13 33 06.8		Um	iP	05 23 07.5
	Ki	iP	13 33 08.4 C		Ka	iP	05 24 23.0
	Um	iP	13 33 03.4				Jan Mayen (h = 30 km).
			Nicobar Islands	" 29	Ki	iP	06 57 40.3
			(h = 30 km).		Sk	iP	06 57 51.4
" 28	Up	iP	13 33 59.3			eS	06 59 37
	Ki	iP	13 33 57.4		Um	iP	06 58 17.7
	Sk	iP	13 34 15.1 D				Jan Mayen (h = 30 km).
	Um	iP	13 33 55.8	" 29	Up	iP	11 52 44.0 C
	Ka	iP	13 34 01.5	" 29	Up	iP	19 43 27.3
			Nicobar Islands		Ki	iP	19 44 25.8 C
			(h = 30 km).				Dodecanese Islands
" 28	Um	iSKP	15 03 27.7				(h = 60 km).
			South of Fiji Islands	" 30	Up	iP	02 44 53.2
			(h = 550 km).				microns sec
" 28	Up	iP	18 28 56.8			P	Z' 0.1 1.0
			microns sec			M	N 1.3 16
		M	E 0.7 18		Ki	iP	02 44 52.2 D
		M	N 0.9 18				microns sec
		M	Z 0.9 19			M	E 0.5 16
	Ki	iP	18 28 32.5			M	N 0.9 16
			microns sec			M	Z 0.9 19
		M	E 0.8 17		Sk	iP	02 45 10.2
		M	N 1.1 16				Tibet (h = 20 km).
		M	Z 1.0 14	" 30	Ki	iP	04 55 31.6 D
			Formosa (h = 10 km).				microns sec
" 28	Up	iP	20 47 54.1			M	E 0.5 14
			microns sec			M	N 0.3 15
		P	Z' 0.1 0.6			M	Z 1.0 16
" 29	Um	iP	00 27 11.5		Sk	iP	04 55 43.3
							Jan Mayen (h = 30 km).
" 29	Sk	eP	02 50 22	" 30	Ki	eP	05 36 20
			Pyreneans.				



Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964

Aug. 30 Ki iSKP 22 06 41.9  
Um iPKP 22 03 45.8  
Fiji Islands (h = 250 km).

" 31 Ki iP 02 51 30.9  
Kamchatka (h = 30 km).

" 31 Up iP 05 42 23.5  
Ki iP 05 41 55.3  
Ryukyu Islands (h = 90 km).

" 31 Up iP 19 40 55.5 C  
Sk iP 19 41 30.4 C  
Ionian Islands.

" 31 Up iP 23 31 15.3 C  
microns sec  
P Z' 0.1 0.5  
Ki iP 23 30 22.0 C  
microns sec  
P Z' 0.2 0.5  
Sk iP 23 30 52.3  
iPcP 23 31 27.1  
Gb iP 23 31 31.3  
iPcP 23 31 51.4  
Um iP 23 30 48.6 C  
iPcP 23 31 24.8  
Ka iP 23 31 38.3  
Aleutian Islands  
(h = 30 km).

Markus Båth  
June 15, 1965

Seismological Institute  
Uppsala

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

SEPTEMBER 1 - 30, 1964

1964	1	Up	i(P)	11 13 41.9 C	1964	1	Um	iS	13 40 22
Sep.				microns sec	cont.			i	13 40 31
			(P)	Z' 0.1 0.5			Ka	iP	13 32 45.2 C
		Um	e(P)	11 12 03				i	13 32 48.1
"	1	Gb	iPg	12 25 57.6 C			India-China. h = 40 km (Um). Magn. = 6.0 (Up,Ki). PZ' is multiple at our stations with a small onset followed after 3.0 sec in average by a much larger phase.		
			iSg	12 25 59.4					
			D = 15 km = 0.14°.						
		Local blast.							
"	1	Up	iP	13 32 36.1 C					
			iS	13 40 43		"	1	Um	e(P)
			iScS	13 42 28					16 47 32
			microns sec						16 47 41.6
			P	Z' 0.3 0.8		"	1	Up	iP
			M	E 3.1 15					17 27 46.2 D
			M	N 2.4 15					microns sec
			M	Z 5.2 15					Z' 0.2 1.0
			D = 6550 km = 59°.				Ki	iP	17 26 54.1
		Ki	iP	13 32 29.9 C				ipP	17 27 07.6
			i	13 32 33.0				eS	17 35 08
			eS	13 40 33				microns sec	
			eScS	13 42 15				P	Z' 0.2 1.0
			microns sec					S	N 0.4 9
			P	Z 0.6 6				M	E 0.7 19
			P	Z' 0.3 0.8				M	N 0.4 18
			S	E 0.8 8				D = 6800 km = 61°.	
			S	N 0.4 10			Sk	iP	17 27 23.9
			M	E 8.5 15			Gb	iP	17 28 00.9 D
			M	N 3.5 12				ipP	17 28 15.0
			M	Z 8.7 14			Um	iP	17 27 19.9
			D = 6450 km = 58°.					ipP	17 27 33.7
		Sk	iP	13 32 52.6				iS	17 36 01
			i	13 32 55.5			Ka	iP	17 28 08.2
		Gb	iP	13 32 57.3 C				ipP	17 28 23.2
			i	13 33 00.1			Aleutian Islands. h = 60 km (Ki,Gb,Um,Ka). Magn. = 6.1 (Up,Ki).		
		Um	eP	13 32 28					
			i	13 32 31.2					
			ipP	13 32 37.9					

cont.

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

1964					
Sep.	2	Ki	eP	18 24 39	
		Sk	iP	18 24 33.2	
		Colombia (h = 110 km),			
"	3	Um	iP	01 49 53.2	
"	3	Ki	i(Sn)	05 23 10.0	
			iSg	05 23 31.7	
"	3	Up	iP	05 42 05.0	
		Vancouver Island (h = 30 km).			
"	3	Ka	iP	12 42 31.0	
		Alaska (h = 40 km).			
"	3	Gb	iSKP	13 18 51.3	
		Fiji Islands (h = 570 km).			
"	3	Um	iP	13 58 03.2	
"	3	Um	iPKP	15 56 17.2	
		Kermadec Islands (h = 30 km).			
"	3	Um	eP	17 06 46	
"	3	Gb	iP	21 14 27.3 C	
		Ka	iP	21 14 39.8	
		Alaska (h = 30 km).			
"	3	Up		---	
				microns sec	
		M	E	0.3 17	
		M	N	0.7 18	
		M	Z	0.8 17	
		Ki	iP	21 26 55.7	
				microns sec	
		M	E	0.4 14	
		M	N	0.5 16	
		M	Z	0.8 18	
		Um	iP	21 27 07.8	
		Gulf of California (h = 30 km).			
"	4	Up	iP	03 39 21.2 D	
			eS	03 48 05	
				microns sec	
		P	Z'	0.1 1.0	
		S	E	0.3 5	
		S	N	0.3 5	
		M	E	0.7 19	
		M	N	1.7 17	
		M	Z	1.3 20	
		D = 7400 km = 66 1/2°.			
		Ki	iP	03 39 51.7	
			iS	03 49 10	

cont.

1964					
Sep.	4	Ki		microns sec	
cont.		P	Z'	0.1 1.0	
		M	E	1.7 19	
		M	N	0.5 15	
		M	Z	0.6 12	
		D = 7950 km = 71 1/2°.			
		Sk	eP	03 39 19 D	
		Gb	iP	03 38 57.6 D	
		Um	eP	03 39 39	
			iS	03 48 46	
		Ka	iP	03 39 03.5 D	
		Atlantic Ocean (h = 20 km). Magn. = 5.6 (Up,Ki).			
"	4	Up	iP	03 44 54.6	
		Ki	iP	03 45 48.1	
				microns sec	
		P	Z'	0.1 1.0	
		Sk	iP	03 45 33.8	
		Gb	iP	03 45 04.1	
			i	03 45 08.0	
		Um	iP	03 45 17.2	
		Ka	iP	03 44 39.5	
		Turkey (h = 30 km).			
"	4	Ki	ePg	08 15 07	
			iSg	08 15 28.2	
		D = 140 km = 1.3°.			
		Sk	eSg	08 17 12 16	
		Um	iSg	08 17 03.3	
		Sweden-Norway border region, 67.9°N, 17.1°E.			
		Origin time = 08 14 43.			
"	4	Um	iP	10 02 37.3	
		Gulf of California (h = 30 km).			
"	4	Up	ePP	10 52 41	
			eS	11 00 03	
				microns sec	
		M	E	1.6 21	
		M	N	3.3 23	
		M	Z	3.8 23	
		Ki	eP	10 48 02	
			iPP	10 52 14	
			iSKS	10 58 39	
				microns sec	
		PP	Z	0.9 9	
		SKS	E	1.0 11	
		M	E	3.0 20	
		M	N	3.2 22	
		M	Z	5.6 21	
		D = 11300 km = 101 1/2°.			
		Sk	eP	10 48 25	
			ePKKP	11 04 15	
		Um	iP	10 48 06.8 C	
			iPP	10 52 20	

cont.

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

1964					1964				
Sep.	4	Um	i	10 52 32.6	Sep.	5	Sk	e	03 14 33
cont.			iSKS	10 58 45	cont.			ePKKP	03 22 58
			iS	10 59 48			Gb	ePKP	03 12 49
			iPKKP	11 04 11.2				i	03 13 02.5
				New Guinea (h = 30 km).				i	03 14 35.6
				Magn. = 6.2 (Up,Ki).				ePKKP	03 22 44
"	4	Ki	iPKP	15 08 45.8			Um	iP	03 08 26
		Gb	iPKP	15 09 12.2				iPKP	03 12 25.0
		Um	iSKP	15 11 39.9				iPP	03 13 07.5
				South of Fiji Islands				iPS	03 22 42
				(h = 550 km).				iPKKP	03 23 06.7
"	4	Um	eP	17 19 04				iSS	03 29 06
"	5	Up	iPKP	02 36 15.7			Ka	ePKP	03 12 39
			i	02 36 22.9				i	03 13 01.6
				microns sec				ePKKP	03 22 40
			PKP	Z' 0.1 0.6					Solomon Islands (h = 70 km).
		Ki	iPKP	02 35 55.1	"	5	Up	iP	06 47 29.5
		Sk	iPKP	02 36 10.4				i	06 47 31.8
			i	02 36 14.0			Ki	eP	06 47 16
		Gb	iPKP	02 36 23.5			Sk	eP	06 47 41
			i	02 36 36.5			Gb	iP	06 47 54.0
			e(SKIP)	02 39 53			Um	iP	06 47 16.0
		Um	iPKP	02 36 05.0 D				i	06 47 20.5
		Ka	iPKP	02 36 38.3					Yunnan, China (h = 30 km).
				South of Kermadec Islands	"	5	Up	iP	07 59 37.3
				(h = 400 km).			Ki	iP	07 59 13.6 C
"	5	Up	iP	03 08 44			Sk	eP	07 59 44
			ePKP	03 12 31			Um	iP	07 59 20.9
			iPP	03 13 36			Ka	iP	07 59 52.4
			ePKKP	03 22 54	"	5	Ki	iPKP	12 15 26.1
			ePKKS	03 26 41					West of Macquarie Island
				microns sec					(h = 30 km).
			PP	Z 1.1 9	"	5	Up	eP	12 38 19
			M	E 3.8 22				eS	12 47 10
			M	N 8.5 24					microns sec
			M	Z 6.4 24					S N 1.0 16
				(D = 13000 km = 117°).					M E 1.4 19
		Ki	eP	03 08 17					M N 2.3 19
			ePKP	03 12 22					M Z 2.2 22
			i	03 12 44.4					D = 7550 km = 68°.
			iPP	03 12 56			Ki	eP	12 38 59
			iPS	03 22 15				eS	12 48 31
			i	03 22 43					microns sec
			iPKKP	03 23 16.0					S N 0.8 12
				microns sec					M E 1.0 16
			PP	E 0.3 8					M N 1.3 20
			PP	Z 0.5 5					M Z 2.3 17
			M	E 7.4 21					D = 8300 km = 74 1/2°.
			M	N 6.4 22			Sk	eP	12 38 26
			M	Z 11 21			Um	iP	12 38 40 C
				(D = 12450 km = 112°).					
		Sk	ePKP	03 12 38					
cont.					cont.				

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

1964					1964				
Sep. cont.	5	Um	ePP	12 41 13	Sep. 6	Up	i	09 57 27.1	
			iS	12 47 58			iSn	09 57 44.3	
		Ka	iP	12 37 52.9			i	09 58 39.8	
		Atlantic Ocean (h = 30 km).				Sk	e	09 58 00	
		Magn. = 5.6 (Up,Ki).					iSg	09 58 51.6	
"	5	Up	ePg	13 21 40		Gb	iPg	09 56 03.0	
			eSg	13 22 31			iSg	09 56 29.2	
			D = 430 km = 3.8°.			Um	eSg	09 59 59	
		Ki	e	13 24 36		Ka	ePn	09 56 25	
			iSg	13 25 12.6			eSg	09 57 36	
		Um	iSg	13 23 01.4		Skagerack. No satisfactory agreement between the data.			
			i	13 23 13.3	"	6	Up	iP	10 40 39.9
		Ka	iPg	13 22 30.5			Ki	iP	10 39 46.7
			eS <sup>x</sup>	13 23 36			Um	iP	10 40 13.7
			iSg	13 23 53.0			Alaska (h = 30 km).		
			D = 680 km = 6.1°.		"	6	Ki	eP	16 07 35
		North coast of Esthonia, 59 1/2°N, 25°E. Origin time = 13 20 27. Explosion?					Alaska (h = 30 km).		
"	5	Up	eP	21 12 37	"	6	Up	iP	17 46 24.9
		Ki	eP	21 14 04			Ki	iP	17 45 26.1
		Sk	eP	21 13 15			Sk	eP	17 45 53
		Um	eP	21 13 21			Um	eP	17 45 56
			iS	21 17 18			Ka	iP	17 46 50.5
		Italy (h = 40 km).					Alaska (h = 30 km).		
"	5	Up	iP	21 14 07.6	"	6	Up	eP	18 54 39
			ePcP	21 19 11				microns sec	
				microns sec			M	E 1.0 17	
		M	E	0.3 9			M	N 1.7 17	
		M	N	0.3 8			M	Z 1.1 17	
		M	Z	0.4 9		Ki	iP	18 54 04.7	
		Ki	eP	21 15 35			eSKS	19 04 38	
				microns sec				microns sec	
		M	E	0.4 9			M	E 2.1 21	
		M	N	0.3 9			M	N 1.7 20	
		M	Z	0.4 9			M	Z 2.5 18	
		Sk	iP	21 14 45.0		Um	iP	18 54 14.6	
		Um	iP	21 14 55.9			iSS	19 11 59	
			iS	21 18 50		Caroline Islands (h = 30 km).			
		Ka	iP	21 13 45.6	"	6	Up	eP	19 02 38
		Italy. This shock occurred 01 32 after the preceding (i.e. origin time = 21 10 21) and is slightly larger than that one.					Ki	iP	19 03 12.7
							Sk	iP	19 02 32.6
							Um	iP	19 02 54.9
						Azores Islands (h = 30 km).			
"	6	Up	iPKP	09 39 30.8	"	6	Up	iP	19 09 08.6 D
			iSKP	09 42 14.9			ipP	19 09 22.8	
		Ki	iSKP	09 41 51.0				microns sec	
		Sk	iSKP	09 42 07.7			P	Z' 0.1 0.6	
		Gb	eSKP	09 42 23		Ki	iP	19 09 11.0 D	
		Um	iSKP	09 42 02.8				microns sec	
		Ka	iPKP	09 39 41.4			P	Z' 0.1 1.0	
			iSKP	09 42 25.0		Sk	iP	19 09 25.4	
		Fiji Islands (h = 620 km).			cont.				

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

1964				1964						
Sep. cont.	6	Sk	i(pP)	19 09 42.3	Sep.	8	Ki	i(Sn)	05 18 25.3	
		Gb	iP	19 09 23.6				e(Sg)	05 18 48	
		Um	iP	19 09 06.0		"	8	Ki	iP	08 07 39.1 D
			ipP	19 09 19.7			Um	iP	08 07 46.2	
		Ka	iP	19 09 11.4			Mindanao (h = 180 km).			
		Nicobar Islands. h = 60 km (Up,Um). Magn. = 5.9 (Up,Ki).				"	8	Um	iP	11 05 05.1
"	6	Up	iP	19 34 23.8	"	8	Up	iP	13 52 05.3	
"	6	Ki	eL	21 58			Ki	iP	13 51 31.5	
				microns sec					microns sec	
		M	E	0.6 17			Um	iP	13 51 45.8	
		M	N	0.4 17				i	13 51 53.7	
		M	Z	1.0 18			South of Japan (h = 80 km).			
		Easter Island (h = 30 km).			"	8	Gb	iPKP	14 01 02.2	
"	7	Up	iP	03 51 00.6				i	14 01 19.6	
		Ki	eP	03 50 33			Ka	iPKP	14 01 03.5	
		Philippine Islands (h = 30 km).						i	14 01 21.3	
"	7	Up	iP	04 04 41.3			South of Fiji Islands (h = 170 km).			
		Um	eP	04 04 15	"	8	Gb	iPKP	14 28 33.7	
		Kurile Islands (h = 100 km).						i	14 28 45.6	
"	7	Ki	iP	07 51 24.3			Ka	iPKP	14 28 34.9	
		Sk	iP	07 51 51.6				i	14 28 47.7	
		Alaska (h = 30 km).					South of Fiji Islands (h = 210 km).			
"	7	Up	iP	11 36 11.9	"	8	Gb	iPKP	14 31 57.2	
			i	11 36 34.4				i	14 32 02.8	
				microns sec			Ka	iPKP	14 31 58.3	
		M	E	0.9 23				i	14 32 04.7	
		M	N	2.3 22			South of Fiji Islands (h = 180 km).			
		M	Z	2.2 22			PKP is multiple in this and the two preceding cases, but the time difference between the two phases is different in the three cases, being in average for Gb and Ka 17.6 sec for the first shock, 12.9 sec for the second and 6.0 sec for this one.			
		Ki	iP	11 37 02.6						
			eS	11 44 54						
				microns sec						
		S	N	0.5 7						
		M	E	3.0 20						
		M	N	1.7 20						
		M	Z	3.9 22						
		D = 6400 km = 57 1/2°.								
		Um	eP	11 36 40						
		Ka	eP	11 36 03						
			i	11 36 15.6						
		Arabian Sea (h = 30 km). Magn. = 5.6 (Up,Ki).			"	8	Um	eP	17 04 25	
"	7	Ki	iP	15 59 45.8			South of Japan (h = 30 km).			
		Ka	iP	15 59 50.3	"	8	Up	iPKP	17 23 40.5	
		Afghanistan-USSR (h = 170 km).					Fiji Islands (h = 540 km).			
"	7	Gb	i(P)	17 16 20.7	"	8	Ki	eP	20 35 48 C	
									microns sec	
									P Z' 0.1 1.3	

cont.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964					1964				
Sep.	8	Um	iP	20 35 55.7	Sep.	12	Ki	iPS	13 11 04
cont.				Mindanao (h = 30 km).	cont.			eSS	13 16 43
"	9	Um	iP	06 18 26.0					microns sec
				Bonin Islands (h = 30 km).				M	E 1.4 22
								M	N 4.0 30
									New Guinea (h = 120 km).
"	9	Ki	iP	22 26 36.7	"	12	Up	iSKP	15 40 16.0
				Iran-Iraq (h = 70 km).			Ki	iPKP	15 37 24.1
"	10	Um	iP	13 30 20.1				iSKP	15 39 50.2
"	10	Up	iPg	17 19 34.4			Sk	iSKP	15 40 07.9
			iSn	17 20 15.3			Um	iPKP	15 37 31.8
			iLgl	17 20 35.3				iSKP	15 40 03.3
				D = 540 km = 4.8°.					Fiji Islands (h = 560 km).
		Sk	eLgl	17 22 34	"	12	Up	iP	16 06 09.7
		Gb	eSg	17 19 32	"	12	Up	iPKP	22 26 52 C
		Ka	iPg	17 18 25.4 C				e(PKP2)	22 27 25
			iSg	17 18 38.3				iPKP2	22 27 32.4
			i(T)	17 19 17.3				iPP	22 30 59
				D = 110 km = 1.0°.					microns sec
				Southern Baltic, 55.3°N,				PKP	E 1.4 11
				14.7°E. Origin time =				PKP	Z 10 12
				17 18 02. Probably underwater				PKP2	E 2.0 11
				explosion.				PKP2	Z 7.8 9
"	11	Um	iP	03 25 06.2				PKP2	Z' 0.2 0.9
"	11	Um	iP	04 24 18.1				PP	E 3.7 12
"	11	Up	eP	20 00 23				PP	Z 8.6 12
		Ki	eP	20 00 10				M	E 6.1 19
		Gb	iP	20 00 14.3				M	N 12 18
				Mexico (h = 130 km).				M	Z 21 18
"	12	Up	iSg	08 07 33.8					(D = 17450 km = 157°).
		Ki	iPg	08 03 47.6			Ki	iPKP	22 26 52.8 C
			iSg	08 03 56.6				iPKP2	22 27 17.1
			iRg	08 03 59.2				i	22 27 43.8
								iPKS	22 30 32
								iPP	22 30 47
								iSKSP	22 41 00
									microns sec
								PKP	E 3.0 10
								PKP	N 1.3 9
								PKP	Z 13 10
								PKP	Z' 1.5 1.5
								PKP2	Z' 1.3 1.2
								PKS	E 3.0 10
								PP	Z 16 10
								M	E 16 21
								M	N 15 18
								M	Z 23 19
									(D = 17100 km = 154°).
"	12	Up		---			Sk	ePKP	22 26 54
								iPKP2	22 27 37.6
							Gb	iPKP2	22 27 46.1
								i	22 27 49.4
							Um	ePKP	22 26 52 C
								iPKP2	22 27 23.7
cont.					cont.				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964					1964				
Sep.	12	Um	iPP	22 30 58	Sep.	14	Sk	i	13 42 53.7
cont.		Ka	iPKP	22 27 03.3	cont.			i	13 42 59.8
		Auckland Islands (h = 30 km). Magn. = 7.1 (Up,Ki). The records offer some opportunity for comparison of PKP2 with PKP1, PKP2 usually having slightly shorter period and larger trace amplitude at our stations in this case.			"	14	Up		---
									microns sec
							M	E	0.7 19
							M	N	1.0 17
							M	Z	1.3 20
						Ki	iP		13 46 02.6
									microns sec
							M	E	2.1 21
							M	N	0.8 18
							M	Z	2.8 21
"	13	Ki	iPKP	00 41 04.6 C		Sk	iP		13 45 57.3 D
		Auckland Islands (h = 30 km).				Mexico (h = 60 km).			
"	13	Um	iP	15 33 12.7 C					
			i	15 33 16.5					
"	13	Sk	iP	22 58 27.3	"	14	Sk	eP	14 25 54
		Um	iP	22 58 21.5		North Atlantic Ocean, 59°N, 32°W. Origin time = 14 21 13.			
		Ka	iP	22 57 01					
		Yugoslavia-Albania.			"	14	Up	iP	14 27 58.0
						Ki	iP	14 27 54.6	
"	13	Sk	eP	23 05 53		Sk	iP	14 27 24.3	
		North Atlantic Ocean (h = 30 km).				North Atlantic Ocean, 59°N, 32°W. Origin time = 14 22 43. The determination in this and the preceding case made by combination with readings at Sodankylä, Kevo, Akureyri, Nord and Strasbourg.			
"	13	Sk	iP	23 28 22.1					
		North Atlantic Ocean (h = 25 km).			"	14	Up	iP	15 28 51.2 C
"	14	Sk	iP	06 24 35.0					microns sec
		North Atlantic Ocean (h = 30 km).					P	Z'	0.1 1.0
"	14	Sk	iP	06 39 23.3		Ki	iP		15 29 23.3
		North Atlantic Ocean (h = 30 km).							microns sec
							P	Z'	0.1 1.0
							M	N	0.5 12
"	14	Up	iP	10 28 12.8		Sk	eP		15 29 24
		Ki	iP	10 27 19.3 C			i		15 29 26.0
			ipP	10 27 34.3		Gb	iP		15 29 04.0
						Um	iP		15 29 02.5
							i		15 29 13.1
						Ka	iP		15 28 44.3
						Iran (h = 30 km). Magn. = 5.7 (Up,Ki).			
					"	14	Ki	iP	15 57 55.3
						Sk	iP		15 57 43.9
						Guatemala (h = 40 km).			
"	14	Sk	eP	13 41 54	"	15	Ki	eP	05 51 06
			i	13 41 57.2					microns sec
							M	E	0.9 18
							M	N	1.0 22
"	14	Sk	e(P)	13 42 50			M	Z	1.1 17
cont.					cont.				





Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964					1964					
Sep.	16	Ki	iP	15 22 45.5	Sep.	17	Gb	iP	19 50 32.2	
		Um	iP	15 23 04.3						
		Japan (h = 170 km).			"	18	Up	iP	00 14 12.6	
"	16	Ki	e	20 14 33			i	00 14 30.7		
			i(Sg)	20 14 47.8			eS	00 18 37		
"	16	Up	iP	21 44 48.7 C				microns sec		
"	16	Up	iP	22 33 18.7			S	N 0.9 9		
			iS	22 41 06			M	E 7.7 17		
			D = 6300 km = 56 1/2°.				M	N 5.4 18		
		Ki	iP	22 33 40.2 C			M	Z 8.3 14		
			microns sec				D = 2900 km = 26°.			
		P	Z'	0.2 1.4		Ki	iP	00 15 12.6 C		
		Sk	iP	22 33 09.1 C			eS	00 20 30		
		Gb	iP	22 32 56.7			iLg1	00 25 45		
			i	22 33 01.4			iLg2	00 26 28		
		Um	iP	22 33 33.5				microns sec		
		Ka	iP	22 33 07.1			S	E 0.8 5		
		North Atlantic Ocean					S	N 0.4 10		
		(h = 30 km).					M	E 4.2 17		
							M	N 1.4 16		
							M	Z 2.1 10		
							D = 3600 km = 32 1/2°.			
"	16	Up	eP	22 47 38		Gb	eP	00 14 12		
		Ki	iP	22 46 42.5		Um	iP	00 14 29.4		
		Kamchatka (h = 30 km).					i(S)	00 19 30		
"	17	Ki	e(Sn)	05 33 04		Ka	eP	00 13 50		
			i(Sg)	05 33 23.8			iPP	00 14 30.5		
"	17	Up	iPKP	07 19 12.2		Eastern Mediterranean Sea				
		South of Fiji Islands				(h = 20 km).				
		(h = 30 km).				Magn. = 5.3 (Up, Ki).				
"	17	Up	iP	15 08 33.4	"	18	Up	iP	00 14 42.7	
			microns sec					microns sec		
		P	Z'	0.1 0.8			P	Z' 0.1 1.0		
		M	E	0.8 15	A = 32°		Ki	iP	00 15 44.0	
		M	N	1.4 17	5.70			microns sec		
		M	Z	1.5 16	-4.02		P	Z' 0.1 0.8		
		Ki	iP	15 08 56.8	4.7		Sk	eP	00 14 59	
			i	15 09 02.8			Eastern Mediterranean Sea.			
			eS	15 14 37			Remarkably enough, the P of			
			microns sec				this shock is stronger than			
		P	Z'	0.2 1.3			P for the preceding shock at			
		M	E	2.8 17			Up, Ki, Sk, but not at the			
		M	N	0.9 13			other stations where the			
		M	Z	2.2 15			second P was not clearly			
		D = 3950 km = 35 1/2°.				"	18	Sk	eP	01 50 31
		Sk	iP	15 08 18.7			Greece.			
		Gb	iP	15 08 08.4 C		"	18	Up	iP	08 04 28.4
		Um	iP	15 08 49.0			Ki	iP	08 02 57.1	
			iS	15 14 23				iS	08 05 07.7	
		Ka	iP	15 08 21.9			D = 1400 km = 12 1/2°.			
		North Atlantic Ocean					Sk	iP	08 04 06.1	
		(h = 25 km).						iS	08 07 22.5	

cont.

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1964				1964					
Sep. cont.	18	Um	iP i(S) Novaya Zemlya. Underground explosion.	08 03 43.7 C 08 07 04.9	Sep.	18	Ki	i(P)	23 47 18.4
"	18	Ki	i(Sg)	09 48 00.6	"	19	Up Ki	iP iP	00 46 30.4 D 00 46 40.0
"	18	Up	eP	13 18 41	"	19	Up	iP	05 21 00.8 C
"	18	Up	eP iS	13 19 39 13 25 15				eSKS e(S)	05 31 28 05 31 53
				microns sec					microns sec
		M	E	1.9 20				P	Z 0.6 6
		M	N	1.6 16				SKS	E 0.7 12
		M	Z	3.8 17				(S)	N 0.9 9
				D = 3950 km = 35 1/2°.				M	E 1.9 20
		Ki	iP	13 20 08.7 D				M	N 1.7 17
			iS	13 26 14				M	Z 3.0 19
				microns sec					D = 9700 km = 87 1/2°.
		P	Z'	0.5 1.5			Ki	iS	05 31 31
		S	N	0.6 6					microns sec
		M	E	2.6 20				S	E 2.2 10
		M	N	1.2 15				S	N 0.8 10
		M	Z	3.1 18				S	Z 0.6 10
				D = 4400 km = 39 1/2°.				M	E 2.6 20
		Sk	iP	13 19 27.4				M	N 1.0 17
			i	13 19 30.0				M	Z 3.9 22
			iPP	13 20 29.8			Sk	iP	05 20 42.8
		Gb	iP	13 19 09.0			Gb	eP	05 20 51
			iPP	13 20 32.4			Um	iP	05 20 57 C
		Um	iP	13 19 57.3				ePP	05 24 15
			iPP	13 21 26				iSKS	05 31 24
			iS	13 25 49					Mexico (h = 40 km).
		Ka	iP	13 19 20.5					Magn. = 5.9 (Up,Ki).
				Azores Islands (h = 20 km).	"	19	Up	iSn	12 17 38.2
				It is characteristic for			Ki	iPn	12 14 14.1
				Atlantic earthquakes to have				iP <sup>x</sup>	12 14 21.2
				relatively long periods of				iSn	12 14 58.5
				PZ' at our stations, the				iS <sup>x</sup>	12 15 10.5
				periods in this case being					D = 410 km = 3.7°.
				1.5-1.6 sec at all our			Sk	ePn	12 14 52
				stations.				eSn	12 16 02
"	18	Ki	iPn	14 46 03.8			Um	iPn	12 15 01.0
			iSn	14 46 53.5				iPg	12 15 25.9
			iSg	14 47 08.0				iSn	12 16 15.2
		Sk	iPn	14 46 51.8	"	19	Ki		Norwegian Sea (h = 30 km).
			eSn	14 48 19					---
		Um	iSn	14 48 19.4					microns sec
			iSg	14 49 04.7				M	E 0.5 16
				Norwegian Sea, 71°N, 14°E.				M	N 0.5 20
				Origin time = 14 45 00.			Um	iP	19 18 55.1
"	18	Ki	iP	19 18 30.2 C	"	19	Up	iP	19 53 19.0 C
				Alaska (h = 50 km).			Ki	iP	19 52 56.8
"	18	Ki	iP	22 10 06.3			Sk	eP	19 53 24
							Um	iP	19 53 05.8
									Formosa (h = 30 km).

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1964				1964					
Sep.	20	Ka	eP	01 37 32	Sep.	20	Gb	iSg	19 03 04.5
"	20	Up		---	cont.		Um	ePn	19 01 46
				microns sec				iS <sup>x</sup>	19 03 38.6
			M	N 0.4 20				iSg	19 03 58.4
		Ki	ePKP	04 53 17			Ka	ePn	19 01 54
				microns sec				iSn	19 03 19.8
			M	E 0.5 18				iSg	19 04 19.7
			M	N 0.4 18				Off coast of Norway, near	
			M	Z 1.0 20				Ålesund.	
		Easter Island (h = 30 km).			"	21	Up	iPKP	04 41 32.8
								i	04 44 43.7
"	20	Up	iP	14 47 16.3 C				microns sec	
			ipP	14 49 03.1				PKP	Z' 0.1 0.5
			iPP	14 50 21.4			Ki	ePKP	04 41 13
				microns sec				i	04 41 24.3
			P	Z' 0.2 0.7				iSKP	04 43 57.5
			PP	Z' 0.1 1.0				microns sec	
		Ki	iP	14 46 43.9 C				SKP	Z' 0.1 1.0
			ipP	14 48 28.4			Sk	iPKP	04 41 26.4
			iS	14 55 27			Gb	iPKP	04 41 43.3 D
				microns sec			Um	iPKP	04 41 20.8
			P	Z' 0.2 1.0				i	04 41 32.8
			S	N 0.3 8				iSKP	04 44 08.3
		Sk	iP	14 47 13.2 C			Ka	iPKP	04 41 45.1 D
			ipP	14 48 59.6				i(SKP)	04 44 29.1
			iPP	14 50 15.6				Fiji Islands (h = 610 km).	
		Um	iP	14 46 57.5 C				The amplitudes of PKP Z' at	
			i	14 48 36.6				Gb and Ka (just outside the	
			ipP	14 48 43.2				shadow zone) are 15 times the	
			i	14 49 08.1				corresponding amplitudes just	
			iPP	14 49 51.9				inside the shadow zone (Ki,	
		South of Japan.						Um, Sk, Up).	
		h = 480 km (Up, Ki, Sk, Um).							
		Magn. = 5.9 (Up, Ki).							
"	20	Up	iPn	19 01 37.3 C	"	21	Up	iP	05 10 49.5
			i	19 01 45.7			Sk	eP	05 11 28
			i	19 02 47.8			Greece.		
			iSn	19 03 00.9	"	21	Um	iP	05 51 41.6
			iSg	19 03 35.8			Banda Sea (h = 120 km).		
				microns sec	"	21	Ki	iP	08 44 29.3
			Sg	Z' 0.2 0.5			Ceram Sea (h = 40 km).		
			D = 760 km = 6.9°.		"	21	Ki	iPKP	12 20 45.5
		Ki	iPn	19 02 05.8 C			New Hebrides Islands		
			eSn	19 03 41			(h = 30 km).		
			i	19 04 07.3	"	21	Up	iP	14 43 39.6
			iSg	19 04 54.5	"	21	Up	iPKP	18 29 58.3
			D = 990 km = 8.9°.					i	18 30 02.9
		Sk	ePn	19 00 59				microns sec	
			ipg	19 01 17.4				PKP	Z' 0.2 0.5
			iSn	19 01 43.3			Ki	iPKP	18 29 35.6
			iS <sup>x</sup>	19 02 02.9				i	18 29 44.2
			i(Sg)	19 02 18.6					
		Gb	iPn	19 01 20.4					
			iSn	19 02 21.5					

cont.

cont.

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964					1964					
Sep.	21	Sk	iPKP	18 29 51.1	Sep.	23	Ka	i	05 11 19.7	
cont.			ipPKP	18 31 23.3	cont.		Alaska (h = 30 km).			
		Gb	iPKP	18 30 06.0			Magn. = 5.9 (Up,Ki).			
			i	18 30 15.7		"	23	Ki	eP	06 28 47
		Um	iPKP	18 29 46.1			Alaska (h = 15 km).			
		Ka	iPKP	18 30 07.5		"	24	Up	iLgl	12 35 49.7
		Kermadec Islands (h = 320 km).						Sk	eLgl	12 37 47
"	22	Ki	iP	09 17 50.5 C			Gb	iSg	12 34 55.1	
		Gb	iP	09 18 56.8			Ka	iPg	12 33 37.5	
		Um	iP	09 18 10.8 C				iSg	12 33 50.8	
			i(pP)	09 18 21.4				i(Rg)	12 33 58.4	
		Kurile Islands (h = 30 km).						D = 110 km = 1.0°.		
"	22	Um	e	11 47 23			Southern Baltic, 55.3°N,			
			i(Sg)	11 47 32.1			14.7°E. Origin time =			
"	22	Um	i	14 37 11.9			12 33 18. Probably			
			i(Sg)	14 37 30.1			underwater explosion.			
"	22	Um	iP	21 30 20.8			Comparing the Ka Z' record			
"	23	Ki	iP	01 47 41.6 C			<b>for this case with the</b>			
		Cyprus (h = 60 km).					related event on Sep. 10,			
"	23	Up	iP	05 10 37.8 C			17 18, we find these records			
			ipP	05 10 48.1			to be completely different:			
			i	05 10 57			Sep. 10: Pg and Sg are of			
			iS	05 19 38			similar amplitude and there			
							is no Rg; Sep. 24: Pg is			
							very small compared to Sg			
							and Rg has the largest			
							amplitudes in the record.			
							The probable reason for these			
							differences is different			
							source properties. On the			
							other hand, the Ka Z' record			
							for Sep. 24 is quite similar			
							to Ki Z' for Sep. 12, 08 03.			
						"	24	Up	iP	14 11 08.8 C
								Ki	eP	14 10 27
								Sk	eP	14 10 39
									i	14 10 47.5
								Um	iP	14 10 49.5
								Oregon (h = 15 km).		
						"	24	Up	i(Pg)	14 21 52.1
									iSg	14 22 05.2
								Explosion?		
						"	24	Up	iP	14 47 24.7
								Ki	iP	14 46 55.2
								Um	iP	14 47 08.4
								Mariana Islands (h = 150 km).		
		Sk	iP	05 10 13.1 C		"	25	Up	iP	05 32 30.1
		Gb	iP	05 10 51.1			Aleutian Islands (h = 30 km).			
		Um	iP	05 10 11.3 C		"	25	Gb	iPg	12 17 35.3
			iS	05 18 37						
		Ka	iP	05 11 00.4 C						
cont.						cont.				



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1964					1964				
Sep.	27	Up	iP	16 01 24.5 C	Sep.	28	Up	iP	06 58 41.9
			e	16 09 38				ipP	06 59 08.3
			eS	16 09 57					microns sec
				microns sec			P	Z' 0.1 0.5	
			P	N 0.5 5		Ki	iP	06 58 50.0	
			P	Z 0.4 3			ipP	06 59 12.0	
			P	Z' 0.1 1.0				microns sec	
			M	E 0.9 19			M	N 0.4 10	
			M	N 1.6 20			M	Z 0.3 8	
			M	Z 1.4 18		Sk	eP	06 59 06	
			D = 7050 km = 63 1/2°.				ipP	06 59 29.5	
		Ki	iP	16 00 29.9 C			iPP	07 01 23.7	
			eS	16 08 13		Gb	i(sP)	06 59 35.6	
				microns sec		Um	iP	06 58 39.4	
			P	N 0.3 5			ipP	06 59 01.9	
			P	Z 0.5 5			iPP	07 00 38.4	
			P	Z' 0.1 1.0		Ka	iP	06 58 47.1	
			S	E 0.6 11			i(sP)	06 59 17.1	
			S	N 0.4 8				Hindu Kush.	
			M	E 0.8 16				h = 110 km (Up,Ki,Sk,Um).	
			M	N 1.8 21		"	28	Um	iP
			M	Z 2.3 19					11 54 09.2
			D = 6150 km = 55 1/2°.		"	28	Up	iP	16 37 32.8
		Sk	iP	16 00 56.9 C				microns sec	
		Gb	iP	16 01 35.9 C			P	Z' 0.1 0.8	
			ipP	16 01 42.5		Ki	iP	16 36 55.5 C	
		Um	iP	16 00 58.1 C		Sk	eP	16 37 27	
			iS	16 09 04		Um	iP	16 37 11.8 C	
		Ka	iP	16 01 47.2 C				Japan (h = 80 km).	
				Alaska. h = 25 km (Gb).		"	28	Up	iP
				Magn. = 5.7 (Up,Ki).					20 37 59.9
"	28	Up	iP	05 15 57.5	"	29	Um	iP	11 33 46.0
			eS	05 24 59	"				
			eScS	05 26 03	"	29	Um	iP	13 58 50.5
				microns sec	"			Japan (h = 40 km).	
			S	E 0.3 9	"	29	Up		---
			M	E 0.7 18				microns sec	
			M	N 1.2 20			M	N 2.4 20	
			M	Z 1.5 19			M	Z 1.9 20	
			D = 7650 km = 69°.			Ki		---	
		Ki	iP	05 16 39.0				microns sec	
			eS	05 26 21			M	E 1.6 21	
				microns sec			M	N 1.0 20	
			P	Z' 0.3 2.0			M	Z 3.5 21	
			S	E 0.7 9		Um	iPKP	14 19 34.5 C	
			M	E 1.1 20				Tonga Islands (h = 30 km).	
			M	N 1.2 22		"	29	Up	iP
			M	Z 1.0 18					20 45 18.7
			D = 8400 km = 75 1/2°.					Peru-Bolivia (h = 140 km).	
		Sk	eP	05 16 02	"	29	Up	iP	22 36 31.6
			i	05 16 21.4				Crete (h = 30 km).	
		Um	iP	05 16 20.3 C					
			iS	05 25 46					
		Ka	iP	05 15 38.3					
				Atlantic Ocean (h = 40 km).					

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

1964

Sep.	30	Up	iP	04 45 10.4
			iS	04 49 33
				microns sec
			P	Z' 0.1 0.5
			M	E 1.6 17
			M	N 2.9 18
			M	Z 2.2 17
				D = 2850 km = 25 1/2°.
		Ki	iP	04 46 20.0
				microns sec
			P	Z' 0.1 1.0
			M	E 3.0 20
			M	N 1.3 14
			M	Z 1.9 14
		Sk	iP	04 45 50.3 C
		Gb	iP	04 45 01.2
		Um	iP	04 45 50.1
		Ka	iP	04 44 35.8
				Crete (h = 40 km).
				Magn. = 5.5 (Up,Ki).
"	30	Up	iP	05 58 21.0
"	30	Up	iP	06 11 31.9
"	30	Gb	iPg	08 36 59.1
			iSg	08 37 01.3
				D = 20 km = 0.2°.
				Local blast.
"	30	Ki	iP	10 51 04.1
				Sumatra (h = 30 km).
"	30	Up	iP	18 32 24.9
"	30	Um	iP	19 25 11.7
				Japan (h = 80 km).
"	30	Ki	iP	20 36 47.7 C
		Gb	iP	20 37 54.2
		Um	iP	20 37 15.9
				Alaska (h = 15 km).

Markus Båth  
 July 3, 1965



Seismological Institute  
Uppsala

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

U P P S A L A , K I R U N A , S K A L S T U G A N , G Ö T E B O R G ,

U M E Å a n d 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

O C T O B E R 1 - 31, 1964  
.....

1964				1964					
Oct.	1	Up	iPKP	09 17 13.3	Oct.	2	Sk	iPKP	13 19 29.9
							Gb	iPKP	13 19 38.9
							Um	iPKP	13 19 24.4
								i	13 19 36.9
								i	13 20 19
								iPP	13 20 50.7
								eSKSP	13 30 30
							Ka	iPKP	13 19 50.0
								iPP	13 21 36.0
								Solomon Islands (h = 70 km).	
"	2	Up	iP	01 08 44.6 C					
				microns sec					
		P	Z'	0.1 1.0					
		M	E	1.9 13					
		M	N	2.1 13					
		M	Z	2.5 16					
		Ki	iP	01 07 55.3 C					
			ipP	01 08 00.8	"	2	Up	iP	22 33 38.1
				microns sec			Ki	iP	22 32 43.8 C
		P	Z'	0.3 1.5			Sk	iP	22 33 17.4 C
		M	E	5.8 18			Gb	iP	22 33 49.0 C
		M	N	3.3 18			Um	iP	22 33 11.7
		M	Z	2.3 13			Ka	iP	22 34 01.5
		Gb	iP	01 09 08.5					Alaska (h = 20 km).
		Um	iP	01 08 17.6 C					
		Ka	iP	01 09 08.8 C	"	3	Ka	iPKP	02 13 28.6
			ipP	01 09 14.4					Fiji Islands (h = 550 km).
				Sakhalin. h = 20 km (Ki,Sk).					
				Magn. = 5.8 (Up,Ki).	"	3	Up	iP	12 59 29.1
							Ki	iP	12 59 57.1 D
"	2	Up	iPKP	13 19 32.0					
			i	13 19 39.7	"	3	Up	iP	13 49 33.2
			ePP	13 21 15				ipP	13 49 40.4
				microns sec			Ki	iP	13 48 36.3
		M	E	1.4 19				ipP	13 48 44.6
		M	N	3.4 19					microns sec
		M	Z	2.9 18				pP	Z' 0.4 1.5
		Ki	iPKP	13 19 19.4			Sk	iP	13 49 03.1
			eSKSP	13 30 22				ipP	13 49 11.3
				microns sec			Gb	iP	13 49 43.2
		M	E	5.3 21				ipP	13 49 52.4
		M	N	2.7 20			Um	eP	13 49 07
		M	Z	6.3 20				ipP	13 49 13.7

cont.

cont.

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

1964					1964					
Oct.	3	Um	iPcP	13 50 15.5	Oct.	4	Gb	iP	23 01 35.7	
cont.		Ka	iP	13 49 55.5	cont.		Um	iP	23 02 30.9	
			ipP	13 50 04.5			Ka	eP	23 01 14	
		Alaska. h = 30 km (Up,Ki,Sk, Gb,Um,Ka).					Ionian Sea (h = 90 km).			
		The Z' amplitudes of pP are on the average 3.7 times those of P.			"	5	Ka	iP	00 15 20.5	
"	3	Ki	eSg	16 31 12	"	5	Up	iP	03 46 07.9	
		Sk	eSg	16 31 16				iPcP	03 46 32.2	
		Um	eSg	16 31 38					microns sec	
		Probably Nordlands Fylke, Norway, 66 1/2°N, 14 1/2°E. Origin time = 16 29 42.							P	Z' 0.2 0.9
"	3	Up	iPKP	23 00 03.4 C			Ki	iP	03 45 25.4	
		Gb	iPKP	23 00 09.7					microns sec	
		Fiji Islands (h = 220 km).							P	Z' 0.1 0.9
"	4	Up	iP	01 51 11.2			Sk	iP	03 45 59.6	
		Ki	iP	01 52 26.9			Gb	iP	03 46 29.1	
		Sk	iP	01 51 47.6			Um	iP	03 45 43.7 C	
		Gb	iP	01 50 50.9				i	03 46 05.1	
		Um	iP	01 51 50.8 C			Ka	iP	03 46 28.9	
			i	01 51 54.0			Japan (h = 40 km).			
		Ka	iP	01 50 32.0 C			Magn. = 6.0 (Up,Ki).			
			i	01 50 40.2	"	5	Up	i(P)	13 32 25.0	
		Italy (h = 260 km).						i	13 35 29.6	
"	4	Up	iP	07 09 29.0 C	"	5	Gb	e(PKP)	14 18 43	
		Ki	iP	07 09 45.7 C			Ka	iPKP	14 18 30.7	
		Um	eP	07 09 32			Tonga Islands (h = 30 km).			
		India-West Pakistan (h = 15 km).			"	5	Up	iP	20 45 42.5	
"	4	Up	iLgl	13 06 43.9					microns sec	
		Ki	iPn	13 02 02.8					P	Z' 0.1 0.5
			iSn	13 02 51.5	"	5	Up	iP	22 21 45.5	
			iLgl	13 03 06.9				i	22 21 55.4	
			D = 440 km = 4.0°				Sk	eP	22 21 46	
		Um	iLgl	13 04 36.5			Um	iP	22 21 24.0	
		Northwest Russia, 69.5°N, 30.6°E. Origin time = 13 01 00. Explosion?						ipP	22 21 38.3	
								i	22 25 30.5	
							Ka	eP	22 21 59	
							Japan (h = 60 km).			
"	4	Up	iP	13 48 57.0	"	6	Up	iP	01 47 49.5	
							Sk	iP	01 47 22.9	
"	4	Up	iP	16 52 45.5				i	01 47 31.6	
							Alaska (h = 30 km).			
"	4	Up	iP	21 06 12.7 C	"	6	Um	iP	02 32 27.0	
							Mexico (h = 130 km).			
"	4	Up	iP	23 01 52.6	"	6	Up	iP	06 23 38.3	
		Sk	eP	23 02 33				ipP	06 23 46.3	
								isP	06 23 50.1	
									microns sec	
							M	E	1.1 15	
cont.					cont.					

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

1964					1964				
Oct.	6	Up	microns sec		Oct.	6	Sk	iP	14 35 22.8
cont.		M	N 0.8 14		cont.		Gb	iP	14 34 34.2 C
		M	Z 1.9 15				Um	iP	14 35 12.2 D
		Ki	---				Ka	iP	14 34 05.7 C
			microns sec				Turkey (h = 10 km).		
		M	E 2.9 13				Magn. = 5.4 (Up, Ki).		
		M	N 0.9 13		"	6	Up	iP	14 36 00.2 D
		M	Z 2.9 13					iS	14 39 43
		Sk	eP 06 23 47						microns sec
		Um	iP 06 23 26.2 C				P	E 11 9	
			ipP 06 23 36.1				P	N 49 10	
			iS 06 33 16				P	Z 61 14	
			iSS 06 38 25				P	Z' 1.1 0.8	
		Ka	iP 06 23 50.5				S	E 52 14	
		Philippine Islands.					S	N 70 14	
		h = 40 km (Up, Um).					S	Z 32 13	
		The Um long-period E and Z					M	E 280 15	
		components exhibit a very					M	N 310 15	
		pronounced Airy phase.					M	Z 390 15	
"	6	Up	iSg 07 30 15.1				D = 2300 km = 20 1/2°.		
		Sk	eSn 07 30 49			Ki	iP	14 37 11.4 D	
			iSg 07 31 09.0				iS	14 42 02	
		Um	iSg 07 30 21.0				i	14 42 27	
		Probably Central Baltic.							microns sec
"	6	Ki	---				P	E 2.7 15	
			microns sec				P	N 14 14	
		M	E 1.4 19				P	Z 17 12	
		M	N 0.8 19				P	Z' 1.2 1.0	
		M	Z 1.1 17				S	E 63 17	
		Um	e(PKP) 07 37 06				S	N 160 19	
			iPKP 07 37 16.6				M	E 250 16	
			i 07 41 37				M	N 160 14	
			eSS 07 57 45				M	Z 270 14	
		Ka	iPKP 07 37 11.3				D = 3100 km = 28°.		
		Easter Island Rise				Sk	iP	14 36 45.6	
		(h = 30 km).					i	14 36 54.3	
"	6	Ka	iP 11 45 31.9			Gb	iP	14 35 57.2	
"	6	Up	iPg 11 51 34.3 D				i	14 36 05.0	
			iSg 11 51 50.1			Um	iP	14 36 34.8 D	
			iL 11 51 58.5				iS	14 40 42	
		Probably Baltic underwater				Ka	iP	14 35 26.6	
		explosion.				Turkey (h = 10 km).			
						Magn. = 6.9 (Up, Ki).			
						PZ' is complicated with a			
						succession of onsets with			
						gradually increasing amplitudes.			
"	6	Up	iP 13 12 16.4		"	6	Um	eP	15 27 00
		Ka	eP 13 12 22		"	6	Up	iP	18 28 22.4
"	6	Up	iP 14 34 37.1					iS	18 30 59.2
			microns sec					iSS	18 31 28.6
		P	Z' 0.1 0.6						microns sec
		Ki	iP 14 35 48.5				M	E 0.8 17	
			microns sec				M	N 1.5 19	
		P	Z' 0.1 1.3		cont.				

Up = Uppsala, Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964						1964				
Oct.	6	Up		microns sec		Oct.	7	Um	i	23 13 37.3
cont.			M	Z 1.5 19		cont.			eS	23 17 26
				D = 1600 km = 14 1/2°.						Turkey (h = 30 km).
		Ki	iP	18 27 15.2 C		"	8	Ki	e(Sg)	05 38 58
			iS	18 29 12.8		"	8	Um	iP	17 03 51.2 D
			eT	18 35 01						Aleutian Islands (h = 30 km).
				microns sec		"	8	Up	iP	20 48 43.6
			P	Z' 0.2 0.6		"	8	Up	iP	21 37 04.5
			M	E 1.2 18		"	9	Up	iP	12 54 17.9
			M	N 1.1 16				Ki	iP	12 53 46.8 D
			M	Z 1.4 17				Sk	iP	12 54 14.8
				D = 1100 km = 10°.				Gb	iP	12 54 36.2
		Sk	iP	18 27 19.9						Bonin Islands (h = 520 km).
			i	18 27 33.8		"	9	Ki	iP	15 06 31.7 C
			iS	18 29 08.2						Alaska (h = 30 km).
			i	18 29 15.2		"	9	Up	iP	19 38 55.9
		Gb	eP	18 28 33				Ki	iP	19 38 59.8
		Um	eP	18 27 44						microns sec
			i	18 27 49.6						Z' 0.1 0.9
			iS	18 29 59.1				Sk	iP	19 38 43.6 D
			i(Li)	18 30 27.7				Um	iP	19 38 58.3
		Ka	iP	18 28 59.1						Colombia (h = 160 km).
			i	18 33 02.1		"	9	Up	iP	20 06 03.3
				Jan Mayen (h = 30 km).				Ki	iP	20 05 09.5
"	6	Ki	iPKP	19 31 08.7 C						20 05 16.2
		Sk	iPKP	19 31 20.4				Sk	iP	20 05 35.7
		Um	iPKP	19 31 15.7				Gb	iP	20 06 15.3 C
				New Hebrides Islands				Um	iP	20 05 36.1 C
				(h = 20 km).		"	9			Alaska (h = 15 km).
"	6	Up	iP	20 28 41.0 C				Up	iP	20 41 12.6
		Ki	iP	20 28 44.0 C						microns sec
				microns sec						Z' 0.1 0.5
			M	N 0.8 20		"	9	Ki	iPg	22 34 19.7 C
		Sk	iP	20 29 02.4 C				Um	eLgl	22 36 24
		Gb	iP	20 29 01.0						Probably blast in Kiruna ore
		Um	iP	20 28 37.0 C						mines.
		Ka	iP	20 28 46.6 C		"	10	Up	iP	04 57 02.9
			i	20 29 01.0				Sk	iP	04 57 20.6
				Nepal-India (h = 25 km).				Gb	iP	04 57 25.0
"	7	Um	iP	02 05 21.8						Tibet (h = 20 km).
"	7	Up	iP	05 52 31.3		"	10	Up	iP	19 48 47.0
"	7	Ka	iP	14 45 52.1 C				Ki	iP	19 47 51.6 C
"	7	Up	iP	23 12 31.6						microns sec
			i	23 12 38.7						Z' 0.1 1.0
		Ki		---		cont.				
				microns sec						
			M	E 0.6 14						
		Sk	eP	23 13 14						
		Um	iP	23 13 10.3						
			i	23 13 21.9						

cont.

cont.





Up = Uppsala, Ki = Kiruna, Sk = Skalistugan, Gb = Göteborg, Um = Umeå  
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1964					1964				
Oct.	14	Ki	eP	03 16 08	Oct.	15	Um	iPKP	11 23 59.5
cont.			eS	03 25 16				Kermadec Islands	
				microns sec				(h = 480 km).	
			P	Z' 0.1 1.5		"	15	Up	iP
			S	E 1.0 12					11 55 00.8
			S	N 0.4 9		"	15	Up	iP
			M	E 2.6 20				eS	20 37 52.2 C
			M	N 1.7 18					20 46 47
			M	Z 3.6 16					microns sec
			D = 7700 km = 69 1/2°.					P	Z' 0.2 1.0
		Sk	eP	03 16 43				S	E 1.7 15
		Um	iP	03 16 27.3				S	N 1.6 16
			iS	03 25 48				M	E 8.0 20
			iSS	03 30 28				M	N 18 19
			iSSS	03 34 06				M	Z 16 18
			Japan (h = 30 km).					D = 7550 km = 68°.	
			Magn. = 5.7 (Up,Ki).			Ki	iP	20 37 06.2 C	
"	14	Ki	eP	03 29 37			iS	20 45 23	
			i	03 31 25.8			iScS	20 46 56	
"	14	Gb	iP	05 13 00.1				microns sec	
"	14	Up	iSg	12 55 06.9			P	N 0.4 7	
		Ki	eLgl	12 58 16			P	Z 1.3 9	
		Sk	iSg	12 55 39.2			P	Z' 0.1 1.0	
		Gb	iPg	12 53 30.5			S	E 2.7 15	
			iSg	12 53 49.5			S	N 0.9 12	
			D = 160 km = 1.4°.				M	E 15 18	
			Oslo Fjord, 59.1°N, 10.7°E.				M	N 13 20	
			Origin time = 12 53 04.				M	Z 16 18	
"	14	Up	iP	17 35 11.0			D = 6800 km = 61°.		
			iS	17 42 42			Sk	iP	20 37 43.5
			microns sec				Gb	iP	20 38 13.7 C
			M	N 0.9 18			Um	iP	20 37 27.6 C
			M	Z 1.1 18				iS	20 46 09
		Ki	iP	17 35 49.9				iSS	20 50 36
			eS	17 43 48			Ka	iP	20 38 14.6 C
			microns sec				Kurile Islands (h = 50 km).		
			S	E 0.4 10			Magn. = 6.1 (Up,Ki).		
			S	N 0.3 10		"	15	Up	iP
			M	E 1.4 19				ipP	20 46 47.8
			M	N 1.2 19				Ki	eP
			M	Z 1.9 20				Ka	iP
		Sk	eP	17 35 46				Kurile Islands.	
		Um	iS	17 43 01				h = 60 km (Up).	
			iSS	17 47 16		"	15	Up	iP
			Arabian Sea.					Um	iP
			Magn. = 5.4 (Up,Ki).					Costa Rica (h = 40 km).	
"	14	Up	iP	20 49 03.9		"	15	Up	iP
		Ki	iP	20 49 40.4 D				ipP	22 51 47.8
			Arabian Sea (h = 10 km).					Ki	eP
"	15	Ki	i(P)	02 22 51.5					22 50 48
									microns sec
								M	E 0.9 18
								M	N 0.6 18
								M	Z 1.6 20

cont.

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

1964  
 Oct. 15 Um iP 22 51 06.9  
 cont. Kurile Islands.  
 h = 60 km (Up).  
 " 15 Up iP 23 10 11.0  
 Ki iP 23 09 16.6  
 Sk iP 23 09 43.8  
 ipP 23 09 50.3  
 Gb iP 23 10 26.1  
 i 23 10 29.3  
 Um eP 23 09 46  
 Ka eP 23 10 37  
 Alaska (h = 30 km).  
 " 15 Up iP 23 19 51.7 C  
 Ki iP 23 18 57.5 C  
 Sk iP 23 19 24.2 C  
 Gb iP 23 20 03.4 C  
 ipP 23 20 10.1  
 Um iP 23 19 25.8  
 Ka iP 23 20 13.8  
 Alaska (h = 30 km).  
 " 15 Um iP 23 57 34.4 C  
 " 16 Up iP 01 47 45.5  
 Kurile Islands (h = 40 km).  
 " 16 Ki eP 04 15 59  
 Alaska (h = 30 km).  
 " 16 Up iP 06 34 36.3  
 microns sec  
 PKP Z' 0.1 0.6  
 Ki iP 06 34 20.0  
 Sk iP 06 34 31.8  
 Gb iP 06 34 46.4  
 Um iP 06 34 25.3  
 Ka iP 06 34 48.9 C  
 South of Fiji Islands  
 (h = 180 km).  
 " 16 Up iP 07 10 39.9  
 i 07 10 41.1  
 iS 07 19 39  
 microns sec  
 P N 1.6 8  
 P Z 2.5 8  
 P Z' 0.6 1.0  
 S E 4.5 15  
 S N 4.7 12  
 M E 28 19  
 M N 42 18  
 M Z 41 18  
 D = 7600 km = 68 1/2°.

cont.

1964  
 Oct. 16 Ki iP 07 09 54.1 C  
 cont. i 07 09 59.3  
 eS 07 18 12  
 iScS 07 19 48  
 microns sec  
 P E 0.9 8  
 P N 1.1 8  
 P Z 3.6 8  
 P Z' 0.2 1.0  
 S E 8.2 13  
 S N 3.6 12  
 M E 50 18  
 M N 39 18  
 M Z 50 17  
 D = 6850 km = 61 1/2°.  
 Sk iP 07 10 31.5  
 Gb iP 07 11 02.2  
 Um iP 07 10 15.7 C  
 i 07 18 27  
 iS 07 18 46  
 Ka iP 07 11 02.9  
 Kurile Islands (h = 30 km).  
 Magn. = 6.6 (Up,Ki).  
 " 16 Um iP 07 19 13.8 C  
 Sandwich Islands (h = 30 km).  
 " 16 Up iP 07 28 08.1  
 ipP 07 28 20.7  
 Um iP 07 27 44.8  
 Kurile Islands.  
 h = 50 km (Up).  
 " 16 Up iP 07 32 46.1 D  
 ipP 07 33 00.0  
 microns sec  
 P Z' 0.2 0.8  
 Ki iP 07 32 00.7  
 Sk eP 07 32 37  
 Gb iP 07 33 07.2  
 Um eP 07 32 19  
 i 07 32 20.8  
 Ka iP 07 33 07.9  
 Kurile Islands.  
 h = 60 km (Up).  
 " 16 Up iP 07 35 25.7  
 " 16 Up iP 07 35 50.3 C  
 Gb eP 07 36 11  
 Sakhalin (h = 30 km).  
 " 16 Up iP 07 39 29.0  
 Ki iP 07 38 42.0  
 Sk eP 07 39 19

cont.



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1964					1964				
Oct.	16	Gb	iP	07 39 50.6	Oct.	16	Two remarks about the present earthquake sequence in the Kurile Islands:		
cont.		Um	eP	07 39 04	cont.		1) This is a typical earthquake <u>swarm</u> with no pronounced main shock.		
		Kurile Islands (h = 50 km).					2) The focal depths are around 50-60 km in every case we have been able to determine it, and possibly the whole swarm is located in that depth range.		
"	16	Up	iP	07 48 20.1					
				microns sec					
			P	Z' 0.1 0.9					
		Ki	iP	07 47 36.4					
		Gb	iP	07 48 43.0					
		Um	iP	07 48 02.5					
		Ka	iP	07 48 42.5					
		Kurile Islands (h = 30 km).			"	16	Up	iP	08 40 46.1
"	16	Up	iP	08 02 38.9	"	16	Up	iP	08 44 31.8
		Kurile Islands (h = 30 km).						ipP	08 44 45.5
								microns sec	
			P	Z' 0.1 0.5					
"	16	Up	iP	08 29 28.9 C			Ki	eP	08 43 47
			eS	08 38 19			Sk	eP	08 44 22
			iScS	08 39 38			Gb	iP	08 44 54.2
				microns sec			Um	iP	08 44 06.5
			P	Z 0.8 5			Ka	iP	08 44 55.1 D
			P	Z' 0.5 0.8			Kurile Islands.		
			S	E 2.6 13			h = 50 km (Up).		
			S	N 2.2 14					
			M	E 10 19	"	16	Up	iP	08 45 50.0 C
			M	N 23 19			Ki	eP	08 45 03
			M	Z 19 18			Gb	iP	08 46 10.8
			D = 7600 km = 68 1/2°.				Um	iP	08 45 27.1
		Ki	iP	08 28 43.2 C			Kurile Islands (h = 30 km).		
			iScS	08 38 35	"	16	Ki	iP	08 47 42.4
				microns sec			Kurile Islands (h = 30 km).		
			P	Z 1.5 8					
			P	Z' 0.1 0.9	"	16	Up	iP	08 58 26.5
			M	E 21 18			Um	iP	08 58 01.4
			M	N 16 20			Kurile Islands (h = 30 km).		
			M	Z 23 18					
		Sk	iP	08 29 18.8 C	"	16	Up	iP	09 09 52.3
		Gb	iP	08 29 50.2	"	16	Up	iP	09 29 18.6 C
		Um	iP	08 29 03.4				eS	09 38 26
		Ka	iP	08 29 50.8				microns sec	
		Kurile Islands (h = 30 km).						P	Z' 0.3 0.7
		Magn. = 6.3 (Up,Ki).						S	E 2.1 14
"	16	Up	iP	08 34 01.2				S	N 4.1 17
			i	08 34 06.8				M	E 12 19
			ipP	08 34 14.0				M	N 19 18
				microns sec				M	Z 15 18
			P	Z' 0.2 0.7			Ki	iP	09 28 33.0 C
		Ki	iP	08 33 15.1				ipP	09 28 45.2
		Gb	iP	08 34 22.0 C				microns sec	
		Um	iP	08 33 35.7				P	Z' 0.1 1.0
		Ka	iP	08 34 23.3				M	E 22 18
		Kurile Islands.						M	N 16 20
		h = 50 km (Up).						M	Z 25 17
cont.					cont.				



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

1964					1964				
Oct.	16	Sk	eSg	17 25 11	Oct.	17	Up	iP	02 10 09.7
cont.		Um	eSg	17 23 53			Ki	eP	02 09 13
				Northwest Russia, 68.9°N,					microns sec
				29.1°E. Origin time =				M	E 0.9 22
				17 20 32. Explosion?				M	N 0.6 19
								M	Z 1.3 20
"	16	Ki	iP	19 16 52.6			Sk	iP	02 09 40.7 C
			iS	19 18 42.5			Gb	i(P)	02 10 27.3
				D = 1100 km = 10°			Um	iP	02 09 43.4
		Um	iP	19 17 47.2			Ka	iP	02 10 32.7
			i(S)	19 20 30.5					Alaska (h = 30 km).
				Svalbard. Origin time =					
				19 14 35.	"	17	Um	iP	02 40 15.4
				Solution obtained by					South of Japan (h = 20 km).
				combination with Norwegian					
				and Finnish data.	"	17	Up	iP	02 52 31.5
"	16	Up	iP	20 44 09.8	"	17	Up	eP	03 30 45
				microns sec			Ki	iP	03 30 33.9 C
			P	Z' 0.1 0.6				ipP	03 30 41.5
"	16	Up	i(P)	21 41 42.7					microns sec
								P	Z' 0.2 1.1
"	16	Um	iP	23 53 24.5			Sk	iP	03 30 52.9
				Kurile Islands (h = 30 km).			Gb	iP	03 31 00.6 C
"	17	Up	iP	01 11 17.4				ipP	03 31 08.7
			i	01 12 06.1			Um	iP	03 30 36.8 C
		Ki	iP	01 10 40.0			Ka	iP	03 30 53.8
		Sk	eP	01 11 12	"	17	Up	iP	08 33 26.3
		Um	iP	01 10 55.1	"	17	Up	iP	09 55 53.0
			ipP	01 11 17.0				iPP	09 56 27.6
				South of Japan.				eS	10 00 25
				h = 90 km (Um).					microns sec
"	17	Up	iP	01 51 01.5			M	E	1.6 11
"	17	Up	iPKP	01 57 28.7			M	N	1.4 12
		Ki	ePKP	01 57 06			M	Z	1.4 11
			i	01 57 19.2					D = 2800 km = 25°
		Sk	ePKP	01 57 18			Ki	iP	09 57 00.7
			i	01 57 28.5					microns sec
		Gb	iPKP	01 57 25.6			P	Z'	0.1 1.0
		Um	iPKP	01 57 10.7			M	E	4.7 17
			i	01 57 22.3			M	N	1.6 11
		Ka	iPKP	01 57 23.9			M	Z	2.3 11
			i	01 57 36.0			Sk	iP	09 56 31.7
				Solomon Islands (h = 60 km).			Gb	eP	09 55 44
				The amplitude of the second			Um	iP	09 56 25.3
				phase is larger, but it is not				i	09 56 34.2
				certain whether this is pPKP				i(S)	10 01 33
				or a multiple PKP.			Ka	iP	09 55 23.3
"	17	Um	iP	02 07 53.8				iPP	09 55 50.3
								eS	09 59 23
									Crete (h = 30 km).

Up = Uppsala. Ki = Kiruna, Sk = Skalstugan, Gb = Göteborg, Um = Umeå  
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1964				1964					
Oct.	17	Up	iP	10 25 03.7	Oct.	18	Gb	i	09 17 40.3
				Kurile Islands (h = 30 km).				iPP	09 19 54.9
"	17	Up	iP	12 19 02.6			Um	i	09 20 08.8
		Ki	iP	12 18 23.9				iP	09 17 29.6
		Sk	iP	12 18 56.9				ipP	09 17 35.1
		Um	iP	12 18 41.0 C				i	09 17 41.0
				Japan (h = 50 km).			Ka	iS	09 26 34
"	17	Ki	eP	14 57 49				iP	09 17 18.3
		Sk	eP	14 57 18 C				ePP	09 19 49
				North Atlantic Ocean					Indian Ocean. h = 25 km
				(h = 30 km).					(Up,Ki,Sk,Gb,Um).
"	17	Um	iP	15 15 06.0					The Z' records are characterized
				Banda Sea (h = 120 km).					by three clear phases: P is
"	18	Up	iP	06 27 37.9 C					followed by a phase after 6.2
		Ki		---					sec (interpreted as pP) and
				microns sec					another after 11.6 sec. Other
		M	E	0.5 13					interpretations are possible,
		M	N	0.3 12					e.g. that the first two phases
		M	Z	0.6 16					represent P of two different
		Um	iP	06 27 13.0					shocks.
			eSS	06 40 22					
				Kurile Islands (h = 30 km).					
"	18	Up	iP	09 17 20.1					
			i	09 17 21.2					
			ipP	09 17 26.9					
			i	09 17 31.9					
			eS	09 26 13					
				microns sec					
		pP	Z'	0.6 1.6					
		S	E	0.5 10					
		M	E	1.0 18					
		M	N	1.0 17					
		M	Z	1.5 19					
				D = 7500 km = 67 1/2°.					
		Ki	iP	09 17 45.5					
			ipP	09 17 51.3					
			i	09 17 57.2					
			iS	09 27 07					
				microns sec					
		P	Z	0.6 5					
		pP	Z'	0.6 1.9					
		S	E	0.7 9					
		M	E	2.9 21					
		M	N	1.7 20					
		M	Z	4.7 22					
				D = 7950 km = 71 1/2°.					
		Sk	eP	09 17 46					
			ipP	09 17 52.5					
			i	09 17 57.4					
		Gb	iP	09 17 28.5					
			ipP	09 17 34.7					

cont.

cont.

Up = Uppsala, Ki = Kiruna, Sk = Skalistugan, Gb = Göteborg, Um = Umeå  
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1964				1964			
Oct.	18	Ki	microns sec	Oct.	18	Up	eP 22 42 57
cont.			S E 4.3 6			Ki	iP 22 43 36.2
			S N 3.5 8			Sk	iP 22 43 32.1
			PKKP Z' 0.2 1.1			Um	eP 22 43 16
			M E 7.7 18			Iran (h = 40 km).	
			M N 3.6 19	"	19	Ki	iP 00 05 40.1
			M Z 11 18			Sunda Strait (h = 80 km).	
			(D = 11200 km = 101°).	"	19	Um	iP 02 28 29.7
		Sk	iP 12 45 35.4	"	19	Gb	e 13 29 25
			iPKP 12 49 43.3			Ka	e(P) 13 27 41
			ipPP 12 52 00.2			i	13 28 24.7
			iPKKP 13 01 07.4			Indistinct record; probably near source.	
			i 13 01 29.3	"	19	Ki	iP 16 38 57.7
		Gb	iP 12 45 42.8			Alaska (h = 50 km).	
			i 12 45 44.1	"	19	Up	iP 20 30 43.8
			ipP 12 47 56.4	"	19	Up	iP 21 49 32.3
			isP 12 48 59.4			Ka	iP 21 49 53.7
			iPKP 12 49 47.2			Kurile Islands (h = 30 km).	
			ipP 12 50 22.1	"	20	Ka	iP 15 28 23.1
		Um	iP 12 45 18.2 D	"	20	Um	iP 23 15 47.6
			ipP 12 47 24	"	21	Up	iSg 06 39 23.8
			iX 12 47 33.1			Ki	iPn 06 35 04.2
			ipP 12 49 30.4			iPg	06 35 18.4
			ipPP 12 51 18			iSn	06 35 59.9
			isPP 12 52 24			iSg	06 36 17.3
			isKS 12 54 54			D = 460 km = 4.1°.	
			iS 12 55 58			Sk	iPn 06 36 10.6
			iSP 12 57 49			iSn	06 37 53.4
			ePKKP 13 01 17			iSg	06 38 50.2
		Ka	iP 12 45 36.9			D = 980 km = 8.8°.	
			ipP 12 47 48.6			Um	iPn 06 35 31.2
			isP 12 48 54.4			iSn	06 36 45.0
			i(PKKP) 13 01 28.8			iSg	06 37 32.0
			Banda Sea. h = 590 km (Up,Ki, Gb,Um,Ka).			D = 690 km = 6.2°.	
			Magn. = 7.0 (Up,Ki).			Northwest Russia, 68.0°N, 31.4°E. Origin time = 06 33 59.	
"	18	Up	iP 13 27 31.4			Explosion?	
		Ki	iP 13 28 09.6			This is probably the strongest event we have ever had in this whole series.	
			ePP 13 29 42	"	21	Up	iP 07 49 27.0
		Sk	eP 13 28 07			microns sec	
		Um	iP 13 27 46.8			M	E 0.8 18
			Iran (h = 30 km).			M	N 1.5 19
"	18	Up	iP 15 01 37.4			M	Z 1.7 18
"	18	Up	iP 21 33 05.2			cont.	
		Ki	iP 21 33 39.6				
		Sk	eP 21 33 38				
			i 21 33 41.6				
		Gb	iP 21 33 17.3				
		Um	iP 21 33 17.9				
		Ka	iP 21 33 00.3				
			Iran (h = 60 km).				

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1964					1964				
Oct.	21	Ki	iP	07 48 50.4	Oct.	21	The long-period E and Z components show a very pronounced Airy phase of the fundamental-mode Rayleigh waves. Well developed higher-mode surface waves.		
cont.				microns sec	cont.				
			M	E 1.5 16					
			M	N 1.1 18					
			M	Z 1.8 15					
			Hebgen Lake, USA (h = 30 km).						
			Magn. = 5.4 (Up,Ki).						
"	21	Sk	eP	14 42 46	"	22	Up	eP	01 52 20
		Gb	iP	14 43 25.5	"	22	Ki	iP	03 12 39.4
		Um	iP	14 42 47.5			Um	iP	03 12 57.2
		Alaska (h = 30 km).					Sea of Japan (h = 30 km).		
"	21	Ki	iP	17 31 13.4	"	22	Up	iP	10 06 03.5
		Ka	iP	17 31 09.8				ipP	10 06 16.6
		Hindu Kush (h = 180 km).					Ki	iP	10 05 25.1
"	21	Up	iP	23 19 18.0 C			Sk	eP	10 05 57
			ipP	23 19 35			Um	iP	10 05 41.9 C
			iS	23 27 22				ipP	10 05 54.3
			iLi	23 38 26			Ka	iP	10 06 23.0
			microns sec				Japan. h = 50 km (Up,Um).		
			P	Z' 0.3 0.7	"	22	Up	iSn	10 27 57.7
			S	E 2.4 10				iSg	10 28 30.1
			S	N 7.2 13				D = 640 km = 5.8°.	
			M	E 110 18			Ki	eSn	10 28 23
			M	N 37 22				iS*	10 28 49.4
			M	Z 180 19				iSg	10 29 05.2
			D = 6550 km = 59°.				Sk	iPn	10 27 13.9
		Ki	iP	23 19 09.2 C				i(Sn)	10 28 51.0
			ePa	23 22 40				iSg	10 29 32.9
			iS	23 27 10			Um	ePn	10 26 32
			iLi	23 37 31				iSn	10 27 28.2
			iLgl	23 39 43				iSg	10 27 47.3
			microns sec					D = 500 km = 4.5°.	
			P	E 2.2 9			Eastern Finland, 61 3/4°N, 28 3/4°E. Origin time = 10 25 21. Explosion?		
			P	Z 5.0 9	"	22	Up	iP	12 50 14.7 C
			P	Z' 2.6 2.0			Volcano Islands (h = 90 km).		
			S	E 9.4 11	"	22	Up	iP	16 11 19.3
			S	N 4.7 12			Ki	iP	16 11 07.3
			S	Z 6.2 10			Mississippi, USA. Underground nuclear explosion ("Salmon event").		
			M	E 130 16					
			M	N 40 12					
			M	Z 150 15					
			D = 6450 km = 58°.						
		Sk	iP	23 19 33.8 C					
			ipP	23 19 50.2					
		Gb	iP	23 19 40.0					
			ipP	23 19 56.2					
		Um	iP	23 19 09.5 C					
			ipP	23 19 25.7					
			iPP	23 21 15					
			iS	23 27 04					
		Ka	iP	23 19 27.7 C					
		India-China. h = 70 km (Up,Sk, Gb,Um).							
		Magn. = 6.9 (Up,Ki).							
cont.					cont.				
						23	Up	iP	02 06 41.6
								ipP	02 06 48.8
								eX	02 15 05
								iS	02 15 20
								isS	02 15 32
								iScS	02 16 45



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1964					1964				
Oct.	25	Ki		microns sec	Oct.	26	Up	iP	11 17 47.4
cont.			P	Z' 0.1 1.0	"	26	Um	iP	12 18 12.2
			S	Z' 0.3 1.0	"	26	Ki	eP	14 36 10
			D = 1350 km = 12°.		"	26	Molucca Passage (h = 50 km).		
		Sk	iP	08 04 05.6	"	26	Up	iP	14 43 18.9
			iS	08 07 16.4			Ki	iP	14 42 23.9
		Gb	iP	08 05 02.9			Sk	iP	14 42 51.7
		Um	iP	08 03 34.0			Gb	iP	14 43 30.0
			i	08 03 42.9			Um	iP	14 42 51.5
			i	08 07 14.3			Alaska (h = 30 km).		
		Ka	iP	08 05 06.4	"	26	Um	iPg	15 15 25.1
			iSS	08 09 55.0				iSn	15 15 45.9
			i(SSS)	08 10 26.4				iSg	15 15 51.5
		Novaya Zemlya. Explosion.						D = 230 km = 2.1°.	
		There is a general similarity						Origin time = 15 14 43.	
		between these records and			"	26	Up	iP	15 25 24.1 C
		those we obtained for the						ipP	15 25 28.4
		underwater explosion at						microns sec	
		Novaya Zemlya on Oct. 23,						P	Z' 0.1 0.6
		1961, at 10 30 48.					Ki	iP	15 25 03.2
"	25	Up	iPKP	12 27 05.1				ipP	15 25 09.9
			iSKP	12 29 50.9			Sk	iP	15 25 34.7
			microns sec				Um	iP	15 25 07.5 C
			SKP	Z' 0.1 1.0				ipP	15 25 12.9
		Ki	iPKP	12 26 58.1			Ka	eP	15 25 36
			iSKP	12 29 28.8			Sinkiang, China.		
			microns sec				h = 20 km (Up,Ki,Um).		
			SKP	Z' 0.2 1.2	"	26	Up	iP	20 19 33.9
		Gb	iPKP	12 27 15.7 D			Ryukyu Islands (h = 30 km).		
			iSKP	12 29 59.9	"	26	Up	iP	21 30 52.5
		Um	i(PKP)	12 26 53.1	"	27	Up	iP	02 52 27.2
			iPKP	12 26 59.7			Ki	iP	02 52 07.5
			i	12 27 05.6			Luzon (h = 60 km).		
			iSKP	12 29 39.9	"	27	Um	iPg	15 20 41.4
		Ka	iPKP	12 27 17.9 D				iSg	15 20 59.9
			iSKP	12 30 00.4				D = 160 km = 1.4°.	
		Fiji Islands (h = 530 km).						Origin time = 15 20 14.	
"	25	Up	iP	23 03 34.6	"	27	Up	iP	19 49 03.9 C
			ipP	23 03 42.4				iS	19 51 19.1
			iPP	23 04 59.0				iSS	19 51 43.7
		Ki	iP	23 03 41.8				i(Lgl)	19 52 16
			iPP	23 05 11.6				iLgl	19 52 32
		Sk	eP	23 04 03				iLg2	19 52 48
			i	23 05 13.5				microns sec	
			ePP	23 05 37			P	Z' 0.1 0.6	
		Um	iP	23 03 30.8			M	E 1.4 6	
			i(PP)	23 05 13.6					
		Ka	iP	23 03 40.0					
			ipP	23 03 50.5					
		Afghanistan-USSR.							
		h = 40 km (Up,Ka).							
"	26	Um	iP	03 30 05.1					

cont.



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1964					1964				
Oct.	27	Up		microns sec	Oct.	28	Um	iP	08 39 44.3 D
cont.			M	N 2.8 7				iSg	08 40 08.5
			M	Z 2.2 7		"	28	Um	e(P)
				D = 1350 km = 12°.				iSg	08 47 17
		Ki	iP	19 50 46.6					08 47 30.3
			iS	19 54 44.8		"	28	Ka	iP
			iLg1	19 56 56					16 54 55.6
			iLg2	19 57 30		"	28	Up	iP
				microns sec				Gb	eP
			P	Z' 0.2 1.7				Kurile Islands (h = 20 km).	
			M	E 7.0 10		"	28	Up	iP
			M	N 2.8 9					19 42 51.0
			M	Z 1.5 9				i	19 42 52.6
				D = 2200 km = 20°.				iPP	19 44 28.5
		Sk	iP	19 49 54.5 C					microns sec
			iS	19 53 05.4				P	Z' 0.1 0.5
			iLg2	19 54 49.1			Ki	iP	19 42 54.5
		Gb	iP	19 48 39.3			Sk	iP	19 43 17.2
			eS	19 50 37				ePP	19 45 02
			iLg1	19 51 40.3			Gb	iP	19 43 11.0
		Um	iP	19 49 56.3			Um	iP	19 42 48.7
			iS	19 53 08.0				i	19 43 01.9
			iSS	19 53 17			Ka	iP	19 42 55.6
			e	19 53 43				i	19 43 33.9
			iLg1	19 54 47			Hindu Kush (h = 130 km).		
			iLg2	19 54 58.6		"	28	Gb	i(P)
		Ka	iP	19 48 12.8				Ka	i(P)
			i	19 48 15.6					23 03 44.4
			i(S)	19 49 28.1		"	29	Um	iP
			iLg2	19 50 51.8				Aleutian Islands (h = 30 km).	
		Austria (h = 40 km).				"	29	Up	iP
"	27	Up	iPKP	20 19 57.0		"	29	Up	iP
		Ka	i(PKP)	20 20 15.2				Ki	---
		Kermadec Islands (h = 170 km).							microns sec
"	27	Up		---				M	E 0.8 14
				microns sec			Sk	iP	04 40 40.4
			M	E 1.4 18			Um	iP	04 40 45.8
			M	N 2.8 20			Yugoslavia (h = 30 km).		
			M	Z 3.0 19		"	29	Um	iPKP
		Ki	iPKP	21 43 38.3				New Hebrides Islands	
				microns sec				(h = 40 km).	
			M	E 3.3 21		"	29	Up	iP
			M	N 1.1 18				Ki	iP
			M	Z 3.9 22				Sk	iP
		Um	iPKP	21 43 28.3				Um	iP
			eSS	22 02 06				Burma (h = 170 km).	
		Indian Ocean (h = 30 km).				"	29	Um	iP
		Magn. = 6.2 (Up,Ki).						North Atlantic Ocean	
"	28	Up	iP	05 53 33.4				(h = 30 km).	
"	28	Um	e(P)	08 37 11					
			iSg	08 37 21.1					

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1964

Oct.	29	Gb	iPg	15 25 40.1
			iSg	15 25 42.0
				D = 16 km = 0.14°.
			Blast?	
"	29	Sk	eP	16 18 36
"	30	Um	eSS	02 50 55
			Easter Island (h = 30 km).	
"	30	Up	iP	03 05 54.5
			Indian Ocean (h = 30 km).	
"	30	Gb	iPg	15 10 40.3
			iSg	15 10 42.1
				D = 16 km = 0.14°.
			Blast?	
"	30	Up	iP	17 23 43.4 C
				microns sec
			P	Z' 0.1 1.0
		Ki	iP	17 22 48.9 C
				microns sec
			P	Z' 0.1 1.2
		Sk	iP	17 23 15.7
		Gb	iP	17 23 55.0 C
		Um	iP	17 23 17.3 C
			ipP	17 23 22.1
			Alaska. h = 20 km (Um).	
			Magn. = 5.7 (Up,Ki).	
"	31	Up	iP	02 51 32.5
		Um	iP	02 51 12.1
			South of Japan (h = 40 km).	
"	31	Up	iP	04 25 21.4
"	31	Ki	iPn	14 44 27.2
			iSn	14 45 15.8
			iSg	14 45 31.3
				D = 410 km = 3.7°.
			Probably northwest Russia.	
			Origin time = 14 43 29.	
			Explosion?	

Markus Båth  
 July 30, 1965

Seismological Institute  
Uppsala

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

U P P S A L A , K I R U N A , S K A L S T U G A N , G Ö T E B O R G ,

U M E Å a n d 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, 1964

1964				1964					
Nov.	1	Up	iPKP	03 15 18.7 C	Nov.	1	Up	iP	12 39 32.3
		Gb	iPKP	03 15 28.5				i!	12 43 53.7
		Um	iSKP	03 18 05.9				iSKS	12 50 03
		South of Fiji Islands (h = 460 km).						eS	12 50 33
								microns sec	
"	1	Up	iP	05 06 31.9			S	N	0.5 5
		Sk	eP	05 05 58			M	E	1.7 22
		Queen Charlotte Islands (h = 30 km).					M	N	2.1 21
							M	Z	2.9 22
							D = 10800 km = 97°.		
"	1	Up	iP	05 28 11.9 C			Ki	iP	12 39 15.2
								ipP	12 39 36.0
								iSKS	12 49 42
								microns sec	
			P	Z' 0.1 0.5			P	Z'	0.2 1.3
		Ki	iP	05 27 54.7			SKS	E	1.2 7
		Sk	iP	05 28 18.5			M	E	1.4 17
		Gb	eP	05 28 40			M	N	1.8 21
		Um	iP	05 28 00.3			M	Z	2.5 18
		Mindoro (h = 90 km).					D = 10350 km = 93°.		
"	1	Ki	iSn	05 42 48.0			Sk	iP	12 39 36.5
			iSg	05 43 05.9			Um	iP	12 39 21.4
				D = 420 km = 3.8°.				ipP	12 39 44
		Sk	iSg	05 45 41.4				i	12 40 25.5
		Um	iSn	05 43 32.8				ipP	12 43 21.9
			iSg	05 44 11.9				iSKS	12 49 49
				D = 630 km = 5.7°.				iS	12 50 21
		Northwest Russia, 67.7°N, 30.5°E. Origin time = 05 41 00. Explosion?					Halmahera. h = 80 km (Ki,Um). Magn. = 5.9 (Up,Ki).		
"	1	Up	iP	06 57 53.1	"	1	Ka	iP	13 53 38.1
		Ki	iP	06 57 00.9	"	1	Um	iP	15 57 27.5
		Aleutian Islands (h = 20 km).			"	1	Up	iPKP	17 02 36.4
							Kermadec Islands (h = 370 km).		
"	1	Sk	iP	12 21 58.2 C	"	2	Ka	i(P)	06 30 38.4

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

1964					1964			
Nov.	2	Up	iP	07 04 14.6	Nov.	3	Up	iP 15 06 43.1
		Ki	iP	07 04 18.3			Gb	iP 15 07 04.4
			isP	07 04 48.8			Kurile Islands (h = 20 km).	
				microns sec				
			P	Z' 0.1 1.5	"	3	Up	iP 17 42 31.6
		Sk	eP	07 04 02			Ki	iP 17 43 11.2
		Gb	iP	07 04 00.9				microns sec
		Um	iP	07 04 18.9				P Z' 0.2 1.1
			iS	07 15 41			Gb	iP 17 42 45.4
			isS	07 16 25			Um	iP 17 42 46.0
		Ka	iP	07 04 10.9			Iran (h = 30 km).	
		Peru. h = 90 km (Ki,Um).						
"	2	Up	eP	23 03 22	"	3	Ki	iP 19 01 57.1 C
			i	23 03 30.7	"	4	Gb	iP 03 48 13.7
		Sk	eP	23 04 00			Kamchatka (h = 50 km).	
		Italy (h = 30 km).						
"	3	Up	iP	00 27 18.0	"	4	Up	iP 13 50 45.9
								microns sec
								P Z' 0.1 0.7
"	3	Up	iP	00 39 45.6 D	"	4	Up	iP 15 30 48.5
		Ki	iP	00 38 59.1			Burma (h = 40 km).	
			iPcP	00 39 52.7				
		Um	iP	00 39 20.7	"	4	Gb	iP 17 11 04.6
		Sea of Okhotsk (h = 350 km).			"	4	Up	iP 19 53 29.6
"	3	Up	iP	02 17 12.4 D			Um	iP 19 53 24.6
		Ki	iP	02 16 33.8			Hindu Kush (h = 210 km).	
		Gb	iP	02 17 33.0	"	4	Up	iP 21 16 05.8
		Um	iP	02 16 51.2			Ki	iP 21 15 46.7
		Japan (h = 90 km).					Mindanao (h = 70 km).	
"	3	Up	iP	02 33 03.0	"	4	Up	iP 22 34 54.1
		Iran (h = 40 km).					i	22 34 56.7
"	3	Up	iP	06 13 30.3				microns sec
		Sk	eP	06 13 56				P Z' 0.1 0.6
		Gb	iP	06 13 46.3	"	5	Up	i(P) 19 18 51.7
		Um	iP	06 13 31.3	"	5	Up	iP 21 01 09.2 C
		Ka	iP	06 13 28.9			Ki	iP 21 02 17.0 C
		Afghanistan (h = 40 km).					Sk	iP 21 01 47.2 C
"	3	Sk	eP	06 22 37			Gb	iP 21 00 58.1
		Iran (h = 30 km).					Um	iP 21 01 41.2
"	3	Up	eP	11 21 19			Ka	iP 21 00 34.3
		Um	iP	11 20 53.4			Crete (h = 10 km).	
			ipP	11 20 59.7	"	6	Up	iP 10 04 19.2 C
		Japan. h = 25 km (Um).						microns sec
"	3	Ki	iP	12 56 09.7			P	Z' 0.1 0.9
		Celebes (h = 150 km).					M	E 3.6 19
"	3	Up	iP	14 04 18.5			M	N 5.6 21
		Kurile Islands (h = 30 km).					M	Z 6.8 21

cont.

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

1964					1964				
Nov.	6	Ki	iP	10 03 36.6	Nov.	8	Ki	iPKP	03 03 52.7
cont.				microns sec	cont.			i	03 04 34.4
			M	E 4.6 18				iPP	03 07 40
			M	N 5.0 20					microns sec
			M	Z 7.6 18				M	E 3.7 20
		Gb	iP	10 04 41.1				M	N 2.8 22
		Ka	iP	10 04 42.3				M	Z 4.6 19
		Kurile Islands (h = 60 km).					Gb	iPKP2	03 04 50.5 C
		Magn. = 5.8 (Up,Ki).					Um	iPKP	03 03 48.6 C
"	7	Up	iP	01 02 37.4 D				iPKP2	03 04 17.5
		Ki	iP	01 02 36.8 D				iPP	03 07 51
		Um	iP	01 02 33.9 D				i	03 13 47
		Sumatra (h = 30 km).						iSS	03 27 11
"	7	Up	iP	12 15 14.2 C			Auckland Islands (h = 30 km).		
"	7	Ki	iP	14 59 23.7	"	8	Um	iP	09 15 26.0 C
		Um	iP	14 59 46.8	"	8	Up	iP	10 40 38.7
		Kurile Islands (h = 30 km).						i	10 42 22.3
"	7	Um	iP	15 50 23.6					microns sec
"	7	Up	iP	18 50 12.3				P	Z' 0.1 1.0
				microns sec			Ki	iP	10 41 18.0 C
			P	Z' 0.1 0.6				iPP	10 42 54.7
			M	E 2.2 17					microns sec
			M	N 2.7 22				P	Z' 0.1 1.0
			M	Z 2.7 17			Sk	iP	10 41 13.2
		Ki	iP	18 50 11.5			Gb	iP	10 40 49.5
				microns sec			Um	iP	10 40 55.3
			P	Z' 0.2 1.0				iPP	10 42 21.1
			M	E 1.8 16				iPcP	10 43 01.4
			M	N 2.2 23				iSS	10 49 45
			M	Z 3.2 17			Ka	iP	10 40 30.6
		Sk	iP	18 50 27.8	"	8	Iran (h = 40 km).		
		Um	iP	18 50 08.8			Magn. = 5.7 (Up,Ki).		
			i	18 50 10.7			Up	iP	18 07 51.1
			i(S)	19 00 38			Ki	iP	18 07 16.0
		Sumatra (h = 110 km).					Sk	eP	18 07 48
		Magn. = 5.9 (Up,Ki).					Um	iP	18 07 30.2
"	7	Up	iP	22 14 10.7			Japan (h = 40 km).		
				microns sec	"	9	Um	iP	04 58 09.0
			P	Z' 0.1 0.5			Banda Sea (h = 130 km).		
"	8	Up	iPKP	01 45 18.3	"	9	Sk	iP	06 50 04.6
		Um	iPKP	01 45 07.5	"	9	Up	iP	08 11 32.1
		Kermadec Islands (h = 30 km).						isP	08 11 52.8
"	8	Up		---				i	08 13 34.7
				microns sec			Ki	iP	08 12 09.9
			M	E 3.1 23				iPP	08 12 25.0
			M	N 3.8 23				iSn	08 18 32.0
			M	Z 4.5 23					microns sec
cont.					cont.			pP	Z' 0.1 1.1

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

1964					1964				
Nov.	9	Sk	iP	08 12 10.4	Nov.	11	Gb	iPg	08 02 40.0
cont.			i	08 12 43.8				iSg	08 02 41.5
		Um	eP	08 11 35				D = 13 km = 0.12 <sup>o</sup> .	
			iPP	08 12 15.5				Blast?	
			eSS	08 17 45					
		Ka	iP	08 11 25.1 C	"	11	Up	iP	08 11 36.1 D
			ipP	08 11 40.2			Ki	iP	08 10 41.3 D
		Caucasus.							microns sec
		h = 70 km (Up,Ki,Ka).						P	Z' 0.2 1.5
"	9	Up	iP	16 22 13.4			Gb	iP	08 11 46.6
			i	16 22 18.1			Um	iP	08 11 09.5
				microns sec			Ka	iP	08 11 57.7
			P	Z' 0.1 0.6			Alaska (h = 10 km).		
		Ki	iP	16 22 12.9	"	11	Gb	iPKP	11 38 41.1
			i	16 22 15.9			South of Fiji Islands		
		Sk	iP	16 22 36.4			(h = 330 km).		
		Um	iP	16 22 11.6	"	11	Up	iP	13 27 44.7
		Ka	iP	16 22 22.7			Gb	iP	13 28 03.2
			i	16 22 24.9			Kamchatka (h = 30 km).		
		Tibet (h = 30 km).			"	11	Up	iP	13 27 44.7
"	9	Up	iP	18 55 46.2			Gb	iP	13 28 03.2
		Ki	iP	18 55 25.9 C	"	11	Gb	iPg	14 31 53.7
				microns sec				iSg	14 31 55.4
			P	Z' 0.2 1.5				D = 14 km = 0.13 <sup>o</sup> .	
			M	N 0.6 14				Blast?	
		Um	iP	18 55 32.9	"	11	Gb	eP	15 50 45
		Philippine Islands					Kamchatka (h = 30 km).		
		(h = 30 km).			"	11	Gb	iP	17 07 53.4
"	9	Up	iP	20 38 31.2			Kamchatka (h = 30 km).		
"	9	Ka	iP	22 10 48.1	"	11	Gb	iP	17 22 59.9
			i	22 10 57.1					
"	10	Up	i(P)	04 39 06.2 C	"	11	Sk	eP	17 38 29
"	10	Sk	iP	06 17 24.0			Gb	iP	17 39 15.2
		Gb	iP	06 18 06.0			Kamchatka (h = 30 km).		
		Um	iP	06 17 26.8 C	"	11	Gb	iP	18 03 44.5
		Alaska (h = 40 km).					Kamchatka (h = 30 km).		
"	10	Ki	iP	12 56 24.6 C			It is a remarkable fact that		
		Japan (h = 170 km).					Göteborg (otherwise our least		
"	10	Um	iP	13 46 36.0			sensitive station) has the		
"	10	Up	iP	15 54 34.3			greatest sensitivity of all		
		Ki	iP	15 55 13.1			our stations for the present		
		Um	iP	15 54 48.0			series of Kamchatka shocks.		
		Iran (h = 30 km).					Part of the reason is due to		
"	10	Gb	iPg	15 56 34.4			microseisms, which on Nov. 11		
			iSg	15 56 35.9			are generally stronger at our		
			D = 13 km = 0.12 <sup>o</sup> .				other stations.		
			Blast?		"	11	Up	iP	19 17 04.3
							Kamchatka (h = 30 km).		

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

1964				1964					
Nov.	11	Gb	iP	19 24 06.6	Nov.	13	Up	iP	21 40 17.0
		Kamchatka (h = 30 km).							
"	11	Ki	iP	21 30 59.7	"	13	Up	i(PKP)	22 16 52.3
								iPKP	22 17 07.8
"	11	Up	iP	22 31 05.4 C					microns sec
							Sk	PKP	Z' 0.1 1.3
								ePKP	22 16 59
			P	Z' 0.1 0.5				i	22 17 00.9
"	12	Up	iP	05 26 36.4 C			Gb	iPKP	22 17 15.5
							Ka	iPKP	22 17 17.5
							Kermadec Islands		
							(h = 80 km).		
			P	Z' 0.1 0.5	"	13	Up	iP	22 19 01.3
		Sk	iP	05 26 25.7					microns sec
		Um	iP	05 26 11.2 C				P	Z' 0.1 0.6
		Okhotsk Sea (h = 330 km).							
"	12	Ka	i(P)	10 20 12.9	"	14	Sk	eP	03 49 43
"	12	Um	iP	14 09 00.2	"	14	Up	iP	04 07 25.3 C
		Japan (h = 40 km).						ipP	04 07 39.7
"	12	Up	iP	15 13 37.8				iPcP	04 07 52.9
									microns sec
"	12	Up	iP	15 29 11.7				P	Z' 0.3 1.2
"	12	Up	iP	20 08 35.0			Ki	iP	04 06 51.8
		Ki	iP	20 07 52.2					microns sec
		Sk	iP	20 08 27.7				P	Z' 0.2 0.9
		Gb	iP	20 09 05.6 C			Sk	iP	04 07 23.9 C
		Um	iP	20 08 07.5 C				isP	04 07 43.7
			i	20 08 11.7			Gb	iP	04 07 46.0
		Japan (h = 70 km).						isP	04 08 05.0
"	13	Up	iP	07 55 58.7 C			Um	iP	04 07 05.4
								i(PP)	04 10 00.1
			P	Z' 0.1 0.5				iS	04 16 06
"	13	Um	iP	14 17 29.6 C			Japan. h = 60 km (Up,Sk,Gb).		
"	13	Ka	iP	15 30 31.8			Magn. = 6.3 (Up,Ki).		
			i	15 30 40.4	"	14	Up	iP	06 08 08.2
"	13	Ki	iPn	15 52 02.7 D					microns sec
			iSn	15 52 51.1				P	Z' 0.1 0.9
			iSg	15 53 06.5			Sk	iP	06 08 03.1
			D = 430 km = 3.9°.				Um	iP	06 07 46.2
		Um	ePg	15 53 12			Ka	iP	06 08 28.1
			eS	15 54 19			Japan (h = 90 km).		
			iSg	15 54 40.3	"	14	Ki	iPn	06 27 11.9
			D = 730 km = 6.6°.					iSn	06 28 08.1
		Northwest Russia, 68.9°N, 30.9°E.						iSg	06 28 30.3
		Origin time = 15 51 00.						D = 510 km = 4.6°.	
		Explosion?					Sk	eSg	06 31 07
"	13	Up	iP	20 44 13.1			Um	e(Pn)	06 27 40
								iSn	06 28 52.0
								iSg	06 29 29.6
								D = 710 km = 6.4°.	
									cont.

2207

2207

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

1964				1964			
Nov. cont.	14	Northwest Russia, 67.7°N, 32.8°E. Origin time = 06 26 00. Explosion?		Nov.	15	Up iP	18 58 54.3
"	15	Up iP 01 06 59.9 Ki iP 01 06 21.9 C Um iP 01 06 38.4 Japan (h = 70 km).		"	15	Up iP 20 09 52.6 Ki iP 20 10 54.0 i 20 11 04.4 P Z' 0.1 1.0 Sk iP 20 10 07.9 Gb iP 20 09 21.3 C Um iP 20 10 26.0 i 20 10 50.1 Morocco (h = 3 km).	
"	15	Ki iP 02 34 32.4		"	16	Up iP 00 07 34.4 C P Z' 0.1 0.5 Ki iP 00 06 48.5 P Z' 0.1 1.0 Sk iP 00 07 23.4 Um iP 00 07 08.9 C Okhotsk Sea (h = 300 km). Magn. = 5.6 (Up,Ki).	
"	15	Ki eP 04 47 11 Mindanao (h = 60 km).		"	16	Up iP 04 54 48.8 C iP 04 55 34.9 P Z' 0.1 0.8 Ki iP 04 54 58.1 C i 04 57 39.3 P Z' 0.2 1.0 Sk iP 04 55 14.1 C Gb iP 04 55 09.8 Um iP 04 54 47.3 C Ka iP 04 54 53.5 Hindu Kush. h = 230 km (Up). Magn. = 5.7 (Up,Ki).	
"	15	Up iP 06 39 32.9 Ki iP 06 40 17.5 P Z' 0.1 0.9 Sk iP 06 40 11.9 Um iP 06 39 50.5 Ka iP 06 39 23.1 ipP 06 39 29.6 Iran-Iraq. h = 25 km (Ka).		"	16	Up iP 05 32 49.8 i 05 33 05.8 M E 1.6 17 M N 2.7 17 Ki iP 05 33 40.1 C P Z' 0.1 1.0 M E 2.0 19 M N 1.4 18 Sk eP 05 33 30 Gb iP 05 32 59.2 Um iP 05 33 09.8 C Ka iP 05 32 34.4 i 05 32 38.6 Turkey (h = 40 km).	
"	15	Sk e(SKP) 07 43 28 Um i(SKP) 07 43 27.5 Fiji Islands (h = 610 km).					
"	15	Up iP 09 40 59.6 i 09 41 03.2 Ka iP 09 41 38.0 C iPP 09 43 09.8 Iran (h = 30 km).					
"	15	Up iP 16 04 07.7 P Z' 0.2 1.2 M E 2.4 18 M N 2.8 20 M Z 3.4 18 Ki iP 16 03 43.8 P Z' 0.1 1.0 M E 1.9 17 M N 1.0 17 M Z 2.3 17 Sk iP 16 04 11.7 Formosa (h = 40 km). Magn. = 5.9 (Up,Ki).					
"	15	Up iP 17 20 06.6 Ki iP 17 20 15.3 Sk iP 17 20 31.8 Um iP 17 20 04.4 Hindu Kush (h = 220 km).					



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

1964					1964				
Nov.	16	Up	iP	06 06 52.9 C	Nov.	17	Up		microns sec
			i	06 07 11.6				PKKP	Z' 0.1 1.0
			i	06 07 42.5				M	E 23 22
			iPP	06 08 00.9				M	N 30 22
			i	06 08 11.6				M	Z 29 23
				microns sec					(D = 12900 km = 116°).
			P	Z' 0.1 0.7			Ki	e(P)	08 29 48
			PP	Z' 0.1 0.8				e(PKP)	08 33 54
		Ki	iP	06 06 37.8 C				iPKP	08 34 08.5
			iPP	06 07 49.7				iPP	08 34 41
				microns sec				iS	08 41 51
			P	Z' 0.4 0.7				e	08 43 26
		Sk	iP	06 07 08.8 C				e(PKKP)	08 44 53
			iPP	06 08 29.2					microns sec
		Gb	iP	06 07 22.9				PKP	Z' 0.1 1.0
			iPP	06 08 46.9				PP	Z 3.2 7
		Um	iP	06 06 37.9 C				S	E 2.4 8
			i	06 07 20.7				M	E 50 23
			i	06 08 16.5				M	N 18 21
		Ka	iP	06 07 09.6				M	Z 60 25
			iPP	06 08 32.4					(D = 12200 km = 110°).
				Kazakh SSR.			Um	iP	08 30 12 C
				Magn. = 6.1 (Up,Ki).				iPKP	08 34 11.4
				Underground explosion.				i	08 34 38
"	16	Up	iP	12 27 14.6 D				iPP	08 34 58
				Kurile Islands				iPKKP	08 45 04.8
				(h = 30 km).					New Britain (h = 50 km).
"	16	Up	iP	12 49 22.6 C	"	17	Up	iPKP	11 21 31.1
				microns sec				Ki	iPKP 11 21 22.0
			P	Z' 0.4 0.8				Gb	iPKP 11 21 40.8
		Sk	iP	12 49 08.8 C				Um	iPKP 11 21 29.7
		Gb	iP	12 49 42.8 C					eSKP 11 24 09
		Um	iP	12 48 55.7					South of Fiji Islands
		Ka	iP	12 49 45.4					(h = 550 km).
				Kurile Islands	"	17	Up		---
				(h = 30 km).					microns sec
"	16	Up	iP	20 37 28.9				M	E 1.0 17
"	16	Um	iP	22 15 13.6				M	Z 1.6 17
				Arctic Ocean (h = 30 km).			Ki	eP	19 13 08
"	16	Ki		---					microns sec
				microns sec				P	Z' 0.1 1.3
			M	E 0.8 18				M	E 1.2 18
		Um	iP	22 53 54.1				M	N 0.6 14
				Borneo (h = 30 km).				M	Z 1.3 18
							Um	iP	19 13 19.0
									Mariana Islands
									(h = 40 km).
"	17	Up	iP	01 34 06.4 C	"	17	Up	i(P)	20 38 44.3
				Iran (h = 50 km).					
"	17	Up	iPKP	08 34 17.8 D	"	17	Ki	iP	22 57 18.5
			iPP	08 35 19					Turkey (h = 40 km).
			iPKKP	08 44 53.1					
			i	08 45 05					

cont.

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

1964					1964				
Nov.	18	Up	iP	13 32 50.7	Nov.	19	Ki	eP	23 49 35
		Ki	iP	13 31 58.2 C				iPKP	23 53 41.6 C
				Aleutian Islands				i	23 53 51.1
				(h = 10 km).				ePP	23 54 10
"	18	Up		---				iSKS	00 00 10
				microns sec				i(SKS)	00 00 25
		M	E	2.2 19				i	00 03 10
		M	N	5.2 23					microns sec
		M	Z	6.7 25				PKP Z'	0.1 1.0
		Ki	iPKP	14 53 44				(SKS)E	4.0 7
			iPP	14 54 09.9				(SKS)N	2.6 11
				microns sec				M E	32 20
		M	E	2.9 21				M N	23 21
		M	N	2.6 21				M Z	40 20
		M	Z	4.9 21					(D = 12200 km = 110°).
		Um	iPP	14 54 06.5		Sk	iPKP	23 53 51.7 C	
			i	15 03 30			ePKKP	00 04 35	
			iPS	15 03 51		Gb	iPKP	23 53 58.1	
			iSS	15 09 43			iPP	23 55 29.3	
				New Britain (h = 50 km).		Um	iP	23 49 48	
				Magn. = 6.2 (Up,Ki).			iPKP	23 53 44.5	
"	19	Ki	iPn	19 37 55.5			iPP	23 54 16	
			iSn	19 38 43.9			i(PP)	23 54 30	
			iSg	19 38 59.3			iPPP	23 56 59	
				D = 400 km = 3.6°.			iSKS	00 00 24	
		Sk	eSg	19 41 47				New Britain (h = 3 km).	
		Um	iPn	19 38 34.1				Magn. = 7.1 (Up,Ki).	
			iS*	19 40 00.8	"	20	Ki	e(P)	00 00 17
			iSg	19 40 26.4	"	20	Ki	iPKP	00 13 40.0
				D = 690 km = 6.2°.			Um	iPKP	00 13 45.3
				Northwest Russia, 68.6°N,					New Britain (h = 30 km).
				30.0°E.	"	20	Ki	eP	05 00 14
				Origin time = 19 37 00.					Alaska (h = 30 km).
				Explosion?	"	20	Um	iP	07 04 30.4 D
"	19	Up	iP	20 07 28.1	"	20	Up	iP	10 00 57.7
"	19	Up	iP	22 37 44.7	"	20	Ki	iP	10 01 41.2
"	19	Up	eP	23 50 14			Sk	iP	10 01 08.4
			ePKP	23 53 52			Um	iP	10 01 22.4
			ePP	23 54 50				iPcP	10 01 47.9
			iSKS	00 00 35					Atlantic Ocean (h = 30 km).
			iPKKP	00 04 18.3	"	20	Gb	iPg	12 14 46.2 C
			e	00 07 31				iSg	12 14 48.1
				microns sec					D = 17 km = 0.15°.
		PP	Z	1.7 7					Blast?
		SKS	E	1.7 7	"	20	Up	iP	16 46 04.1
		SKS	N	2.1 7			Ki	iP	16 45 26.0
		M	E	19 21			Sk	eP	16 46 00
		M	N	41 22			Um	iP	16 45 43.1
		M	Z	32 19					Japan (h = 90 km).
				(D = 12900 km = 116°).					

cont.

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

1964				1964							
Nov.	20	Up	iP	23 44 09.9 C	Nov.	21	Ki	iP	15 47 11.0 C		
				microns sec					microns sec		
			P	Z' 0.1 0.8				P	Z' 0.1 1.2		
			M	E 3.0 22			Sk	eP	15 47 35		
			M	N 4.7 18			Um	iP	15 47 21.6		
			M	Z 4.6 18			Mariana Islands				
		Ki	iP	23 43 23.1			(h = 40 km).				
			iPcP	23 44 05.8							
				microns sec		"	21	Up	iP	16 01 08.8	
			P	Z' 0.1 1.0				i	16 01 18.5		
			M	E 3.7 18					microns sec		
			M	N 4.1 16				P	Z' 0.2 1.0		
			M	Z 5.4 17			"	21	Up	iP	22 53 18.7
		Sk	eP	23 43 59				Ki	iP	22 53 17.5	
		Gb	iP	23 44 31.2			Sumatra (h = 30 km).				
		Um	iP	23 43 44.6			"	22	Ki	iP	00 12 31.2 C
			eS	23 52 08				i	00 12 41.0		
			iPS	23 52 30			Um	iP	00 12 34.8		
		Ka	iP	23 44 31.2			North Atlantic Ocean				
		Kurile Islands (h = 30 km).					(h = 30 km).				
		Magn. = 5.8 (Up,Ki).				"	22	Ki	iP	02 34 54.2	
"	21	Up	iP	00 02 36.1		"	22	Sk	eP	02 34 26	
		Ki	eP	00 01 50			Crete (h = 30 km).				
		Gb	iP	00 02 58.9		"	22	Up	iP	08 28 24.0	
		Ka	iP	00 02 59.6				i	08 28 29.6		
		Kurile Islands (h = 30 km).							microns sec		
"	21	Up	iP	02 29 48.9		"	22	Up	eP	14 42 57	
			ePP	02 33 34			Sk	iP	14 42 51.1		
		Ki	iP	02 29 35.2			"	22	Sk	iP	20 24 09.7 C
		Sk	eP	02 29 58			Mexico (h = 120 km).				
			ePP	02 33 59		"	22	Um	i(P)	21 59 36.8	
		Um	eP	02 29 40			Ka	i(P)	22 00 07.2		
			ipP	02 30 37.7		"	23	Up	iP	07 06 07.5 D	
		Celebes. h = 240 km (Um).					Ki	iP	07 05 56.3		
"	21	Up	iP	04 13 24.0			Sk	iP	07 06 24.4 D		
			i	04 13 34.4			Um	iP	07 05 58.2		
		Ki	iP	04 13 25.1 C			Sinkiang, China (h = 30 km).				
				microns sec		"	23	Um	iP	19 06 36.4 D	
			P	Z' 0.1 1.0				ipP	19 06 51.3		
		Sk	eP	04 13 48			Japan. h = 60 km (Um).				
		Um	iP	04 13 21.1 C		"	23	Up	iP	22 00 09.2	
		Sumatra (h = 30 km).							microns sec		
"	21	Ka	iP	08 55 51.9				P	Z' 0.1 0.5		
"	21	Up	iP	12 17 53.4							
"	21	Um	iP	13 39 27.1							
		Formosa (h = 60 km).									
"	21	Um	iP	14 44 22.2							
		Mariana Islands									
		(h = 60 km).									

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

1964				1964					
Nov.	23	Ki	eP	22 29 00	Nov.	24	Up	iPg	14 05 25.8
		Um	iP	22 29 08.0				iSg	14 05 42.0
		Molucca Sea (h = 70 km).						microns sec	
"	24	Up	iP	02 44 18.9				Pg	Z' 0.1 0.5
			ipP	02 44 31.0				D = 130 km = 1.2°.	
		Um	iP	02 44 03.2			Um	iLgl	14 07 43.5
		Ryukyu Islands.					Central Baltic, 58.6°N, 18.4°E.		
		h = 50 km (Up).					Origin time = 14 05 02.		
							Underwater explosion.		
"	24	Um	iPKP	06 53 18.5	"	24	Up	iPg	14 07 59.1
		Fiji Islands (h = 660 km).						iSg	14 08 15.5
"	24	Ki	iP	10 54 47.9 C				microns sec	
		Java (h = 130 km).						Pg	Z' 0.1 0.5
"	24	Up	iP	12 53 38.8 C				D = 130 km = 1.2°.	
			i	12 53 55			Sk	eLgl	14 10 38
			iS	13 04 15			Um	iLgl	14 10 17.5
		microns sec					Central Baltic, 58.6°N, 18.4°E.		
		P	Z'	0.3 0.7			Origin time = 14 07 36.		
		S	N	5.1 8			Underwater explosion.		
		M	E	11 21	"	24	Up	iPg	14 14 22.2
		M	N	22 18				iSg	14 14 38.5
		M	Z	22 21				microns sec	
		D = 9650 km = 87°.						Pg	Z' 0.1 0.5
		Ki	iP	12 53 17.4 C				D = 130 km = 1.2°.	
			iS	13 03 39			Sk	eLgl	14 16 59
		microns sec					Um	iLgl	14 16 40.7
		P	Z'	0.3 1.2			Central Baltic, 58.6°N, 18.4°E.		
		S	E	2.9 6			Origin time = 14 13 59.		
		S	N	7.5 10			Underwater explosion.		
		M	E	21 16			In this and the two preceding		
		M	N	14 18			events the Pg Z' amplitudes		
		M	Z	23 17			at Up are about 1.5 times the		
		D = 9150 km = 82 1/2°.					amplitudes of Sg Z'.		
		Sk	iP	12 53 47.7	"	24	Up	eP	19 22 45
		Gb	iP	12 53 54.4	"	24	Um	iP	23 23 01.8 D
		Um	iP	12 53 25.6 C	"	25	Up	iP	08 43 11.0
			iS	13 03 44				microns sec	
		Ka	iP	12 53 53.7				P	Z' 0.1 0.5
		Luzon (h = 5 km).					Sk	eP	08 43 26
		Magn. = 6.7 (Up,Ki).					Um	iP	08 43 02.5
"	24	Up	iP	13 03 15.6			Burma (h = 80 km).		
			e	13 03 47	"	25	Ki	iP	21 47 59.9
		microns sec					microns sec		
		P	Z'	0.1 1.0			P	Z'	0.1 1.0
		Ki	iP	13 02 57.3 C	"	26	Um	iP	02 04 21.9
		microns sec					microns sec		
		P	Z'	0.2 1.0	"	26	Um	iP	02 53 41.7
		Um	iP	13 03 03.8 C			microns sec		
		Luzon (h = 100 km).					microns sec		
		Magn. = 5.9 (Up,Ki).					microns sec		
"	24	Um	iP	13 07 12.0			microns sec		

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

1964				1964					
Nov.	26	Up	iP	04 55 36.3	Nov.	27	Gb	iP	00 40 29.1
				Iran (h = 30 km).					
"	26	Up	iP	05 54 19.4 C	"	27	Um	iP	05 18 21.1
"	26	Gb	iPg	08 00 52.1	"	27	Up	iP	05 47 01.1 C
			iSg	08 00 53.2				iPcP	05 47 25.2
				D = 9 km = 0.08°.					Kurile Islands (h = 30 km).
				Blast?	"	27	Up	iP	05 55 28.7
"	26	Up	iP	10 32 50.1	"	27	Up	iP	07 56 46.1
			eSa	10 51 33					microns sec
			iLgl	10 59 45				P	Z' 0.1 0.8
				microns sec			Ki	iP	07 55 49.3 C
			P	Z' 0.4 1.5					microns sec
			M	E 16 18				P	Z' 0.1 0.8
			M	N 16 23			Sk	iP	07 56 17.5 C
			M	Z 25 19			Gb	iP	07 56 58.8 C
		Ki	iP	10 32 25.3			Um	iP	07 56 18.8
				microns sec			Ka	iP	07 57 10.3
			P	Z' 0.5 1.8					Alaska (h = 110 km).
			M	E 13 17					Magn. = 5.9 (Up,Ki).
			M	N 10 14	"	27	Up	iP	11 11 10.9
			M	Z 9.0 15					microns sec
		Um	iP	10 32 33.5				P	Z' 0.1 0.5
			iSS	10 46 41			Ki	iP	11 11 20.1 D
				Formosa (h = 30 km).					microns sec
				Magn. = 6.4 (Up,Ki).				P	Z' 0.2 1.5
				As the epicenter is located			Ka	iP	11 11 15.5
				on the eastern edge of the					Hindu Kush (h = 220 km).
				Asiatic continental					Magn. = 5.7 (Up,Ki).
				structure, this is one	"	27	Up	iP	13 58 58.0
				of the longest continental					microns sec
				paths with Lgl, ever				P	Z' 0.3 1.0
				observed (Up).			Ki	iP	13 58 19.0 C
"	26	Up	iP	12 01 36.0 C					microns sec
"	26	Up	iP	16 40 32.3 D				P	Z' 0.3 1.0
"	26	Ki	eP	16 46 12				M	E 4.2 14
				Alaska (h = 30 km).				M	N 5.2 13
"	26	Ki	iPn	16 50 24.7				M	Z 3.8 12
			iSn	16 51 13.3			Sk	iP	13 58 52.5 C
			iSg	16 51 27.0				i	13 58 54.1
				D = 390 km = 3.5°.			Gb	iP	13 59 20.0
		Um	eSg	16 52 59.			Um	iP	13 58 35.3
				Northwest Russia.					Japan (h = 40 km).
				Origin time 16 49 30.					Magn. = 6.3 (Up,Ki).
				Explosion?	"	27	Up	iP	13 59 47.3
"	26	Um	iP	17 38 34.9					microns sec
"	26	Up	iP	23 42 30.6 C				P	Z' 0.5 1.4
							Ki	iP	13 59 08.9
									microns sec
								P	Z' 0.3 1.2

cont.



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

1964						1964				
Nov.	30	Up		microns sec		Nov.	30	Gb	iPKP	16 26 10.1
cont.			P	Z' 0.1 1.0				Ka	iPKP	16 26 11.7
		Ki	iP	12 36 07.2 C				South of Fiji Islands		
		Um	iP	12 36 03.6				(h = 480 km).		
		Ka	iP	12 36 09.0 C						
		Nicobar Islands (h = 30 km).				"	30	Up	iPKP	19 11 35.9
"	30	Up	iP	12 39 32.4				Ki	eSKP	19 14 06
			i	12 39 34.4				Gb	iPKP	19 11 46.7
			ipP	12 39 44				Um	iSKP	19 14 17.8
			iS	12 49 18				Ka	iPKP	19 11 48.3 C
			i	12 49 26				South of Fiji Islands		
								(h = 550 km).		
				microns sec		"	30	Ki	eP	22 51 03
			P	Z' 0.8 0.9				Um	iP	22 51 04.6
			M	E 5.7 21					ipP	22 51 25.6
			M	N 11 22				Aleutian Islands.		
			M	Z 9.5 21				h = 80 km (Um).		
			D = 8550 km = 77°.							
		Ki	iP	12 39 30.9						
			i	12 39 35.1						
			eS	12 49 21						
			i	12 50 35						
				microns sec						
			P	E 0.7 5						
			P	Z 1.4 6						
			P	Z' 0.9 1.0						
			S	E 4.8 6						
			S	N 2.6 9						
			M	E 7.8 17						
			M	N 13 22						
			M	Z 6.5 16						
			D = 8550 km = 77°.							
		Sk	iP	12 39 47.3						
			ipP	12 40 01.5						
		Gb	iP	12 39 49.0						
			i	12 39 53.3						
		Um	iP	12 39 27.0						
			i	12 39 31.1						
			iS	12 49 16						
		Ka	iP	12 39 35.5						
			ipP	12 39 48.6						

Markus Båth  
 August 5, 1965

Nicobar Islands.  
 h = 50 km (Up,Sk,Ka).  
 Magn. = 6.6 (Up,Ki).  
 Multiple P, with a small  
 onset followed after 2-4  
 sec by a much larger phase:  
 multiple shocks? A number of  
 other stations have also  
 reported multiple P, the  
 average difference between  
 the two phases being 4.3+1.2  
 sec (determined from 12  
 stations).

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

DECEMBER 1 - 31, 1964

1964					1964				
Dec.	1	Um	iP	04 23 00.3	Dec.	1	Up		microns sec
"	1	Up	ePKP	05 12 15	cont.		PKP	Z' 0.1 0.7	
		Ki	iPKP	05 12 06.9 C			Ki	ePKP	12 06 28
			iSKP	05 15 11.4			Sk	iPKP	12 06 38.5 C
				microns sec			Gb	iPKP	12 06 53.2
			PKP	Z' 0.1 1.5			Um	iPKP	12 06 33.0 C
			SKP	Z' 0.2 1.7			Ka	ePKP	12 06 53
		Sk	ePKP	05 12 17			Kermadec Islands		
		Um	ePKP	05 12 13			(h = 30 km).		
		Ka	iPKP	05 12 23.0	"	1	Up	iP	22 22 31.5
		Tonga Islands (h = 230 km).			"	2	Um	eP	01 22 44
"	1	Up	iP	07 44 23.6	"	2	Ki	eP	08 00 50
			i	07 44 26.8				iS	08 02 35.7
				microns sec					D = 1100 km = 10°.
			P	Z' 0.1 1.0					Svalbard (h = 30 km).
		Ki	iP	07 42 47.1	"	2	Up	iP	08 29 30.2
			i	07 42 51.0					North Atlantic Ocean
				microns sec					(h = 30 km).
			P	Z' 0.1 1.0	"	2	Up	iP	08 30 53.6
		Sk	iP	07 43 37.8			Ki	iP	08 30 53.7 C
		Gb	iP	07 44 44.9			Sk	iP	08 31 12.1 C
		Um	iP	07 43 36.6			Gb	iP	08 31 13.2
			i	07 43 41.4			Um	iP	08 30 48.7
		Svalbard (h = 30 km).					Ka	iP	08 30 56.5
		Multiple P-phases: a small phase followed after about 4 sec by a much larger one (Up, Ki, Um).					Nepal (h = 25 km).		
"	1	Ki	e(P)	08 29 56	"	2	Gb	iPg	12 00 05.5
"	1	Up	iP	10 25 51.1				iSg	12 00 07.1
		Sk	iP	10 26 31.7					D = 13 km = 0.12°.
		Gb	iP	10 25 38.5			Blast?		
		Greece.			"	2	Up	iPP	12 40 38.4
"	1	Up	iPKP	12 06 45.1			Ka	iP	12 39 16.8
			i	12 06 48.8			Afghanistan-USSR		
cont.							(h = 30 km).		



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

1964				1964					
Dec.	2	Up	iP	13 29 17.6	Dec.	4	Ki	microns sec	
			i	13 29 22.2				Z' 0.1 1.0	
			ipP	13 29 28.1		cont.	Sk	iP	07 47 18.0
				microns sec			Gb	eP	07 48 21
			P	Z' 0.1 0.7				i	07 48 27.4
		Ki	iP	13 28 24.6 C			Um	iP	07 47 16.4
			iPcP	13 29 13.2				i	07 47 21.4
				microns sec				i	07 47 29.9
			P	Z' 0.3 0.9			Ka	iP	07 48 51.7
		Sk	iP	13 28 54.2			Svalbard (h = 30 km).		
		Gb	iP	13 29 32.1 C			Multiple P-phases (Ki,Gb,Um).		
		Um	iP	13 28 51.8 C			Compare remark to Dec. 1,		
		Ka	iP	13 29 40.9 C			07 44.		
		Aleutian Islands.							
		h = 40 km (Up).			"	4	Up	i(P)	09 26 43.0
"	2	Up	iP	15 33 27.2	"	4	Gb	iP	14 06 47.7
"	3	Up	iP	04 02 29.1	"	4	Um	ePS	16 17 46
			iSKS	04 12 56				i(SS)	16 24 17
				microns sec			New Britain (h = 20 km).		
			P	Z 0.9 4					
			P	Z' 0.4 1.5	"	5	Ki	iP	02 20 56.0 C
			M	E 1.6 21			Arctic Ocean (h = 30 km).		
			M	N 2.7 22	"	5	Ki	eP	04 59 39
			M	Z 2.3 23				i	04 59 49.6
		Ki	iP	04 02 52.2			Gb	eP	05 01 36
			eSKS	04 13 17				i	05 01 38.5
				microns sec				iPP	05 01 59.7
			M	E 2.7 22			Svalbard (h = 30 km).		
			M	N 1.1 18	"	5	Up	iP	09 37 11.3
			M	Z 3.5 21	"	5	Ki	iP	13 04 08.6
		Sk	iP	04 02 48.9	"	5	Up	iP	14 30 47.2 C
		Gb	iP	04 02 31.5				i	14 32 12.0
		Um	iP	04 02 37.3	"	5	Ki	iP	19 59 14.1
			iSKS	04 13 14			Sk	iP	19 59 42.5
			iS	04 13 22			Alaska (h = 30 km).		
		Indian Ocean (h = 50 km).			"	5	Ki	iP	22 41 13.8
		Magn. = 6.3 (Up,Ki).					Sk	iP	22 41 50.5
"	3	Up	iSg	12 28 41.9			Kamchatka (h = 40 km).		
		Sk	iSg	12 29 21.9	"	5	Ki	iP	00 02 03.8
		Gb	iPg	12 26 52.0			Ki	iP	00 01 09.2
			iSg	12 27 08.0				ipP	00 01 20.1
				D = 130 km = 1.2°			Sk	iP	00 01 45.6
		Skagerack, 58.5°N, 10.4°E.					Kamchatka.		
		Origin time = 12 26 28.					h = 40 km (Ki).		
"	3	Ki	eP	22 39 49	"	6	Up	iP	00 06 22.4
		Iran (h = 30 km).						ipP	00 06 34.4
"	4	Up	i(P)	02 22 53.9					
			i	02 23 16.1					
"	4	Ki	iP	07 46 21.5 C					
			i	07 46 28.7					

cont.

cont.





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

1964		1964	
Dec. cont.	10	Origin time = 16 54 19. Explosion? Solution obtained by combination with Tromsø readings.	Dec. 12 Up iP 13 17 06.7 Crete (h = 60 km).
"	10	Up iP 19 54 32.0 C Kurile Islands (h = 20 km).	" 12 Up iP 20 04 22.1 i 20 04 33.5 South of Tonga Islands (h = 90 km).
"	10	Ki eP 23 41 18 microns sec M E 1.7 17 M N 0.8 15 Sk eP 23 41 55 Um iP 23 41 31.7 i 23 41 35.0 Sea of Japan (h = 40 km).	" 13 Ki iP 00 40 40.7 D ipP 00 40 47.2 Alaska. h = 25 km (Ki).
"	11	Up i(P) 05 57 21.2 i 05 57 39.8	" 13 Up iP 00 43 00.3 Ki iP 00 42 00.4 ipP 00 42 06.9 microns sec P Z' 0.2 1.0 Um iP 00 42 30.1 Ka iP 00 43 26.3 Alaska. h = 25 km (Ki).
"	11	Gb iPg 10 44 14.2 iSg 10 44 15.7 D = 13 km = 0.12°. Blast?	" 13 Up iP 13 27 56.7 D microns sec P Z' 0.3 1.3 Ki iP 13 27 35.1 D microns sec P Z' 0.4 1.5 Gb eP 13 28 19 i 13 28 22.0 Um iP 13 27 42.6 i(pP) 13 27 48.7 Philippine Islands (h = 30 km). Magn. = 6.2 (Up,Ki).
"	11	Um iP 14 15 14.4 C	" 14 Up --- microns sec M E 4.0 21 M N 5.0 24 M Z 4.3 22 Ki --- microns sec M E 1.7 19 M N 2.5 18 M Z 4.5 17 Um eSS 02 35 37 South Atlantic Ocean (h = 30 km). Magn. = 6.2 (Up,Ki).
"	11	Up iP 16 14 57.2 D microns sec P Z' 0.3 0.7 Ki iP 16 14 21.6 D microns sec P Z' 0.3 0.8 Sk iP 16 14 55.5 D Gb iP 16 15 18.7 D Um iP 16 14 36.3 D ipP 16 16 28.9 Ka iP 16 15 15.8 D Sea of Japan. h = 570 km (Um). Magn. = 5.9 (Up,Ki).	" 14 Up iP 03 42 54.1 Ki i(P) 03 42 54.3 C Sinkiang, China (h = 30 km).
"	11	Up iP 22 09 45.6	
"	11	Um i(PP) 23 01 46.8 Tanimbar Islands (h = 50 km).	
"	12	Um iP 07 38 45.9 New Britain (h = 30 km).	
"	12	Um iP 11 32 43.9	





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1964				1964				
Dec. cont.	17	Sk	epP	23 55 42	Dec.	18	Um iP	20 25 13.2
			iPcP	23 55 53.7		"	18 Um iP	21 24 05.4
		Um	iP	23 55 15.6		"	19 Ki iP	02 05 35.4
			ipP	23 55 30.3			Rhodes Island	
			iPcP	23 55 48.2			(h = 50 km).	
		Aleutian Islands.						
		h = 60 km (Um).				"	19 Um iP	02 37 50.6
"	18	Ki	eP	00 43 27	"	19 Um iP	03 37 02.4	D
		Um	iP	00 43 05.6	"	19 Um iP	05 15 52.4	
		Iran (h = 30 km).				"	19 Up iPKP	07 01 08.1
"	18	Um	iP	02 33 47.3			Sk iPKP	07 01 02.9
							Um iPKP	07 00 57.5
"	18	Um	iP	02 39 38.6			i	07 01 29.2
		Alaska (h = 30 km).					South of Kermadec Islands	
"	18	Ki	iP	06 16 06.7			(h = 200 km).	
		Sk	iP	06 16 49.1	"	19 Ka iP	08 40 08.0	
		Um	iP	06 16 24.3	"	19 Um iP	12 30 27.3	D
		Japan (h = 30 km).				"	19 Um iP	13 01 15.8
"	18	Um	iP	07 01 19.9	"	19 Um eP	14 50 48	
		Japan (h = 60 km).					i	14 51 08.6
"	18	Gb	iPg	08 01 51.3	"	20 Um iP	01 33 16.9	D
			iSg	08 01 52.9	"	20 Up iP	03 40 42.2	
		D = 13 km = 0.12°.					Ki iP	03 40 44.1
		Blast?					Sk iP	03 41 03.3
"	18	Um	iP	09 20 56.9			Gb iP	03 41 02.0
		Kurile Islands					Nepal (h = 30 km).	
		(h = 30 km).				"	20 Ki e(Pn)	04 12 35
"	18	Up	iP	10 14 17.3			iSn	04 13 29.5
"	18	Ka	eP	10 38 11			iSg	04 13 50.9
							D = 480 km = 4.3°.	
"	18	Gb	iPg	12 00 51.6			Sk e(Sg)	04 16 19
			iSg	12 00 52.9			Um eSn	04 14 09
		D = 11 km = 0.10°.					iS <sup>x</sup>	04 14 41.3
		Blast?					iSg	04 14 55.7
"	18	Gb	iPg	12 19 41.8			D = 690 km = 6.2°.	
			iSg	12 19 43.5			Northwest Russia,	
		D = 14 km = 0.13°.					67.9°N, 31.8°E.	
		Blast?					Origin time = 04 11 30.	
"	18	Um	eP	13 34 23			Explosion?	
			i	13 38 00.2	"	20 Up i(P)	05 41 10.4	
"	18	Up	i(P)	15 29 40.4			microns sec	
		Um	i(P)	15 29 17.0			(P) Z'	0.1 1.5
"	18	Up	iP	19 11 37.0				
		(Lower California;						
		h = 30 km).						

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1964				1964			
Dec.	20	Ki	iPn 05 43 10.2 iSn 05 44 01.1 iSg 05 44 23.3 D = 490 km = 4.4°.	Dec.	21	Ki	iP 21 49 06.6 iPP 21 51 23.3 Montana (h = 30 km).
		Sk	e(Sg) 05 47 04	"	22	Sk	iP 00 37 10.7
		Um	iSn 05 44 50.0 iS <sup>x</sup> 05 45 05.9 iSg 05 45 27.9 D = 700 km = 6.3°.			Gb	iP 00 37 04.8 Peru-Brazil (h = 610 km).
			Northwest Russia, 67.9°N, 32.1°E. Origin time = 05 42 00. Explosion?	"	22	Gb	iPKP 01 04 49.9
						Ka	iPKP 01 04 52.4 D
						Fiji Islands	(h = 660 km).
"	20	Up	iP 10 13 22.7	"	22	Up	iP 04 44 18.8 iPP 04 46 01 iS 04 50 35 microns sec P Z' 0.1 0.7 D = 4600 km = 41½°.
"	20	Up	iPKP 11 44 57.7 Fiji Islands (h = 460 km).	Ki		iP	04 44 50.3
"	20	Up	iP 13 43 18.5 ipP 13 43 30.4			iScS	04 54 55 microns sec P Z' 0.2 1.0 M E 14 16 M N 10 15 M Z 21 16
		Ki	iP 13 42 38.8 C	Sk		iP	04 44 53.1 D
		Um	iP 13 42 56.2 C			ipP	04 45 01.5
			ipP 13 43 08.7 iPcP 13 43 18.9 Japan. h = 50 km (Up,Um).	Gb		iP	04 44 30.6
"	20	Up	iP 23 26 07.9			ipP	04 44 39.8
		Um	iP 23 25 45.9 Japan (h = 80 km).	Um		iP	04 44 28.9
"	21	Up	iP 09 17 51.8 C microns sec P Z' 0.1 0.5			ipP	04 44 36.3
"	21	Up	iP 11 24 13.1 C			iPP	04 46 12.4
"	21	Up	i(P) 12 00 50.5 C i 12 01 20.4 microns sec (P) Z' 0.3 0.5 Local explosion?	Ka		iP	04 44 10.7
"	21	Up	iP 17 46 25.6			ipP	04 44 19.2
		Ki	iP 17 45 31.4 microns sec P Z' 0.1 1.0			i	04 44 37.9
		Gb	iP 17 46 38.6			iPP	04 45 49.1
			i 17 46 44.3			i	04 46 03.7
		Um	iP 17 46 01.1 Alaska (h = 40 km).				Iran. h = 40 km (Sk,Gb,Um,Ka). Magn. = 6.1 (Up,Ki).
"	21	Up	iP 18 17 21.1 C	"	22	Up	iP 08 12 29.6 ipP 08 12 56.6 i 08 13 23.7
"	21	Ki	iP 18 40 39.4 C microns sec P Z' 0.1 1.0 Alaska (h = 110 km).	Ki		iP	08 12 30.4 C microns sec P Z' 0.4 1.8
				Sk		iP	08 12 11.9
						ipP	08 12 40.1
				Gb		iP	08 12 11.9
						i	08 12 30.6
				Um		iP	08 12 32.9 C
						ipP	08 13 00.5
						iS	08 21 52
				Ka		iP	08 12 25.9
						ipP	08 12 51.3
							Mona Passage. h = 110 km (Up,Sk,Um,Ka).





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 Ka = Karlskrona

1964					1964				
Dec.	24	Um	iP	19 37 51.2 C	Dec.	26	Ka	iP	14 41 02.9 C
cont				Sumatra (h = 140 km).	cont.			i	14 41 11.8
"	24	Um	iP	20 00 26.6				ipP	14 41 33.3
				Aleutian Islands					Kamchatka. h = 140 km
				(h = 40 km).					(Up,Ki,Sk,Gb,Um,Ka).
"	24	Up	iP	20 06 29.7					This interpretation is
		Ki	iP	20 05 59.8					in agreement with USCGS,
		Um	iP	20 06 08.8					but a phase
				Japan (h = 70 km).					(unidentified) appearing
"	25	Um	iP	14 01 52.8					about 10 sec after P
				Japan (h = 100 km).					(Up,Sk,Ka) and bigger
"	25	Up	iP	17 13 08.6	"	26-	Up	iP	00 00 34.2
			ipP	17 13 15.3		27	Ki	eP	23 59 42
		Ki	iP	17 12 33.5 C			Um	iP	00 00 09.6
				microns sec			Ka	iP	00 00 59.8
		M	E	1.9 17					Alaska (h = 40 km).
		M	N	2.8 18	"	27	Up	iP	01 23 48.3 C
		Sk	i(P)	17 13 12.1	"	27	Up	iP	01 50 56.5
			i	17 13 26.5	"	27	Um	iP	04 23 29.4
		Gb	e(P)	17 13 37	"	27	Up	iSg	04 56 34.1
		Um	iP	17 12 44.1			i	04 56 40.5	
				Japan. h = 25 km (Up).			Ki	iSn	04 53 38.0
"	26	Up	iP	04 33 52.3 C				iSg	04 53 55.1
"	26	Up	iP	11 08 22.2			Sk	eSg	04 56 00
				Japan (h = 10 km).			Um	eS <sup>x</sup>	04 54 16
"	26	Up	iP	14 40 47.9				iSg	04 54 29.6
			i	14 40 57.2					Finland-USSR border
			ipP	14 41 21.4					region, 66.6°N, 28.7°E.
			iS	14 49 08					Origin time = 04 52 00.
			isS	14 50 13					Explosion?
				microns sec	"	27	Up	iP	10 25 48.7
		P	Z'	0.1 0.6					Aleutian Islands
		M	E	3.0 29					(h = 30 km).
		M	N	1.7 21	"	27	Gb	eP	16 07 03
		M	Z	2.1 25	"	27	Up	iP	17 56 06.5
		Ki	eP	14 39 56				iSKS	18 06 31
			ipP	14 40 30.1				iS	18 06 45
			isS	14 48 35					microns sec
				microns sec				P	Z' 0.1 1.3
		pP	Z'	0.8 1.8				SKS	E 0.8 6
		M	E	2.7 14				S	E 0.6 4
		Sk	eP	14 40 35				S	N 1.5 7
			i	14 40 48.3				M	E 1.5 16
			ipP	14 41 14				M	N 2.9 18
		Gb	iP	14 41 08.0				M	Z 2.5 16
			ipP	14 41 43.2					D = 9700 km = 87½°.
			i(sP)	14 42 03.1					
		Um	iP	14 40 20.9 C	cont.				
			isP	14 41 06.6					
			iS	14 48 17					

cont.

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

1964					1964						
Dec.	27	Ki	iP	17 55 48.1	Dec.	28	Sk	iPKP	16 34 19.4		
cont.			i	17 56 23.7	cont.			iSKP	16 37 06.1		
			iS	18 06 07			Gb	iPKP	16 34 34.9		
				microns sec				ipPKP	16 37 02.2		
			P	Z' 0.4 1.2				iSKP	16 37 21.1		
			S	E 2.1 7				iSKKP	16 45 31.0		
			S	N 3.0 8			Um	i(PKP)	16 34 13.0		
			M	E 1.5 16				i	16 34 14.7		
			M	N 1.8 17				iPKP	16 34 26.7		
			M	Z 3.2 14				iSKP	16 37 00.6		
				D = 9350 km = 84°.				ipPKS	16 40 12		
		Um	iP	17 55 55.2				isPKS	16 41 15		
			iSKS	18 06 13				iSKKP	16 46 04		
			iS	18 06 20				iSS	16 54 14		
		Ka	eP	17 56 19			Ka	i(PKP)	16 34 36.4		
		Samar, Philippine Islands						iPKP	16 34 37.8		
		(h = 30 km).						ipPKP	16 36 58.6		
		Magn. = 6.2 (Up,Ki).						iSKP	16 37 22.4		
								i	16 37 39.4		
"	27	Ka	iP	18 00 08.3				isPKP	16 38 00.2		
			i	18 00 24.2			South of Fiji Islands				
"	28	Um	iP	03 08 45.6			(h = 610 km).				
							Magn. = 6.9 (Up).				
"	28	Up	i(PKP)	16 34 24.4	"	28	Up	iP	17 10 50.3		
			iPKP	16 34 26.1				i	17 10 55.9		
			iSKP	16 37 12.9			Ki	iP	17 09 28.5 C		
			iPP	16 37 37.0				iS	17 13 23		
			iPKS	16 38 09					microns sec		
			iSKKP	16 45 42.5				P	N 2.5 6		
				microns sec				P	Z 1.9 4		
			PKP	Z' 0.3 0.5				P	Z' 0.5 1.0		
			SKP	Z' 0.1 0.7				S	E 3.6 6		
			PP	N 0.7 3				S	N 1.6 10		
			PP	Z 1.7 3					D = 2200 km = 20°.		
			PP	Z' 0.9 1.5			Sk	iP	17 10 18.6 C		
			PKS	N 1.2 4				i	17 10 25.2		
			M	E 2.2 23			Gb	iP	17 11 09.9		
			M	N 2.0 20				i	17 11 17.0		
			M	Z 3.0 23			Um	iP	17 10 10.2		
				(D = 15650 km = 141°).			Arctic Ocean (h = 30 km).				
		Ki	i(PKP)	16 34 05.4			Magn. = 6.2 (Ki).				
			iPKP	16 34 17.5			The P-phases exhibit the				
			ipPKP	16 36 43.7			characteristic features				
			iSKP	16 36 50.1			for the Atlantic Ridge				
			i!	16 41 06			and Arctic shocks:				
			iSKKP	16 45 50			multiple P-phases and				
				microns sec			relatively long periods.				
			PKP	Z' 0.3 1.0			"	28	Um	iP	19 49 32.9
			SKP	Z 5.6 7			"	29	Up	iP	00 01 42.1
			SKP	Z' 0.5 1.5			Aleutian Islands				
			M	E 3.0 16			(h = 30 km).				
			M	N 1.9 11			"	29	Up	iP	00 55 21.2 C
			M	Z 2.6 12							
				(D = 14800 km = 133°).							
		Sk	e(PKP)	16 34 16							
cont.					cont.						

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

1964					1964				
Dec.	29	Up	iPcP	00 55 47.3	Dec.	30	Up	iS	15 48 17.1
cont.		Sk	iP	00 54 59.1	cont.				microns sec
		Aleutian Islands (h = 40 km).						P	Z' 0.9 0.6
							Ki	iP	15 38 17.7 D
									microns sec
"	29	Up	iP	01 51 09.0				P	Z' 0.7 1.0
			iPcP	01 51 35.3			Sk	iP	15 38 48.1 D
		Ki	iP	01 50 15.4 C			Gb	iP	15 39 11.4
		Aleutian Islands (h = 40 km).					Um	iP	15 38 32.2
							Ka	iP	15 39 08.7
"	29	Um	iP	02 16 42.3				i	15 39 09.7
		Alaska (h = 30 km).						i	15 39 14.1
							South of Japan (h = 260 km).		
"	29	Up	iP	06 46 04.8			Magn. = 6.5 (Up,Ki).		
		Ki	iP	06 45 11.3	"	30	Sk	eP	16 55 02
		Gb	iP	06 46 20.4 D					
		Um	iP	06 45 38.1	"	30	Up	iPKP	21 49 23.0
			iPcP	06 46 12.5			Ki	iSKP	21 51 52.8
		Aleutian Islands (h = 20 km).					Um	iSKP	21 52 03.9
							South of Fiji Islands (h = 550 km).		
"	29	Up	iP	06 50 07.7					
				microns sec	"	30	Ki	iPn	23 02 00.2
			P	Z' 0.2 1.0				iSn	23 02 48.2
		Ki	iP	06 49 15.0				iSg	23 03 07.6
				microns sec				D = 470 km = 4.2°.	
			P	Z' 0.1 1.0			Sk	iPn	23 02 41.2
		Sk	iP	06 49 46.2				iSn	23 04 05.0
		Gb	iP	06 50 23.7 D				D = 800 km = 7.2°.	
		Um	iP	06 49 41.1 D			Norwegian Sea, 71.0°N, 12.1°E.		
			iPcP	06 50 16.0			Origin time = 23 00 52.		
		Aleutian Islands (h = 30 km).					Solution obtained by combination with Tromsø readings.		
		Magn. = 5.9 (Up,Ki).			"	31	Up	iP	01 58 35.5 D
"	29	Up	iP	10 20 37.2					microns sec
		Aleutian Islands (h = 80 km).						P	Z' 0.1 0.6
"	29	Um	iP	13 01 26.6 C			Ki	iP	01 58 03.4 D
			i	13 01 33.8			Sk	iP	01 58 32.1 D
		Sea of Japan (h = 15 km).					Um	iP	01 58 17.1 D
"	30	Up	iP	00 19 21.6 C			Ka	iP	01 58 50.6
							Bonin Islands (h = 430 km).		
"	30	Up	iP	06 34 43.5	"	31	Up	iP	16 23 14.0
								i	16 23 21.6
"	30	Up	iP	07 02 19.3				iPcP	16 26 50.2
				microns sec				i(sPcP)	16 27 30.4
			P	Z' 0.1 0.5				iScP	16 30 20.2
"	30	Up	i(P)	11 16 58.2					microns sec
								P	Z' 0.1 0.5
"	30	Up	iP	15 38 51.7 D			Ki	iP	16 24 22.3 C
cont.					cont.				

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

1964  
Dec. 31 Sk iP 16 23 53.1 C  
cont. iPcP 16 27 01.0  
Gb iP 16 23 06.3  
ipP 16 23 38.0  
Um iP 16 23 47.3  
i 16 23 48.3  
isP 16 24 37.3  
iPcP 16 26 59.5  
Ka iP 16 22 41.2 C  
ipP 16 23 08.5  
iPP 16 23 28.5  
iS 16 26 29.4  
Crete. h = 150 km  
(Gb,Um,Ka).  
" 31 Up iP 18 00 55.8

Markus Båth  
September 16, 1965