

SEISMOLOGICAL BULLETIN

1957

INSTITUTE OF SEISMOLOGY  
UNIVERSITY OF HELSINKI

Registration  
of earthquakes at Helsinki and Sodankylä

By  
M. T. Porkka, E. Penttilä  
and Lea Laakkonen



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### Introduction

Helsinki, the first seismograph station in Finland, was established in 1923. Since that time, most of the interpretations of results have been sent to the ISS. The seismograms were analysed under the supervision of Prof. Henrik Renqvist, the founder and first director of the station. There were no possibilities for publishing the data and therefore the bulletin remained in manuscript form. These manuscripts are stored at the Institute of Seismology. Unfortunately, some of them were destroyed during World War II. On account of lack of assistant personnel analyses of of seismograms remained defective during some periods in the latter part of the 1930's.

A second station was established in 1956 for the IGY at Sodankylä, in northern Finland. The station is operating in the Geophysical Observatory of the Finnish Academy of Sciences. The Director of the Observatory, Mr. Eero Kataja, M.A., has been taking care of the seismic observations.

Except the preliminary seismological bulletins, issued in the years 1927 - 1929, from October of 1946 to March 1952 and since the beginning of 1961, this is the first number of the Finnish Seismological Bulletin to be published. It includes the time readings of phases from seismograms of both the above-mentioned stations. The material is uneven. There are breaks in recording because of experimental and construction work and the instrumental constants are only approximately known.

- 2 -

Most of the analysis work on the distant earthquakes has been done by Mrs. Lea Laakkonen. The near shocks have been interpreted by Mr. E. Penttilä, M. A. Very many near shocks have been recorded at Sodankylä station. Perhaps many of them are not of seismic origin. In this bulletin are included only the near shocks also observed in neighbouring countries.

## Stations and seismographs

## Helsinki (HEL)

Location: = 60°10'32.3"N  
 = 24°57'25.2"E  
 h = 19.9 m  
 Ground: Migmatite

## Sodankylä (SOD)

Location: = 67°22'16.2"N  
 = 26°37'44.7"E  
 h = 181 m  
 Ground: About 20 m gravel overlying the Precambrian metamorphic shists

## Approximate instrumental constants:

Seismometer	Period	Damp.	Max.magn.	Recording
	Seism. Galv.	ratio		
HEL				
Mainka N	10 -	3:1	150	Mechanical on
" E	10 -	3:1	150	smoked paper
Nurmia Z	0.7 1)	3:1	50 000	Photographic
" N	0.5 1)	3:1	35 000	"
" E	0.5 1)	3:1	35 000	"
SOD				
Benioff Z	1 0.2	17:1	70 000	Photographic
Galitzin N <sup>2)</sup>				"
Nurmia N <sup>3)</sup>	0.5 1.5	3:1	35 000	"
Nurmia E <sup>3)</sup>	0.5 1.5	3:1	35 000	"

- 1) Various short-period galvanometers in trial use
- 2) January to June
- 3) From the beginning of July



January			January			February		
9	SOD eP	01 48 27	25	SOD iP	03 46 57	6	SOD iP	20 42 43
	Komandorskie Islands			iPcP	47 43		iPP	44 20
				iScP	51 40		Lake of Baikal	
9	SOD iP	08 03 04		iP'P'	04 16 20			
	i	38		Andreanof Islands		7	SOD iP	01 46 43
	Fox Islands		25	SOD eP	13 21 11		Sumatra	
9	SOD iP	10 38 36	25	SOD eP	23 29 46	7	SOD eP	16 27 10
	i	41		NE of Greenland			Andreanof Islands	
	Honshu, Japan		26	SOD iP	09 10 16	7	SOD iP	21 52 39
13	SOD iP	11 45 31		i	29		iPcP	58
	ePP	47 59		Philippine Islands			Sea of Japan	
	Tadzhik, USSR		26	SOD iP	16 36 26	8	SOD iP	10 06 19
13	SOD iP	12 31 10		i(Pa)	41	9	SOD eP	02 06 55
	i	16		iPP	37 04		New Guinea	
	Honshu, Japan			eLg	44 39	9	SOD iP	08 20 06
14	SOD iSKP	14 40 59		Caucasus			Caroline Islands	
	Fiji Islands		28	SOD iP	05 34 42	9	SOD iPKP	13 48 37
17	SOD iP	16 32 40		Ryukyu Islands			iPKS	52 24
	i	53	28	SOD eP	23 28 44		New Zealand	
	Batan Islands			Kurile Islands		9	SOD iP	16 49 19
17	SOD iP	22 37 09	29	SOD iP	15 23 24		ePcP	44
	Honshu, Japan			i(Pa)	45		California	
22	SOD iP	11 29 51		Caucasus		9	SOD eP	17 49 37
	iPcP	30 02	29	SOD iP	15 27 03		California	
	Belgian Congo			i(Pa1)	18	10	SOD iP	05 56 30
23	SOD iP	17 33 09		i(Pa2)	24		Azores	
	W coast of Greece			ePP	44			
23	SOD iP	22 10 33		eLg	35 33	10	HEL eSKS	22 55 21
	Caucasus, USSR			Caucasus			SOD iP	22 44 50
24	SOD ePKP	01 29 44	30	SOD iP	12 16 58		i	55
	New Guinea			Yokon			i	45 30
24	SOD eP	15 12 00		February			i	50
	California		4	SOD iP	10 38 14		ePP	48 03
24	SOD iP	16 01 38		Kamchatka			iSKS	55 09
	Sumatra		5	SOD iP	05 01 30		eS	22
24	SOD eP	16 43 07		ePcP	02 20		Philippine Islands	
	California			Mid-Atlantic Ocean		10	HEL eSKS	23 14 09
24	SOD iP	17 12 13	5	SOD ePKP	16 16 13		SOD iP	23 03 27
	California			Santa Cruz Islands			i	39
							eSKS	13 46
							eS	14 00
							e	30
							Philippine Islands	

- 5 -

1957

February			February			February		
11	SOD iP	01 27 16	12	SOD eP	21 19 41	18	SOD ePKP	16 21 56
	ePP	30 29		Philippine Islands			ePP	25 22
	eSKS	37 39					Sandwich Islands	
	iS	53	13	SOD iP	00 42 26	19	HEL eP	07 49 05
	i	38 17		ePP	45 39		SOD iP	07 50 17
	Philippine Islands			eSKS	52 34		i	42
11	SOD iP	03 48 50		iS	50		iPP	51 11
	Philippine Islands			i	53 16		iPPP	25
				Philippine Islands			iPcP	53 26
11	SOD iP	03 57 08	13	SOD iP	04 56 05		iS	55 21
	Philippine Islands						Greece	
11	SOD iP	04 16 44	13	SOD iP	08 43 29	19	SOD iP	20 08 21
	Philippine Islands						iPcP	09 30
11	SOD iP	07 00 11	13	SOD ePKP	12 55 50		Kamchatka	
	Philippine Islands			New Hebrides		20	SOD iP	04 47 34
11	SOD eP	12 09 51	13	SOD iP	14 51 35		Tunisia	
	Philippine Islands			Kurile Islands		20	SOD iP	13 09 09
11	SOD eP	12 33 10	14	SOD iP	12 16 36		ipP	30
	Philippine Islands						iPcP	10 11
11	SOD iP	14 38 14	14	SOD iP	23 12 44		Kamchatka	
	iSKS	48 28		Formosa		20	SOD iP	22 10 38
	iS	44	16	SOD eP	13 49 13		ePP	13 43
	e	49 11		Java Sea			iS	20 39
	Philippine Islands						Sumatra	
11	SOD iP	15 47 25	17	SOD eP	03 58 49	21	SOD iP	01 20 58
	iS	51 10		Philippine Islands			Mid-Atlantic Ocean	
	England		17	SOD iP	04 45 29	21	SOD iP	14 40 01
11	SOD iP	16 36 03		Kamchatka			ipP	28
	Aleutian Islands		17	SOD iP	10 03 33		isP	42
11	SOD iP	19 09 24		Philippine Islands			epPcP	41 16
	Philippine Islands		17	SOD iP	15 59 29		i(PP)	42 11
11	SOD iP	19 36 01		Oaxaca, Mexico			ipPP	44
	Philippine Islands						ePPP	43 42
12	SOD eP	09 02 46	18	SOD eP	00 28 33		Aleutian Islands	
	Kurile Islands			Kurile Islands		21	SOD iPcP	19 55 32
12	SOD eP	17 26 59	18	SOD iP	14 59 37		i	42
	Philippine Islands			Mid-Atlantic Ocean			Kermadec Islands	
						22	SOD iP	05 04 56
							Lake of Issyk-Kul	

February			March			March		
23	SOD iP	03 44 41	2	SOD iP	07 20 16	9	SOD iP	16 42 46
	Kurile Islands			iPP	22 03		Andreanof Islands	
				South of Iran				
23	SOD eP	05 07 39	4	SOD eP	03 36 03	9	SOD iP	16 49 26
	Kurile Islands			Kirghiz			Fox Islands	
23	SOD iP	05 11 18	5	SOD iP	12 33 41	9	SOD iP	16 51 59
	Kurile Islands			N Atlantic Ocean		9	SOD iP	16 55 57
23	SOD eP	13 27 19	6	SOD iP	11 36 39		i	56 09
	Vancouver Island			Kurile Islands		9	SOD iP	17 20 24
23	HEL eP	20 37 42	7	SOD iP	21 59 56		iPcP	21 09
	eS	46 52		Arctic Ocean			Andreanof Islands	
	SOD iP	20 37 22	8	HEL eP	12 18 59	9	SOD iP	18 02 09
	iPP	39 55		eS	22 51		Andreanof Islands	
	iPPP	41 37		eLi	24 56	9	SOD iP	18 04 25
	iPcS	58		eLg <sup>1</sup>	25 59		Aleutian Islands	
	iS	46 26		SOD iP	12 20 15	9	SOD iP	18 07 28
	iPS	50		Greece			i	56
	iPPS	47 04	8	SOD iP	12 27 07		Unimak Island	
	iScS	19		iLi	35 43	9	SOD iP	18 42 51
	eLg <sup>1</sup>	21 02 28		iLg <sup>1</sup>	36 39			
	Formosa			Greece		9	SOD iP	19 23 39
23	SOD i(PKP)	22 56 25	8	SOD eP	20 43 51		Fox Islands	
				Greece		9	SOD eP	19 29 24
24	SOD iP	21 58 36	8	SOD iP	23 41 04		Aleutian Islands	
	i	48		eS	45 53	9	SOD iP	19 44 58
	Formosa			Greece			Andreanof Islands	
26	SOD iP	03 07 14	9	SOD iP	14 15 35	9	SOD iP	19 47 41
	i	22		Alaska			iPcP	48 25
	epP	39	9	HEL eP	14 33 25		Andreanof Islands	
	Philippine Islands			ePS	42 46	9	SOD iP	19 52 20
27	SOD iP	15 12 36	9	SOD iP	14 32 39		Andreanof Islands	
	i	48		iPS	41 15	9	SOD iP	20 11 12
	Formosa			Andreanof Islands			Fox Islands	
28	SOD iP	11 11 54	9	SOD iP	15 52 06	9	SOD iP	20 17 14
	i	12 14		Andreanof Islands			Fox Islands	
	Andreanof Islands		9	SOD iP	16 16 22	9	SOD iP	20 32 12
				Fox Islands			Fox Islands	
			9	SOD iP	16 31 54	9	SOD iP	20 38 15
				Andreanof Islands				
March								
2	SOD iP	00 39 39						
	i	40 15						
	Jamaica							



March			March			March		
9	SOD iP Fox Islands	20 42 10	10	SOD iP Fox Islands	02 32 38	10	SOD iP Andreanof Islands	12 55 48
9	SOD iP Andreanof Islands	20 43 20	10	SOD iP Hokkaido, Japan	03 05 20	10	SOD iP Andreanof Islands	13 20 24
9	HEL eP eS eSS SOD iP eS eScS eSS Fox Islands	20 50 12 59 03 21 03 12 20 49 25 57 38 59 11 21 01 22	10	SOD iP iPcP Andreanof Islands	03 16 21 17 08	10	SOD iP Andreanof Islands	13 38 41
9	SOD iP Fox Islands	22 06 30	10	SOD iP Fox Islands	03 19 10 56	10	SOD iP Aleutian Islands	14 56 02
9	SOD iP Fox Islands	22 47 05	10	SOD iP Aleutian Islands	03 37 40	10	SOD iP Andreanof Islands	15 36 35 iPcP 37 18 ePP 38 54
9	SOD iP Fox Islands	23 09 43	10	SOD eP Fox Islands	04 04 30	10	SOD iP Fox Islands	15 58 45
9	SOD iP i Fox Islands	23 19 33 20 56	10	SOD iP Aleutian Islands	04 47 15	10	SOD iP iPcP Andreanof Islands	16 47 57 48 43
9	SOD iP Andreanof Islands	23 31 02	10	SOD iP Fox Islands	04 51 13	10	SOD iP Andreanof Islands	16 49 59
10	SOD iP Fox Islands	00 16 42	10	SOD iP Andreanof Islands	06 33 56	10	SOD iP Andreanof Islands	16 28 44
10	SOD iP Aleutian Islands	00 36 18	10	SOD iP Fox Islands	07 33 29	10	SOD eP Andreanof Islands	19 51 08
10	SOD iP Aleutian Islands	01 10 38	10	SOD iP Fox Islands	07 41 39 iPcP 42 26	10	SOD iP Andreanof Islands	20 43 56 ePcP 44 43
10	SOD iP Andreanof Islands	01 27 04	10	SOD eP Andreanof Islands	09 33 51	10	SOD iP Unimak Island	21 07 06
10	SOD iP ePcP Fox Islands	01 32 14 33 00	10	SOD iP Aleutian Island	10 00 54	10	SOD iP Fox Islands	21 20 23
10	SOD eP Andreanof Islands	01 53 43	10	SOD iP Fox Islands	11 30 57	10	SOD iP Unimak Island	21 20 23
10	SOD iP Fox Islands	01 56 05	10	SOD eP Aleutian Island	11 45 43	10	SOD iP Andreanof Islands	21 42 38
			10	SOD iP Andreanof Islands	12 22 56 ePcP 23 41	10	SOD iP Andreanof Islands	21 46 56
			10	SOD iP Fox Islands	12 46 21	10	SOD iP Andreanof Islands	21 46 56



March			March			March		
12	HEL iP	11 55 49	13	SOD iP	09 19 43	14	SOD eP	16 01 12
	i	56		iPcP	20 29		iPcP	58
	eS	12 04 38		Fox Islands			Andreanof Islands	
	SOD iP	11 55 03	13	SOD iPKP	09 30 34	15	SOD iP	03 02 16
	i	10		ipPKP	31 46		iPcP	03 03
	iPP	56 44		New Zealand			i	51
	iScP	59 56	13	SOD iP	15 52 16	15	SOD iP	03 08 20
	iS	12 03 20		iPcP	59		iP	03 08 20
	iP'P'	24 18		iPP	54 35	15	SOD iP	04 23 07
	i	29		iScP	57 00		iPcP	53
	Andreanof Islands			iS	16 00 27		Andreanof Islands	
12	SOD iP	12 56 18		iP'P'	21 37	15	SOD iP	12 07 46
	iPcP	57 05		Andreanof Islands			Andreanof Islands	
	iScP	13 01 07	13	SOD iP	17 53 58	15	SOD iP	16 48 07
	eS	04 33		iPcP	54 42		Fox Islands	
	Fox Islands			Andreanof Islands		16	SOD iP	00 50 44
12	SOD eP	15 51 01	13	SOD iP	19 06 39		iPa	51 43
	Fox Islands			Fox Islands			iPcP	53 11
12	SOD iP	17 10 34	13	SOD iP	20 09 25		North of Iran	
	ePcP	11 18		i	10 06	16	SOD eP	02 23 34
	Andreanof Islands			i	13 57		Andreanof Islands	
12	SOD ePKP	17 39 49		Fox Islands		16	HEL eP	02 45 00
	iSKP	42 16	14	SOD eP	00 37 47		eS	54 00
	Fiji Islands			Fox Islands			SOD iP	02 44 20
12	SOD iP	19 26 05	14	SOD iP	02 02 26		iScP	49 13
	Fiji Islands			Fox Islands			i	51 39
12	SOD iPKP	19 29 37	14	SOD iP	02 57 01		iS	52 30
	Fiji Islands			i	13		iPS	45
12	SOD iP	20 10 33		Unimak Island			iP'P'	03 13 44
	i	43	14	HEL eP	14 58 41		Andreanof Islands	
	Unimak Island			eS	15 07 26	16	SOD iP	12 29 52
12	SOD iP	23 55 37		eScS	08 26		Hindu Kush	
	iPcP	56 22		SOD iP	14 57 56	17	SOD eP	01 57 21
	Andreanof Islands			iPP	15 00 17		Andreanof Islands	
13	SOD iP	02 58 33		iPPP	01 54	17	HEL iP	02 59 38
	Andreanof Islands			iScP	02 41		i	50
13	SOD iP	03 17 27		iS	06 07		SOD eP	02 58 52
	Fox Islands			iPS	25		i	59 04
13	SOD iP	03 43 08		iP'P'	27 22		Andreanof Islands	
	iScP	47 54		Andreanof Islands		17	HEL iP	02 59 38
	Andreanof Islands		14	SOD iP	15 15 18		i	50
				Andreanof Islands			SOD eP	02 58 52
							i	59 04
							Andreanof Islands	

March				March				March			
17	HEL iP	07 15	36	18	HEL iP	05 19	28		i	13 02	20
	SOD iP	07 14	49		SOD eP	05 18	44		iScP	05 53	
	Fox Islands				i		52		i	06 23	
					Andreanof Islands				iS	09 19	
17	HEL iP	08 04	47	18	SOD iSKP	19 51	23		iScS	10 59	
	i		59		Fiji Islands				iP'P'	30 17	
	SOD iP	08 40	00						Andreanof Islands		
	ePcP		42	18	HEL iP	20 14	43	19	SOD i	13 46	
	Andreanof Islands				SOD eP	20 13	55		HEL iP	15 58	
17	HEL iP	15 22	36		Andreanof Islands				SOD iP	15 57	
	SOD iP	15 21	49	18	HEL iP	23 21	18		Fox Islands		
	i		22 00		iS		24 09	19	HEL iP	17 15	
	Fox Islands				eLg		26 04		ePcP	54	
17	SOD iP	16 27	27		SOD iP	23 22	36		SOD iP	17 14	
	i		30		iS		26 46		i	42	
	i		38		iLg		29 52		Fox Islands		
	i		46		Crimea			20	HEL iP	00 11	
	iPcP		28 07	19	HEL iP	03 50	32		ePcP	12 17	
	ePP		29 46		SOD iP	03 49	43		SOD eP	00 11	
	Fox Islands				i		56		i	13	
17	SOD iP	18 39	24		ePcP		50 28		Andreanof Islands		
	i		32		Andreanof Islands				Andreanof Islands		
	Aleutian Islands			19	HEL iP	08 23	41	20	SOD iP	00 29	
17	SOD iP	18 43	27		SOD iP	08 22	54		ePcP	57	
	Aleutian Islands				Fox Islands				Aleutian Islands		
17	HEL iP	22 55	33	19	HEL iP	08 25	05	20	HEL iP	00 33	
	ePS		23 04 37		i		33		i	32	
	SOD iP	22 54	47		SOD iP	08 24	18		iScP	37 46	
	iPcP		35 37		i		27		SOD iP	00 32	
	iScP		59 40		i		25 20		Fox Islands		
	eP'P'		24 21		Fox Islands			20	HEL iP	00 53	
	Fox Islands								SOD iP	00 52	
18	HEL iP	00 23	09	19	HEL iP	11 39	48		ePcP	53 47	
	SOD eP	00 22	23		iPcP		40 16		Fox Islands		
	Andreanof Islands				SOD iP	11 39	02				
18	SOD eP	02 34	47		iPcP		47		20	HEL eP	
	Fox Islands				i		40 43		SOD iP	02 54	
					iScP		43 46		Andreanof Islands	02 53	
18	HEL iP	02 36	22		Andreanof Islands				Andreanof Islands		
	iPcP		50	19	HEL iP	13 01	50	20	HEL iP	03 35	
	SOD iP	02 35	36		i		56		iPcP	36 26	
	ePP		37 49		iPcP		02 18		SOD iP	03 35	
	iScP		40 21		eS		10 46		Andreanof Islands		
	Fox Islands				SOD iP	13 01	00		20	HEL iP	
					i		33		06 23	16	
					iPcP		48		iPKKP	41 45	
					cont.				Philippine Islands		

March				March				March			
20	SOD	iP	09 44 25	23	SOD	iP	05 26 14	24	HEL	iP	12 12 13
		i	38			i	20			ipP	55
						ipP	55			isP	13 17
20	HEL	iP	11 12 41			i	27 00		SOD	iP	12 12 31
	SOD	iP	11 11 53			isP	12			epP	13 12
		i	57			iPP	30 26			iPP	14 05
	Andreanof Islands					i	43		Hindu Kush		
						isPP	31 16				
20	SOD	iP	19 01 27			ePPP	32 39	24	HEL	iP	16 43 27
	Andreanof Islands					iSKS	36 38		SOD	iP	16 42 39
						iS	38 32		Fox Islands		
						iSS	44 39				
					Banda Sea						
21	SOD	iP	08 57 35					25	HEL	iP	00 50 23
		i	48						SOD	iP	00 49 35
	Mexico									ePcP	50 21
				23	SOD	iP	13 34 46		Fox Islands		
21	SOD	iP	12 41 41		Andreanof Islands						
		i	56					25	HEL	iP	01 14 54
		iPcP	42 25	23	HEL	iP	19 27 15		Andreanof Islands		
	Fox Islands				Ionian Islands						
								25	HEL	iP	05 48 22
21	SOD	iP	14 22 19						SOD	eP	05 47 28
				24	HEL	eP	02 14 48		Unimak Island		
21	SOD	eP	17 49 23		SOD	iP	02 13 43				
		i	42					26	SOD	iP	02 20 18
	Andreanof Islands								Fox Islands		
				24	HEL	iP	04 47 15				
22	HEL	eP	14 31 56			iPcP	46	26	SOD	iP	03 15 11
	ePPP		36 01		SOD	iP	04 46 27		Fox Islands		
	e		40 00			iPcP	47 17	26	SOD	iP	03 15 11
	eS		35		Rat Islands				Fox Islands		
	eScS		41 34					26	SOD	iP	04 57 22
	SOD	iP	14 31 09	24	HEL	iP	07 40 15		Iran		
	ePP		33 14		SOD	eP	07 39 31				
	iS		39 12		Andreanof Islands			27	SOD	iP	04 24 04
	iPS		32						Fox Islands		
	iSS		43 00					27	SOD	iP	16 56 45
	eP'P'	15 00 44		24	HEL	iP	08 33 19			i	57
	Fox Islands					i	23			ePcP	57 30
						iPcP	47		Unimak Islands		
					SOD	iP	08 32 36				
						i	39				
					Vancouver						
22	HEL	iP	14 43 13					28	SOD	iP	13 01 45
		iPcP	44 03						Unimak Islands		
	Fox Islands							28	HEL	eP	20 19 20
				24	HEL	eP	11 17 07			ePcP	47
22	SOD	iP	17 19 59		SOD	iP	11 16 20		SOD	eP	20 18 36
		i	20 19			i	30		Fox Islands		
		iPcP	46		Fox Islands						
	Fox Islands							28	HEL	iP	22 30 45
				24	HEL	iP	11 47 45		SOD	iP	22 31 59
						ePcP	48 13		Greece		
22	SOD	iP	19 55 50		SOD	iP	11 46 58				
	California				Fox Islands						

March	April	April
29 HEL iP 05 21 21	2 HEL iP 00 50 44	4 HEL iP 00 23 15
SOD iP 05 20 32	i 57	iPcP 24 43
i 43	iPcP 51 11	iScP 27 50
iPcP 21 20	SOD iP 00 49 57	eS 31 24
i 29	i 50 11	iP'P' 52 25
i 22 07	Andreanof Islands	SOD iP 00 22 28
ePP 48		iPcP 23 31
iScP 25 26	2 HEL iP 08 43 55	eScP 27 22
eP'P' 50 09	iPcP 44 07	Alaska Peninsula
Fox Islands	SOD iP 08 43 32	4 HEL iP 01 01 43
	Honshu, Japan	i 52
29 HEL iP 05 51 47	2 HEL iP 09 02 27	SOD iP 01 00 55
SOD iP 05 51 17	iPcP 40	Fox Islands
Talaud Islands	SOD iP 09 02 01	
	Honshu, Japan	4 HEL iP 01 40 41
29 SOD iP 22 59 59		i 52
Fox Islands	2 SOD iP 12 01 59	SOD iP 01 39 54
	Andreanof Islands	Fox Islands
30 SOD iP 00 52 49	2 HEL iP 20 27 59	
Andreanof Islands	SOD iP 20 27 12	4 HEL iPcP 11 19 28
	ePcP 58	i 55
30 SOD eP 02 00 45	Andreanof Islands	SOD iPcP 11 19 34
Andreanof Islands		Argentina
30 SOD iP 09 27 10	2 HEL eP 20 50 06	4 HEL iP 11 43 35
i 22	i 19	SOD eP 11 43 56
Andreanof Islands	iPcP 33	Hindu Kush
31 HEL iP 21 38 09	SOD iP 20 49 20	
	Andreanof Islands	
April	2 HEL iP 21 38 59	4 HEL iP 12 36 45
	SOD iP 21 38 11	SOD eP 12 37 43
1 HEL iP 07 43 15	i 25	W coast of Greece
Philippine Islands	Andreanof Islands	
1 HEL eP 08 07 26	3 HEL iP 00 41 25	4 HEL iP 14 54 41
Molucca Passage	Near S coast of Iran	iPcP 55 10
		SOD iP 14 53 54
1 SOD ePn 09 33 37	3 HEL iP 17 00 42	i 04
eSb 35 11	Aleutian Islands	i 28
eSg 30		ePcP 40
	3 HEL iP 20 34 19	Fox Islands
1 HEL iP 11 46 35	iPP 31	
i 44	W coast of Cyprus	4 HEL iP 16 16 22
ePcP 47 07		iPP 36
SOD iP 11 45 47	3 HEL eP 23 20 12	iPPP 52
i 46 01	iPcP 41	SOD eP 16 17 37
Andreanof Islands	Aleutian Islands	Northern Iran

April

5 HEL iP 03 00 36  
 iPcP 01 06  
 SOD iP 02 59 50  
 iPcP 03 00 37  
 Fox Islands

5 SOD iPcP 07 49 38  
 ipPKP 50 05  
 ePP 52 20  
 iSKP 53 04  
 ipSKP 48  
 Kermadec Islands

5 SOD iP 16 46 29  
 iPcP 47 14  
 Andreanof Islands

5 HEL iP 23 27 10  
 SOD iP 23 26 54  
 Formosa

7 SOD iP 08 13 52  
 Fox Islands

7 SOD eP 10 27 48  
 i 56  
 New Guinea

7 SOD eSg 14 51 44

7 SOD iP 22 48 55  
 Fox Islands

9 HEL iP 00 35 35  
 ipP 37 19  
 iS 44 31  
 SOD iP 00 35 08  
 i 13  
 iPcP 28  
 ipP 36 51  
 isP 37 48  
 iS 43 43  
 iScS 44 23  
 Honshu, Japan

9 HEL iP 02 29 36  
 SOD iP 02 29 15  
 iPcP 34  
 Mariana Islands

April

9 HEL eP 10 10 23  
 Andreanof Islands

9 HEL eP 10 46 22  
 SOD iP 10 45 57  
 S of Honshu, Japan

9 HEL eP 11 13 09  
 SOD iP 11 12 27  
 iPcP 13 12  
 Andreanof Islands

9 HEL iP 20 34 51  
 i 35 05  
 ePcP 19  
 SOD iP 20 34 04  
 i(pP) 15  
 i 21  
 Fox Islands

10 HEL iP 03 36 11  
 i 23  
 iPcP 41  
 SOD iP 03 35 25  
 i 35  
 iPcP 36 13  
 iScP 40 11  
 iP'P' 04 04 57  
 Fox Islands

10 HEL eP 05 25 15  
 SOD iP 05 24 58  
 iPP 28 28  
 eSKS 35 28  
 Oaxaca, Mexico

10 HEL iP 09 20 22  
 ipP 33  
 iPcP 50  
 SOD iP 09 19 36  
 ipP 47  
 i 20 03  
 ePcP 19  
 Andreanof Islands

10 HEL iP 11 40 34  
 iS 49 17  
 iScS 50 30  
 SOD iP 11 39 44  
 cont.

April

iS 11 47 40  
 iPS 57  
 iScS 49 23  
 eP'P' 12 09 09  
 Kodiak Islands

10 HEL iP 12 13 03  
 SOD iP 12 12 14  
 Aleutian Islands

10 HEL iP 13 05 43  
 i 49  
 SOD eP 13 04 55  
 Kodiak Islands region

10 HEL iP 13 31 11  
 Andreanof Islands

10 HEL eSb 20 05 46  
 SOD iPn 20 04 47  
 eSn 05 30  
 iSg 54

11 HEL eSg 08 07 33  
 SOD eSg 08 07 36

11 HEL iP 17 51 34  
 i 46  
 iPcP 52 07  
 SOD eP 17 50 51  
 Fox Islands

12 HEL iP 04 28 41  
 i 49  
 iPcP 29 07  
 Andreanof Islands

12 HEL iP 21 09 49  
 ePcP 10 17  
 Aleutian Islands

13 HEL iP 05 24 28  
 SOD iP 05 23 42  
 Fox Islands

13 HEL iP 06 43 11  
 i 28  
 SOD iP 06 43 02  
 i 15  
 eS 53 26  
 Mindanao

April			April			April		
13	HEL iP	08 10 17	14	HEL iP	21 10 03	iPP	04 19 52	
	i	30		i(pP)	13	ipPP	21 43	
	SOD iP	08 09 29		i(sP)	20	iPPP	59	
	Fox Islands			iPcP	32	iSKS	25 42	
13	HEL iP	10 23 53		iS	19 02	iS	26 10	
	i	24 06		eP'P'	38 14	iSP	27 28	
	SOD iP	10 23 43		SOD iP	21 09 17	iSPP	28 24	
	epP	24 14		i(pP)	27	isSKS	29 42	
	isP	21		iPcP	10 01	isS	51	
	esS	34 54		ePP	11 33	isSP	31 04	
	S coast of Mindanao			iS	17 35	eSS	32 20	
13	SOD iP	16 28 05		eP'P'	38 26	Java Sea		
	Hokkaido, Japan			Andreeanof Islands				
14	HEL iP	07 20 41	15	HEL iP	10 49 31	16	SOD eP	08 50 26
	iS	27 45		i	40	17	HEL iP	02 26 47
	SOD iP	07 20 49		i	46		Italy	
	iPcP	22 11		iPcP	50 04	17	HEL iP	04 46 24
	iPP	46		SOD iP	10 48 47		SOD iP	04 45 36
	iPPP	23 35		i	55		Kodiak Island	
	iScP	26 05		ePcP	49 30	17	HEL ePKP	08 26 55
	iS	28 00		Andreeanof Islands			i	27 07
	eLg	39 03	15	HEL iP	18 23 27		Tonga Islands	
	Southern Tibet			SOD iP	18 22 41	17	HEL iP	08 44 50
14	HEL iP	08 36 47		Andreeanof Islands			Italy	
	SOD iP	08 36 38	15	HEL iP	21 44 05	17	HEL iP	09 38 50
	Windward Passage			i	15		iPcP	39 19
14	HEL iP	16 45 40		iPcP	36		Fox Islands	
	i	43		iS	53 00	17	HEL iP	13 35 54
	SOD iP	16 45 47		SOD iP	21 43 18		i	36 09
	ePcP	46 09		i	21		iPcP	30
	Southern Tibet			ePcP	44 02		SOD eP	13 35 08
14	HEL iPKP	19 37 05		ePP	45 36		Fox Islands	
	iPKP	16		eS	51 31	17	HEL iP	15 18 15
	iPP	39 38		eScS	52 07		SOD iP	15 17 27
	iSKP	40 44		iP'P'	22 12 41		S of Unimak Island	
	iSKSP	49 38		Fox Islands		17	HEL iP	19 08 14
	ePPP	53 14	16	HEL iP	04 16 06		Hokkaido, Japan	
	SOD iPKP	19 37 04		ipP	18 11	17	HEL iP	21 18 03
	iPP	38 59		iSKS	25 38		i	20 03
	ePKS	40 27		iS	26 07		i	22 51
	eSKS	44 08		iSS	32 19			
	i	50 14		i	33 31			
	eSS	55 50		SOD iP	04 16 09			
	Samoa Islands			ipP	18 14			
				isP	19 10			
				cont.				



April			April			April		
18	HEL iP	00 27 13	21	HEL iP	21 25 14		iLg2	02 38 44
	i	27		iPP	28 44		SOD iP	02 31 56
	SOD iP	00 26 28		eSKS	35 53		i	32 16
	Fox Islands			iS	58		iPPP	33 10
18	HEL iP	05 30 13		SOD iP	21 25 12		i	36 24
	Turkey			iPP	28 45		i	44
18	HEL iP	05 42 24		iSKS	35 39		iSS	38 42
	i	42		Columbia- Venezuela			E of Rhodes Island	
18	HEL eP	07 11 17	21	HEL eP	23 28 54	25	HEL iP	04 42 14
	Andreanof Islands			Andreanof Islands			i	39
18	SOD iP	22 24 28	22	HEL iP	00 27 04	25	HEL iP	07 05 49
	i	34		SOD iP	00 27 12			
	S of Honshu, Japan			Tibet		25	HEL iP	05 30 36
19	SOD iP	07 14 52	22	HEL iP	00 49 24		E of Rhodes Island	
	Unimak Island			Crete		25	HEL iP	07 17 40
19	HEL iP	15 55 56	22	HEL iP	01 50 09		iPcP	19 22
	i	56 04		SOD iP	01 51 13		iPP	27
	iPcP	25	22	HEL iP	01 51 06		SOD iP	07 17 24
	iS	16 04 58	22	HEL iP	05 38 15		iPP	19 00
	iP'P'	24 09		Tibet			iPcP	09
	SOD iP	15 55 09	22	SOD iP	13 55 59	25	HEL iP	07 26 12
	iS	16 03 26		Colombia-Venezuela			iPcP	40
	iPS	41	22	HEL iP	15 50 04		SOD iP	07 25 26
	Fox Islands			Colombia-Venezuela			iPcP	26 14
19	HEL iP	22 30 28	22	HEL iP	15 50 04		eScP	30 16
	i	40		Colombia-Venezuela			Andreanof Islands	
	iPcP	56	24	HEL iP	02 12 41	25	HEL iP	07 57 20
	iS	39 23		SOD iP	02 12 46		SOD eP	07 58 27
	eScS	40 18		Sumatra			Rhodes Island	
	eSS	43 52	24	HEL iP	19 15 23	25	HEL iP	11 19 26
	iP'P'	58 44		iS	19 39		i	30
	SOD iP	22 29 39		SOD iP	19 16 28		SOD iP	11 19 16
	iPP	31 58		i	50		ePP	23 05
	iS	38 51		iPP	17 23		Molucca Passage	
	eScS	40 33		iPPP	39	25	HEL iP	14 18 04
	iP'P'	58 56		eS	21 29		iPcP	53
	Fox Islands			i	22 33		SOD iP	14 17 11
20	HEL iP	02 09 44		East Rhodes Island			i	35
	SOD iP	02 09 02	25	HEL iP	02 30 52		ePcP	18 22
20	SOD iP	18 04 33		iS	35 02		Alaska	
	Fox Islands			iLg1	38 16	25	SOD iP	15 48 28
				cont.				

April			April			April		
25	HEL iP	17 56 07	28	HEL iP	01 36 42	30	SOD eP	15 29 47
	iPcP	36		eS	47 28		Aleutian Islands	
	SOD iP	17 55 22		SOD iP	01 36 30		Philippine Islands	
	ePcP	56 06						
	Andreanof Islands		28	HEL iP	19 07 02	May		
26	HEL iP	02 18 50		SOD iP	19 07 10		Sumatra	
	ipP	19 30				1	HEL iP	00 52 18
	isP	52					i	23
	i(PP)	20 08	28	HEL iP	20 14 42		ePP	53 46
	SOD iP	02 19 08		iPcP	15 11		SOD iP	00 52 22
	epP	48		Andreanof Islands			iLg2	01 05 16
	i(PP)	20 38					Kirghiz-China borde	
	iPcP	21 16	28	HEL iP	23 50 14	1	HEL iP	20 08 37
	Hindu Kush			i	25		SOD iP	20 08 53
26	HEL iP	02 42 12		SOD iP	23 49 17		Sinkiang Province	
				Fox Islands				
26	HEL iP	06 38 50	29	HEL iP	04 41 03	1	HEL iP	23 39 04
	eS	43 10		SOD iP	04 40 12		iPcP	33
	SOD eP	06 39 54		ipP	33		ipP	41 32
	i	40 09		isP	42		SOD iP	23 38 17
	ipP	56		iPcP	56		ePcP	39 03
	iSP	46 39		Fox Islands			Fox Islands	
	iLi	48 11	29	HEL iP	04 48 10	2	HEL iP	02 33 07
	iLg1	49 34		SOD iP	04 47 22		iPcP	36
26	SOD iP	10 32 37		Fox Islands			SOD iP	02 32 19
	Alaska						iPcP	33 08
			29	HEL iP	04 55 31		Fox Islands	
26	HEL iP	15 19 08		SOD iP	04 54 42	2	HEL iP	04 02 30
	iPcP	39		Fox Islands			SOD iP	04 01 43
	SOD iP	15 18 30	29	SOD iP	09 32 25		iS	06 38
	isP	58		Kurile Islands			Baffin Bay	
	Kurile Islands		29	HEL iP	19 35 28	2	HEL ePKP2	10 55 16
26	HEL iP	16 14 20		SOD iP	19 35 15		South Pacific Ocean	
	Rhodes Island			Philippine Islands		2	HEL iP	11 40 10
27	HEL eP	00 23 12	29	HEL iP	21 09 18		ePcP	39
	SOD eP	00 23 14		SOD iP	21 09 20		SOD iP	11 39 21
	Celebes			Off S coast of Java			ePcP	40 06
27	HEL iP	02 50 18	30	HEL iP	03 45 36		Fox Islands	
	ipP	30		i	47	2	HEL iP	11 49 50
	iPcP	46		Philippine Islands			SOD iP	11 49 02
	SOD iP	02 49 32	30	SOD i(P)	04 00 50		iPcP	49
	ipP	42					Fox Islands	
	Fox Islands							

May	May	May
2 HEL iP 21 49 08 iPP 53 16 iSKS 58 49 i 59 22 iSP 22 01 16 SOD iP 21 49 03 ipP 51 12 isP 52 16 i 30 iPP 53 04 Flores Sea	7 HEL eP 05 47 29 SOD iP 05 46 42 Andreanof Islands 7 HEL eP 09 20 56 SOD iP 09 20 07 i 21 Fox Islands 7 HEL iP 22 30 56 SOD iP 22 30 28 S of Honshu, Japan	12 SOD iP 11 42 28 ePP 46 11 eSKS 53 04 iS 32 ePS 55 04 S coast of Java 12 HEL iP 22 17 51 i 55 i 18 08 12 HEL iP 23 48 52 Samoa Islands
3 HEL iP 05 51 03 Kamchatka	9 HEL eP 08 51 28 Turkestan, USSR	13 HEL iP 02 30 44 iPcP 31 21 i(pP) 46 SOD iP 02 30 11 iPcP 31 02 Siberia
3 HEL iP 07 21 19 SOD iP 07 20 34 ePcP 21 21 Andreanof Islands	10 HEL iP 16 43 24 Kermadec Islands	13 HEL iP 04 39 07 iPP 44 E of Rhodes Island
3 HEL iP 14 55 37 Philippine Islands	11 HEL eP 00 42 52 Greece	13 HEL iP 06 39 18 Greece
3 HEL iP 16 25 59 iPcP 26 28 Andreanof Islands	11 HEL iP 15 06 52 i 07 05 SOD iP 15 06 06 Kamchatka	13 HEL iP 13 29 44 SOD iP 13 29 33 Philippine Islands
4 HEL iP 15 01 16 i 20 SOD iP 15 01 09 i 13 Chinghai Province	11 SOD iP 18 54 13 Honshu, Japan	14 HEL iP 03 10 10 Honshu, Japan
5 HEL iP 19 32 22 Iran	11 SOD iP 19 55 39 Mongolia	14 HEL iP 18 54 57 Andreanof Islands
6 HEL iP 11 30 45 Andreanof Islands	12 SOD eP 02 05 29 Greece	15 HEL iP 01 27 24 i 47 iPP 28 56 SOD iP 01 27 45 iPP 29 21 Northern Afghanistan
6 SOD iP 15 13 36 i 14 39 Iran	12 SOD iP 05 07 01 iPP 09 32 iPKS 10 42 Sandwich Islands	15 HEL iP 01 54 03 iPcP 30 Andreanof Islands
6 HEL iP 21 54 19 i 30 SOD iP 21 54 06 i 18 Philippine Islands	12 SOD iP 06 57 27 i 32 ePcP 58 46 Northern Sakhalin	15 HEL iP 02 23 48 SOD iP 02 23 33 Chiapas, Mexico
6 HEL iP 22 55 03 i 37 SOD iP 22 54 46 i 55 22	12 SOD eP 07 58 26 Greece	

May	May	May
17 HEL iP 03 01 13 Fiji Islands	20 HEL iP 20 02 37 SOD iP 20 03 42 N coast of Sicily	SOD iP 13 40 02 i 41 18 iPP 42 30 ePPP 44 54 iS 48 29 ePS 38 eScS 49 52 iP'P' 14 09 21 Andreanof Islands
17 HEL iP 06 06 31 SOD iP 06 05 43 Fox Islands	21 HEL iP 01 24 25 ipP 51 i(sp) 25 07 iPP 27 46 i 29 23 eSKS 34 34 iS 39 isS 35 23 iSP 37 iPS 49 SOD iP 01 24 02 ipP 26 iPP 27 14 iS 33 53 iScS 34 02 iSKS 09 isS 37	24 HEL iP 02 50 56 i(pP) 51 15 iPP 54 40 iSKS 03 01 22 Colombia
17 HEL iP 23 13 47		24 HEL iP 03 08 24
18 HEL iP 05 35 06 i 20 iPcP 34 SOD iP 05 34 20 i 49 iPcP 35 06 Fox Islands		24 HEL iP 03 47 26 iPcP 54 Fox Islands
19 HEL iP 03 25 33 SOD iP 03 26 33 Greece		25 HEL iP 00 41 04 i 14 SOD iP 00 40 16 Kamchatka
19 HEL iP 13 48 02 Greece	21 HEL iP 09 26 13 Aleutian Islands	26 SOD iP 04 27 05 Fox Islands
19 HEL iP 20 56 39 iPcP 53 i 57 06 SOD iP 20 56 21 i 47 iPP 53 53 Ryukyu Islands	21 HEL iP 11 47 22 iPcP 45 SOD iP 11 46 50 i 47 01 ePP 49 21 Honshu, Japan	26 HEL iP 06 38 02 i 16 iPPP 33 iS 41 27 iLi 43 24 iLg1 44 02 SOD iP 06 39 15 i 46 iS 43 52 Turkey
19 HEL iP 21 05 22 iPcP 52 SOD iP 21 04 34 ePcP 05 22 Aleutian Islands	21 HEL iP 11 49 08 SOD iP 11 50 13 eLg1 12 00 32 N coast of Sicily	26 HEL iP 08 59 18 eS 09 02 48 SOD iP 09 00 28 eS 05 10 iLg1 08 31 Turkey
19 SOD eP 22 10 06 Iran	21 HEL iP 13 29 02 SOD iP 13 30 13 e 35 11 iLg1 39 27 iLg2 59 E coast of Greece	
20 HEL iP 02 01 49 iPcP 02 18 i 27 Andreanof Islands	21 SOD iP 15 11 53 Unimak Island	
20 HEL iP 03 53 17 iPcP 46 Fox Islands	22 HEL iP 13 40 49 iPcP 41 22 cont.	26 HEL eP 09 18 14 SOD iP 09 19 26 Turkey

May				May				May			
26	SOD iP	09 22 17	28	HEL iPKP	23 38 16		iPP	02 35 11			
	i	34		ipPKP	39 26		ipPKP	36 09			
	Turkey			iSKP	41 10		Argentina				
26	HEL iP	09 41 06		SOD iPKP	23 38 03						
	iSr2	44 30		New Hebrides Islands	31		HEL iP	03 21 09			
	SOD iP	09 42 17	28	HEL iP	23 57 48		iPcP	42			
	iS	46 56		iPcP	58 08		SOD iP	03 20 20			
	i	47 20		SOD iP	23 57 33		i	30			
	iPcS	49 22		iPcP	49		ePcP	21 01			
	iLi	50 17		Formosa			Unimak Island				
	Turkey										
26	SOD i(P)	11 10 15	29	HEL iP	08 52 21		HEL iP	22 28 07			
				iSr1	11 59		iPcP	35			
				SOD iP	08 53 55		SOD iP	22 27 20			
27	HEL iP	06 24 57		Turkey			ePcP	28 09			
	SOD iP	06 26 09					eScP	32 06			
	Turkey		29	HEL iP	10 08 21		iP'P'	56 40			
				Iran			Andreanof Islands				
27	HEL iP	07 09 37	29	HEL iP	10 22 14	June					
	iS	13 07		iS	25 47		HEL iP	05 31 24			
	SOD iP	07 10 50		SOD iP	10 23 27	1	iS	34 57			
	Turkey			Turkey			SOD iP	05 32 38			
27	HEL iP	08 28 45	29	HEL iP	16 23 15		Turkey				
	Turkey			Turkey							
27	HEL iP	11 06 05	29	HEL iP	18 44 15	1	HEL iP	16 14 04			
	iS	09 28		i	24		iPcP	48			
	SOD iP	11 07 09		eS	48 16		SOD iP	16 13 13			
	i(S)	11 59		SOD iP	18 45 22		i	27			
	eLg1	16 07		i(Pa)	46 13		Alaska				
	Turkey			Greece							
27	SOD iP	20 08 07	30	HEL iP	13 12 30	1	HEL iP	21 12 47			
	Fox Islands			SOD eP	13 30 40		iS	16 19			
28	HEL eP	00 14 21		Turkey			SOD iP	21 13 57			
	SOD iP	00 15 31					iPP	14 56			
	Turkey		30	SOD eP	14 35 46		Turkey				
28	SOD iP	01 29 34	30	HEL iP	20 00 20	1	HEL iP	22 41 18			
	i	46		SOD iP	19 59 45		SOD eP	22 41 18			
	Fox Islands			Hokkaido, Japan		2	HEL iP	01 16 30			
28	HEL eP	05 38 17					iSr2	19 57			
	SOD iP	05 39 26	30	HEL iPKP	21 16 31		iSr1	20 02			
	Turkey			iSKP	19 20		iPcP	36			
				SOD iSKP	21 19 07		SOD iP	01 17 41			
				Fiji Islands			eLi	25 42			
28	HEL eP	06 01 29					Turkey				
	SOD iP	06 01 26	31	HEL ePKP	02 34 00	2	HEL iP	21 32 10			
	i	49		i	36 14		ePcP	50			
	iPcP	02 13		SOD iPKP	02 34 06		SOD iP	21 31 23			
	Pakistan-Burma border						i	35			
							Kamchatka				

cont.

June	June	June
3 HEL iP 00 59 18	6 SOD iP 05 48 37	ipP 03 26 23
4 HEL iP 00 51 31	i 54	i 33
iPcP 52 02	Fox Islands	Mariana Islands
SOD iP 00 50 44	6 HEL iP 20 03 01	10 SOD iP 04 54 29
Unimak Island	i 10	Balutchistan
4 HEL iPKP 11 33 48	SOD iP 20 02 53	11 HEL iP 04 15 22
Santa Cruz Islands	i 03 05	i(pP) 35
4 HEL iPKP 17 23 13	iPP 06 31	iPcP 53
iSKP 26 02	eS 13 42	SOD iP 04 14 34
SOD iPKP 17 23 11	Molucca Passage	i(pP) 48
iSKP 25 39	7 HEL eP 00 10 26	i 15 06
Fiji Islands	i 44	Unimak Island
4 HEL iP 20 30 46	SOD iP 00 10 34	11 HEL iP 05 04 21
i 56	eLg1 22 35	i 53
iPP 34 06	China	SOD iP 05 04 40
SOD iP 20 30 50	7 HEL iP 01 38 42	ePP 06 20
i 31 09	SOD iP 01 38 20	e 42
Sumatra	Mariana Islands	eS 10 29
5 HEL iP 06 40 53	7 HEL iP 02 58 05	eSS 13 25
i 41 13	SOD iP 02 56 52	Hindu Kush
SOD iP 06 42 06	Andreanof Islands	11 SOD iPKP 15 09 01
Caucasus	8 HEL iP 16 50 46	i 11
5 HEL iP 07 23 02	SOD eP 16 51 29	iSKP 12 34
SOD iP 07 22 48	Caspian Sea	ePKS 45
i 56	9 HEL eP 04 17 30	Kermadec Islands
eS 28 13	SOD eP 04 17 04	11 SOD iP 19 01 07
North Atlantic Ocean	i 15	iPcP 21
5 HEL iP 08 36 45	Honshu, Japan	iS 10 41
Southern Alaska	9 SOD iP 21 01 32	i(SKS) 56
5 HEL iP 14 08 07	i 41	iPS 11 17
i 21	Fox Islands	Philippine Islands
SOD iP 14 07 21	10 HEL iP 01 13 39	12 SOD iP 00 04 06
i 34	i 15 08	iPcP 52
E coast of Kamchatka	ePP 17 48	iScP 08 55
5 SOD iPn 21 13 04	iSKS 24 06	Andreanof Islands
iPg 20	SOD iP 01 13 37	12 SOD iP 00 09 20
iSb 14 21	iPP 17 38	ePcP 10 53
6 HEL iP 03 41 16	iSKS 24 03	Andreanof Islands
iPcP 44	Sumbava Island	12 SOD iP 08 38 50
SOD iP 03 40 30	10 HEL iP 03 26 08	i 39 17
i 57	ipP 42	Hokkaido, Japan
iPcP 41 15	SOD iP 03 25 49	
Andreanof Islands	i 59	
	cont.	

June	June	June
13 HEL eP 10 51 29 eS 11 00 29 SOD iP 10 50 52 iPcP 51 36 iScP 55 40 i(PcS) 51 iS 59 00 eScS 11 11 39 iP'P' 20 17 Andreanof Islands	SOD iP 02 23 21 iPcP 40 i 24 04 Burma	iSP 06 32 18 iSKS 42 06 iS 27 Chiapas, Mexico
13 SOD iP 20 34 09 ipP 49 i(sP) 35 03 Sumatra	18 HEL iP 11 30 47 epP 31 08 i 33 20 iPP 39 SOD iP 11 30 34 Philippine Islands	22 HEL iP 09 02 14 iS 03 55 SOD iP 09 01 05 Off coast of Norway
13 SOD iP 21 40 30 Northern Celebes	18 HEL iP 14 59 23 i 44 iPcP 50 SOD iP 14 59 27 i 43 iPcP 52 iS 15 08 37 Burma	22 HEL iP 19 33 18 Mid-Atlantic Ridge
14 SOD eP 06 34 29 i 46 Andreanof Islands	18 SOD eP 21 33 26 Rat Islands	23 HEL iP 00 04 24 iPP 08 38 eSKS 15 00 eS 15 59 ePPS 18 36 eSS 23 14 SOD iP 00 04 07 ePP 08 10 iS 15 34 e 22 02 N coast of New Guinea
14 HEL iP 11 44 28 i(PP) 46 12 iPcP 38 Southern Afghanistan	19 HEL iPcP 01 49 14 iPKS 53 09 SOD ePKP 01 49 08 Tonga Islands	23 HEL iP 03 37 19 i 36 iPP 39 38 SOD iP 03 36 30 i 37 21 Coast of SE Alaska
15 SOD iP 18 28 29 iPcP 29 15 Fox Islands	19 HEL iP 23 42 26 i 38 iPcP 53 Alaska	23 SOD eP 20 28 33 Iran
15 SOD iP 20 14 10 ipP 21 E coast of Honshu	20 HEL iP 00 44 35 Philippine Islands	25 SOD iP 10 22 43 i 51 Andaman Islands
16 SOD iP 00 20 00 i 39	20 HEL iP 01 19 14 ipP 45 Mariana Islands	25 SOD iP 16 16 19 W coast of Sumatra
16 SOD iP 02 27 31 Fox Islands	22 HEL iP 06 32 07 ipP 27 i 52 ePP 35 43 eSKS 42 29 iS 55 SOD iP 06 31 49 ipP 32 09 cont.	26 HEL eP 02 59 57 SOD iP 03 00 15 i 32 Indian Ocean
18 HEL iP 02 23 16 i 22 iPcP 35 iPP 25 23 iSZ 32 29 cont.		27 HEL iP 00 17 43 iPP 19 33 iScP 23 13 cont.

June	July	July
iS 00 24 30	1 SOD iP 13 29 50	3 SOD ePKP 06 20 42
eSS 27 26	Mid-Atlantic Ridge	i 54
iSS 35		iSKP 23 35
i(Sa) 28 05	1 SOD iP 16 26 41	Fiji Islands
iLi 31 19	Kamchatka	
iLg1 33 10		3 SOD iP 12 34 54
iLg2 34 10	1 HEL iP 19 40 15	i 56
SOD iP 00 17 05	eS 48 09	iS 43 12
iPP 18 41	i 49 15	eP'P' 13 04 07
iS 23 12	SOD iP 19 40 17	Andreanof Islands
Lake Baikal, USSR	iS 48 18	
	iPS 44	3 SOD iP 15 21 48
27 HEL iP 01 47 36	isS 49 02	Andreanof Islands
SOD iP 01 46 59	India-Burma border	
		3 SOD iP 17 14 27
27 HEL eP 04 16 10	1 SOD iP 23 52 40	Fox Islands
SOD iP 04 16 00	iPcP 53 21	
Philippine Islands	Kamchatka	3 SOD eP 21 46 41
		4 HEL iP 02 56 22
27 HEL iP 07 15 43	2 HEL iP 00 48 33	SOD iP 02 56 14
iPP 16 02	iS 53 30	USSR
Greece	SOD iP 00 49 14	
	iL 01 01 54	4 HEL iP 08 41 39
28 HEL iP 18 00 25	Northern Iran	i 45
Philippine Islands		i 51
	2 HEL iP 01 23 01	ipP 42 07
29 SOD iP 22 41 30	SOD eP 01 23 43	iPP 45 05
ePP 43 09	Iran	Sumatra
Lake Baikal		4 HEL iP 08 53 44
	2 SOD eP 05 02 59	Kamchatka
29 SOD iP 23 40 52	Iran	
		4 HEL iP 19 32 18
29 SOD iP 23 53 36	2 SOD iP 05 16 09	Mariana Islands
SE coast of Spain	i 15	
	Iran	5 HEL iP 01 10 15
30 SOD iP 03 06 31	2 SOD iP 07 43 26	Arizona-Mexico bord
Northern Iran	Indian Ocean	
		5 HEL iP 12 26 13
	2 SOD iP 14 29 32	Andreanof Islands
July	i 30 37	
	Iran	5 HEL iP 12 53 31
1 SOD ePKP 02 41 36		Kermadec Islands
iSKP 45 02		
Tonga Islands	2 SOD iP 15 08 49	5 HEL iP 15 42 27
		i 31
1 SOD iP 06 36 43	2 SOD eP 22 37 43	iPcP 54
i 37 08	Fox Islands	Congo
		7 HEL iP 06 03 58
1 SOD eP 13 16 50	3 SOD iP 01 57 19	SOD iP 06 04 53
i 58	i 33	eS 09 48
Mid-Atlantic Ridge	Kamchatka	Turkey



July			July			July		
7	SOD iP	06 27 43	10	SOD eP	04 02 41	14	HEL iP	06 43 11
	Kamchatka						iSKP	46 34
7	HEL iP	16 29 58	10	SOD iP	04 52 38		SOD ePKP	06 42 36
	SOD iP	16 29 39		i	53 11		i	43
	iPKKP	40 39		Fox Islands			i	58
	Solomon Islands		10	HEL eP	23 42 33		iPP	45 43
7	SOD e(P)	18 19 45		i	40		iSKP	46 14
	Iran			SOD iP	23 43 41		Kermadec Islands	
8	HEL iP	00 43 09	11	HEL iP	08 21 56	14	HEL iP	08 30 29
	i	24		iPcP	22 25		ePKS	34 10
	i	29		SOD iP	08 21 17		SOD ePKP	08 30 07
	SOD iP	00 43 09		Kurile Islands			i	20
	i	25					Kermadec Islands	
	India-Burma border		11	HEL iP	17 21 48	14	SOD ePKP	10 01 38
8	SOD iSb	00 50 34		SOD iP	17 22 02		Tonga Islands	
	iSg	51 05		Hindu Kush		15	SOD iP	09 43 38
8	SOD iP	14 57 01	12	SOD iP	02 16 29		W of Gibraltar	
8	HEL iP	15 42 46	12	HEL iP	22 24 38	15	HEL iP	23 16 16
	SOD iP	15 43 07		SOD iP	22 24 16		SOD eP	23 16 33
	ipP	44		i	28		Western Pakistan	
	Guatemala			E coast of Formosa		16	SOD iP	12 15 06
9	SOD eP	06 06 32	13	HEL iP	01 10 31		ipb	12
	Fox Islands			i	43		iPg	22
9	HEL iP	10 11 05		SOD iP	01 09 39		iSn	46
	ipP	16		i	50		iSb	56
	i	21		Fox Islands			iSg	16 03
	SOD iP	10 11 10	13	HEL iP	01 59 16	16	Sod eP	17 10 10
	ipP	24		SOD iP	01 58 26		E coast of Borneo	
	i	43		Fox Islands		16	SOD iP	19 33 39
	ePP	14 44					iPcP	34 29
	S coast of Sumatra		13	HEL iP	03 36 31		Unimak Island	
9	SOD iP	20 24 38		Greece		16	SOD eP	21 16 12
	N of Iceland		13	SOD iP	12 06 54	17	SOD iP	09 04 18
9	SOD iP	20 39 03		iSg	07 27		Fox Islands	
	N of Iceland		13	SOD e(P)	16 22 29	17	HEL iP	11 29 11
9	SOD iP	21 08 46					SOD iP	11 28 56
	N of Iceland		14	HEL iP	02 37 41		ePP	30 13
9	SOD iP	21 24 23		iPcP	38 10		ePKKP	39 17
	N of Iceland			SOD iP	02 36 56		Santa Cruz Islands	
9	SOD iP	22 35 41		iPcP	37 44	17	SOD iP	16 58 44
	Congo			Kurile Islands				

July			July			July		
17	SOD iP	18 51 32	20	HEL iP	14 19 05		iPP	00 58 34
	Mid-Atlantic Ridge			i	25		iS	01 05 01
17	SOD e(P)	20 10 29		ePP	21 34		iPPS	39
	e	13 45		eS	27 53		iScS	06 04
18	HEL iP	01 25 49		SOD iP	14 18 27		SOD iP	00 55 21
	i	26 03		i	37		iPcP	56 03
	iPcP	13		eS	26 42		iScP	01 00 09
	SOD iP	01 24 59		E coast of Hokkaido			eS	03 23
	Fox Islands		20	SOD ePKP	15 58 00		eP'P'	24 43
18	HEL iP	01 30 47		ePP	16 00 18		Andreanof Islands	
	i	58		eSKP	01 20	24	HEL iPKP	06 25 20
	iPcP	13		Tonga Islands			New Zealand	
	SOD iP	01 29 59	20	HEL iP	19 18 41	24	HEL iSKS	11 12 35
	Fox Islands			i	44		Argentina	
18	SOD iP	08 40 29		SOD iP	19 19 53	24	HEL iSKP	11 25 08
	Israel			Greece			New Hebrides	
18	HEL iP	12 17 46	20	SOD iP	19 44 50	25	HEL iP	07 53 23
	i	57		Fox Islands			iPcP	50
	i	18 06	21	SOD iP	06 16 51		Andreanof Islands	
	SOD iP	12 17 17		Coast of Guatemala		25	HEL iP	18 42 21
	i	53	21	HEL iPKP1	19 56 36		i	35
	iS	25 57		iPKP2	48		iP	41
	S coast of Honshu			Kermadec Islands			SOD iP	18 41 48
19	HEL iP	03 31 47					iP	42 08
	i	32 29	22	HEL iP	04 00 34		i	11
	ePP	33 24		SOD eP	04 00 22		Hokkaido, Japan	
	SOD iP	03 32 02		Philippine Islands		25	SOD iP	22 28 07
	Hindu Kush		22	HEL iPKP	06 36 45		Philippine Islands	
19	HEL iP	12 09 31		i	37 01	25	SOD iP	23 02 23
	SOD iP	12 08 40		SOD iPKP	06 36 27			
	Fox Islands			i	51	26	SOD iPKP	07 09 17
19	HEL iP	13 13 36		eSKP	40 02		New Zealand	
	iPcP	49		Kermadec Islands		26	SOD iP	13 47 25
	SOD iP	13 13 13	22	HEL iPKP	06 41 45		Hokkaido, Japan	
	i	16		SOD ePKP	06 41 25			
	i	54		Kermadec Islands		27	SOD iP	07 01 42
	iS	22 14	22	HEL iP	14 08 37		Guatemala	
	N coast of Formosa			SOD iP	14 07 48	27	HEL iP	14 30 52
20	SOD iP	10 52 21		Fox Islands			SOD iP	14 30 28
	Alaska		23	HEL iP	00 56 07		i	31
20	SOD iP	11 22 31		i	31	27	SOD iP	15 50 27
	Kamchatka			iPcP	37		Philippine Islands	
				cont.				

July			August			August		
27	SOD eP Andreanof Islands	21 09 29	1	HEL iP SOD iP Hindu Kush	11 06 30 11 06 47	4	SOD eP Mexico	14 29 04
28	HEL iSb iSg SOD iPn iPg iSn iSb iSg	06 21 15 42 06 18 05 09 38 41 43	1	HEL iP SOD iP Fox Islands	16 29 45 16 28 56	4	SOD eP SOD e(PKP) ePP Prince Edward Island	19 54 08 21 27 39 28 28
28	HEL iP iPP iPPP eSKS iS iPPS SOD iP iPP eSKS eS Mexico	08 53 06 56 47 58 59 09 03 39 53 05 06 08 52 50 56 15 09 03 17 29	1	HEL iP SOD iP Honshu, Japan	18 04 16 18 03 48	5	HEL iP SOD iP i i	02 44 23 02 43 57 44 09 16
			1	SOD ePn ePb ePg iSn i iSg i	21 43 59 44 01 04 27 30 32 44	5	SOD iP Kamchatka SOD iP Kamchatka SOD iP Kamchatka	10 14 15 14 00 54 14 21 43
28	SOD iP Mexico	10 11 16	1	SOD e(P) Mexico	22 26 35	5	SOD iP Kamchatka	14 38 00
28	SOD iP	13 34 11	2	HEL iPKP SOD ePKP New Zealand	02 32 26 02 32 15	5	SOD eP Mexico	17 47 36
28	SOD iP Mexico	13 47 03	2	HEL iPb iPg i iSn iSb iSg	09 17 03 13 37 43 59 18 13	5	SOD eP HEL iPKP i Kermadec Islands	20 10 40 21 50 09 33
29	SOD iP Mexico	00 24 07		SOD iPg iSg	09 17 05 59	5	SOD iP Kyushu, Japan	23 14 58
29	HEL iP	02 59 17	2	SOD iP Andreanof Islands	12 31 47	6	SOD iP Kamchatka	00 13 32
29	HEL iPKP SOD iPKP iPKKP Coast of Chile	10 17 06 17 33 56 17 33 58 44 39	3	SOD iP Sumatra	06 56 47	6	SOD iP Philippine Islands	03 46 53
30	HEL iP SOD iP iPcP Iran	01 49 35 01 50 22 52 43	3	SOD iP Mariana Islands	11 57 08	7	HEL iP SOD iP Kamchatka	06 00 07 05 59 20
31	SOD iP Sunda Strait	07 45 43	4	SOD eP ePP Mexico	06 19 24 22 53	7	HEL iP i Kamchatka	06 02 01 32

August	August	August
7 SOD iP 15 35 51 Hindu Kush	10 HEL iP 19 25 24 SOD iP 19 25 17 Celebes Sea	13 HEL iP 16 02 31 SOD iP 16 02 16 E coast of Formosa
7 SOD iPKP 19 58 55 iSKP 20 01 28 Fiji Islands	10 HEL iP 20 36 04 SOD iP 20 37 08 i 28 Greece	14 HEL iP 02 49 48 i 57 SOD iP 02 50 51 S of Rhodes Island
8 HEL iP 01 18 06 SOD iP 01 19 08 i 15 Coast of Egypt	10 SOD iP 21 17 09	14 SOD ePKP 18 45 49 iSKP 48 51 Tonga Islands
8 HEL iP 19 52 50 iPcP 53 40 SOD iP 19 53 32 i 47 Sinkiang Province	11 HEL iPKP 05 32 37 SOD iPKP 05 32 21 New Zealand	15 HEL eP 06 30 33 Ionian Islands
8 HEL iP 22 44 42 i 55 SOD iP 22 45 18 i 23 Ascension Island	11 SOD iPKP 21 57 08 New Hebrides	15 SOD iP 08 45 41 N coast of Panama
8 SOD eP 23 10 42 Ascension Island	12 SOD iP 07 21 24 iPP 24 54 Philippine Islands	15 SOD ePb 14 28 51 iPg 53 i 58 eSb 29 23 iSg 26
9 HEL iP 00 07 42 SOD e(P) 00 08 59 Caspian Sea	12 SOD iP 08 07 41 i 51 iPcP 08 46 Kamchatka	15 SOD ePKKP 21 14 05 e 21 Solomon Islands
9 HEL iP 02 43 23 SOD iP 02 43 04 i 37 New Guinea	12 SOD iP 11 30 10 S coast of Honshu	16 SOD iP 01 40 05 Aleutian Islands
9 SOD iP 07 53 02 Andreanof Islands	12 HEL iP 21 49 22 Afghanistan	16 HEL iP 08 37 51 SOD iP 08 37 10 Kurile Islands
9 SOD iP 11 09 39 Kurile Islands	13 HEL i(P) 00 48 22 SOD i(P) 00 47 42 i 57	16 HEL iP 21 06 41 SOD iP 21 06 16 i 35 Volcano Islands
10 HEL iP 00 12 11 iPcP 43 SOD iP 00 11 31 Kurile Islands	13 SOD iP 01 21 57 i 22 04 Mid-Atlantic Ridge	16 SOD iP 23 45 16 iPP 49 06 Pacific Ocean
10 HEL ePKP 02 36 51 i 59 i 37 03 eSKP 39 40 SOD ePKP 02 36 48 iSKP 39 21 Fiji Islands	13 HEL iP 12 10 05 SOD iP 12 09 11 i 22 Southern Alaska	16 SOD iP 08 33 07 i 39
	13 HEL iP 14 55 18 SOD iP 14 55 06 Philippine Islands	17 SOD iP 08 59 43 Aleutian Islands

- 27 -

1957

August			August			August		
17	HEL iP	12 51 19	19	HEL iP	21 42 58	23	HEL eP	11 54 08
	i(pP)	40		i	43 13		i	17
	SOD iP	12 50 49		iPcP	30		SOD iP	11 53 46
	i	51 04		SOD iP	21 42 09		i	58
	iPcP	11		Fox Islands			ePcP	54 06
	Bonin Islands						E coast of Formosa	
17	HEL iP	19 11 21	20	SOD iP	15 28 21	23	HEL ePKP	20 30 56
	SOD iP	19 11 19		ipP	29 08		e	31 11
	Philippine Islands			Hindu Kush			Kermadec Islands	
17	SOD iP	23 04 30	20	SOD iP	22 27 13	23	HEL iP	23 04 24
	Honshu, Japan			i	28		Java	
				Andreanof Islands				
18	HEL iP	08 49 29	20	SOD iP	22 39 23	24	SOD e(P)	03 06 06
	i	40		i	29			
	SOD iP	08 49 15		Outer Mongolia		25	SOD eP	10 15 22
	i	18					Rat Islands	
	iS	59 34	21	SOD iPKP	06 07 48	25	SOD iP	16 54 24
	Philippine Islands			New Zealand			Philippine Islands	
18	SOD eP	09 15 03	21	SOD iP	12 01 20	25	SOD iP	21 25 20
				i	30		S coast of Java	
18	SOD iP	21 24 18		Fox Islands				
	Mexico		21	SOD iP	15 44 02	26	SOD iP	07 03 57
18	HEL iP	21 52 59		i	20		i	04 10
	iPcP	53 36		e(pP)	29		iPcP	41
	iPP	55 21		Kurile Islands			Andreanof Islands	
	iS	22 01 26	21	SOD iP	19 41 23	26	SOD eP	14 12 27
	iScS	02 46		i	36		Coast of Ecuador	
	SOD iP	21 52 16		Fox Islands		27	HEL iP	11 58 50
	i	18	22	SOD iP	03 48 10		SOD eP	11 59 58
	iPPP	56 01		iPcP	54		Italy	
	iPcS	57 14		Hokkaido, Japan		27	HEL ePKP	21 14 47
	eS	22 00 11					SOD ePKP	21 14 38
	iPPS	29		Molucca Passage			iSKP	17 15
	Kurile Islands		22	SOD iPg	12 52 06		South of Fiji Islands	
19	SOD iP	06 20 34		iSg	44	28	HEL iPKP	08 38 48
	Fox Islands						SOD ePKP	08 38 42
19	HEL iP	07 28 12	22	SOD iPKP	17 02 31		Kermadec Islands	
	e	47		New Hebrides				
	iS	32 57	22	SOD eP	18 35 28	28	HEL iP	23 24 59
	SOD iP	07 28 53		i	31		S of Honshu	
	e	29 51		Sinkiang Province				
	i	35 02						
	Caspian Sea							

August			August			September		
28	HEL eP	23 29 48	30	SOD iP	20 57 29	2	HEL iP	03 45 56
	SOD iP	23 29 27		Mariana Islands			SOD iP	03 45 55
	i	33					i	46 06
	Mariana Islands		30	SOD e(P)	21 07 39		India-Burma border	
28	HEL iP	23 35 02	30	SOD iP	21 23 37	2	SOD iP	07 04 43
	SOD iP	23 34 39					Jan Mayen Island	
	i	45	31	SOD iP	00 17 13	2	SOD iP	10 29 02
	Mariana Islands						Rumania	
29	HEL iP	00 02 54	31	HEL iP	01 54 26	2	SOD iP	13 36 24
	SOD iP	00 02 32		SOD eP	01 54 21			
	i	40		i	55 13	2	SOD iP	14 31 13
	Mariana Islands			Pamir region			HEL iP	i 23
29	HEL iP	01 10 28	31	HEL iP	12 02 01		iPcP	44
	SOD iP	01 10 05		iPP	29		iPP	33 41
	Mariana Islands			SOD iP	12 03 03		iS	40 12
				i	29		SOD iP	14 30 26
29	SOD eSKP	14 23 33		Greece			i	36
	S of Fiji Islands		31	SOD iP	12 08 42		iS	38 41
30	HEL iPKP	04 10 16		iPP	10 19		eP'P'	59 46
	Kermadec Islands			iPPP	45		Fox Islands	
				iLg2	23 13	2	SOD iP	18 15 08
30	HEL iP	16 25 01		Outer Mongolia			Aleutian Islands	
	i(Pa1)	26 14				2	SOD i(P)	18 16 24
	iPP	22	September			2	HEL iP	21 34 33
	ePPP	44	1	HEL iP	12 57 07		i	35 26
	iPcP	27 34		i	16		iPP	36 08
	iS	30 22		SOD iP	12 57 18		iPcP	48
	iPcS	31 16		i	23		i	37 02
	iScS	35 20		iPP	58 53		eS	40 14
	SOD iP	16 25 14		iS	13 03 15		SOD iP	21 34 51
	i	20		iLg1	10 15		i	36 03
	e	34		Sinkiang Province			ePP	24
	iPP	49	2	HEL iP	00 12 52		iS	40 41
	iS	31 11		iS	23 36		Hindu Kush	
	iLg1	37 44		SOD iP	00 12 29	3	SOD iP	05 34 44
	Tadzhik, USSR			iSKS	22 46	3	SOD iP	05 39 38
30	HEL iP	17 05 05		Mariana Islands		3	SOD iP	07 59 59
	SOD iP	17 04 19					Fox Islands	
	i	32	2	HEL iP	00 40 13	3	SOD iP	14 40 14
	E coast of Honshu			SOD iP	00 39 50		Mariana Islands	
30	HEL iP	20 15 50		epP	40 15			
	i	16 03		Mariana Islands				
	SOD iP	20 15 34	2	SOD iP	01 53 56			
	Batan Islands							

September			September			September		
3	SOD iPKP	14 58 32	6	HEL iP	20 26 34	10	HEL iP	06 23 30
	iSKP	15 01 04		SOD iP	20 27 48		iPP	25 31
	Fiji Islands			Albania-Greece border			SOD iP	06 23 34
							India-Burma border	
4	HEL iP	08 15 10	6	HEL iP	20 28 30			
	i	24		SOD iP	20 29 48	10	HEL iP	20 08 22
	i	40		Albania-Greece border			SOD iP	20 08 44
	SOD iP	08 15 39					Mid-Atlantic Ridge	
	West Pakistan		7	HEL eP	01 23 15			
				i	20	11	SOD ePg	12 35 41
4	SOD iP	20 13 13		SOD iP	01 23 13		eSg	36 23
	Fox Islands			Western Venezuela				
5	SOD iP	04 11 39	7	HEL iP	06 59 04	11	SOD iSKP	14 02 29
	Alaska			i	26		Fiji Islands	
				iPcP	41	11	SOD iPKP	23 41 15
5	SOD iP	04 15 16		SOD iP	06 58 20		i	26
	Mid-Atlantic Ridge			Kurile Islands			Samoa Islands	
5	SOD iP	04 26 03	7	SOD ePb	08 36 31	12	HEL iP	00 40 40
				iPg	34		i	54
5	HEL iP	07 35 37		i	35		SOD iP	00 40 26
	SOD iP	07 34 49		i	38		i	37
	E coast of Kamchatka			iSb	37 01		ePP	43 43
				iSg	06		iS	50 45
5	HEL iP	11 43 17					North of Honduras	
	i	23	7	HEL iP	10 17 41			
	SOD iP	11 43 59		iPcP	18 09	13	SOD iP	06 40 12
	i	44 05		SOD iP	10 16 53			
	ePP	45 34		iPP	19 11	15	HEL iP	04 35 09
	Southern Iran			iScP	21 37		SOD iP	04 35 11
5	SOD iP	14 03 46		iS	25 14		iPP	39 01
	Java			iP'P'	46 16		N coast of Java	
				Andreanof Islands				
6	HEL iP	01 27 39	7	SOD iPn	11 02 27	15	HEL iP	22 18 25
	SOD iP	01 27 16		iSn	04 20		SOD iP	22 17 38
	i	28 06					Andreanof Islands	
	Mariana Islands		7	SOD iP	20 03 05	16	SOD iP	00 18 24
6	HEL iP	05 05 40					ipP	45
	i	53	8	HEL iP	10 30 47		S coast of Honshu	
	i	06 03		SOD iP	10 29 58			
	SOD iP	05 04 51		Fox Islands		16	SOD iP	01 39 57
	i	05 04					eS	44 19
	Andreanof Islands		10	HEL eP	00 25 20		Arctic Ocean	
6	SOD iP	16 17 13		SOD iP	00 25 57	16	SOD eP	14 25 46
				Atlantic Ocean			Mid-Atlantic Ridge	

September			September			September		
16	SOD iP	15 05 31	20	HEL iP	08 35 57	27	HEL iP	05 08 21
	Andaman Sea			SOD iP	08 35 23		SOD iP	05 07 26
16	SOD iP	18 43 36		Kurile Islands			iPcP	08 56
	i	49	20	SOD iP	10 09 15		Eastern Siberia	
16	HEL iP	20 03 12		Hindu Kush		27	HEL eP	11 27 49
	SOD iP	20 02 34	20	SOD iP	15 57 28		SOD eP	11 26 56
	Unimak Islands						Fox Islands	
17	SOD iP	15 57 01	20	HEL iP	23 18 20	27	HEL eP	14 33 41
	i	18		SOD iP	23 17 31		Philippine Islands	
17	HEL iP	18 55 46		i	38			
	SOD iP	18 55 19		Fox Islands				
	S coast of Honshu		21	SOD i(P)	10 00 35	28	HEL iP	00 38 21
17	HEL iP	21 15 16					iPcP	38
	Greece		21	HEL iP	20 21 29		i	39 17
18	HEL iP	01 09 42		iS	24 53		i	24
	i	53		i	25 06		iS	47 12
	iPcP	10 21		SOD iP	20 22 37		SOD iP	00 37 54
	SOD iP	01 08 56		i	42		iS	46 21
	i	09 05		iPcP	25 51		S coast of Honshu	
	E coast of Kamchatka			eS	27 33			
18	SOD iP	18 25 19		Northern Turkey		28	HEL iP	14 38 09
	i	29	23	SOD iP	09 23 00		iSKP	41 00
	Fox Islands			Fox Islands			iPKS	53
18	SOD iP	23 12 27	24	HEL iP	08 34 13		ipPKS	44 12
	Andreanof Islands			eSKS	44 45		isPKS	45 06
19	HEL iP	13 53 06		iS	45 07		iSKKP	49 49
	SOD iP	13 52 17		SOD iP	08 34 02		i	56 09
	i	36		iPP	37 41		eSS	58 23
	Fox Islands			iS	44 47		eSSS	15 03 46
19	HEL iP	17 33 50		eP'P'	59 49		SOD ePKP	14 37 54
	eS	37 44		Philippine Islands			i	38 08
	iSS	38 10	24	HEL iP	09 23 36		Fiji Islands	
	SOD iP	17 32 22		SOD iP	09 23 19	28	HEL ePKP	15 02 17
	iS	34 46		Philippine Islands			i	27
	NW of Spitsbergen		25	HEL iP	16 49 45		SOD iPKP	15 02 16
20	HEL iP	02 24 10		Philippine Islands			Fiji Islands	
	Greece		26	SOD ePKP	12 22 30	28	SOD iPb	16 05 34
20	HEL eP	06 33 54		New Zealand			iPg	37
	SOD iP	06 32 41	26	HEL iP	18 59 49		iSb	06 09
	Arctic Ocean			SOD iP	18 59 34		iSg	14
				iS	19 10 20		i	22
				Philippine Islands		29	HEL eP	06 50 33
							Celebes	



September			October			October		
29	HEL iPKP	08 31 43	3	SOD iP	01 44 48	6	SOD iP	09 01 28
	i	32 33		Hokkaido, Japan			iS	03 28
	iSKP	34 33					W of Novaya Zemlya	
	iPKS	35 26	4	SOD iPKP	01 19 32	6	HEL iP	21 38 20
	ipPKS	37 35		iSKP	22 24		iPcP	57
	iSKKP	43 02		Fiji Islands			SOD iP	21 37 37
	i	49 16					Kurile Islands	
	SOD iPKP	08 31 34	4	HEL iP	05 38 06			
	iSKP	34 15		i(pP)	24	6	HEL iP	23 37 56
	S of Fiji Islands			eS	48 02		SOD eP	23 37 09
29	HEL iP	13 40 59		SOD iP	05 38 13		Andreanof Islands	
	E coast of Kamchatka			i(sP)	35			
				Coast of Venezuela				
29	HEL iP	17 47 26	4	SOD iPb	12 20 45	7	HEL iP	13 30 16
	Philippine Islands			iPg	50		i	28
				iSb	21 25		SOD iP	13 29 31
30	SOD iP	09 10 59		iSg	32		SE coast of Kamchatka	
	i	11 08						
30	SOD iP	11 14 13	4	SOD iPg	12 24 35	8	HEL iP	07 05 36
	i	28		iSg	25 13		SOD eP	07 06 44
	S coast of Honshu						Greece	
30	SOD iP	20 33 23	4	SOD iP	23 07 13	10	HEL iP	01 53 57
	Volcano Islands			i	25		i	54 12
				Mongolia			iPcP	27
							SOD iP	01 53 10
							Fox Islands	
			5	HEL iP	00 06 28			
				iPcP	07 00			
				SOD iP	00 05 41	10	HEL iP	03 50 10
				iPcP	06 31		i	23
				Rat Islands			iPcP	36
1	SOD eP	03 13 13					SOD iP	03 49 22
	Jan Mayen Island						i	34
							Fox Islands	
1	SOD eP	08 16 39	5	SOD iPg	02 57 47			
	West Pakistan			iSg	58 20			
2	SOD e	01 13 49	5	SOD iP	05 29 26	10	HEL ePKP	04 05 06
				E coast of Honshu			i	10
							iSKP	07 46
2	SOD iP	11 37 56	5	HEL iP	11 42 17		SOD iSKP	04 07 24
	i	38 17		SOD iP	11 43 20		Fiji Islands	
	Philippine Islands			SE of Crete				
2	HEL iP	12 40 02	5	HEL iP	15 57 19	10	HEL iP	05 55 30
	SOD iP	12 40 04		SOD iP	15 58 22		iPcP	56
	Coast of Venezuela			SE of Crete			SOD iP	05 54 42
							i	55
							iPcP	55 27
2	SOD iP	13 17 14	5	HEL iP	22 47 47		Andreanof Islands	
	S coast of Iran			i	58			
				i	51 28			
2	HEL eP	21 10 29		SOD iP	22 48 05	10	HEL iP	06 58 21
	SOD iP	21 10 52		i	21		iS	07 01 08
	i	11 00		iPPP	49 53		SOD iP	06 57 07
	Chagos Islands			Tadzhik-Afghanistan			iS	58 59
							Novaya Zemlya	

October				October				October			
10	HEL	iP	07 49 15	19	HEL	iP	18 40 22	24	HEL	iP	02 37 54
		iPcP	43			eS	49 44			eSr2	41 14
	SOD	iP	07 48 27			iPS	50 23			eSr1	26
		iPcP	49 12		SOD	iP	18 40 06		SOD	eP	02 38 58
	Andreanof Islands					iS	49 11			i	39 02
						iPS	37			eS	43 36
10	HEL	ePKP	19 03 16			i(Lg)	19 04 51		NW Turkey		
	Fiji Islands				E coast of Formosa						
				24	SOD	iPKP	09 25 44				
10	HEL	iP	19 04 49	19	HEL	iP	21 52 28			iSKP	28 17
		i	05 10			iS	22 00 57		Fiji Islands		
		iPcP	20		SOD	iP	21 51 48				
	SOD	iP	19 03 58			iScP	56 23	24	SOD	iP	21 56 54
		iPcP	04 48			iS	59 47			i	57 00
	Fox Islands				NE coast of Hokkaido				Gulf of California		
11	HEL	eP	00 32 46	20	HEL	iP	12 15 32	25	HEL	eP	01 54 34
	SOD	iP	00 31 59		SOD	iP	12 15 47		SOD	iP	01 54 17
	Fox Islands					i	51		Coast of Formosa		
						iPcP	16 15				
11	HEL	iP	03 00 38		Mid-Atlantic Ridge			25	HEL	eP	03 27 52
12	SOD	iP	19 10 27	20	SOD	i(PKP)	16 16 19		SOD	iP	03 27 29
		i	30			i	41			i	39
	S coast of Java					e	19 31		Batan Islands		
					(Indian Ocean)			25	SOD	iP	04 47 43
13	SOD	iP	04 28 52						Fox Islands		
	Kamchatka			21	SOD	iP	14 34 38				
					Mid-Atlantic Ridge			25	HEL	eP	06 30 46
14	SOD	iP	01 29 40						SOD	iP	06 30 32
15	HEL	iPKP	06 14 46	21	SOD	iP	17 54 34			i	42
		i	59						Coast of Formosa		
	SOD	iPKP	06 14 24	22	HEL	iP	20 55 26				
	Kermadec Islands					i	42	25	SOD	e(P)	07 48 03
					SOD	iP	20 54 50				
					Coast of Hokkaido			25	HEL	iP	10 13 54
17	SOD	iP	14 33 04	22	HEL	ePKP	22 25 45			iPcP	14 32
	S coast of Honshu				S of Kermadec Islands				SOD	iP	10 13 14
18	HEL	eP	01 55 41	23	HEL	iP	04 50 08			i	16
	SOD	iP	01 56 52		SOD	iP	04 50 05			iPcP	14 14
	Greece				Puerto Rico					eS	20 58
									S coast of Kamchatka		
18	SOD	iPn	00 02 25	23	HEL	iP	06 07 47	25	SOD	iP	11 50 05
		iPb	28			i	08 59		Fox Islands		
		iPg	31		SOD	iP	06 06 59				
		i	33			i	07 09				
		iSn	57			iPcP	44	25	SOD	iP	22 56 37
		iSb	03 00		Fox Islands				Philippine Islands		
		iSg	07								
18	SOD	iP	21 56 21	24	SOD	iPKP	00 10 32	26	SOD	iP	04 44 21
	Oaxaca, Mexico				Argentina				Molucca Passage		

- 33 -

1957

October	October	November
26 HEL iPKP 08 44 27 i 35 iSKP 47 15 SOD iPKP 08 44 22 iSKP 46 54 Fiji Islands	31 SOD ePKP 15 49 04 i 14 S of Tasmania	5 SOD iPn 10 26 16 iPb 20 iSn 55 iSb 27 00
26 SOD iP 14 30 05 Borneo	November	5 SOD iP 20 01 26 Andreanof Islands
27 HEL iP 22 42 26 iPcP 43 14 iPP 44 40 SOD iP 22 41 39 i 50 iPcP 42 55 iScP 46 32 Kamchatka	1 SOD iP 14 29 24 Turkestan	6 SOD iP 13 23 03 iPcP 50 Kurile Islands
29 HEL iP 02 34 45 SOD iP 02 34 41 Borneo	1 SOD ePg 20 09 01 eSg 33	8 HEL iP 09 14 24 SOD iP 09 13 49 E coast of Hokkaido
30 HEL iP 01 48 25 eS 52 43 SOD iP 01 49 29 Dodecanese Islands	2 HEL iP 01 29 15 i 29 Fox Islands	9 SOD iP 05 14 40
30 SOD iP 02 23 13 iPcP 24 03 Fox Islands	2 HEL iP 07 33 53 SOD iP 07 33 36 Mexico	9 SOD eP 06 27 00 Unimak Island
30 SOD eP 03 00 39 Andreanof Islands	2 SOD iPn 14 17 00 iPb 02 iPg 05 i 07 iSn 32 iSb 36 iSg 41 i 47	9 HEL iP 22 16 50 iS 19 37 SOD iP 22 15 46 iS 17 44 Jan Mayen
30 HEL iP 07 35 44 SOD iP 07 36 45 iS 42 01 Dodecanese Islands	2 SOD iP 16 29 50 Philippine Islands	10 HEL iP 00 00 28 Greece
31 SOD iP 02 47 25 Honshu, Japan	2 SOD iPKP 18 49 17 i 34 New Hebrides	10 HEL iP 08 37 31 iPcP 55 SOD iP 08 36 58 S coast of Honshu
31 SOD iP 02 59 07 California	3 SOD iP 12 55 46	10 HEL iP 09 52 03 SOD iP 09 51 32 S coast of Honshu
31 SOD iP 10 21 02 ePP 24 37 Off coast of Panama	4 SOD eP 02 40 39 Andreanof Islands	10 HEL iP 10 34 05 i(pP) 27 SOD iP 10 33 59 i 34 17 i(pP) 21 Northern Colombia
	5 SOD iP 00 46 23 Philippine Islands	10 SOD iP 12 03 29
	5 HEL iPKP 10 12 26 SOD iPKP 10 12 13 New Hebrides	10 HEL iP 12 34 28 SOD iP 12 34 03

November		November		November	
10	HEL iP 18 14 49 E coast of Borneo	15	SOD iP 08 05 04 Philippine Islands	20	HEL iP 12 51 14 eS 13 00 01 SOD iP 12 50 24 i 43 iPcP 51 14 Unimak Islands
10	HEL iP 19 31 30 i 39 SOD iP 19 31 01 Honshu, Japan	15	SOD iP 12 12 33 S coast of Honshu	20	SOD iP 16 25 24 i 32
10	SOD iP 19 41 22 Honshu, Japan	15	SOD iP 16 40 09 E coast of Kamchatka	22	SOD iP 18 13 45 Bonin Islands
10	SOD iP 20 04 01 Honshu, Japan	17	HEL iP 06 07 37 i 54 iS 15 39 iScS 16 49 SOD iP 06 06 58 Sea of Okhotsk	22	SOD iPb 18 16 11 iPg 17 iSb 49 iSg 57
10	HEL iP 22 24 09 SOD iP 22 23 17 i 26 Kenai Peninsula	17	SOD iP 18 05 33 S of Honshu	22	SOD iP 01 05 19 Near Islands
11	HEL iPcP 06 43 41 Kermadec Islands	18	SOD iP 03 08 55 Southern Iran	23	HEL iP 01 09 30 SOD iP 01 08 41 i 54 iPcP 09 29 Fox Islands
11	SOD iP 11 56 53	18	SOD iP 10 22 09 Andreanof Islands	23	SOD iP 18 50 48 Rat Islands
11	SOD iP 18 33 31 Guerrero, Mexico	18	SOD iP 15 04 08 Andreanof Islands	24	HEL iP 09 48 42 SOD iP 09 47 31 i 37 Coast of Greenland
12	HEL eP 00 15 21 Caymen Islands	18	HEL iP 15 23 44 SOD iP 15 23 06 Kurile Islands	25	HEL iP 04 20 46 SOD iP 04 19 52 Alaska
12	HEL ePKP 00 39 28 Tonga Islands	19	SOD iP 01 55 45 Ryukyu Islands	25	SOD eP 20 43 24 Oregon, USA
13	HEL iPcP 17 42 31 SOD iPcP 17 42 11 i 16 iSKP 45 45 Kermadec Islands	19	SOD iP 11 33 09 Bonin Islands	25	SOD eP 22 27 58 Oregon, USA
14	HEL iP 04 45 40 SOD iP 04 44 52 iPcP 45 36 Andreanof Islands	19	HEL iP 16 23 59 SOD iP 16 23 18 iP 41 iPcP 24 08 Kurile Islands	25	HEL iP 22 48 14 SOD iP 22 48 09 i 15 E coast of Borneo
14	SOD iP 05 30 27 Andreanof Islands	19	SOD iP 19 38 55 Philippine Islands	26	SOD eP 00 49 06 Pamir
14	SOD eP 14 22 29 NW coast of Corfu	19	SOD iP 23 25 58 S coast of Honshu		
15	SOD iP 06 17 08 Fox Islands	20	SOD iP 02 47 31 Volcano Islands		

November			November			December				
26	HEL iP	01 55 40		ePS	22 48 15	1	SOD iP	02 22 36		
	SOD iP	01 55 46		iSP	43		Kurile Islands			
	iPcP	52		i(PKKP)	59	1	HEL iP	03 20 02		
	i(pP)	56 19		iPKKP	49 17		SOD iP	03 29 20		
	i	30		i	52 30		Kurile Islands			
	NE coast of Sumatra			iP'P'	57 29					
				SOD i(P)	22 34 08	1	SOD i(P)	04 44 05		
26	HEL iP	05 23 14		iPP	38 00	1	HEL iP	05 21 20		
	SOD iP	05 23 13		i(sPP)	39 30		SOD iP	05 20 39		
	i	23		iSKS	44 12	1	Kurile Islands			
	E coast of Borneo			ipSKS	45 08					
26	HEL iP	08 20 08		i	48 55					
	SOD iP	08 21 18		iSS	53 38					
	i	21		Southern Bolivia			1	HEL iP	10 10 50	
	Greece		30	HEL iP	02 10 55		SOD iP	10 10 07		
				SOD iP	02 11 31		Kurile Islands			
26	SOD iP	10 55 48		Amirante Islands			1	HEL iP	10 11 16	
26	HEL iP	11 46 46	30	HEL eP	17 47 33		SOD iP	10 10 33		
	iPcP	47 10		SOD iP	17 46 28		Kurile Islands			
	SOD iP	11 45 56		i	31	1	HEL iP	19 16 29		
	i	46 10		Arctic Ocean				SOD iP	19 15 42	
	iPcP	38					Fox Islands			
	Andreanof Islands		30	HEL iP	20 38 55					
				Kurile Islands			2	SOD iP	04 26 40	
26	HEL iP	11 54 49	30	HEL iP	21 47 58		Rumania			
	SOD iP	11 56 02		SOD iP	21 47 16					
	Greece			i	23	2	SOD iP	12 55 37		
26	SOD iP	19 18 42		Kurile Islands			Coast of Algeria			
	i	48	30	HEL iP	22 04 55	3	HEL iP	00 04 29		
	Philippine Islands			iPcP	05 24		SOD iP	00 03 20		
27	HEL iP	03 12 49		SOD iP	22 04 13		NE coast of Greeland			
	eS	16 40		Kurile Islands			3	SOD eP	01 56 13	
	SOD iP	03 13 58	30	HEL iP	23 12 23		Andreanof Islands			
	iPPP	14 59		SOD iP	23 11 58	3	SOD iP	21 50 51		
	Greece			December			3	HEL iP	21 57 13	
27	SOD iP	03 33 53		1	HEL iP	01 11 10		SOD iP	21 56 24	
	Philippine Islands				Kurile Islands			Fox Islands		
29	HEL iP	22 33 54		1	HEL iP	01 19 44	3	SOD iP	23 41 23	
	iPKP	37 51			SOD iP	01 19 02		iPcP	42 09	
	iPP	38 19			i	13	Andreanof Islands			
	ipPP	39 12			i	20 32				
	i	41 36			Kurile Islands			4	HEL eP	00 40 25
	iSKS	44 00			1	SOD iP	01 48 23	SOD iP	00 40 16	
	iSKKS	58				Fox Islands				
	iS	45 30								
	esS	47 09								
	iSP	21								
	cont.									

## December

4 HEL iP 03 46 03  
     iS 52 43  
     iSS 55 51  
     SOD iP 03 45 45  
     Outer Mongolia  
 4 SOD eP 04 26 57  
 4 HEL iP 04 37 16  
     SOD eP 04 36 55  
 4 SOD iP 05 08 54  
     Outer Mongolia  
 4 SOD iP 05 24 33  
 4 HEL iP 08 01 35  
     Outer Mongolia  
 4 HEL eP 09 17 36  
     i 41  
     SOD iP 09 17 19  
     i 24  
     Outer Mongolia  
 4 SOD iP 10 50 49  
     Outer Mongolia  
 4 HEL iP 11 27 51  
     SOD iP 11 27 38  
     Outer Mongolia  
 4 SOD iP 12 43 09  
 4 HEL iP 13 28 35  
     ePcP 30 13  
     iPP 21  
     SOD iP 13 28 16  
     iPP 30 02  
     iPcP 06  
     Outer Mongolia  
 4 HEL iP 22 25 16  
     SOD iP 22 25 00  
     Outer Mongolia  
 4 HEL iP 23 50 13  
     SOD iP 23 49 56  
     Outer Mongolia  
 5 SOD iP 07 50 22  
     Hokkaido, Japan

## December

5 HEL iP 14 07 54  
     iS 10 32  
     SOD iP 14 06 41  
     eS 08 10  
     iT(Pg) 11 19  
     iT(Sg) 12 13  
 5 HEL iP 18 17 52  
     i 56  
     SOD iP 18 17 35  
     Outer Mongolia  
 6 SOD eP 02 29 05  
     Kurile Islands  
 6 SOD iP 02 41 44  
     Kurile Islands  
 6 HEL iP 04 00 16  
     SOD iP 03 59 36  
     Kurile Islands  
 6 HEL iP 08 47 10  
     SOD iP 08 46 29  
     iPcP 47 15  
     Kurile Islands  
 6 HEL iPcPK 10 00 18  
     SOD iPcPK 10 00 29  
     iSKP 03 39  
     Sandwich Islands  
 6 SOD ePKP 21 32 33  
     Tonga Islands  
 6 SOD eP 23 05 47  
     Philippine Islands  
 7 SOD i(P) 06 14 40  
 7 SOD i(P) 13 21 28  
 7 HEL iP 14 19 46  
     i 54  
     SOD iP 14 19 30  
     iPcP 21 09  
     iPP 26  
     Outer Mongolia  
 7 SOD iP 22 31 25  
     Nicaragua

## December

8 HEL iP 06 21 24  
     i 30  
     SOD iP 06 21 06  
     Outer Mongolia  
 8 SOD iP 12 27 26  
     i 38  
     Honshu, Japan  
 8 HEL iP 15 37 31  
     SOD iP 15 37 15  
     Outer Mongolia  
 8 HEL iP 16 35 20  
     SOD iP 16 34 48  
     Outer Mongolia  
 8 HEL iP 21 37 12  
     SOD iP 21 36 51  
     Outer Mongolia  
 9 HEL eP 01 28 12  
     SOD iP 01 27 54  
     Philippine Islands  
 9 SOD iPcPK 16 08 08  
     New Hebrides  
 9 HEL iP 22 17 05  
     SOD iP 22 16 16  
     i 27  
     Yokon  
 10 HEL ePKP 14 54 41  
     Solomon Islands  
 11 HEL iP 18 22 56  
     SOD iP 18 22 28  
     S coast of Honshu  
 11 HEL iP 22 03 38  
     iPcP 05 14  
     SOD iP 22 03 23  
     i 28  
     ePcP 05 04  
     ePP 10  
     Outer Mongolia  
 12 HEL iPcPK 10 06 13  
     SOD iPcPK 10 06 01  
     New Hebrides

December				December				December			
12	SOD	iPn	11 54 14	17	HEL	iP	05 20 31	25	HEL	iP	16 38 11
		iPb	17			i(pP)	42		SOD	iP	16 38 12
		iPg	29			i	56		Venezuela		
		iSn	55 12		SOD	iP	05 19 43	26	HEL	iPKP	12 28 56
		iSb	23			i(pP)	56			i	29 00
		iSg	34		Kamchatka				SOD	iPKP	12 28 41
12	HEL	iPKP	18 57 24	17	HEL	iPKP	14 09 04			i	44
	New Hebrides					i	39		Kermadec Islands		
		iPP				eSKS	11 00	26	HEL	iP	15 06 13
12	HEL	eP	20 14 51			iPKKP	16 04			eS	09 54
	SOD	iP	20 14 54		SOD	iPKP	14 08 54		SOD	iP	15 07 22
	Manipur-Burma					ePP	10 23			e	12 34
		iPPP				iPKKP	12 43		Turkey		
		iPKKP				iPcPPKP	19 08	27	SOD	iP	01 38 48
13	HEL	iP	01 44 51		Santa Cruz				E coast of Honshu		
		ipP	45 07	19	SOD	eP	12 13 29	27	HEL	iP	05 12 23
	SOD	iP	01 44 47		Kamchatka				SOD	iP	05 11 18
		ipP	45 01			i				i	26
	Colombia			19	SOD	eP	19 12 33	28	SOD	iP	05 44 08
13	HEL	iP	01 51 08		Honshu, Japan				Outer Mongolia		
		iPP	52 05	21	SOD	iP	16 11 24	30	HEL	iP	12 56 56
		iS	56 04		Algeria				SOD	iP	12 56 06
		iSS	57 41	21	SOD	iP	19 00 15			iPcP	55
		iLi	58 02			i	18		Fox Islands		
	SOD	iP	01 51 56		Algeria			30	SOD	iP	14 10 11
	Iran			23	SOD	iP	12 42 37			i	22
13	HEL	iP	09 14 58		Atlantic Ocean				Philippine Islands		
		i(pP)	15 37	23	HEL	iP	23 41 50	30	SOD	iP	18 48 06
	N Afghanistan					i(S)	44 25			i	23
13	HEL	iP	20 37 19			SOD	23 43 19		S of Unimak Island		
	Fox Islands					i(S)	47 15	31	SOD	iP	00 26 50
					Rumania			31	SOD	eP	10 27 24
14	SOD	iP	16 13 48	24	SOD	iP	18 09 41		North Atlantic Ocean		
	Fox Islands				(Arctic Ocean)			31	SOD	iP	13 12 33
16	HEL	eP	17 38 56	25	HEL	iP	02 19 41		North Atlantic Ocean		
	SOD	iP	17 38 05			i(pP)	52	31	SOD	iP	14 48 06
		i	12			SOD	02 18 53			i	13
		iPcP	45			i(pP)	19 05		Coast of Kamchatka		
		i	54	25	SOD	iP	13 51 34			i	25
	Vancouver Island					i	42		SOD	i(PKP)	14 47 54
16	SOD	iP	23 12 26		Kamchatka				New Zealand		