

KONINKLIJK NEDERLANDS
METEOROLOGISCH INSTITUUT

Seismic Records
at De Bilt

Volume 51
1963

De Bilt, 1969

Publicatienummer K.N.M.I. 108 - 51

P R E F A C E

This seismic Yearbook was composed under the supervision of Dr. J. Veldkamp, director of the Geophysical Section . The records haven been reduced by Mr. J. Oldeman, scientific officer.

The Director in Chief of
the Royal Netherlands Meteo-
rological Institute,
Dr. M.W.F. Schregardus.

De Bilt, February 1969

I N T R O D U C T I O N

SEISMOLOGICAL STATION DE BILT

The geographic coordinates of the seismological station are $50^{\circ}6'1''$ N and $5^{\circ}10'6''$ E. The instruments are placed at a height of 3 m above mean sea-level on a subsoil consisting of sand (pleistocene).

The instruments are: a set of seismographs (two horizontal and one vertical) with galvanometric recording according to GALITZIN.

THE GALITZIN SEISMOGRAPHS AT DE BILT. Below are given: the period of the galvanometer T1, the reduced pendulum length l, the distance A1 between the mirror of the galvanometer and the recording paper, and the rough values for the natural period of the undamped pendulum T, of the damping constant and of the multiplying factor k for the year 1963.

	NS comp.	EW comp.	Z comp.
Period of galvanometer T1	24.43 sec	24.96 sec	12.0 sec
Reduced length of pendulum l	123 mm	123 mm	406 mm
Distance A1	1380 mm	1380 mm	1380 mm
Period of pendulum T	25 sec	25 sec	12 sec
Damping constant μ	0.0	0.0	0.0
Multiplying factor k	11.0	11.0	175

SEISMOLOGICAL STATION HEERLEN

The geographic coordinates of the seismological station are: $50^{\circ}53'0''$ N and $5^{\circ}59'0''$ E.

The instrument, a horizontal seismograph, $M = 450$ kg, is placed at a height of 100 m above mean sea-level on a subsoil consisting of loess.

The mean values of the constants for the year 1963 are:

T	E	V	V max.	T max.
2	3	400	600	2

SEISMOLOGICAL STATION WITTEVEEN

The geographic coordinates of the seismological station are: $52^{\circ}48'8''$ N and $6^{\circ}40'1''$ E.

The instrument, a GRENET vertical seismograph with galvanometric record, is placed at a height of 2 m above mean sea-level on a subsoil consisting of pleistocene sand.

The period of the seismograph is 2.3 sec, the period of the galvanometer is 0.8 sec. The maximum amplification is 6500 for a period of about 1 sec.

EXPLANATION OF THE TABLES

The data given in this Yearbook have mostly been obtained from the GALITZIN records. The velocity of the recording paper is 30 mm per minute, allowing a good time-accuracy.

In a few cases the data from the seismograph at Heerlen are mentioned.

The time is Greenwich mean time.

In the column "direction" + means an upward movement of the soil (compression), - means a downward movement (dilatation). Uncertain data have been given in parentheses. The following symbols were used for the phases.

P	= normal first phase, or first longitudinal tremor.
pP	= P-wave once reflected at the earth's surface near the epicentre.
PP	= P-wave reflected halfway between epicentre and station.
PPP	= P-wave two times reflected at the earth's surface.
PPPP	= P-wave three times reflected.
S	= Second phase, arrival of the transversal tremor.
sS	= S-wave reflected at the earth's surface near the epicentre.
PS	= wave changed from longitudinal to transversal oscillation through reflection at the earth's surface.
PPS	= wave twice reflected, having been transversal on one branch of the path.
SS	= S-wave reflected halfway between epicentre and station.
SSS	= S-wave two times reflected at the earth's surface.
SSSS	= S-wave three times reflected at the earth's surface.
PcP	= P-wave reflected at the core boundary.
ScS	= S-wave reflected at the core boundary.
P'	= PKP = wave having penetrated the core.
S'	= SKS = transversal wave, having been longitudinal within the core.
PKS	= alternating wave having penetrated the core.
pP'	= P'-wave reflected near the epicentre.
sS'	= S'-wave reflected near the epicentre.
SKKS	= alternating wave which has been reflected within the core.
L	= long wave or surface waves.
M	= maximum of the surface waves.
L'	= surface waves travelling around the major arc.
M'	= maximum of these waves.
i	= sudden beginning of the phase.
e	= gradual beginning of the phase.
F	= end of discernable movement.
H	= time of the shock at point of origin.
h	= depth of the origin.
△	= distance of epicentre.

The indices H, N, E and Z refer to horizontal, north-south, east-west and vertical components of the movement.

The distance of the epicentre and the depth of origin have been calculated by means of curves constructed with the aid of the time tables of Jeffreys and Bullen (1940).

The data given in the column "amplitude" are the maximal amplitudes measured from the medium line, The amplitudes have been calculated by means of the formula:

$$V = \frac{A_1 k T_b}{\pi l} \frac{1}{\left\{ 1 + \left(\frac{T_b}{T} \right)^2 \right\}^2}$$

In this formula A_1 is the distance between galvanometer mirror and recording paper, k is the multiplying factor, T_b the period of the wave, l the reduced length of the pendulum, T the free period of the undamped seismograph, and V the magnification. The period of the galvanometer is assumed to be equal to the free period of the undamped seismograph.

For the horizontal components of the GALITZIN records the following mean values were used: $k = 11,0$ and $T = 24,5$ sec, and for the vertical component $k = 175$ and $T = 12,0$ sec.

Whenever it was possible the amplitudes and periods of the first P- and S-waves have been given. As the movement of these waves is irregular in general, the accuracy of these data is small. The amplitudes of the maxima of L-waves have been calculated in case of very strong earthquakes.

THE MICROSEISMIC ACTIVITY

The table on page 1 shows the character of the microseismic activity (see also 1915 p. 101 and 1916 p. 101). The numbers 0, 1, 2 and 3 mean:

- 0 = very weak and weak
 1 = moderate
 2 = strong
 3 = very strong

For measuring the microseismic activity the records of the GALITZIN seismograph were used. The table below gives the amplitudes of the oscillations (measured from the medium line) and the corresponding amplitudes of the movement of the surface.

Character	Ampl. record	Ampl. surface
0	0 - $\frac{1}{2}$ mm	0 - 1 $\frac{1}{4}$ μ
1	$\frac{1}{2}$ - 2 "	1 $\frac{1}{4}$ - 5 "
2	2 - 4 "	5 - 10 "
3	> 4 "	> 10 "

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Character of the microseismic movement

Date 1963	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	2 1	1	3	1	1 2 1	1	0	1 0	1	1 2	2 1	3
2	1 2	1 2	3	1	1 2	1	0	0	1	2 1	1	3 2
3	2	2 1	3	1	2 1	1	0	0	1 0	2 3 2	1	2 3
4	2	1 2	3 2	1	1 2	1 0	0	0 1	0 1 0	2	1	3 2
5	2	2	2 3	1	2	0	0	1 0	0 1 0	2 1	1	2 1
6	2 3	2 3 2	3 2	1 2	2 1	0	0	0	0 1	1	1	1
7	3 2	2	2	2 1	1	0	0	0 1	1	1	1 2	1
8	2	2 1	2	1	1 2 1	0	0 1	1	1 3 2	1 2	2 3 2	1
9	2 3	1	2 3	1	1 2	0	1	1	2 1	2 3	2 3	1
10	3	1 2 1	3	1 2	2 1	0	1	1	1	3 2	3	1 2
11	3	1	3 2	2 3	1	0 1	1 0	1	1 0 1	2	3	2 3
12	3 2	1	2	3	1 3	1 0	0	1	1	2	3	3 2
13	2 3	1 2	2	3 2	3	0	0 1	1	1 3	2	3 2	2 1
14	3 2	2 3	2 3	2	3 2	0 1	1	1 0	3	2 3	2 3	1 2
15	2	3	3 2	2	2 1	1	1	0 1	3 2	3	3 2	2 3
16	2 1	3 2	2 1	2	1	1 2	1 0	1	2 1	3 2	2 3	3
17	1 2	2	1	2	1 2	2 1	0 1 0	1	1	2	3	3
18	2	2 3	1	2	2	1 2	0	1	1	2	3	3
19	2 3	3	1	2	2 1	2 1	0 1	1 2	1	2 3	3	3
20	3	3	1	2	1	1	1	2 1	1	3	3	3 2
21	3 2	3 2	1	2	1 2 1	1	1	1	1	3 1	3	2 3
22	2	2 1	1	2 1	1	1	1	1	1	1	3	3 2
23	2 1	1 2	1	1	1	1	1	1	1	1	3	2 3
24	1 2	2 3	1 2	1 0	1	1	1 0	1 2 1	1 2 1	1 2	3	3
25	2 3	3	2 3 2	0	1	1	0 1	1	1 2 1	2 1	3	3
26	3 2	3	2	0 1	1 2	1	1	1 2	1 3	1	3 1	3
27	2 1	3	2 3	1	2	1 0	1 2 1	2 1	3 2	1	1	3
28	1	3	3	1	2 1	0 1	1	1	2 1	1	1 2	3
29	1		3 2	1	1	1	1	1	1 2 1	1	2 3 2	3
30	1		2 1	1	1	1 0	1	1 2	1	1	2 3	3
31	1		1		1		1	2 1		1 2		3

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Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Jan. 1 (1)	iP iz iS eL F	23	50	19.9	+	3	7	(1) Wi:iP 23h 50m 17.0s (+) USCGS: 56.6N 157.7W, H. 23h 39m 05.6s, h about 50 km. Alaska Peninsula.
Jan. 2 (2)	e F	16	05					(2) USCGS: 4.1S 135.2E, H. 14h 56m 05.6s, h about 33 km. Near south coast of New Guinea
Jan. 2 (3)	e F	17	10					(3) Wi:ePKP 16h 15m 29s. USCGS: 52.9S 118.2W H. 15h 55m 47.9s, h about 33 km. South Pacific Ocean.
Jan. 3 (4)	eL F	3	50					(4) USCGS: 29.7N 130.1E, H. 3h 05m 03.5s, h about 33 km. Ryukyu Islands.
Jan. 4 (5)	eL F	6	35					(5) USCGS: 29.7N 142.2E, H. 5h 42m 35.3s, h about 33 km. Bonin Islands region.
Jan. 5 (6)	e F	14	20					(6) USCGS: 10.0S 124.0E, H. 13h 16m 43.0s, h about 33 km. Timor.
Jan. 7 (7)	e F	12	43					(7) USCGS: 0.6N 126.7E, H. 11h 48m 22.7s, h about 42 km. Halmahera region.
Jan. 8 (8)								(8) He:i 10h 28m 08s. Local shock.
Jan. 8 (9)								(9) Wi:iP 15h 58m 51.2s -. USCGS: 31.2N 130.2E, H. 15h 46m 45.5s, h about 177km. Near south coast of Kyushu.
Jan. 11 (10)	e F	12	45					(10) USCGS: 45.0S 75.7W, H. 12h 12m 16.2s, h about 33 km. Near coast of south Chile.
Jan. 12 (11)								(11) Wi:iP 3h 52m (51s). USCGS: 4.8N 76.7W, H. 3h 40m 34.8s, h about 102 km. Northern Colombia.
Jan. 12 (12)								(12) Wi:eP 6h 30m (32s). USCGS: 36.1N 69.6E, 4.6h 20m 13.6s, h about 97 km. Hindu Kush.
Jan. 15 (13)	eP eS eL F	1	36	49				(13) USCGS: 68.9 N 17.1W, H. 1h 32m 20.0s, h about 33 km. Danmark Strait.
Jan. 15 (14)	eP eS eL F	5	27	40				(14) Wi:eP 5h 27m 44s. USCGS: 69.0N 16.6W, H. 5h 23m 10.4s, h about 33 km. Jan Mayen Island region.
Jan. 15 (15)								(15) Wi:eP 15h 08m 51s. USCGS: 36.0N 23.9E, H. 15h 04m 15s, h about 81 km. Mediterranean Sea.
Jan. 15 (16)								(16) Wi:iPKP 19h 45m 23s, dilatation. USCGS: 20.5S 177.9W, H. 19h 26m 34.3s, h about 496 km. Fiji Islands.
Jan. 17 (17)								(17) Wi:eP 20h 53m 39s, dilatation. USCGS: 25.6N 125.2E, H. 20h 41m 14.8s, h about 140 km. Rynkyu Islands.

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Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Jan. 24 (18)	eL F	4	07				(18) BCIS: 40.4N 19.6E, H. 3h 58m 56s, Near coast of Albania.	
Jan. 24 (19)	eL F	23	19				(19) USCGS: 8.0N 126.8E, H. 22h 27m 32.5s, h about 67 km. Near coast of Mindanao.	
Jan. 25 (20)							(20) Wi:iPKP 0h 35m 27s, dilatation. USCGS: 20.3S 169.6E, H. 0h 16m 05.7s, h about 135 km. Loyalty Islands region.	
Jan. 25 (21)							(21) Wi:ePKP 20h 41m 00s, USCGS: 19.0S 173.3W, H. 20h 21m 31.6s, h about 129 km. Tonga Islands.	
Jan. 27 (22)	eL F	1	56				(22) USCGS: 66.9N 162.4W, H. 1h 44m 34.2s h about 33 km. Seward Peninsula, Alaska.	
Jan. 27 (23)	eP eL F	19	41	41			(23) Wi:eP 19h 41m 33s. USCGS: 41.2N 49.8E, H. 19h 35m 14.3s, h about 33 km. Caspian Sea near Azerbaijan, SSR	
Jan. 28 (24)	eL F	4	43				(24) Wi:eP 4h 17.5m. USCGS: 43.5N 144.6E, H. 4h 05m 30.9s, h about 33 km. Near south coast of Hokkaido, Japan.	
Jan. 28 (25)	ePP ePS eSS eL F	12	32	08			(25) Wi:e 12h 31m 16s. USCGS: 2.6S 149.9E, H. 12h 12m 19.8s, h about 39 km. New Britain	
Jan. 28 (26)	iP ePP F	13	12	20			(26) Disturbed by microseisms. Wi:iP 13h 12m 17s, compression. USCGS: 54.7N 161.6W, H. 13h 00m 50.7s, h about 33 km. Alaska Peninsula.	
Jan. 28 (27)							(27) Wi:ePKP 14h 09m 07s. USCGS: 19.7S 178.1W, H. 13h 50m 28.3s, h about 587 km. Fiji Islands.	
Jan. 29 (28)	iP ePP epPP eS eSS F	9	32	48	+	4 3	(28) Wi:iP 9h 32m 41s, compression. USCGS: 49.7N 154.9E, H. 9h 21m 14.3s, h about 126 km. Kurile Islands.	
Jan. 30 (29)							(29) Wi:eP 4h 51m 22s. USCGS: 54.8N 161.6W, H. 4h 39m 56s, h about 33 km. Alaska Peninsula.	
Jan. 30 (30)	eP ePP ePPP eSKS eS ePS eSS eL F	10	24.5				(30) USCGS: 55.6S 28.3W, H. 10h 10m 04.1s, h about 33 km. Sandwich Islands region.	

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Date 1963	Phase	Time			Direction	Period s	Amplitude M	Remarks
		h	m	s				
Jan. 31 (31)	eP ePP eS eSS eL F						(31) Wi:eP 5h 19m 16s. USCGS: 27.9N 126.3E, H. 5h 06m 46.0s, h about 33 km. Ryukyu Islands.	
Feb. 11 (32)	e F	23 23	46 55				(32) BCIS: Mid. Atlantic ridge, North of Azores.	
Feb. 4 (33)							(33) Wi:iP 23h 32m 48s, compression. USCGS: 48.5N 154.9E. H. 23h 21m 09.0s, h about 85 km. Kurile Islands.	
Feb. 5 (34)	ePS eL F	21 21 22.5	08 32	30			(34) Disturbed by microseisms. USCGS: 38.4S 73.2W, H. 20h 39m 21.6s, h about 41 km. Near coast of Central Chile.	
Feb. 6 (35)	eL F	1 2	52 40				(35) USCGS: 38.4S 73.6W, H. 1h 21m 19.0s, h about 33 km. Near coast of Central Chile.	
Feb. 9 (36)	eL F	4 4	37 55				(36) USCGS: 36.4N 137.9E, H. 3h 53m 06.1s, h about 33 km. Central Hondo, Japan.	
Feb. 10 (37)	eL F	5 5	24 32				(37) USCGS: 54.1N 166.5W, H. 5h 10m 40s, h about 33 km. Fox Islands, Aleutian arc.	
Feb. 10 (38)	e F	16 16	49 44				(38) USCGS: 44.6N 28.1W, H. 16h 36m 11.1s, h about 33 km. Azores Islands region.	
Feb. 10 (39)							(39) Wi:eP 21h 47m 40s. USCGS: 44.6N 147.8E, H. 21h 35m 48.7s, h about 67 km. Kurile Islands region.	
Feb. 12 (40)							(40) Wi:iPKP 23h 26m 03s, compression. USCGS: 17.8S 178.6W, H, 23h 07m 28.9s, h about 583 km. Fiji Islands.	
Feb. 13 (41)	iP iPP eSKS eS eSS eL F	9 9 9 9 9 9 12.5	02 06 12 13 19.0 26	41	+	6 18	(41) Wi:iP 9h 02m 37s, compression. He:eL 9h 35.5m. USCGS: 24.5N 121.8E, H. 8h 50m 02.2s, h about 33 km. Northern Formosa.	
Feb. 13 (42)	ePKP ePP ePKS eSS eL F	18 18 18 18 19 21	33 35 36 54 13 30	10 40 46 30			(42) Wi:ePKP 18h 33.2m. USCGS: 9.9S 160.8E, H. 18h 13m 55.1s, h about 29 km. Solomon Islands.	
Feb. 14 (43)	eL F	7 8	45 30				(43) Disturbed by microseisms. Wi:e 7h 23.2m. USCGS: 7.2S 128.2E, H. 7h 04m 40.8s, h about 197 km. Banda Sea.	
Feb. 14 (44)							(44) Wi:eP 12h 19m 19s. USCGS: 0.9N 30.0W, H. 12h 09m, 11.4s, h about 33 km. Mid Atlantic Ridge.	
Feb. 14 (45)							(45) Wi:eP 13h 21m 39s. USCGS: 44.5N 15.5E, H. 13h 18m 56.4s, h about 36 km. Near coast of Yugoslavia.	
Feb. 14 (46)	eL F	23 24	12 00				(46) Disturbed by microseisms. USCGS: 3.1S 134.3E, H. 22h 41m 51.1s, h about 49 km. West of New Guinea.	

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Date 1963	Phase	Time			Direction	Period s	Amplitude μ	Remarks
		h	m	s				
Feb.17 (47)							(47) Wi:eP 8h 33m 30s. USCGS: 42.1N 37.2E, H. 8h 28m 24.9s, h about 33 km. Black Sea.	
Feb.21 (48)							(48) Wi ePKP 14h 48m 12s. USCGS: 20.5S 173.9W, H. 14h 28m 29s, h about 29 km. Tonga Islands region.	
Feb.21 (49)	e(P) e(S) eL F	17 17 17 17	19 23 28 48	35 45			(49) Disturbed by microseisms. Wi:eP 17h 19m 35s. USCGS: 32.7N 20.9E, H. 17h 14m 35.7s, h about 33 km. Near coast of Libya.	
Feb.21 (50)							(50) Wi:eP 20h 31m 51s. USCGS: 32.6N 21.0E, H. 20h 26m 43.8s, h about 33 km. Libya.	
Feb.22 (51)	eP ePP F	7 7 8.0	17 19	56 32			(51) Disturbed by microseisms. Wi:eP 7h 17m 41s. USCGS: 85.0N 98.9E, H. 7h 10m 28.0s, h about 33 km. North Pole region.	
Feb.22 (52)	eL F	14 14	20 35				(52) Disturbed by microseisms. Wi:e 14h 20.5m, F 14h 27m. USCGS: 40.6N 20.5E, H. 14h 12m 54.4s, h about 33 km. Albania.	
Feb.24 (53)							(53) Wi:eP 13h 46m 30s (compression). USCGS: 14.6N 91.4W, H. 13h 34m 15.7s, h about 135 km. Central Guatemala.	
Feb.25 (54)	eL F	17 18	56 15				(54) Wi:iP 17h 23m 39s, dilatation. USCGS: 24.4N 123.4E, H. 17h 11m 01.7s, h about 33 km. Near east coast of Formosa.	
Feb.26 (55)	iPP epPP ePPP iSS eL F	20 20 20 20 21 22	34 35.8 37 51 18	45 8 28 33	+	8 18	(55) Disturbed by microseisms. Wi:eP 20h 29m 25s, ePKP 20h 32m 49s, epPKP 20h 33m 35s, ePP 20h 34m 33s. USCGS: 7.5S 146.2E, H. 20h 14m 08.7s, h about 171 km. Eastern New Guinea.	
Feb.27 (56)	e eL F	5 5 7.0	00 30				(56) Disturbed by microseisms. Wi:ePKP 4h 49.0m. USCGS: 6.0S 149.4E, H. 4h 30m 00.8s, h about 52 km. New Britain region.	
Feb.27 (57)							(57) Wi:iPKP 20h 47m 27s, (compression). USCGS: 4.6S 152.9E, H. 20h 28m 34.9s, h about 100 km. New Britain.	
Feb. 27 (58)							(58) Wi:eP 23h 48m 46s. USCGS: 54.8N 161.6W, H. 23h 36m 20.4s, h about 33 km. Alaska Peninsula.	
Mar.1 (59)							(59) Wi:iP 10h 57m 59s, compression. USCGS: 41.2N 142.9E, H. 10h 45m 55.7s, h about 41 km. South of Hokkaido, Japan.	
Mar.1 (60)							(60) Wi:eP 19h 24m 14s. USCGS: 1.4N 29.6W, H. 19h 14m 13.1s, h about 33 km. Atlantic Ocean.	
Mar.2 (61)							(61) Wi:iPKP 22h 35m 45s, compression. USCGS: 17.1S 175.0W, H. 22h 16m 35.4s, h about 240 km. Tonga Islands.	
Mar.4 (62)							(62) Wi:eP 7h 48.0m. USCGS: 82.9N 7.7W, H. 7h 41m 51.0s, h about 33 km. North Pole region.	

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Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Mar.4 (63)	eL F	14	20			s	(63) Disturbed by microseisms. Wi:eP 13h 51m 15s. USCGS: 24.2N 121.7E, H. 13h 38m 41.0s, h about 33 km. Formosa.	
Mar.4 (64)	eL F	15	21			s	(64) Disturbed by microseisms. Wi:iP 15h 15m 11.5s. USCGS: 35.2N 25.4E, H.15h 10m 19.2s, h about 42 km. Crete.	
Mar.4 (65)						s	(65) Wi:eP 15h 56m 14s, (dilatation). USCGS: 4.5S 81.6W, H. 15h 43m 04.0s, h about 33 km. Near coast of Peru.	
Mar.7 (66)	eL F	6	00			s	(66) Disturbed by microseisms. USCGS: 27.0S 113.5W, H. 5h 22m 01.1s, h about 33 km. West of Easter Island.	
Mar.8 (67)						s	(67) Wi:iP 15h 16m 09s. USCGS: 1.1N 29.9W, H. 15h 06m 05.3s, h about 33 km. Mid Atlantic Ridge.	
Mar.9 (68)						s	(68) Wi:iP 2h 26m 49s. USCGS: 21.9N 62.0E, H. 2h 17m 39.5s, h about 33 km. Arabian Sea.	
Mar.9 (69)						s	(69) Wi:iPKP 23h 02m 39s, compression. USCGS: 21.5S 179.0W, H. 22h 43m 50.5s, h about 529 km. Fiji Islands.	
Mar.10 (70)						s	(70) Wi:iP 1h 37m 16s, dilatation. USCGS: 56.2N 153.8W, H. 1h 26m 04.1s, h about 33 km. Kodiak Island, Alaska.	
Mar.10 (71)	eL F	3	35			s	(71) Disturbed by microseisms. USCGS: 24.7N 122.1E, H. 2h 53m 33.0s, h about 33 km. East of Formosa.	
Mar.10 (72)						s	(72) Wi:iPg 5h 52m 13.5s. He:i 5h 51m 46s. BCIS: 51.1N 5.6E, H. 5h 51m 30s. Roermond fault, Belgium-Netherlands border.	
Mar.10 (73)	e F	11	50			s	(73) Disturbed by microseisms. USCGS: 29.9S 71.2W, H. 10h 51m 48.1s, h about 70 km. Near coast of Central Chile.	
Mar.11 (74)						s	(74) Wi:iP 7h 32m 11s, compression. USCGS: 38.1N 29.3E, H. 7h 27m 22.0s, h about 33 km. Turkey.	
Mar.15 (75)	e F	1	05			s	(75) USCGS: 8.4N 126.4E, H. 0h 16m 01.3s, h about 117 km. Mindanao, Philippine Islands.	
Mar.16 (76)	iP iS eSS eL F	8	56	51	+	7 12	(76) Wi:iP 8h 56m 46s. He:e 8h 56m 59s USCGS: 46.5N 154.7E, H. 8h 44m 48.3s, h about 26 km. Kurile Islands,	
Mar.17 (77)	eL F	14	26			s	(77) Wi:eP 14h 21m 14.5s. BCIS: 39.4N 21.0E, H. 14h 17m 18s. Greece.	
Mar.20 (78)						s	(78) Wi:iPKP 5h 01m 44s, epPKP 5h 04m 14s. USCGS: 19.9S 179.1W, H. 4h 43m 13.5s, h about 680 km. Fiji Islands region.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Mar.20 (79)							(79) Wi:iPKP 5h 04m 20s, ipPKP 5h 06m 48s. USCGS: 19.6S 179.3W, H. 4h 45m 49.5s, h about 680 km. Fiji Islands region	
Mar.21 (80)							(80) Wi:iP 4h 12m 31s. USCGS: 36.5N 140.9E, H. 4h 00m 11.1s, h about 50 km. Near east coast of Honshu, Japan.	
Mar.24 (81)	ePP eSS eSSS eL F	2	26.7 42 46.5 56				(81) Wi:ePKP 2h 25.8m. USCGS: 9.7S 120.4E, H. 2h 07m 12.8s, h about 33 km. Sumba Island.	
Mar.24 (82)							(82) Wi:eP 2h 36.7m. USCGS: 51.6N 173.3W, H. 2h 24m 49.2s, h about 55 km. Andreanov Islands, Aleutian arc.	
Mar.24 (83)	eL F	10	39 50				(83) USCGS: 9.0N 125.6E, H. 9h 43m 20.2s, h about 51 km. Mindanao region, Philippine Islands.	
Mar.24 (84)	eP ePP eS eL F	12	50 52 56 59.5 10	58 18 35			(84) Wi:iP 12h 50m 51.5s, compression. USCGS: 34.4N 47.9E, H. 12h 44m 03.2s, h about 33 km. West Iran.	
Mar.24 (85)							(85) Wi:eP 21h 47m 07s. USCGS: 51.8N 178.1W, H. 21h 35m 24.4s, h about 57 km. Andreanov Island, Aleutian arc.	
Mar.25 (86)							(86) Wi:iP 22h 59m 11.5s. USCGS: 0.7N 96.5E, H. 22h 46m 16.2s, h about 30 km. Off southwest coast of Sumatra.	
Mar.26 (87)	iPKP ePP F	10	08 12 13.0	17 24	+	5 9	(87) De Bilt no records from 10h19-11h43. Wi: ePKP 10h 08m 12s. USCGS: 29.7S 177.8W, H. 9h 48m 19.7s, h about 45 km. Kermadec Islands.	
Mar.26 (88)							(88) De Bilt no records. Wi:ePKP 13h 44m 58s. USCGS: 29.8S 177.9W, H. 13h 25m 02.6s, h about 42 km. Kermadec Islands.	
Mar.26 (89)							(89) Wi:iP 19h 58m 33s. USCGS: 44.4N 146.7E, H. 19h 47m 46.0s, h about 110 km. Kurile Islands.	
Mar.26 (90)	eP ePP eS eL F	21	47 50 57 12 23.5	00 00 20			(90) Disturbed by microseisms. Wi:eP 21h 46m 57s. USCGS: 36.0N 135.7E, H. 21h 34m 41.1s, h about 33 km. Near east coast of Honshu, Japan.	
Mar.28 (90a)	iP iS F	0	20 23 4	04.5 21	-	8 20	(90a) Wi:iP 0h 20m 06.5s, i oh 20m 09s, dilatation. USCGS: 66.3N 19.6W, H. oh 15m 47.6s, h about 15 km. North of Iceland.	
Mar.28 (91)							(91) Wi:ePKP 11h 32m 25s. USCGS: 30.2S 177.8W, H. 11h 12m 31.3s, h about 38 km. Kermadec Islands.	
Mar.28 (92)							(92) Wi:eP 23h 49.1m. USCGS: 29.6S 177.5W, H. 23h 29m 14.6s, h about 54 km. Kermadec Islands.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Mar.29 (93)	e F	3	19				(93) Wi:eP 3h 13m 27s. USCGS: 40.4N 26.6E, H. 3h 09m 11.2s, h about 33 km. NW-Turkey.	
Mar.30 (94)	ePKP epPKP eSS eL F	2	12	36			(94) Disturbed by microseisms. Wi:ePKP 2h 12m 44s. USCGS: 19.1S 169.1E, H. 1h 53m 28.8s, h about 160 km. New Hebrides Islands.	
Mar.30 (95)	iP eS eL F	17	04	58	+		(95) Wi:iP 17h 04m 54s, compression. USCGS: 44.2N 148.0E, H. 16h 51m 56.6s, h about 33 km. Kurile Islands.	
Mar.31 (96)	ePKP ePS eL F	5	50	45			(96) Wi:ePKP 5h 50m 44s. USCGS: 29.9S 177.7W, H. 5h 30m 49.3s, h about 48 km. Kermadec Islands.	
Mar.31 (97)	eL F	8	08				(97) USCGS: 6.1S 149.0E, H. 7h 07m 36.3s, h about 60 km. New Britain.	
Mar.31 (98)	eL F	13	18				(98) USCGS: 35.8N 132.6E, H. 12h 26m 11.6s, h about 33 km. Near South coast of Hondo, Japan.	
Mar.31 (99)	e F	18	32				(99) Wi eP 17h 41m 48s. USCGS: 0.8N 96.6E, H. 17h 28m 52.7s, h about 33 km. Near West coast of Sumatra.	
Mar.31 (100)	ePKP ₁ ePKP ₂ ePP eL F	19	42	45			(100) Wi:ePKP ₁ 19h 42m 45s, ePKP ₂ 19h 43m 15s. USCGS: 30.0S 178.0W, H. 19h 22m 53.3s, h about 50 km. Kermadec Islands.	
Apr.1 (101)	e F	9	45				(101) USCGS: 35.4N 69.8E, H. 9h 22m 51.8s, h about 100 km. Hindu-Kush.	
Apr.2 (102)							(102) Wi:iP 16h 30m 21s, iP 16h 31m 02s, dilatation. USCGS: 53.1N 171.7W, H. 16h 18m 55.3s, h about 140 km. Andreanov Islands, Aleutian arc.	
Apr.3 (103)	eL F	16	01				(103) Wi:ePKP 15h 08m. USCGS: 55.5S 128.1W, H. 14h 47m 55.6s, h about 33 km. South Pacific.	
Apr.6 (104)							(104) Wi:iPKP 7h 21m 44s, compression. USCGS: 17.5S 178.9W, H. 7h 03m 06.5s, h about 526 km. Fiji Islands.	
Apr.6 (105)							(105) Disturbed by microseisms. Wi:eP 11h 29.7m. USCGS: 63.4N 149.5W, H. 11h 19m 23.3s, h about 39 km. Central Alaska.	
Apr.7 (106)	e F	16	03				(106) USCGS: 53.7N 170.1W, H. 15h 28m 01.8s, h about 202 km. Fox Islands, Aleutian arc.	
Apr.7 (107)	eP ePP eS iPS eL F	22	49	36			(107) Disturbed by microseisms. Wi:eP 22h 49m 33s. USCGS: 4.9S 103.2E, H. 22h 36m 03.4s, h about 72 km. Near south-west coast of Sumatra.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Apr. 9 (108)							(108) Wi:eP 1h 46.7m. BCIS: 71.5N 12.9W, H. 1h 42m 07s. Near east coast of Greenland.	
Apr. 9 (109)							(109) Wi:iPKP 2h 21m 02s, dilatation. USCGS: 17.7S 178.8W, H. 2h 02m 25.1s, h about 538 km. Fiji Islands.	
Apr. 13 (110)	iP eS ePS eL F	2 2 2 2 3	33 44.9 45 58 25	44 24	-	5 5	(110) Disturbed by microseisms. Wi:iP 2h 33m 49s, dilatation. USCGS: 6.2S 76.5W, H. 2h 20m 57.5s, h about 125 km. Peru.	
Apr. 13 (111)	e F	15 15	25 55				(111) USCGS: 3.4S 135.4E, H. 14h 31m 21s, h about 31 km. Near north coast of New Guinea.	
Apr. 15 (112)							(112) Wi:ePKP 23h 59m 05s. USCGS: 18.3S 173.7W, H. 23h 39m 27.3s, h about 33 km. Tonga Islands.	
Apr. 16 (113)	ePKP ePP eSKS ePS eL F	1 1 1 1 2 5.5	44.0 48 54.5 58.0 16	57			(113) Disturbed by microseisms. Wi:ePKP 1h 47.5m. USCGS: 0.9S 128.2E, H. 1h 29m 15.9s, h about 33 km. Halmahera region.	
Apr. 16 (114)							(114) Wi:ePKP 2h 13.3m. USCGS: 0.7S 128.0E, H. 1h 55m 10.9s, h about 32 km. Halmahera region.	
Apr. 17 (115)	iPKP eL F	2 2 4.0	31 55	10	-		(115) Disturbed by microseisms. Wi: iPKP 2h 31m 05s, dilatation. USCGS: 19.6S 178.6E, H. 2h 11m 26.1s, h about 33 km. South of Fiji Islands.	
Apr. 17 (116)	eL F	18 18	02 20				(116) USCGS: 58.3N 32.3W, H. 17h 55m 02.9s, h about 33 km. North Atlantic Ocean.	
Apr. 18 (117)							(117) Wi:iPKP 2h 10m 40s, compression. USCGS: 20.3S 177.7W, H. 1h 51m 55.2s, h about 531 km. Fiji Islands.	
Apr. 19 (118)	iP eS eL F	7 7 8 10.0	45 54 10	55 37			(118) Wi:iP 7h 45m 46s. USCGS: 35.8N 96.9E, H. 7h 35m 23.7s, h about 33 km. Tsinghai Province, China.	
Apr. 20 (119)							(119) Wi:iP 20h 43m 45s. USCGS: 52.3N 159.5E, H. 20h 32m 16.2s, h about 33 km. Off east coast of Kamchatka.	
Apr. 21 (120)	eL F	5 6	20 05				(120) Wi:eP 4h 50m 55s. USCGS: 24.2N 122.3E, H. 4h 38m 21.7s, h about 35 km. Near east coast of Formosa.	
Apr. 21 (121)	eL F	11 12	48 00				(121) USCGS: 3.2S 146.9E, H. 10h 38m 30.2s, h about 33 km. Bismarck Sea.	
Apr. 23 (122)	eL F	3 3	23 40				(122) Wi:eP 3h 01m 14s. USCGS: 46.7N 103.5E, H. 2h 51m 15.8s, h about 33 km. Outer Mongolia.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period s	Amplitude M	Remarks
		h	m	s				
Apr. 23 (123)	eL F	10	35				(123) USCGS: 25.7N 99.5E, H. 9h 55m 06.9s, h about 30 km. Yunnan Province, Chine.	
Apr. 24 (124)	eL F	14	19				(124) Wi:eP 13h 44m 50s. USCGS: 26.6N 129.1E, H. 13h 32m 06.8s, h about 10 km. Ryu Kyu Islands region.	
Apr. 24 (125)							(125) Wi:iPKP 22h 01m 28s, dilatation. USCGS: 20.8S 179.0W, H. 22h 42m 58.8s, h about 600 km. Fiji Islands region.	
Apr. 25 (126)							(126) Wi:eP _n 13h 38.0m. He:e 13h 39m 12s. USCGS: 45.2N 5.9E, H. 13h 36m 14.2s, h about 33 km. Isère, France.	
Apr. 25 (127)							(127) Wi:iPKP 18h 09m 29.5s, compression. USCGS: 21.7S 177.9W, H. 17h 50m 21.4s, h about 346 km. Fiji Islands region.	
Apr. 26 (128)	e F	24	32				(128) Wi:iP 23h 57m 37.5s, dilatation. USCGS: 24.0N 122.5E, H. 23h 44m 56.7s, h about 2 km. Off east coast of Formosa.	
Apr. 27 (129)	e F	3	52				(129) Wi:iP 3h 46m 54s, compression. USCGS: 66.7N 19.2W, H. 3h 42m 33.9s, h about 33 km. Off north coast of Iceland.	
Apr. 27 (130)							(130) Wi:e 5h 31m 52s. BCIS: 45.0N 5.7E, H. 5h 28m 20s. Isère, France.	
Apr. 27 (131)	e F	9	37				(131) USCGS: 0.9S 128.4E, H. 8h 42m 58.1s, h about 27 km. Halmahera region.	
Apr. 28 (132)							(132) Wi:iP 0h 46m 20s, compression. USCGS: 40.5N 27.4E, H. 0h 42m 11.1s, h about 160 km. Northwest of Turkey.	
Apr. 29 (133)	eP eS eSS eL F	21	56	03			(133) Wi:eP 21h 56m 02s. USCGS: 51.3N 178.7E, H. 21h 44m 17.2s, h about 56 km. Andreanov Islands, Aleutian arc.	
Apr. 30 (134)	eS eSS eL F	1	24.5				(134) Wi:ePKP 1h 17.0m. USCGS: 0.9S 128.8E, H. 0h 58m 19.2s, h about 33 km. Halmahera region.	
May 1 (135)	iPKP epPKP iZ iZ epPP ipPPP iZ eL F	10	22	39	+		(135) Wi:ePKP 10h 22m 37s. He: ePKP 10h 22m 47s. USCGS: 19.0S 168.9E, H. 10h 03m 20.2s, h about 142 km. New Hebrides Islands.	
May 5 (136)							(136) Wi:iPKP 17h 31m 22s. USCGS: 17.6S 173.7W, H. 17h 11m 47.2s, h about 52 km. Tonga Islands region.	
May 6 (137)	eL F	19	40				(137) BCIS: 39.1N 20.7E, H. 19h 30m 29s. Gulf of Arta, Greece.	
May 8 (138)							(138) Wi:iP 10h 34m 30s. USCGS: 36.4N 141.0E, H. 10h 22m 09.6s, h about 45 km. Honshu, Japan.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
May 8 (139)	eL F	15 16	57 02				(139) USCGS: 5.3N 125.6E, H. 15h 23m 58.9s, h about 60 km. Off coast of Mindanao, Philippine Islands.	
May 10 (140)							(140) Wi:ePKP 4h 48m 15s. USCGS: 20.2S 168.1E, H. 4h 28m 42.6s, h about 40 km. Loyalty Islands.	
May 10 (141)	iP iS eL F	22 22 23 24	35 46 00 05	34 08	-		(141) Wi:iP 22h 35m 33s. USCGS: 2.1S 77.6W, H.22h 22m 42.7s, h about 30 km. Ecuador.	
May 11 (142)	eL F	18 19	36 00				(142) USCGS: 24.1N 122.3E, H. 17h 49m 41.9s, h about 33 km. Off coast of Formosa.	
May 12 (143)	eL F	20 21	45 20				(143) Wi:iP 20h 19m 44s, dilatation. USCGS: 57.3N 154.0W, H. 20h 08m 40.8s, h about 60 km. Kodiak Island, Alaska.	
May 12 (144)							(144) Wi:iP 20h 48m 23s. USCGS: 56.1N 163.1E, H. 20h 37m 17.8s, h about 69 km. Near east coast of Kamchatka.	
May 15 (145)	eL F	4 4	00 15				(145) USCGS: 3.4S 146.9E, H. 2h 52m 39.7s, h about 33 km. Bismarck Sea.	
May 15 (146)	eP eL F	12 12 12	13 21 40	42			(146) Wi:eP 12h 13m 51s. USCGS: 38.0N 26.4W, H. 12h 08m 08.8s, h about 33 km. Near Azores Islands.	
May 17 (147)							(147) Wi:iP 4h 18m 31s, compression. USCGS: 45.3N 150.8E, H. 4h 06m 39.5s, h about 51 km. Kurile Islands.	
May 17 (148)	eL F	6 7	55 15				(148) USCGS: 15.7N 120.1E, H. 6h 09m 20.4s, h about 99 km. Near west coast of Luzon, Philippine Islands.	
May 17 (149)	eL F	12 13	55 10				(149) USCGS: 41.7N 141.9E, H. 12h 09m 08.1s, h about 72 km. South of Hokkaido, Japan.	
May 17 (150)							(150) Wi:iPKP 22h 59m 54s (compression) USCGS: 24.7S 177.3W, H. 22h 40m 12.4s, h about 128 km. Tonga Islands region.	
May 19 (151)	ePP ePPP ePS eSSS eL F	1 1 1 1 1 3.5	23.5 25 55 33 08 40.0 52				(151) USCGS: 46.5S 75.1W, H. 1h 03m 06.2s, h about 48 km. Coast of southern Chile.	
May 19 (152)	e(P ^x) eS ^x eL F	10 10 10 10	02,3 04 22 04 40 15				(152) Wi:i 10h 02m 22s. He:eP _n 10h 01m 56s. BCIS: 46.0N 14.8E, H. 10h 00m 04s, h about 32 km. East of Ljubljana, Yugoslavia.	
May 19 (153)	iP iS eL F	21 21 21 24.0	44 51 55 0	17 29	+	5 5	(153) Wi:iP 21h 44m 34s. USCGS: 23.8N 45.9W, H. 21h 35m 47.0s, h about 10 km. Mid Atlantic ridge:	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
May 20 (154)	iPKP ₁ iPKP ₂ iPP eZ eP _c PPKP ePPP eSKKS eSS eSSS eL F	11 11 12 12 12 12 12 12 12 12 12	57 58 02 02 08 10.6 12.5 22.7 28.5 53 14.5	56 32 10 49 13	+	6	5	(154) Wi:iPKP ₁ 11h 57m 55s, iPKP ₂ 11h 58m 28s. USCGS: 30.7S 178.3W, H. 11h 38m 05.3s, h about 68 km. Kermadec Islands region.
May 21 (155)	eL F	18 19	36 02				(155) USCGS: 11.1S 163.3E, H. 17h 30m 15.4s, h about 33 km. Solomon Islands.	
May 22 (156)	iP iS eL F	14 14 14 15	08 18 32 30	33 17			(156) Wi:iP 14h 08m 28s. USCGS: 48.6N 154.7E, H. 13h 56m 47.5s, h about 54 km. Kurile Islands.	
May 22 (157)	e eL F	22 22 23	12 49 45				(157) USCGS: 8.2S 115.7E, H. 21h 53m 03.7s, h about 47 km. Bali Islands, Java Sea.	
May 23 (158)	e eL F	3 4 5	57 45 40				(158) USCGS: 15.0S 176.7W, H. 3h 33m 24.8s, h about 302 km. Fiji Islands.	
May 25 (159)							(159) Wi:eP 8h 53m 02s (compression) USCGS: 42.9N 144.4E, H. 8h 41m 11.6s, h about 88 km. Near east coast of Hokkaido, Japan.	
May 25 (160)	e(PKP) eZ eH F	16 16 16 19.2	27.0 36.5 43.0 19.2				(160) USCGS: 56.7S 24.8W, H. 16h 08m 00.6s, h about 33 km. Sandwich Islands.	
May 25 (161)							(161) Wi:ePKP 24h 19m 38s. USCGS: 20.0S 173.9W, H. 23h 59m 55.9s, h about 33 km. Tonga Islands.	
May 26 (162)	iP ePP ePPP eS eL F	23 23 23 23 23 24.0	18 20 22 27 41 24.0	12 50 32 30			(162) Wi:eP 23h 18m 06s. USCGS: 55.2N 159.9E, H. 23h 06m 54.0s, h about 34 km. Near east coast of Kamchatka.	
May 27 (163)	eP epP eZ eS eL F	4 4 4 4 4 5	10 10 14 19 35 15	03 44 28 25			(163) Wi:eP 4h 09m 56s. USCGS: 55.3N 160.1E, H. 3h 58m 46.6s, h about 49 km. Near east coast of Kamchatka.	
May 29 (164)							(164) Wi:iP 8h 43m 46.7s, dilatation. USCGS: 27.0N 59.4E, H. 8h 35m 03.7s, h about 52 km. Southern Iran.	
May 29 (165)							(165) He:i 16h 07m 05s. Local shock.	
May 30 (166)	eL F	8 9	10 15				(166) USCGS: 54.3S 144.1E, H. 6h 56m 08.6s, h about 33 km. Southern Australia.	
June 1 (167)	eL F	1 2.0	15				(167) USCGS: 15.3S 173.4W, H. 23h 58m 52.2s, h about 61 km. Samoa Islands region.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
June 1 (168)	ePKP	21	48	04		s	M	(168) USCGS: 22.2S 169.6E, H. 21h 08m 14.2s, h about 48 km. Loyalty Islands region.
June 1 (169)	ePKP	21	33	21				(169) USCGS: 15.2S 173.5W, H. 21h 13m 52.7s, h about 33 km. Samoa Islands region.
	ePP	21	36	40				
	eZ	21	37	10				
	ePS	21	47					
	eL	22	35					
	F	23	30					
June 2 (170)	ePP	21	23.5					(170) USCGS: 58.3S 15.3W, H. 21h 04m 21.6s, h about 33 km. Sandwich Islands region.
	ePPP	21	26.0					
	ePS	21	33.0					
	eSS	21	39					
	eL	21	54					
	F	23.0						
June 3 (171)	eP	7	48	30				(171) Wi:iP 7h 48m 28s. USCGS: 34.2N 138.7E, H. 7h 35m 50.6s, h about 21 km. Honshu, Japan.
	ePP	7	51	38				
	eS	7	58.5					
	eL	8	12					
	F	9.0						
June 3 (172)	eP	11	44.0					(172) Wi:eP 11h 44m. USCGS: 5.3N 72.9W, H. 11h 31m 50.5s, h about 32 km. Colombia.
	eS	11	54	48				
	eL	12	12					
	F	13	10					
June 4 (173)	ePP	21	23.7					(173) Wi:e 21h 23m 40s. USCGS: 1.2S 127.3 H. 21h 04m 42.3s, h about 33 km. Halma-hera region.
	eZ	21	23	54				
	ePS	21	33	20				
	eSS	21	39.5					
	eL	22.0						
	F	23						
June 5 (174)	eL	23	47					(174) USCGS: 3.0S 119.5E, H. 22h 54m 28.7s, h about 75 km. Celebes.
	F	0	30					
June 6 (175)	eP	5	31	47				(175) Wi:eP 5h 31m 43s, compression. USCGS: 19.9N 120.2E, H. 5h 18m 55.1s, h about 33 km. Off north coast of Luzon, Philippine Islands.
	ePP	5	35	09				
	eS	5	42	22				
	ePS	5	43	40				
	eSS	5	53	30				
	eL	6	04					
	F	7.0						
June 6 (176)	e	13	09					(176) BCIS: 49° 33' 3 N 14° 14' 1E. Explosion Czechoslovakia..
	F	13	30					
June 7 (177)	eS	16	13	30				(177) USCGS: 19.0N 121.8E, H. 15h 49m 57.4s, h about 33 km. Off north coast of Luzon, Philippine Islands.
	eL	16	35					
	F	17	10					
June 7 (178)	ePP	19	47	50				(178) USCGS: 8.5N 103.1W, H. 19h 30m 35.6s, h about 33 km. Clipperton Island region.
	ePS	19	56	28				
	eL	20	15					
	F	21.0						
June 7 (179)	ePKP	22	57	00				(179) USCGS: 15.3S 173.2W, H. 22h 37m 30.0s, h about 33 km. Samoa Islands region.
	eH	23	19	00				
	eL	23	50					
	F	1.0						
June 9 (180)	eS	20	55	25				(180) Wi:eP 20h 47m 41s. USCGS: 10.7N 41.9W, H. 20h 37m 51.6s, h about 11 km. Mid Atlantic ridge.
	eL	21	04					
	F	21	30					

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
June 10 (181)	ePKP eSS eL	4	36	32		s		(181) F in next shock. Wi:ePKP 4h 36m 33s. USCGS: 55.4S 146.4E, H. 4h 16m 37.7s, h about 33 km. 800 km west of Macquarie Islands.
June 10 (182)	ePKP ₁ ePKP ₂ ePKS ePP eSS eH eL F	6	58	58		s	μ	(182) Wi:ePKP 6h 59m 00s. USCGS: 55.3S 146.1E, H. 6h 39m 04.0s, h about 18 km. 800 km. west of Macquarie Islands.
June 10 (183)								(183) Wi:eP 10h 58m 35s. USCGS: 50.9N 160.2E, H. 10h 46m 58.1s, h about 44 km. Off coast of Kamchatka.
June 10 (184)								(184) Wi:ePKP 24h 17m 40s. USCGS: 4.6S 152.9E, H. 23h 58m 44.1s, h about 72 km. New Britain.
June 11 (185)	eL F	16	08					(185) USCGS: 31.8N 116.2W, H. 15h 23m 42.7s, h about 33 km. California.
June 11 (186)	eL F	18	40					(186) USCGS: 30.9N 87.3E, H. 18h 07m 24.1s, h about 33 km. Tibet.
June 12 (187)	eN iZ	22	59	09				(187) Wi:i 23h 04m 23s. Explosion Muiden, Netherlands.
June 15 (188)	eL F	16	33					(188) USCGS: 36.3S 98.9W, H. 15h 30m 37.7s, h about 33 km. Off coast of central Chile.
June 17 (189)	eP eS eL	18	42	50				(189) F in next shock. Wi:iP 18h 42m 48s. USCGS: 60.4N 140.8W, H. 18h 32m 14.5s, h about 33 km. Southwestern Yukon.
June 17 (190)	ePKP ₁ ePKP ₂ ePP eL F	18	51	05				(190) USCGS: 65.8S 179.5W, H. 18h 30m 54.1s, h about 33 km. Scott Island region.
June 17 (191)								(191) Wi:iPKP 20h 28m 23s. USCGS: 20.4S 174.4W, H. 20h 08m 37.0s, h about 33 km. Tonga Islands.
June 18 (192)	eL F	4	45					(192) Wi:iP 4h 15m 04s. USCGS: 29.0N 129.9E, H. 4h 02m 31.0s, h about 53 km. Ryukyu Islands.
June 19 (193)								(193) Disturbed by microseisms. Wi:iP 10h 58m 21s, dilatation. USCGS: 25.0N 92.1E, H. 10h 47m 24.6s, h about 51 km. India - Eastern Pakistan border.
June 19 (194)	eL F	23	38					(194) USCGS: 31.7N 140.0E, H. 23h 01m 55.9s, h about 62 km. South of Honshu, Japan.
June 20 (195)	eL F	19	57					(195) USCGS: 35.6N 3.6W, H. 19h 47m 40.0s, h about 46 km. Strait of Gibraltar.
June 20 (196)	eL F	24	15					(196) Wi:ePKP 23h 06m 14s. USCGS: 28.0S 176.5W, H. 22h 46m 18.8s, h about 48 km. Kermadec Islands.

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
June 21 (197)	eL F	14	20				(197) USCGS: 47.8N 130.5E, H 13h 44m 20.8s, h about 8 km. Eastern Russia-northeastern China border.	
June 21 (198)							(198) Wi:iP 15h 37m 25s. USCGS: 24.9N 92.1E, H 15h 26m 29.3s, h about 53 km. India-Eastern Pakistan border.	
June 23 (199)	e F	9	38				(199) Wi: e 9h 38m. USCGS: 45.6N 14.9E, H. 9h 33m 53.2s, h about 33 km. Yugo-slavia.	
June 24 (200)	iP iS eSS eL F	4	37	30	-	4 3	(200) Wi:iP 4h 37m 27s. USCGS: 59.5N 151.7W, H. 4h 26m 37.9s, h about 52 km. Cook Inlet, Alaska.	
June 24 (201)	eL F	16	50				(201) USCGS: 52.2N 171.1W, H. 16h 17m 15.7s, h about 36 km. Fox Islands, Aleu-tian arc.	
June 25 (202)							(202) He:i 17h 42m 29s. BCIS: 50 35 N 7 20 E, H. 17h 42m 01.7s. Southeast of Bonn, Germany.	
June 25 (203)							(203) He:i 22h 16m 33s. BCIS: 50 35 N 7 20 E, H. 22h 16m 10.5s. Southeast of Bonn, Germany.	
June 26 (204)	eL F	10	35				(204) BCIS: 36.0N 4.2W, H. 10h 27m 10s. Near Malaga, West-Medeterranean.	
June 26 (205)	eP eSP eL F	17	55	16			(205) Wi:eP 17h 55m 11s. USCGS: 7.1N 82.3W, H. 17h 42m 40.6s, h about 20 km. Near south coast of Panama.	
June 28 (206)	iP eS eSS eL F	22	07	38	+	8 12	(206) Wi:eP 22h 07m 33s, dilatation. USCGS: 46.5N 153.2E, H. 21h 55m 36.8s, h about 12 km. Kurile Islands region.	
June 29 (207)	eL F	13	45				(207) USCGS: 46.7N 153.7E, H. 13h 14m 04s, h about 24 km. Kurile Islands.	
June 30 (208)							(208) Wi:ePKP 2h 24m 12s. USCGS: 21.9S 170.8E, H. 2h 04m 36.9s, h about 73 km. Loyalty Islands region.	
June 30 (209)	iP eS eL F	22	16	51			(209) Wi:iP 22h 16m 47s, (compression). USCGS: 46.5N 153.3E, H. 22h 04m 52.8s, h about 22 km. Kurile Islands region.	
July 1 (210)	e(P) F	10	36				(210) BCIS: 65N 18W, H. 10h 27.8m. Ice-land.	
July 1 (211)	e F	21	43				(211) USCGS: 37.0N 96.1E, H. 21h 10m 28.5s, h about 33 km. Tsinghai Province, China.	
July 2 (212)	e F	0	40				(212) USCGS: 43.9N 85.2E, H. 0h 15m 22.4s, h about 39 km. Sinkiang Province, China.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
July 4 (213)	iPKP ₁ iPKP ₂ iPP eSKSP ePS F	11	17	47		7	4	(213) Wi:ePKP 11h 17m 45s, i 11h 17m 54s. USCGS: 26.3S 177.7W, H. 10h 58m 13.2s, h about 158 km. Tonga Islands region.
July 4 (214)	eP eS eL F	23	07	40				(214) Wi:eP 23h 07m 46s. USCGS: 18.5S 12.6W, H. 22h 56m 15.7s, h about 33 km. St. Helena Island region.
July 5 (215)								(215) Wi:iP 6h 01m 36.5s, compression. USCGS: 11.6S 77.5W, H. 5h 48m 13.4s, h about 55 km. Southwestern Peru.
July 5 (216)	eL F	14	30.5					(216) USCGS: 39.1N 22.9E, H. 14h 21m 28.5s, h about 33 km. Greece.
July 8 (217)	eP eS eL F	11	14	40				(217) USCGS: 0.3N 17.8W, H. 11h 05m 07.5s, h about 33 km. Mid Atlantic ridge.
July 8 (218)	e F	16	15					(218) USCGS: 36.6N 28.0E, H. 16h 02m 26.8s, h about 30 km. Near south coast of Turkey.
July 9 (219)	eP eS eL F	9	36	54				(219) USCGS: 8.5N 83.0W, H. 9h 24m 33.3s, h about 31 km. Costa Rica-Panama border.
July 9 (220)	e F	18	28					(220) USCGS: 24.2N 122.4E, H. 17h 34m 33.2s, h about 33 km. Near east coast of Formosa.
July 10 (221)	eP eS eSS eL F	5	34	55	+	8	5	(221) Wi:iP 5h 34m 52s. USCGS: 46.3N 152.9E, H. 5h 22m 57.1s, h about 33 km. Kurile Islands region.
July 12 (222)	eP eS eL F	15	40	04				(222) Wi:eP 15h 40m 01s. USCGS: 46.8N 153.6E, H. 15h 28m 08.5s, h about 33 km. Kurile Islands region.
July 13 (223)	eL F	0	28					(223) USCGS: 5.5S 153.3E, H. 23h 51m 16s, h about 56 km. New Britain.
July 13 (224)	eL F	14	50					(224) Wi:eP 14h 10m 25s. USCGS: 44.3N 148.8E, H. 13h 58m 25.7s, h about 33 km. Kurile Islands.
July 14 (225)	e(PKP) eL F	0	22					(225) USCGS: 30.5S 177.2W, H. 0h 02m 22.8s, h about 33 km. Kermadec Islands region.
July 14 (226)	eP eS eSS eL F	5	52	47				(226) Wi:eP 5h 52m 44s. USCGS: 10.4N 62.6W, H. 5h 41m 43.0S, h about 24 km. Off coast of northern Venezuela.

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
July 16 (227)	eP iZ eS iH eL F	18	32	50	-	7	12	(227) Wi:iP 18h 32m 43s. USCGS: 43.1N 41.5E, H. 18h 27m 18.4s, h about 33 km. Georgia. SSR.
July 17 (228)	eP eS eL F	12	02	40				(228) Wi:eP 12h 02m 32s. USCGS: 43.1N 41.5E, H. 11h 57m 06.7s, h about 33 km. Georgia. SSR.
July 18 (229)	iZ eSS eL F	5	27.5					(229) USCGS: 61.0S 22.3W, H. 4h 58m 09.2s, h about 33 km. Sandwich Islands region.
July 19 (230)	eP eS eL F	5	47	37				(230) Wi:eP 5h 47m 50s. He:eP 5h 47.7m. USCGS: 43.4N 8.2E, H. 5h 45m 28.0s, h about 33 km. Ligurian Sea.
July 19 (231)	eL F	9	45					(231) USCGS: 36.3N 141.0E, H. 9h 00m 44.8s, h about 70 km. Near east coast of Honshu.
July 20 (232)	ePKP eSS eL F	6	56.1					(232) USCGS: 57.6S 148.5E, H. 6h 36m 10.8s, h about 33 km. Macquarie Island region.
July 21 (233)	eL F	11	15					(233) BCIS: 42.5N 13.4E, H. 11h 08m 25s. Rieti Province, Italy.
July 22 (234)	e F	0	59					(234) USCGS: 6.1S 148.9E, H. 0h 29m 14.9s, h about 59 km. New Britain.
July 23 (235)								(235) Wi:iP 6h 29m 46s. USCGS: 41.5N 141.9E, H. 6h 17m 51.5s, h about 91 km. Off northeast coast of Honshu.
July 24 (236)								(236) He:iS 0h 15m 55s. BCIS: 43.4N 13.1E, H. 0h 10m 25s. Central Italy.
July 24 (237)	eL F	12	15					(237) Wi:eP 11h 45m 11s. USCGS: 24.6N 122.0E, H. 11h 32m 17.7s, h about 33 km. Near east coast of Formosa.
July 26 (238)	iP eS eL F	4	20	49				(238) Wi:eP 4h 20m 49s. He:e 4h 20m. USCGS: 42.1N 21.5E, H. 4h 17m 12.5s, h about 5 km. Southern Yugoslavia (Skopje).
July 27 (239)								(239) Wi:e 6h 00.7m. He:e 6h 01m. USCGS: 43.5N 8.4E, H. 5h 58m 23.4s, h about 33 km. Ligurian Sea.
July 28 (240)	e(P) eS eL F	13	30					(240) USCGS: 72.0N 0.1W, H. 13h 25m 18.1s, h about 33 km. Jan Mayen Island region.
July 28 (241)	eP eL F	19	03.5					(241) Wi:eP 19h 03m 29s. USCGS: 46.6N 153.1E, H. 18h 51m 36.7s, h about 33 km. Kurile Islands region.
July 29 (242)								(242) Wi:iP 6h 18m 27.5s. USCGS: 27.8N 55.6E, H. 6h 10m 22.6s, h about 37 km. Southern Iran.

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
July 29 (243)	ePKP eSS eL F	20	34.0				(243) Wi:e(PKP) 20h 34m 15s, e(PKS) 20h 37m 00s. USCGS: 30.2S 177.3W, H. 20h 14m 07.3s, h about 39 km. Kermadec Islands.	
July 30 (244)	ePKP eSS eL F	6	05	45			(244) Wi:e(PKP) 6h 06.0m. USCGS: 29.6S 177.3W, G. 5h 43m 53.3s, h about 33 km. Kermadec Islands region.	
July 30 (245)							(245) Wi:iP 7h 03m 52s. USCGS: 51.7N 158.1E, H. 6h 52m 22.7s, h about 33 km. Kamchatka.	
July 30 (246)	eL F	14	45				(246) USCGS: 55.9S 27.5W, H. 13h 51m 57.8s, h about 33 km. Sandwich Islands.	
July 30 (247)	eL F	16	30				(247) USCGS: 29.9S 177.4W, H. 15h 04m 38.7s, h about 76 km. Kermadec Islands.	
Aug. 2 (248)	iP eL	9	12	25	(+)		(248) Wi:eP 9h 12m 29s, (compression). F in next shock. USCGS: 56.2N 34.1W, H. 9h 07m 18.0s, h about 41 km. North Atlantic Ocean.	
Aug. 2 (249)	eP F	9	18	53	(+)		(249) Wi:iP 9h 18m 58s. USCGS: 56.3N 34.5W, H. 9h 13m 47.8s, h about 33 km. North Atlantic Ocean.	
Aug. 3 (250)	iP iS eL F	10	31	11	+	7 12	(250) Wi:iP 10h 31m 20s, compression. USCGS: 7.7N 35.8W, H. 10h 21m 36.6s, h about 33 km. Mid Atlantic ridge.	
Aug. 3 (251)							(251) Wi:ePKP 20h 46m 31s. USCGS: 30.7S 178.3W, H. 20h 26m 04.1s, h about 37 km. Kermadec Islands.	
Aug. 5 (252)	iPKP F	0	12	56			(252) Wi:iPKP 0h 12m 53s. USCGS: 17.5S 179.1W, H. 23h 54m 14.0s, h about 515 km. Fiji Islands region.	
Aug. 5 (253)	eL F	17	07				(253) USCGS: 60.7S 154.3E, H. 15h 39m 07s, h about 33 km. Macquarie Islands region.	
Aug. 6 (254)	eP eS eL F	13	41	35			(254) Wi:eP 13h 41m 43s. USCGS: 57.0N 33.6W, H. 13h 36m 35.6s, h about 33 km. North Atlantic Ocean.	
Aug. 7 (255)							(255) Wi:iP 4h 44m 36.5s. USCGS: 54.0N 142.1E, H. 4h 33m 42.7s, h about 33 km. Sakhaline Island. SSR.	
Aug. 8 (256)	iP eS eL F	2	26	22			(256) Wi:iP 2h 26m 18s. USCGS: 54.2N 168.1E, H. 2h 14m 54.4s, h about 33 km. Fox Islands, Aleutian arc.	
Aug. 8 (257)	eL F	12	20				(257) Wi:eP 11h 54m 05s. USCGS: 27.3N 129.2E, H. 11h 41m 30.5s, h about 92 km. Ryukyu Islands.	
Aug. 9 (258)	eZ eH eL F	6	09.5				(258) Wi:e 6h 07.6m, e 6h 08.0m. He:e 6h 07m 47s. USCGS: 44.5N 11.9E, H. 6h 05m 32.2s, h about 33 km. Northern Italy.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period s	Amplitude μ	Remarks
		h	m	s				
Aug.9 (259)	ePKP eSS eL F	14 15 15 17	56.4 19 50				(259) USCGS: 15.3S 175.7W, H. 14h 36m 45.9s, h about 33 km. Fiji Islands region.	
Aug.9 (260)							(260) Wi:i 19h 14m 34.5s, (compression). He:i 19h 14m 19s. BCIS: 51°11'N 6°24' E, H. 19h 14m 07s. East of Venlo fault. Near München-Gladbach, Germany.	
Aug.13 (261)							(261) Wi:iPKP 6h 48m 02s, compression. USCGS: 20.6S 178.5W, H. 6h 29m 19.1s, h about 562 km. Fiji Islands.	
Aug.13 (262)	ePKP eL F	22 23 24.2	12 15	22			(262) Wi:ePKP 22h 12m 18s. USCGS: 19.3S 173.7W, H. 21h 52m 37.4s, h about 33 km. Tonga Islands.	
Aug.15 (263)	iP ePP eS eL F	6 6 6 6 9.0	23 27 34 49	54 02 06	+	5 6	(263) Wi:iP 6h 23m 46s, compression. USCGS: 37.9N141.6E, H. 6h 11m 34.6s, h about 590 km. Near east coast of Honshu, Japan.	
Aug.15 (264)	iP epP iSKS eS ePS esS eH F	17 17 17 17 17 17 17 21.0	37 39 47 47 48 51 52	16 35 11 40 54 27 23	-	6 4	(264) Wi:iP 17h 37m 22s, ipP 17h 39m 43s. He:i 17h 37m 37s. USCGS: 13.8S 69.3W, H. 17h 25m 05.9s, h about 543 km. Peru-Bolivia border.	
Aug.17 (265)	iP iPP eS eSS eL F	11 11 11 11 11 13.5	25 28 35 42.0 52	14 33 36	+	7 3	(265) Wi:eP 11h 25m 09s. USCGS: 30.6N 130.9E, H. 11h 12m 41.2s, h about 33 km. Ryukyu Islands region.	
Aug.18 (266)	eP eS eL F	18 19 19 20	55 05 20	15 08			(266) Wi:iP 18h 55m 10s. USCGS: 50.3N 176.9W, H. 18h 43m 16.1s, h about 33 km. Andreanov Islands, Aleutian arc.	
Aug.22 (267)	eSKP ePS eSS eL F	20 20 20 21 22.4	15.0 24.1 31.5 20				(267) USCGS: 9.4S 158.0E, H. 19h 52m 25.0s, h about 33km. Solomon Islands.	
Aug.23 (268)							(268) Wi:eP 13h 20m 53s. USCGS: 52.4N 159.6E, H. 13h 09m 25.3s, h about 33 km. East coast of Kamchatka.	
Aug.25 (269)	e(S) eL F	6 6 6	22 26 45	08			(269) Wi:eP 6h 17m 17s. USCGS: 38.9N 38.4E, H. 6h 11m 43.3s, h about 33 km. Central Turkey.	
Aug.25 (270)	iPKP ipPKP eSS esSS F	12 12 12 13 14.5	36 39 58 01.8	49 11 18	-	4 8	(270) Wi:iPKP 12h 36m 42.5s, dilatation. USCGS: 17.5S 178.8W, H. 12h 18m 12.5s, h about 565 km. Fiji Islands region.	
Aug.26 (271)							(271) Wi:iPKP 5h 08m 18.0s, dilatation. USCGS: 17.7S 178.8W, H. 4h 49m 43.8s, h about 575 km. Fiji Islands.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Aug.27 (272)	eL F	4	26				(272) USCGS: 45.9S 75.3W, H. 3h 23m 32.6s h about 33 km. Near coast of Southern Chile.	
Aug.29 (273)	iP iPP iS iSS eL F	9	02	26	+	7	6	(273) Wi:eP 9h 02m 17s. USCGS: 39.6N 74.2E, H. 8h 53m 48.4s, h about 31 km. Sinkiang Province, China.
Aug.29 (274)	iP ePP eH eS ePS eSS eSSS eL F	15	43	49	-	7	11	(274) Wi:eP 15h 43m 53s. USCGS: 7.1S 81.6W, H. 15h 30m 31.4s, h about 23 km. Off coast of Peru.
Aug.30 (275)	eL F	5	11					(275) USCGS: 44.8N 80.1E, H. 4h 46m 25s, h about 33 km. China-Kazakhstan border, SSR.
Sep.2 (276)	e F	2	03					(276) USCGS: 33.9N 74.7E, H. 1h 34m 31.6s, h about 44 km. North of India.
Sep.2 (277)	eL F	14	45					(277) USCGS: 25.7N 109.5W, H. 14h 10m 44.7s, h about 33 km. Gulf of California.
Sep.2 (278)	eL F	24	30					(278) Wi:eP 23h 57.2m. USCGS: 45.4N 150.8E, H. 23h 45m 00.1s, h about 33 km. Kurile Islands.
Sep.3 (279)								(279) Wi:iP 5h 41m 35s, dilatation. USCGS: 45.4N 150.9E, H. 5h 29m 39.5s, h about 33 km. Kurile Islands.
Sep.3 (280)	eL F	9	23					(280) USCGS: 62.8N 25.2W, H. 9h 13m 33.1s, h about 33 km. Iceland region.
Sep.4 (281)	iP eS eL F	5	10	33				(281) Wi:iP 5h 10m 45s, (dilatation). He:eL 5h 14m - 5h 21m. USCGS: 36.1N 5.3E, H. 5h 06m 47.0s, h about 38 km. Near coast of Algeria.
Sep.4 (282)	eL F	8	45					(282) USCGS: 36.3N 5.1E, H. 8h 37m 40.2s, h about 33 km. Algeria.
Sep.4 (283)	iP iPP eS eL F	13	39	31	-	5	3	(283) Wi:iP 13h 39m 32s, dilatation. USCGS: 71.4N 73.3W, H. 13h 32m 12.3s, h about 35 km. Near east coast of Baffin Island.
Sep.5 (284)								(284) Wi:iPKP 1h 14m 35s, dilatation. USCGS: 17.8S 178.5W, H. 0h 55m 59.1s, h about 558 km. Fiji Islands.
Sep.5 (285)	eL F	17	19					(285) USCGS: 36.0N 5.7E, H. 17h 11m 08s, h about 33 km. South of Sétif, Algeria.

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Sep.6 (286)							(286) Wi:ePKP 2h 00m 16s. USCGS: 19.3S 176.9W, H. 1h 40m 45.0s, h about 66 km. Tonga Islands.	
Sep.6 (287)	eP ePP eS ePS eSS eL F	6	15	59			(287) Wi:eP 6h 15m 55s. USCGS: 36.4N 130.6E, H. 6h 03m 52.1s, h about 33 km. Sea of Japan.	
Sep.6 (288)							(288) Wi:iPKP 10h 35m 35s, ipPKP 10h 37m 39s. USCGS: 24.0S 179.9E, H. 10h 16m 38.9s, h about 500 km. Kermadec Islands region.	
Sep.7 (289)	eL F	1	54				(289) Wi:eP 1h 28m 57s. USCGS: 36.4N 130.6E, H. 1h 16m 55.1s, h about 33 km. Off east coast of Southern Korea.	
Sep.7 (290)							(290) Wi:iP 7h 25m 35s, dilatation. USCGS: 45.4N 150.8E, H. 7h 13m 39.9s, h about 33 km. Kurile Islands.	
Sep.7 (291)	eH eL F	9	14	44			(291) USCGS: 11.7S 13.6W, H. 8h 50m 57.5s, h about 33 km. Ascension Island.	
Sep.7 (292)							(292) Wi:iP 12h 55m 14s, dilatation. USCGS: 54.0N 160.3E, H. 12h 44m 01.1s, h about 110 km. Kamchatka.	
Sep.8 (293)							(293) Wi:ePKP 20h 09m 15s. USCGS: 23.6S 179.8E, H. 19h 50m 29.8s, h about 550 km. Fiji Islands region.	
Sep.9 (294)	eL F	3	48				(294) Wi:ePKP 3h 04m 44s. USCGS: 4.4S 152.7E, H. 2h 45m 45.5s, h about 34 km. New Britain.	
Sep.10 (295)							(295) Wi:iPKP 6h 44m 05.5s. USCGS: 23.0S 179.8E, H. 6h 25m 14.5s, h about 520 km. Fiji Islands.	
Sep.10 (296)	e(PKP) F	19	34.0				(296) Wi:iPKP 19h 34m 03s. USCGS: 19.0S 175.8E, H. 19h 14m 26.8s, h about 33 km. Fiji Islands region.	
Sep.12 (297)							(297) Wi:iPKP 3h 31m 33s, (compression). USCGS: 22.5S 170.7E, H. 3h 11m 53.9s, h about 54 km. Loyalty Islands region.	
Sep.12 (298)	e F	8	31				(298) USCGS: 34.9N 32.2E, H. 8h 18m 57.9s, h about 55 km. Cyprus.	
Sep.13 (299)							(299) Wi:iP 17h 11m 58s, dilatation. BCIS: 37°03'38"N 116°01'18"W. H. 17h 00m 00.13s. Elevation 536.4m. Nuclear explosion, Nevada.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Sep.15 (300)	iPKP iPP iPS eSS eSSS eL F	1	06	12	-	7	6	(300) Disturbed by microseisms. Wi:ePKP 1h 06.0m, ePP 1h 08m 35s. USCGS: 10.3S 165.6E, H 0h 46m 54.1s, h about 43 km. Santa Cruz Islands.
Sep.17 (301)	eL F	6	35					(301) USCGS: 10.6S 78.2W, H. 5h 54m 33.7s, h about 61 km. Central Peru.
Sep.17 (302)	iPKP ePP ePKS eSS eSSS eL F	19	39	29	-	6	4	(302) Wi:iPKP 19h 39m 29s, ePP 19h 42.0m. USCGS: 10.1S 165.3E, H. 19h 20m 08.2s, h about 17 km. Santa Cruz Islands.
Sep.18 (303)	eP iZ eS iH eL F	17	02	45		7	7	(303) Wi:eP 17h 02m 39s. He:eP 17h 02.6m. USCGS: 40.9N 29.1E, H. 16h 58m 12.5s, h about 33 km. Turkey.
Sep.19 (304)	eP eS	16	54	17				(304) Wi:iP 16h 54m 28s, dilatation. USCGS: 47.1N 27.4W, H. 16h 49m 29.9s, h about 33 km. North Atlantic Ocean.
Sep.22 (305)	iPKP eH eL F	3	16	05	(+)			(305) Wi:iPKP 3h 16m 01s, (dilatation). USCGS: 19.3S 175.9E, H. 2h 56m 24.3s, h about 28 km. Fiji Islands region.
Sep.22 (306)	ePKP F	19	41	38				(306) Wi:iPKP 19h 41m 35s, dilatation. USCGS: 19.2S 175.9E, H. 19h 21m 57.1s, h about 24 km. Tonga Islands region.
Sep.23 (307)	iP e(S) eL F	9	13	16				(307) Wi:eP 9h 13m 19s. USCGS: 16.6S 28.8E, H. 9h 01m 56.8s, h about 33 km. Northern Rhodesia.
Sep.23 (308)								(308) Wi:iP 17h 14m 23s. USCGS: 51.3N 179.2W, H. 17h 02m 36.6s, h about 33 km. Andreanov Islands.
Sep.24 (309)	e F	2	22					(309) USCGS: 41.0N 29.0E, H. 2h 10m 44.9s, h about 33 km. Turkey.
Sep.24 (310)								(310) He:e 6h 30.8m. Local shock.
Sep.24 (311)	eP epP ePP eS eSS eSS eL F	16	43	30				(311) Wi:eP 16h 43m 38s. USCGS: 10.6S 78.0W, H. 16h 30m 16.0s, h about 80 km. Near coast of Peru.
Sep.29 (312)								(312) Disturbed by microseisms. Wi:e(P) 22h 21m. USCGS: 36.1N 18.0E, H. 22h 16m 38.6s, h about 47 km. Ionian Sea.

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Oct.2 (313)	ePKP eH F	6	07.0				(313) Disturbed by microseisms. USCGS: 20.8S 174.1W, H. 5h 47m 05.5s, h about 33 km. Tonga Islands.	
Oct.2 (314)		7	09				(314) He:i 23h 45m 05s. Local shock.	
Oct.3 (315)	eP eS eL F	23	37.0				(315) Disturbed by microseisms. Wi:eP 23h 36m 58s. USCGS: 32.2N 131.6E, H. 23h 24m 34.7s, h about 33 km. Kyushu, Japan.	
Oct.5 (316)	eS e F	15	14.0				(316) Disturbed by microseisms. USCGS: 11.6N 42.8E, H. 14h 57m 47.4s, h about 33 km. French Somaliland.	
Oct.7 (317)		15	18.0				(317) Wi:iPKP 13h 33m 16s. USCGS: 23.6S 179.9E, H. 13h 14m 24.6s, h about 550 km. Fiji Islands region.	
Oct.8 (318)	eL F	0	07				(318) Disturbed by microseisms. USCGS: 42.7N 110.5E, H. 23h 34m 26.6s, h about 33 km. Outer Mongolia - Inner Mongolia border.	
Oct.8 (319)	ePKP ePP eH eL F	0	36 30				(319) Disturbed by microseisms. USCGS: 15.1S 173.2W, H. 0h 17m 01.1s, h about 33 km. Samoa Islands region.	
Oct.8 (320)		0	39 30				(320) Wi:eP 3h 02m 25s. USCGS: 28.6N 95.1E, H. 2h 51m 06.0s, h about 24 km. Assam, India.	
Oct.9 (321)		0	59.5				(321) Wi:iPKP 5h 33m 06s, dilatation. USCGS: 18.6S 173.7W, H. 5h 13m 26.9s, h about 33 km. Tonga Islands.	
Oct.9 (322)	e F	21	44				(322) Disturbed by microseisms. BCIS: 46.3N 12.4E, H. 21h 41m 40s. Catastrophe of the Barrage de Vaiont, Italy.	
Oct.11 (323)	e F	21	48				(323) Disturbed by microseisms. USCGS: 17.8N 105.9W, H. 10h 17m 07.5s, h about 33 km. Off coast of Jalisco, Mexico.	
Oct.12 (324)	iP iS eSS eL F	11	38 59	+	5	6	(324) Disturbed by microseisms. Wi:iP 11h 38m 13s, compression. USCGS: 44.8N 149.0E, H. 11h 26m 57.9s, h about 40 km. Kurile Islands.	
Oct.13 (325)	iP eS F	11	54.5	+	7	25	(325) Disturbed by microseisms. Wi:iP 5h 29m 50s, compression. USCGS: 44.8N 149.5E, H. 5h 17m 57.1s, h about 60 km. Kurile Islands.	
Oct.13 (326)		5	29 59				(326) Disturbed by microseisms. Wi:iP 7h 15m 19s, dilatation. USCGS: after-shock of (325), H. 7h 03m 23.8s.	
Oct.13 (327)		5	40.0				(327) Disturbed by microseisms. Wi:iP 9h 28m 21s, dilatation. USCGS: after-shock of (325), H. 9h 16m 25.9s.	
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Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Oct. 13 (328)						u	(328) Disturbed by microseisms. Wi:iP 12h 54m 09s. USCGS: aftershock of (325) H. 12h 42m 13.0s.	
Oct. 13 (329)	eL F	13 14	30 15				(329) Disturbed by microseisms. Wi:iP 13h 10m 15s, ipP 13h 10m 29s. USCGS: aftershock of (325), H. 12h 58m 21.6s.	
Oct. 13 (330)	eL F	16 17	43 15				(330) Disturbed by microseisms. Wi:iP 16h 11m 46s, compression. USCGS: after- shock of (325), H. 15h 59m 52.9s.	
Oct. 13 (331)	eL F	18 18	15 45				(331) Disturbed by microseisms. USCGS: aftershock of (325), H. 17h 31m 18.7s.	
Oct. 13 (332)							(332) Disturbed by microseisms. Wi:iP 19h 39m 32s, compression. USCGS; after- shock of (325), H. 19h 27m 38.2s.	
Oct. 14 (333)	eL F	0 1	40 15				(333) Disturbed by microseisms. USCGS: aftershock of (325), H. 23h 52m 22.8s.	
Oct. 14 (334)	eL F	4 5	50 30				(334) Disturbed by microseisms. USCGS: aftershock of (325), H. 4h 11m 14s.	
Oct. 14 (335)	eL F	14 14	06 30				(335) Disturbed by microseisms. Wi:iP 13h 33m 40s. USCGS: aftershock of (325), H. 13h 21m 45.2s.	
Oct. 14 (336)							(336) Disturbed by microseisms. Wi:iP 18h 02m 09s, dilatation. USCGS: after- shock of (325), H. 17h 50m 15.2s.	
Oct. 15 (337)	e F	7 8.0	45				(337) Disturbed by microseisms. USCGS: 20.5S 173.9W, H. 7h 06m 59.9s, h about 33 km. Tonga Islands.	
Oct. 15 (338)							(338) Disturbed by microseisms. Wi:iP 8h 12m 09s. USCGS: aftershock of (325), H. 8h 00m 11.5s.	
Oct. 15 (339)							(339) Disturbed by microseisms. Wi:iP 9h 44m 03.5s, compression. USCGS: after- shock of (325), H. 9h 32m 08.7s.	
Oct. 15 (340)	eS eL F	10 10 11.0	07 08.5	32			(340) Disturbed by microseisms. Wi:iP 10h 03m 49s, compression. USCGS: 67.2N 18.4W, H. 9h 59m 30.1s, h about 33 km. North of Iceland.	
Oct. 15 (341)	e F	19 19	07 40				(341) Disturbed by microseisms. Wi:eP 18h 35m 53s. USCGS: aftershock of (325), H. 18h 23m 57.8s.	
Oct. 16 (342)							(342) Disturbed by microseisms. Wi:eP 5h 27m 33s. USCGS: aftershock of (325), H. 5h 15m 36.1s.	
Oct. 16 (343)	eP eSS eL F	15 16 16 17	51 02.0 07.0 15	40			(343) Disturbed by microseisms. Wi:eP 15h 51m 35s, ePP 15h 53m 29s. USCGS: 38.6N 73.4E, H. 15h 43m 00.8s, h about 33 km. Tadzhik SSR.	
Oct. 17 (344)	iP eS eH eL F	23 23 23 24	36 46 55.8 02	36 30	+		(344) Disturbed by microseisms. Wi:eP 23h 36m 31s, i 23h 36m 33s, compression. USCGS: aftershock of (325), H. 23h 24m 34.4s.	
			1.5					

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period s	Amplitude μ	Remarks
		h	m	s				
Oct.18 (345)							(345) Disturbed by microseisms. Wi:iP 2h 11m 36s. USCGS: aftershock of (325), H. 1h 59m 38.8s.	
Oct.18 (346)							(346) Wi:eP 4h 13m 18s. USCGS: aftershock of (325), H. 4h 01m 21.7s.	
Oct.18 (347)							(347) Wi:eP 9h 05m 29s. USCGS: aftershock of (325), H. 8h 53m 33.9s.	
Oct.18 (348)							(348) Wi:eP 20h 17m 01s. USCGS: aftershock of (325), H. 20h 05m 14.4s.	
Oct.18 (349)							(349) Wi:iP 21h 34m 48s. USCGS: aftershock of (325), H. 21h 22m 52.7s.	
Oct.19 (350)	e F	2	36				(350) Wi:eP 2h 30m 19s. USCGS: aftershock of (325), H. 2h 18m 37.9s.	
Oct.19 (351)	eP eS eL F	3	46	18			(351) Wi:eP 3h 46m 12s. USCGS: aftershock of (325), H. 3h 34m 19.6s.	
Oct.19 (352)							(352) Wi:eP 3h 59m 02s. USCGS: aftershock of (325), H. 3h 47m 07.7s.	
Oct.19 (353)							(353) Wi:eP 16h 27m 12s, e 16h 27m 25s. USCGS: aftershock of (325), H. 16h 15m 21.4s, h about 120 km.	
Oct.20 (354)	eP eS F	1	05	11	+	3 6	(354) Wi:eP 1h 05m 08s, i 1h 05m 13s. USCGS: aftershock of (325), H. 0h 53m 07.2s.	
Oct.20 (355)							(355) Wi:iPKP 3h 18m 51s. USCGS: 20.8S 178.6W, H. 3h 00m 10.9s, h about 600 km. Fiji Islands region.	
Oct.20 (356)							(356) Wi:eP 4h 59m 07s, dilatation. USCGS: aftershock of (325), H. 4h 46m 57.9s.	
Oct.20 (357)	eL F	9	55				(357) Disturbed by microseisms. Wi:iP 9h 22m 43s, dilatation. USCGS: aftershock of (325), H. 9h 10m 43.9s.	
Oct.20 (358)	eL F	12	36				(358) Disturbed by microseisms. Wi:iP 12h 04m 17s, compression. USCGS: aftershock of (325), H. 11h 52m 20.7s.	
Oct.20 (359)							(359) Wi:eP 13h 33m 08s. USCGS: aftershock of (325), H. 13h 21m 14.1s.	
Oct.20 (360)							(360) Wi:eP 17h 53m 25s, i 17h 53m 47s. USCGS: aftershock of (325), H. 17h 41m 27.3s.	
Oct.20 (361)							(361) Wi:eP 18h 10m 56s, i 18h 11m 07.5s USCGS: aftershock of (325), H. 17h 58m 58.7s.	
Oct.21 (362)							(362) Wi:eP 15h 51m 15s. USCGS: aftershock of (325), H. 15h 38m 24.3s,	
Oct.21 (363)							(363) Wi:eP 17h 32m 46s. USCGS: aftershock of (325), H. 17h 20m 46.0s.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Oct.22 (364)	eL F	4	00				(364) Disturbed by microseisms. USCGS: aftershock of (325), H. 3h 17m 15.3s.	
Oct.24 (365)	eL F	1	51				(365) Disturbed by microseisms. Wi:eP 1h 18m 24s. USCGS: aftershock of (325), H. 1h 06m 25.9s.	
Oct.24 (366)	eL F	8	25				(366) Disturbed by microseisms. USCGS: 4.9S 102.9E, H. 7h 26m 23.9s, h about 50 km. Off south coast of Sumatra.	
Oct.24 (367)	eL F	20	05				(367) Disturbed by microseisms. USCGS: 28.3N 128.5E, H. 19h 19m 10.2s, h about 33 km. Ryukyu Islands.	
Oct.25 (368)							(368) He:eP _n 4h 47m 42s. BCIS: 50.9N 1.1W, H. 4h 45m 30s. South coast of England.	
Oct.25 (369)	eL F	20	53				(369) Disturbed by microseisms. USCGS: aftershock of (325), H. 20h 18m 12.7s.	
Oct.26 (370)	eL F	4	39				(370) Disturbed by microseisms. Wi:eP 4h 07m 35s. USCGS: aftershock of (325), H. 3h 55m 39.7s.	
Oct.26 (371)							(371) Disturbed by microseisms. Wi:eP 6h 11m 39s. USCGS: aftershock of (325), H. 5h 59m 44.2s.	
Oct.26 (372)	eL F	12	07				(372) Disturbed by microseisms. Wi:eP 11h 33m 43s. USCGS: aftershock of (325), H. 11h 21m 47.6s.	
Oct.27 (373)							(373) Wi:iPKP 9h 04m 17s, compression. USCGS: 17.9S 178.5W, H. 8h 45m 43.8s, h about 586 km. Fiji Islands region.	
Oct.27 (374)							(374) Wi:ePKP 18h 44m 35s. USCGS: 24.3S 176.1W, H. 18h 24m 42.9s, h about 33 km. Tonga Islands region.	
Oct.27 (375)							(375) Wi:eP 20h 17m 33s. USCGS: aftershock of (325), H. 20h 05m 38.1s.	
Oct.28 (376)							(376) Wi:eP 5h 10m 37s. USCGS: aftershock of (325), H. 4h 58m 42.9s.	
Oct.28 (377)							(377) Wi:ePKP 8h 15m 05s. USCGS: 24.3S 176.0W, H. 7h 55m 12.3s, h about 33 km. Tonga Islands region.	
Oct.28 (378)	eL F	12	42				(378) Disturbed by microseisms. Wi:eP 12h 14m 45s. USCGS: 52.8N 159.8E, H. 12h 03m 19.8s, h about 33 km. Off east coast of Kamchatka.	
Oct.28 (379)							(379) Wi:ePKP 20h 18m 09.5s. USCGS: 24.5S 179.9E, H. 19h 59m 15s, h about 532 km. Fiji Islands region.	
Oct.28 (380)	eL F	21	20				(380) Disturbed by microseisms. Wi:eP 20h 48m 50s. USCGS: aftershock of (325), H. 20h 36m 56.0s.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Oct. 29 (381)							(381) Wi:eP 22h 33m 07s. USCGS: 47.0N 92.8E, H. 22h 24m 02.6s, h about 118 km. Mongolia.	
Oct. 29 (382)							(382) Wi:ePKP 22h 42m 32s. USCGS: 24.4S 176.1W, H. 22h 22m 37.7s, h about 33 km. Tonga Islands region.	
Oct. 29 (383)	e F	22 23	51 20				(383) BCIS: 43.3N 17.4E, H. 22h 41m 11s. Yugoslavia.	
Oct. 30 (384)							(384) Wi:iP 1h 30m 35s. USCGS: 4.8S 77.9W, H. 1h 17m 31.1s, h about 20 km. Northern Peru.	
Oct. 31 (385)	iPKP eSS eL F	3 4 4 6	37 00.4 34 0	31			(385) Disturbed by microseisms. Wi:ePKP 3h 37.5m. USCGS: 21.8S 175.0W, H. 3h 17m 42.0s, h about 33 km. Tonga Islands.	
Nov. 1 (386)							(386) Wi:ePKP 21h 19m 10s. USCGS: 22.5S 176.8W, H. 20h 59m 28.1s, h about 71 km. Tonga Islands.	
Nov. 1 (387)							(387) Wi:iP 22h 53m 16s, dilatation. USCGS: aftershock of (325), H. 22h 41m 23.8s.	
Nov. 3 (388)	iP eS eL F	3 3 3 5	23 33 49 30	05 50	+	6 3	(388) Wi:iP 3h 23m 10s (compression). USCGS: 3.5S 77.8W, H. 3h 10m 12.7s, h about 33 km. Peru-Ecuador border.	
Nov. 3 (389)	e F	14 14	45 55				(389) USCGS: 39.2N 21.1E, H. 14h 35m 59.4s, h about 29 km. Gulf of Arta, Greece.	
Nov. 4 (390)	eP iPP i(S) F	1 1 1 6	32 36 44 30	04 59 41			(390) Wi:eP 1h 32m 00s, iPKP 1h 35m 46s. He:e(PP) 1h 37.0m. USCGS: 6.8S 129.6E, H. 1h 17m 08.9s, h about 80 km. Banda Sea.	
Nov. 6 (391)	ePP ePS eSS eL F	2 2 2 3 5	44 43.0 49.0 06 0	15			(391) USCGS: 2.6S 138.4E, H. 2h 13m 16.8s, h about 33 km. Western New Guinea.	
Nov. 9 (392)	eL F	2 3	55 15				(392) USCGS: 56.8N 34.6W, H. 2h 46m 44.5s, h about 33 km. Southwest of Iceland.	
Nov. 9 (393)	iP ipP iPP eH eH eSS F	21 21 21 21 21 21 24	27 29 30 36 36 41.0	28 34 42 01 26			(393) Disturbed by microseisms. Wi:eP 21h 27m 29s; i 21h 27m 32s (compression); e 21h 53.0m. He:eP 21h 27m 28s. USCGS: 9.0S 71.5W, H. 21h 15m 30.4s, h about 600 km. Western Brazil.	
Nov. 10 (394)	eL F	1 2	23 0				(394) Disturbed by microseisms. Wi:eP 1h 12m 38s, epP 1h 14m 45s. USCGS: 9.2S 71.5W, H. 1h 00m 38.8s, h about 600 km. Western Brazil.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Nov.10 (395)							(395) Wi:eP 17h 29m 44s. USCGS: 44.4N 149.5E, H. 17h 17m 42.7s, h about 40 km. Kurile Islands.	
Nov.11 (396)							(396) Wi:iPKP 11h 48m 22s. USCGS: 16.9S 174.4W, H. 11h 29m 06.4s, h about 185 km. Tonga Islands.	
Nov.11 (397)							(397) He:iP _g 23h 45m 08s. BCIS: 50.6N 7.3E, H. 23h 44m 37.0s. Germany.	
Nov.15 (398)	eP eS eL F	21	18	40			(398) Disturbed by microseisms. Wi:iP 21h 18m 30s, compression. USCGS: 44.3N 149.0E, H. 21h 06m 34.0s, h about 50 km. Kurile Islands.	
Nov.16 (399)							(399) Wi:eP 2h 42.0m. USCGS: 44.3N 149.0E, H. 2h 30m 07.0s, h about 50 km. Kurile Islands.	
Nov.16 (400)	eL F	24	09				(400) Wi:iPKP 23h 03m 14s, dilatation. USCGS: 22.3S 175.0W, H. 22h 43m 26.4s, h about 33 km. Tonga Islands.	
Nov.17 (401)	eP eS eL F	0	57	45			(401) Disturbed by microseisms. Wi:eP 0h 57m50s. USCGS: 7.6N 37.4W, H. 0h 48m 02.6s, h about 33 km. Mid-Atlantic Ridge	
Nov.17 (402)							(402) Wi:iPKP 13h 32m 27.5s, compression. USCGS: 17.4S 178.5W, H. 13h 13m 49.3s, h about 509 km. Fiji Islands region.	
Nov.18 (403)	eL F	15	12				(403) Disturbed by microseisms. USCGS: 29.9N 113.6W, H. 14h 38m 28.9s, h about 14 km. Gulf of California, USA.	
Nov.19 (404)							(404) Disturbed by microseisms. Wi:iP 11h 12m 51s, compression. USCGS: 44.4N 149.2E, H. 11h 00m 54.3s, h about 33 km. Kurile Islands.	
Nov.22 (405)	e F	15	30				(405) Disturbed by microseisms. USCGS: 44.4N 149.0E, H. 14h 45m 51.7s, h about 33 km. Kurile Islands.	
Nov.23 (406)							(406) Wi:iPKP 19h 49m 05s, compression. USCGS: 20.2S 178.1W, H. 19h 30m 19.4s, h about 515 km. Fiji Islands.	
Nov.28 (407)							(407) He:i 10h 27m 19s. Local shock.	
Dec.2 (408)							(408) Wi:eP _n 6h 51m, iS ^x 6h 53m 06s. He:eS _n 6h 52m 45s. USCGS: 47.9N 16.5E, H. 6h 49m 08.7s, h about 43 km. Austria.	
Dec.2 (409)	eS eL F	21	07				(409) Disturbed by microseisms. Wi:eP 21h 01m 50s. USCGS: 80.1N 0.6W, H. 20h 55m 58.8s, h about 33 km. West of Spitzbergen.	
Dec.3 (410)	eL F	23	55				(410) Disturbed by microseisms. USCGS: 22.4S 69.3W, H. 23h 03m 41.6s, h about 18 km. Northern Chile.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Dec. 4 (411)	eL F	2	10				(411) Disturbed by microseisms. Wi:e(P) 1h 39.5m, i 1h 39m 44s. USCGS: 46.2N 153.1E, H. 1h 27m 34.1s, h about 20 km. Kurile Islands.	
Dec. 4 (412)	eL F	17.0					(412) Disturbed by microseisms. USCGS: 35.5S 102.8W, H. 15h 59m 42.1s, h about 33 km. Easter Island region.	
Dec. 7 (413)							(413) Wi:ePKP 4h 26m 35s, i 4h 26m 40s (compression), ePP 4h 29m 53s. USCGS: 22.1S 179.4W, H. 4h 07m 52.8s, h about 546 km. Fiji Islands region.	
Dec. 7 (414)							(414) Wi:e 10h 43.5m. He:eP ^x 10h 41m 11s. BCIS: 45.0N 5.5E, H. 10h 39m 00s. France.	
Dec. 9 (415)							(415) Wi:ePKP 11h 12m 32s, i 11h 12m 37s (dilatation). USCGS: 21.1S 178.0W, H. 10h 53m 39.4s, h about 435 km. Fiji Islands region.	
Dec. 9 (416)							(416) Wi:iP 12h 34m 37s. USCGS: 45.2N 151.2E, H. 12h 22m 42s, h about 50 km. Kurile Islands.	
Dec. 11 (417)							(417) Wi:iPKP 2h 49m 55s, compression. USCGS: 17.8S 178.6W, H. 2h 31m 19.4s, h about 537 km. Fiji Islands region.	
Dec. 11 (418)							(418) Wi:iP 17h 19m 59s. USCGS: 51.1N 179.3W, H. 17h 08m 12.3s, h about 32 km. Andreanov Islands, Aleutian arc.	
Dec. 15 (419)	e F	20.0					(419) Disturbed by microseisms. Wi:iP 19h 47m 26.5s, dilatation. USCGS: 4.8S 108.0E, H. 19h 34m 45.5s, h about 650 km. Java Sea.	
Dec. 16 (420)	e F	2 30					(420) Disturbed by microseisms. USCGS: 6.4S 105.4E, H. 1h 51m 30.6s, h about 64 km. Strait of Sunda, near Krakatua vulcano.	
Dec. 16 (421)	iP eS eL F	13 52 20			5	13	(421) Disturbed by microseisms. Wi:eP 13h 52m 14s, i 13h 52m 17s, dilatation. USCGS: 37.1N 20.9E, H. 13h 47m 56.4s, h about 15 km. Ionian Sea.	
Dec. 18 (422)	ePKP iZ F	0 49 50					(422) Disturbed by microseisms. Wi:iPKP 0h 49m 49s, dilatation. He:e 0h 50m 04s. USCGS: 24.8S 176.6W, H. 0h 30m 02.6s, h about 46 km. Tonga Islands.	
Dec. 18 (423)							(423) Wi:iP 3h 02m 27.5s, dilatation. USCGS: 45.5N 151.3E, H. 2h 50m 31s, h about 33 km. Kurile Islands.	
Dec. 21 (424)	eL F	13 56					(424) Wi:ePKP 12h 54m 00s, e 12h 54m 25s. USCGS: 21.2S 175.8W, H. 12h 34m 22.7s, h about 90 km. Tonga Islands.	
Dec. 26 (425)							(425) Wi:eP 8h 03m 40s. USCGS: 76.5N 22.4E, H. 7h 58m 22.4s, h about 33 km. Southeast of Spitzbergen.	

Seismic Records at De Bilt



Date 1963	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Dec.26 (426)						M	(426) Wi:e 8h 53.3m. USCGS: 69.3N 16.5W, H. 8h 48m 52.1s, h about 33 km. North of Iceland.	
Dec.28 (427)							(427) Wi:iPKP 9h 23m 46s, (compression). USCGS: 32.7S 178.9W, H. 9h 03m 52.9s, h about 33 km. Kermadec Islands.	
Dec.30 (428)	eL F	14	13				(428) Disturbed by microseisms. Wi:iP 13h 41m 18s, compression. USCGS: 45.5N 150.6E, H. 13h 29m 25.3s, h about 40 km. Kurile Islands.	
Dec.31 (429)	e ePS eSS eL F	17	56.1				(429) Disturbed by microseisms. USCGS: 56.5S 26.0W, H. 17h 37m 32.1s, h about 30 km. Sandwich Islands.	
Dec.31 (430)							(430) Wi:ePKP 19h 36m 24s. USCGS: 17.4S 174.2W, H. 19h 16m 54.9s, h about 80 km. Tonga Islands.	