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**KONINKLIJK NEDERLANDS  
METEOROLOGISCH INSTITUUT**

SEISMIC RECORDS  
AT DE BILT

Volume 49  
1961

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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 have been reduced by Mr. J. Oldeman, scientific officer

The Director in Chief of  
the Royal Netherlands Meteorological Institute,

Dr. M.W.F. Schregardus.

De Bilt, December 1967

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

SEISMOLOGICAL STATION DE BILT

The geographic coordinates of the seismological station are  $52^{\circ}06'11''$  N and  $5^{\circ}10'16''$  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 T<sub>1</sub>, the reduced pendulum length l, the distance A<sub>1</sub> 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 1961.

	NS comp.	EW comp.	Z comp.
Period of galvanometer T <sub>1</sub>	24.43 sec	24.96 sec	12.0 sec
Reduced length of pendulum l	123 mm	123 mm	406 mm
Distance A <sub>1</sub>	1380 mm	1380 mm	1380 mm
Period of pendulum T	25 sec	25 sec	12 sec
Damping constant $\mu$	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:  $50^{\circ}53'10''$  N and  $5^{\circ}59'10''$  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 1961 are:

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

SEISMOLOGICAL STATION WITTEVEEN

The geographic coordinates of the seismological station are:  $52^{\circ}48'18''$  N and  $6^{\circ}40'11''$  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.

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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.
- Δ = 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.

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Seismic Records at De Bilt

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 - 1/2 mm	0 - 1 1/4 "
1	1/2 - 2 "	1 1/4 - 5 "
2	2 - 4 "	5 - 10 "
3	> 4 "	> 10 "

Seismic Records at De Bilt

CHARACTER OF THE MICROSEISMIC MOVEMENT																							
Date 1961	Jan.	Febr.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.											
1	3	2	3	2	1	2	1	1	0	0	1	1	3	2	2	3	2						
2	2	3	3	2	1	1	0	1	0	1	0	1	2	1	2	3	2						
3	3	3	2	3	2	1	1	1	0	1	0	1	1	0	1	3	2						
4	3	2	3	2	2	1	2	1	1	0	1	1	2	1	1	0	1	3	2	2	3		
5	2	3	2	2	1	1	2	1	0	1	0	1	1	1	0	1	1	2	1	3			
6	3	2	2	3	1	2	1	0	0	2	1	1	0	1	1	1	1	1	3	2			
7	2	3	2	2	0	2	3	2	1	0	0	1	1	2	1	1	2	1	1	2	2	-	
8	2	2	3	2	3	0	1	2	0	0	1	3	2	1	1	2	1	2	1	-	3		
9	2	3	2	3	3	1	2	1	0	1	0	2	0	1	0	1	1	1	3	2			
10	2	3	3	2	1	2	1	1	0	0	1	1	1	1	1	1	1	1	2	1			
11	2	3	2	2	2	1	1	0	1	0	0	1	0	1	1	1	2	1	1	2	1		
12	2	2	1	2	1	2	1	0	0	1	0	1	2	1	1	0	1	2	2	1	1	2	1
13	2	3	1	2	2	1	0	1	0	0	1	1	0	2	3	1	2	3	1				
14	3	2	2	2	1	1	2	1	0	1	1	2	0	1	3	2	1	3	1	1			
15	2	2	1	1	2	1	0	1	2	1	1	2	2	3	1	1	1	1					
16	2	1	1	2	2	1	0	1	0	1	1	0	2	3	1	2	1	1					
17	1	2	1	2	1	0	1	2	1	0	2	1	3	1	2	3	1	2	1				
18	1	2	1	2	1	0	1	2	1	0	1	2	1	1	3	1	1	1					
19	2	1	1	3	2	1	1	2	0	1	1	0	1	1	1	0	3	2	1	1			
20	1	3	2	1	3	2	1	1	1	1	1	2	0	1	2	3	2	1	1				
21	1	2	3	1	2	1	1	0	1	1	0	2	1	2	1	1	1	1					
22	1	2	2	1	1	0	1	0	0	2	1	1	1	1	1	1	1	1					
23	2	3	2	1	1	0	0	1	0	1	1	1	1	2	1	2	1	2	1	2			
24	3	2	1	1	0	1	1	0	1	1	1	2	3	2	2	2	3	1					
25	3	2	1	2	1	2	1	1	0	0	1	1	2	1	2	3	2	3	1				
26	3	2	2	3	2	1	1	0	1	2	1	2	1	3	2	2	1						
27	3	2	3	3	2	1	0	1	0	1	0	1	2	1	1	2	2	2	1				
28	3	3	2	2	1	0	1	1	0	0	1	1	2	1	2	1	2	1					
29	3		1	2	1	1	0	1	0	1	0	1	1	2	1	2	3	2	1				
30	3		1	1	2	1	0	1	0	0	1	1	2	3	1	2	2	3	1	2	1		
31	3		1		1		1		1		1		1		2	3	2						1

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Jan. 1 (1)							(1) Wi: iPKP 16h 56m 58.5s (+). USCGS: 18°3 S 178°2 W, H. 16h 38m 27.8s, h about 663 km. Fiji Islands region	
Jan. 1 (2)							(2) Wi: i 17h 41m 59.0s +.	
Jan. 2 (3)	ePKP ePP ePKS eSSS eL F	10 31 10 33 10 34 10 57.5 11 17 12.5	10 56 45				(3) Disturbed by microseisms Wi: iPKP 10h 31m 08s -; iPKS 10h 34m 37s. USCGS: 12°4 S 166°4 E, H. 10h 11m 56.9s, h about 161 km. Santa Cruz Islands region	
Jan. 4 (4)							(4) Wi: iPKP 13h 44m 11s (-). USCGS: 17°4 S 178°9 W, H. 13h 25m 35.6s, h about 591 km. Fiji Islands	
Jan. 5 (5)	eP eS eL F	14 18 14 28 14 43 16.0	19 04				(5) De Bilt no z-record Wi: eP 14h 18m (16)s. USCGS: 51°6 N 176°3 W, H 14h 06m 25.9s, h about 37 km. Andreanof Islands, Aleutian Islands.	
Jan. 5 (6)							(6) Wi: iP 15h 21m 35s -. USCGS: 45°7 N 149°3 E, H. 15h 09m 37s, h about 19 km. Kurile Islands.	
Jan. 5 (7)	ePP ePS eSSS eL F	16 15.0 16 24.5 16 35 16 50 17.5					(7) Disturbed by microseisms. BCIS and USCGS: 4°1 S 143°0 E, H. 15h 53m 56.0s, h about 108 km. Central New Guinea region	
Jan. 5 (8)	ePKP ePP	18 17 18 21.0	30				(8) Disturbed by microseisms. F in next shock. Wi: ePKP 18h 17m 30s -. USCGS: 21°2 S 169°3 E, H. 17h 57m 56.6s, h about 123 km. Loyalty Islands region.	
Jan. 5 (9)	iPKP ePP ePPP eSS e F	18 34 18 37.7 18 40 18 56.9 19 14 19.7	18 58	+			(9) Disturbed by microseisms. Wi: ePKP 18h 34m 13.7s +. USCGS: 21°0 S 169°1 E, H. 18h 14m 43.0s, h about 124 km. Loyalty Islands region	
Jan. 7 (10)							(10) Wi: eP 10h 35m 45s. USCGS: 35°9 N 27°0 E, H. 10h 30m 58.0s, h about 127 km. Crete.	
Jan. 7 (11)	eL F	16 02 16 05					(11) BCIS: 37°6 N 20°8 E, H. 15h 52m 51s. USCGS: 37°7 N 21°1 E, H 15h 52m 54.0s, h about 22 km West coast of Greece	
Jan. 7 (12)	eL F	19 15 19 25					(12) USCGS: 57°2 S 25°3 W, H. 18h 16m 51.2s, h about 22 km Sandwich Islands	
Jan. 10 (13)	eP eS ePS eSS eL F	14 34.0 14 43 14 44 14 48.5 14 57 16.0	38 10				(13) Disturbed by microseisms. Wi: iP 14h 34m 02s (-). USCGS: 49°9 N 156.2 E, H 14h 22m 18.2s, h about 29 km. Kurile Islands region.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Jan. 11 (14)	eP eS eL F	12 11 12 21 12 38 14 50	45 45				(14) Disturbed by microseisms. Wi: eP 12h 11m 42s. USCGS: 51°8 N 171°0 W, H. 11h 59m 55.0s, h about 47 km. Fox Islands, Aleutian Islands.	
Jan. 12 (15)							(15) Wi: ePKP 5h 35m 45s. USCGS: 20°3 S 169°0 E, H. 15h 16m 12s, h about 100 km. New Hebrides Islands	
Jan. 12 (16)							(16) Wi: eP 14h 24m 32s. USCGS: 57°4 N 155°9 W, H. 14h 13m 27.7s, h about 40 km. Alaska Peninsula	
Jan. 14 (17)	eP eS eL F	16 50.5 17 00.4 17 15 18.1					(17) Disturbed by microseisms. Wi: iP 16h 50m 33s -. USCGS: 53°9 N 163°7 W, H. 16h 38m 55.6s, h about 41 km. Unimak Island region	
Jan. 15 (18)	iPKP F	17 04 17 06	09				(18) Disturbed by microseisms. Wi: iPKP 17h 04m 04.8s +. USCGS: 20°4 S 169°5 E, H. 16h 44m 44.8s, h about 182 km. Loyalty Islands region	
Jan. 16 (19)	iP iPP eL F	7 32 7 36 8 04.5 10 30	44 00	+			(19) Disturbed by microseisms. Change of papers from 7h.43 - 7h.54. USCGS: 36°0 N 141°1 E, H. 7h 20m 18.6s, h about 131 km. Near east coast of Honshu, Japan.	
Jan. 16 (20)	eP ePP eS eL	11 32.1 11 35 11 42.5 12 03	28				(20) Disturbed by microseisms. F in next shock. USCGS: 35°7 N 140°6 H. 11h 19m 46.5s, h about 157 km. Near east coast of Honshu, Japan.	
Jan. 16 (21)	eP ePP eS eSS eL	12 25.0 12 28 12 35 12 41.0 12 52	13 24				(21) Disturbed by microseisms. F in next shock. Wi: eP 12h 24m 55s. USCGS: 36°2 N 141°7 E, H. 12h 12m 35s, h about 105 km. Honshu, Japan.	
Jan. 16 (22)	eP eS eL	14 16 14 26.3 14 47					(22) Disturbed by microseisms. F in next shock. Wi: eP 14h 16m 22s. USCGS: 36°3 N 141°2 E, H. 14h 04m 05.3s, h about 127 km. Near east coast of Honshu, Japan.	
Jan. 16 (23)	eP ePP eS eL F	15 53 15 56 16 04 16 21 17.5	46 56 05				(23) Disturbed by microseisms. Wi: eP 15h 53m 39s. USCGS: 36°4 N 140°6 E, H. 15h 41m 23.3s, h about 147 km. Near east coast of Honshu, Japan.	
Jan. 17 (24)	ePKP F	23 24 23 30	41				(24) Disturbed by microseisms. USCGS: 21°4 S 169°3 E, H. 23h 05m 32.5s, h about 84 km. Loyalty Islands region.	
Jan. 19 (25)	eL F	18 00 18 30					(25) BCIS and USCGS: 49°7 N 155°8 E, H. 17h 22m 16.9s, h about 31 km. Kurile Islands.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period s	Amplitude	Remarks
		h	m	s				
Jan. 20 (26)	eP eS eSS eL F	17	20	30			(26) Disturbed by microseisms. Wi: eP 17h 20m 28s +. BCIS: 56°5 N 152°1/4 W, H. 17h 09m 15s, USCGS: 56°4 N 152°3 E, H. 17h 09m 15.7s, h about 46 km. Sea of Okhotsk.	
Jan. 20 (27)							(27) Wi: iP 22h 47m 05s -. USCGS: 38°1 N 141.2 E, H. 22h 34m 51.1s, h about 52 km. Near east coast of Honshu, Japan.	
Jan. 22 (28)	iPKP iPP ePKS iSS eL F	3	43	38	+	5	(28) Disturbed by microseisms. Wi: 3h 43m 36s. USCGS: 11°9 S 166°2 E, H. 3h 24m 04.5s, h about 25 km. Santa Cruz Islands region	
Jan. 23 (29)							(29) Wi: eP 5h 00m 21s USCGS: 42°9 N 145°4 E, H. 4h 48m 21.4s, h about 46 km. Hokkaido, Japan.	
Jan. 26 (30)	eL F	17	30	18.5			(30) Disturbed by microseisms. Wi: ePKP 16h 31m 59s. USCGS: 21°4 S 169°5 E, h about 119 km. Loyalty Islands.	
Jan. 26 (31)							(31) Wi: iPKP 19h 08m 27.5s +, USCGS: 20°7 S 169°5 E, H. 18h 48m 56.9s, h about 106 km Loyalty Islands region	
Jan. 28 (32)	eL F	21	00	21 15			(32) Disturbed by microseisms. Wi: ePKP 20h 02m 50s. USCGS: 21°3 S 169°5 E, H. 19h 43m 01.4s, h about 50 km. Loyalty Islands region.	
Jan. 31 (33)	eS eSS eSSS eL F	1	09.5	1 14.0 1 17.5 1 24 2.0			(33) Disturbed by microseisms. Wi: eP 0h 59m 58s. USCGS: 55°8 N 153°9 W, H. 00h 48m 36.5s, h about 26 km. Near Kodiak Island. Alaska	
Feb. 3 (34)	e F	24	00.0	24 05			(34) Wi: e 23h 58.7m; He: 23h 57m 56s. Bensberg: 50°9 N 6°2 E, H. 23h 57m 51s. Between Alsdorf and Jülich, Rheinland, Germany	
Feb. 4 (35)	eL F	19	53	20 20			(35) Disturbed by microseisms. USCGS: 24°0 N 122°7 E, H. 19h 09m 129s, h about 14 km. Off east coast of Formosa.	
Feb. 5 (36)	eP eS eL F	15	51.0	16 02.1 16 21 17.0			(36) Disturbed by microseisms. Wi: eP 15h 50m 59s; e 15h 51m 26s. USCGS: 8°0 N 82°8 W, H. 15h 38m 34°0s, h about 49 km South of Panama.	
Feb. 5 (37)	eL F	19	04	19 12			(37) Disturbed by microseisms. USCGS: 38°4 S 77°6 E, H. 17h 50m 55.6s, h about 60 km. Northeast of Kerguelen Islands.	
Feb. 6 (38)							(38) Wi: iP 18h 27m 20.5s -. USCGS: 44°8 N 149°1 E, H. 18h 15m 21.6s, h about 25 km. Kurile Islands.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period s	Amplitude	Remarks
		h	m	s				
Feb. 6 (39)	eL F	22	44	23.5			(39) Disturbed by microseisms. Wi: iPKP 22h 04m 16s -. USCGS: 6°8 S 155°3 E, H. 21h 45m 13.5s, h about 59 km. Solomon Islands.	
Feb. 8 (40)							(40) Wi: iPKP 18h 09m 32.5s. USCGS: 20°4 S 178°1 W, H. 17h 50m 45.2s, h about 543 km. Tonga Islands.	
Feb. 9 (41)	eL F	3	00	4.0			(41) Disturbed by microseisms. Wi: ePKP <sub>1</sub> 2h 28m 07s; iPKP <sub>2</sub> 2h 28m 35s. USCGS: 28°2 S 177°4 W, H. 2h 08m 15.9s, h about 37 km. Kermadec Islands region.	
Feb. 11 (42)	eL F	6	45	7.0			(42) Disturbed by microseisms. BCIS and USCGS: 28°8 N 139°5 E, H. 6h 12m 23.2s, h about 358 km. North of Bonin Islands region.	
Feb. 11 (43)	eL F	22	25	23.0			(43) Disturbed by microseisms. Wi: iPKP <sub>1</sub> 21h 20m 58s -; iPKP <sub>2</sub> 21h 21m 08s; iPKP <sub>2</sub> 21h 21m 24s -. USCGS: 28°2 S 177°5 W, H. 21h 01m 06.4s, h about 41 km. Kermadec Islands.	
Feb. 12 (44)	iP iPP iS eSS eSSS eL F	22	05	22 06 22 15 22 21.5 22 25.0 22 30 1.5	+	6	(44) Wi: iP 22h 05m 43s +. USCGS: 43°7 N 147°6 E, H. 21h 53m 43.5s, h about 45 km. Kurile Islands	
Feb. 12 (45)							(45) Wi: iP 23h 38m 34s (+). USCGS: 44°0 N 147°7 E, H. 23h 26m 34.5s, h about 23 km. Kurile Islands.	
Feb. 12 (46)	eL F	7	57	9 00			(46) USCGS: 17°0 S 173°7 W, H. 6h 45m 25.0s, h about 43 km. Tonga Islands region.	
Feb. 13 (47)							(47) Wi: iP 9h 18m 59s -. USCGS: 43°8N 147°0 E, H. 9h 06m 55.9s, h about 25 km. Kurile Islands.	
Feb. 13 (48)	iP eS eL F	16	39	16 49 17 09 17.6			(48) Wi: iP 16h 39m 23s +. USCGS: 43°7 N 149°6 E, H. 16h 27m 20.9s, h about 25 km. Kurile Islands.	
Feb. 13 (49)							(49) Wi: eP 22h 49m 15s. USCGS: 43°6 N 148°1 E, H. 22h 37m 12.9s, h about 40 km. Kurile Islands.	
Feb. 14 (50)							(50) Wi: iP 0h 27m 05s. USCGS: 43°7 N 147°5 E, H. 0h 15m 40.6s, h about 92 km. Kurile Islands.	
Feb. 14 (51)	eL F	4	02	4 35			(51) Wi: iP 3h 34m 03s +. USCGS: 43°8 N 147°9 E, H. 3h 22m 00.7s, h about 20 km. Kurile Islands.	



Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Feb. 15 (52)	eP eS eSS eL F	10 57 11 07 11 12.5 11 23 12.5	18 19				(52) Wi: iP 10h 57m 14s -. USCGS: 43°7 N 147°4 E, H. 10h 45m 15.9s, h about 69 km. Kurile Islands.	
Feb. 16 (53)	e F	3 53 4 00	50				(53) USCGS: 41°1 N 19°4 E, H. 3h 44m 58.8s, h about 143 km. Near coast of Albania.	
Feb. 16 (54)	eL F	14 35 15 00					(54) Wi: iP 14h 06m 50s +. USCGS: 43°2 N 148°0 E, H. 13h 54m 53.7s, h about 71 km. Kurile Islands.	
Feb. 16 (55)							(55) Wi: eP 15h 06m 25s. USCGS: 43°6 N 147°6 E, H. 14h 54m 27.7s, h about 50 km. Kurile Islands.	
Feb. 17 (56)							(56) Wi: ePKP 0h 42m 16s. USCGS: 18°8 S 173°5 W, H 0h 22m 30.8s, h about 25 km. Tonga Islands.	
Feb. 18 (57)							(57) Wi: iP 1h 16m 00s. USCGS: 44°4 147°5 E, H. 1h 04m 07.2s, h about 50 km. Kurile Islands.	
Feb. 18 (58)							(58) Wi: iPKP 12h 25m 22s. USCGS: 22°7 S 171°3 E, H. 12h 05m 36.3s, h about 38 km. Loyalty Islands region.	
Feb. 18 (59)	eP eS eL F	17 11 17 19.8 17 30 17 50	53				(59) USCGS: 1°3 S 15°7 W, H. 17h 02m 10.0s, h about 25 km Atlantic Ocean, North of Ascension Island	
Feb. 20 (60)							(60) Wi: iP 22h 39m 52s. BCIS and USCGS: 2°4 S 77°6 W, H. 22h 26m 59.1s, h about 25 km. Ecuador.	
Feb. 21 (61)							(61) Wi: iP 3h 06m 29s, USCGS: 36°3 N 23°9 E, H. 3h 01m 52.6s, h about 25 km. Near south of Greece.	
Feb. 22 (62)	eL F	23 17 23 40					(62) Wi: ePKP 22h 13m (30s), USCGS: 28°4 S 177°2 W, H. 21h 53m 34.5s, h about 78 km. Kermadec Islands region.	
Feb. 23 (63)	eL F	3 34 3 41					(63) BCIS and USCGS: 35°1 N 27°2 E, H. 3h 23m 18.5s, h about 25 km. Dodecanese Islands.	
Feb. 23 (64)	eS eL F	4 39.0 4 57 5 50					(64) BCIS and USCGS: 38°4 N 142°8 E, H. 4h 16m 24.3s, h about 116 km. Off east coast of Honshu, Japan.	
Feb. 23 (65)	eL F	21 58 22 15					(65) Disturbed by microseism. BCIS and USCGS: 36°9 N 27°3 S, H. 21h 45m 50.5s, h about 25 km. Dodecanese Islands.	
Feb. 24 (66)							(66) He: i 23h 40m 15s, i 23h 40m 31s; i 23h 40m 53s. Local shock?	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Feb. 24 (67)							(67) BCIS and USCGS: 26°2 N 125°7 E, H. 3h 04m 16.1s, h about 50 km. Ryukyu Islands.	
Feb. 26 (68)	eL F	6 57 7 25						
Feb. 26 (69)	iP iPP iS eSS eL F	18 23 18 26 18 33 18 39 18 50 23.0	19 33 40 30	+	8	17	(69) Disturbed by microseisms. Wi: eP 18h 23m 12s +. USCGS: 31°6 N 131°2 E, H. 18h 10m 48.7s, h about 54 km. Near coast of Kyushu, Japan He: i 18h 23m 27s; i 18h 23m 40s, eL 18h 52m.	
Feb. 27 (70)	eL F	11 31 11 40					(70) Disturbed by microseisms. 38°9 S 72.4° W, H. 10h 29m 48.3s, h about 57 km. Southern Chile.	
Feb. 27 (71)							(71) Wi: eP 13h 18m 16s. USCGS: 52°5 N 168°8 W, H. 13h 06m 35.8s, h about 56 km. Fox Islands Aleutian Islands.	
Feb. 27 (72)	eL F	21 52 22 10					(72) BCIS: 36°6 N 26°9 E, H. 21h 43.7m, h about 40 km. Dodecanese Islands.	
Feb. 28 (73)							(73) Wi: 12h 45m 26s -. BCIS and USCGS: 47°7 N 152°2 E, H 12h 33m 32.1s, h about 29 km. Kurile Islands.	
Mar. 5 (74)	eL F	2 32 3 10					(74) BCIS and USCGS: 10°7 S 161°6 E, H. 1h 26m 26.1s, h ≈ 99 km. Solomon Islands region.	
Mar. 5 (75)							(75) Wi: iPKP 10h 58m 24s. USCGS: 17°8 S 179°1 W, H. 10h 39m 50.8s, h. about 584 km. Fiji Islands region	
Mar. 5 (76)							(76) Wi: iPKP 21h 45m 07s -. USCGS: 20°0 S 176°6 W, H. 21h 26m 23.6s, h about 300 km. Tonga Islands region	
Mar. 7 (77)	iPKP iPP iSKSP eSS eL F	10 30 10 34 10 45 10 54 11 28 14.0	32 38 00 32	-	7	20	(77) Wi: iPKP 10h 30m 32s. USCGS: 28°3 S 175°7 W, H. 10h 10m 38.9s, h about 43 km. Kermadec Islands region	
Mar. 7 (78)	eL F	20 05 20 50					(78) USCGS: 38°4 S 78°1 W, H. 19h 08m 36.1s, h about 30 km Indian Ocean	
Mar. 7 (79)							(79) Wi: iPKP 23h 30m 55s -. USCGS: 4°7 S 153°2 E, H, 23h 11m 59.6s, h about 90 km. New Britain region.	
Mar. 8 (80)							(80) Wi: iP 0h 29m 38s +. USCGS: 52°7 N 164°7 W, H. 0h 17m 58.9s, h about 34 km. Fox Islands, Aleutian Islands.	
Mar. 9 (81)	eL F	4 25 4 38					(81) Wi: eP 4h 08m 56s, e 4h 09m 04s. USCGS: 10°9 N 41°7 W, H. 3h 59m 08.7s, h about 27 km. Atlantic Ocean.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period s	Amplitude	Remarks
		h	m	s				
Mar. 11 (82)	eS eL F	1	53.0				(82) Disturbed by microseisms. No. 2 - record Wi: eP 1h 43m 20s. BCIS and USCGS: 48°7' N 154°6' E, h about 26 km. Kurile Islands	
Mar. 11 (83)	eS eL F	8	57.5				(83) Disturbed by microseisms. No. 2. record Wi: eP 8h 50m 03s. i 8h 50m 07s. BCIS: 11°8' N 43°0' E, H. 8h 41m 06s. USCGS: 11°2' N 43°3' E, H. 8h 41m 00s, h about 18 km. Near coast of British Somaliland.	
Mar. 13 (84)	eSKS eL F	8	27	25			(84) USCGS: 19°2' N 107°3' W, H. 8h 03m 43.9s, h about 49 km. West coast of Mexico.	
Mar. 13 (85)	eS eL F	19	26	40			(85) Disturbed by microseisms. Wi: eP 19h 22m 23s. BCIS and USCGS: 34°5' N 26°6' E, H. 19h 17m 16.0s, h about 25 km. Crete.	
Mar. 15 (86)	eSS eL F						(86) Disturbed by microseisms. USCGS: 3°3' S 150°6' E, H. 10h 14m 55.5s, h about 21 km. New Ireland region.	
Mar. 16 (87)							(87) Wi: ipPKP 4h 51m 42s+. USCGS: 25°1' S 180°0', H. 4h 30m 39.0s, h about 482 km. South of Fiji Islands	
Mar. 16 (88)							(88) Wi: iP 5h 09m 45s+. USCGS: 51°7' N 176°1' E, H. 4h 58m 00.4s, h about 39 km. Rat Islands, Aleutian Islands.	
Mar. 16 (89)	ePP ePPP ePS eL F	14	050				(89) Disturbed by microseisms. USCGS: 8°2' S 122° E, H. 13h 45m 35.6s, h about 74 km. Flores Sea.	
Mar. 17 (90)	eL F	15	37				(90) Disturbed by microseisms. Wi: ePKP 14h 26m 44s. USCGS: 24°1' S 175°9' W, H. 14h 06m 56.4s, h about 123 km. Tonga Islands region.	
Mar. 17 (91)	eL F	21	35				(91) Disturbed by microseisms. Wi: ePKP 20h 30m 30s. USCGS: 24°3' S 175°6' W, H. 20h 11m 17.4s, h about 79 km. Tonga Islands region	
Mar. 18 (92)	ePKP ePP eL F	15	15	08			(92) Disturbed by microseisms. USCGS: 49°9' S 163°3' E, H. 14h 54m 59.3s, h about 38 km South of New Zealand.	
Mar. 20 (93)	eL F	6	50				(93) Disturbed by microseisms. USCGS: 11°3' N 86°5' W, H. 6h 16m 21.1s, h about 60 km. Off west coast of Nicaragua.	
Mar. 20 (94)	iPKP ipPKP eSS F	16	12	38	-	7	20 (94) Disturbed by microseism Wi: ePKP 16h 12m 38s. USCGS: 18°4' S 175°8' W, H. 15h 53m 26.1s, h about 178km. Tonga Islands.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period s	Amplitude	Remarks
		h	m	s				
Mar. 21 (95)	eL F	1	05				(95) Disturbed by microseisms. USCGS: 24°1' S 176°0' W, H. 23h 42m 36.8s, h about 25 km. Tonga Islands region	
Mar. 21 (96)							(96) Wi: ePKP 20h 14.6m BCIS and USCGS: 22°9' S 171°3' E, H. 19h 54m 44.4s, h about 19 km. Loyalty Islands region.	
Mar. 24 (97)	eS eL F	23	20				(97) Disturbed by microseisms. Wi: eP 23h 09m 34s+. BCIS and USCGS: 35°7' N 140°9' E, H. 22h 57m 14.3s, h about 102 km. Near east coast of Honshu, Japan.	
Mar. 28 (98)	iP iPP iS iPPS eSS eSSS eL F	9	50	08	+		(98) Disturbed by microseisms. BCIS and USCGS: 0°2' N 123°6' E, H. 9h 35m 55.4s, h about 83 km. Northern Celebes.	
Mar. 28 (99)	eP eL F	12	41	00			(99) Disturbed by microseisms. Wi: iP 12h 40m 39s (+). BCIS and USCGS: 51°7' N 176°2' W, H. 12h 29m 12.7s, h about 60 km. Andreanof Islands, Aleutian Islands.	
Mar. 28 (100)	eSS eL F	21	33.5				(100) Disturbed by microseisms. BCIS and USCGS: 22°1' S 68°0' W, H. 21h 01m 56.2s, h about 125 km. Chile-Bolivia border.	
Mar. 30 (101)	eL F	8	25				(101) Disturbed by microseisms. BCIS and USCGS: 22° N 107°8' W, H. 7h 42m 59.4s, h about 20 km. Gulf of California	
Mar. 30 (102)	eL F	10	05				(102) USCGS: 15°2' S 172°8' W, H. 8h 49m 45.6s, h about 25 km. Samoa Islands region	
Apr. 1 (103)	iP iPP iS eSS eL F	15	27	21	+	4	10 (103) Wi: iP 15h 27m 14s. BCIS and USCGS: 39°6' N 77°7' E, H. 15h 18m 22.8s, h about 21 km. Sinkiang Province, China.	
Apr. 3 (104)							(104) Wi: iP 16h 43m 31s, BCIS and USCGS: 52°5' N 158°9' E, H. 16h 32m 04.3s, h about 38 km. Near east coast of Kamchatka.	
Apr. 4 (105)	eP eS eSS eL F	9	55.7	48			(105) BCIS and USCGS: 40°1' N 77°8' E, H. 9h 46m 36.6s, h about 16 km. Sinkiang Province China.	
Apr. 4 (106)							(106) Wi: e 22h 45.0m, e 22h 46.5m. BCIS: 62½° N 2 1/4° E. North Sea, west of Norway.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period s	Amplitude	Remarks
		h	m	s				
Apr. 6 (107)	eL F	2	00				(107) BCIS and USCGS: 39°6 N 77°8 E, H. 1h 33m 46.9s, h about 33 km. Sinkiang Province China.	
Apr. 6 (108)	eL F	4	42				(108) USCGS: 40°1 N 124°8 W, H 4h 04m 46.1s, h about 73 km. Near north coast of California.	
Apr. 6 (109)							(109) Wi: iP 14h 17m 57s. BCIS and USCGS: 2°2 N 97°2 E, H. 14h 05m 00.3s, h about 25 km. Near coast of Sumatra	
Apr. 6 (110)							(110) Wi: iPKP 15h 53m 07s. BCIS and USCGS: 20°3 S 169°4 E, H 15h 33m 38.6s, h about 129 km. Loyalty Islands region.	
Apr. 6 (111)	eP eS eL F	18	20	53			(111) Wi: iP 18h 20m 46s. BCIS and USCGS: 27°8 N 56°7 E, H. 18h 12m 40.7s, h about 109 km. Southern Iran	
Apr. 7 (112)	eP eS eL F	20	06.2	19			(112) Wi: eP 20h 05m 58s. BCIS and USCGS: 57°2 N 163°3 E, H 19h 54m 51.9s, h about 20 km. Near east coast of Kamchatka.	
Apr. 7 (113)	eL F	21	42				(113) BCIS and USCGS: 39°3 N 70°3 E, H. 21h 17m 43.8s, h about 44 km. Kirghiz - Tadzhik border.	
Apr. 8 (114)	iP ePs eSS eSSS eL F	18	19	08			(114) BCIS and USCGS: 38°2 S 72°7 W, H. 17h 59m 46.7s, h about 60 km. Chile.	
Apr. 9 (115)	eP eS eL F	7	34	40			(115) USCGS: 36°5 N 121°3 W, H. 7h 23m 16.0s, h about 11 km. San Benito County, California.	
Apr. 9 (116)							(116) Wi: ePKP 9h 40m 19s. USCGS: 26°0 S 178°4 E, H. 9h 21m 29.0s, h about 655 km. South of Fiji Islands.	
Apr. 9 (117)	iP iPP iS eSS eL F	15	47	52	+	5	(117) Wi: iP 15h 47m 46s +; ePP 15h 51m 01s. BCIS and USCGS: 24°1 N 122°2 E, H. 15h 35m 05.4s, h about 13 km. Near coast of Formosa.	
Apr. 12 (118)	eP eS eL F	22	32	20			(118) Disturbed by microseisms. Wi: eP 22h 32m 49s -. BCIS and USCGS: 13°1 N 88°9 W, H. 22h 20m 33.6s, h about 122 km. El Salvador.	
Apr. 13 (119)	iP ePP eS eSS eL F	16	43	35	+	4	(119) Wi: eP 16h 43m 26s. USCGS: 40°1 N 77°8 E, H. 16h 34m 39.1s, h about 19 km. Sinkiang Province, China.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period s	Amplitude	Remarks
		h	m	s				
Apr. 16 (120)							(120) Wi: iP 11h 53m 02s -. BCIS and USCGS: 53°5 N 158°7 E, H. 11h 40m 40.7s, h about 27 km. Kamchatka.	
Apr. 17 (121)	eH F	16	48				(121) BCIS and USCGS: 3°9 N 31°5 W, H. 16h 21m 10.2s, h about 25 km. Mid Atlantic Ocean.	
Apr. 17 (122)							(122) Wi: iPKP 21h 07m 04s (+). USCGS: 21°3 S 178°6 W, H. 20h 48m 12.5s, h about 549km. Tonga Islands region.	
Apr. 18 (123)	eH F	19	51				(123) BCIS and USCGS: 38°5 S 73°3 W, H. 18h 49m 25.1s, h about 30 km. Near coast of southern Chile.	
Apr. 19 (124)	eL F	16	50				(124) Wi: iP 16h 24m 26s (-). BCIS and USCGS: 44°2 N 148°0 E, H. 16h 12m 28.7s, h about 51 km. Kurile Islands.	
Apr. 19 (125)							(125) Wi: iP 18h 25m 12s (+). BCIS and USCGS: 55°1 N 163°6 E, H. 18h 13m 51.8s, h about 21 km. Kamchatka.	
Apr. 19 (126)	eL F	20	56				(126) Wi: iP 20h 31m 47s BCIS and USCGS: 44°6 N 150°2 E, H. 20h 19m 46.4s, h about 27 km. Kurile Islands.	
Apr. 19 (127)							(127) Wi: iP 22h 19m 48s (-). BCIS and USCGS: 44°9 N 149°5 E, H. 22h 07m 51.2s, h about 34 km. Kurile Islands.	
Apr. 20 (128)	eL F	22	45				(128) USCGS: 15°2 S 173°7 W, H. 21h 39m 07.0s, h about 25 km. South of Samoa Islands.	
Apr. 21 (129)	eL F	20	13				(129) USCGS: 48°1 N 154°6 E, H. 19h 30m 36.9s, h about 23 km. Kurile Islands.	
Apr. 21 (130)	eL F	20	55				(130) Wi: eP 20h 22m 30s. USCGS: 47°7 N 154°6 E, H. 20h 10m 38.3s, h about 27 km. Kurile Islands.	
Apr. 21 (131)	eL F	22	45				(131) Wi: eP 21h 38m 27s. BCIS and USCGS: 51°7 N 173°9 W, H. 21h 26m 42.1s, h about 36 km. Andreanof Islands, Aleutian Islands.	
Apr. 22 (132)	eL F	1	31				(132) BCIS: 6½°S 150° E, H. 0h 30.4m. New Britain region.	
Apr. 23 (133)	iP iPP eS eL F	5	27	16			(133) Wi: iP 5h 27m 10s -. BCIS and USCGS: 26°2 N 129°8 E, H. 5h 14m 31.1s, h about 110 km. Ryukyu Islands.	
Apr. 23 (134)	iP ePP eS eSS eSSS eL F	9	13	45	+		(134) Wi: iP 9h 13m 40s +. BCIS and USCGS: 44°6 N 150°2 E, H. 9h 01m 41.8s, h about 44 km. Kurile Islands.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s		s		
Apr. 23 (135)	eP eS eL F	17	03.0				(135) Wi: eP 7h 02m 59s. USCGS: 44°5' N 150°1' E, H. 16h 51m 03.6s, h about 76 km. Kurile Islands.	
Apr. 24 (136)	eL F	13	15				(136) Wi: eP 12h 39.6m. USCGS: 44°5' N 150°2' E, H. 12h 27m 39.5s, h about 76 km. Kurile Islands.	
Apr. 25 (137)							(137) Wi: iP 0h 40m 41s. BCIS and USCGS: 44°6' N 150°0' E, H. oh 28m 15.1 s, h about 72 km. Kurile Islands	
Apr. 25 (138)	iP eS eL F	1	29	43	(+)		(138) Wi: iP 1h 29m 38s. USCGS: 44°5' N 150°0' E, H. 1h 17m 42.7s, h about 78 km. Kurile Islands	
Apr. 25 (139)	eL F	12	45				(139) USCGS: 32°7' N 178°5' W, H. 11h 16m 41.4s, h about 45 km. Kermadec Islands region.	
Apr. 26 (140)	eP eS eSS eL F	7	51	03			(140) Disturbed by microseisms. Wi: iP 7h 50m 57.5s -. BCIS and USCGS: 44°6' N 149°9' E, H. 7h 38m 54.1s, h about 20 km. Kurile Islands.	
Apr. 26 (141)	eL F	20	17				(141) Wi: iP 19h 44m 32s -. BCIS and USCGS: 44°6' N 150°1' E, H. 19h 32m 34.2s, h about 51 km. Kurile Islands.	
Apr. 28 (142)							(142) Wi: iPKP 20h 55m 01s. USCGS: 17°7' S 178°7' W, H. 20h 36m 25.3s, h about 595 km. Fiji Islands.	
Apr. 29 (143)	eP iZ	9	31	37			(143) Wi: 9h 31m 35s. F in next shock. BCIS and USCGS: 40°6' N 127°5' W, H. 9h 19m 28.3s, h about 26 km. Off coast of northern California.	
Apr. 29 (144)	iP iS eL F	9	33	47	+	4½	12 (144) Wi: 9h 33m 40s +. BCIS: 72° N 7½° W, H 9h 29m 05s. USCGS: 72°3' N 7°4' W, H. 9h 29m 09.5s, h about 14 km. Atlantic Ocean, north of Jan Mayen Island.	
Apr. 29 (145)	eL F	11	20				(145) BCIS and USCGS: 41°8' N 104°5' E, H. 10h 45m 39.1s, h about 25 km. Outer Mongolia.	
Apr. 30 (146)	iP eS eL F	7	38	54			(146) Wi: eP 7h 38m 42s; i 7h 39m 02s. BCIS and USCGS: 52°0' N 31°9' W, H. 7h 33m 53.5s, h about 38 km North Atlantic Ocean.	
Apr. 30 (147)	eP eS eL F	11	27	22			(147) Wi: iP 11h 27m 15s, BCIS and USCGS: 44°6' N 149°7' E, H. 11h 15m 19.8s, h about 70 km. Kurile Islands.	
Apr. 30 (148)	eL F	16	03				(148) USCGS: 15°3' S 174°4' W, H. 14h 48m 11.5s, h about 25 km. Samoa Islands region.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s		s		
May 2 (149)	eL F	3	20				(149) Wi: eP 3h 16m 18s. BCIS and USCGS: 71°2' N 6°9' W, H. 3h 11m 45.7s, h about 22 km. Jan Mayen Island.	
May 2 (150)	iPKP ePP eSS eL F	23	04	40			(150) Wi: ePKP 2304.8 USCGS: 27°8' S 176°5' W, H. 22h 44m 44.3s, h about 47 km. Kermadec Islands region.	
May 4 (151)		23	08	41			(151) Wi: eP 2h 29.6m, USCGS: 40°6' N 127°1' W, H. 2h 17m 34.0s, h about 25 km. Off coast of Northern California.	
May 4 (152)		23	28.5				(152) Wi: iPKP 3h 51m 40s-. USCGS: 17°9' S 178°5' W, H 3h 33m 03.5s, h about 601 km. Fiji Islands region.	
May 5 (153)	ePKP eL F	14	03.5				(153) USCGS: 27°8' S 176°1' W, H 13h 43m 21.1s, h about 84 km. Kermadec Islands region.	
May 6 (154)	e F	20	05				(154) USCGS: 1°2' S 15°5' W, H 19h 38m 04.6s, h about 24 km. Atlantic Ocean, north of Ascension Island.	
May 7 (155)	e F	1	25				(155) USCGS: 44°3' N 144°4' E, H 0h 59m 063s, h about 37 km. Kurili Islands	
May 7 (156)	e F	11	15				(156) BCIS and USCGS: 5°8' N 126°8' E, H 10h 22m 437s, h about 89 km. Off coast of Mindanao, Philippine Islands.	
May 7 (157)	e F	15	50				(157) BCIS and USCGS: 71°2' N 7°1' W, H 15h 40m 52.5s, h about 66 km. Jan Mayen Island region.	
May 8 (158)	e F	20	20				(158) USCGS: 24°3' S 69°7' W, H 19h 33m 35.4s, h about 48 km. Northern Chile.	
May 11 (159)		20	40				(159) He: i 3h 08m 53s; i 3h 08m 54s; i 3h 09m 14s.	
May 11 (160)	eL F	9	30				(160) BCIS and USCGS: 37°2' S, 73°6' W, H 7.8h, 38m 27.1s, h about 47 km. Near coast of southern Chile.	
May 13 (161)	ePKP F	14	36.8				(161) USCGS: 27°9' S 176°0' W, H 14h 18m 42.4s, h about 25 km. Kermadec Islands region.	
May 13 (162)	iPKP eL F	15	11	37	+		(162) Wi: iPKP 15h 11m 35s +. USCGS: 17°5' S 178°8' W, H 14h 52m 55.3s, h about 556 km. Fiji Islands region.	
May 13 (163)		15	45				(163) Wi: iP 16h 01m 32s. BCIS and USCGS: 43°4' N 147°8' E, H 15h 49m 29.6s, h about 31 km. Off northeastern coast of Hokkaido, Japan.	
May 14 (164)	iP eS eL F	15	12	32	(+)		(164) USCGS: 67°7' N 18°4' W, H 15h 08m 04.2s, h about 47 km. North of Iceland.	

Seismic Records at De Bilt

Date 1961	Phase	Time h m s	Direction	Period s	Amplitude	Remarks
May 14 (165)	iP eS eL F	15 42 38 15 46 24 15 48.0 16 15	+			(165) BCIS and USCGS: 67°7' N 18°4' W, H. 15h 38m 07.5s, h about 23 km. North of Iceland.
May 14 (166)	eL F	20 14 20 25				(166) USCGS: 40°8' N 127°4' W, H 19h 31m 34.4s, h about 45 km. Off west coast of California.
May 15 (167)	ePKP eZ	21 12 40 21 14 40				(167) Wi: iP 21h 12m 37s-. USCGS: 20°0' S 177°2' W, H 20h 53m 05.3s, h about 89 km. Tonga Islands region.
May 16 (168)	eP eS eL F	21 58 06 22 08 32 22 27 23 12				(168) Wi: iP 21h 58m 00s- USCGS: 30°0' N 132°0' E, H 21h 45m 24.0s, h about 25 km. Ryukyu Islands.
May 17 (169)	iP iS eSS eL F	19 41 08 19 50 50 19 56.0 20 07 21 50	+	5	4	(169) Wi: iP 19h 41m 03s (+). USCGS: 52°0' N 173°9' E, H 19h 29m 19.3s, h about 21 km. Near Islands, Aleutian Islands.
May 19 (170)						(170) Wi: iP 2h 40m 22s+. USCGS: 22°5' S 179°2' E, H 2h 21m 31.8s about 600 km. Fiji Islands region
May 19 (171)	eL F	17 15 17 45				(171) Wi: eP 16h 50m 04s. BCIS and USCGS: 24°1' N 123°4' E, 4.16h 37m 28.9s, h about 71 km. Ryukyu Islands.
May 20 (172)	eL F	18 30 18 50				(172) USCGS: 6°5' S 31°7' E, H 17h 52m 04.6s, h about 58 km. Tanganyika.
May 22 (173)	iPKP eSS eL F	14 04 16 14 27 15 03 16 30	(-)			(173) Wi: iP 14h 04m 18s-. USCGS: 21°3' S 174°4' W, H 13h 44m 35.8s, h about 97 km. Tonga Islands.
May 22 (174)	ePKP ePP eSS eL F	17 52 10 17 55 42 18 15 18 32 20.0				(174) Wi: ePKP 17h 52m 08s; i 17h 52m 12s. USCGS: 22°8' S 176°1' W, H 17h 32m 21.6s, h about 35 km. Tonga Islands region.
May 22 (175)						(175) Wi: iP 0h 06m 04s-. USCGS: 22°6' S 177°0' W, H 23h 47m 03.2s, h about 526 km. Tonga Islands region.
May 23 (176)	iP iS eL F	2 50 15 2 54 22 2 57 4 50	+	6	6	(176) Wi: iP 2h 50m 13s. H: iP 2h 50m 13s; i 2h 50m 31s. BCIS: 36°8' N 28°7' E, H 2h 45m 18.8s, h about 70 km. USCGS: 36°4' N 28°3' E, H 2h 45m 16.0s, h about 49 km. Southwestern Turkey.
May 23 (177)	eP	3 52 38				(177) Wi: iP 3h 52m 40s (+). USCGS: 9°8' N 84°0' W, H 3h 40m 26.1s, h about 136 km. Costa Rica.

Seismic Records at De Bilt

Date 1961	Phase	Time h m s	Direction	Period s	Amplitude	Remarks
May 23 (178)						(178) Wi: iP 3h 55m 23.5s. BCIS: 9° $\frac{3}{4}$ ' N 84° W; H, 3h 44m 10s, h about 150 km. Costa Rica.
May 23 (179)	eP ePP eL F	16 57 06 17 00 20 17 20 18.0				(179) Wi: iP 16h 57m 10s. USCGS: 12°6' N 87°3' W, H. 16h 44m 59.4s, h about 138 km. Near coast of Nicaragua.
May 25 (180)	eL F	13 23 13 30				
May 27 (181)	eL F	23 35 23 40				(181) USCGS: 15°8' N 119°2' E, H. 22h 38m 35.5s, h about 91 km. Near coast of Luzon, Philippine Islands.
May 29 (182)						(182) Wi: eP 0h 34m 06s. BCIS and USCGS: 52°1' N 166°6' W, H. 0h 22m 55.6s, h about 67 km. Fox Islands, Aleutian Islands.
May 29 (183)	eL F	8 25 9 00				(183) USCGS: 39°0' S 73°4' W, H 7h 28m 11.7s, h about 13 km. Near south coast of Chile.
May 29 (184)	eL F	11 16 12 00				(184) Wi: eP 11h 00m 58s. BCIS and USCGS: 10°6' N 39°4' E, H. 10h 52m 01.2s, h about 25 km. Ethiopia.
May 29 (185)	e F	19 55 20 15				(185) USCGS: 2°5' N 128°4' E, H 17h 48m 21.6s, h about 25 km. Halmahera Island region.
May 31 (186)	eL F	14 55 15 30				(186) USCGS: 29°8' N 114°0' W, H. 14h 17m 43.8s, h about 74 km. Gulf of California.
May 31 (187)	eL F	20 20 20 40				(187) BCIS and USCGS: 5°3' S 151°6' E, H. 19h 15m 57.0s, h about 56 km. New Britain.
June 1 (188)	iP iS eSS eL F	23 38 19 23 45 42 23 49 16 23 52 2.5				(188) Wi: iP 23h 38m 15s; 23h 38m 23s. USCGS: 10°6' N 39°3' E, H. 23h 29m 21s, h about 33 km. Ethiopia.
June 2 (189)						(189) Wi: eP 1h 17m 52.5s; i 1h 17m 54s. USCGS: 10°3' N 39°6' E, H. 1h 08m 59.8s, h about 64 km. Ethiopia.
June 2 (190)	iP eS eSS eL F	5 00 12 5 07 30 5 11 10 5 15 8.0	-	5	4	(190) Wi: iP 5h 00m 10s -. USCGS: 9°8' N 40°0' E, H. 4h 51m 10.4s, h about 41 km. Ethiopia.
June 2 (191)						(191) Wi: eP 5h 31m 28s. USCGS: 10°4' N 39°6' E, H. 5h 22m 29.1s, h about 26 km. Ethiopia.

## Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period s	Amplitude	Remarks
		h	m	s				
June 2 (192)							(192) Wi: eP 5h 53m 50s, i 5h 53m 57s. USCGS: 10°3 N 39°8 E, H. 5h 44m 52.4s, h about 31 km. Ethiopia.	
June 3 (193)	eH F	1 55 2.5					(193) USCGS: 56°3 N 164°8 E, H. 1h 13m 25.4s, h about 29 km Off east coast of Kamchatka.	
June 4 (194)	iP eS ePS eSS eL F	7 42 7 50 7 50 7 55.0 8 02 9 15	47 38 56	-	5	6	(194) Wi: iP 7h 42m 37s -. USCGS: 34°1 N 82°0 E, H 7h 33m 06.0s, h about 32 km. Tibet.	
June 4 (195)	eL F	14 23 14 30					(195) USCGS: 33°9 N 82°1 E, H. 13h 51m 29.9s, h about 32 km.	
June 5 (196)	eL F	3 55 4 05					(196) Wi: eP 3h 38m 58s. USCGS: 27°9 N 55°1 E, H. 3h 30m 56.0s, h about 30 km. Southeastern Iran.	
June 6 (197)	eL F	21 27 21 35					(197) USCGS: 39°4 N 77°9 E, H. 20h 56m 20.1s; h about 102 km. Sinkiang Province, China.	
June 7 (198)	eP eS eL F	14 25 14 33 14 42 15 30	23 36	-	6	2	(198) Wi: eP 14h 25m 28s. USCGS: 5°4 S 11°6 W, H. 14h 15m 18.9s, h about 17 km. Ascencion Island.	
June 9 (199)							(199) Wi: iP 9h 43m 15s. USCGS: 41°0 N 50°7 E, H. 9h 36m 49.2s, h about 17 km. Caspian Sea.	
June 10 (200)	ePP eSS eL F	20 52 21 09.6 21 24 23.0	45				(200) USCGS: 24°2 S 112°1 W, H. 20h 31m 50.9s, h about 47 km. Easter Islands region.	
June 11 (201)	iP eS eSS eL F	5 18 5 25 5 28 5 30 8 40	36 08 32	-	5	5	(201) Wi: eP 5h 18m 26s; i 5h 18m 28s. USCGS: 28°9 N 54°6 E, H. 5h 10m 26.0s, h about 37 km. Southern Iran.	
June 11 (202)							(202) Wi: eP 5h 38m 12s. USCGS: 27°8 N 55°0 E, H. 5h 30m 14.5s, h about 62 km. Southern Iran.	
June 11 (203)							(203) Wi: iP 6h 04m 29s. USCGS: 51°6 N 159°3 E, H. 5h 52m 51.7s, h about 18 km. Near south coast of Kamchatka.	
June 11 (204)	eP eS eL F	12 39 12 46 12 55 13 40	34 06	+			(204) Wi: eP 12h 39m 26s. USCGS: 28°2 W 54°6 E, H. 12h 31m 26.8s, h about 36 km. Southern Iran.	

## Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period s	Amplitude	Remarks
		h	m	s				
June 11 (205)							(205) Wi: iP 14h 06m 00s -. USCGS: 27°8 N 54°6 E, H. 13h 57m 58.6s, h about 63 km. Southern Iran.	
June 11 (206)	eL F	17 55 18 10					(206) Wi: eP 17h 26m 57s. USCGS: 25°2 N 98°6 E, H. 17h 15m 34.5s, h about 33 km. Birma-China border.	
June 11 (207)							(207) Wi: ePKP 22h 41m 02s. USCGS: 17°9 S 178°6 W, H. 22h 22m 40.2s, h about 640 km. Fiji Islands.	
June 12 (208)							(208) Wi: eP 10h 10m 20s. USCGS: 21°6 N 106°0 E, H. 9h 58m 17.1s, h about 33 km. North Viet-Nam.	
June 13 (209)							(209) Wi: iPKP 21h 57m 30s -. USCGS: 21.5 S 176°4 W, H. 21h 37m 55.0s, h about 146km. Fiji Islands region.	
June 14 (210)	eP eS eL F	20 41 20 48 21 00 22.0	17 36				(210) Wi: eP 20h 41m 12s. BCIS: 10° <sup>30</sup> N 40° E, H. 20h 32.3m. USCGS: 10°5 N 39°9 E, H. 20h 32m 21.6s, h about 33 km. Ethiopia.	
June 15 (211)	eL F	0 07 0 30					(211) USCGS: 51°8 N 175°0 W, H. 23h 50m 26.6s, h about 33 km. Rat Islands, Aleutian Islands.	
June 15 (212)							(212) Wi: iP 23h 36m 35s +. USCGS: 45°9 N 151°2 E, H. 23h 24m 43.8s, h about 36 km. Kurile Islands.	
June 16 (213)	iP iS eL F	10 43 10 53 11 05 11.5	38 14	-	3	4	(213) Wi: iP 10h 43m 42s -; i 10h 44m 09s. USCGS: 8°9 N 73°4 W, H. 10h 31m 56.2s, h about 120 km. Northern Colombia.	
June 17 (214)	eP eS eL F	15 20.0 15 30.3 15 45 16 30					(214) Wi: eP 15h 19m 57s. USCGS: 14°2 N 92°0 E, H. 15h 07m 33.7s, h about 85 km. Mexico-Guatemala border.	
June 18 (215)							(215) Wi: ePKP <sub>1</sub> 14h 14m 26s; iP <sub>2</sub> 14h 15m 02s +. USCGS: 31°5 S 179°8 E, H. 13h 15m 16.6s, h about 434 km. Kermadec Islands region.	
June 18 (216)	eL F	23 16 24 05					(216) USCGS: 56°6 S 142°2 W, H. 22h 13m 25.1s, h about 33 km. South Pacific Ocean.	
June 19 (217)	eL F	2 33 3 00					(217) USCGS: 12°7 N 122°1 E, H. 1h 45m 25.5s, h about 48 km. Near coast of Luzon, Philippine Islands.	
June 19 (218)	eL F	3 33 3 50					(218) USCGS: 39°3 N 143°1 E, H. 2h 46m 03.6s, h about 42 km. Off east coast of Honshu, Japan.	

Seismic Records at De Bilt

Date 1961	Phase	Time h m s	Direction	Period s	Amplitude	Remarks
June 19 (219)						(219) Wi: iP 7h 50m 39s -. USCGS: 39°3 N 143°0 E, H. 7h 38m 25.0s, h about 29 km. Off east coast of Honshu, Japan.
June 19 (220)	eS F	17 19 17 45			44	(220) Wi: eP 17h 12m 49s +. USCGS: 36°5 N 70°9 E, H. 17h 04m 37.0s, h about 200 km. Hindu Kush.
June 20 (221)						(221) Wi: eP 3h 30.5m. USCGS: 12°2 N 44°2 E, H. 3h 21m 34.3s, h about 33 km. Gulf of Aden.
June 21 (222)						(222) Wi: iP 6h 47m 23s (-). USCGS: 27°8 N 54°8 E, H. 6h 39m 23.0s, h about 40 km. Iran.
June 21 (223)	eP eS eL F	16 09 16 13 16 16 16 35			40 50	(223) Wi: eP 16h 09m 36s. USCGS: 37°9 N 28°7 E, H. 16h 04m 47.2s, Western Turkey.
June 21 (224)						(224) Wi: iP 20h 41m 30s. USCGS: 7°6 S 110°0 E, H. 2h 25m 00.9s, h about 163 km. Near north coast of Java.
June 22 (225)	eP eS eL F	1 00.2 1 03.0 1 03.3 1 20				(225) Wi: eP 0h 59.5m. BCIS: 42°4 N 19°3 E, H. 0h 56m 01s. USCGS: 42°4 N 19°3 E, H. 0h 56m 03.7s, h about 30 km. Northern Albania Yugoslavia border.
June 23 (226)	eP eL F	9 07 9 31 11			48	(226) No records from 9h 16m till 9h 27m. USCGS: 44°1 N 128°9 W, H. 8h 55m 55s, h about 56 km. Off coast of Oregon.
June 23 (227)	e F	16 55 17 30				(227) Wi: eP 16h 43m 30s. USCGS: 27°6 N 55°1 E, H. 16h 38m 22.8s, h about 32 km. Southern Iran.
June 25 (228)	e F	17 10 18 15				(228) USCGS: 21°8 N 143°5 E, H. 16h 46m 38.6s, h about 33 km. Marianas Islands.
June 26 (229)	iP epP eS eSS eL F	14 59 14 59 15 08 15 09 15 22 16 15			11 34 57 28	(229) USCGS: 52°2 N 174°7 E, H. 14h 47m 27.3s, h about 40 km. Near Islands, Aleutian Islands
June 27 (230)	eP eS F	7 15.1 7 24 9.0			20	(230) Change of papers 7h 31m till 7h 40m. USCGS: 28°0 N 99°4 E, H. 7h 03m 42.2s, h about 33 km. Yunan Province, China.
June 29 (231)	ePKP ePP F	9 42 9 45 11.5			25 13	(231) USCGS: 13°9 S 166°0 E, H. 9h 22m 55.8s, h about 37 km. New Hebrides Islands.

Date 1961	Phase	Time h m s	Direction	Period s	Amplitude	Remarks
June 29 (232)						(232) Wi: iP 12h 53m 38s. Jena: 50° 49' N 10° 06' 5 E, H. 12h 52m 49s. Eastern Germany.
July 1 (233)						(233) Wi: eP 13h 24m 08s. USCGS: 15°3 S 74°8 W, H. 13h 10m 40.9s, h about 68km. Near coast of Peru.
July 1 (234)						(234) Wi: iPKP 19h 09m 33.2s. USCGS: 18°0 S 178°4 W, H. 18h 50m 57.5s, h about 601 km. Fiji Islands.
July 6 (235)	iPKP ePP eSS eSSS eL F	22 29 22 32 22 51 22 57 23 21 1.0	07.7 + 32	7	20	(235) Wi: iPKP 22h 29m 05.2s +; iPP 22h 32m 44s. USCGS: 20°0 S 169°4 E, H. 22h 09m 29.4s, h about 47 km. Loyalty Islands region
July 7 (236)	ePKP ePP ePS eSS eL F	13 29 13 32 13 41 13 49.0 14 12 16.0	47 43 38			(236) USCGS: 5°7 S 149°7 E, H. 13h 10m 43.8s, h about 57 km. New Britian
July 7 (237)						(237) H: i 22h 28m 44s; e 22h 28m 49s Local Shock.
July 7 (238)	iPKP F	22 39 22 50	09			(238) Wi: iPKP 22h 39m 04s. USCGS: 20°2 S 169°0 E, H. 22h 19m 31.6s, h about 41 km. Loyalty Islands region
July 8 (239)	ePKP iZ eSS eL F	2 54 2 55 3 17 3 45 5.0	58 00 27	8	6	(239) Wi: ePKP 2h 54m 55s. USCGS: 20°8 S 168°7 E, H. 2h 35m 20.5s, h about 33 km. Loyalty Islands.
July 8 (240)						(240) Wi: ePKP 3h 45m 05s. USCGS: 20°7 S 169°1 E, H. 3h 25m 23.4s, h about 33 km. Loyalty Islands region.
July 8 (241)	iPKP eZ ePP eSS F	15 54 15 55 15 57 16 17.5 18.0	17 26 42	7	7	(241) Wi: iPKP 15h 54m 13s +. USCGS: 20°1 S 168°7 E, H. 15h 34m 37.4s, h about 26 km. Loyalty Islands.
July 8 (242)	iPKP	15 59	55			(242) Wi: ePKP 15h 59m 48s. BCIS: 20½° S 169° E, H. 15h 14.0s, aftershock of (235).
July 8 (243)	ePKP ePP F	21 33 21 37.1 21 50	38			(243) Wi: ePKP 21h 33m 36s. USCGS: 20°4 S 169°0 E, H. 21h 13m 59.5s, h about 33 km. Loyalty Islands.
July 8 (244)	iPKP eSS F	22 08 22 37 23.5	23 +			(244) Wi: iPKP 22h 08m 20s +. USCGS: 20°4 S 169°0 E, H. 21h 48m 42.3s, h about 18 km. Loyalty Islands.

Date 1961	Phase	Time h m s	Direction	Period s	Amplitude	Remarks
July 11 (245)	eP eS ePS eL F	9 44 07 9 54 26 9 55.3 10 14 11.0		4	3	(245) USCGS: 8°0 N 93°1 E, H. 9h 31m 57.2s, h about 17 km. Nicobar Islands region.
July 12 (246)	eH F	2 58.8 3 05				(246) USCGS: 39°1 N 23°4 E, H. 2h 48m 48.0s, h about 33 km. Near east coast of Greece.
July 13 (247)	eL F	22 28 22 45				(247) USCGS: 22°9 N 122°7 E, H. 21h 44m 33.4s, h about 33 km. Off east coast of Formosa.
July 15 (248)						(248) Wi: iPKP 20h 52m 10s. USCGS: 20°4 S 178°2 W, H. 20h 33m 23.0s, h about 511 km. Fiji Islands.
July 16 (249)						(249) Wi: iPKP 7h 06m 44.3s -. USCGS: 18°9 S 175°6 W, H. 6h 47m 26.4s, h about 206 km. Tonga Islands.
July 16 (250)	ePKP ePP ePPP eL F	14 21 24 14 25.0 14 28.5 15 17 16.3				(250) Wi: ePKP 14h 21m 19s, i 14h 21m 21s. USCGS: 23°0 S 171°4 E, H 14h 01m 38.8s, h about 15 km. Loyalty Islands.
July 17 (251)						(251) Wi: iP 1h 13m 44.0s -. USCGS: 16°8 N 97°6 W, H. 1h 01, 09.7s, h about 40 km. Oaxaco, Mexico.
July 17 (252)						(252) Wi: iP 5h 21m 38s. USCGS: 27°8 N 55°1 E, H 5h 13m 21.3s, h about 16 km. Iran.
July 17 (253)	eP eS eL F	16 32.9 16 43 17 17 05 17.7				(253) Wi: eP 16h 32m 43s. USCGS: 35°8 N 141°3 E, H. 16h 20m 19.1s, h about 51 km. Near east coast of Honshu, Japan.
July 18 (254)	iP iPP ePPP iS eSS eL F	14 16 19.0 14 19 45 14 21 50 14 26 44 14 31 30 14 41 18.0		7	10	(254) Wi: iP 14h 16m 13.3s -. USCGS: 29°4 N 131°6 E, H. 14h 03m 36.5s, h about 21 km. Northern Ryukyu Islands.
July 18 (255)						(255) Wi: iP 14h 46m 37.1s -. USCGS: 29°7 N 131°5 E, H. 14h 34m 03.1s, h about 33 km. Northern Ryukyu Islands.
July 18 (256)						(256) Wi: eP 15h 28m 49s. USCGS: 29°7 N 131°3 E, H. 15h 16m 12.5s, h about 35 km. Northern Ryukyu Islands.

Date 1961	Phase	Time h m s	Direction	Period s	Amplitude	Remarks
July 18 (257)	eL F	20 15 20 40				(257) USCGS: 29°3 N 131°8 E, H. 19 29m 07.5s, h about 33 km. Northern Ryukyu Islands.
July 19 (258)	eL F	7 18 7 40				(258) USCGS: 29°8 N 131°7 E, H. 6h 33m 18.1s, h about 27 km. Northern Ryukyu Islands.
July 19 (259)	eL F	12 45 13 15				(259) USCGS: 29°8 N 131°5 E, H. 11 58m 43.7s, h about 31 km. Northern Ryukyu Islands.
July 19 (260)	iP iS eL F	23 05 08 23 08 35 23 10.5 24 00	-	5	3	(260) BCIS: 37°8 N 20°1 E, H. 23h 00m 54s. USCGS: 37°9 N 20°2 E, H. 23h 00m 56.7s, h about 37 km. Ionean Sea, near Cephalonia Island Greece.
July 21 (261)	eL F	19 40 20 05				(261) Wi: eP 19h 03m 27s. USCGS: 29°8 N 131°7 E, H. 18h 50m 54.7s, h about 33 km. North of Ryukyu Isl.
July 21 (262)	eL F	23 30 23 40				(262) USCGS: 28°9 N 131°6 E, H. 22 39m 53.2s, h about 32 km. North of Ryukyu Islands.
July 23 (263)	ePKP eL F	14 23 18 15 11 17 40				(263) USCGS: 18°6 S 168°2 E, H. 14 03m 39.8s, h about 44 km. New Hebrides Islands.
July 23 (264)	iPKP iPP iSS eL F	22 10 42 22 13 59 22 32 38 22 51 3.0	+	8	20	(264) Wi: iPKP 22h 10m 43s +. USCGS: 18°5 S 168°2 E, H. 21h 51m 07s, h about 44 km. New Hebrides Islands.
July 24 (265)						(265) Wi: iPKP 1h 49m 35s. USCGS: 21°2 S 179°2 W, H. 1h 30m 56.6s, h about 598 km. Fiji Islands region
July 28 (266)						(266) Wi: eP 0h 46m 40s. USCGS: 27°1 N 126°6 E, H. 0h 34m 19.5s, h about 149 km. Ryukyu Islands.
July 28 (267)	iP ipP iS eSS eL F	1 18 04 1 18 41 1 28 17 1 35.0 1 43 2 15		5	4	(267) Wi: iP 1h 18m 06s (-); epP 1h 18m 44s. USCGS: 2°2 S 77°1 W, H. 1h 05m 30.0s, h about 136 km. Ecuador.
July 28 (268)	ePKP eSS F	06 31 25 6 53 30 7 40				(268) Aftershock of (264). USCGS: 18°7 S 167°7 E, H 6h 11m 38.7s, h about 41 km. New Hebrides Islands
July 28 (269)						(269) Wi: iP 15h 31m 39s (-). USCGS: 43°6 N 146°1 E, H. 15h 19m 40.0s, h about 34 km. Near coast of Hokkaido, Japan.



Seismic Records at De Bilt.

Date 1961	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s		
July 29 (270)						(270) Wi: iPKP 16h 47m 14s -. USCGS: 24°1 S 176°1 W, H. 16h 27m 19.0s, h about 23 km. Tonga Islands region.
Aug. 1 (271)	ePKP ePP ePPS eSS eL F	5 59 6 01 6 14.5 6 19.5 6 38 9.0	-			(271) Wi: ePKP 5h 59m 03s. USCGS: 9°9 S 160°5 E, H. 5h 39m 53.2s, h about 50 km. Solomon Islands region.
Aug. 2 (272)	eL F	3 30 4 00				(272) USCGS: 57°0 S 24°8 W, H. 2h 31m 28.9s, h about 33 km. Sandwich Islands.
Aug. 2 (273)						(273) Wi: iP 12h 23m 58s. USCGS: 44°6 N 148°8 E, H. 12h 12m 02.0s, h about 38 km. Kurile Islands.
Aug. 2 (274)						(274) Wi: iP 14h 43m 54s (+). USCGS: 52°1 N 157°8 E, H. 14h 32m 27.9s, h about 50 km. Near east coast of Kamchatka.
Aug. 3 (275)						(275) Wi: iP 3h 18m 37s +. USCGS: 18°4 N 66°3 W, H. 3h 08m 05.1s, h about 132 km. Puerto Rico.
Aug. 4 (276)	e F	18 51 19.0				(276) Disturbed by microseisms. USCGS: 35°0 N 38°7 W, H. 18h 35m 20.8s, h about 26 km. North Atlantic Ocean.
Aug. 4 (277)	eL F	23 35 24.5				(277) Wi: iP 23h 04m 49s (+). Disturbed by microseisms. USCGS: 45°2 N 151°2 E, h about 22 km. Kurile Islands.
Aug. 7 (278)	eL F	5 15 5 45				(278) USCGS: 2°7 S 121°6 E, H. 4h 22m 20.5s, h about 18 km. Celebes.
Aug. 8 (279)	eP eH eL F	12 30 12 40 12.9 14		19 03		(279) Wi: iP 12h 30m 14s -. Disturbed by microseisms. USCGS: 51°2 N 170°7 W, H. 12h 18m 23.1s, h about 33 km. Fox Islands, Aleutian Islands.
Aug. 9 (280)						(280) Wi: iPKP 16h 22m 05s -. USCGS: 19°2 S 168°8 E, H. 16h 02m 35.5s, h about 44 km. New Hebrides Islands region.
Aug. 11 (281)	eL F	6 52 7 15				(281) Disturbed by microseisms. USCGS: 32°0 N 131°7 E, H. 6h 08m 16.7s, h about 33 km. Eastern Kyushu, Japan.
Aug. 11 (282)	iP ePP iS ePS eL F	16 03 16 06 16 13 16 14 16 30 19	+	7	30	(282) Wi: iP 16h 03m 31s +. USCGS: 43°0 N 145°0 E, H. 15h 51m 35.6s, h about 50 km. Eastern Hokkaido, Japan.

Seismic Records at De Bilt

Date 1961	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s		
Aug. 11 (283)	eSKS eH ePS eL F	23 02 23 04 23 05.8 23 32 24.5				(283) USCGS: 2°9 S 122°1 E, H. 22h 37m 24.7s, h about 22 km. Celebes
Aug. 11 (284)						(284) Wi: iP 23h 45m 48.5s (+). USCGS: 43°1 N 145°2 E, H. 23h 33m 52.2s, h about 50 km. Eastern Hokkaido, Japan.
Aug. 13 (285)		6 47 7 10				(285) USCGS: 24°4 N 121°7 E, H. 6h 01m 01.8s, h about 38 km. Near coast of Formosa.
Aug. 14 (286)	e F	20 15 21.0				(286) Wi: ePKP 19h 10m 48s. USCGS: 24°6 S 175°7 W, H. 18h 15m 55.2s, h about 70 km. Tonga Islands region.
Aug. 14 (287)	e F	22 48 23 20				(287) USCGS: 31°6 N 131°5 E, H. 22h 04m 59.7s, h about 20 km. Off south coast of Kyushu, Japan.
Aug. 14 (288)	iPKP ePP eL F	23 48 23 51 24 45 25 45	+	5	5	(288) Wi: ePKP 23h 48m 16s. USCGS: 20°9 S 169°4 E, H. 23h 28m 46.5s, h about 97 km. New Hebrides Islands region.
Aug. 15 (289)	eP eS eL F	19 46 19 27.4 19 50 20 25				(289) Wi: iP 19h 16m 38s (+). Disturbed by microseisms. USCGS: 33°0 E, 142°4 E, H. 19h 03m 55.4s, h about 60 km. South of Honshu, Japan.
Aug. 16 (290)	e F	16 51 17 00				(290) USCGS: 33°7 N 137°2 E, H. 15h 53m 42.2s, h about 340 km. Off south coast of Honshu, Japan.
Aug. 17 (291)	iP epP ePP eS eL F	21 28 21 28 21 31 21 37 21 45 22 50	-	5	9	(291) Wi: iP 21h 28m 03.5s -. USCGS: 46°4 N 149°3 E, H. 21h 16m 30.1s, h about 160 km. Kurile Islands.
Aug. 19 (292)	iP epP eSKS ePS eL F	5 21 5 23 5 31 5 35 6 01 8.5	-			(292) Wi: iP 5h 21m 53s -; i 5h 21m 54s +. H: i 5h 21m 53s; i 5h 22m 01s, USCGS: 10°8 S 71°0 W, H. 5h 09m 5s, h about 649 km. Brazil-Peru border.
Aug. 19 (293)						(293) Wi: eP 5h 45m 50s. USCGS: 36°2 N 136°5 E, H. 5h 33m 30.6s, h about 17 km. Off west coast of Honshu, Japan.
Aug. 19 (294)	e F	15 20 15 45				(294) Wi: eP 15h 03m 15s, USCGS: 18°0 N 68°8 W, H. 14h 52m 29.7s, h about 100 km. Mona Passage, Caribbean Sea.

Date 1961	Phase	Time			Remarks
		h	m	s	
Aug. 20 (295)	iPKP F	5	22	56.8	(295) Wi: iPKP 5h 22m 50.3s +. USCGS: 17°9' S 178°8' W, H. 5h 04m 14.3s, h about 592 km. Fiji Islands.
Aug. 21 (296)					(296) Wi: iPKP 16h 26m 29.4s; iPKP: 16h 26m 50.0s. USCGS: 17°9' S 174°4' W, H. 16h 06m 55.4s, h about 74 km. Tonga Islands.
Aug. 21 (297)					(297) Wi: eP 17h 12m 35.4s -. USCGS: 40°9' N 139°1' E, H. 17h 00m 38.9s, h about 40 km. Off coast of northern Honshu, Japan.
Aug. 23 (298)	eP eS eSS eL F	4	22.8 27.6 31.0 37 00		(298) USCGS: 38°9' N 68°7' E, H. 4h 12m 35.9s, h about 25 km. Tadzhik, S.S.R.
Aug. 25 (299)	eZ e F	12	24.9 26.0 29		(299) Wi: e 12h 23m 39s. H. 1 12h 24m 11s; i 12h 24m 18s; i 12h 24m 35s. BCIS: 47°5' N 10°8' E, H. 12h 21m 55.0s, h about 14 km. Allgäuer Alps, Austria-Germany border.
Aug. 27 (300)	eL F	2	25 40		(300) Wi: eP 2h 03.0m. USCGS: 15°4' S 13°1' W, H. 1h 51m 51.8s, h about 49 km. Ascension Island.
Aug. 27 (301)	eP eS eL F	16	34 44.1 02 15	11	(301) Wi: eP 16h 34m 03s, 47°0' N 154°0' E, H. 16h 22m 12.8s, h about 45 km. Kurile Islands.
Aug. 27 (302)					(302) Wi: eP 21h 08m 11s. USCGS: 46°9' N 154°1' E, H. 20h 56m 20.9s, h about 51 km. Kurile Islands.
Aug. 27 (303)	eP eS eL F	22	13 17.4 20 32	31	(303) Wi: iP 22h 13m 28.3s -. USCGS: 35°6' N 23°8' E, H. 22h 08m 45.2s, h about 33 km. Crete.
Aug. 28 (304)					(304) Wi: iPKP 10h 02m 54s. USCGS: 18°9' S 177°8' W, H. 9h 44m 14.2s, h about 548 km. Fiji Islands.
Aug. 29 (305)					(305) Wi: eP 15h 02m 57s. USCGS: 52°4' N 170°8' W, H. 14h 51m 14.2s, h about 41 km. Fox Islands, Aleutian Islands.
Aug. 31 (306)	iP epP eS	2	00 02 10	38 43 39	(306) Wi: iP 2h 00m 40s (-). F in next shock. USCGS: 10°1' S 70°9' W, H. 1h 48m 37.5s, h about 626 km. Peru-Brazil border.

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Aug. 31 (307)	eP ipP iSKS iS iss F	2	09 11 18 19 23 5.0	08 20 41 10 06				(307) Wi: iP 2h 09m 09s (-); ipP 2h 11m 25s. USCGS: 10°5' S 70°7' W, H. 1h 57m 08.0s, h about 629 km. Peru-Brazil border.
Sep. 1 (308)	eP ePKP iPP iPPP eSKS eH ePS eSS eSSS eL F	0	24 28.0 28 31 34 36 38 44 48.0 04 3.0	17 54 27 34 46 30 10				(308) wi: ePKP 0h 28m 05s. USCGS: 59°5' S 27°3' W, H. 0h 09m 34.6s, h about 131 km. Sandwich Islands region.
Sep. 1 (309)								(309) Wi: iPKP 19h 00m 06.2s +.. USCGS: 18°1' S 178°3' W, H. 18h 41m 32.4s, h about 619 km. Fiji Islands region.
Sep. 1 (310)	iP eS eL F	19	03 13 30 15	08 30	+	5	7	(310) Wi: iP 19h 03m 10.0s +. USCGS: 13°6' N 92°5' W, H. 18h 50m 35.4s, h about 37 km. Off coast of Guatemala.
Sep. 2 (311)								(311) Wi: iP 0h 37m 50.5s +. USCGS: 52°0' N 170°9' W, H. 0h 26m 06.2s, h about 39 km. Fox Islands. Aleutian Islands.
Sep. 2 (312)								(312) Wi: iP 11h 02m 03.5s -.. USCGS: 2°0' S 67°8' E, H. 10h 50m 25.8s, h about 133 km. Southwest of Maldiva Islands, Indian Ocean.
Sep. 2 (313)	e F	14	26.5 34					(313) USCGS: 39°1' N 23°9' E, H. 14h 16m 10.5s, h about 33 km. Near coast of Greece.
Sep. 4 (314)								(314) Wi: iP 5h 05m 08s. USCGS: 47°1' N 154°1' E, H. 4h 53m 19.2s, h about 22 km. Kurile Islands.
Sep. 4 (315)	eP eS eL F	10	01 10 25 11.0	04 50				(315) Wi: eP 10h 01m 00s. USCGS: 51°6' N 178°2' W, H. 9h 49m 13.5s, h about 40 km. Andreanof Islands, Aleutian Islands.
Sep. 5 (316)	eH F	1	26.8 35					(316) USCGS: 38°5' N 23°6' E, H. 1h 16m 51.7s, h about 35 km. Near east coast of Greece.
Sep. 5 (317)	e F	2	50 05					

## Seismic Records at De Bilt

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Date	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Sep. 5 (318)	iP iPP eS eL F	6	21	32			(318) Wi: eP 6h 21m 22s. USCGS: 38°5 N 73°2 E, H. 6h 12m 59.7s, h about 104 km. Tadzhik, SSR.	
Sep. 5 (319)	iP iZ eS eL F	11	45	40	+		(319) Wi: iP 11h 45m 25s; i 11h 45m 36s. USCGS: 60°0 N 150°6 W, H. 11h 34m 37.3s, h about 42 km. Kenai Peninsula, Alaska.	
Sep. 8 (320)	eL F	5	25				(320) USCGS: 51°7 N 131°3 W, H. 4h 52m 08.6s, h about 33 km. Queen Charlotte Islands.	
Sep. 8 (321)	eP ePP iSKS iPS eSS eL F	11	41	24			(321) Wi: ePP 11h 46.0m; ePS 11h 55.0m. USCGS: 56°3 S 27°1 W, H. 11h 26m 32.9s, h about 125 km. Sandwich Islands region.	
Sep. 9 (322)	eL F	19	58				(322) USCGS: 1°3 N 90°8 W, H. 19h 10m 45.7s, h about 33 km. Galapagos Islands.	
Sep. 10 (323)	e F	9	20				(323) BCIS: 74° N 52° E, H. 9h 00m 10s, h = 0 km. USCGS: 74°2 N 52°5 E, H. 9h 00m 09.2s, h = 0 km. Nova Zembla, USSR nuclear explosion.	
Sep. 11 (324)							(324) Wi: eP 2h 58m 36s. USCGS: 51°4 N 180°0 W, H. 2h 46m 50.3s, h about 60 km. Rat Islands, Aleutian Islands.	
Sep. 11 (325)							(325) Wi: eP 22h 25m 55s; eP 22h 26m 25s. USCGS: 10°9 N 62°4 W, H. 22h 15m 02.6s, h about 134 km. Near coast of Venezuela.	
Sep. 11 (326)							(326) Wi: iP 23h 59m 20s. USCGS: 42°9 N 145°3 E, H. 23h 47m 23.1s, h about 49 km. Near east coast of Hokkaido, Japan.	
Sep. 12 (327)	e F	10	27				(327) USCGS: 74°4 N 52°1 E, H. 12h 08m 15.3s, h = 0 km. Nova Zembla, USSR nuclear explosion.	
Sep. 12 (328)							(328) Wi: eP 12h 39m 04s. USCGS: 44°0 N 147°9 E, H. 12h 27m 07.6s. h about 50 km. Kurile Islands.	
Sep. 12 (329)	e F	20	25				(329) USCGS: 59°9 S 30°4 W, H. 19h 29m 09.2s, h about 33 km. Sandwich Islands region.	

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Sep. 13 (330)	e F	22	0				(330) USCGS: 41°7 S 75°2 W, H. 21h 19m 19.9s, h about 40 km. Off coast of southern Chile.	
Sep. 14 (331)							(331) Wi: eP 8h 10m 01s. USCGS: 33°0 N 47°4 E, H. 8h 03m 08.7s, h about 33 km. Iran-Irak border.	
Sep. 15 (332)	eP eS eL F	1	51	50			(332) H: i 1h 51m 43s; i 1h 51m 48s; 1h 51m 59s; 1h 52m 07s. USCGS: 34°9 S 33°8 E, H. 1h 46m 09.9s, h about 36 km. Cyprus.	
Sep. 17 (333)	eL F	9	24				(333) Wi: iP 8h 54m 32s. USCGS: 23°9 N 122°1 E, H. 8h 41m 57.3s, h about 53 km. Off coast of Formosa.	
Sep. 17 (334)	e F	24	26				(334) Wi: iPKP 23h 41m 01s -. USCGS: 5°9 S 147°4 E, H. 23h 22m 06.3s, h about 45 km. Near east coast of New Guinea.	
Sep. 18 (335)	e F	3	00				(335) USCGS: 49°0 N 128°9 W, H. 2h 25m 19.3s, h about 21 km. Vancouver Island region.	
Sep. 18 (336)	eL F	5	21				(336) Wi: eP 5h 13m 31s. USCGS: 35°0 N 26°3 E, H. 5h 08m 37.7s, h about 83 km. Crete.	
Sep. 18 (337)	e F	8	18				(337) USCGS: 74°0 N 52°0 E, H. 7h 59m 36.8s, h = 0 km. Nova Zembla, USSR, nuclear explosion.	
Sep. 18 (338)	eL F	11	14.2				(338) Wi: iP 11h 07m 23s (+), USCGS: 41°0 N 50°2 E, H. 11h 01m 04.5s, h about 11 km. Caspian Sea.	
Sep. 19 (339)	eP epP eSKS eS eH eSS F	2	38.2	12			(339) Wi: iP 2h 38m 12s (-). USCGS: 20°5 S 62°9 W, H. 2h 25m 49.2s, h about 580 km. Southern Bolivia	
Sep. 19 (340)	eP eS eL F	9	58	52			(340) Wi: eP 9h 58m 56s. USCGS: 6°7 N 82°4 W, H. 9h 46m 17.7s, h about 33 km. Off south coast of Panama.	
Sep. 19 (341)							(341) Wi: iPKP 18h 44m 10.5s +. USCGS: 21°6 S 179°3 W, H. 18h 25m 28.9s, h about 592km. Fiji Islands region.	
Sep. 19 (342)	e F	22	36				(342) USCGS: 60°1 S 23°3 W, H. 21h 34m 42.3s, h about 33 km. Sandwich Islands region.	



Date 1961	Phase	Time h m s	Direction	Period s	Amplitude	Remarks
Sep. 20 (343)	ePP eSS eL F	19 24.1 19 41.0 20 04 21 30				(343) Wi: ePKP 19h 22m 35s. USCGS: 306 S 15100 E, H. 19h 03m 37.7s, h about 44 km. New Britain.
Sep. 24 (344)						(344) Wi: eP 19h 17m 07s; epP 19h 17m 30s. USCGS: 1803 N 9806 W, H. 19h 04m 36.3s, h about 55 km Pueblo, Mexico.
Sep. 24 (345)	eS eL F	22 04 22 24 23 00		20		(345) Wi: iP 21h 53m 30s. USCGS: 3305 N 14103 E, H. 21h 40m 57.3s, h about 50 km. South of Honshu, Japan.
Sep. 25 (346)						(346) Wi: eP 2h 38m 50s. USCGS: 6005 N 15300 W, H. 2h 27m 13.4s, h about 125 km. Southern Alaska.
Sep. 27 (347)						(347) Wi: iPKP 6h 52m 41s -; epPKP 6h 55.0m; i 6h 55m 30s. USCGS: 1703 S 17807 W, H. 6h 34m 05.4s, h about 555 km. Fiji Islands.
Sep. 27 (348)	eL F	13 06 13 20				(348) USCGS: 5903 S 2303 W, H. 12h 07m 32.6s, h about 33 km. Sandwich Islands.
Sep. 27 (349)	eL F	20 10 20 45				(349) Wi: iP 19h 32m 22s. USCGS: 5207 N 16707 W, H. 19h 20m 48.6s, h about 42 km. Fox Islands. Aleutian Islands.
Sep. 28 (350)						(350) Wi: eP 3h 37m 29s. USCGS: 3008 N 14196 E, H. 3h 24m 37.7s, h about 41 km. South of Honshu, Japan.
Sep. 28 (351)	eL F	5 05 5 46				(351) USCGS: 3604 N 7007 E, H. 5h 00m 43.4s, h about 204 km. Hindu Kush.
Sep. 28 (352)						(352) Wi: eP 22h 44.5m. USCGS: 2702 N 5701 E, H. 22h 36m 24.7s, h about 41 km. Near coast of Iran.
Sep. 29 (353)						(353) Wi: iP 17h 02m 26s. USCGS: 4209 N 14503 E, H. 16h 50m 35.4s, h about 45 km. Near east coast of Hokkaido, Japan.
Sep. 29 (354)	eS eSS eL F	19 32 19 40.0 19 56 20 20		10		(354) USCGS: 095 N 12204 E, H. 19h 06m 13.4s, h about 110 km. Northern Celebes.
Sep. 29 (355)						(355) Wi: iP 22h 50m 46s. USCGS: 107 N 7903 W, H. 22h 38m 04.1s, h about 33 km. Near coast of southern Colombia.
Oct. 2 (356)	iP eS eL F	7 26 7 29 7 32 8 00		13 55		(356) Wi: iP 7h 26m 11s. BCIS: 3700 N 2200 E, H. 7h 21m 44s. USCGS: 3607 N 2109 E, H. 7h 21m 44.7s, h about 33 km. Near coast of Greece.
Oct. 4 (357)	eL F	3 35 4 00				(357) Wi: iPKP 3h 42m 17s. USCGS: 1302 S 16605 E, H. 3h 23m 23.5s, h about 66 km. New Hebrides Island region.
Oct. 4 (358)	e F	7 50 7 55				(358) USCGS: 7307 N 5308 E, H. 7h 30m 54.8s, h = 0 km. Nova Zembla, USSR. nuclear explosion.
Oct. 5 (359)						(359) Wi: 18h 28m 12s. USCGS: 1904 16900 E, H. 18h 08m 43.4s, h about km. Royalty Islands region.
Oct. 5 (360)	e F	23 20 23 40				(360) USCGS: 2400 N 12107 E, H. 22 34m 58.9s, h about 39 km. Near coast of Formosa.
Oct. 6 (361)	e F	7 19 7 26				(361) USCGS: 7403 N 5106 E, H. 7h 00m 12.2s, h = 0 km. Nova Zembla, USSR. nuclear explosion.
Oct. 10 (362)						(362) Wi: iPKP 4h 03m 29.5s +. USCGS: 2209 S 1800, H. 3h 44m 38.3s, h about 576 km. South of Fiji Islands.
Oct. 10 (363)	e F	18 30 18 50				(363) USCGS: 407 S 13802 E, H. 17h 24m 58.9s, h about 36 km. New Guinea.
Oct. 10 (364)						(364) Wi: iPKP 19h 03m 19s. USCGS: 1601 S 17603 W, H. 18h 44m 28.6s, h about 361 km. Fiji Islands region.
Oct. 12 (365)	e F	7 14 7 21				(365) USCGS: 302 S 14501 E, H. 6h 01m 28.6s, h about 33 km. Near coast of New Guinea.
Oct. 13 (366)	e F	5 58 6 05				(366) USCGS: 5509 S 2707 W, H. 4h 59m 02.2s, h about 33 km. Sandwich Islands.
Oct. 13 (367)						(367) Wi: iPKP 17h 47m 52.0s -. USCGS: 2200 S 17609 W, H. 17h 28m 21.5s, h about 155 km. Tonga Islands region.
Oct. 14 (368)						(368) Wi: iP 22h 10m 26.5s (-); i 22h 10m 36s. USCGS: 5102 N 15902 E, H. 21h 58m 59.7s, h about 100 km. Kamchatka.
Oct. 18 (369)	e F	17 35 18 30				(369) Disturbed by microseisms. USCGS: 3607 S 7300 W, H. 16h 51m 57.3s, h about 33 km. Near coast of southern Chile.
Oct. 22 (370)	eL F	11 02 11 30				(370) Disturbed by microseisms. Wi: ePKP 10h 10m 05s. USCGS: 2000 17207 E, H. 9h 50m 30.8s, h about 65 km. New Hebrides Islands.

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Oct. 22 (371)							(371) Wi: iPKP 14h 59m 38s -. USCGS: 17°7' S 178°7' W, H. 14h 41m 03.0s, h about 554 km. Fiji Islands.	
Oct. 23 (372)	ePS eL F	0 1 2	38. 00 40				(372) Disturbed by microseisms. USCGS: 60°2' S 33°6' W, H. 0h 08m 36.6s, h about 33 km. Sandwich Islands region.	
Oct. 23 (373)	e F	8 8	47 55				(373) USCGS: 73°9' N 53°8' E, H. 8h 31m 22.1s, h = 0 km. Nova Zembla, USSR. nuclear explosion.	
Oct. 23 (374)	eL F	15 16	30 30				(374) Disturbed by microseisms. USCGS: 3°5' N 126°6' E, H. 14h 39m 33.3s, h about 20 km. Molucca Passage.	
Oct. 24 (375)							(375) Wi: eP 7h 37m 06s. USCGS: 44°7' N 146°5' E, H. 7h 25m 24.7s, h about 126 km. Kurile Islands.	
Oct. 26 (376)	eL F	1 2	35 10				(376) USCGS: 3°1' S 148°1' E, H. 0h 38m 22.8s, h about 33 km. Bismarck Sea.	
Oct. 26 (377)	eS eL F	15 16 16	51. 16 50				(377) USCGS: 0°3' S 98°7' E, H. 15h 27m 05.9s, h about 34 km. Off west coast of Sumatra.	
Oct. 28 (378)							(378) Wi: iPKP 1h 53m 34.5s +. USCGS: 17°5' S 178°9' W, H. 1h 34m 55.7s, h about 518 km. Fiji Islands.	
Oct. 28 (379)							(379) Wi: iPKP 7h 06m 47.5s (-). USCGS: 18°8' S 178°1' W, H. 6h 48m 07.6s, h about 571 km. Fiji Islands.	
Oct. 28 (380)	eL F	15 16	52 05				(380) USCGS: 36°6' S 73°9' W, H. 14h 49m 17.5s, h about 53 km. Near coast of Chile.	
Oct. 28 (381)	iPP eH F	23 23 23	06 19. 30	48			(381) USCGS: 13°9' S 166°0' E, H. 22h 44m 30.2s, h about 37 km. New Hebrides Islands.	
Oct. 29 (382)	eS eL F	9 9 10	33. 46 40				(382) change of papers 9h 37m till 9h 43m. USCGS: 49°0' N 128°7' W, H. 9h 12m 15.7s, h about 16 km. Vancouver Island region.	
Oct. 29 (383)	eL F	15 15	22 36				(383) USCGS: 49°0' N 128°3' W, H. 14h 47m 16.8s, h about 33 km. Vancouver Island region.	
Oct. 30 (384)	eP eL F	2 2 3	28 55 10	35			(384) Wi: eP 2h 28m 26s. USCGS: 42°3' N 126°7' W, H. 2h 16m 32.7s, h about 36 km. Off coast of Oregon.	
Oct. 30 (385)							(385) Wi: eP 4h 59m 33s. USCGS: 50°8' N 158°3' E, H. 4h 47m 59.8s, h about 32 km. Off south coast of Kamchatka.	

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Oct. 30 (386)	(eZ e F	8 8 9	39 45 10	40)			(386) Wi: (e 8h 39m 26s; e 8h 39m 38 USCGS: 73°8' N 53°5' E, H. 8h 33m 27.8s, h = 0 km. Nova Zembla, USSR; nuclear explosion.	
Oct. 30 (387)	eL F	22 22	05 30				(387) Disturbed by microseisms. USCGS: 28°9' N 141°8' E, H. 21h 15m 35.2s, h about 31 km. South of Honshu, Japan.	
Oct. 31 (388)							(388) Wi: eP 1h 55m 37s. USCGS: 51°9' N 176°1' E, H. 1h 43m 53.3s, h about 35 km. Rat Islands, Alentian Islands.	
Oct. 31 (389)	e F	8 9	48. 01				(389) USCGS: 75°1' N 56°7' E, H. 8h 38m 00.5s, h = 0 km. Nova Zembla, USSR. nuclear explosion.	
Nov. 2 (390)							(390) Wi: iPKP 5h 41m 17.5s -. USCGS: 17°7' S 178°5' W, H. 5h 22m 42.0s, h about 566 km. Fiji Islands.	
Nov. 4 (391)	e F	7 7	39 45				(391) USCGS: 73°7' N 55°7' E, H. 7h 20m 19.7s, h = 0 km. Nova Zembla, USSR. nuclear explosion.	
Nov. 6 (392)	e F	6 7	30 20				(392) USCGS: 13°3' S 166°5' E, H. 5h 28m 33.8s, h about 59 km. Hebrides Islands.	
Nov. 9 (393)							(393) Wi: iPKP 1h 29m 08s. USCGS: 22°0' S 170°0' E, H. 1h 09m 15.3s, h about 33 km. Loyalty Islands region.	
Nov. 10 (394)							(394) Wi: iPKP 18h 19m 26.6s +. USCGS: 17°5' S 178°8' W, H. 18h 00m 49.6s, h about 586 km. Fiji Islands.	
Nov. 12 (395)	eP eS eL F	2 2 2 3	24 32. 45 15	50			(395) Wi: iP 2h 24m 51.5s -. Disturb by microseisms. USCGS: 0°8' N 29°5' E, H. 2h 15m 16.7s, h about 39 km Congo region.	
Nov. 14 (396)	eL F	5 5	18 55				(396) USCGS: 7°3' N 82°4' W, H. 4h 42m 26.5s, h about 29 km. Off coast of southern Panama.	
Nov. 15 (397)	iP ipP eL F	7 7 7 9	29 29 54 20	17 33	+	5 12	(397) Wi: iP 7h 29m 09.6s +. Change of papers from 7h 32m till 7h 40m. USCGS: 43°1' N 145°1' E, H. 7h 17m 12.4s, h about 43 km. Near coast of Hokkaido, Japan.	
Nov. 17 (398)							(398) Wi: iPKP 19h 23m 18s. USCGS: 19°4' S 175°6' W, H. 19h 03m 55.9s, h about 196 km. Tonga Islands region.	

## Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Nov. 18 (399)	e F	22	55				(399) Wi: iP 22h 22m 25s. USCGS: 23°9 N 121°7 E, H. 22h 09m 51.9s, h about 38 km. Near coast of Formosa.	
Nov. 19 (400)	ePP epPP iZ iZ eSKS eL F	23	40	25			(400) USCGS: 0°8 N 124°3 E, H. 23h 21m 55.5s, h about 157 km. Northern Celebes.	
Nov. 20 (401)	e F	4	31				(401) USCGS: 50°8 N 92°3 E, H. 4h 03m 56.7s, h about 33 km. Outer Mongolia- Siberia border.	
Nov. 20 (402)	iPKP iZ ePS eSS eL F	12	04	05	-	9 10	(402) Wi: ePKP 12h 04m 02s. USCGS: 21°8 S 169°9 E, H. 11h 44m 19.4s, h about 33 km. Loyalty Islands region.	
Nov. 20 (403)	iP eS eL F	18	05	57			(403) Wi: iP 18h 05m 56s -. USCGS: 31°3 N 40°8 W, H. 17h 58m 17.5s, h about 34 km. North Atlantic Ocean.	
Nov. 20 (404)							(404) Wi: ePKP 19h 11m 18s. USCGS: 21°7 S 170°0 E, H. 18h 51m 36.7s, h about 24 km. Loyalty Islands region.	
Nov. 22 (405)							(405) Wi: ePKP 3h 05m 05s. USCGS: 21°6 S 169°8 E, H. 2h 45m 26.1s, h about 33 km. Loyalty Islands region.	
Nov. 23 (406)							(406) Wi: e 1h 14m 06s. H: i 1h 14m 44s; 1h 15m 13s; 1h 15m 19s. BCIS: 45°8 N 9°5 E, H. 1h 12m 05s. Italian Alps.	
Nov. 25 (407)	eL F	21	10				(407) USCGS: 36°2 N 141°4 E, H. 20h 19m 50.4s, h about 45 km. Near east coast of Honshu, Japan.	
Nov. 27 (408)	eL F	6	38				(408) Wi: iP 6h 09m 38s. USCGS: 31°6 N 131°1 E, H. 5h 57m 07.7s, h about 25 km. Near south coast of Honshu, Japan.	
Nov. 27 (409)	eH eH eL F	17	39.0				(409) Disturbed by microseisms. USCGS: 0°4 S 127°6 E, H. 17h 10m 38.1s, h about 33 km. Halmahera region.	

## Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s				
Dec. 1 (410)							(410) H: i 10h 33m 54s; i 10h 34m 11s; i 10h 34m 14s; i 10h 34m 25s; i 10h 34m 50s. local shock.	
Dec. 1 (411)	ipP eS ePS eL F	21	26	18			(411) Wi: iP 21h 25m 17.5s +; epP 21h 26m 13s. Disturbed by micro- seisms. USCGS: 26°5 N 124°9 E, H. 21h 13m 04.1s, h about 206 km. China Sea.	
Dec. 2 (412)	eL F	12	48				(412) Wi: eP 12h 44m 10s. Disturbed by microseisms. BCIS: 36°9 N 8°0 E, H. 12h 40m 18s. USCGS: 36°5 N 8°5 E, H. 12h 40m 16.2s, h about 33 km. Northern Tunisia.	
Dec. 3 (413)	eL F	17	28				(413) Disturbed by microseisms. USCGS: 11°6 S 166°1 E, H. 16 h 14m 31.4s, h about 122 km. Santa Cruz Islands.	
Dec. 3 (414)	eL F	18	46				(414) Disturbed by microseisms. USCGS: 40°9 N 44°1 E, H. 18h 31m 56.1s, h about 44 km. Armenia.	
Dec. 4 (415)	eL F	13	11				(415) Wi: eP 12h 48m 43s. Disturbed by microseisms. USCGS: 33°2 N 95°3 E, H. 12h 38m 11.9s, h about 45 km. Tibet.	
Dec. 5 (416)							(416) H: i 9h 58m 06s. local shock.	
Dec. 6 (417)	eL F	14	55				(417) Wi: iPKP 13h 55m 38s. Distur- bed by microseisms. USCGS: 23°5 S 176°1 W, H. 13h 35m 48.2s, h about 45 km. Tonga Islands region.	
Dec. 6 (418)	eP eS eL F	16	51	22			(418) Wi: eP 16h 51m 16s. Disturbed by microseisms. USCGS: 49°3 N 155°4 E H 16h 39m 37.6s, h about 60 km. Kurile Islands.	
Dec. 7 (419)							(419) Wi: iPKP 0h 38m 18.3s -. USCGS: 23°4 S 175°9 W, H. 0h 18m 26.0s, h about 45 km. Tonga Islands region.	
Dec. 9 (420)	eL F	2	58				(420) Wi: eP 2h 26.5m. Disturbed by microseisms. USCGS: 56°3 N 153°9 W, H. 2h 15m 22.0s, h about 31 km. Kodiak Island.	
Dec. 9 (421)	eL F	12	07				(421) Disturbed by microseisms. USCGS: 43°7 S 75°2 W, H. 11h 18m 08.4s, h about 34 km. Near coast of southern Chile.	

Seismic Records at De Bilt.

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s		s		
Dec. 9 (422)							(422) Wi: iPKP 20h 08m 25.0s -. USCGS: 21°7' S 179°9' E, H. 19h 49m 41.3s, h about 620 km. Fiji Islands.	
Dec. 10 (423)							(423) Wi: eP 8h 44m 06s. USCGS: 34°6' N 26°0' E, H. 8h 39m 03.6s. h about 17 km. Crete.	
Dec. 11 (424)							(424) Wi: iP 16h 57m 42s. USCGS: 36°9' N 23°6' E, H. 16h 53m 06.4s, h about 33 km. Near coast of southern Greece.	
Dec. 12 (425)							(425) Wi: iP 23h 18m 15.8s. USCGS: 43°4' N 146°2' E, H. 23h 06m 20.6s, h about 65 km. Near east coast of Hokkaido, Japan.	
Dec. 13 (426)							(426) H: i 10h 23m 53s. local shock.	
Dec. 13 (427)							(427) Wi: eP 17h 39m 13s. BCIS: 38°5' N 23°0' E, H. 17h 35m 24s. Greece.	
Dec. 16 (428)							(428) Wi: eP 13h 52m 14s. USCGS: 51°9' N 160°1' E, H. 13h 40m 26.3s, h about 62 km. Near east coast of Kamchatka.	
Dec. 16 (429)							(429) Wi: ePKP 20h 54m 48s. USCGS: 28°4' S 179°2' W, H. 20h 35m 29.0s, h about 295 km. Kermadec Islands.	
Dec. 20 (430)	eP ipP iS eSS F	13 13 13 13 16.0	37 38 47 48	32 14 24 26			(430) Wi: iP 13h 37m 35.5s -; epP 13h 38m 17s. USCGS: 4°6' N 75°6' W, H. 13h 25m 34.4s, h about 176 km. West-central Colombia.	
Dec. 24 (431)							(431) Wi: iP 7h 02m 39.2s -. USCGS: 43°3' N 144°0' E, H. 6h 50m 54.0s, h about 125 km. Near coast of northern Hokkaido, Japan.	
Dec. 25 (432)	e F	0 1	47 10				(432) USCGS: 38°3' S 74°6' W, H. 23h 43m 19.2s, h about 31 km. Near coast of central Chile.	
Dec. 25 (433)							(433) Wi: iPKP 14h 15m 18.7s. USCGS: 20°4' S 173°7' W, H. 13h 55m 38.8s, h about 64 km. Tonga Islands.	
Dec. 27 (434)	eS eL F	17 17 17	04 17 30	08			(434) USCGS: 197 S 12°9' W, H. 16h 46m 31.2s, h about 37 km. Atlantic Ocean, north of Ascension Island.	

Seismic Records at De Bilt

Date 1961	Phase	Time			Direction	Period	Amplitude	Remarks
		h	m	s		s		
Dec. 28 (435)	ePKP <sub>1</sub> ePKP <sub>2</sub> ePP eSKKS eH eL F	0 0 0 0 0 1 2	08 09 13 20 23.4	10 26 00 00			(435) USCGS: 41°2' S 175°8' E, H. 23h 48m 01.7s, h about 40 km. Near coast of North Island, New Zealand.	
Dec. 28 (436)							(436) H: i 21h 14m 42s. local shock.	
Dec. 30 (437)	eP iS eSS eSSS eL F	0 1 1 1 1 2	51 01 06 09 14 25	18 00 03 46			(437) Wi: iP 0h 51m 06.4s -. USCGS: 52°3' N 177°6' E, H. 0h 39m 27.1s, h about 56 km. Rat Islands, Aleutian Islands	