KONINKLIJK NEDERLANDS METEOROLOGISCH INSTITUUT
No. 108.

SEISMIC RECORDS
AT DE BILT

33.

1945.

SEISMIC RECORDS
AT DE BILT

~~~~~~~~~~~

33.

1945.

———

PREFACE

Owing to the war circumstances the seismological station De Bilt was out of function during the period October 11, 1944 to June 1, 1945. Fortunately the instruments and the building did not get the slightest damage. On the 1st of June electric power was again available and recording could be retaken.

The records have been reduced by Dr J. Veldkamp, director of the Section for Terrestrial Magnetism and Seismology, and by Mr J. Oldeman, scientific assistant.

The Director in Chief of the Royal
Netherlands Meteorological Institute,

F. A. Vening Meinesz.

De Bilt, November 1948.

INTRODUCTION.

The geografic coordinates of the seismographic station are: 52° 6′,1 N and 5° 10′,6 E. The instruments are standing 3 m above mean sea-level on a subsoil consisting of sand (diluvial deposits).

The instruments used are:

a set of seismographs (two horizontal and one vertical) with galvanometric recording according to Galitzin,

one astatic horizontal seismograph according to Wiechert, M = 200 kg,

two horizontal pendulums according to Bosch, M = 25 kg.

THE GALITZIN SEISMOGRAPHS. Below are given: the period of the galvanometer T_1, the reduced length of pendulum l, the distance between the mirror of the galvanometer and the recording paper A_1, and the rough values for the natural period of the undamped pendulum T, of the damping constant μ and of the multiplying factor k for the year 1945.

	NS comp.	EW comp.	Z comp.
Period of galvanometer T_1	24,43 sec	24,96 sec.	12,0 sec
Reduced length of pendulum l	123,1 mm	122,6 mm	406 mm
Distance A_1	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	178

THE WIECHERT AND BOSCH SEISMOGRAPHS. The mean values of the natural period of the undamped pendulum T, of the damping ratio ε and of the static magnification V are for the year 1945:

		T	ε	V
Wiechert	(NS comp.)	4,9 sec	4	160
,,	(EW comp.)	4,9 sec	4	170
Bosch	(NS comp.)	18,0 sec	4	20
,,	(EW comp.)	18,0 sec	4	20

The data given in this Yearbook have been obtained from the GALITZIN records in general. The velocity of the recording paper is 30 mm per minute, allowing a good time-accuracy. Only when the earthquake was extraordinarily strong, so that the GALITZIN records could not be disentangled, the records of the seismographs WIECHERT and BOSCH were used. The velocity of the paper on these seismographs is 10 mm and 15 mm per minute respectively. When the WIECHERT and BOSCH records were used, this has been mentioned in the column "remarks".

The time is Greenwich mean time, from midnight till midnight counted as 0 till 24 hours. In the column "direction" + means an upward movement of the soil (compression), — means a downward movement (dilatation). Uncertain data have been given in parenthesis. The subjoined symbols were used for the phases.

P   = normal first phase, or first longitudinal tremor.
pP   = P-wave one time reflected at the earth's surface near the epicenter.
PP   = P-wave reflected halfway between epicenter 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 epicenter.
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 epicenter 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 epicenter.
sS'   = S'-wave reflected near the epicenter.
SKKS = alternating wave which has been reflected within the core.

L   = long waves 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 epicenter.

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

The distance of epicenter and the depth of origin have been calculated by means of the curves of Brunner's "focal depth-time-distance chart" and the time tables of Macelwane (1933) and of Jeffreys and Bullen (1940).

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

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

Here 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 mean values were used: $k = 10,9$ and $T = 24,5$ sec.

For the vertical component of the Galitzin records they were: $k = 175$ and $T = 12,0$ sec.

It was tried to give the amplitudes and periods of the first P- and S-waves. As the movement of these waves is irregular in general, the accuracy of these data is small. Moreover the amplitudes of the maximum of L-waves have been calculated in many cases.

The amplitudes have been omitted when the oscillations were too irregular.

The seismological bulletins of the following stations were available: Bogota, Seismological Service of Canada, La Plata, Mexico, Paris, Pasadena, Pittsburg, San Fernando, St. Louis, Strasbourg, Trieste, Zürich.

BCIS   = Bureau central international séismologique.
JSA   = Jesuit seismological association.
USCGS = U.S. coast and geodetic survey.

THE MICROSEISMIC ACTIVITY.

The table on page VII gives the character of the microseismic activity (see also 1915 p. 101 and 1916 p. 101). The employed 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 WIECHERT seismograph were employed. In the table below the amplitudes of the oscillations (measured from the medium line) and the corresponding amplitudes of the movement of the soil are given.

Character	Ampl. record	Ampl. soil
0	0—¼ mm	0—1¼ μ
1	¼—1 ,,	1¼—5 ,,
2	1—2 ,,	5—10 ,,
3	>2 ,,	>10 ,,

Character of the microseismic movement.

Date 1945	Jan.	Febr.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						0, 1, 0	2, 1	1	1, 0	0, 1	1	1, 2
2						0, 1	1	1	0	1, 0	1	2, 3, 2
3						1	1	1, 0	0, 1	0, 1, 0	1	2
4						1	1	0, 1, 0	1, 0	0, 1	1	2
5						1	1	0	0, 1	1	1	2, 3
6						1, 2	1	0, 1	1	1, 2	1	3, 2
7						2, 1	1	1	1, 0	2, 1	1	2
8						1, 2	1	1	0	1	1, 3	2, 1
9						2, 1	1	1, 2	0, 1	1	3	1
10						1	1, 0	2, 3, 2	1	1	3, 2	1
11						1	0, 1, 0	2, 1	1	1	2, 1	1
12						1, 2	0	1, 0	1	1	1	1, 2
13						2	0	0, 1	1, 2	1	1	2, 3, 2
14					1, 0	2, 1	0	1	2, 1	1	1	2
15					0, 1, 0	1, 2	0, 1	1	1	1	1, 2, 1	2, 3, 2
16					0, 1, 0	2, 1	1, 2, 1	1, 2	1	1	1, 2	2, 3
17					0, 1, 0	1	1, 0	2, 1	1	1	2, 1	3
18					0, 1, 0	1	0	1	1	1	1	3
19					0, 1, 0	1	0	1	1	1	1	3, 2
20					0, 1	1	0, 1	1	1, 2, 1	1	1	2
21					1, 0	1	1	1, 2, 1	1	1	1	2, 3
22					0, 1, 0	1, 0	1, 0, 1	1, 2, 1	1, 2	1, 2, 1	1	3
23					0, 1, 0	0, 1	1	1	2	1, 3, 2	1	3
24					0, 1, 0	1, 0	1, 0	1, 2, 1	2, 1	2, 3	1	3
25					0	0	0	1, 2, 1	1, 2, 1	3	1, 2	3, 2
26					0	0, 1, 0	0, 1	1	1	3	2, 3, 2	2, 1, 2
27					0	0, 1	1, 2	1, 0	1	3	2	2
28					0	1	2, 1	0, 1, 0	1, 2, 1	3, 2	2	2, 3, 2
29					0	1	1	0	1	2	2	2, 1
30					0	1, 2	1	0	1, 0	2, 1	2, 1	1
31					0, 1, 0		1	0, 1		1		1

Date 1945	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
June 1 (1)	eP	15 25 25				(1) BCIS: provisional epicenter 60° N 157° W, H. 15^{h}14,3^m.
	e(PS)	15 35				JSA: 50°,1 N 170°,9 W, H. 15^{h}13^{m}49^s,
	F	17 00				h = 200 km.
June 1 (2)	e(S)	22 41 30				(2) BCIS: 8° N 35° W, H. 22^{h}24,3^m.
	eL	22 48				Pasadena: 5° N 35° W, H. 22^{h}24,2^m.
	F	23 40				JSA: 7° N 35° W, H. 22^{h}24^{m}13^s.
June 3 (3)	e	0 54				
	F	0 57				
June 3 (4)	iP	13 17 56	+	4	3	(4) USCGS: 8°,3 N 82°,6 W, H.13^{h}05,6^m.
	eS	13 28 08				JSA: 8°,7 N 82°,0 W, H. 13^{h}05^{m}39^s,
	eL	13 34				h = 80 km.
	eL	13 45				
	F	16 00				
June 4 (5)	iP	12 18 50	+	3	3	(5) BCIS: 32° N 79° E, H. 12^{h}09^{m}09^s.
	iS	12 26 51		10	9	Moscow: 28° N 77° E.
	eL	12 40				
	ME	12 46		14	75	
	Mz	12 46		14	85	
	F	14 00				
June 4 (6)	e	16 35				
	F	16 55				
June 4 (7)	e	18 37				(7) BCIS: 43°,0 N 12°,0 E, H. 18^{h}30,9^m.
	F	18 40				
June 6 (8)	eP	1 05 28				(8) △ = 10000 km.
	eS	1 16 10				Triest: △ = 9550 km.
	eL	1 37				Toledo: △ = 13300 km.
	F	2 30				
June 6 (9)	iP	7 04 49		5	3	(9) BCIS: 60° N 31° W, H. 6^{h}59,8^m.
	iP	7 04 50		10	13	JSA: 57°,5 N 27°,8 W, H. 7^{h}00^{m}12^s, possibly
	iS	7 08 43				deep.
	eL	7 10				
	MN	7 12		16	15	
	F	7 50				
June 7 (10)	eP	1 25 40				(10) BCIS: 41°,7 N 33°,0 E, H. 1^{h}20^{m}40^s
	eS	1 29 47				
	eL	1 35				
	F	2 00				
June 7 (11)	eL	13 13				
	F	14 00				

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
June 7 (12)	e	20 42				
	F	21 02				
June 12 (13)	eL	17 24				
	F	18 30				
June 14 (14)	eH	0 07				
	eL	0 25				
	F	1 10				
June 14 (15)	e	5 08				(15) BCIS: Apennines south of Modena.
	F	5 13				
June 16 (16)	eL	20 05				(16) BCIS: 50° N 30° W, H. 19h54,7m.
	F	20 15				
June 17 (17)	e	16 51				
	F	17 10				
June 19 (18)	eL	18 15				
	F	18 35				
June 20 (19)	eP	1 35 47	+	6	3	(19) Fore shock of (23).
	eS	1 45 42				BCIS: 47°,7 N 154°,0 E, H. 1h23,9m.
	eSS	1 51		9	2	JSA: 47°,8 N 152°,9 E, H. 1h23m56s.
	eL	2 04				
	ME	2 09		20	7	
	F	3 30				
June 20 (20)	eL	9 45				(20) BCIS: 3° S 146° E.
	F	10 30				
June 20 (21)	e	16 51				
	F	17 00				
June 20 (22)	iP	17 47 09	+	7	6	(22) Same epicenter as (19).
	iS	17 57 05		10	5	USCGS: 45° N 153° E, H. 17h35,0m.
	eL	18 15				JSA: H. 17h35m18s.
	F	21 00				
June 22 (23)	iP	9 30 34	+	3	5	(23) BCIS: 44°,5 N 145°,5 E, H. 9h18m40s,
	iz	9 31 03	+	9	27	h = 100 km.
	iS	9 40 21				USCGS: 43° N 146° E, H. 9h18,5m,
	eL	9 59				h = 20—100 km.
	ME	10 00		30	20	JSA: 45°,2 N 146°,6 E, H. 9h18m48s,
	F	11 30				h ≈ 100 km.
						Moscow: 49° N 158° E.
June 22 (24)	iP	18 10 15	+	5	6	(24) BCIS: 34°,7 N 75°,8 E, H. 18h01m03s.
	iS	18 17 48		9	10	JSA: region of 33° N 75°E, H. approximately 18h01m00s.
	F	20 25				Moscow: 33° N 77° E.

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
June 23 (25)	e	20 55				
	eL	21 20				
	MH	21 25		22	3	
	F	22 00				
June 24 (26)	eL	18 01				
	F	18 20				
June 24 (27)	e	20 24				(27) JSA: 34° S 71°,5 W, H. 19h58m07s, h = 100 km.
	F	21 15				Pasadena: 28° S 67° W, H. 19h58m00s, h = 100 km.
June 25 (28)	eH	8 12 35				
	eL	8 15				
	F	8 50				
June 25 (29)	e	11 26				
	F	11 40				
June 25 (30)	e	16 33				
	F	17 00				(31) Pasadena: Japan?
June 26 (31)	iH	0 02 35				
	F	0 45				
June 26 (32)	e	2 48				
	F	3 00				
June 27 (33)	iP	13 20 54	—	3	2	(33) USCGS: 26° N 110° W, H. 13h08,2m.
	iS	13 31 18				JSA: 27°,3 N 111°,1 W, H. 13h08m25s.
	eSS	13 36 40				Felt at Santa Rosalia, Mexico.
	eL	13 44				
	F	16 40				
June 27 (34)	iP	18 20 41				(34) Aftershock of (33).
	eS	18 31 05				USCGS: 27° N 112° W, H. 18h08,1m.
	(eL)	18 45				JSA: H. 18h08m09s.
	F	19 45				
June 28 (35)	eL	3 45				
	F	4 05				
June 28 (36)	e	15 06				
	F	15 20				
June 29 (37)	e(P)	4 41 15				(37) (Δ = 6400 km).
	e(S)	5 49 14				Toledo Δ = 4900 km.
	e(L)	5 02				Triest Δ = 5950 km.
	F	5 30				

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
June 29 (38)	e F	7 37 7 41				
June 29 (39)	iz eL F	15 39 46 15 41 30 15 50				(39) BCIS: 45°,3 N 10°,8 E, H. 15h37,2m.
June 30 (40)	eP iPP eSS F	5 44 40 5 48 29 6 02 20 8 30		6	3	(40) USCGS: 17° N 116° W, H. 5h 31,3m. JSA: 17°,0 N 115°,9 W, H. 5h31m23s. Pasadena: 16° N 116° W, H. 5h31m15s.
July 1 (41)	e F	3 26 3 30				(41) Malaga: 38°48′ N 0°35′ W, H. 03h18m06s.
July 2 (42)	e F	9 20 9 35				
July 3 (43)	eL F	17 57 18 40				
July 3 (44)	e F	20 46 21 00				
July 3 (45)	e F	22 40 22 55				
July 6 (46)	e F	0 37 0 40				
July 9 (47)	iP iS F	16 54 28 17 04 37 18 00	−			(47) USCGS: 1° N 77° W, H. 16h41,8m. JSA: 4°,3 N 77°,2 W, H. 16h42m17s.
July 11 (48)	eP ePP iS eL F	0 41 40 0 44 10 0 50 31 1 03 1 40				(48) BCIS: 60° N 147° W, H. 0h30,8m. Pasadena: 61° N 148° W, H. 0h30,7m.
July 11 (49)	e F	3 03 3 10				
July 11 (50)	e F	15 23 15 35				
July 11 (51)	e F	23 35 23 40				

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
July 15 (52)	eP ePP ez ePPP eS′ eL Me F	5 48 57 5 53 10 5 54 00 5 55 24 5 59 26 6 24 6 28 8 30	+	 30	 25	(52) USCGS: 17° N 145° E, H. 5h35,0m. JSA: 15°,5 N 143°,5 E, H. 5h35m07s, h = 150 km. Change of papers 7h26m—7h38m.
July 15 (53)	e F	19 52 20 30				
July 21 (54)	e F	1 52 2 00				
July 21 July 22 (55)	eL F	23 25 0 10				
July 22 (56)	e(P) e(S) eL F	10 52 43 11 03 25 11 22 12 25				(56) (△ = 9800 km).
July 23 (57)	iP eS eL F	4 07 42 4 18 10 4 35 7 00				(57) BCIS: 3° S 88° E, H. 3h55,0m.
July 25 (58)	e M F	11 07 11 10 11 18				
July 31 (59)	eL F	5 44 6 10				
Aug. 1 (60)	eL F	7 26 7 40				
Aug. 1 (61)	iP iPP eS eL MN F	22 35 59 22 39 20 22 46 40 23 10 23 12 24 00	+ +	8 20	3 35	(61) BCIS: 20° N 120° E, H. 22h23,2m.
Aug. 2 (62)	eL F	3 21 3 35				

Date 1945	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Aug. 2 (63)	eP	18 05 04		6	2	(63) $\triangle$ = 9800 km.
	ePP	18 08 35				BCIS: repetition of (61) H. $17^h52.2^m$.
	e(S')	18 15 24				
	e(PS)	18 16 40				
	eL	18 38				
	F	19 30				
Aug. 2 (64)	eP	20 55 56				(64) USCGS: 54°,2 N 133°,1 W, H. $20^h44.8^m$.
	eS	21 05 00				JSA: 54°,3 N 132°,9 W, H. $20^h44^m45^s$.
	eSS	21 09 30				
	eL	21 18				
	F	22 15				
Aug. 3 (65)	iP	4 24 05				(65) USCGS: 4°,4 N 82°,1 W, H. $4^h11.3^m$.
	iS	4 34 26				JSA: 6°,1 N 82°,2 W, H. $4^h11^m33^s$.
	eSS	4 40 08				
	eL	4 50				
	F	6 00				
Aug. 3 (66)	eL	7 15				(66) Aftershock of (65) USCGS: H. $6^h34.5^m$.
	F	8 00				JSA: H. $6^h34^m44^s$.
Aug. 4 (67)	iP	14 52 26	—	7	7	(67) BCIS: 37°.2 N 16°,4 E, H. $14^h48.4^m$.
	eS	14 55 46				
	eL	14 57				
	F	15 35				
Aug. 6 (68)	eL	23 46				(68) La Plata: north-east of Peru.
	Mz	23 50		25	4	
Aug. 7	F	0 20				
Aug. 7 (69)	iP	22 20 42	—			(69) BCIS: probable epicenter 32° N 142° E,
	ePP	22 24 12				H. $22^h08.0^m$.
	eS	22 31 10				
	eL	22 54				
Aug. 8	F	0 30				
Aug. 8 (70)	iP	10 05 49				(70) BCIS: 2° N 86° E, H. $9^h53.7^m$.
	iP	10 05 58	+			
	ePP	10 08 56				
	iS	10 15 46				
	eSS	10 21				
	eL	10 36				
	Mɴ	10 39		24	20	
	F	12 30				
Aug. 9 (71)	e	13 09				
	F	13 15				
Aug. 9 (72)	eLz	16 28				
	F	16 35				

Date 1945	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Aug. 9 (73)	eL	22 39				
	Mz	22 47		14	4	
	F	23 00				
Aug. 10 (74)	e	12 00				(74) USCGS: 15°,4 N 88°,8 W, H. $11^h20.3^m$.
	Mz	12 13		17	4	JSA: 15°,5 N 89°,0 W, H. $11^h20^m19^s$.
	F	12 25				
Aug. 11 (75)	iS	0 56 42				(75) USCGS: 4°,4 N 82°,1 W, H. $0^h33.5^m$.
	eL	1 10				JSA: 6° N 82° W, H. $0^h33^m44^s$.
	Mᴇ	1 16		22	6	
	Mz	1 16		22	7	
	F	2 00				
Aug. 11 (76)	e	22 35				
	F	22 38				
Aug. 12 (77)	eL	9 21				
	F	9 50				
Aug. 12 (78)	eL	12 21				
	F	12 50				
Aug. 14 (79)	iP	12 23 38	—	9	2	(79) BCIS: 27° N 130° E, H. $12^h10.9^m$.
	ePP	12 27 00				
	eS	12 34 20				
	eL	12 55				
	F	15 00				
Aug. 15 (80)	e	0 00				
	F	0 08				
Aug. 15 (81)	eL	15 02				
	F	15 35				
Aug. 15 (82)	eL	18 38				(82) BCIS: 33°,1 N 116°,1 W, H. $17^h56.4^m$.
	F	18 55				
Aug. 16 (83)	eL	1 00				
	eL	2 25				
	M	2 35				
	F	3 00				
Aug. 19 (84)	eL	4 56				
	F	5 10				
Aug. 21 (85)	eL	17 08				(85) BCIS: 13° S 74° W, H. $16^h29.4^m$, h = 120 km.
	F	17 13				

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
Aug. 21 (86)	e	20 22				(86) BCIS: 17° S 163° E, H. 20h02,6m.
	eH	20 44 15				
	F	22 30				
Aug. 22 (87)	iz	5 33 47				
	iz	5 33 59	−			
	eL	6 25				
	M	6 33				
	F	7 30				
Aug. 27 (88)	eL	2 44				
	F	3 25				
Aug. 27 (89)	iH	7 58 36				(89) BCIS: 23° N 142° E, H. 7h34,5m.
	ez	8 00 43				
	eL	8 22				
	F	9 15				
Aug. 27 (90)	iP	16 31 38				(90) BCIS: 37° N 30° E, H. 16h26,5m.
	iS	16 35 33				
	F	16 45				
Aug. 27 (91)	e	20 48				(91) Malaga: North Africa.
	F	20 50				
Aug. 28 (92)	eS	19 44 20				(92) no z-registration. BCIS: 37° N 146° E, H. 19h21m10s.
	eL	20 01				
	F	21 30				
Aug. 29 (93)	eP'	10 42 04	+	5	2	(93) USCGS: 14° S 166° E, H. 10h22,6m. JSA: 15°,5 S 169°,2 E, H. 10h22m43s.
	iz	10 42 26	−	5	12	
	iPP	10 45 15		10	25	
	iH	10 46 04		8	20	
	eL	11 30				
	F	14 30				
Aug. 29 (94)	eL	16 00				
	F	19 30				
Aug. 30 Aug. 31 (95)	iP'	23 49 49		7	4	(95) BCIS: Probably same epicenter as (93)
	iN	0 18 00				
	eL	0 39				
	F	2 00				
Sept. 1 (96)	iP1'	23 04 13	+	12	7	(96) JSA: 45°,2 S 166°,7 E, H. 22h44m17s. Wellington: 46°,7 S 165°,7 E, H. 22h44,4m.
	iP2'	23 05 22	+	14	8	
	iPP	23 09 14	−			
	iSS	23 29 50		20	35	
Sept. 2	eL	0 00				
	F	2 30				

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
Sept. 2 (97)	iP	11 59 15	+	3½	4	(97) BCIS: 34°,0 N 28°,3 E, H. 11h54,0m, h = 70—100 km. USCGS: 34°,0 N 30°,0 E, H. 11h53,9m, h = 70 km. JSA: 33°,6 N 30°,0 E, H. 11h54m01s, h = 100 km. Moscow: 34° N 29° E.
	iS	12 03 30		14	17	
	eL	12 07				
	F	12 35				
Sept. 3 (98)	iP	13 09 12				(98) BCIS: 3° S 17° W, H. 12h59.0m.
	iS	13 17 08				
	eSSS	13 23 30				
	F	14 00				
Sept. 4 (99)	e	17 59				
	eL	18 42				
	F	19 30				
Sept. 5 (100)	e	1 55				
	F	2 08				
Sept. 5 (101)	iP'	22 07 46				(101) BCIS: 6° S 155° E, H. 21h48,9m. JSA: 5° S 154° E, H. 21h48m51s. F in next shock.
	e(PS)	22 19				
	e(SS)	22 27				
	eL	22 50				
Sept. 6 (102)	eL	2 30				(102) BCIS: aftershock of (101).
	F	4 00				
Sept. 6 (103)	e(P')	15 10 19				(103) BCIS: aftershock of (101).
	e(PS)	15 21 55				
	eL	15 45				
	F	17 20				
Sept. 7 (104)	iP	15 51 58	−	4	6	(104) BCIS: 46°,7 N 27°,0 E, H, 15h48,3m. Moscow: 47° N 27° E.
	eS	15 55 00		8	35	
	eL	15 57				
	F	16 30				
Sept. 8 (105)	eH	4 17				
	eL	4 50				
	F	6 00				
Sept. 9 (106)	iP'	4 22 32	−	6	3	(106) JSA: prov. epicenter 16°,7 S 167°,1 E, H. 4h02m50s, h = 50 km. Pasadena: 18° S 173° E.
	iPP	4 25 49	−	7	5	
	eSS	4 44 30				
	eSSS	4 50				
	eL	5 10				
	F	7 30				
Sept. 10 (107)	e	14 25				
	F	14 35				

Date 1945	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s	s	s	μ	
Sept. 12 (108)	iP	1 00 23	+			(108) BCIS: 2° N 16° E, H. 0ʰ51,4ᵐ.
	ePP	1 02 20				Pasadena: 2° N 11° E, H. 0ʰ51,2ᵐ.
	eL	1 18				
	M	1 22				
	F	1 55				
Sept. 12 (109)	eS	16 36 20				(109) BCIS: 41°,0 N 21°,3 E, H. 16ʰ29ᵐ24ˢ.
	eL	16 39				
	F	17 00				
Sep. 13 (110)	eP′	11 34 56				(110) USCGS: 34° S 70° W, H. 11ʰ17,0ᵐ,
	ez	11 36 16				h = 90 km.
	eS′	11 41 57				JSA: 32°,9 S 70°,3 W, H. 11ʰ17ᵐ20ˢ.
	eS	11 43 25				
	eSS	11 50 57				
	e(L)	12 00				
	F	13 00				
Sept. 14 (111)	iP	2 12 10				(111) USCGS: 7°,0 N 38°,8 W, H. 2ʰ02,4ᵐ.
	eS	2 20 05				JSA: 7°,6 N 39°,3 W, H. 2ʰ02ᵐ39ˢ.
	eL	2 27				
	F	3 30				
Sept. 18 (112)	eL	3 30				
	F	4 10				
Sept. 18 (113)	eL	11 55				
	F	12 10				
Sept. 19 (114)	eL	11 19				
	F	11 25				
Sept. 19 (115)	eP	12 40 00		7	3	(115) BCIS: 43° N 143° E, H. 12ʰ28,0ᵐ.
	eS	12 50 00				
	eL	13 07				
	ME	13 10		33	15	
	F	13 50				
Sept. 22 (116)	e(PPP)	9 33				(116) △ ≈ 13000 km.
	e(S′)	9 36 20				Pasadena: roughly 2° S 147° E, H. 9ʰ09,8ᵐ.
	eSS	9 47				
	eL	10 06				
	F	11 40				
Sept. 23 (117)	eL	16 13				(117) BCIS: 50° N 127° E.
	MN	16 16		15	100	
	F	17 00				
Sept. 24 (118)	eL	13 39				
	F	14 10				

Date 1945	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s	s	s	μ	
Sept. 25 (119)	e	15 13				
	F	15 25				
Sept. 26 (120)	e	13 49 40				(120) Zürich: △ = 1176 km, South Bosnia.
	F	14 00				BCIS: repetition of (109), H. 13ʰ41,9ᵐ.
Sept. 26 (121)	eL	14 55				(121) USCGS: 18°,9 N 62°,4 W,
	M	15 05		17	2	H. 14ʰ26,8ᵐ.
	F	15 30				JSA: 19°,5 N 64°,5 W, H. 14ʰ27ᵐ01ˢ.
Sept. 28 (122)	eL	0 30				
	F	2 00				
Sept. 28 (123)	iP	22 36 08				(123) USCGS: 41°40′ N 126°55′ W,
	iS	22 46 03				H. 22ʰ24ᵐ05ˢ.
	eSSS	22 55				JSA: 41°,5 N 126°,2 W, H. 22ʰ24ᵐ08ˢ.
	eL	23 00				
Sept. 29	F	0 20				
Sept. 29 (124)	e	0 58				
	F	1 10				
Oct. 1 (125)	eP	5 25 (45)		4	2	(125) P under paperclip.
	eS	5 33 00		6½	8	△ ≈ 5600 km.
	eSS	5 36 30				BCIS: Afghanistan.
	eL	5 47 30				Moscow: 27° N 64° E.
	F	6 30				
Oct. 2 (126)	eL	1 15				
	MH	1 18		20	11	
	F	1 50				
Oct. 4 (127)	e	2 09				
	F	2 30				
Oct. 5 (128)	e	3 15				
	F	3 35				
Oct. 5 (129)	eL	4 00				
	F	4 35				
Oct. 6 (130)	eL	10 12				
	F	10 40				
Oct. 7 (131)	iP	13 35 55	+	8½	3	(131) USCGS: 12°,3 N 89°,0 W,
	iPP	13 39 09				H. 13ʰ23,4ᵐ.
	eSorS′	13 46 00				JSA: 12°,9 N 89°,9 W, H. 13ʰ23ᵐ34ˢ,
	eSS	13 52 00				deeper than normal.
	eSSS	13 55 40				e S or S′ under paperclip.
	eL	14 03				
	MEZ	14 15		17	10	
	F	15 00				

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
Oct. 9 (132)	eH	3 21 45				(132) no z-registration.
	eL	3 24				
	F	3 32				
Oct. 9 (133)	iP	14 48 31	+			(133) USCGS: 43° N 150° E, H. 14h36,6m.
	iP	14 48 53	—			Pasadena: 43° N 145° E, H. 14h36m29s,
	iP	14 49 06	—			h = 100 km.
	ePP	14 51 20				JSA: 44°,0 N 146°,8 E, H. 14h36m43s,
	iS	14 58 21				h ≈ 100 km.
	e(SS)	15 04 40				Zürich: 46° N 148° E.
	eL	15 14				
	ME	15 16		37	45	
	F	17 30				
Oct. 13 (134)	ez	0 54				
	eL	1 22				
	F	2 00				
Oct. 13 (135)	e	21 22				
	F	21 30				
Oct. 14 (136)	ez	4 26 45				(136) Riverview: iP 4h14m25s, iS 4h20m18s.
	ez	4 30				
	eL	5 18				
	F	6 00				
Oct. 15 (137)	eL	8 33				(137) USCGS: 59°,0 N 140°,0 W, H. 8h01,2m.
	F	9 00				JSA: 59°,0 N 139°,2 W, H. 8h01m12s.
Oct. 15 (138)	iP	18 29 24				(138) BCIS: 73° N 2° W, H. 18h26,6m.
	eS	18 33 13				Pasadena: 73° N 5° E, H. 18h24,5m.
	eL	18 35				
	F	19 00				
Oct. 16 (139)	iP	16 17 15	+	6	1	(139) USCGS: 0°,5 N 126°,0 E, H. 16h03,1m.
	iPP	16 21 45		9	4	
	iS'	16 27 53				
	i(SKKS)	16 28 36				
	ePS	16 31 10				
	eL	16 55				
	F	19 00				
Oct. 20 (140)	eL	1 02				No registration from Oct. 20 16h47m till Oct. 21 7h55m.
	F	1 35				
Oct. 21 (141)	eL	16 30				
	F	16 45				

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
Oct. 25 (142)	iP	15 09 57				(142) disturbed by very strong microseisms.
	eS	15 19 (10)				BCIS: 57°,5 N 165° E, H. 14h58m57s.
	eL	15 32				USCGS: 56°,1 N 162° E, H. 14h58,5m.
	F	16 30				JSA: 57°,2 N 163°,6 E, H. 14h58m50s,
						h ≈ 60 km.
Oct. 26 (143)	e	14 05 50				(143) Moscow: 41° N 37° E.
	F	14 34				
Oct. 27 (144)	iP	11 36 37				(144) USCGS: 15° N 91° W, H. 11h24,5m.
	iS	11 46 35				JSA: 15°,9 N 91°,4 W, H. 11h24m43s,
	e(L)	11 59				h ≈ 200 km.
	F	12 30				
Oct. 28 (145)	eH	0 33 40				
	F	1 20				
Oct. 29 (146)	e	6 34				
	F	6 45				
Oct. 29 (147)	eSS	11 19				(147): USCGS: 52° N 131° W, H. 10h54,3m.
	eL	11 29				JSA: 51°,1 N 130°,0 W, H. 10h54m27s,
	F	12 35				h ≈ 50 km.
Nov. 2 (148)	i(P')	19 17 30				
	eL	19 57				
	F	20 20				
Nov. 3 (149)	iP	22 20 06				(149) USCGS: 59°,1 N 151°,0 W,
	iPP	22 22 27				H. 22h09,0m.
	eS	22 28 50				JSA: 59°,0 N 150°,4 W, H. 22h09m03s.
	eSS	22 36				
	eL	22 42				
	F	23 45				
Nov. 5 (150)	e	3 34				
	F	3 40				
Nov. 7 (151)	eL	16 11				
	F	16 25				
Nov. 8 (152)	eL	1 34				
	F	1 55				
Nov. 8 (153)	e	9 17				(153) BCIS: 81°,2 N 15° W, H. 9h05m34s.
	F	10 00				USCGS: 81° N 7° W, H. 9h05,5m.
						JSA: 80°,9 N 23°,8 W, H. 9h05m41s.

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
Nov. 8 (154)	eL	10 15				(154) repetition of (153). BCIS: H. 10h02m46s. USCGS: 81° N 7° W, H. 10h02,5m. JSA: 80°,9 N 23°,8 W, H. 10h02m52s.
	F	11 00				
Nov. 11 (155)	eL	10 23				
	F	11 00				
Nov. 11 (156)	e	15 50				
	F	16 05				
Nov. 15 (157)	e	13 10				
	F	13 30				
Nov. 16 (158)	e	18 26				(158) USCGS: 57°,7 N 135°,8 W, H. 18h02,5m. JSA: 58°,2 N 136°,2 W, H. 18h02m21s.
	eL	18 32				
	F	19 30				
Nov. 18 (159)	e	5 40				(159) Zürich: West Mediterranean.
	F	5 50				
Nov. 20 (160)	eP	6 34 05				(160) no N-S registration. BCIS: epicenter approximately 30°,5 N 40° E, H. 6h28m16s.
	eS	6 39 36				
	eL	6 46				
	F	7 25				
Nov. 22 (161)	e	15 4°				
	F	16 10				
Nov. 22 (162)	e	21 49				
	F	22 30				
Nov. 23 (163)	e	0 59				
	F	1 15				
Nov. 23 (164)	eL	13 34				
	F	14 00				
Nov. 24 (165)	eL	17 38				
	F	17 55				
Nov. 24 (166)	eL	18 26				
	F	18 40				
Nov. 26 (167)	iP'	5 31 57		6	3	(167) BCIS: h ≈ 600 km. USCGS: 23° S 180° W, H. 5h12m09s.
	ipP'	5 34 14		7	3	
	eSS	5 54				
	F	7 00				
Nov. 27 (168)	ez	12 13 37				
	F	14 30				

Date 1945	Phase	Time (h m s)	Direction	Period (s)	Amplitude (μ)	Remarks
Nov. 27 (169)	iP	22 06 02	+	17	170	(169) extraordinary strong earthquake. BCIS: 25°,0 N 62°,2 E, H. 21h57m00s. USCGS: 22° N 62° E, H. 21h56,8m. Zürich: 25° N 64° E. Destructive seawave.
	iS	22 13 27				
Nov. 28	F	3 30				
Nov. 28 (170)	e	19 41				
	F	19 50				
Nov. 29 (171)	e	12 18				(171) BCIS: 41° N 35° E, H. 12h03,2m.
	F	12 30				
Nov. 30 (172)	eE	12 34				
	eL	13 00				
	F	13 40				
Dec. 1 (173)	ez	6 10 04				
	F	6 12				
Dec. 1 (174)	eL	19 28				
	F	19 50				
Dec. 7 (175)	eH	5 00				
	F	5 15				
Dec. 8 (176)	eP'	1 23 10				(176) BCIS: 4° S 151°,5 E, H. 1h04,1m. USCGS: 1° S 148° E, H. 1h04,0m. Pasadena: 6°,5 S 151° E, H. 1h04,0m.
	iPP	1 25 01	—	9	4	
	ePS	1 35 00				
	eSS	1 42				
	eSSS	1 47				
	eL	2 03				
	MN	2 15		25	95	
	F	4 20				
Dec. 9 (177)	iP	6 12 24	—	4	4	(177) BCIS: H. 6h08,5m. Zürich: 45° N 28° E.
	iS	6 15 24				
	eL	6 17				
	F	6 30				
Dec. 9 (178)	eL	21 26				
	F	22 00				
Dec. 11 (179)	e	10 52				
	F	11 15				
Dec. 14 (180)	iE	17 49 54				(180) BCIS: 5° N 75° W, H. 17h26,9m.
	F	18 20				
Dec. 15 (181)	e	5 33				(181) BCIS: 44°,4 N 8°,7 E, H. 5h28m52s.
	F	5 34				

Date 1945	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Dec. 20	eH	4 26				(182) BCIS: 7°,5 N 127°,5 E, H. 3ʰ59,2ᵐ.
(182)	eL	4 29		28	35	
	F	5 40				
Dec. 21	e	18 52				
(183)	F	19 05				
Dec. 27	iP′	5 00 10				(184) BCIS: same epicenter as (176),
(184)	iPP	5 01 59	—			H. 4ʰ41,1ᵐ.
	ePPP	5 05 00				USCGS: 6° S 148° E, H. 4ʰ41,0ᵐ, foreshock
	ePS	5 12				of (185).
	ePPS	5 13 30				
	eSS	5 19				
	eL	5 40				
	MN	5 52		25	70	
	F	7 30				
Dec. 28	iPP	18 09 29				(185) Disturbed by very strong microseisms.
(185)	eSS	18 27				BCIS: same epicenter as (176), H. 17ʰ48,9ᵐ.
	eSSS	18 31				USCGS: 6° S 151° E, H. 17ʰ48,8ᵐ.
	F	23 00				
Dec. 29	e	10 51				
(186)	F	11 30				
Dec. 29	e	13 28				
(187)	F	14 00				
Dec. 30	eP′	1 07 45				(188) BCIS: aftershock of (185). H. 0ʰ48,6ᵐ.
(188)	iPP	1 09 40		6	2	
	ePS	1 19 40				
	eSS	1 27 15				
	eL	1 47				
	F	3 30				
Dec. 31	e	18 06				
(189)	eL	18 25				
	F	18 30				