No. 52. 1942.

Geodætisk Institut

Proviantgaarden, Copenhagen, Denmark.

Bulletin

of the seismological station

KØBENHAVN

φ = 55° 41′ N. λ = 12° 27′ E. h = 13 m.

Lithologic foundation: chalk.

No. 52. Jan.—Dec. 1942

Instruments:

Galitzin-Wilip seismographs.

Constants:

Component	l	A_1	T_1		T	k
	cm	cm	sec		sec	
N	12.5	100	12.59		$12^1/_2$	105
E	12.5	100	12.60		$12^1/_2$	102
Z	14.5	100	11.52	$^1/_1-^{30}/_{11}$	8	88
				$^{30}/_{11}-^{31}/_{12}$	10	90

Damping was approximately aperiodic.

Wiechert 1000 kg. horizontal seismograph.
Wiechert 1300 kg. vertical seismograph.

Constants:

Component		T	v	ϱ	V
		sec		mm	
N	$^1/_1-^{17}/_7$	9.0	4.1	0.5	175
	$^7/_8-^{31}/_{12}$	9.0	4.5	0.3	175
E	$^1/_1-^{17}/_7$	8.9	4.6	0.4	210
	$^7/_8-^{31}/_{12}$	10.2	7	0.5	175
Z	$^1/_1-^{17}/_7$	5		0.3	165
	$^8/_9-^{31}/_{12}$	6	$6^1/_2$	0.1	155

Milne-Shaw seismograph, *E* component, with the approximate constants $T = 12^s$ $v = 20$ $V = 300$.
Benioff vertical seismograph, $T_1 = {}^1/_4{}^s$ $T = 1^s$.

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No.	Date	Hour	Forerunners P or P′	Forerunners S	Forerunners	Forerunners	L	△	Remarks
	1942 Jan.		m s	m s	m s	m s	h m	°	
1	18	16	i *i* 44 12	50 23	45 43	53 28	58	41	
2	26	15	i 50 45						
3	27	1	i 22 43						
4	27	1	i 49 59						
5	27	13			e 47.9	56 2*	1.3		*SKS* 54^{m}.5. 58.^{m}5. *SS* 63^{m}.9. △ = ca.
6	27	22	i 17 37						[110°. Strong microseisms.
7	29	9	e 42 55		43 33	46 30			e *e* 43^{m}.1. i 46^{m}32^{s}.
8	29	20	i 51 4						
9	30	12	i *e* 24 25	34 34				81	Indian Ocean.
10	31	15	i 40 57						
11	31	17	e 41 56	51 7	52 3*			70	
	Febr.								
12	1	14	i 43 14						
13	2	17	i 8 5						
14	2	17	e *i* 10 22	*i* 14 22				22	Turkey.
15	2	18	e 12 18						
16	4	3	e 10 40*						
17	4	17	e 37 58						
18	4	18	i 22 57						
19	4	23	i 25 7				32		
20	5	1	i 20 24	24 3	*i* 20 26		26	20	
21	6	16	i 46 21						
22	7	10	i *e* 28 58	33 13				24	
23	14	10	i 52 43				1.1		
24	14	13	e *i* 4 27				.5		
25	16	18	e 27 16		29 40	30 45			e 30^{m}33^{s}. e_E 40^{m}.2. e_N 43^{m}20^{s}. e_N 47^{m}.0.
26	17	4			33 18	34 33			[△ = ca. 135°.
27	18	17	i 4 17						
28	18	19	i 57 22						
29	20	1	e 1 26						Small, uncertain.
30	21	7	i *i* 19 34 +	*i* 29 21	19 49	22 26	45	77	29^{m}46^{s}. 34^{m}.1. Japan. Deeper than normal.
31	21	20	e 3 5						
32	21	21	e 57 24						
33	23	12	e 0 33						
34	28	5	i 2 41				17		
	March								
35	1	10	e 4 51		15.5		34		
36	2	2	e 17 22						
37	3	21	e 38 33						
38	5	19	- *i* 59 11 +	*i* 68 6	60 8	62 45		72	*i* 68^{m}49^{s}. Depth about 250 km.
39	6	10	e 23 36						Small.
40	6	20	e 27 24				1.1		*P* small, somewhat uncertain.
41	7	22	e 44 1						
42	8	4	e 57 26		66 12		1.2		*P* small, the reading not quite certain.
43	10	12	i 11 27						
44	10	17	i 54 46						
45	11	10	i 59 9						

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No.	Date	Hour	Forerunners P or P′	Forerunners S	Forerunners	Forerunners	L	△	Remarks
	1942 March		m s	m s	m s	m s	h m	°	
46	12	14	i 36 13						
47	19	12		19 45			.6		
48	20	1	i *i* 24 26 +	33 53				73	Aleutian Islands.
49	21	23	i *i* 32 58 +	43 1*	*i* 33 16	36.1		80	Japan.
50	22	2	e *i* 16 18 +	*i* 22 34	*i* 17 2	*i* 17 21		45	*P* (*x*, —5.3, + 4.0; *x*, + 7.5, —7.1). *PP* 18^{m}1^{s}. $_{P}PP$ 18^{m}39^{s}. 18^{m}57^{s}. 19^{m}23^{s}; 20^{m}3^{s}. *isS* 23^{m}44^{s}. e_N 25^{m}23^{s}. *SS* 25^{m}51^{s}. Depth about 210 km. Hindu Kush.
51	27	18	i 44 23						
52	30	9	i 16 11						
	April								
53	3	16	e 40 40						
54	4	23	i 13 41						
55	8	15	i *i* 53 21	*i* 64 6	56 45	*i* 63 50		88	*P* (—1.0, —2.8, + 1.9; + 1.7, + 4.0,
56	8	19	e 42 45				74		[— 4.5). 64^{m}34^{s}. *PS* 65^{m}5^{s}. 65^{m}50^{s}.
57	9	4	e 55 20				76		[67^{m}49^{s}. *SS* 70^{m}10^{s}. Felt in the
58	10	13	e 46 50						[Phillippines.
59	11	1	i 37 40		48 5	48 45			
60	13	3	e 10 28		15.1				
61	13	7	i *e* 56 37 +	64 53	59 0*	*i* 60 30		61	*i* 65^{m}3^{s}. Atlantic Ocean.
62	13	18	i 14 35						
63	14	20	i 32 58						
64	14	20	i 50 42						
65	16	19	i 19 1						
66	16	21	i 2 16		e 5 26				
67	20	1	i 40 5	43 42	i 40 24	40 32	45	20	
68	20	8	i *i* 51 59	*i* 61 27	53 15	53 51		80	63^{m}45^{s}. 66^{m}36^{s}. Depth about 325 km.
69	20	23	i 8 32						[Japan.
70	23	11	i 8 55						
	27	9							Recording interrupted.
71	27	11	i 2 24						
72	29	12	i *i* 0 12 —		3 46				
73	29	12	e *e* 3 31						
74	30	23	i 31 31						
	May								
75	5	3			46 4		60		
76	9	4	i *e* 41 55		46 34				Deep focus.
77	10	8	i 53 6						
78	11	23	i *e* 43 28	52 56				73	
79	14	2	i *i* 26 35	38 4	30 12	*i* 32 18		99	*e P* 26^{m}30^{s}. *e* 36^{m}.3. *i SKS* 37^{m}4^{s}.
80	14	8			62 34	63 4			[*SKKS* 37^{m}24^{s}. *PS* 38^{m}56^{s}. *SS* 43^{m}.1. [Destructive in Ecuador.
81	15	2	e *e* 56 52	61 3				24	
82	15	11			14 23	14 48			
83	15	12	*e* 4.5		15 5	15 31			
84	15	14	i 19 3						
85	15	16	i 29 2						
86	15	17	i *i* 3 11		4 19	6 0*			12^{m}51^{s}.

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No.	Date	Hour	Forerunners P or P′	Forerunners S	Forerunners	Forerunners	L	△	Remarks
	1942 May		m s	m s	m s	m s	h m	°	
87	17	15			37 28	37 58			
88	18	0					42		
89	18	16	i 35 19		i 35 22				
90	21	3	i *i* 46 58	50 39				20	
91	21	5	i 48 59						
92	22	10	i 43 17	53 40				84	
93	23	14	i 30 31						
94	23	20	e 9 58	16 51				47	
95	24	3	i *e* 38 53	49 7				82	
96	27	6	- *e* 52.1		55.7	62 21			
97	28	1	e *i* 15 37 +		19 50	27 0*			29^m3^s. $34^m.7$.
98	28	3	e 26 3						
99	28	15	i 27 55		29 34	34 15			37^m36^s.
100	29	2	i 58 27						
101	29	5	i 38 2						No time-marks except on B. *Z*.
102	31	2	e *e* 48 6	52 26				25	
	June								
103	1	9	e *i* 21 49	25 17	25 41			19	Greece.
104	1	12	e *e* 17 35				42		
105	1	22	*e* 14 30						
106	2	0	*e* 49 53		57 47	65.4			$69^m.3$.
107	3	0	i 51 11						
108	7	10	e 55 46		62 8				
109	10	1	*i* 18 52 +	27 47				67	
110	10	10			39 14	45 19			47^m41^s.
111	13	19	*i* 34 12 —						
112	14	3	e *e* 23 39		28 5	*i* 34 15			34^m48^s. 35^m12^s. 36^m40^s. 41^m50^s.
113	14	14			46 35	54 3			
114	15	1	e 1 32						
115	15	14	*e* 6 8						i *e* 6^m16^s; i 31^s; *i* 33^s.
116	16	4	e *e* 52 43	56 52			60	23	Anatolia. Deeper than normal.
117	16	5	e *e* 46 42	50 2*				18	Balkan.
118	16	6	i 18 52						
119	16	9	i *i* 18 39	*i* 22 29				21	
120	16	15	i 37 41						Seismic?
121	16	21			18 23				
122	18	9			45 32	48 12			49^m16^s. 50^m9^s. 55^m31^s. 56^m30^s. 58^m18^s.
123	19	19	i *i* 48 42	58 13				74	
124	20	10	-		*i* 25 6				
125	21	4	i *i* 43 28	47 24				22	
126	21	21	e 59 45						Seismic?
127	24	11	e *e* 36 27		37 18	41 0			*SKKS* 47^m39^s. 48^m25^s. *SKSP* 51^m12^s.
128	27	2	e 55 34		*i* 65 11				[*SS* $61^m.0$. *SSS* $68^m.7$. New Zealand.
129	29	6	-		45 53	*i* 51 47			*i SKKS* 52^m53^s. *PS* 55^m22^s. Chile.
130	29	19	i 9 3						
	July								
131	2	6	i 47 4						Seismic?
132	3	2	e *e* 59 5	66 9	61 2*	70 3	74	49	

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No.	Date	Hour	Forerunners P or P′	Forerunners S	Forerunners	Forerunners	L	△	Remarks
	1942 July		m s	m s	m s	m s	h m	°	
133	4	2	- *e* 6 30	17 17	16 47	18 25		89	Ecuador.
134	4	6	- *e* 22 9	32 52	32 20			88	»
135	5	10			52 46	54 3			
136	7	3	i *i* 12 41 —		*i* 14 26	14 46			16^m7^s. $35^m.6$. $37^m.0$. Deep focus.
137	7	12	*e* 51 10	61 53				88	Ecuador.
138	7	18	i 52 19						
139	8	7	e *e* 9 54		13 21	*i* 14 14			17^m2^s. 20^m34^s. 21^m56^s. 23^m34^s. $29^m.5$. Chile.
140	8	21			41 53	49 25			Chile.
141	8	22	*e* 44 20	55 4	54 40	56 16		88	Ecuador.
142	12	5	e *e* 18 26 +	*i* 29 29	22 1	28 59*		92	*PS* 30^m30^s.
143	25	6	*e* 35 41 —		39 28	46 7			46^m37^s. 47^m18^s. 47^m49^s. 48^m22^s.
144	27	11			26 11				
145	29	20	i *i* 29 51		36 6				
146	29	23	*e* 3 27		7 56	10 8			14^m15^s. 17^m25^s. Banda Sea.
	Aug.								
147	1	12	i *i* 54 1		54 45	58 25			61^m38^s. 66^m30^s. $69^m.9$. New Zealand.
148	3	20	e *e* 28 33						No G. or W. *Z* records.
149	6	23	i 49 36		53 7	60 5			i *i* 49^m38^s, 51^s. i_E 60^m10^s. i_N 60^m17^s.
150	8	0	i - 31 49	41 11				72	[$65^m.9$. $69^m.6$. Guatemala and [Salvador.
151	8	14					14		
152	8	22	e *e* 49 11		52 43	59 15			59^m44^s. Central America.
153	12	20	e *e* 43 8	46 55			49	21	
154	12	22					3		
155	13	16	*e* 5 42		15 42				Solomon Islands.
156	14	8	*e* 32 21		42 17				
157	14	17	*i* 28 44		30 29	31 25			34^m57^s. 36^m10^s. 38^m23^s.
158	15	15			22 36	32 58	56		33^m18^s. $38^m.8$.
159	16	11	*e* 39 37		48 6	49 6			49^m34^s. 51^m9^s.
160	16	20			31 25		48		
161	19	19			50 31				
162	20	9	i 40 20						
163	20	16	e 28 29						
164	22	8	i 42 51						
165	22	9					39		Disturbed.
166	22	15	- *i* 48 7						Local. Seismic?
167	23	6	- *i* 46 23 —	*i* 55 27	48 54	57 36	67	69	*P* (+ 1.5, + 0.8, — 2.8; — 2.7, — 1.1, [+ 4.3).
168	23	15					49		
169	23	21	e 19 55						
170	24	23	e *e* 4 17		8 17	9 0*			14^m30^s. 15^m14^s. 15^m58^s. 16^m31^s. $18^m.1$. 18^m51^s. $20^m.1$. $23^m.0$. $27^m.2$. Destructive in Peru.
171	25	20			40 30	41 22			
172	26	12	*e* 22 22		26 30	33 2*			33^m22^s. 36^m23^s. Peru.
173	27	6	e *i* 17 46	20 37			22	16	*P* (— 2.0, + 0.5, — 1.2; + 5.5, — 2.5,
174	28	16	i 41 15						[+ 4.5). L_R 23^m. Albania.
175	29	1	i *i* 8 28		18 11				

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No.	Date	Hour	Forerunners P or P'	S			L	△	Remarks
	1942 Aug.		m s	m s	m s	m s	h m	°	
176	29	1	e *e* 58 2		i 58 5	*i* 60 9			
177	29	12	i 23 17						
178	29	15	i 6 41						
	Sept.								
179	1	9	*e* 47 13	51 18	e 47 17	51 48	53	23	
180	1	18	i 28 10						
181	1	19	- *e* 10 10				34		
182	3	8			3 14				
183	4	17	i 36 47						
184	4	17	i 57 40						
185	8	16	i *i* 19 26	29 13				77	
186	9	1	i 36 39	45 54	46 41		58	71	
187	14	11	i *e* 50 20		53 40				
188	17	11			59 55				
189	20	23			65 11				
190	21	6			14 31		35		
191	22	1			17 55	25.5	49		
192	24	3	e *i* 51 15 —	61 21	54 18	62 16	78	80	
193	26	4			23 10	24 35			$29^m.0$.
194	30	22			40 4				
	Oct.								
195	1	0	e 17 56						
196	5	7	i 33 44						
197	9	15	i *i* 57 18 —	66 26				70	
198	20	13			i 11 25				
199	20	23	- *e* 35 7		39 0*	45 46			46^m19^s. 47^m49^s. $53.^m0$. Philippines.
200	21	16		44 56			59		
201	22	2		13 15					
202	25	8			58 5	58 30			
203	26	15	i 27 27						
204	26	21	i *i* 20 40 +	30 1*	30 35			72	
205	28	2	e 27 13*						
206	28	2	e 46 15						
207	28	11			8 21				
	Nov.								
208	3	0	*e* 19 4*		21 52	23 31	75		
209	5	11			50 0				
210	6	13	- *i* 44 20 —		55 48	56 25			Peru.
211	10	11	*e* 55 40		59 2*	60 5			62^m25^s. *SKS* 66^m21^s. 67^m45^s. *PS* 69^m20^s. *PPS* 70^m30^s. *SS* $75^m.0$.
212	12	5	i *i* 8 4	18 38	18 22	19 11	30	86	Mexico. Period of *M* waves about [1/2 min.
213	12	15			50 36	51 22			
214	13	23	i 13 23		i 13 27				
215	15	17	i *e* 5 49		9 28				
216	15	17	i *e* 24 0	33 51	24 15			78	Strong microseisms.
217	16	21	e 33 57						» »
218	19	9			15 9				

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No.	Date	Hour	Forerunners P or P'	S			L	△	Remarks
	1942 Nov.		m s	m s	m s	m s	h m	°	
219	20	4	i 24 31						
220	21	14	e 6 28	10.5			14	22	Strong microseisms.
221	25	12	i 19 14						
222	26	14	i *i* 38 50	48 8	43 46	48 49		72	
223	28	10	e *e* 49 1	57 18	63 52		66	61	
	Dec.								
224	2	19	e *e* 9 6 —	12 58				22	Turkey.
225	4	15			55.4	62.3	82		$66^m.7$.
226	5	14	i *i* 39 7 —	47 42	48 56			64	
227	11	2	i *e* 43 57	47 52	*i* 43 59	48 10		22	Anatolia.
228	19	23	e 23 5	33.1	*i* 23 19	33 17		79	
229	20	14	*i* 7 57	*i* 12 2	9 30	11.8		23	*P* (—9.9, + 11.2, —6.0). Anatolia.
230	24	15	i 30 53						Seismic?
231	24	16	i 29 53						Seismic?
232	24	23	e 53 3						
233	26	12	i *e* 44 18	54 15	e 44 7			79	Colombia.
234	27	16		62 45	e 52 34		83		Japan.
235	29	3	e *i* 45 19	47.8				14	
236	31	11	i 41 0						Seismic?
237	31	11	i 56 11						
238	31	12	*i* 13 40 —	21 45				59	

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Seismometric readings: Notation

P — normal first preliminary tremors, longitudinal waves.
P + — first wave, as recorded on Galitzin or Wiechert instruments, condensational (away from the epicentre).
P — — first wave, as recorded on Galitzin or Wiechert instruments, dilatational (towards the epicentre).
P (± a, ± b, ± c) — a, b and c are trace amplitudes in mm. of first swing on NS, EW and vertical component Galitzin records respectively. + indicates ground motion directed to N, to E or up, — indicates ground motion to S, to W or down. When a second set of amplitudes is given it refers to the second swing. If an amplitude is not measurable the number is replaced by x.
PP... — longitudinal waves reflected at the earth's surface.
S — normal second preliminary tremors, transverse waves.
SS... — transverse waves reflected at the earth's surface.
PS; *PPS*; ... — waves reflected at the earth's surface which travel partly as longitudinal, partly as transverse waves.
SKS — waves which traverse the mantle as transverse waves but are refracted through the core with longitudinal oscillation.
PKS — waves which pass the mantle on one side of the core as longitudinal waves, on the other side as transverse waves and are refracted through the core with longitudinal oscillation.
SKKS — waves which traverse the mantle as transverse waves, are refracted through the core with longitudinal vibration and are reflected on its inner boundary.
L — long, or surface, waves; main phase.
i, *i* — sharply defined beginning of a phase as recorded on Benioff seismograph and other seismographs respectively.
e, *e* — gradual beginning of a phase as recorded on Benioff seismograph and other seismographs respectively.
△ — arcual distance from the station to the epicentre.
*) affixed to time of phase indicates that the beginning is in a time-mark.

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