

No. 59

1949

Geodætisk Institut

Proviantgården, Copenhagen, Denmark

Bulletin of the seismological station

KØBENHAVN

$\varphi = 55^{\circ}41' N.$ $\lambda = 12^{\circ}26' E.$ $h = 13 m.$

Lithologic foundation: chalk

No. 59. Jan.—Dec. 1949.

Instruments:

Galitzin-Wilip seismographs.

Constants:

Component	l	A_1	T_1	μ^2		T	k
	cm	cm	sec			sec	
N	12.5	100	12.64	0.1	$1/1-18/5$	12.3	104
E	12.5	100	12.69	0	$18/5-31/12$	12.8	99
Z	14.5	100	11.56	0.1	$1/1-22/6$ $22/6-31/12$	12.1 12.8	84

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component		T	ν	ρ	V
		sec		mm	
N	$1/1-18/5$ $18/5-31/12$	8.1	5.5	0.6	209
E		8.2	3.9	0.6	210
Z		5.8	5.5	0.2	154

Milne-Shaw seismograph, E component, with the approximate constants $T = 12^s$, $\nu = 20$, $V = 300$.

Benioff vertical seismograph, $T_1 = 1/4^s$, $T = 1^s$. $V_{\max} = \text{abt. } 30\,000$.

From Oct. 6. a Grenet vertical seismograph is in use on the station. $T_1 = 1/4^s$, $T = 1^s$. $V_{\max} = \text{abt. } 30\,000$.

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No.	Date	Hour	Forerunners				L	△	Remarks
			P or P'	S					
			m s	m s	m s	m s	h m	°	
1	1949 Jan. 3	18					34		
2	4	3					05		
3	4	19	i 52 02		i 52 10		18		Near Rhodos?
4	9	17					39		
5	9	18					19		
6	13	9	e e 06 06		i i 06 10	i 06 16	39		
7	19	14					19		
8	19	15	e e 12 18	e 22 25			39	80	ipP' 08 ^m 36 ^s . esP' 09 ^m 39 ^s . Depth about [600 km. South of Fiji Islands.
9	23	01	i 13 07				20		Formosa region?
10	23	01	i 18 27				24		Off east coast of Greenland. Repetition.
11	23	06		55 38	48 15	55 05	74		PS 56 ^m 50 ^s . SS 62 ^m 12 ^s . SSS 66 ^m .3. Southwest of Sumatra.
12	24	09	i i 35 17		i i 35 43				Depth about 100 km. Tonga Islands.
13	28	23	i 38 24						Off east coast of Korea.
14	Febr. 1	18			i 35 10	37.5			SKS 41 ^m 15 ^s . PS 44 ^m 35 ^s . SS 50 ^m 42 ^s . SSS 54 ^m .9. New Guinea.
15	2	17	i 52 32	i 61 36	i i 53 21	e 53 42			62 ^m 42 ^s . Depth about 200 km. Aleutian Islands.
16	5	0	e 32 47						Strong microseisms. Turkey.
17	5	15	e 28 34						Ionian Islands.
18	10	22	e 16 25		19 47	20 01	1.1		Samoa.
19	13	18	e i 44 12		44 37	i 44 56	1.6		ipP ₂ 45 ^m 08 ^s . sP ₂ 45 ^m 25 ^s . ePP 48 ^m 24 ^s . pPP 48 ^m 35 ^s . 55 ^m 26 ^s . 58 ^m 37 ^s . 63 ^m .4. SS 68 ^m .0. SSS 74 ^m .0. Depth about 100 km. Kermadec Islands.
20	14	19					.5		Strong microseisms.
21	21	16	i 47 12		i 47 17				
22	23	16	i i 16 41	i 23 32	18 35	27 05	32	47	SSS 28 ^m 03 ^s . 31 ^m 26 ^s . Sinkiang Province, [China.
23	24	23					29		
24	26	4					44		
25	28	0			39 51	42 48	68		SS 49 ^m . Sandwich Islands region.
26	March 2	6	e 58 33	e 62 00	59 14	63 40	64	19	Jan Mayen region.
27	4	1	e e 30 10		e 40 40	41 03			i 41 ^m 40 ^s . 42 ^m 40 ^s . 48 ^m 01 ^s . Sumatra.
28	4	10	i i 27 09	i 33 22	28 08	29 00			pPP 30 ^m 02 ^s . sS 34 ^m 38 ^s . P (+ 2.4, - 44.0, + 9.0; - 5.6, + 50.4, - 14.0). [Depth about 200 km. Hindu Kush.
29	4	15	i 35 39				.8		
30	5	2					24		
31	6	11	i 36 27				.6		
32	9	4					.8		
33	9	5					04		Strong microseisms.
34	11	23					71		SKKS 42 ^m 43 ^s . PS 45 ^m 23 ^s . PPS 46 ^m 49 ^s . The phases not clearly marked. New Britain.
35	16	22	i 34 01		35 27	41 21			

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No.	Date	Hour	Forerunners				L	△	Remarks
			P or P'		S				
			m s	m s	m s	m s	h m	°	
36	1949 March 17	21			25 20	28 20	62		SKS 31 ^m 16 ^s . SKKS 32 ^m 43 ^s . PS 35 ^m 18 ^s . SS 42 ^m 12 ^s . SSS 46 ^m .5. No Benioff record. The phases not clearly marked. New Britain.
37	19	18	i i 31 10	40 52	e 31 51	42 00			SS 47 ^m 05 ^s . Depth about 150 km.
38	22	2					.3		[Japan.
39	23	18	e 10 42		e 11 42				
40	24	21		i 18 36	23 32	26.8			No Benioff record. Off Cape Mendocino, California.
41	27	6	e 47 55		i 52 17	58 32			PS 61 ^m 02 ^s . Celebes Sea.
42	27	12					46		
43	27	21					29		
44	28	13			13 57		32		Philippine Islands.
45	30	15			10.7		56		Strong microseisms.
46	31	22					41		
47	April 1	9					38		
48	2	17					.1		
49	3	7					27		
50	5	9	i 37 24	45 49	46 21				Depth about 550 km. Siberia.
51	10	0	i 04 08						
52	11	0	e 08 06		e 08 09		1.3		
53	13	15	e 23 20	31.7			42		
54	13	20	i i 06 56-	i 16 11	e 07 14	20 38	26	71	State of Washington.
55	13	20	i 34 46						
56	14	23	i e 32 44		33 15		37		
57	15	10	i 59 51		i 60 08				
58	18	21	i 53 05						
59	19	15	i e 30 34				.9		
60	20	3	i e 48 04		49 10	49 25	82		SKS 54 ^m 37 ^s . SKKS 56 ^m 00 ^s . 56 ^m 29 ^s . PS 58 ^m 44 ^s . 60 ^m .2. 60 ^m .4. SS 65 ^m .1. SSS 69 ^m .9. Chile.
61	23	11	e 30 03		i 34 19	41 54	67		P quite small. The reading uncertain. PS 43 ^m .5. PPS 44 ^m .4. SS 49 ^m .5. Flores Sea.
62	24	4	e i 30 07+	36 23	i 31 54	33 03	40	42	36 ^m 45 ^s , large. 37 ^m 09 ^s . SS 39 ^m .5. Per- sian Gulf.
63	25	14	e 09 08	20 06	e i 12 55	13 14			iSKS 19 ^m 16 ^s . pSKS 19 ^m 49 ^s . sS 21 ^m 06 ^s . SP 21 ^m 46 ^s . 22 ^m 30 ^s . Depth about 100 km. Coast of northern Chile.
64	25	20			01 26	05 41	21		South Pacific Ocean.
65	25	23	i i 14 36	i 19 12			23	27	Turkey.
66	26	11					.3		
67	30	1	e i 36 58		40 58	41 28			iSKS 47 ^m 22 ^s . sSKS 48 ^m 12 ^s . e 49 ^m 05 ^s . 50 ^m 28 ^s . 55 ^m 18 ^s . Depth about 100 km. South of Mindanao.

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No.	Date	Hour	Forerunners				L	△	Remarks
			P or P'	S					
	1949								
	June								
104	26	5		e 49 41			51.8	Ionian Sea.	
105	26	8	e 55 16		i _E 60 01	65.8		i _E 66 ^m 08 ^s . 66 ^m 36 ^s . 69 ^m .1. SS 74 ^m .8.	
106	27	1					03	[SS 78 ^m .1. Molucca Sea.	
107	28	20		e 25 16			34	North Atlantic Ocean.	
	July								
108	2	11	e 48 35		e 49 25			Southwest of New Zealand?	
109	2	20	e i 10 52	i 22 28	14 22	15 02		i _{SKS} 21 ^m 28 ^s . i 22 ^m 16 ^s . 24 ^m 44 ^s .	
110	4	1	i 58 19				98	[SS 29 ^m .0. Mariana Islands region.	
111	4	3	i i 48 36+	i 54 55	50 16		58.2	58 ^m 40 ^s . Persian Gulf.	
112	4	4	i 30 36					Probably aftershock.	
113	5	2	e e 37 57	e 44 15	i i 38 01	i 38 08	42	i 44 ^m 23 ^s . Aftershock.	
114	7	0					.1		
115	7	4		e 45 38	48 30		50	North Atlantic Ocean.	
116	7	12	e 26 02	e 30 08			33.5	South of Rhodos.	
117	8	7	e 58 27					Foreshock?	
118	8	8	e e 10 04	e 16 24	11 42	15 24	42	Turkestan.	
119	8	13					.1		
120	8	18	i e 22 08	25 24			26.8	18 Southwest of Spitsbergen.	
121	9	1					.7		
122	10	4	i i 01 24+	i 07 43	i 02 56	03 06	14.0	42 03 ^m 32 ^s . ScP 07 ^m 15 ^s . 08 ^m 34 ^s . 09 ^m 01 ^s . i _{SS} 10 ^m 39 ^s . Turkestan.	
123	10	5	e 23 15					Repetition.	
124	10	11	i e 05 18	e 11 32	14 34		42	»	
125	10	12	i e 05 40	e 12 01	i 07 19		42	»	
126	10	14	i e 21 13	e 27 30	i 21 16	22 55	42	»	
127	10	15	i 15 38					»	
128	10	15	i i 26 49+	e 33 07	28 27	31 16	42	»	
129	10	15	i i 57 05	i 63 23	i 58 43		42	»	
130	10	16	i i 31 50	i 38 08	i 33 30	40 57	42	»	
131	10	17	i 48 36					»	
132	10	19	i 02 33					»	
133	10	23	i 16 46					»	
134	11	4	i 03 26					»	
135	11	9	e 50 44		e 50 54	e 51 06		Fiji Islands region?	
136	11	16	i i 22 38	e 32 22	i e 22 52			Deeper than normal. Japan.	
137	13	10	i e 21 50	e 28 12	23 29		42	Aftershock to Turkestan quake.	
138	13	18	i 36 15	e 42 34	37 55		42	Aftershock to Turkestan quake.	
139	14	3	e 43 24	e 49 41			42	Aftershock to Turkestan quake.	
140	14	11					16.8	Yugoslavia.	
141	14	20			i 59 29			Off east coast of Borneo.	
142	14	23	i i 32 52	i 42 34				Deep focus. Bonin Islands region.	
143	15	11			37.7		.9		
144	18	0			e 51 10	e 57 33	81	Molucca Sea.	
145	18	22					34		
146	19	17	e e 50 02		51 41	52 06		59 ^m 25 ^s . No Galitzin records Turkestan.	
147	20	22			44 26	45 05	62	No Galitzin Z record. Southwest of Java.	

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			P or P'		S									
			m	s	m	s	m	s	m	s	h	m	°	
148	1949 July	21					40	30	43	50				No Galitzin Z record. pPKS 50 ^m 23 ^s . 56 ^m 36 ^s . 57 ^m 06 ^s . 59 ^m 06 ^s . PPP (> 180°) 61 ^m 16 ^s . 62 ^m 16 ^s . 67 ^m 01 ^s . No Galitzin Z record. Depth about 200 km. New Hebrides Islands.
149	23	10	i	i 45 50			i 48 47		49	34				
150	23	15	i	e 07 57	i	11 33		11 59			13.3	20	No Galitzin Z record. First movement small, then large swings. Near west-coast of Turkey.	
151	23	18					02	27			04		39 ^m 21 ^s . SKKS 42 ^m 06 ^s . SKSP 45 ^m 07 ^s . SKKS (> 180°) 46 ^m 37 ^s . SS 54 ^m 47 ^s . No Galitzin Z record. Kermadec Islands.	
152	27	15	e	i 31 27			i 31 34		35	16				
153	30	17									57		Forerunners traced but very uncertain. No Galitzin Z record. Turkey.	
154	Aug. 5	19	e	22 00	i	33 00	e	32 35	33	54	53	90	SS 39 ^m 37 ^s . SSS 43 ^m .1. Central Equador. Destructive.	
155	6	0	e	55 02			55	13	58	44			63 ^m 37 ^s . 64 ^m 53 ^s . 67 ^m 28 ^s . 69 ^m 49 ^s . 73 ^m 05 ^s . 76 ^m .0. Phases not clearly marked. [Tonga Islands region. Indian Ocean.	
156	7	7									.2			
157	8	7					32	29	38	13				
158	8	13									17			
159	9	21									54			
160	11	14									29			
161	11	14			e	51.4	53.1				54.5		North Atlantic Ocean.	
162	11	21									28		PS 53 ^m 59 ^s . PPS 54 ^m 54 ^s . SS 60 ^m 09 ^s . SSS 63 ^m .3. Northeast of New Guinea.	
163	13	18					44	22	51	26				
164	16	11	e	57 36	e	64 27						47	Masked by longperiodic microseisms. Baluchistan.	
165	17	18	i	i 45 38									Depth about 100 km. Japan.	
166	17	18	i	i 49 39	i	54 02					58	25	Destructive. Eastern Turkey.	
167	17	20			e	54 56					58		Aftershock. Partly masked by preceding shock.	
168	18	13					56	42					Masked by microseisms. Panama.	
169	22	4	i	i 12 11	i	21 13	12	47	21	58	33.6	69	SS 25 ^m 50 ^s . Off British Colombia.	
170	23	13	i	46 11							53		Eastern Turkey.	
171	23	15			e	39 16	38	16	46.3		1.0		Near coast of Peru.	
172	23	20	e	i 35 34	i	44 42	38	05	45	38	57.5	70	SS 49 ^m 03 ^s . SSS 52 ^m .1. British Colombia.	
173	23	22	e	11 44									Eastern Turkestan.	
174	24	6	i	45 18									Depth about 100 km. Tonga Islands region.	
175	25	4	e	e 25 49	e	35 09	40	25			50	72	Aleutian Islands.	
176	25	23	e	44 50			45	23	52	22	80		55 ^m 07 ^s . 57 ^m 11 ^s . SS 60 ^m 24 ^s . Banda Sea.	
177	26	5	e	38 31			i	39 01					First onset of very short period. Seismic?	

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No.	Date	Hour	Forerunners				L	△	Remarks
			P or P'		S				
			m s	m s	m s	m s	h m	°	
178	1949 Aug. 28	19		e 39 22			42.2		North Atlantic Ocean.
179	29	3	i 53 36						
180	29	14					54.2		
181	30	16	i 54 29	i i 57 33			59.6	17	Crimea.
182	Sept. 4	11	i 28 19						Seismic?
183	5	3	e e 06 45		e 17 24	18 28	34		Philippine Islands.
184	5	3	e e 30 54						Repetition. Masked by first shock.
185	12	9	i 36 36		39 50	43 09	1.3		SKKS 46 ^m 32 ^s . Loyalty Islands region.
186	14	2					.3		
187	14	20	e 04 06		e 04 35	i 08 30			PPP 10 ^m 30 ^s . eSKS 14 ^m 48 ^s . iPS 17 ^m 22 ^s .
188	15	16					31		[18 ^m 35 ^s . Celebes region.
189	16	19			35 58		58		Aftershock to Celebes quake. (No. 187).
190	17	2					46		
191	17	11	i i 34 41	i 38 26			40.5	21	Greece.
192	17	23	e 11 53		13 47	17 42			iSKS 21 ^m 21 ^s . Pacific Ocean.
193	19	22			10 41	12 34	33		SS 16 ^m 49 ^s . SSS 20 ^m .6. South Atlantic
194	20	3					04		[Ocean.
195	20	8					.0		
196	20	12	i 15 09		e 15 16	18 55	58		29 ^m 17 ^s . SS 38 ^m .8. SSS 44 ^m .2. Ker-
197	21	13	e i 07 46		18 13	19 04			madec Islands region.
198	22	16					19		PPS 19 ^m 28 ^s . SS 23 ^m 52 ^s . SSS 27 ^m .5.
199	24	4			48 38	51 42	75		Southern Mexico.
200	25	15			38 10	42.6	72		SS 54 ^m .2. SSS 57 ^m .2. Solomon Islands region.
201	27	15	i e 41 14	i 49 50	i i 41 28	43 45	61	64	45 ^m 20 ^s . 51 ^m 10 ^s . SS 54 ^m .0. Deeper than
202	27	18					.0		[normal. Alaska.
203	29	4	i 55 45		i 55 50		72		
204	Oct. 4	10	e i 30 53	i 39 26	i 31 10	41 01		64	SS 43 ^m 30 ^s . SSS 46 ^m .3. Mid Atlantic Ocean.
205	4	17		e 41 39			45		Greece.
206	5	21					10		
207	7	12	i i 15 55		19 21	19 51	48		iSKS 26 ^m 34 ^s . iSKKS 26 ^m 43 ^s . PS 28 ^m 46 ^s . PPS 29 ^m 32 ^s . SS 34 ^m .3.
208	7	14					(.2)		Indian Ocean.
209	8	3	i 13 10		i e 13 16		19.4		The onset of L masked by previous L-waves.
210	8	21					23		Mediterranean Sea.
211	12	22					.9		
212	13	4					.9		
213	13	10	i 32 35				42.6		Iran.
214	19	9					02		

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			P or P'		S												
			m	s	m	s	m	s	h	m	°						
215	1949 Oct. 19	21				21	24	27	14				PS 30 ^m 45 ^s . SS 37 ^m 15 ^s . SSS 43 ^m 03 ^s . Strong microseisms. Solomon Islands [region].				
216	20	2								42							
217	20	13				15	12	22	17	.7			SSS 25 ^m 22 ^s . Strong microseisms. So-				
218	21	6								.9			[lomon Islands region.				
219	21	21				54	47	64	32	1.5			Solomon Islands region.				
220	28	19	i	06	43								Depth about 450 km. Fiji Islands region.				
221	31	1								06							
222	31	1	e	i	50	15	i	59	07	52	47	54	35	ScS 60 ^m 18 ^s . SS 63 ^m 29 ^s . Alaska.			
223	31	18				16	00	26	05	52				31 ^m 54 ^s . 32 ^m 51 ^s . Solomon Islands region.			
224	Nov. 1	13	e	13	14					24.4		27.5	48	P very small, uncertain. Altai Mountains, Mongolia.			
225	2	2						51	42	67.3		81		Northwest of New Guinea.			
226	3	1	i	i	23	39	i	32	40	24	22	28	39	i 32 ^m 54 ^s . i 33 ^m 27 ^s . i 38 ^m 25 ^s . 41 ^m .0. Depth about 200 km. Kurile Islands.			
227	4	7						i	16	52				Felt in Stevns, Denmark.			
228	7	6	i	e	19	00		21	37	i	i	22	25	i 31 ^m 18 ^s . 34 ^m 39 ^s . SS 39 ^m 42 ^s . New Hebrides Islands.			
229	8	8	e	57	50					1.5				North of New Guinea.			
230	11	15	e	56	38	e	66	54	60	44		87	82	Formosa region.			
231	13	5						07	05			23		Forerunners masked by microseisms. Guatemala.			
232	20	7	i	i	22	28	e	32	44	i	32	54	34	28	SS 38 ^m 08 ^s . Gulf of California.		
233	22	1	i	i	11	23				i	i	11	25	i	11	41	iipP ₂ 12 ^m 21 ^s . iiPP 15 ^m 11 ^s . 17 ^m 04 ^s . i 18 ^m 40 ^s . 20 ^m 32 ^s . SKSP 25 ^m 29 ^s . SKKS ₂ 26 ^m 27 ^s . 29 ^m 44 ^s . Deeper than normal. Kermadec Islands.
234	22	15	i	29	11									Iran.			
235	23	16	i	i	55	25	e	59	18			61.5		S uncertain. Aegean Sea.			
236	27	9	i	e	01	45			05	31	12	00	.9	20 ^m 13 ^s . SS 23 ^m 24 ^s . SSS 28 ^m .8. Tonga Islands.			
237	Dec. 5	13	e	11	36							.5					
238	5	13										.8					
239	6	17										26.2		South of Crete.			
240	7	16	i	18	34	e	22	45									
241	17	1										.5					
242	17	7	i	12	50			15	14	17	54			SKS 21 ^m 45 ^s . 22 ^m 47 ^s . PS 25 ^m 15 ^s . Straits of Magellan.			
243	17	15	i	e	27	14		30	14	31	57	68.2		SS 46 ^m .4. Straits of Magellan.			
244	18	5	i	58	37			i	59	08				Depth about 150 km. Kermadec Islands.			
245	20	4	i	35	12									Depth about 600 km. Fiji Islands.			
246	21	19	i	i	45	46		49	52	i	55	29		59 ^m 14 ^s . i 59 ^m 35 ^s . 61 ^m 37 ^s . Depth about 600 km. Southern Bolivia.			

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			P or P'		S							
			m	s	m	s	m	s	h	m	°	
247	1949 Dec. 22	9	i	i 43 21	i	i 53 39	i	i 43 46	i	43 56		iPP 46 ^m 44 ^s . 53 ^m 57 ^s . i 54 ^m 27 ^s . Depth [about 100 km. Mexico. Foreshock to next quake. Masked by microseisms. Japan.
248	23	21	e	46 02								
249	25	23	i	29 28								
250	25	23	i	36 51	e	47.0	i	36 55	i	36 59	58	
251	26	6					i	50 26		64.6		Masked by microseisms. Fiji Islands. 27 ^m 14 ^s . SS 33 ^m 32 ^s . Masked by microseisms. Sandwich Islands. eSKS 26 ^m 54 ^s . i 27 ^m 24 ^s . Northern [Luzon. Philippine Islands. Depth about 200 km. Kermadec Islands.
252	28	0						17 23		23 17		
253	28	6									41	
254	29	3	i	i 16 34				17 37		18 27	50	
255	29	10	e	30 42							61	
256	29	17	i	e 02 32				25.6				

December 1954

HENRY JENSEN