



HELWAN OBSERVATORY

SEISMOLOGICAL REPORT FOR THE YEAR 1948

Published under the Direction of

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Director of Helwan Observatory

SEISMOLOGICAL REPORT
1948

HELWAN OBSERVATORY

Seismological Bulletin

Constants of the Station:

$\phi=29^{\circ} 51'N.$ $\lambda=31^{\circ} 20'E.$ $h=115$ m.

NATURE OF STRATA: Limestone rock.

INSTRUMENTS: Galitzin Wilip Aperiodic Seismograph, Photo Galvanometric Registration, Vertical Component.
Milne-Shaw Seismographs, Photographic Registration, two Horizontal Components.

Component	Date from which Constants apply	Pendulum Free Period T	Galvanometer Free Period T ₁	Damping Constant	Transmission Coefficient K	Static Magnification V
		sec.	sec.			
N	Monthly	12.0				250
E	"	12.0				250
Z	9 6-1938	11.16	11.13	+0.05	175	1000

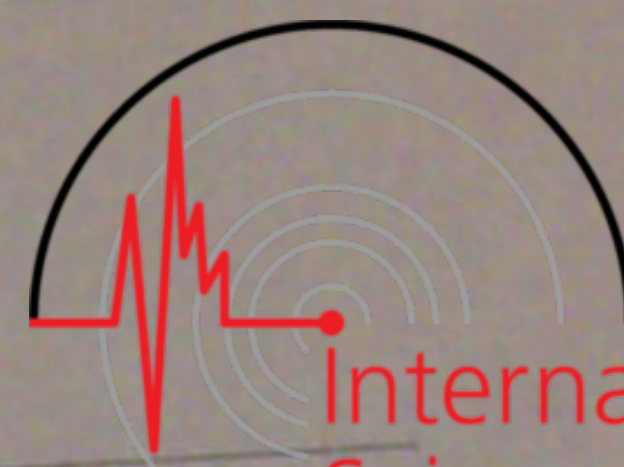
The Seismological station at Helwan is superintended by Assis. Professor Azouz Ismail who carried out the measurements contained in this volume.

N.B.

Please note that " Compression " should be taken " Dilatation "
and " Dilatation " a " Compression "

** Confused with the succeeding earthquake.

*** Lost in changing the paper.



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
10	22	Z Z N	e e M F	20 21 21.6	29 40 16	32 12						Very weak
11	24	Z	iP F	17 23.1	59	22						Dilatation
12	25	Z Z N	eP e e F	6 7.2	10 12 21	41 33 12						
13	26	Z Z Z Z	eP e e i F	9 9.9	11 12 13	21 32 50 18						Confused with microseisms
14	26	Z Z Z N N N N	iP PP PPP S e PPS M F	14 17.5	23 26 28 33 34 35 02	20 36 32 48 24 00 08	24	+24			9335	Compression
15	27	Z N N N N N N N N N N N	iPKP e e e pPKP pPKKP e PP sPP e e e e F	12 15.0	17 18 19 20 21 24 26 33 36 39	06 26 36 21 48 34 08 18 54 36 14 24					17000	Compression h = 600 Kms.
16	28	Z N N	eP eS PPS F	4 6.0	00 11 13	32 30 36					10400	
17	28	N N N	eP e S F	15 16 17.7	57 58 02	42 12 42					3465	
18	30	Z	e F	3 4.7	17	33						Very weak
19	30	Z N	eP S F	8 11.1	49 54	37 44					3445	
20	February 1	Z Z	e i	11	51 52	46 12						Confused with microseisms
21	1	Z	eP F	20 22.5	48	00						" " "
22	1/2	Z N ZN Z Z Z	e e i e i i F	23 0.3	43 47 51 52 53 54	39 46 42 33 33 08						" " "
23	3	Z Z Z Z	ePKP (PKKP) (PP) e F	00 3.0	48 52	24 41 16 54					17020	" " " Very weak
24	3	Z	e F	12 14.0	02	06						" "

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
25	4	Z Z Z N	eP i i e F	4 5 5.7	54 55 59 02	56 11 45 33						
26	6	Z N	e i F	1 2.5	52 57	00 16						Very weak
27	6	Z Z Z N ZN	eP e PP ~ PS F	22 23.9	31 32 34 41 42	23 16 37 54 48					9500	Preceded by microseisms
28	9	Z	iPn F***	12	59	51						Dilatation (Very strong)
29	9	Z Z Z	eP i i F	15 17.0	07 08 10	15 33 57						Confused with the preceding earthquake
30	10	Z Z Z Z	i i i i F	14 14.8	26 27 28	30 10 30 09						Confused with microseisms
31	10	Z Z Z Z Z	Pn P* e Sn e F	16 16.7	00 01 01 02	30 45 15 54 18					722	)
32	11	Z Z Z Z	P e i i F	9 9.7	21 23 24	55 15 54 19						" " "
33	11	Z Z Z N	e e e i F	15 15.9	34 35 38	28 33 20 54						" " "
34	11	Z Z N NZ N	Pn e Sn e e F	18 18.7	05 06 07	18 24 38 48 18					778	" " "
35	11	Z NZ Z Z Z Z	e i i i i i F	22 22.9	33 34 35 39	06 12 31 52 12 32 26						Preceded by microseisms (Near earthquake)
36	12	N Z Z Z Z	Pn e Pg Sn S* F	22 23.0	28 29 30	54 09 27 12 36					744	Preceded by microseisms
37	13	Z Z Z N N	P i PcP S e F	5 6.3	05 06 11 15	00 38 57 24 02					4720	" " "
38	13	Z Z Z	e e i	8	18 19	09 45 24						" " "

No	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
39	14	ZE	e			42						
		Z	i		20	45						
			F	8.6								
		Z	e	1	00	10						Very weak
		Z	e		01	28						
			F	2.3								
40	14	Z	e	22	22	06						" "
		Z	e		29	02						
		Z	e		30	37						
			F	24.0								
41	15	ZN	ePn	17	56	30					688	
		Z	eSn		57	42						
			F	18.5								
		Z	iP	22	15	08						Compression
42	17	N	e			42						(Near earthquake)
		Z	e		16	12						
		Z	e		17	09						
		NZ	i		18	30						
		N	i			52						
		Z	e		19	54						
		N	e		20	06						
			F	23.3								Very weak
43	18	Z	e	00	15	47						
		Z	e		17	47						
		Z	e		18	10						
			F	0.4								" "
44	18	Z	e	6	30	30						
		Z	e			42						
		N	e		33	08						
			F	6.8								Dilatation
45	18	Z	iP	20	39	04					5835	
		Z	PeP		40	16						
		NZ	PP		41	04						
		Z	i			51						
		N	iS		46	30						
		N	PPS			45						
			F	22.3								Very weak
46	19	N	e	22	20	52						
			F	22.9								
47	23	Z	e	9	45	20						
		Z	e			44						
			F	12.0								Confused with microseisms
48	28	Z	eP	2	11	38					10665	
		N	SKS		22	14						
		N	PS		24	20						
			F	3.5								
49	March 1	Z	iP	1	25	56					10500	Dilatation
		ZN	PP		29	45						
		N	S		37	06						
		N	i		39	57						
		N	M	2	06	30	24	+83				
			F	5.0								
50	3	Z	eP	9	21	56					8720	
		N	iS		31	51						
		N	PS		32	33						
			F	12.1								
51	4	Z	e	14	56	36						Very weak
		N	i			40						
		NZ	e		57	30						
			F	15.2								
52	4	N	e	17	42	36						" "
		N	e		48	15						
			F	18.0								
53	6	Z	e	14	05	53						" "
		Z	e		06	00						
		Z	e		09	29						

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
54	6	ZN N N	Pn Pg Sn F	20 20.8	14 15	36 30 43					633	Local (NoI felt)
55	7	N N	e e F	19 20.2	03 13	00 26						Very weak
56	9	N N N	e e M F	19 22.0	15 19 54	12 02						" "
57	10	Z N N	PKP (SS) M F	11 12 14.1	45 07 54	05 30					17000	" "
58	10	Z Z	e e F	20 21.4	17 30	42 24						" "
59	11	Z	e	13	50	41						" "
60	13	N	e F	5 5.3	22	06						" "
61	13	N N	e e F	8 8.7	25 28	24 26						" "
62	13	N N N N N	e e e e e F	20 22.0	21 26 27 28	00 56 30 06 36						" "
63	14	Z Z N N	eP e eS M F**	21	23 27 24	26 56 58					2945	" "
64	14	Z N	e M F	22 23.6	25 55	48						" "
65	15	Z	e F	1 2.7	54	33						" "
66	15	Z Z N N	P PP eS e F	11 12.8	36 40 47	39 03 18 30					9555	Preceded by microseisms
67	16	Z Z Z N	P e e S F	2 3 4.2	52 53 54 02	42 15 04 47					8890	" " "
68	16	Z Z NZ	(Pn) (P*) (Pn) F	14 14.2	00 01	00 19 30					766	Confused with microseisms
69	17	N	i F	20 21.1	06	16						Very weak
70	21	N N N N N N	ePP SKS e S PS M F	21 22 24.0	52 58 59 01 31	12 48 15 54 09 03	15	+16			11020	
71	23	N N N	eP PP S	18	23 27 34	54 14 00					9445	h = 100 Kms.

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H	M.	S.	Sec.	μ	μ	μ	Kms.	
72	23 (Contd)	N	pS		35	00						
		N	sS			24						
			F	19.4								
73	24	N	eP	5	31	42					8720	
		N	iS		41	39						
		N	eF	7.4	42	30						
74	26	N	e	13	47	00						Very weak
		N	e			30						
		N	e		48	06						
		N	M	14	13							
75	29		F	14.7								
		Z	Pn	2	34	36					610	Preceded by Microseisms
		Z	i			42						(Not felt)
		N	Sn		35	41						
		N	S*		36	02						
		NZ	Sg			12						
76	29	Z	PeP		41	51						
		Z	F	3.3								
		Z	iP	10	24	45					889	Dilatation
		Z	PPP		25	00						
77	April 3	NEZ	iS		26	18						
			F	11.5								
		Z	iPKP	12	10	15					16110	Dilatation
		Z	pPKP			42						
		Z	sPKP			35						h = 100 Kms.
		Z	i		11	07						
78	4	Z	i		13	24						
		Z	PP			45						
		Z	pPP		14	06						
		Z	F	14.3								
79	9	Z	i	7	55	53						Very weak
		Z	i		56	15						
		N	eF	8	06	16						
80	9		F	8.6								
		Z	e	4	54	50						" "
			F	5.1								
81	9	Z	e	13	39	03						" "
		Z	e		42	18						
		Z	eF	13.8		54						
82	9	Z	e	15	11	54						" "
		N	M		19	45	12	-12				
			F	16.0								
83	12	Z	eP	9	09	23						Preceded by Microseisms
		NE	M	10	01							
			F	11.2								
84	13	Z	eP	13	06	24						" " "
		Z	i			33						
		Z	eF	13.4	07	09						
85	17	ENZ	iP	16	24	05					9390	Dilatation
		EZ	PP		27	24						
		E	iS		34	29						
		N	PS		35	28						
		N	PPS			49						
		N	M	17	08	00	18	+76				
86	18		F	20.2								
		Z	P	12	34	10					11780	Preceded by Microseisms
		Z	i		37	27						
		Z	i			44						
		Z	PP		38	37						
		Z	e		39	30						
		E	e		44	46						
		EN	SKS			54						
		N	e		46	36						
		N	e		49	24						
		N	eF	16.0	54	58						

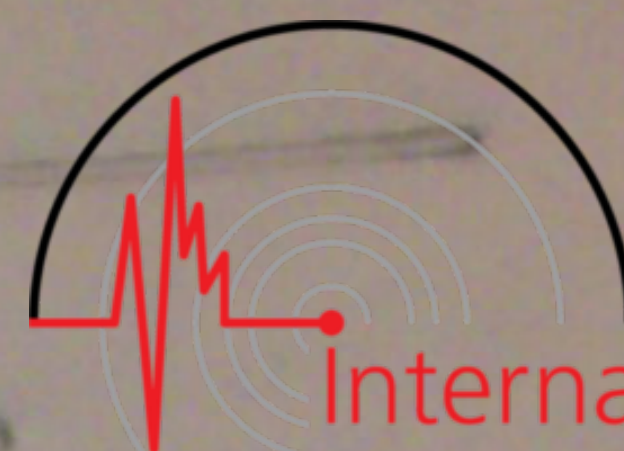
No	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
85	20	Z	e	4	50	46						Very weak
		Z	e		51	09						
			F	5.1								
86	21	Z	e	15	40	48						" "
		Z	e									
			F	17.5	43	16						
87	21/22	Z	iP	20	35	06					10000	Comprission
		Z	e		38	18						
		ZN	PP			38						
		Z	PPP		40	42						
		EN	SKS		45	37						
		N	S		46	00						
		E	PS		47	06						
		E	SS		52	00						
		N	M	21	10	42	20	+37				
			F	0.4								
88	22	Z	iP	00	41	21					9890	Comprission
		Z	PP		44	49						
		N	SKS		51	48						
		NE	S		52	09						
		E	PS		53	15						
			F	3.2								
89	22	Z	e	4	51	50						Very weak
			F	5.1								
90	22	ZN	P	10	45	42					1380	Pacceded by microaslons
		Z	PP			51						
		NE	S		48	02						
		Z	SS			15						
		N	M		56	45	15	-123				
			F	13.3								
91	22	Z	e	13	22	03						Very weak
		Z	e		23	30						
		E	e		32	33						
		N	e			54						
		N	M		56							
			F	14.5								
92	23	Z	e	5	44	08						" "
		Z	e			21						
			F	6.2								
93	23	Z	eP	12	03	24					9865	Preceded by microaslous
		NE	(SKS)		13	48						
		N	(S)		14	10						
			F	13.5								
94	24	Z	e	16	51	32						Very weak
		Z	e		52	48						
		Z	e		53	34						
			F	17.1								
95	26	ZNE	e	7	30	06						" "
			F***o									
96	26	Z	e	9	04	35						" "
		Z	i			48						
		Z	i		06	14						
			F	9.2								
97	26	Z	e	9	41	42						" "
		Z	e		49	12						
			F	10.3								
98	28	Z	e	21	44	18						" "
		Z	e		46	21						
			F	22.0								
99	28	Z	iP	12	14	33					10000	Dilatation
		Z	(pP)		15	00						
		E	SKS		24	52						h = 100 Kms.
		ENZ	is		25	15						
		ZN	e			28						
		Z	e		27	03						
			F	13.1								

No.	Date	Comp.	Phase	G.M.T			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
100	30	NE N E	Pn Pg Sn F	14 15.2	52 53	18 45 24					633	Felt in Cairo
	May											
101	3	Z N N NE	iP (s) (PS) M F	12 13.2	12 22 23 49	05 33 20					9380	Dilatation Very weak
102	3	Z Z N N N	iP e (s) (PS) M F	13 14 15.4	55 57 05 06 33	22 23 42 30 10	15	+10			9245	Dilatation Very weak
103	3	Z N NE	eP e M F	21 22 22.2	20 32 00	10 06						" "
104	5	N Z Z	i e e F	23 23.8	37 38 41	36 06 42						" "
105	7	Z Z Z Z N N	iP e PP e e es F	15 15.3	00 01 02	29 36 41 06 46 54					1465	Compression Very weak
106	8	Z Z Z Z NE N	iP i i e (s) i F	2 3 4.0	59 02 09 10	12 31 45 52 05 46 15					9555	Dilatation Very Weak
107	9	Z Z Z Z NE N NE	iP i e e PP S e e F**	2 24 31 32	21 24 31 32	29 39 57 06 43 46 06 51					9220	Dilatation
108	9	Z Z	i i F	2 5.1	51	24 43						
109	9	Z Z Z Z	e i e e F	8 11.0	36 37	12 30 03 30						Very weak
110	11	Z Z ZE E N N Z Z N E	P i i PP SKS S i PS i M M F	9 10 11.5	10 13 14 20 22 23 24 01 01	07 23 39 28 37 18 43 42 27 08 08	18 18	-14	+24		12020	
111	12	Z Z Z	e e e	1	02 03	51 06 40						

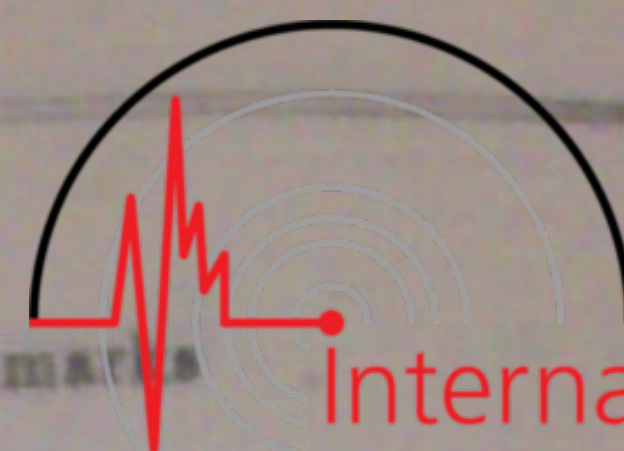
No.	Date 1947	Comp.	Phase	G.M.T.			Period Sec.	Amplitude			Δ Kms.	Remarks
								A_n μ	A_e μ	A_z μ		
112	12	Z	e		04	27					9610	
		Z	e		05	51						
		Z	e		06	33						
		Z	e			54						
		Z	eP	1	09	42						
		Z	e		10	56						
		Z	e		12	56						
		NE	PP		13	06						
		NE	e		20	06						
		N	s			25						
		NE	e		21	52						
		E	SS		26	15						
113	14	N	M		59	58	18	+24			10000	Very weak h = 300 Km.
			F	5.0								
		Z	P	00	03	33						
		Z	e		04	38						
		Z	(PP)		07	15						
114	14	E	(SKKS)		13	40					9555	Dilatation
			F	1.0								
		Z	iP	13	31	53						
		Z	PP		35	15						
		N	SKS		42	18						
115	14	ZN	es			36					10335	Very weak h = 180 Km.
		N	i			48						
			F	15.0								
		Z	P	18	52	25						
		Z	(pP)		53	09						
116	14/15	N	(s)		19	03					10445	Dilatation
			F	20.4								
		NZ	iP	22	45	10						
		Z	PP		48	59						
		N	e		52	46						
117	15	N	SKS		55	42					10500	h = 110 Km.
		N	SKKS		56	00						
		N	PS		57	38						
		N	PPS		58	00						
		N	SS	23	02	44						
118	17	N	M		29	54	24	+115			10500	h = 110 Km.
			F	3.2								
		Z	eP	2	55	08						
		Z	e			27						
		Z	e		59	15						
119	18	Z	(s)		3	06					10500	h = 110 Km.
		N	F**			00						
		Z	eP	18	01	42						
		Z	e			57						
		Z	pP		02	12						
120	19	Z	PP		05	36					810	Very weak
		Z	pPP		06	02						
		N	S		12	44						
			F	19.6								
		Z	e	1	41	50						
121	22	Z	e		42	09					810	Very weak
		Z	e			08						
		Z	e		43							
			F	1.8								
		Z	eP	17	55	12						
122	22	Z	e			27					810	Very weak
		Z	e		59	24						
			F	18.2								
		Z	eP	5	09	42						
		Z	e			53						
123	22	Z	e		10	53					810	Very weak
		NE	Sn			06						
			F**									
		N	i	5	30	48						
		Z	i		31	51						
124	22	Z	e		32	30					16355	
		Z	e			57						
			F	5.8								
		Z	ePKP	19	41	12						
		N	e		42	54						

No	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
124	23	Z	SKS		48	11						
		NEZ	e		55	51						
		N	M	20	43							
			F	23.4								
		Z	P	4	31	39					8555	h = 170 Kms.
		Z	e			52						
		Z	pP		32	20						
		Z	sP			35						
		Z	PP		34	38						
		Z	i			55						
		E	e		35	08						
		NE	S		41	05						
			F	6.1								
125	23	N	i	9	34	18						Very weak
			F	10.2								
126	25	E	(SS)	7	34	48						Beginning last in changing the paper.
		E	M		54	47						
			F	11.2			16	+ 124				
127	25	Z	e	19	11	51						Very weak
		N	M		18							
			F	19.6								
128	26	Z	eP	9	30	21					10280	
		Z	PP		34	00						
		Z	e			45						
		N	SKS		40	48						
		NE	S		41	26						
			F	11.0								
129	27	Z	iPn	7	34	31					890	Compression
		Z	e			48						
		NEZ	Sn		36	03						
		Z	e			24						
		Z	e			20						
			F		42							
130	28	NE	M	6	41							
			F	7.0								
131	28	Z	e	14	57	54						
		Z	e		58	14						
			F	16.0								
132	29	NZ	e	2	20	54						Very weak
		Z	e		21	08						
		Z	e			36						
		Z	e		22	33						
		Z	e		23	36						
			F	2.6								
133	29	NZ	iP	4	52	36					1890	Doubtful h = 150 Km.
		Z	e		53	07						
		NZ	i			14						
		Z	e			44						
		EZ	s		55	36						
		Z	e		56	20						
			F	5.2								
134	30	Z	i	5	52	24						
		Z	i			39						
		Z	i		53	06						
		Z	i			27						
		Z	i			49						
		Z	i		54	04						
			F	6.1								
135	June 1	N	e	3	39	06						Very weak
		NE	M	4	00							
			F	4.6								
136	1	Z	eP	19	06	27					7445	
		Z	e			45						
		Z	e		07	23						
		Z	e		08	39						
		Z	PP			55						
		N	S		15	20						
		N	e		16	05						

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
136	1 (Contd)	N N	SSS M F	21.0	22 34	42 18	18	+21				
137	8	Z Z Z NE E	P e e S M F	3	23 26 32 50	23 35 06 14					7390	confused with microseisms
138	13	Z Z	e e	6	38	18 43						Very weak
139	15	Z Z Z N N N N	iP i PP S e PS M F	11 12	57 00 07 08 39	17 27 30 36 05 30 06	15	+11			9220	Compression
140	17	Z Z NZ Z Z	Pn e Sn S* Sg F	6	55 57 58	06 50 03 46 14	12	+10			1145	
141	17	Z Z NE N	P i S PeP F	14	12 15 17	19 54 28 06					1890	
142	18	Z Z Z Z N	PKP e PP PPP e F	1	12 13 14 17 31	47 09 18 05 12					13445	h = 100 km.
143	18	Z Z NE	iP PP S F	18	49 50 53	39 12 54					2665	Compression
144	19	Z	i	6	38	15						Traces
145	19	Z	e	23	06	51						"
146	20	Z	e F	15 15.3	01	19						Very weak
147	21	Z	e	5	46	00						Traces
148	21	Z Z E N N	iP PP SKS S e F	12	18 22 29 35	33 14 00 36 44					10280	Dilation
149	21	Z Z Z	e e e F	14	10 15	48 20 30						Very weak
150	27	Z Z N	P e S F	00	18 26	24 45 30					6555	
151	27	Z N N Z	e e e e F	13	06 14 15 16	30 27 50 30						Very weak
152	27	Z Z ENZ	iP e PP	21	52 53 56	44 04 33					10555	Dilation



No.	Date 1948	Comp.	Phase	G.M.T.			Period Sec.	Amplitude			Δ Kms	Remarks
								A_n μ	A_e μ	A_z μ		
152	27 (contd)	N N N	SKS SKKS S F**	22	03	16 30 56						
153	27/28	NZ NEZ N Z N N N	PKP SKP e SKS i e SKKS F	22 23 24'5	53 56 00 01 02	22 42 03 21 03 28 24					14665	Confused with the preceding Choc
154	28	Z Z Z Z Z EN	iP i i e PP S F	7 11'0	25 26 28 29 36	58 21 56 28 08 18					9220	Dilation
155	29	Z Z Z Z	e e e e F	10 11 13'0	58 59 02 03	19 12 42 21						Beginning lost in change the paper
156	29	Z NZ	iP (S) F	16 17'3	10 13	23 48					2065	Compression
157	30	Z Z ENZ E	iP PP S M F	12 14'3	24 26 35	13 20 18 02	17	141—			1220	Dilation
158	30	Z Z Z NZ Z Z Z Z Z	iP PP PPP e S i i i i F	19 20'0	35 36 38 39 40 41	36 06 15 48 45 07 20 45 14 46					2555	Dilation (Doubtful)
159	July 3	Z Z Z Z Z Z	e i i e e e	13	09 11 12 14	16 21 34 03 41 27 35						Very weak
160	5	Z Z Z N NE E N	P PP PPP e S SS M F	13 14 16'2	58 02 03 07	21 46 58 24 30 06 (24)	12	258			2510	
161	7	Z Z Z Z NE	iP e PP PPP S F	2 4'1	31 32 35 37 42	50 07 12 07 24					9555	Dilation
162	8	NZ Z	e e	9	21 22	42 03						Very weak
163	8	Z NZ Z NE	iP PP e S F	12 13'3	43 44 45 49	02 50 18 48					5110	Compression

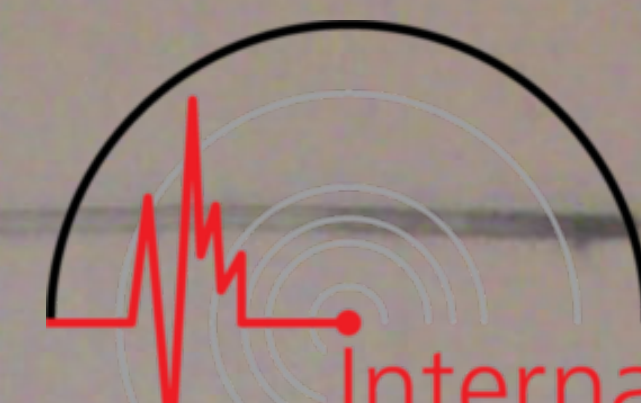


Remarks

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Seismological
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No.	Date 1948	Comp.	Phase	G.M.T.			Period	Amplitude			Δ Kms.	Remarks
								A_n μ	A_e μ	A_z μ		
164	12	Z Z	i i	3	02 06	36 12						Very weak
165	14/15	Z Z Z Z N N	(PP) e e e (PS) e F	22 23 1.5	48 49 50 58 04	50 51 09 30 42 44					13220	
166	16	Z EN	e M F	7 8 9.2	41 20	10						Very weak
167	18	Z Z Z N NE N NE N	eP PP e S e e ePPS M F	6 7 8.7	56 00 07 08 09 34	24 03 51 18 12 42 03					10055	
168	20	Z	e F	1 3.1	02	05						Very weak
169	20	N N E NZ	e e e i F	10 11.2	53 55 56	32 45 54 06						Confused with microseisms
170	20	Z Z Z Z E N N E	eP PP e e SKS S e M F	11 12 13.3	16 21 22 23 27 29 06 06	52 20 30 45 27 06 36					12220	" " "
171	21	Z Z Z	i i i	16	06 17	43 06 30						
172	22	Z NZ Z Z	Pn Sn e e	6	49 50 51	00 39 02 26					966	Very weak
173	22	N	M F	18 18.8	25							" "
174	23	Z Z Z E Z N	e e e e e F	12 14.9	40 43 50 51 56	18 54 03 24 42 48						Preceded by microseisms
175	23	NZ	M F**	20	43							Very weak
176	23	Z Z Z NE	P e e M F**	20 21	56 58 10	51 21 32						" "
177	23	Z N N	iP e e F	21 22.3	08 17	47 22 30						Dilatation
178	24	Z ZE E	iPn Sn Sg F	6 8.7	04 06 07	56 (20) 06					810	Compression (felt in Cairo)

No.	Date 1948	Comp.	Phase	G.M.T.			Period Sec.	Amplitude			Δ Kms	Remarks
				H.	M.	S.		A _n μ	A _e μ	A _z μ		
179	24	Z Z Z Z N NE	P i i e e e F	14	42	00 06 43 55 00 07			*			Very weak
180	26	Z NE Z Z	iP e e e F	11	28 29 31	07 17 27 24						Compression Very weak
181	28	NE Z	P e F	8	21	18 33						Very weak
182	29	Z Z Z N N	eP i i e F	00	45 49 56 00	57 42 55 36 18					9665	
183	30	Z Z Z NZ NZ N N	P PP e S e i M F	3	33 34 35 36 38 42	48 00 18 45 24 30 12	09	+23			1780	
184	30	Z N Z Z	e i e e F	6	37 39	20 34 09 42						Very weak
185	30	Z N Z Z Z	P e e e F	15	20 21	17 28 56 18 30						" "
186	August 4/5	Z E N	iP SKS es F	23	29 39 40	27 57 24					10110	Dilatation Very weak
187	5	Z Z NZ N N E	eP e S i SS M F	22	38 41 43 44 47	57 57 37 56 54 48	8	-9			3055	
188	6	N Z Z Z	e e e e	7	30 32	18 30 54 37						Very weak
189	6	Z N Z Z	e e e e	7	45 46 47	57 12 33 05						Very Weak
190	6	Z Z Z Z	e i i i F	9	35 36	15 22 45 42						Near earthquake
191	7	Z Z Z Z Z Z	P e e e e PP	14	53 54 55 56	09 40 40 02 38 52					10110	



No.	Date 1948	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
191	7 (contd)	Z Z EN EN N	e e SKS S e F	15	57 58 03 04 06	36 22 28 06 18						
192	10	Z ZN N	eP iS SS F	13	29 30	02 36 50					910	Preceded by microseisms
193	11	Z Z Z Z Z Z Z NE NEZ	ePKP e PP i sPP i i PPP e PS F	10	54 55 56 57 02 04	30 49 15 31 48 16 29 40 15 40					12220	" " " h < 100 Kms.
194	12/13	Z Z Z Z Z NE	eP e PP e e M F	22	38 42 44 46 20	44 05 57 35 31					11235	Very weak
195	14	Z Z Z Z NE N	iP e PP e eS e F	17	08 11 12 19	32 52 57 16 28 42					9780	Dilatation
196	17	Z Z Z Z NE	P e e PP e F	17	21 22 25 32	37 02 40 08 06					9780	
197	18	Z Z Z Z Z Z Z	iP PP i e eS i i F	19	08 10 11 12	45 56 13 36 46 04 06					1165	Compression
198	18	Z Z EZ	P e S F	21	16 19	34 43 54					2000	
199	19	Z Z Z Z Z NE	e e e e e i F	11	03 07 08 15	18 51 18 57 36 00						
200	19	Z Z Z N EN Z	iP epP iPP e iS e F	14	03 06 13 14	28 54 56 46 00 58					9780	Dilatation h = 100 Kms.
201	19	Z N	e e F	20	17 25	54 36						Very weak
202	19	Z Z	e e	20	49	39 49						Local tremor

No.	Date 1948	Comp.	Phase	G.M.T.			Period Sec.	Amplitude			Δ Kms.	Remarks
								A_n μ	A_e μ	A_{tz} μ		
203	20	Z Z	eP (PP) F	18 19 20.0	59 02	06 48						Very weak
204	21	NE Z Z	e e e	3	20 21	54 57 15						" "
205	21	Z Z Z Z	e e e e F	8 9.2	51 52	17 58 24 48						
206	21	Z ZE Z	e e e F	15 15.4	11 12 13	06 09 03						
207	22	Z Z Z N E NZ	iP e PPP e S e F	23 23.6	20 23	28 39 51 24 48 54					2000	Compression
208	24	Z Z Z	e e e F	6 6.6	19 22	26 36 00						Very weak
209	24	Z Z NE N	eP PP e PS F	8 9.2	14 17 23 24	44 17 34 09					7555	
210	25	Z Z Z E Z Z EN N N N	P e e i PP PPP SKS e S PPS F	6 9.8	23 27 30 34 35 38	39 53 09 43 57 18 20 06 42 00					11880	
211	26	Z Z	e e	14	29 32	42 33						Very weak
212	27	Z Z Z Z Z	eP PPP e S SS F	10 11.2	47 48 50 51	55 16 33 54 14					1780	
213	27	E NE Z Z Z	e i i e e F	17 18.0	13 14 16 17	06 00 30 51 24						
214	28	Z Z Z Z N	P i i PP S F	2 4.0	40 41 43 51	38 59 18 57 06					9445	
215	28	Z Z Z	e e e	9	48	14 27 36						Very weak
216	28	Z Z Z Z	PKP PKKP e PP F	12 14.6	44 45 48	20 45 03 18					17335	



No.	Date 1948	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
217	29	Z	PKP	17	57	39					17335	
		Z	PKKP		58	04						
		Z	'e			30						
		Z	i		59	21						
		Z	PP	18	01	04						
		Z	i		02	34						
		Z	e		11	00						
		Z	PPS		15	12						
			F	20.4								
218	29/30	Z	P	23	42	06					9335	
		Z	i			27						
		Z	e		43	14						
		NE	S		52	29						
		Z	(PS)		53	27						
			F	1.0								Very weak
219	30	Z	e	21	46	12						
		Z	e		49	21						
		Z	e		52	18						
			F	22.0								Preceded by microseisms
220	31	Z	eP	3	25	15						
		NZ	i			36						
		Z	e		26	24						
			F	3.6								
	September											
221	2	Z	(eP)	22	48	13					2035	Doubtful
		Z	i		49	51						
		Z	e		51	06						
		Z	S			34						
		N	i			42						
		E	M		55	32	9	-7				
			F	23.3								
222	2/3	Z	iP	23	47	45					10000	Compression
		Z	i		48	29						
		Z	i		50	27						
		Z	PP		51	21						
		NE	SKKS		58	24						
		N	S			36						
		N	i		59	20						
		N	PS			43						
		N	i	24	00	00						
		E	PPS			14						
			F	2.5								
223	3	Z	e	10	08	27						Very weak
			F	11.0								
224	3	N	e	22	18	18						Local tremor
		N	e			27						
225	4	Z	P	15	20	02					7780	
		Z	i			18						
		Z	PP		22	38						
		Z	i		23	30						
		Z	e		24	27						
		NE	eS		29	15						
		N	M		53	06	15	+14				
			F	17.5								
226	6	Z	ePKP	8	29	27						
		Z	e		39	15						
		Z	e		40	13						
			F									
227	6	Z	PKP	9	01	48					17655	Confused with the preceding ear the strike
		Z	iPKKP		02	21						
		Z	i		03	02						
		Z	e			39						
		Z	i		04	47						
		Z	i		05	02						
		Z	PP			21						
			F	11.0								
228	7	Z	iP	8	21	42					3780	Dilatation
		Z	e		22	04						
		Z	ipP			26						h = 220 km
		Z	e			45						
		Z	PP		23	08						
		Z	e			49						
		Z	PeP		24	10						

No.	Date 1948	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A _n	A _e	A _z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
228	7 (contd.)	N	S F	9.0	26	50						
229	8	NEZ	M F	11 11.7	35							
230	8	Z E N E N NE NE N N N	iPKP PKKP e PP e SKKS PSKS e (PPS) i F	15 02.6	29 33 36 40 43 46 48 52	07 39 08 14 10 00 36 36 06 54				17580	Dilatation	
231	9	Z Z Z	i e e F	6 8.5	29 30 36	45 03 39						Very weak
232	10	Z Z Z	e e e F	12 12.9	11 17 21	18 07 09						" "
233	10	Z Z Z N S N	iP e PP SKS S PPS F	14 18.0	01 04 11 13	15 09 39 40 48 05				9555	Dilatation	
234	11	Z Z NE N N	iPn i Sn i S* F	8 9.6	55 56 57	00 27 45 12 24				1010	Dilatation	
235	12	Z Z Z Z	i i e e	3	39 40 42 43	42 19 46 29						Very weak
236	14	Z Z Z	i e i	8	32 33	46 05 15						" "
237	15	Z E Z Z	e e e e F	4 4.7	00 07 11 24	46 29 45 00						" "
238	19	Z Z	i e	5	05 06	47 18						" "
239	19	Z Z N N N	P PP SKS SKKS e F***	6	27 31 38 40	26 20 00 18 20				10660	weak	
240	20	Z Z Z N E	Pn e e iSn e F	18 44	01 02	24 39 45 24 27				566		
241	21	Z Z Z Z Z N NE	iP i e i i i e i F**	17	44 45 47 49 52 53	15 31 57 23 16 15 48 10					Compression	



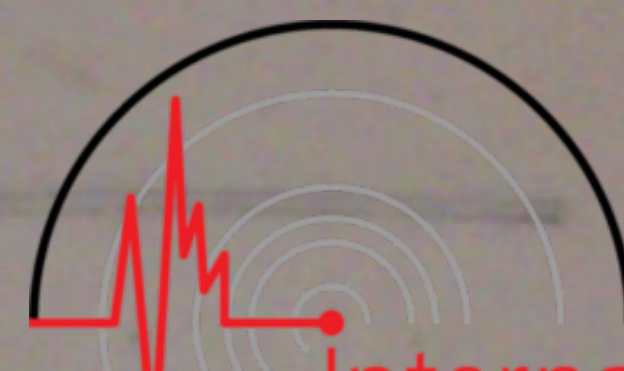
No.	Date 1948	Comp.	Phase	G.M.T.			Period Sec. μ	Amplitude			Δ Kms.	Remarks
								A_n μ	A_e μ	A_z μ		
242	21	Z Z Z N N	iP i i S i F	H. 17	M. 56 58	S. 21 32 54 10 42					1055	Compression
243	22	Z Z Z E E Z Z Z	e i i e e e e F	7	36 37 42 43 45 46	30 16 26 24 18 06 41 39						Very weak
244	23	Z Z N N	iP i (S) e F	15	23 24 34 35	54 07 32 26						Dilatation Very weak
245	24	NE Z Z Z Z Z	e i i i i i F	3	19 20 21 22	12 48 03 39 06 50						Near earthquake
246	24	Z Z Z Z Z	P e e e e F	21	01 02 03 11 12	04 09 24 03 03						Very weak
247	24/25	Z Z Z N Z	iP e iPP e S F	23	40 41 43 50	12 08 21 15 30					9220	Compression
248	25	Z Z	i i F	00	08 12	29 36						Very weak
249	25	Z Z	P e F	3	24 25	57 14						" "
250	26	Z Z Z	i i e F	1	20 28	13 44 18						" "
251	26	Z Z NE	e e M F	8	08 09 24	00 15						" "
252	27	Z NE	eP e F	21	26 35	15 42						Confused with microseisms
253	28	Z Z Z Z N Z N N E	iP pP e PPP iS sS e e M F	21	46 48 49 54 55 56 15	24 54 48 52 02 48 22 30					6220	Compression h = 120 Km.
254	30	Z Z Z Z	e e i e F	2	23	04 13 21 44						Very weak

No.	Date 1948	Comp.	Phase	G.M.T			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
255	30	Z Z	i i	19	02 03	51 12						Very weak
256	October 1	Z Z	e •	23	08 09	16 21						" "
257	2	Z Z Z Z Z Z Z	PKP PKKP sPKP e PP e e F	14	42	03 28 42 43 44 46 47 48					16835	" " h = 100 Km.
258	4	Z Z Z Z Z NE E Z Z	iP i e e PP es SKS e PPS F	6	08 09	58 15 33 04 00 54 10 44 58					8720	Dilatation
				7.2								
259	5/6	ENZ N N	iP PP iS F	20	17	18 54 38					2755	Dilatation (Very strong)
260	6	Z EZ E Z	iP es e SS F	1	29 34 35	56 24 06 10					2890	Dilation
				2.5								
261	8	Z Z Z N	iP e PP es F	19	12	23 54 46 46					6890	Dilation
				20.0								
262	10	Z	iP F	2 3.0	17	09						Compression (Very weak)
263	10	Z Z N N	iPn Pg iSn S* F	17	45	09 48 39 09					866	Dilatation
				18.6								
264	10	Z Z	e i	18	59	30 45						Very weak
265	11	Z Z N	P e i F	17	00 02 16	39 09 12						
				17.7								
266	12	N NE	e M F	21 22.1	40 45	48						Confused with microseisms
267	14	Z Z Z Z Z Z Z	iPKP pPKP e sPKP e ePP e e	22	01 03	27 36 51 30 00 36 12 21					17220	Dilation h = 550 Km.
268	15/16	Z Z Z Z Z NZ EN N	eP e PP e e PS PPS SS F	22 23	57 58 01 02 06 10 11 16	35 19 40 31 06 44 36 06					11110	
				1.0								

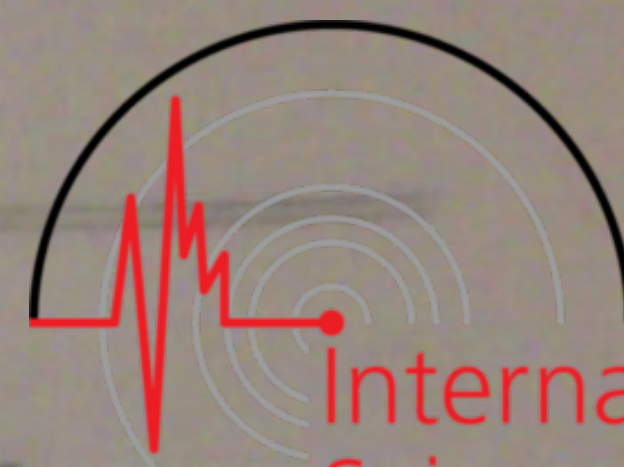


No	Date 1948	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
269	18	Z Z NZ ENZ ENZ E	iPn P* Pg i Sn e F	9	01	34 52 12 48 58 30					799	Compression
				9.9	03							
270	19	Z Z NE Z Z	Pn e Sn e e F	3	06	08 12 24 36 54					744	
				3.7	07							
271	21	Z Z Z Z N N	PKP e e e e e F	5	20	41 51 18 45 20 12						
				8.2	39							
272	21	Z Z NZ Z	ePn P* Sn Sg F	12	15	39 55 54 36					722	Preceded by microseisms
				12.5	17							
273	23	Z Z Z N	e i i i F	15	58	33 42 36 42						Very weak
				16	01							
				17.0	08							
274	26	Z Z Z Z Z	e e e e e	8	31	14 09 52 11 50						" "
					32							
					36							
275	26	Z Z	e e	20	04	42 09						" "
					08							
276	28	ZE Z Z ZE Z N N N	iP i pP PP e eS e sS F	20	58	10 24 36 34 25 30 42 06					9445	Dilatation h = 100 Km.
				21	01							
					02							
					08							
					09							
				22.4								
277	November 1	NE N N N N N	eP i SKS S PS e F	12	18	34 46 52 06 10 28					9555	
				13.8								
278	2	N NE N	eP e e F	10	00	45 04 45					4335	
				11.1	06							
279	3	NE	eP F***	5	26	20						
280	3	N	e F	6	01	42						
				8.2								
281	4	N	e F	13	41	00						
				14.5								
282	9	E N N N N	e e e e F	2	41	07 30 14 06						
					47							
					48							
					49							
				3.1								

No.	Date 1948	Comp.	Phase	G.M.T.			Period Sec.	Amplitude			Δ Kms.	Remarks
								A_n μ	A_e μ	A_z μ		
283	10	Z Z Z N Z	eP e PP S PS F	3	35 36 39 46 47	56 12 31 48 58					10000	
284	11	Z Z Z Z N	eP e e e (ea) F	7	44 45 54	18 29 43 06 33						Confused with microseisms
285	12	Z Z	ePKP i F	17 19.8	53 54	41 07						" " "
286	13	Z Z N Z	iP e eS SS F	4	47 50	39 00 18 31					1555	Dilatation
287	13	Z Z Z Z Z Z	ePKP e e e e e F	7	20 21 22 24 25	22 51 12 45 09 03						Very weak
288	13/14	Z Z Z Z Z	ePKP e e e e F	23	08 12 13 14	42 57 20 30 06						Confused with microseisms
289	19	N N	e e F	1 3.3	30 32	36 30						Very weak
290	20	E	e F	3 3.7	33	22						" "
291	21	E EN EN N	e i i e F	19 21.5	32 33 50	52 06 48 00						
292	22	Z Z N	e e i F	9 10.5	19 24 30	40 11 50						Confused with microseisms
293	22	Z Z Z	eP e e	23	42 44	06 21 12						Very weak
294	25	Z Z Z	i i i	15	06 09	05 15 45						
295	26	Z Z Z Z N N N N	e e i i e e e F	5 6 8.0	51 55 56 57 03 04 11	51 51 24 21 36 12 38						Confused with microseisms
296	28	Z Z Z E	eP e e e F	21 22 22.7	52 54 55 00	51 45 00 36						" " "
297	30	Z Z Z	eP e e F	8 9.2	47 48 56	06 50 28						" " "



No.	Date 1948	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A_n	A_e	A_z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
298	December 4	Z Z Z Z Z NE N N N	PP i i PPP e S PS e e F	00	42	12 24 51 44 45 52 48 19 30					10000	Confused with microseisms
299	5	Z N N	e e e F	00	02	21 08 33 11 50						Very weak
300	5	Z Z Z Z N N N Z Z	ePKP PP i SKP e e e e F	6	45	31 52 06 52 30 16 00 18 27					14780	Confused with microseisms
301	6	Z Z N	ePKP i e F	12 13 14.3	30 33 00	16 18 03					1380	" " "
302	6	Z N	eP e F	14 14.7	21 31	20 30						" " "
303	8	Z Z Z Z	eP e e e F	8	02 06	08 18 33 54						" " "
304	8	N NE	e M F	16 17 18.0	37 09	30						Very weak
305	10	Z Z	iP e	9	54 55	40 09					10335	Dilatation
306	12	Z Z Z Z N N	eP e e PP SKS i F	13 14.8	30 31 34 41	36 46 03 24 06 20						
307	15	Z Z Z Z Z N	iP ipP sP PP sPP epS F	19 21.0	24 25 28 29 36	32 30 57 30 53 30					10555	Dilation h = 240 Km.
308	16	Z Z Z Z Z Z Z	e e e e e e F	7 10.0	38 40 41 42 43 52	18 51 00 47 12 44 25 33						Confused with microseisms
309	18	Z Z Z Z Z Z	e e e e e e	14	30 33 34 36 38	27 24 04 08 34 52					10000	Very weak



No.	Date 1948	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks	
				H.	M.	S.		A_n	A_e	A_z			
				H.	M.	S.	Sec.	μ	μ	μ	Kms.		
310	19	Z	e	11	05	51						Confused with microseisms	
		Z	e		06	33							
		Z	e		07	20							
		Z	e		10	21							
		Z	e			33							
		Z	e		11	33							
			F	11.3									
311	23	Z	e	7	32	24						Very weak	
		Z	e		33	10							
		Z	e		34	21							
		Z	e		35	36							
		Z	e		37	51							
312	23	Z	iP	8	53	55					9555	Dilation	
		Z	e		54	15							
		Z	i			28							
		Z	i		55	12							
		Z	i			31							
		Z	PP		57	18							
		Z	i		58	21							
		Z	e	9	01	00							
		N	SKS		04	20							
		N	e			36							
		E	PS		05	27							
		N	PPS			54							
		F	11.0										
313	26	Z	e	7	42	15						Very weak	
		Z	e			39							
			F	8.7									
314	26	Z	eP	9	45	06						" "	
		Z	e		48	33							
			F	11.3									
315	27	Z	ePn	13	23	30						Confused with microseisms	
		Z	e			42							
		Z	e		24	12							
		Z	e		27	20							
		F											
316	29	Z	(ePKP)	6	01	09						" " "	
		Z	e			39							
		Z	e		02	15							
		Z	e		03	18							
		Z	e		05	44							
		NE	M	7	02								
			F***										
317	31	Z	eP	00	03	30					11110	" " "	
		Z	PP		07	39							
		NZ	PS		16	35							
			F	2.8									

Tremors were also recorded at:

	D	H	D	H	D	H	D	H
January	2	4	9	14	13	15	14	4
	16	6,23	17	8	19	3		
February	11	15,16	15	22	16	2	27	3
March	4	3	6	17	12	21	16	10,19
	22	1,22	23	1	24	4	26	3
April	2	5	21	14	22	16		
May	4	20	5	10	14	11	15	19
	16	22	17	20	24	5	25	17
	28	14	29	15				
June	4	4,6	9	19	20	10		
July	13	20	15	12	26	14,21	31	17
August	9	11	31	10				
September	1	21	7	16	16	9	20	14
October	12	10,13	15	21	21	15	23	22
November	2	0	6	16	9	20	23	15
December	4	20	8	0	12	7	21	0
	24	8	28	5				

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