



HELWAN OBSERVATORY



SEISMOLOGICAL REPORT FOR THE YEAR 1951

Published under the Direction of

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Director of Helwan Observatory

SEISMOLOGICAL REPORT
1951

HELWAN OBSERVATORY

Seismological Bulletin

Constants of the Station:

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

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.

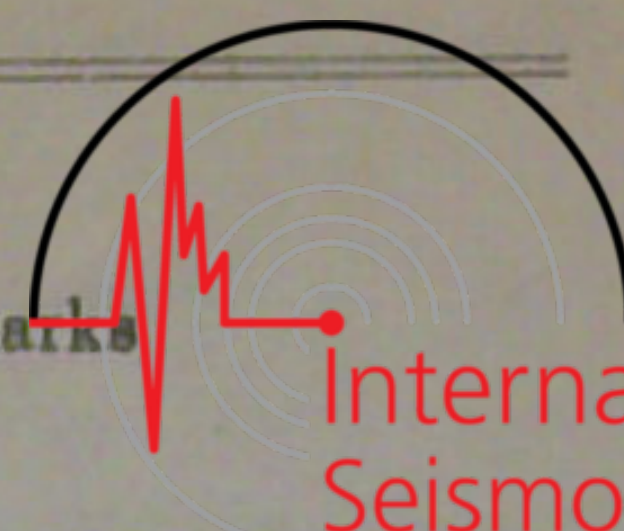
N. B. Compression should be taken dilatation
& dilatation compression

** Confused with the succeeded 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.	
1	Janv. 1	Z Z Z Z Z	ePKP e iPP i PPP F	20	35	46					15790	Very Weak
					36	06						
					38	47						
					39	09						
					51	40						
				21.0								
2	5	Z	e F	1	11	10						" "
				2.7								
3	6	ZE Z ZE E E N N	iP pP sP PP S sS e F	5	23	42					3720	Dilatation h = 200 Kms.
					24	23						
						49						
					25	07						
					28	49						
					30	15						
					31	33						
				7.0								
4	6	N N N E	e e e e F	8	16	24						Very weak
					17	36						
					19	42						
					25	06						
				11.0								
5	8	Z Z Z N N	eP e PP S e F	18	45	06			2335		9335	Confused with microseisms
						18						
						29						
						30						
						06						
				19.5								
6	9	Z N Z	eP e e F	00	30	51						" " "
					32	46						
					37	00						
				1.0								
7	9	Z Z N	e e e F	9	06	54						" " "
					07	35						
					17	42						
				9.6								
8	9	Z N N	eP e e F	16	10	38						" " "
					14	16						
					19	00						
				17.1								
9	10	Z Z	e e	6	40	10						Very Weak
						25						
10	10	Z Z Z	e e e F	8	47	07						" "
					50	42						
					52	18						
				10.6								
11	10	Z	e F	10	33	26						" "
				12.3								
12	10	Z Z Z	ePKP e e F	19	35	00						" "
					36	16						Confused with microseisms
					37	39						
				21.5								
13	14	Z Z Z	e e i F	10	43	12						" " "
						25						
					44	51						
				12.5								
14	15	Z Z Z Z Z ZE Z ZE Z E N	(ePKP) e e e e e iPP PKS i PPP e e F	4	31	23					15555	h = 150 Km. "
						32						
						54						
						40						
						00						
						18						
						33						
						06						
						38						
						42						
						12						
						48						
				7.0								



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.		
15	16	Z N Z Z	eP e e e F	17 18 18.2	57 01 03 (4	44 04 30 15						Confused with microsoisms	
16	18	Z Z Z	eP e e F	21 22.6	29 33 38	08 15 26						" " "	
17	22	Z Z Z Z ZN N N	iP e e PeP S e M F	12 15.0	24 26 31 35 46	42 51 04 12 41 34 50	15	-54			5310	Compression	
18	23	Z Z N Z N	ePKP e PP PPP M F	7 8 9.3	12 16 20 19	42 33 48 21 45	22	+41				17445	Confused with microsoisms
19	24	Z EZ Z N N	eP e e e e F	5 7.0	03 07 09 13 15	16 18 51 50 10							" " "
20	25	Z Z Z Z Z	e e e e e F	3 4.1	53 45 56	15 28 45 54 43							" " "
21	25	Z Z Z Z N N	eP e PeP e S e F	16 17.8	45 46 48 53 55	21 03 15 55 15 12						6335	" " "
22	30/31	Z Z Z	iPn P* Pg F	23 1.2	08 1.2	14 29 45						722	Dilatation Strongly felt in Cairo
23	February 3	Z Z Z ENZ	Pn i i iSn F	00 0.3	01 02	00 12 51 12						688	
24	7	N ENZ	e e F	4 4.1	01 02	50 10							Very weak
25	8	Z Z Z Z Z	ePKP e e e e F	10 11 13.0	57 58 01	57 09 19 52 54							" "
26	10	Z Z Z Z	PKP e e e F	3 6.0	47 50 51 52	42 28 18 38							" "
27	10	Z Z	e e F	22 22.6	08 11	21 20							" "
28	12	Z Z	P e	17	33	11 33						7720	Preceded by microsoisms

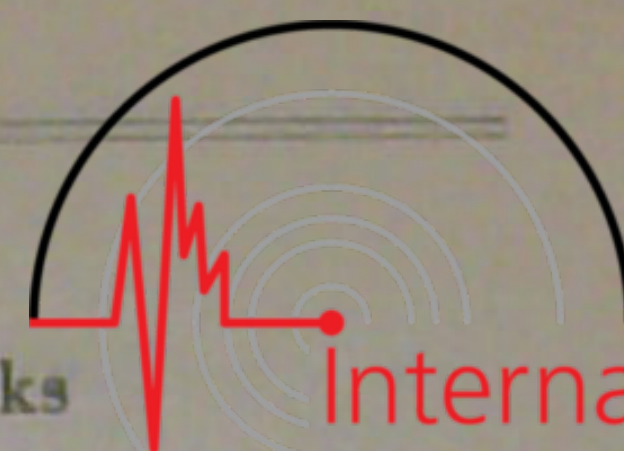
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A _N	A _E	A _Z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms	
28	12 (contd)	Z Z NE N	PP PPP S SKS F	19.1	35 37 42 43	48 28 18 10						
29	13	Z Z Z N	eP e (PP) S F	00 01 2.2	57 59 00 06	34 39 12 04					7720	Very weak
30	13	Z Z Z Z Z	iPKP e PPKP PP i F	12 14.2	15 16 19 20	11 49 16 00 06					16780	Compression h = 250 km.
31	13/14	Z Z N N N N	iP PP SKS S SS M F	22 23 2.0	26 30 36 37 43 13	18 03 52 24 44 29	24	+95			10335	Dilatation
32	16	Z Z	e e	19	30	11 39						Very weak
33	17	Z Z Z ZE E E E E	eP PP PKP PP SKS e PS (PPS) F	21 23.6	21 22 25 26 32 33 36 37	47 33 37 30 03 13 09 18					12445	h = 180 km.
34	19	Z Z Z	e e e F	22 24.3	31 32	52 19 39						Very weak
35	20	Z Z Z Z	e e i e F	15 17.2	44 45 46	24 48 34 09						" "
36	21	Z Z Z Z	e i e e	7	39	14 33 17 10						" "
37	22	Z Z Z	e e e F	2 3.0	04 05	28 51 30						" "
38	23	N	e F	11 13.0	55	06						" "
39	25	Z Z N Z	P i e e F	15 16.3	52 53 55 58	00 08 34 13						" "
40	2	Z Z	e e F	12 12.6	28 29	49 45						" "
41	4	N N Z Z	e e e e F	11 13.0	44 46 47	14 46 02 09						" "
42	5	NE N E N	eP PP PP e	20	23 24 27	50 26 00 42					9000	h = 150 Km.



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.	
42	5 (contd)	N N N	SKS e e F	21.7	33 35 40	48 00 30						
43	6	NE NE	eP M F	19 19.8	15 36	32						Very weak
44	9	Z Z Z E E E Z Z E	eP e e e SKKS S PS e M F	19 20 23.0	58 01 02 08 09 11 12 42	09 27 28 30 11 42 18 12 33	20	—40		11110	Confused with microseisms	
45	10/11	Z ZE Z Z ZE Z Z N N	iPKP ipPKP e e iPP ipPP e e e F	22 1.0	16 17 18 19 20 21 38 39	03 42 15 06 31 03 08 27 12				16110	Dilatation h = 150 km.	
46	12	Z NE NE	eP (S) e F	15 16.0	01 09 11	42 24 30						Very weak
47	13	Z Z Z	e e e F	14 14.7	30 31 32	05 06 24						" "
48	14	Z Z	e e F	9 10.0	48 50	48 00						Very weak
49	16	Z Z	e e	14	06 14	34 26						" "
50	17	Z Z Z NE N	iP (PcP) e e e F	4 5.8	37 38 39 45 47	29 15 09 02 04						Dilatation
51	17	Z Z	e e F	10 11.8	11 12	33 20						Very weak
52	17	Z	c F	16 17.0	13	46						" "
53	18	Z Z Z	e e e F	9 10.0	31 33	20 54 05						" "
54	19	Z Z E	e e e F	9 11.2	38 43 46	40 00 02						" "
55	19	Z Z N	P PP eS F	20 22.0	41 44 51	28 48 50					9445	" "
56	22	Z N	e e F	10 11.8	48 52	17 00						" "
57	23	Z Z	PKP pPKP	21	58 59	08 12					15665	h = 250 km.



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.	
57	23 (contd)	Z Z N N N	e PP PSKS e e F	22	00 01 11 13 17	42 24 22 06 20						
				24'0								
58	24	Z Z Z Z Z Z E	iPKP pPKP PP SKP e e e F	00	36 37 39 41 42 45	44 27 14 51 16 02 54					14780	Dilatation h = 150 Km.
				2'0								
59	28	Z Z Z Z Z Z	e i e e e e F	2	14 15 16 18 19	21 28 45 28 02 24						Confused with microseisms
				3 0								
60	28	Z Z	e e F	10	31 33	11 55						" " "
				12'0								
61	29	Z Z Z	e e e F	8	28 29	39 57 24						" " "
				8'6								
62	31	Z Z	eP e F	8	51 53	40 30						" " "
				9'0								
63	2	E Z	e e F	00	38 42	50 44						Very weak
				2'0								
64	April 2	Z Z	eP e	14	52	15 25						" "
65	2	Z Z Z	e e e	22	29 30 33	54 23 18						" "
66	2	Z Z	e e F	22	38 42	49 44						" "
				23'5								
67	5	Z Z NZ N Z	ePn e Sn S* e F	3	18 19 20 21	12 02 15 58 24					1177	
				4 0								
68	8	Z Z	eP e F	21	00 02	47 07						" "
				21'5								
69	8	Z N N N	Pn P* Pg Sn F	21	40 41	00 18 36 26					825	
				23'0								
70	10	Z Z Z Z	e e e e F	11	15 16 19	41 52 54 28						" "
				13'2								
71	11	Z Z Z	e e e F	14	07 08 11	40 55 00						" "
				15'0								
72	13	N N N	e e i F	10	38 39	30 54 16						
				12'4								



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.	
73	14	N N N N N	eP e i i e F	1 3.0	03 09 09 10 11	54 28 48 42 20						
74	14	N N	(eP) (S) F	4 5.4	16 22	54 26					7780	
75	14	N N N N N N	eP PP PPP S PS SS F	13 16.8	44 47 48 53 54 58	24 00 42 32 06 12						
76	14/15	N N	i e F	23 00 1.3	57 00	52 08						
77	18	N N N	e e e F	12 13.2	45 49	14 50 12						
78	20	N N N	e e e F	8 8.4	09 11 13	00 06 18						
79	22	N N	i e F	3 4.5	54 56	46 54						
80	30	N N N N	i e i e F	15 16 17.8	56 59 05 10	36 12 33 00						
81	May 1	N N N N	e e e M F	5 6 8.1	24 25 34 25	00 18 18						
82	2	N N N	i e M F	16 17 18.6	40 49 11	06 12						
83	4	N N N N	i i e e F	12 12.9	06 15 16 17	12 10 51 12						
84	10	N N N N N N	iP e e e e e F	9 11.2	27 29 32 34 38	24 35 05 42 36 36						
85	12	N N	e M F	22 23 0	20 31	12						
86	14	N N	e M F	4 5.1	19 27	36 45	18	33				
87	15	N	e F	12 12.5	01	06						
88	25	N	e F	6 6.7	33	42						
89	28	N N	e e	14	17 19	30 00						Near earthquake

Owing to the shortage of the photographic paper, Galitzin Seismograph has been suspended on April 12.



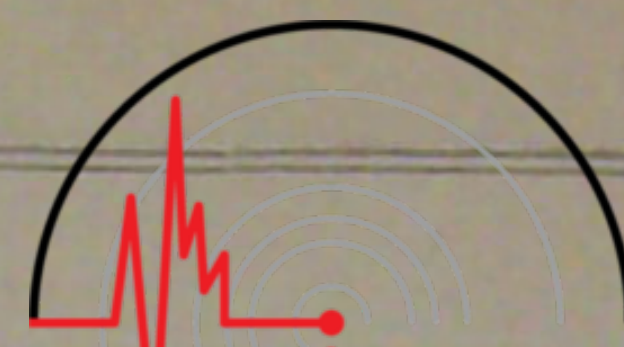
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A _N	A _E	A _Z		
				H.	M.	S.	Sec.	μ	μ	μ	Kms.	
89	28 (contd)	N	e		20	05						Near earthquake
		N	e		21	06						
			F	14.4								
90	June 3	Z	e	18	42	30						Very weak
			F	19.4								
91	5	Z	eP	3	38	35					1780	Preceded by microseisms
		Z	PPP			56						
		Z	e		40	03						
		Z	e		41	24						
		Z	PcP		43	32						
		Z	i		44	23						
			F	4.0								
92	5	Z	P	17	10	08					9220	" " "
		Z	i			18						
		Z	e		11	00						
		Z	PP		13	21						
		NEZ	S		20	27						
		Z	PS		21	17						
			F	19.0								
93	6	Z	eP	16	19	28					5335	" " "
		Z	i			36						
		Z	i			46						
		Z	e		20	33						
		Z	PP		21	17						
		NE	ePS		26	33						
			F	20.0								
94	7/8	Z	PKP	23	18	57					17445	" " "
		Z	PKKP		19	24						
		Z	i			58						
		Z	PP		23	00						
		Z	e			40						
		Z	PPP		26	36						
			F	1.5								
95	9	Z	iP	11	25	47					1835	Compression
		Z	PP		26	10						
		E	S		28	52						
		Z	i		30	05						
		ZE	PcP			40						
		N	M		34	00	12	69				
			F	12.8								
96	24	Z	e	5	01	32						Very weak
		Z	e		02	27						
97	24	Z	e	17	09	45						" "
		Z	i		10	06						
			F	17.5								
98	25	Z	e	16	03	46						" "
		Z	e		04	11						
99	25	Z	iP	16	25	22						Compression
		Z	e		28	52						Very weak
100	26	Z	eP	3	54	13						" "
		Z	e	4	06	30						
101	2	Z	e	22	06	25						" "
		Z	e			35						
		Z	i			48						
		Z	e		07	15						
		Z	e		09	30						
			F	0.5								
102	July 3	ZN	eP	4	16	00						" "
		E	e		20	15						
			F	5.1								
103	3	ZEN	iP	5	28	45					2780	Dilatation
		Z	PP		29	21						
		Z	e			42						
		NE	e		52	54						
		ZN	S		33	06						
			F	6.9								
104	3	Z	e	8	38	36						Very weak
		Z	e		39	52						



Remarks

International
Seismological
Centre

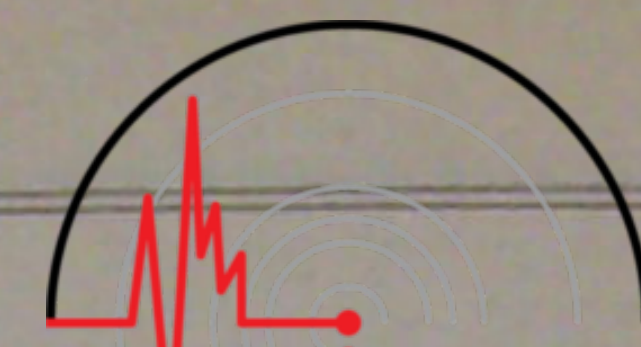
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A _N	A _E	A _Z		
				H.	M.	S.					Kms.	
104	3 (contd)	Z Z	e e F		41 42	24 09						Very weak
				9.3								
105	3	Z Z Z	P e e F	14	32 33 41	42 13 29						" "
				15.0								
106	3	Z N N ZNE	iP e c S F	18	21 24 25	02 57 00 18					2665	Dilatation
				19.3								
107	5	Z N	eP e F	9	12 18	03 40						Very weak
				9.8								
108	8	Z Z Z ZNE N	P e PP SKS PS F	5 6	57 58 00 07 08	02 11 24 24 32					9555	
				8.4								
109	9	Z Z	e e F	5	15 23	42 00						" "
				1.5								
110	11	Z Z Z Z Z NE N	iP PP sP PP PPP SKS S F	18	54 35 36 37 39 43 44	03 55 48 48 56 48 18					10000	Compression h = 500 km.
				21.1								
111	14	Z	eP F	7 8 4	31	00						Very weak
112	16	Z Z Z Z N Z	e i e e e F	10 11	59 02 03 07 09	45 51 12 33 20 25						Preceded by microseisms
				12.4								
113	18	Z Z EN E	iP PPP S M F	9	16 20 25 45	41 29 06 (36)	(18)		526		6890	Dilatation
				13.0								
114	19	Z Z Z N N	eP e e SKS S F	20 21	54 58 02 05	45 30 19 18 30					9890	Very weak
				22.2								
115	19	Z N Z	e i e F	22	37 39	18 34 00						" "
				23.3								
116	21	N N N	e i i F	1	45 49 50	34 52 05						
				2.8								
117	21	N N N	e e M F**	3	09 12 16	06 38 56	9	8				
118	21	N	M F	3 4.5	42	40	9	15				
119	23	Z Z	eP i	16	45 46	58 40					3780	



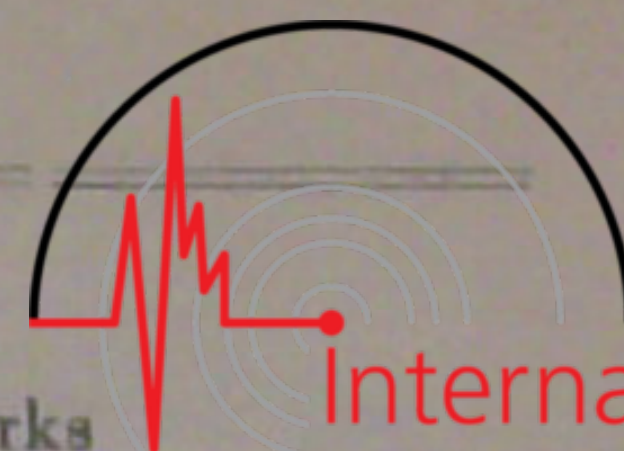
Remarks

International
Seismological
Centre

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.	
119	23	Z N	PP S F	17.5	47 51	08 24						
120	26	Z Z Z Z NE	iP i e e (S) F	10	12 13 16 22	32 47 48 09 54						Dilatation Very weak
121	27	Z	e	00	52	43						" "
122	28	Z Z	P e	21	11 14	00 38						" "
123	28	Z Z N	iP e e F	23	17 20 28	22 06 00						Dilatation Very weak
124	29	Z Z Z	eP e e F	23	46 49 50	31 20 35						Very weak
125	31	Z Z Z N	P PP PP S F	13	41 43 51	09 39 25 30					9220	" = 100 Km.
126	31	Z Z	eP e F	22 23.3	50 51	51 55						
127	August 1	Z Z	e e F	00 01 1.6	57 02	17 33						Very weak
128	2	Z Z ZZ Z Z Z Z N	PKP e (pPKP) e e e e (SS) F	3 4	58 59 00 01 02 08 09 16	40 51 09 16 45 20 08 10 06					13335	" Deep focus
129	2	Z Z Z Z Z	iP e e e e F	10	35 36 37 38 40	46 00 21 06 06						Compression Very weak
130	5	Z Z Z Z ZE	Pn P* Pg Sn e F	15	13	36 46 58 32 46					544	Not felt
131	6	Z Z Z	e e e F	15	31 33	06 22 45						Very weak
132	8	Z Z Z Z	Pn e Sn S* F	8	42 43	08 56 15 46					644	Not felt
133	8	Z Z Z	P PPP S F	21	01 04	04 33 46					2245	Very weak
134	10	Z Z	eP e	5	43 44	43 09						" "



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.	
134	(Cont.) 10	Z Z E	e e F		45 47 53	50 20 21						Very weak
				6.8								
135	10	Z Z Z NE	P PP (S) F	23	12 13 22	14 30 00					9110	h = 320 Km.
				23.7								
136	13	Z E	iP eS F	18	36 38	08 09					1190	Dilatation
				23.0								
137	14	Z Z N	e e e F	18	48 49 53	45 38 36						Very weak
				19.4								
138	16/17	Z Z NE E N	iP e (S) e e F	23 00	57 58 01 02 05	12 12 20 42 15					2555	Compression
				1.0								
139	17	Z Z	e e	10	42 43	50 21						Very weak
140	18	Z Z E	eP e e F	3 4	51 52 02	31 00 00						" "
				4.5								
141	20	Z Z N Z	eP e e i F	12	32 42 43	03 10 50 57						
				13.2								
142	20	Z Z ZN	ePn P* Sn F	22	53 54 55	45 03 06					778	Not felt
				23.2								
143	21	Z Z Z N E E	P e pP SKP (SKKS) e F	11	16 18 19 56 28	21 13 36 37 06 24					15220	
				14.0								
144	21	Z Z Z	e e e F	19	06 08 14	45 48 48						Very weak
				20.0								
145	24	Z ZN Z Z Z	ePn Sn i S* Sg F	10	30 32 33	05 07 27 53 24					1210	" "
				11.0								
146	24	Z Z Z N N ZN Z	iP e i i SKS PS e F	14	33 34 38 44 45 46	57 39 03 04 18 21 27					9445	Dilatation
				15.2								
147	31	Z Z	eP e	10	28 30	17 23						Very weak
148	31	Z Z N	ePn i (Sn) F	12	32 33	03 51 40					945	
				13.2								

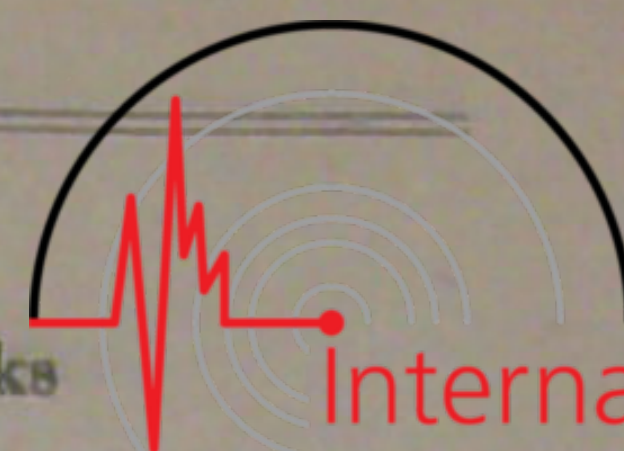


No	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		A _N	A _E	A _Z		
							Sec.	μ	μ	μ	Kms.	
149	31	Z Z ZN Z	ePn e Sn e F	20 20.9	21 22 23	03 17 29 30					833	
150	1	Z Z Z Z Z	e e e e e	4	00 01 02	18 32 42 40 03						Very weak
151	September 1	Z Z Z	e e e	7	00 01	42 08 21						" "
152	1	Z Z Z Z Z	PKP e e e e F	9 11.2	09 10 11	00 16 45 21 23						" "
153	8	Z Z Z Z	P i e e	7	03 05	21 36 45 39						" "
154	8	Z Z Z	eP e e	11 12	58 01	02 15 06						" "
155	8	Z Z Z	e e e	23	44 45	21 42 27						" "
156	9	Z Z Z Z Z Z	PKP e e e i e F	5 7.0	03 04 05 06	53 00 09 21 28 36						" "
157	12	EN N	e e F	15 16.5	33 35	44 00						" "
158	13	Z Z Z Z Z Z	e e e e i i F	3 3.4	00 02 04 06	12 28 15 32 30 51						" " (Near earthquake)
159	15	Z Z	eP i F	22 23.3	54 55	42 06						" "
160	16	Z Z	e e	16	57	38 57						Very weak
161	17	Z Z	e i F	00 0.5	19 20	51 07						" "
162	17	Z Z Z E	iPKP PKKP PP eSKKS F	12 14.2	17 18 21 28	41 08 44 45					17400	Dilatation
163	17	Z Z Z E Z Z	eP e e S ePPS e F	21 22.0	00 01 02 09 11	10 31 35 15 57 23					7665	Very weak
164	21	Z Z	eP e F	9 10.4	23 26	35 49						" "

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No.	Date	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.	
182	Cont. 22	Z E	eP eS F	5 6 9.2	55 05	06 06					8780	Confused with the preceding chock
183	22	Z Z	e e	10	37 38	52 24						Very weak
184	22	Z Z NE N	eP e e(S) e	11	23 33	06 29 18 40						" "
185	22	Z Z Z NE N	eP e e S i F**	13	00 01 05 10 11	45 03 42 40 33					8665	
186	22	Z Z Z E N N	P PP e S SKS i F	13 15.0	13 16 18 23 24	19 18 15 12 30 06					8665	
187	22	Z EN N	P S SKS F**	14 15	58 08 09	48 48 06					8665	Very weak
188	22	Z Z NE N	P e S SKS F**	15	41 42 51 52	54 16 51 06					8755	
189	22	Z Z	eP e F	16 18.3	19	00 21						" "
190	22	Z Z NE	P e e F	18 19 20.2	54 55 04	37 06 33						" "
191	22	Z Z	e e	20	36 38	49 12						" "
192	22	Z	e F	21 22.2	03	45						" "
193	23	Z Z Z E N	P e PPP S SKS F	1 4.0	31 32 34 41	39 09 40 38 48					8780	
194	23	Z Z NE E	iP PP S PS F	9 11.0	07 10 17 18	18 18 17 00					8780	Dilatation
195	24	Z E	eP e F	3 4 5.2	51 01	03 02						Very weak
196	25	Z Z Z N N	eP e PP S i F	12 33 14.6	31 33 34 41 42	46 24 45 42 10					8720	" "
197	28	Z Z N N	eP e i i F	1 2 2.5	58 00 01 04	08 52 44 36						
198	31	Z	eP	7	07	37					7665	

No.	Date	Comp.	Phase	G.M.T.			Por.	Amplitude			Δ	Remarks
								A _N	A _E	A _Z		
				H.	M.	S.	S.	μ	μ	μ	Km.	
198	(contd) 31	Z N N N	e S SKS M F		08 16 17 35	21 42 30 46	18	38				
				10.1								
199	31	Z N	e (P) S F	10 11.9	33 42	45 36						Very weak
200	31	Z Z N	e e e F	12 13.9	00 01 07	54 12 42						" "
201	Nov. 1	Z Z Z N N	iP i PPP S M F	11 13.0	17 18 22 31	19 30 50 42 32	14	39			3620	Compression
202	2	Z Z E EN E	P e e S SS F	12 22 23.0	59 00 01 03	39 11 08 06 34					2110	
203	4	Z EN N	iP S e F	11 12.8	22 33	34 12 30					9665	Dilatation Very weak
204	6	Z Z N	P e (S)	15 16.5	10	07 57						" "
205	6	Z N N N N	eP SKS PS PPS M F**	16 17	52 03 05 05 36	55 24 48 18 30	16	56			9890	
206	6	Z Z Z	eP e e F	19 22.0	03 13 15	18 57 17						
207	8	Z Z Z N	eP e e e F	13 14 17.1	59 02 03 09	14 38 09 12						Preceded by microseisms
208	9	Z Z	eP e	8	10 11	21 12						Very weak
209	9	Z Z Z	ePKP e e F	22 23.8	26 27 28	44 28 09						" "
210	10	Z Z Z	eP e e	5	52 33 55	03 30 39						" "
211	12	Z NE N	eP SKS e F**	8	22 32 33	20 48 36					9780	
212	12	Z Z Z Z	PKP e PKKP pPKP F	9 11.3	32 33 34	54 04 18 45					16665	Confused with the preced- ing earthquake h = 400 Km.
213	12	Z	i F	19 20.4	34	20						Very weak
214	15	Z Z	P e	8	38	32 48						" "



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.	
215	15	Z Z	P e	8	51 52	52 35						Very weak
216	15	Z	e F	9 9.8	39	18						" "
217	15	Z	eP	10	15	19						" "
218	15	Z E	P e	10	44 55	13 12						" "
219	15	Z	eP F	11 12.4	14	00						" "
220	15	Z Z	P e F	15 16.2	15	29 44						" "
221	15	Z Z	eP e	17	58	00 12						" "
222	15	Z Z Z NEZ	iP e PP eS F**	19 20	54 55 58 05	52 20 14 30					9662	Dilatation
223	15	Z Z	P e F	20 21.6	33	11 39						Very weak
224	15	Z Z N	P i eS F	22 23.5	11 12 22	59 09 34					9665	
225	16	N N	e e F	15 17.0	26 44	54 02						" "
226	16	Z Z Z	P e e F	17 20.4	53 55 56	06 45 42						" "
227	17	Z Z EZ EZ	P PP S e F	4 5 6.0	55 57 02 06	05 06 24 36					5720	
228	17	Z Z	P e F	18 19.0	07 09	10 27						" "
229	17	Z Z	P i F	20 21.7	37	27 40						" "
230	18	Z Z	iP e F	4 6.0	51	12 23						Compression
231	18	Z Z EZ EZ	iP PP S i F**	9	35 37 42 43	40 38 58 21					5690	Compression
232	18	Z NE	iP iS F	9 14.5	44 52	51 09					5690	Compression
233	19	Z Z	eP e F	21 22.6	23 27	24 33						Very weak
234	20	Z Z	eP e F	9 9.6	14 17	15 00						" "
235	21	Z Z Z	eP i e F	4 4.8	41 43	06 20 00						" "



Remarks

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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	
236	21	Z Z NE	eP e e (S) F	7 8 9.6	59 01 07	57 14 42						Very weak
237	22	Z	ePKP F	2 4.5	25	06						" "
238	22	Z Z NE NE NE N	e (P) e i e e M F	10 11.3	01 03 07 09 39	18 18 48 00 34						" "
239	22	Z Z	ePKP i F	13 15.1	12 16	42 21						" "
240	24	N	e F	2 3.1	09	48						" "
241	24	Z E E E N	iP PP iS i M F	18 19 23.2	59 02 09 12 35	18 18 20 20 00	24	266			8835	Dilatation
242	26	Z Z Z Z N E	iP e e e S e F	6 7 8.0	50 51 53 54 00 01	36 45 45 24 32 28					8780	" "
243	29	Z E NE NE E	P PP SKS S e F	4 5 6.0	58 02 09 10 15	40 44 24 06 30					11000	
244	30	Z	eP	8	01	34						Very weak
245	Dec. 5	Z Z N Z	P PP eS ePS F	7 8.0	10 13 20 21	41 43 42 32					8890	" "
246	11	Z N Z	Pn e e F	2 2.9	43 44 45	54 12 33						" "
247	12	Z Z E E EZ	eP e e e e F	1 2 3.2	52 56 02 03 06	25 36 33 36 00						" "
248	18	Z Z	e i	14	29 31	17 16						Confused with microseisms
249	20	Z Z	e e F	19 19.6	15 17	53 06						" " "
250	21	Z Z NEZ E	e PP iS M F	8 9 10.0	47 49 55 17	30 52 52					6665	" " "
251	25	Z Z	e e	16	05 11	45 14						Very weak
252	26	Z	e	1	06	09						" "

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A _N	A _E	A _Z		
				h.	M.	S.	Sec.	μ	m	m	Kms.	
253	26	Z	e	10	23	36						Very weak
		Z	e		27	24						
254	26	Z	iP	16	40	06					6000	Dilatation
		Z	e		41	18						
		Z	PP		42	12						
		N	S		47	42						
		N	e		50	00						
			F**									
255	26	Z	eP	17	06	05						Very weak
256	28	Z	ePP	9	39	45					13445	
		Z	PPP		42	17						
		EN	e		46	00						
		EN	e		47	06						
		EN	PS		49	33						
		Z	ePPS		50	09						
			F**									
257	28	Z	e	9	57	34						" "
		Z	e		58	09						
			F	12.3								
258	30	Z	P	18	26	15					2465	
		Z	e		27	22						
		NZ	iS		30	16						
		N	i			36						
			F	20.0								
259	30	Z	eP	22	38	02					13445	
		Z	PP		43	00						
		Z	SKP			27						
		Z	e		44	30						
		Z	e		46	51						
		Z	e		50	05						
		Z	PPS		54	14						
			F	24.0								
260	31	Z	Pn	3	11	37					778	Local
		Z	Sn		12	57						(not felt)
		Z	e		13	14						

** Confused with the preceding earthquake.

Tremors were also recorded at :

	D	H	D	H	D	H
January	3 21	4,19 19	6 28	18,19 14	16	13
February	7 15	7 21	9 19	13 0	14 22	22 5
March	3 23	21 5	5	12	20	2
April	1 12	22 12	7 20	0.5 4	11 23	9 13
May	1 8 20 28	23 21 12,5,20 16	4 10 21 29	20 23 10 7	7 19 22	0 16 20
June	8 17	16 19	10 24	9,10 12	12 25	23 6
July	2	6,14	11	0	13	21
August	3	1	4	0	13	23
September	12 21 28	21 10 4,16	13 24	17 0,14	19 27	3 21
October	1 6 16 28	11 5 7 8	2 8 17 29	0,5 5 8 22	3 15 25	17 22 1.6
November	6 18	5 19	13 25	14 15	15 29	7 8,15
December	6 82	15 16,18,19	8 29	4 22	23	8

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