



HELWAN OBSERVATORY



SEISMOLOGICAL REPORT FOR THE YEAR 1953

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SEISMOLOGICAL REPORT
1953

HELWAN OBSERVATORY

Seismological Bullitin

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	Pendulum Free Period T	Galvanometer Free Period T ₁	Damping Constant	Transmission Coefficient K	Static Magnification V
	sec.	sec.			
N	12.0				250
E	12.0				250
Z	11.16	11.13	+0.05	175	1000

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

*N.B. Dilatation should be taken as compression
and compression as dilatation.*

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H	M.	S.		A _N	A _E	A _Z		
	Janv.						Sec.	μ	μ	μ	Kms.	
1	1	Z	eP	4	55	50						Very weak
2	1	Z Z Z N	iPn i e Sn F	7	03	55.5 57.8 04 03 05 09					766	Dilatation
3	1	EZ EZ	e e	9	33	10 14						Very Weak
4	1	Z Z Z N N	ePn i i Sn i F	10	19	06 21 27 20 25 07 26					756	
5	2	EN N N	e e e	3	22	40 50 07 23						" "
6	5	Z Z Z N N N	P e PP SKS S M F**	8	01	24 37 04 57 11 54 12 15 42 48	24	198			10000	
7	5	Z Z N N N	iP PP SKS e PS F	10	19	15.4 33 39 21 39					9445	Dilatation
8	6	Z Z	e e F	16	24	11 17 17.4						Very Weak
9	7	Z Z N	P PP eS F	00	04	50 02 21 07					1500	
10	7	Z Z Z N	P PP i S F	1	22	20 31 44 24 54					1510	
11	7	Z E E	P (S) e	6	01	40 15 28						" "
12	7	Z Z Z Z	ePKP e SKS e	12	19	17 27 26 27 29 17						" "
13	7	Z Z Z ZE	ePKP e PP ePS F	14	27	16 37 56 38 39					13555	" "
14	7	Z NE	ePn Sn F	17	21	55 11 23 25					688	" "
15	7	Z Z Z N	ePn e Sn F	23	18	31 47 51 38 19 22					633	" "
16	9	Z Z	eP e F	16	53	35 34 55						" "
17	10	Z EN	ePn eSn F	17	22	18 41 23 25					799	

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		A _N	A _E	A _Z		
	Jan.						Sec.	μ	μ	μ	Kms.	
18	10	Z Z Z Z	eP e e eS F	20 21.2	44 45 49	17 27 24 00					3080	Very weak
19	10	Z Z EN EN	oPn i Sn Sg F	23 23	31 33 34 36	33 38 18.6 18					988	
20	11	Z Z NE	ePn e Sn	1	28 30	30 37 11.4					988	
21	11	EN Z	i e F	2 2	47 49	37.6 39						Local (Not felt)
22	11	Z EN	oPn oSn	8	46 48	51 06					722	Very weak
23	11	Z Z NE	ePn e eSn	15	33 34 35	43 09 06					799	
24	11	Z Z NE N	ePn e Sn S* F	19 19	43 44 45 48	36 43 55 18					755	
25	11	Z Z N	Pn P* Sn F	21 21	45 46 50	32 48 51					755	
26	11	Z Z Z Z E	iP e pP e S F	23 24 0	06 09 16	05.3 42 21 45 36					9390	Compression
27	12	E E	ePn iSn F	9 9	32 34 38	46 19.4					910	
28	12	E E E	e e e	10	16	21 40 53						Very weak
29	12	E	e	10	30	7						, ,
30	12	E	e	10	34	13						, ,
31	12	E	e	10	56	18						, ,
32	12	E E	e e	11	07	19 35						
33	12	E E	e e	13	06	15 20						, ,
34	12	Z Z Z Z Z Z E E	P i i PP e e SKS S F	17 19'0	36 37 39 41 43 46 47	21 42 06 52 40 24 51 15					10000	
35	13	Z E Z	ePn Sn S* F	11 11	02 03 06	12 30 54					755	
36	15	Z	i	8	23	58.2						Very weak
37	15	Z Z	P PP	13	19 20	55 21					2390	

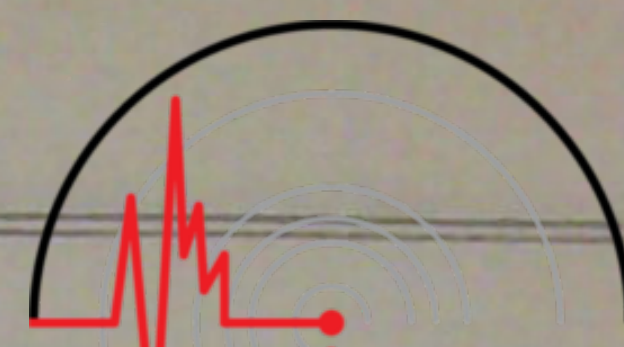
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks			
				H.	M.	S.		Sec.	A _N	A _E			A _Z		
								μ	μ	μ	Kms.				
38	15	Z	eS	13.7	23	50					2780				
		Z	F												
		Z	P	20	11	07									
		Z	e			38									
39	15	Z	i	20.8	15	31						Very weak			
		Z	S												
		Z	F	22	29	41									
		Z	e			08									
40	16	E	e	15	14	52						" "			
		E	e										15	20	
		E	e											28	
41	17	Z	iP	17	42	29.8						Dilatation			
		Z	e										43	04	
		Z	i										46	27	
42	18	Z	P _n	13	02	07					744				
		E	S _n										03	25	
		E	S*											49	
43	19	Z	e	5	10	03						Very weak			
		Z	e											41	
		E	e											20	25
44	20	Z	P	17	46	25					10890				
		Z	i										47	48	
		Z	i										48	19	
		Z	i										49	04	
		Z	PP										50	30	
		E	SKS										56	54	
		E	SKKS										57	24	
45	21	Z	P	1	55	40						" "			
		Z	e											49	
		Z	e											05	56
46	21	Z	e	9	39	58						" "			
		Z	e											40	09
47	21	Z	e	11	25	53						" "			
		NE	i											26	20
48	23	Z	eP	9	47	42						" "			
		Z	c											51	
		Z	e											49	51
49	23	Z	e	13	15	41						" "			
		Z	e											17	04
50	24	E	e	9	59	22						" "			
		E	e											29	
51	24	Z	P	22	49	49						" "			
52	25	Z	i	11	58	07						" "			
		Z	i											17	
53	25	Z	e	20	01	26						" "			
		Z	e											33	
			F										21.0		
54	26	Z	iP	5	15	22.0						Compression			
		Z	e											32	
55	27	Z	P	3	25	43						" "			
		Z	e											55	
		Z	e											28	20
56	27	Z	(PP)	3	29	12									
		E	e											36	39
56	27	Z	ePKP	3	43	57					13445				
		Z	i										45	22	
		Z	e										50	12	
		EZ	(SKS)											51	
		E	e											52	17
		Z	e											53	10

No.	Date	Comp.	Phase	G.M.T.			Por.	Amplitude			Δ	Remarks
				H.	M.	S.		S.	A _N	A _E		
				μ	μ	μ				Km.		
		Z	PS F	5.0	55	21						
57	27	Z Z	P e	8	31	08 19						Very weak
58	27	Z	iP	14	05	28.8						Dilatation
59	27	Z Z	P e	17	18	48 59						Very weak
60	28	Z N E E	ePn Sn i i	18	36 37	04 18 29 37				688		" "
61	29	Z Z	eP e	9	35	07 16						" "
62	30	N Z	e e	6	05	34 49						" "
63	30	Z	iP	15	43	23.3						Compression
64	30	Z Z Z Z E Z	PKP e PP i SKP i e F	22	06 08 09 11	03 24 40 11 30 35 30				15220		
65	31	Z Z NE	ePn e Sn F	9	58 58 59 01	22 40 40				774		Very weak
66	31	Z Z	P i F	22	02	50 55						" "
67	February 1	Z Z Z	iPRP i e	14	31	27.6 39.7 35						Dilatation-Very weak
68	1	Z N NE	iPn Pg Sn F	19	53	42.4 57.4 27				410		Dilatation-(felt in Cairo)
69	1	Z NE	Pn Sn F	21	17	12 57				410		Very weak
70	2	Z Z N	eP e e	9	42	49 58 27						" "
71	2	Z E	e e	10	31	30 48						" "
72	2	Z EN	e e	14	04 05	02 27						" "
73	2	Z Z	e i F	16	33	07 45						" "
74	3	Z	e F	21	06	05						" "
75	4	Z	e	11	01	11						" "
76	4	Z Z Z	i i i	11	30	42.8 44.8 48.0						" "
77	4	Z	iP	12	45	31.0						Compression
78	4	Z Z	e e	18	54 55	43 10						Very weak
79	5	Z	iP	1	53	45.4						Compression



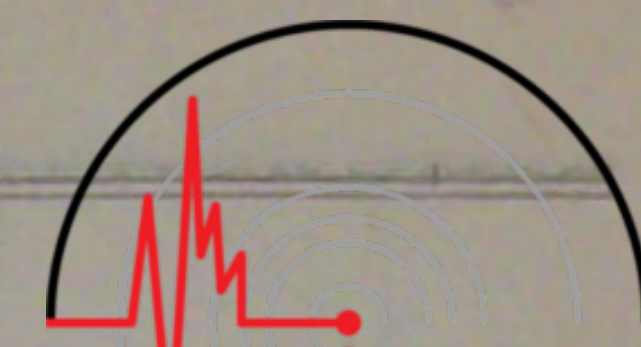
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		A _N	A _E	A _Z		
	Feb.									Kms.		
80	5	Z Z Z E Z	e i i e i	12	05	07 13.0 21.0 06 17 08 53					Very weak	
81	5	Z Z E	ePn e eSn	21	12	21 29 13 38				744		
82	5	Z Z Z E	P PPP e S F	22	44	20 35 50 45 57				945		
83	6	Z	e F	5 6.6	46	12					" "	
84	6	Z Z Z Z	eP e e e F	12	35 36 43	15 10 26 04					" "	
85	6	Z Z E E E	iP PP SKS e e F	13	25 28 36 37	39.0 37 02 32 21				9500	Compression	
86	6	Z Z NE	iPn e iSn F	15 16.0	56 57	42.6 05 12.6				278	" (Not felt)	
87	6	Z	eP	19	25	08					Very weak	
88	6	Z Z	eP e	19	53 54	49 14					" "	
89	7	Z ZEM	Pg Sg	6	03	24 36				100	" " " "	
90	7	Z Z Z Z	eP e e e F	18	36	02 08 32 43 12					" "	
91	7	Z Z N	ePn Pg Sn F	22	33 34	02 40 28				833		
92	8	Z Z NE	ePn e Sn	2	41 42	11 21 29				778		
93	8	Z Z EN Z	eP e S i F	5	26 30	31 40 30 52				2445	" "	
94	8	Z Z N	eP e e	7	40 41 42	31 07 18					Very weak (Near earthquake) Dilatation	
95	10	Z EN	Pn Sn	14	51 52	32 50				755	Preceded by microseisms.	
96	11	Z	eP	14	25	18					Very Weak	
97	11	Z	eP	23	29	50					" "	
98	12	Z	eP	3	22	11					" "	
99	12	Z	eP	4	43	52					" "	
100	12	ZEN E	iP S F	8 12.0	20 24	14.0 14				2465	Compression (Very strong)	

No.	Date	Comp	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A_n	A_e		
								μ	μ	μ	Kms.	
101	(contd.) 13	Z Z EN	ePn e Sn F	23	48	32 54 50					753	
102	14	Z E N	ePn e e	1	46 47	31 49 54						Very weak
103	14	Z EN	iPn iSn F	8	44 46	55.2 08.0					720	Compression (felt in Cairo)
104	14	Z Z	e e F	20	56 59	00 54						Very weak
105	14	Z E E	e e e	22	06 12 13	14 24 09						" "
106	15	Z Z Z EN EN	ePn i P* iSn Sg	6	19	23 29.6 35 28.8 02					610	
107	16	Z Z Z	P i i F	1	10	09 18.0 25.6						" "
108	18	Z Z EN	ePn P* Sn F	3	06 07 10	07 25 28					778	
109	19	Z Z Z Z	PKP i PKKP e PP F	13	25	58 37.6 52 51 27					17300	" "
110	19	Z Z Z E	P i PP e F	15	27 29 36	21 31.0 30 18					6380	
111	22	Z Z EN E E	ePn e Sn e e Sg F	18	29 31 32 34	10 38 09 23 38 21					1145	" "
112	22	Z Z	ePKP e	23	35	16 28						" "
113	23	Z Z Z Z	iP i i eS F	00	54	13.4 18 29 42					4835	Dilatation
114	23	Z Z Z E E	iP e e eS e F	3 4	54 57 01 05	27.8 44 26 06 21					9555	Compression Very weak
115	23	Z Z E	P e M F	12	44 15	13 21						" "
116	24	Z Z Z Z EN	ePn e P* Pg Sn F	14	05 06 10	14 25 30 45 30					622	



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.	
117	25	Z Z	eP (S) F	00 0.3	11 14	23 04						Very weak
118	25	Z Z NE	Pn e Sn F	20	16 17 20	05 30 52					1043	" "
119	25	Z Z Z Z Z EN	P i i e PP e S F	21 23.0	29	35 47.0 56.6 15 20 28 42					10445	
120	26	Z Z Z EN E E	iP e e i e e F	00 1.4	44 45 48 55 56	56.0 30 54 05 51 21						Compression
121	26	Z	e	2	31	08						Very weak
122	26	Z Z	e e	5	12	41 58						" "
123	26	Z Z	e e	10	32 36	40 32						" "
124	26	Z Z Z Z E Z Z	ePKP e e PP ePKS e e F	12 12 15.5	01 02 02 04 05 06	44 24 39 09 14 22 40					14665	" "
125	26	Z	e	19	56	10						" "
126	27	Z E E	ePn eSn e	19	32 33	15 33 55					755	
127	March 2	Z Z	eP e e	22	58	10 19 41						" "
128	3	Z Z Z Z Z Z	PKP PP e SKKS e e F	11 12 14.0	46 49 50 56 59 02	30 36 38 29 56 39					15665	
129	3	Z E E	P e e F	23 23.4	06 17	48 12 23						" "
130	4	Z Z Z Z Z	ePKP e e e e F	1 1.7	15 17 18 19 20 25	40 34 22 21 48 14						" "
131	4	Z Z Z	P PPP es F	15 15.7	33 35	21 36 23					1220	" "
132	5	Z Z N	P e e	6	08 09	22 14 33						" "

No.	Date	Comp.	Phase	G.M.T.			Period Sec.	Amplitude			Δ Kms.	Remarks
				H.	M.	S.		A _N	A _E	A _Z		
				μ	μ	μ						
133	5	Z Z	e e F	19 20.1	11 20	51 36						
134	5	Z Z Z Z E E	iP i pP e e SKS e F**	21	14	04.4 24 36 22 05 26 00				9780	Compression	
135	5	Z Z	P e F	21 23.0	34 40	34 20					Confused with the preceding earthquake	
136	6	Z Z	e e	00	57 58	52 06					Very weak	
137	6	Z Z Z	PKP e e	4	39 40	51 07 30					" "	
138	6	Z ZEN	Pn eSn F	13	17 19 21	45.4 02				744		
139	6	Z Z Z	e e e	22	10 11	47 05 15					" "	
140	7	Z NE	ePn Sn	8	08 10	48 09				778	Confused with microseisms	
141	7	Z Z Z Z	e e e e	22	40 41 42	50 10 53 06					" "	
142	8	Z Z	P e	12	39	30.5 46					Very weak	
143	9	Z Z Z	e e e	5	56 57	20 31 13					" "	
144	9	Z Z Z Z E	PKP e PP e SKKS F	10 11.5	22	32 58 03 18 57				13445		
145	10	Z Z	e e	6	18 21	26 32					" "	
146	10	Z Z Z Z Z	eP e e e e F	22 24.0	13	40 55 09 45 15 06					" "	
147	11	Z Z	e e	11	02 03	52 07					" "	
148	11	Z NEZ	iP i F	13	13 16	47.8 50					Compression	
149	11	Z Z	e e	20	11 12	36 53					Very weak	
150	12	Z Z Z	e e e	5	11 12	22 24 42					" "	
151	13	Z Z NE	ePn P* Sn F	5	27 28 29 40	45 03 12				832	Confused with microseisms	



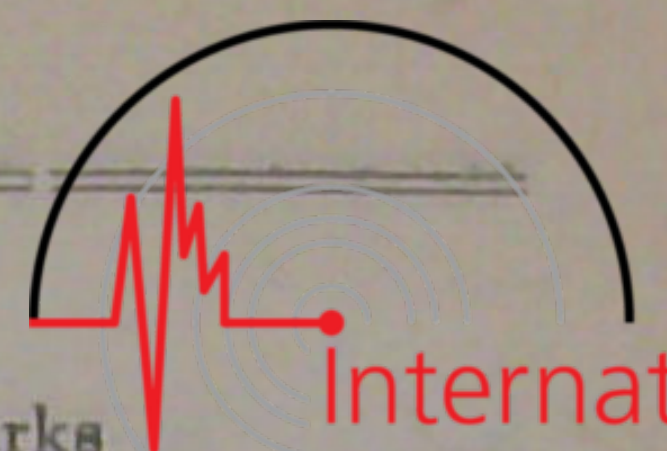
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
152	14	Z	eP	17	13	36					10000	Confused with microseisms
		Z	e		14	39						
		Z	eP		17	08						
		Z	e			20						
		Z	e		20	20						
		Z	e		22	27						
153	15	E	M	18	00							
		Z	P	8	45	12						Very weak
154	15	Z	P	14	17	55					822	
		NE	P*		18	14						
155	16	NE	Sn	14.6	19	21						
		NE	F									
156	16	Z	P	11	26	49						" "
157	16	Z	P	17	43	07						" "
158	17	Z	e	12	42	39						
		Z	e			57						
159	17	Z	i	12	48	56.6					9555	
		Z	e		49	03						
160	18	Z	P	13	17	19.4					1110	Very strong
		Z	i			39						
		Z	e		18	09						
		Z	i			33						
		Z	ePP		20	45						
		E	SKS		27	39						
161	18	Z	S	14.4		51					1110	Confused with the preceding earthquake Replica
		Z	F									
162	18	Z	P	20	08	45					1110	Confused with the preceding earthquake Replica
		E	eS		19	10						
163	18	Z	F	23.5		38					1110	Confused with the preceding earthquake Replica
		Z	eP		20	23						
164	18	Z	e	20		05					1110	Confused with the preceding earthquake Replica
		Z	e			36						
165	18	Z	e	20		43					1110	Confused with the preceding earthquake Replica
		NE	(S)		24	59						
166	18	NE	e	25		05					1110	Confused with the preceding earthquake Replica
		Z	eP		20	37						
167	18	Z	e	20		26.4					1110	Confused with the preceding earthquake Replica
		Z	e			31						
168	18	Z	e	20		36					1110	Confused with the preceding earthquake Replica
		Z	e			36						
169	18	Z	P	21	20	36					1140	Confused with the preceding earthquake Replica
		N	e			47						
170	18	N	e	21		10					1140	Confused with the preceding earthquake Replica
		N	e		21	32						
171	18	Z	P	21	46	49					1140	Confused with the preceding earthquake Replica
		Z	e		21	47						
172	18	Z	e	21		04					1140	Confused with the preceding earthquake Replica
		Z	e			04						
173	18	Z	P	22	30	34					1140	Confused with the preceding earthquake Replica
		Z	e			58						
174	18	Z	e	22		05					1140	Confused with the preceding earthquake Replica
		N	es		31	30						
175	19	Z	e	2	56	17.8						Very weak
		Z	e			22.6						
176	19	Z	P	3	29	38						" "
		Z	e			04						
177	19	Z	P	8	40	17.0					9350	Dilatation
		Z	e			36						
178	19	E	S	50		26					9350	k = 150 km.
		Z	e			26						
179	19	Z	iP	12	56	13.0					1255	Dilatation
		Z	e			31						
180	19	EN	S	13.1		22					1255	Dilatation
		EN	F			22						
181	19	Z	P	19	12	18						Preceded by microseisms
		Z	e			23						
182	19	Z	e	19		36						Preceded by microseisms
		Z	e			36						
183	19	Z	eP	21	16	30						" " "
		Z	e			10						
184	19	N	e	21.4		21						" " "
		N	e			21						
185	19	Z	F	21.4								" " "
		Z	F									



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
223	April 15	Z Z Z	P i i F	1 2.5	29 30	47 10 27						Very weak
224	15	Z Z	e e	14	19	35 46						" "
225	15	Z Z	iP e	18	19 20	44.3 08						Compression
226	16	Z Z	e e	15	32 33	05 47						Very weak
227	17	Z Z Z Z	e e i i	2	42 43	29 51 20 34						" "
228	17	Z Z N N	e e e i	17 18	59 00 01	50 54 03 23						" "
229	18	Z N	e i	21	53 55	04 11						" "
230	18	Z E	e i	15	14 16	12 10.5						" "
231	19	Z	iP	23	01	12.2						Compression
232	20	Z NE	Pn Sn	9	19 20	09 06				545		Very weak
233	20	Z Z Z Z Z	eP i e e i	11	21	36 56 18 20 28						" "
234	20	Z E	eP M F	20 21.0	21 49	10						" "
235	21	Z	P	2	11	40.3						" "
236	21	Z N N	eP e e F	2	22 23 24	48 30 19						" "
237	21	Z E E	e e e	15	17 18 19	37 46 05						" "
238	22	Z Z	eP e	10	22 23	45 10						" "
239	23	Z N	e e	1	24 26	27 36						" "
240	23	Z Z Z	P e e	3	38	06 20 40						" "
241	23	Z Z Z E E	eP PcP e S e F	4 4 8	00 01 02 08 11	35 35 12 22 00				6220		
242	23	Z Z Z NE N N	iPn i i Sn S* Sg F	12 13.1	55 56 57	31.2 48 14 43.6 07 24				690		Compression
243	23	Z Z Z	eP PKP i	16	40 43	00 30 45				12890		

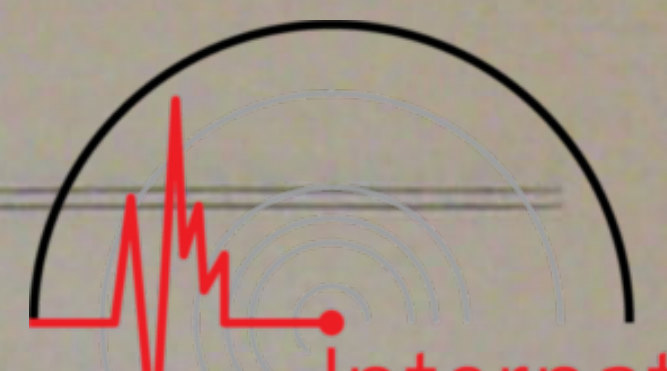


No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		A _N	A	A _Z		
							Sec.	μ	μ	μ	Kms.	
243	April 23	Z E E E E	PP e e e e F		44 52 53 54 55	38 21 06 15 36						
244	24	Z Z Z E	P e PP S F	2	18 20 25	28.0 33.5 22 30					5390	
245	24	ZE N	e e	10	01 02	28 03						Very weak
246	24	Z	eP	23	46	56						" "
247	25	Z Z NE	iPn i iSn F	2	55 56	50.6 56 43					490	Dilatation
248	25	Z Z	eP e	16	32 33	00 40						Very weak
249	25	Z Z Z Z	e e e e	17	22 23 24	18 52 17 06						" "
250	27	Z Z	iP e	11	31	32.6 58						Compression
251	29	Z Z Z Z Z	P i e e e	3	50 52 53 54 55	32 27 03 06 16						Very weak
252	29	Z Z Z	iP e e	20	33 34	34.0 56 04						Compression
253	29	Z Z	P e	22	06	18 53						Very weak
254	30	Z Z	iP e	1	22	09 30						Compression
255	30	Z Z Z ZE E	PKP e e PP PKS F	6	46 47 49	09 27 50 20 43					15835	
256	30	Z Z Z Z	e e e e F	15	49 53 55	30 44 24 08						Very weak
257	May 1	Z Z Z	e e e F	00	18 19 20	34 02 54						" "
258	1	Z Z N Z E	eP e i PPP S F	20	08 09 10 16	59 05 11.4 15 41					1000	
259	2	Z E E	eP e S F	5	44 45 05	10 29 52					1000	
260	2	Z NE	eP S F	10	09 10 15	2.5 45					1000	



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
261	May 2	E E	e e	14	49 50	50 15						Verv weak
262	2	ENZ E N	eP iS i	18	39 41	58 39.2 43.5					1000	
263	4	Z	P	00	07	33						" "
264	4	Z Z	P e	4	16 17	38 03						" "
265	4	Z Z E E	P i e M F	11 12 12.8	41 42 52 26	55 07 33						" "
266	4	Z Z	e i	15	43 44	45 30						" "
267	4	Z	iP	23	39	43						Comprission
268	5	Z Z EN	ePn e Sn F	1 2	56 57 01	29 38 51					790	
269	5	Z E E	ePn P* Sn F	11	39 40 43	30.4 00 53					790	
270	6	Z Z Z ZE E E E	eP e PKP pP e SKS ePS F	17 22.0	31 32 35 36 39 42 46	54 09 29 43 15 22 27					13000	
271	7	NE NE NE	i i i	6	33 34	54.8 07 11						Local (Very weak)
272	7	E N	i i	13	56	07 17						" " "
273	7	Z Z	eP e	18	16 17	26 17						Very weak
274	7	Z Z Z	e e e	19	03 05	04 42 06						" "
275	9	ENZ ENZ	e e	9	47 48	44 03						Local (Very weak)
276	9	Z Z	eP i	12	49	09 19						Very weak
277	10	Z E	ePn Sn	13	48 50	49 10					778	" "
278	10	Z E	P M F	15 15.9	28 36	15.4						" "
279	11	Z Z Z	ePKP e e F	10 13.0	36 37 39	06 51 09						" "
280	11	Z N Z Z	e i e e	15	49 53 54 55	07 42 51 51						" "
281	13	Z Z Z	e e e F	12 15.3	13 16	04 20 59						" "

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
	May							μ	μ	μ	Kms.	
282	14	Z Z E E	ePn P* Sn S* F	3	22 53 57	36 41 16 26					370	
283	14	Z Z Z Z E	eP i i i S F	13	02 03 04 08	39 50 11 28 18					945	
284	15	Z Z	e e F	8 9.1	43 47	55 51						Very weak
285	16	Z Z Z NE N	iPn i P* Sn Sg F	2 3	53 54 55 02	46.5 51 00 57 34.6					667	Dilatation
286	17	Z Z	eP e F	13 14.6	23 28	28 27						Very weak
287	17	Z Z Z	eP e e	1	36	16 23 28						" "
288	17	Z Z Z NE NE	ePn i P* Sn i F	19	08 09 12	28 30.5 34 10 13					378	
289	17	Z Z NE	Pn i iSn F	21	49 50 55	35.0 37.7 51					733	
290	18	Z Z Z	P e e F	8	22 26 27	51 45 18						" " Lost in changing the paper
291	19	Z Z Z E	iP i PP S F	3 5.0	23 24 27 34	55.8 09 33 36					9720	Compression
292	19	Z Z Z	eP e e	6	05	22 29 34						Very weak
293	19	E E	e e	6	25 26	05 24						" "
294	19	Z Z E E	eP e e M F	16 17.0	00 01 02 29	58 05 00						" "
295	20	Z Z Z Z	P e e e F	8 10.0	05 06 07	20 42 06 19 21						" "
296	20	Z Z Z	P e i F	10 11 11.7	56 57 00	48 30 30						" "
297	22	Z NE NE	ePn Sn i	6	55 57	55 06 09					667	



No.	Date	Comp.	Phase	G.M.T.			Period Sec.	Amplitude			Δ Kms.	Remarks
				H.	M.	S.		A _N μ	A _E μ	A _Z μ		
298	May 22	Z Z Z	iP e e	20	33	14.4 24 30					Dilatation	
299	23	Z Z	e e	20	07	05 12					Very weak	
300	23	Z	i	20	10	40					" "	
301	24	Z Z Z Z Z	e e e e e	1	33	33 54 26 12 27					" "	
302	24	Z Z E	eP e e F	5 5.8	28	08 15 36					" "	
303	26	Z Z E E	eP e e e	15	27	11 31 20 50					" "	
304	27	Z E	Pg e	8	16	8.8 11					(not felt)	
305	27	Z E	Pg e	8	30	50.8 53					" "	
306	27	Z Z	e e	18	33 37	54 09					Very Weak	
307	28	Z Z	eP e	00	17 22	21 18					" "	
308	28	Z Z Z Z Z	eP e e e e F	1 2.1	29	50 05 59 15 48					" "	
309	28	Z E E	e e e	1	39 40	33 42 53				(Near)	" "	
310	28	Z E E	e e e	13	38 39	33 20 32					" "	
311	31	Z Z Z Z Z	P e e e e F	5 7.6	13	17 00 51 23 24					" "	
312	31	Z NEZ	P e	19	54 55	54 00					" "	
313	31	Z Z Z E E E	P e PP SKS S PS F	20 23.0	11	40 21 12 11 35 42				10055	" "	
314	June 1	Z Z Z	e e e	20	20	23 24 48					" "	
315	1	Z N	eP e	23	48	24 49					" "	
316	2	Z NE	e e	3	23 24	57 04	08 08	00			" "	
317	2	Z Z Z	P e e	18	08	20 31 54	22 06 09	22 27	0	0 2 i	" "	



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		A _N	A _E	A _Z		
	June									Kms.		
18	3	Z Z	P e	2	33	04 10					Very weak	
19	3	Z N Z Z Z	eP i PP e S SS F	16	08	03.2 10.5 15 18 32 45				1480		
20	3	Z Z	P e	16	04	34 44					" "	
21	5	Z NE	iPg iSg	13	17	39.9 41.0				(Not felt) 9	Compression	
22	6	Z Z NE	ePn P* Sn	00	42 43	58 09 50				466	Very weak	
23	6	Z Z	P e	1	20	20 35					" "	
24	7	Z N	e i	6	44	32 47					" "	
25	7	Z Z Z	e e e	12	36 37 40	59 04 32					" "	
26	7	Z N N EN	Pn e Pg Sn F	13 14	54 02	36.8 46.4 08 52				722		
27	7	Z Z N N N	ePn P* e Sn Sg F	14	49 50 53	21.5 30 07 10 34				466		
28	8	Z Z Z E E	iP i PP S e F	11 12 13.4	53 54 03 04	13.4 10 36 50 09				9555	Compression	
29	8	Z Z	P e	20	55	52.3 56					Very Weak	
30	9	Z Z Z E	eP e PP eS F**	00 1	53 55 56 03	05.8 08 33 45				9665	" "	
31	9	Z Z	P e	1	16	17.8 27					" "	
32	9	Z	e	1	33	46					" "	
33	9	Z Z Z E	iP e PP eS F	1 2 3.4	51 52 55 02	47.8 15 10 24				9610	Compression	
34	9	Z Z	e e F	16 16.8	32 33	47 20					Very weak	
35	10	Z Z Z Z	P e PP PS e F	18 19.8	37 41 50 52	27 52 30 18 18				10890		
36	11	Z Z	P e	13	45	38 50					" "	

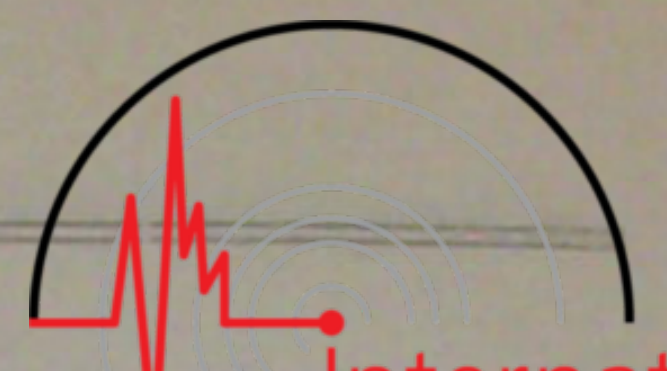
Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
			H.	M.	S.		Sec.	A _N	A _E		
June											
			H.	M.	S.	Sec.	μ	μ	μ	Kms.	
5	18	Z ZE	14	06	28 45.6						Very weak
5	18	Z Z	19	11	34 47						" "
7	19	Z Z	5	12	36.8 43.5						" "
8	19	Z Z N N E	9	43 44	55.6 02.5 17.6 41 12						" "
9	19	N N N	12	44	21 33 39						" "
0	19	Z EN	18	44 45	15.8 15				556		Compression
1	19	Z Z Z	22	40	15 18.4 21.8						Very weak
2	20	Z	3	27	08.4						" "
3	21	Z Z EN	2	38 39 40	59 03.6 13				710		
4	21	Z Z Z Z	8	14	18 29 45 21						" "
5	21	Z Z	16	22	34.8 47						" "
6	22	Z	00 1.0	09	10.0						Compression
7	22	Z Z Z	11	30 31	04 11 30						Very weak
8	23	Z EN	1	55 56	09.6 34.4				721		Dilatation Probable direction = 50° N.W.
9	23	Z Z E E	14	06	14.7 43 36 12				10335		Compression h = 100 Km.
0	23	NEZ N	23	36	12 30						Very weak
1	24	Z ZE NE NE	2	32 33	41 44 29 37				444		
2	24	Z	21	31	25						" "
3	25	EN EN N	7	12 13	47 50.7 05						(Local) Very weak
4	25	E E	7	19	35.5 49						Very weak
5	25	Z Z Z Z	8	40	11.0 22.6 38 06 18						Dilatation
6	25	Z Z Z Z Z	10 11	57 58 01	29 09 30 08 57 24				11780		h = 250 Km.



No.	Date	Comp	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A_n	A_e		
								μ	μ	μ	Kms.	
376	June 25	E E	eS sS F	14.0	09 11	12 00						
377	26	Z Z Z Z Z Z Z ZE E	eP e e e e e e e M F	5 6 9.0	56 59 00 01 02 09 38	21 51 18 36 05 06 00 51						
378	27	Z Z Z Z	e i e i	8	01 02 03	50 57 12 02						Very weak
379	28	Z Z	e e	5	50	11 22						" "
380	28	Z E	e M	20	29 38	53						" "
381	29	EN E E E	e i e i	5	20	10 11 17 25						(Local) Very weak
382	29	Z	iP	23	34	52.9						Compression
383	30	Z Z EN EN N	ePn i e Sn S*	4	45 46 47	26 25 45 50 19						Very weak
384	30	Z Z	iP e	7	50	25.0 35						Compression
385	30	N N N	e i i	14	42	41 47 52						Very weak
386	July 1	Z Z Z Z Z Z Z	iP i i e PP e S F	3	12	15.5 36 58 14 00 15 40 19 18 22 45				9500		Compression
387	2	Z Z Z Z Z E E E E	iPKP iPPKP sPKP PP e e e SS F	7	15 17 19 20 28 30 37	56 0 04.0 29 16 39 54 36 09				15780		Dilatation h = 250 Km.
388	2	Z Z	e e	22	41	10 19						Very weak
389	3	Z Z Z	e e e	2	40 44	32 42 02						" "
390	3	Z Z Z	iP e e	5	43 44	24.4 42 02						Compression
391	3	Z Z E	e e e	18	47 53	00 38 33						Very weak
392	4	Z E E	eP e e	3 4	55 59 00	45 50 06						" "

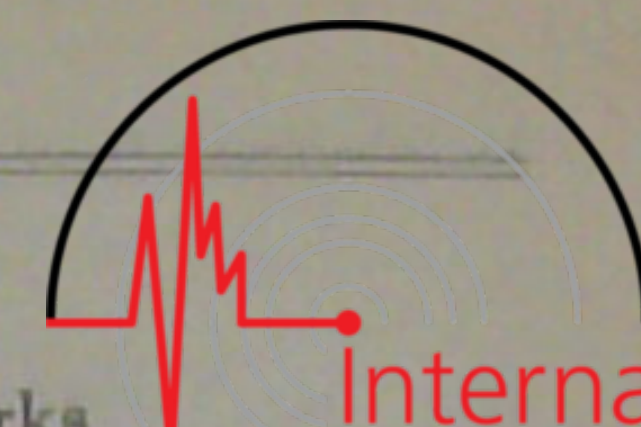


No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
393	July 5	EN E E	e e i	22	43 44 45	19 31 20						Very weak
394	7	Z Z ZE E	iP PP S sS F	4	18 19 27 28	47.5 42 45 23					8055	Compression h = 225 Km.
				5.2								
395	7	ENZ ENZ	e i	21	30	46 50						Very weak
396	8	Z Z EN N	ePn P* i Sn F	6	10 11 12	56 11 05 08					622	" "
				6.3								
397	9	Z E	P e F	19	09 10	39 33						" "
				20.1								
398	9	Z Z	P e	20	51	07 18						" "
399	9	Z Z Z Z Z E	iP e PP e e eS F	21	34	19.6 40 37 27 16 51					7000	Dilatation
				23.6								
400	10	Z Z Z EN E Z Z	iP iPP FPP SKS S SP (PS) F	15	22 24 27 31 32 33 35	22.8 24.0 36 55 06 06 00					9445	" " = 250 Km.
				16.6								
401	12	Z Z	eP e	00 01	59 02	44 21						Very weak
402	12	Z Z Z E	eP (PP) e e F	06 07	57 01 04 08	24 42 00 06						" "
				8.2								
403	14	NE NE NE	iPg Sg i	06	59	34.7 37.0 44					(20)	Not felt
404	14	NE NE N	iPg Sg i	07	09	36.0 38 44					(17)	" "
405	15	Z Z NE	ePn e eSn	(8)	37 38	18 22 36					755	Very weak
406	15	Z	P	22	44	23.5						" "
407	15	Z N	eP e	23	04 05	16 25						" "
408	16	Z NE E	Pn eSn Sg	04	25 26	07 17 53					677	" "
409	16	N N	e e	22	00	31 49						" "
410	17	Z Z Z Z	eP e e e	19 20	52 02 03 04	45 27 06 55						" "
411	18	Z Z NE	eP PPP eS	11	44 45	07 24 51					1010	" "



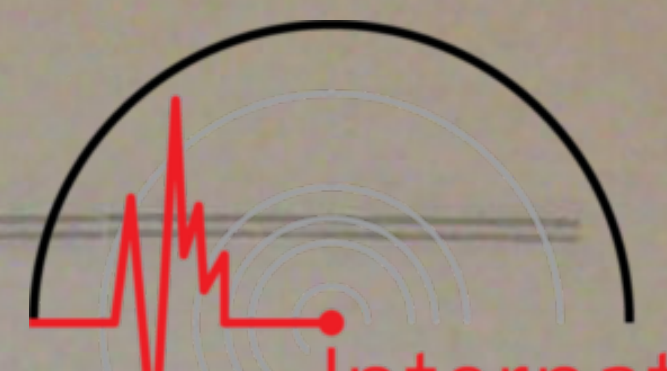
No.	Date	Comp.	Phase	G.M.T.			Period Sec.	Amplitude			Δ Kms.	Remarks
				H.	M.	S.		A_n μ	A_e μ	A_z μ		
412	July 21	Z Z Z E E	P i e e e	17	35	00 17 34 36 45 46					Very weak	
413	22	Z Z Z E E E	iP i PP e eS PPS F	05	23	54.6 15 13 15 27 48				9500	Compression	
414	22	Z Z	eP o	13.0	04	48 59					Very weak	
415	22	Z Z Z NE	iP e i eS F	15	11	48.0 54 12 13 38				1055	Compression	
416	22	Z	P	18	15	19					Very weak	
417	23	Z Z	P e F	01	11	56 27					" "	
418	23	ZE E	e i	18	12	19 30.7					" "	
419	23	Z Z Z	e e e F	18	37	07 21 23					" "	
420	25	Z Z	e e	17	47	25 45					" "	
421	26	Z Z Z EN E E Z	P e PPP SKS SKKS S sS F	17	06	47.5 33 11 50 05 18 39 19 06 43				11335	h = 250 Km.	
422	27	E E Z	Pg i i	16	05	57.4 03 05					Very weak	
423	28	Z Z Z Z Z	iPKP i PKKP PPKP PP	07	58	32.0 39.7 52.5 42 18				16665	Dilatation h = 550 Km.	
424	29	Z Z	e e	02	55	49 19					Very weak	
425	29	Z Z Z E	eP e e e	13	41	55 15 02 17					" "	
426	29	Z N N N Z Z	eP e e e i i F	14	21	22 07 18 00 19 00					" "	
427	29	Z Z Z Z Z	PKP i PKKP PP e	23	37	56 04 16 50 17				17155		
428	30	Z Z Z	eP i e	06	22	50 07 45					" "	

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A_N	A_E		
								μ	μ	μ	Kms.	
429	July 30	Z Z Z	e i e	07	10	10 26 37						Very weak
430	30	Z Z Z	i i i	11	54 56	46.0 20.6 35.0						" "
431	30/31 August	Z E	e e	23 00	59 08	44 27						" "
432	1	Z Z EN E	eP e i e F	06	13 14	39 47 44 58						" "
433	2	Z EN	eP e	16	39 40	32 31						" "
434	2	E E	e e	20	20	30 55						" "
435	3	Z Z	e i	13	57	33 50						" "
436	4	Z Z	e i	02	39	14 28						" "
437	4	Z Z Z Z Z Z E	ePKP PPKP e iPP e e e	14	12 13 15 17 19 21	22 13 12 40 12 42 48				15665		h = 200 Km.
438	5	Z EN E	ePn Sn e	13	30 31	09 25.5 43				733		.
439	6	Z Z	iP e	09	13	36.0 47						Compression
440	6	N N Z	e e e	20	54 55	42 11 35						Very weak
441	8	Z E E	ePn Sn e	12	23 25	58 05 24				644		" "
442	8	Z EN	ePn Sn	12 13	58 00	59 04				622		" "
443	8	Z Z	eP e	18	52	18 30						" "
444	9	Z	iP F	06 07.2	01	06						Dilatation
445	9	Z N	iP eS F	07 09.3	43 46	57.0 14				345		Compression
446	11	Z E	eP eS	03	33 37	15 27				1310		Very Strong
447	11	Z Z E	e e e	09	30 32	35 45 48						Very weak
448	11	Z Z E E	eP PPP S e F**	12	46 48	19 35 30 43 43				1300		
449	11	Z Z E	eP PP eS F	13 13.5	13 14 16	57 6.8 06				1280		



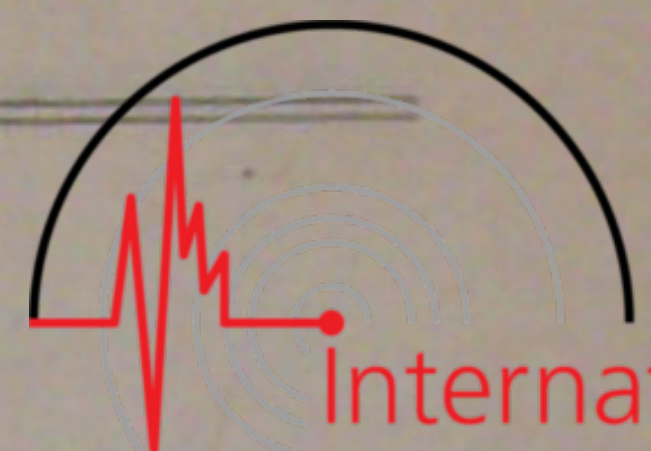
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
450	August 11	Z Z E	eP e eS	13	33 34 35	48 23 57					1290	Very weak
451	11	Z Z E E	ePn P e Sn	16	18 19	43 51 18 27					400	Not felt
452	11	Z Z E	eP e eS	19	48 50	19 55 30					1300	Very weak
453	11	Z E E	e e e	21	27 29	02 06 25						" "
454	12	Z Z E E	iP e eS i	06	10 11 13	58.5 09 08 29					1300	Compression
455	12	Z Z Z	P e e	06 07	59 01	06 16 24						Very weak
456	12	Z	iP	09	26	39.0						Compression
457	12	Z ZE	eP eS	10	10 12	30 35					1220	Very severe
458	12	Z E	eP eS	11	36 38	35 42					1245	
459	12	Z E	P eS	12	08 10	07.4 14.5					1245	
460	12	Z E	P S	13	42 44	11.3 21					1290	
461	12	Z E	P S	14 14	11 13	29 (39)					1290	
462	12	Z N	P S	16	11 13	20.4 31					1290	
463	12	Z Z Z Z Z	PKP PKKP e PP e	17	13 14 17 18	39 05 42 44 06					17445	
464	12	Z E	e e	17	55 57	46 50						Very weak
465	12	Z Z E	eP e e	19	48 50	08 36 14						
466	12	Z Z NE	P PP S	22	20 22	20.4 29 31					1290	
467	13	Z E	eP eS	01	51 53	15 24					1280	" "
468	13	Z Z Z E	P PP i S	03	24 25 27	57.5 16.5 19 07.5					1290	
469	13	Z Z Z Z	iPKP e i e F**	09	42 43 45 46	42.0 20.5 50 30						Compression
470	13	Z ZN	eP eS	10	19 21	36 47					1290	
471	13	Z Z Z N	iP PPP e eS	14	46 47	20.7 37 08 29					1280	

No.	Date	Comp.	Phase	G.M.T.			Por.	Amplitude			Δ	Remarks
				H.	M.	S.		S.	A _N	A _E		
								μ	μ	μ	Km.	
472	August 14	Z Z E	eP e S	01	26 28	05 15 12					1255	
473	14	Z NE	e i	17	45 46	57 59						Very weak
474	14	Z	iP F	22 23.4	33	51.0						Dilatation-Very weak
475	15	Z E	eP eS	09	42 44	50 58					1265	Very weak
476	15	Z EN	iPg iSg	20	32 33	58.6 05.0					56	Compression, not felt
477	16	Z Z	e e	03	34	12 20						Very weak
478	17	Z Z E	eP PP S	00	27 29	13 22 21					1265	
479	17	Z S N	eP PP S	02	13 17	11 19 20					1265	
480	17	Z Z Z E	iP i e M F	03 04 04.5	27 28 07	29.8 49 38						Compression
481	17	Z Z E	eP e e	10	22 23 25	51 16 18						Very weak
482	17	Z N N N	Pg e	11	33	22.8 41.6 45.4 50						" "
483	18	Z N	e e	04 05	58 00	09 33						" "
484	18	Z N E	ePn (Sn) i	09	40 41	18 18.6 50.0					788	" "
485	18	Z N N	eP eS SS	22	46 48 49	40 41 07					1300	" "
486	19	Z E	eP eS	00	56 58	47 55					1265	" "
487	19	Z Z Z N N	eP e e (eS) e	03	20 21 22	20 27 04 30 44					1300	" "
488	19	Z Z	P e	10	26	23 29						" "
489	19	Z E	eP e	19	38 40	02 19						" "
490	20	Z NE	Pg Sg	08	01	39.2 59					166	Not felt
491	20	Z Z E E	P e S e	19	30 32	07 28 16 38					1280	
492	22	Z Z E	e e e	01	13 14	19 44 08						Very weak
493	22	Z Z EN	P PP S	01	22 24	45 55 55					1290	



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.	
494	August 23	Z Z E E	P i e i F	07	27 28 35 36	27 33 09 22						Very weak
495	23	Z ZN	ePn e	12	00 02	41 09					1280	" "
496	24	Z Z N	P PPP S	02	24 25 26	42 03 51						" "
497	24	Z Z Z Z	eP e e e F	16	34 38 41	11 40 17 51						" "
498	25	Z Z Z Z Z	PKP e e e e F	02	23 24 37	10 30 31 45 02						" "
499	25	Z N N	eP e eS	06	46 48	10 30 21					1300	" "
500	25	Z NE	ePn iSn	12	56 57	24 35					677	
501	27	Z N N	eP S SS	19	37 39	03 09 30					1255	
502	27	Z Z Z	P e e	20	37	08 15 40						" "
503	27	Z Z Z	iP e i	22	28 29	50.4 05 32						Compression ; very weak
504	28	Z Z E E	P e (S) i	20	41 42 43 44	39.8 23 47 16						Very weak
505	29	Z Z Z Z Z E	P e e PP PPP e F	02	06 07 08 09 13	41 55 15 30 12 15					5000	
506	29	Z NE	ePn iSn	11	04 05	23 40					744	
507	29	Z Z Z	eP e e	13	46	00 08 38						" "
508	29	Z Z Z EZ	eP e e e F	14	13 14 15 18	52 14 06 24						" "
509	31	Z Z	P i	04	17 18	54 05.5						" "
510	31	Z Z	iP i	08	05	25.0 44.0						Compression
511	31	Z Z Z	P e e	17	22 23	50 03 25						Very weak
512	Sept. 1	Z Z N	iPn e e	06	12 13	53.9 56 08						Compression

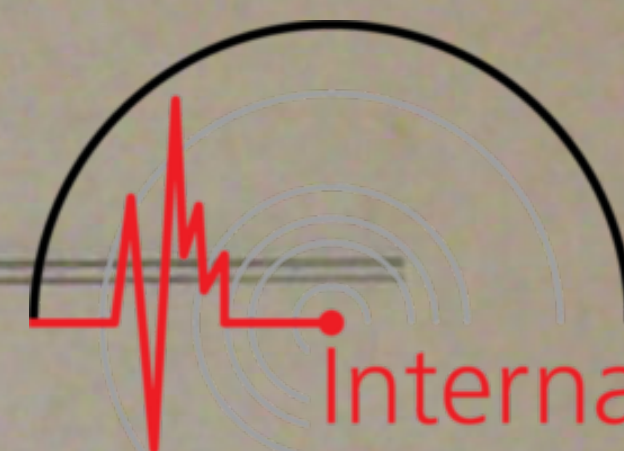
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A_N	A_E		
								μ	μ	μ	Kms.	
	(contd.)											
530	September 5	Z Z	e e	21	14	10 25						Very weak
531	5	Z	e	22	59	40						" "
532	6	Z Z	i e	01	41	05.0 15						" "
533	6	Z ENZ	Pg Sg	05	21	07.9 14.5					56	Az. 39° N.E.
534	6	Z N Z	ePn Sn i	06	42 43	04.8 27 44					790	Very weak
535	7	Z N N	eP e e	01	02 04 05	36 46 19						" "
536	7	Z Z Z E	iP PP e eS F	04	01	36.0 48 20 14					1665	Compression
537	7	Z E	e e	07	35 39	02 09						Very weak
538	8	Z Z N	P e e	11	54 57	49 04 14						" "
539	9	Z Z E	P e M F	16	02 03 36	25 07						" "
540	10	Z E	iPn eSn	04	07 08	16.7 15					545	Dilatation, Felt in Egypt.
541	10	Z EN	ePn Sn	05	00 11	11 07					535	
542	10	Z N N	e i i	05	09 10 11	30 22 49						Very weak
543	10	Z ENZ	(ePn) Sn	05	44 45	56 47						" "
544	10	Z Z Z N	Pn P* e Sn	06	53	14.8 24 29 10.8					535	
545	10	ZN E	e e	07	12 13	51 10						" "
546	10	Z Z NE	Pn e Sn	07	28 29	06 23 02					535	
547	10	Z NE	e e	07	44 45	41 33						" "
548	10	Z Z N N	ePn e Sn e	10	08 09	28 43 23 44					535	
549	10	N N	e e	14	09	05 24						" "
550	10	Z N	Pn Sn	16	26 27	52 48.5					535	
551	10	N N	e e	18	28	16 27						" "
552	11	N	e	02	18	17						" "
553	11	Z Z N	ePn i i	11	00 01 02	57 50 39						" "



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
	(contd.)							μ	μ	μ	Kms.	
554	Sept. 12	Z Z E E	e e e e	18	20	47.4 57 57 15						Very weak
555	12	Z Z N	ePn e Sn	20	58	37 43 33					535	
556	13	Z Z N	ePn i Sn	06	30	02 19.8 58					535	
557	14	Z Z Z Z Z	ePKP i e e i F	00	46	15 19 25 18 00						" "
				03.1								
558	14	Z Z Z Z	eP e (PP) e	09	11	02 14 24 35						" "
559	14	Z Z Z	eP i e	10	00	18 21 06						" "
560	14	Z Z E	P e e F**	10	26	22 15 45						
561	14	Z Z E E	iP e e M F	11	24	28 00 51 54						Dilatation
				13.1								
562	14	Z Z E	eP e S F	14	59	06 21 22					1310	
				15 15.8	01	22						
563	14	Z E E	eP e e	16	16	43 58 04						Very weak
564	14	Z	eP	17	54	47						" "
565	15	Z E E	e i e	03	24	40 34 45						" "
566	15	Z Z E E	eP e e e	01	14	35 43 33 47						" "
567	15	Z Z	eP i F	11	37	23 47						
				12.3	40	47						
568	15	Z Z EN E	iPn i (Sn) i	11	56	04.4 10 58 36					500	Dilatation
569	16	Z Z Z Z Z	ePKP (PKKP) e e (PP)	02	08	41 24 54 00 14						Very weak
570	16	Z	P	03	47	24						" "
571	16	Z NE	(Pn) (Sn)	05	17	27 52					810	
572	16	N N E	e e e	08 09	59 00	36 01 30						" "



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
573	(contd.) September 16	Z E N N	eP (S) i i	12	06 09	46 12 32 49					1445	Very weak
574	17	Z Z Z Z Z Z Z	PKP i PKKP i i PP e SKS F	21	31 32 35 36 38	39 50 06 30 17 36 24 30					17110	h = 100 Km.
575	18	Z N Z	eP _n (S _n) e	07	07 08 09	29 54 09					821	
576	18	Z N	P _n S _n	17	21 22	44 38					500	
577	19	NE Z Z	e e e	12	54 55	54 05 18						Very weak
578	19	Z E E	eP _n S _n i	23	55 56	03.6 28 36					710	
579	20	Z E E	P e M F	19	08 19 39	25 18						" "
580	20	Z E	e e	22	15	04 35						" "
581	21	Z Z Z Z	e e e e	00	47 48	28 42 04 11						
582	21	Z N N Z	e i i i	11	37 38	16 09 16.0 26.0						" " (local)
583	22	Z N N N	e e i i	11	49 50	36 24 38.6 47.8						" " "
584	23	Z Z Z E E E E	iP PP i SKS e e M F	02	27 30 34 37 38 39 10	16.4 39 18 40 06 06					9500	Compression
585	24	Z Z Z E E	P _n e P* S _n e	08	10	39.8 50.5 58 08.8 17					866	
586	24	Z E	eP _n S _n	08	51 52	09 19					666	
587	24	Z E Z	e e e	16 17	58 03 04	36 54 38						Very weak
588	25	Z Z	e e	03	15 19	48 42						" "
589	25	Z Z	e e	13	54 57	14 45						" "
590	25	Z ENZ	iPg e	14	30	31.9 34.0						Compression, not felt

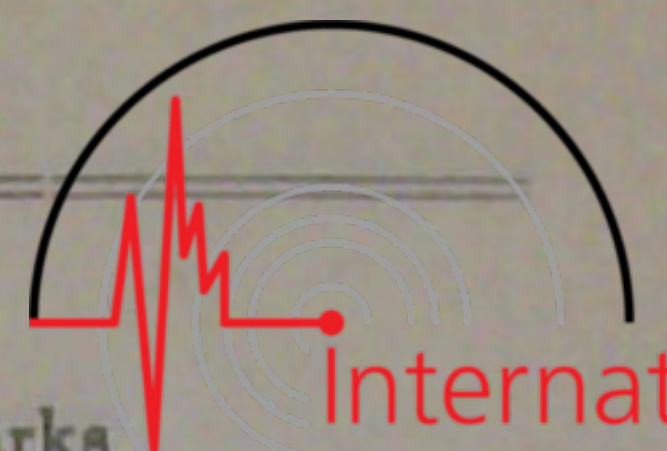


No.	Date	Comp.	Phase	G.M.T.			Period μ	Amplitude			Δ Kms.	Remarks
				H.	M.	S.		A_N μ	A_E μ	A_Z μ		
	(contd)											
591	September 25	Z N	ePn Sn	17	08 09	57 55				545	Very weak	
592	25	Z E E	ePn eSn e	17	23 24	12 16 27				610	" "	
593	25	Z N	Pn Sn	21	38 39	16 (24)				645		
594	25	Z Z	eP e	23	08 09	22 03				645	" " (Near)	
595	26	Z Z Z Z	iP e e e	01	15	12.2 52 36 21					Compression	
596	26	Z Z	e e	19	54 55	57 22					Very Weak	
597	27	Z Z Z Z	iP i PP eS F	06	17	53 12 06 14				9145	Dilatation	
				07.7								
598	27	Z Z	e e	09	34	20.5 36					Very weak	
599	27	Z Z Z	e e i	21	40	47 52 42.8					" "	
600	28	Z E	e e	06	08 14	25 32					" "	
601	28	Z Z	iP e	13	26 30	43.6 00					Compression	
602	28	Z Z	P e	23	54 55	31.5 10					Very weak	
603	29	Z Z E Z Z Z E E E	PKP pPKP sPKP e PPP pPPP i i i F	01	55	57 14 44				17220	h = 300 km.	
				02	00	54						
					03	33						
					04	50						
					11	06						
					20	39						
				04.4		30						
604	30	Z Z Z N	iP e i i	05	06	09.0 24 33 50					Dilatation	
605	30	N N N	e e e	07 08	59 00	15 25 38					Very weak	
606	30	Z Z Z Z E	ePKP e e e (SKS) F	23	23 24	50 03 36 50 48					" "	
				03.0								
607	October 1	Z E	iPn iSn	2	49 50	51.4 58.0				633	Dilatation	
608	3	Z Z Z	eP i e	4	16 17 18	52 42.3 05					Very weak	
609	3	Z N	(Pg) (Sg)	6	16 17	51 03				100	" "	
610	3	Z	eP	15	56	44					" "	
611	4	Z Z	eP e	3	28	44 54					" "	

No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
(contd.)												
October 5												
								μ	μ	μ	Kms.	
612		Z Z Z E E	iP PP PPP S PPS F	4 6.1	44 47 49 54 56	24.2 36 36 50 08					9445	Compression
613	5	Z E	eP (eS) F	10 11.3	09 19	25 59						Very weak
614	5	Z E N	eP eS SSS	12	19 21 22	59 48 12					1066	" "
615	5	Z	eP	13	02	21						" "
616	5	Z Z	eP e	16	01 02	59 18						" "
617	5	Z Z	ePKP e F	23 1.6	35	20 30						" "
718	6	Z Z Z N EN	eP e e eS eSS	20	14 18	40 45 54 19 50					2210	" "
619	6	Z Z E	ePKP PP SKS F	21 22 1.0	57 58 04	06 24 16					13120	
620	6	Z E	iP e F	23 1.0	13 16	08.2 23						Compression
621	7	Z E	eP (eS)	9	25 28	54 51					1770	Very Weak
622	8	Z	eP F	10 11.0	01	56						" "
623	8	Z Z E N	eP PP eS eSS IF	10 11.0	29 32	45 56 07 22					1400	
624	8	Z	eP	16	29	50						" "
625	8	Z Z E E	eP i eS M F	19 20.5	19 25 39	12 17 49					4955	" "
626	9	Z E E E	eP eS SS SSS	17	34 36	23 30 45 58					1245	" "
627	10	Z Z Z E N	iPn eP* ePg iSn Sg	9 21	19 20 21	22.3 38 54 43.3 27					777	Compression
628	10	Z Z Z E	eP i ePPP S F	21 22.1	32 34	00 06.1 19 13					1310	
629	11	Z EN E	eP eS SS	00	17 19	05 10 23					1220	
630	11	Z Z Z ZEN	eP PcP i eS	13 31	21 31	15 18 44.4 40					9365	



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
	(contd.)							μ	μ	μ	Kms.	
630	October 11	Z	PS F	16.0	32	36						
631	11	Z Z E E	eP i e (S) F	17 18.7	16 22	13 18.0 49 56					5110	
632	11	EN	e	18	24	31						Near
633	12	Z E	eP eS	11	34 36	33 55					1190	Very weak
634	12	Z Z N E	ePn P* eSn Sg	16	29 30	11 31 43 36					888	" "
635	14	Z Z Z E Z Z	iP pp iPP eS esS PS F	14 15 16.2	59 00 03 10 11	46.0 15 03 00 42 03					9335	Compression h=120km
636	14	Z E N E	eP eS SS SSS	20	17 20 21	00 48 17 33					2310	Very weak
637	16	Z E E	eP eS M F***	08 09	57 07 27	51 15					8055	" "
638	16	Z	eP F**	09	28	06						" "
639	16	Z E	ePKP M F	10 11.2	12 59	16						" "
640	16	Z Z Z E E	eP PP PPP iS SSS F	21 22.3	47 49 50	34 45 51 46.6 12					1300	
641	17	Z E N	iPn eSn e	00	55 56 57	38.7 53 13					710	Dilatation
642	17	Z Z	iP e	01	37	37.8 56						Compression Very weak
643	17	Z N EN E Z	eP e e e e F	09 10.1	20 31 32 33	32 01 22 31 01						
644	17	Z E	ePn eSn	12	20 21	23 16					488	" "
645	17	Z Z N E E	iP ePP eSKS eS M F	21 22 24.0	20 23 30 05	09.0 33 35 47					9635	Compression
646	17/18	Z E	eP eS	23 00	56 06	08 46						Very weak
647	19	Z E	ePn eSn	00	13 15	56 10					699	
648	20	Z EN	eP eS	04	43 45	29 40					1288	" "



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
649	(contd.) October 20	Z	eP	05	40	15					1545	
		Z	ePP			27						
		Z	ePPP			35						
		E	eS		42	52						
			F	6.1								
650	21	Z	eP	11	33	58					1300	
		E	iS		36	10.1						
		E	SS			25						
			F	12.2								
651	21	Z	eP	12	28	05					1265	Very weak
		E	eS		30	13						
652	21	Z	eP	12	48	18					1265	" "
		E	eS		50	28						
653	21	Z	eP	16	32	33					1265	" "
		E	eS		34	42						
			F	17.0								
654	21	Z	eP	18	42	45					1265	
		E	S		44	52						
		E	M		53							
			F**									
655	21	Z	ePn	19	57	47					466	
		E	Sn		58	37						
		E	S*			49						
		E	Sg			58						
656	21	Z	eP	22	18	14					1265	" "
		E	eS		20	23						
657	21	Z	eP	23	46	55					1265	
		E	S		49	04						
			F	0.2								
658	22	Z	eP	07	05	36					1265	" "
		E	eS		07	44						
659	22	Z	eP	13	15	14					1265	" "
		Z	e			32						
660	22	Z	eP	13	58	18					1265	" "
661	22	Z	eP	23	02	29					1265	" "
		Z	o			40						
662	24	Z	ePKP	23	39	37					1265	" "
		Z	e		41	10						
		E	e	00	42	00						
			F	2.0								
663	25	Z	ePKP	07	40	44					1265	" "
		Z	e			58						
		Z	e		42	09						
		Z	e		44	27						
		Z	e		45	10						
			F	9.2								
664	25	Z	eP	16	56	52					1275	Very weak
		E	eS		59	02						
665	26	E	e	16	09	49					1275	" "
		E	e			54						
666	26	EN	e	16	45	27					1275	" "
		E	o			46						
667	26	N	e	18	05	05					1275	" "
		E	i			41						
		E	e		07	30						
			F	18.2								
668	27	Z	P	03	53	29					1275	" "
		E	e	04	04	10						
		E	e		05	12						
			F	4.8								
669	27	Z	eP	18	34	29					11780	Very weak h = 300 Km.
		Z	ePP			35						
		Z	PP			38						
		E	SKS			59						
			F	19.7	44	42						

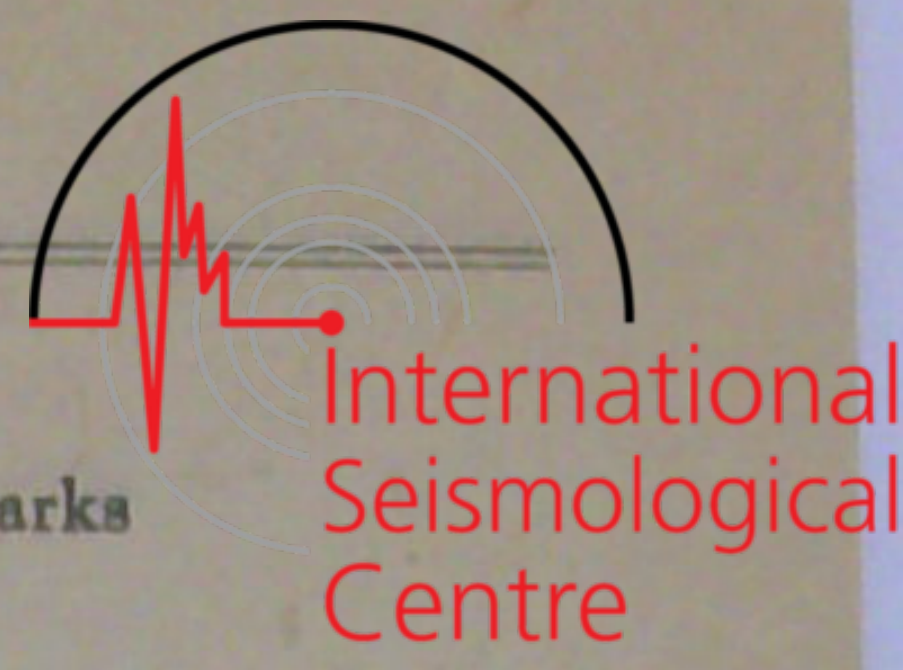
No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
	(contd.)											
670	October 28	Z Z E	eP e M F	02 03 3.3	20 04	50 59						Very weak
671	28	Z	iP	12	22	23.5						Compression
672	28	Z	eP	12	41	40						Very weak
673	28	Z	eP	14	02	53						" "
674	28	Z E	eP eS	14	41 51	06 34				9445		" "
675	29	E	M	11	28							" "
676	29	Z EN	(iPn) (eSn)	14	57 58	57.1 47				460		Compression
677	30	Z E	ePn eSn	11	54 55	08 09				577		Very weak
678	30	Z EN	ePn iSn	18	36	00 51.8				477		
679	31	Z	eP F	14 14.7	12	33						" "
680	31	Z E	iP (eS)	19	51 57	10 34				4740		Compression
681	November 1	Z Z Z	eP e e	00	29 30	27 48 07						Very weak
682	1	Z Z Z E	eP e PP eS F	18 19.4	29 32 39	04 12 07 05				8835		" "
683	1	Z E E	P e M F	21 22.4	08 19 52	26 09						" "
684	2	E	e F	21 22.1	54	42						" "
685	3	EN	e	11	20	31						" "
686	3	Z Z Z Z E	eP PP i PPP eS F	22 23.0	32 34	10 18 21 26 02				1155		" "
687	4	Z NEZ	iPg Sg	00	26	36.0 51.6				133		Compression (not felt)
688	4	Z Z Z Z E	iPKP e PP PKS SKKS F**	04	08 11 12 17	23 3 32 00 00 50				14890		Compression
689	4	Z EN	iP (iS) F	05 8.5	16 25	12.3 16.7						Dilatation Very weak
690	4	Z Z Z E N	ePKP e PP PKS SKS F	12 15.6	46 47 49 50 54	54 06 13 29 04				14510		" "
691	5	Z Z Z E	iP e e e F	08 9.0	27 28 29 33	57.0 41 15 04						Dilatation Very weak



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
	(contd.)							μ	μ	μ	Kms.	
692	November 7	Z	e	08	46	37						Very weak
693	7	Z Z Z EN	e e e e	09	21	29 37 57 25						" "
694	7	Z Z Z E E	eP i e S M F	13	14	27 35.5 50 40 43	14.2				7835	" "
695	8	Z Z F N NE	e e e e e F	01	15	26 35 32 44 56	1.6					Very weak
696	8	Z Z EN	eP e e	12	29	50 59 30						" "
697	8	Z Z Z NE E N	iP i PP S SS SSS F	14	49	26.2 29.7 43 26 47 57	15.2				1155	Compression
698	9	Z ENZ	e e	09	49	58 34						Very weak
699	9	Z N N E	e e e e	11	35	49 39 15 40						" "
700	9	Z Z E ZE E	iP e e i e F	14	11	05.2 24 06 32 21	14.9					Compression Very weak
701	9	Z Z Z N N	iP e PP eS e	17	38	22.3 38 46 55 26					9500	Compression
702	10	Z	e	15	17	24						Very weak
703	10	Z Z Z E E	iP i e (SKS) (S) F	23	53	03.0 09.2 13 30 45	2.4					Compression
704	11	Z Z EN	Pn P* Sn	03	56	03.5 18 14					665	
705	12	Z Z E	eP e e F	01	25	26 34 04	2.0					Very weak
706	13	Z	eP	14	36	11						" "
707	13	Z Z N E E	iP e S e M F	16	27	55.0 12 39 06 57	17.3				7280	Compression Very weak
708	13	Z EZ Z	ePKP e e	19	35	02 37 39						" "



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A _N	A _E	A _Z		
	(contd.)			H.	M.	S.	Sec.	μ	μ	μ	Kms.	
708	November 13	Z	e F	22.5	47	57						
709	14	Z Z Z E EN E	iP i ePP eS i M F	20 21 21.5	16 19 26 27 02	16 28 40 54 07					9665	Compression
710	16	Z Z Z Z	e e e e F	17 19.6	28 29 37 40	28 48 03 02						Very weak
711	17	Z	e F	11 12.3	32	06						" "
712	17	Z Z Z E EN E Z	eP e PP e SKKS PS PPS F	13 17.0	44 48 49 55 56 58 59	34 20 05 16 10 36 48					12445	Confused with microseisms
713	17	Z Z Z	iP e e	22	56	14.8 25 36						Compression Very weak
714	18	Z Z Z Z	eP e e e	15	22 23 24 25	50 02 05 11						" "
715	20	Z E N	e e e	1	07 08	30 19 30						" Near "
716	20	Z Z Z EN E	eP PP PPP S SS	19	16 17 19	55 04 11 03 16					1255	
717	20	Z Z Z Z	eP i e e	21	24	22 31 54 04						Very weak
718	22	Z Z EN	eP e e	11	43 45	08 25 19						
719	24	Z EN N	eP e e F	11 11.3	01 05	32 06 46						" "
720	24	Z Z	eP e	12	03 04	57 06						" "
721	24	Z Z EN	e e e	14	46 47 52	29 42 05						" "
722	25	Z Z	eP e F**	17	55 56	43 51						" "
723	25	Z E	eP iSKS F	18 22.5	01 12	45 09.0					9835	Severe
724	26	Z Z Z EN E	eP i ePP S i F	00 1.6	16 19 26 27	24 39 41 51 07					9390	Very weak



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks	
				H.	M.	S.		Sec.	A _N	A _E			A _Z
								μ	μ	μ	Kms.		
725	(contd.) November 26	Z	P	2	00	24					9500	Very weak	
		Z	e			01							50
		Z	e			04							00
		E	eS			10							55
			F	3.0									
726	27	Z	ePn	6	59	18					770	" "	
		Z	ePg										52
		EN	eSn	7	00	38							
727	27	Z	eP	11	42	56					9735	" "	
		Z	i			43							13
		EN	(S)			53							39
			F	12.0									
728	27	Z	P	23	21	06						" "	
		Z	i										10
		Z	i										24
		Z	i			22							00
		Z	e			24							08
			F	24.0									
729	28	Z	iP	20	20	15.6					1180	Dilatation	
		Z	PP										23
		Z	PPP										31
		N	eS		22								16
		N	M										41
			F	21.0									
730	28	Z	P	23	22	53						Very weak	
		Z	i			23							12
731	29	Z	e	00	44	03						Very weak	
		Z	e										19
		Z	e										40
			F	1.3									
732	30	Z	e	6	02	26						" "	
		Z	e										57
		Z	e			03							14
733	30	Z	e	7	02	39						" "	
		Z	e			03							08
734	30	Z	P	13	23	50					1180	" "	
		Z	(PPP)			24							04
		EN	eS			25							52
			F	13.7									
735	December 1	Z	iP	5	20	44.0					9120	Compression h < 100 Km.	
		Z	i			21							40
		Z	PP			23							58
		EN	iS			30							40.0
		E	(PS)			31							42
		E	(PPS)			32							12
			F	6.0									
736	1	Z	i	21	41	28.4						Very weak	
		Z	e										40
		Z	e			43							39
737	2	Z	eP	4	99	30					12390	" "	
		Z	PKP			43							26
		Z	PP			44							05
		E	SKS			50							02
		ZE	PS			53							36
					F	6.5							
738	3	Z	e	12	22	53						" "	
739	3	Z	P	15	02	35					5190	Dilatation	
		Z	PP			04							26
		Z	PPP			06							12
		E	iS			09							25.0
		E	M			24							
					F	16.1							
740	4	Z	e	7	58	22						Very weak	
		Z	e										35
741	4	Z	P	12	05	51						" "	
742	4	Z	eP	15	08	33						" "	
		E	e			20							09
		Z	e			21							54



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _n	A _e		
(contd.)								μ	μ	μ	Kms.	
743	December 4	Z Z Z	e i i	22	06	19 25.6 35.2						Very weak
744	5	Z Z E	eP e e	9 10	54 58 04	12 09 40						" "
745	5	Z EN	ePn Sn	13	30 31	25 40				710		
746	5	Z Z	e e	18	52	20 37						" "
747	5	Z N	eP S	19	37 39	00 03				1135		" "
748	5	Z Z E	ePn P* iSn	20	16	10 25 26				722		
749	6	Z Z	e e	17	36 40	57 40						" "
750	6	E Z	e e	18	11 12	44 08						" "
751	6	Z E E	e e e	19	45 47 48	46 48 11						" "
752	7	Z Z Z Z E Z Z	eP PP i i SKS PS PPS F	2 4.7	20 24 26	21 27 20 45 27 48 48				12000		h = 100 Km.
753	7	Z Z Z Z N N	iP e PP e SKS e F	14 14.7	24 27	12.0 45 33 55 34 34 06				9500		Compression Very weak
754	7	Z Z Z	e e e F	19 21.1	04	16 26 41						" "
755	8	Z Z Z Z Z E	eP e (PP) PP e SKS F	2 3.0	24	00 12 20 39 03 33				10000		
756	9	Z E	P eS	00	02 03	06 58				1100		" "
757	10	Z E	e e	23	57 59	15 07						" "
758	11	Z	i	14	08	58.0						Local tremor
759	12	Z Z N NZ E	eP PKP SKS PS M F	17 18 21.5	46 49	00 59 41 18 44				12420		
760	12	Z Z E	e e e	18	17	00 08 46						Very weak
761	13	Z	e	3	02	12						" "
762	13	N N	e e	7	09 19	09 88						" "



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
								A _N	A _E	A _Z		
	(contd.)			H.	M.	S.	Sec.	μ	μ	μ	Kms.	
763	December 13	Z	eP	19	40	45						Very weak
764	14	Z Z	e e F	10 11.2	49 50	52 20						" "
765	14	Z E	e e	13 14	52 02	08 33						" "
766	15	Z N N	eP e e F	16 17.1	43 47 48	14 12 13						" "
767	15	Z N	eP e	18	28 31	17 52						" "
768	16	N	e	00	13	28						Local tremor
769	16	Z Z Z N	eP e e e F	2 3 3.9	52 53 03	39 47 23 27						Very weak
770	17	Z N N N	Pn P* e Sn	00	00	21 38 47 47				710		" "
771	17	Z Z	e e	22	51	15 54						" "
772	19	Z	e	17	42	55						" "
773	20	Z Z Z Z	eP PP sP (PP)	00	33 34 35 36	12 23 53 21				9110		Very weak h = 300 Km.
774	20	Z Z	e e	6	47 51	06 00						Very weak
775	20	Z NZ	e M F	9 10 11.0	49 30	15						" "
776	20	Z Z N	ePn e Sn	17	57 58 59	55 14 09				700		
777	20	Z N N	ePn eSn S*	21	05 06 07	20 43 08				800		
778	20	Z Z Z N	eP i e eS F	21 22.6	33	04 14 44 52				9890		Very weak
779	21	Z	iP	1	49	09						Compression
780	21	Z N	e e	4	50 52	42 53						Very weak
781	21	Z N N	eP eS e	10	26 28 29	59 59 19				1180		" "
782	21	Z N	(ePg) e	12	01	30 48						Local tremor
783	21	Z Z	iP e	17	48 49	46.2 10						Compression Very weak
784	22	Z Z N	eP e e F	18 19 19.0	57 59 07	34 04 50						" "
785	23	Z N	iPn eSn	6	09 11	40.0 00				766		Compression Very weak



No.	Date	Comp.	Phase	G.M.T.			Period	Amplitude			Δ	Remarks
				H.	M.	S.		Sec.	A _N	A _E		
								μ	μ	μ	Kms.	
786	(contd.) December 24	Z	eP	2	46	31					9665	Very weak
		N	e		57	12						
		Z	e		58	33						
787	24	Z	iP	23	24	57.0					9665	Compression
		Z	i		33	27						
		E	(eS)		34	34						
788	25	Z	M	24	19						9665	" "
		N	F	1.0								
		N	iP	2	04	14.0						
789	25	Z	SKS		14	41					644	" "
		N	eS		15	52						
		Z	PS	5.5	50	54						
790	25	Z	M								530	Very weak
		Z	F									
		N	Pn	9	25	30						
791	25	Z	P*			44					530	" "
		Z	iSn		26	38.6						
		N	S*			57						
792	26	Z	ePn	14	58	38					530	" "
		Z	P*		59	48						
		N	Sn			34						
793	26	Z	e	18	19	46					677	" "
		Z	e		25	53						
		N	e			53						
794	26	Z	e	9	53	19					677	" "
		Z	e		54	04						
		N	e	10	18	02						
795	26	Z	e			45					677	" "
		N	ePn	11	14	22						
		N	eSn		15	34						
796	27	Z	S*			51					1255	" "
		Z	(eP)	18	26	41						
		Z	e			51						
797	28	Z	e	23	46	34					1255	" "
		Z	i			41						
		E	eP	2	41	37						
798	28	Z	PP		43	48					1255	" "
		Z	S			45						
		E	F	3.2								
799	28	Z	eP	4	43	04					1255	" "
		E	e		45	14						
		E	e		46	05						
800	28	Z	e	5	36	04					1255	" "
		Z	e			11						
		EN	e		37	29						
801	29	Z	e	6	07	45					1255	Very weak
		Z	e			53						
		EN	e									
802	30	Z	e	19	24	04					1255	" "
		Z	i			17.8						
		E	e									
803	30	Z	eP	4	13	22					1255	" "
		Z	e			57						
		N	e		18	10						
804	31	Z	e		19	38					1255	" "
		Z	ePn	11	03	18						
		E	e		04	18						



Tremors were also recorded at:

	D	H	D	H	D	H	D	H
January	2	12.5						
February	9	16	12	15	26	17		
March	25	7	29	12				
April	1	12	8	16	17	1	18	4
May								
June	1	19	25	7				
July	2	14	7	18	11	11		
August	28	00						
September								
October								
November								
December								