

**THE PANAMA CANAL**  
DEPARTMENT OF OPERATION AND MAINTENANCE  
SECTION OF METEOROLOGY AND HYDROGRAPHY



**SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE**

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

h = 36 meters.

Lithologic foundation: Basalt.

Time Correction: Within 1.0 sec.

**INSTRUMENTS—FIXED CONSTANTS**

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

**INSTRUMENTS—DETERMINED CONSTANTS**

INSTRUMENTS	COMPONENT	T.	V	€	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	May 4, 1946
Wood-Anderson	E-W	1.0	1370	16 to 1	May 4, 1946
Bosch-Omori )	Not operating				
Bosch-Omori )					

Month JANUARY 1947

Page No. 1

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
<p>Maximum trace amplitudes are tabulated for each phase whenever the maximum amplitude for either component exceeds 3.0 millimeters. No entry in the amplitude column indicates an amplitude of less than 3.0 millimeters.</p> <p>Approximate distances are given whenever the P and S phases seem clear and distinct. For earth quakes distant less than 300 statute miles local tables are used. For earthquakes distant more than 300 statute miles the 1932 Edition of Jeffreys Tables is used. Whenever the beginning of the P and S phases are indistinct, earthquakes are roughly classified as Nearby or Distant depending upon whether the character of the record indicates an epicenter distant less or more respectively than 300 statute miles.</p> <p>All earthquakes felt in any degree by residents of the Canal Zone are rated on the Modified Mercalli Scale, with quakes reliably reported felt by any one rated at Intensity I.</p>							
# 1 Jan. 2	e F	10:57:40					Distant
# 2 Jan. 2	e P e S F	19:49:32	19:50:20	19:52			Approximate distance 230 miles
# 3 Jan. 4	e P e S F	12:06:10	12:06:41	12:09			Approximate distance 150 miles
# 4 Jan. 16	e P e S F	15:23:18	15:24:06	15:32			Approximate distance 230 miles



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month JANUARY 1947Page No. 2

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
# 5 Jan. 19	• P • S F	15:14:26 15:15:05 15:17					Approximate distance 175 miles
Jan. 21	No record from 12:35 to 13:29 GCT.						
# 6 Jan. 21	• F	18:27:23 18:31					Nearby.
# 7 Jan. 21	• F	20:13:32 20:18					Distant.
# 8 Jan. 22	eP e S F	6:12:44 6:13:27 6:17					Approximate distance 205 miles
# 9 Jan. 25	• F	3:13:45 3:24					Probably same source as #10
#10 Jan. 25	• P • S F	3:53:04 3:54:53 4:17					Approximate distance 650 miles Damage to property and death of one person was reported from Salvador.
#11 Jan. 25	• F	4:49:14 5:02					Probably same source as #10
#12 Jan. 25	• P • S F	6:02:25 6:02:52 6:05					Approximate distance 130 miles
#13 Jan. 26	1 P 1 S F	10:08:36 10:10:08 10:50		1.6 3.6	N 17.2 E 7.0 N 8.5 E 6.5		Approximate distance 560 miles



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month JANUARY 1947Page No. 3

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#14	●	8	24	26		N 1.0 E 1.3	Distant
Jan. 29	●	8	26	15			
	●	8	29	19			
	●	8	33	31		N 1.8 E 0.5	
	F	8	38				

G. E. MATTHEW  
Chief Hydrographer



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Lat. 8° 57' 39" N.

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Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
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INSTRUMENTS	COMPONENT	T.	v	G.	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	May 4, 1946
Wood-Anderson	E-W	1.0	1370	16 to 1	May 4, 1946
Bosch-Omori					
Bosch-Omori					

FEBRUARY, 1947

Month

Page No. 4

No. and Date	Phase	Time G. M. T.	Period	AMPLI- TUDE	REMARKS
#15 Feb. 2	• F	<sup>h</sup> 16: <sup>m</sup> 46: <sup>s</sup> 40 16: 52		mm	Distant
#16 Feb. 7	• F	2:13:35 2:19			Distant
Feb. 11		No record from 21:59:22 to 23:30:34 G.C.T.			
#17 Feb. 12	• P I S F	8:28:54 8:29:41 8:34		N 4.0 E 2.8 N 3.4 E 3.1	Approximate distance 225 miles
Feb. 14		No record from 21:43:34 to 23:45:32 G.C.T.			
#18 Feb. 16	I P I S F	19:02:50 19:03:23 19:08		N 2.5 E 3.0	Approximate distance 160 miles
Feb. 18		No record from 13:06 to 13:55 G.C.T.			



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month February 1947Page No. 5

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
Feb. 19		No Record from 19:58 to 20:23 G. E. T.					
# 19	e	16:09	44				Nearby
Feb. 20	F	16:12					
Feb. 24		No Record from 14:19 to 15:37 G. C. T.					
#20	e	17:37	10				Approximate distance 1800 miles
Feb. 24	e	17:41	38				
	F	18:00					
#21	eP	8:05	05		N 1.0 E 0.6		Approximate distance 170 miles
Feb. 25	IS	8:05	41		N 2.6 E 3.2		
	F	8:09					
#22	eP	10:13	30				
Feb. 27	eS	10:14	03				Approximate distance 160 miles
	F	10:16					
Feb. 27		No record from 19:04 G.C.T. to 20:10 G.C.T.					

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Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

**INSTRUMENTS—DETERMINED CONSTANTS**

INSTRUMENTS	COMPONENT	T.	V	ε	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	May 4, 1946
Wood-Anderson	E-W	1.0	1370	16 to 1	May 4, 1946
Bosch-Omori )	Not in Operation				
Bosch-Omori )					

Month MARCH 1947Page No. 6

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
#23 MAR. 3	eP eS F	13:50:30 13:51:11 13:53					Approximate distance 195 miles
#24 MAR. 9	eP eS F	4:14:16 4:14:41 4:16					Approximate distance 120 miles
#25 MAR. 10	eP eS F	15:53:13 15:54:22 15:58					Approximate distance 355 miles
#26 MAR. 12	eP eS F	8:36:16 8:36:38 8:38					Approximate distance 105 miles
#27 MAR. 16	eP eS F	10:31:27 10:31:58 10:34					Approximate distance 150 miles
#28 MAR. 16	e e F	18:56:37 18:57:35 18:59					Nearby
#29 MAR. 21	e e F	3:44:03 3:44:29 3:46					Nearby
MAR. 21	No Record from 12:34 to 18:17 G.C.T.						





## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month MARCH 1947Page No. 7

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#30 MAR. 23	eP F	1:20:04					(Faint trace of distant disturbance.) 2
#31 MAR. 25	eP eS F	3:40:21					Approximate distance 245 miles
#32 MAR. 31	eP eS F	6:16:15				3.0 N 2.5 E	Approximate distance 200 miles

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INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
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Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

**INSTRUMENTS—DETERMINED CONSTANTS**

INSTRUMENTS	COMPONENT	T.	$\gamma$	$\epsilon$	DETERMINED
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Wood-Anderson	E-W	1.0	1370	16 to 1	May 4, 1946
Bosch-Omori	Not in Operation				
Bosch-Omori					

Month APRIL 1947

Page No. 8

No. and Date	Phase	Time G. M. T.			Period	AMPLITUDE mm	REMARKS
		h	m	s			
# 33 APR. 4	• • F	0	31	48			Distant
		0	32	52			
		0	34				
APR. 5		No record from 19 : 06 : 55 to 20 : 05 : 51 GMT					
# 34 APR. 24	• F	19	42	55			Distant
		20	01				
# 35 APR. 25	• • F	17	16	04			Nearby
		17	16	40			
		17	18				

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Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
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**INSTRUMENTS—DETERMINED CONSTANTS**

INSTRUMENTS	COMPONENT	T.	V	Q	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	Mar. 4, 1946
Wood-Anderson	E-W	1.0	1370	16 to 1	Mar. 4, 1946
Bosch-Omori )	Not operating				
Bosch-Omori )					

Month MAY 1947

Page No. 9

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
		No record from 19:01:13 to 19:34:05					GCT
#36	eN	20	49	53			Distant
	eE	20	50	02			
May 6	eN	20	53	15			
	eE	20	53	20			
	F	21	04				
#37	eP	5	25	11		N 2.5 E 1.7	Approximate distance 210 miles.
May 7	IS	5	25	55		N 3.6 E 3.0	
	F	5	29				
#38	eP	10	15	41			Approximate distance 130 miles.
May 8	eS	10	16	09			
	F	10	19				
#39	eP	10	29	44			Approximate distance 130 miles.
	eS	10	30	11			
May 8	F	10	32				



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

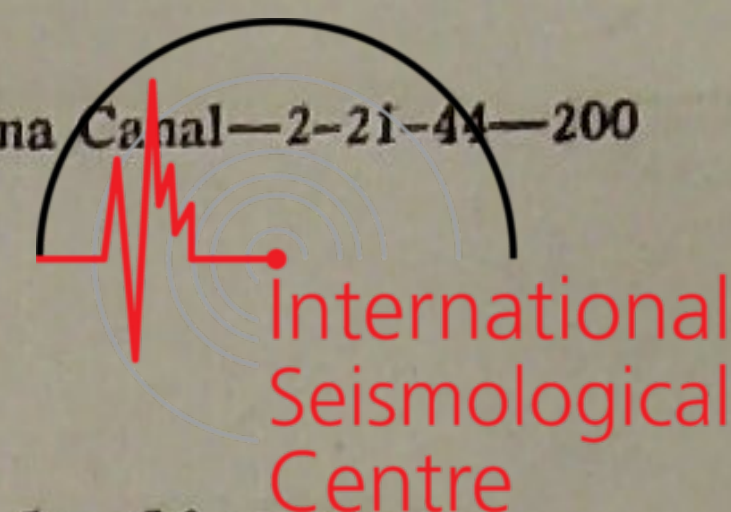
Month MAY 1947Page No. 10

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#40							
May 8	e P	23	56	52			Distant.
May 9	F	0	10				
#41	eP	16	20	13			
May 11	IS	16	21	16			Approximate distance 295 miles.
	F	16	23				
#42	eP	12	20	12			
May 22	eS	13	21	11			Approximate distance 285 miles.
	F	13	24				
#43	e	6	18	38			
May 27	F	6	26				Distant
#44							
May 28	e	23	59	20			Distant.
May 29	F	00	04				
#45	eP	11	27	39			
May 29	eS	11	28	16			Approximate distance 175 miles.
	F	11	30				

L. T. CHAPEL  
Acting Chief Hydrographer



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Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

**INSTRUMENTS—DETERMINED CONSTANTS**

INSTRUMENTS	COMPONENT	T <sub>0</sub>	V	C	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	Mar. 4, 1946
Wood-Anderson	E-W	1.0	1370	16 to 1	Mar. 4, 1946
Bosch-Omori )					
Bosch-Omori )	Not Operating				

Month June, 1947

Page No. 11

No. and Date	Phase	Time G. M. T.			Period	AMPLITUDE mm	REMARKS
		h	m	s			
#46 June 5	e	23	01	02			(From C & G. S. (Arc Distance 777 miles ) Distant (Time at origin 22 H. 58.2 M. ) (Prov. Epicenter 14° N., 90° W.) (Near coast of El Salvador) )
	e	23	03	13			
	f	23	09				
#47 June 7	eP	3	24	06			Approximate distance 325 miles
	eS	3	25	16			
	f	3	28				
#48 June 7	eP	11	54	04			Approximate distance 325 miles
	eS	11	55	11			
	f	12	00				
#49 June 7	e	12	07	06			Approximate distance 325 miles
	e	12	08	14			
	f	12	10				
June 10		No Record from 16:05 to 18:14 G.C.T.					
#50 June 11	eP	12	55	57			Approximate distance 205 miles
	eS	12	56	40			
	f	12	59				
#51 June 12	e	9	22	25			Distant
	f	9	36				
June 12		No Record from 14:11 to 19:31 G.C.T.					
June 13		No Record from 20:09 to 20:31 G.C.T.					



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month June, 1947Page No. 12

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
June 16	No Record from 16:47 to 17:06 G. C. T.						
#52 June 16	eP	17	36	42		N1.9 E1.6	Approximate distance 145 miles
	IS	17	37	12			
	M <sub>N</sub>	17	37	20		5.5	
	M <sub>e</sub>	17	37	24		5.9	
	F	17	42				
#53 June 19	e e f	22 22 23	52 56 05	16 19 05			Distant
#54 June 21	eP eS f	17 17 17	15 16 19	58 57 19			Approximate distance 285 miles
June 30	No Record from 12:42 to 16:31 GCT.						
June 30	Both Wood-Anderson Seismometers were inspected and cleaned. Free period and damping ratio were computed for each component.						
N-S	Component	Free Period			Damping Ratio		
	N-S	1.0			14 to 1		
	E-W	1.0			18 to 1		

L. T. CHAPEL  
Acting Chief Hydrographer



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**INSTRUMENTS—DETERMINED CONSTANTS**

INSTRUMENTS	COMPONENT	T.	V	C	DETERMINED
Wood-Anderson	N-S	1.0	1370	14 to 1	June 30, 1947
Wood-Anderson	E-W	1.0	1370	18 to 1	June 30, 1947
Bosch-Omori	Not Operating				
Bosch-Omori					

Month JULY 1947

Page No. 14

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
#55 July 2	eP	21	09	35		N 1.5 E 1.2	Approximate distance 115 miles
	LS	21	09	59		N 10.6 E 11.2	
	F	21	13				
#56 July 3	e	2	39	44	2.15		Single train of waves.
	F	2	44				Probably of distant origin.
#57 July 4	e	6	51	45			Nearby
	e	6	52	20			
	F	6	55				
#58 July 4	eP	8	41	03			Approximate distance 75 miles
	e S	8	41	18			
	F	8	43				
#59 July 10	e P	22	32	23		N 0.7 E 0.5	Approximate distance 205 miles
	e S	22	33	06		N 3.1 E 2.5	
	F	22	37				



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month JULY 1947Page No. 15

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#60 July 12	i P	6	56	58			Approximate distance 190 miles
	e S	6	57	38			
	F	7	00				
#61 July 12	e P	22	18	26			Approximate distance 185 miles
	e S	22	19	05			
	F	22	21				
#62 July 17	e P	16	11	45			Approximate distance 260 miles
	e S	16	12	44			
	F	16	15				
#63 July 23	e	5	17	08			Distant  Provisional epicenter reported by U. S. Coast & Geodetic Survey as being in approximate position 17° N., 68.5° W. (Off Southwest coast of Puerto Rico)
	e	5	19	51			
	F	5	23				
#64 July 25	e P	3	22	22			Approximate distance 135 miles
	e S	3	22	50			
	F	3	25				
#65 July 25	e	19	20	18			Faint trace of distant disturbance
	e	19	24	23			
	F	19	28				
?	e	12	52	09			Distant
	F	End obscured by following quake.					



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month JULY 1947Page No. 16

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#67 July 29	•	14	02	54	17.0		Distant  Probably same source as No. 65
	•	15	23	0			
	•	15	27	5			
	F	16	00				
#68 July 31	• P	14	15	14	7.0		Approximate distance 770 miles
	• S	14	17	20			
	F	14	29				

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INSTRUMENTS	COMPONENT	T.	V	Q	DETERMINED
Wood-Anderson	N - S	1.0	1370	14 to 1	June 30, 1947.
Wood-Anderson	E - W	1.0	1370	18 to 1	June 30, 1947.
Bosch-Omori	NOT OPERATING				
Bosch-Omori					

Month AUGUST 1947

Page No. 16

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE	REMARKS
		h	m	s			
# 69 Aug. 3	• F	17:	43:	50			D I S T A N T
Aug. 4-5		No Record from 12:24 GMT August 4 to 12:27 GMT August 5, 1947.					
# 70 Aug. 7	• P • S L F	0:	43:	08		N 1.5 E 1.2 N 2.0 E 2.5	Approximate distance 750 miles Considerable property damage reported by Press to have occurred in Santiago, Cuba.
# 71 Aug. 7	• P • S F	22:	19:	51	15 sec.		Approximate distance - 750 miles Probably after shock to No. 70
# 72 Aug. 8	• P 1 S F	19:	19:	00 27 21			Nearby



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Month AUGUST 1947Page No. 17

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
# 73 Aug. 18	• P • S F	17:	55:	01 26 58			Approximate distance 120 miles
Aug. 21	No Record from 15:21 GCT to 15: 28 GCT						
# 74 Aug. 27	• • S F	1:	12:	43 04 17			Distant
# 75 Aug. 27	• P • S F	17:	56:	00 24 59		N 3.2 B 2.6	Approximate distance - 115 miles
							L. T. CHAPEL Acting Chief Hydrographer



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Wood-Anderson	E-W	1.0	1370	18 to 1	" " "
Bosch-Omori	(not in operation)				
Bosch-Omori					

Month September 1947

Page No. 18

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
# 76 Sept. 8	eP	21	52	13			Approximate distance 200 miles
	IS	21	52	55			
	F	21	55				
# 77 Sept. 15	1P	14	57	28		N 6.0 E 5.0	Approximate distance 195 miles
	IS	14	58	09		N 19.5 E 9.0	
	F	15	08				
# 78 Sept 15	e	15	29				Aftershock to #77
	F	15	32				
#79 Sept 15	e	15	45				Aftershock to #77
	F	15	47				
Sept 17	No Record from 12:35 GCT to 12:45 GCT						
# 80 Sept 18	eP	10	00	:39		N 0.7 E 0.3	Approximate distance 120 miles
	IS	10	01	:03		N 2.6 E 3.5	
	F	10	03				



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

SEPTEMBER 1947

19

Month \_\_\_\_\_

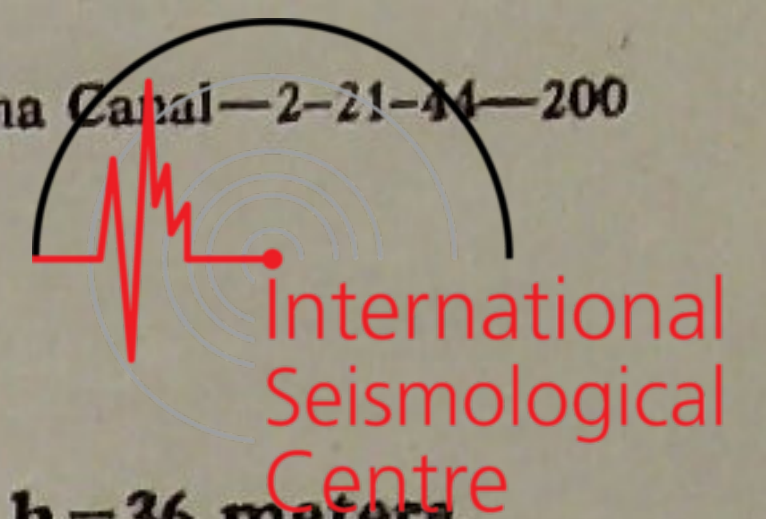
Page No. \_\_\_\_\_

No. and Date	Phase	Time G. M. T.	Period	AMPLI- TUDE	REMARKS
Sept. 18		No Record from 18:18 <sup>h</sup> GCT to 18:51 <sup>m</sup> GCT			
#81 Sept. 19	e F	10 : 30 10 : 34			Faint trace of distant disturbance
Sept. 22		No Record from 15 : 02 GCT to 15 : 12 GCT.			
#82 Sept. 25	e eS F	18 : 31 : 46 18 : 32 : 17 18 : 35			Nearby
Sept. 26		No Record from 4:24 GCT to 4 : 31 GCT. No Record from 8:22 GCT to 9 : 04 GCT.			
#83 Sept. 26	e e F	16:21:16 16:24:25 16:35			Distant
#84 Sept. 27	eP eS F	22:14:34 22:15:58 22:22			Approximate distance 500 miles
# 85 Sept. 28	eP  iS  F	6:08:20  6:09:02  6:13		N 3.2 E 3.5  N 8.1 E 7.5	Approximate distance 200 miles
#86 Sept. 28	eP eS F	11:49:35 11:50:39 11:56			Approximate distance 305 miles
#87 Sept. 28	eP  iS  F	17:27:06  17:27:51  17:34		N 2.0 E 2.5  N 7.0 E 5.1	Approximate distance 215 miles
Sept. 29		No Record from 19:38 GCT to 19:51 GCT			
Sept. 30		No Record from 18:43 GCT to 20:01 GCT			

G. E. MATTHEW  
Chief Hydrographer



**THE PANAMA CANAL**  
DEPARTMENT OF OPERATION AND MAINTENANCE  
SECTION OF METEOROLOGY AND HYDROGRAPHY



**SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE**

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

h=36 meters.

Lithologic foundation: Basalt.

Time Correction: Within 1.0 sec.

**INSTRUMENTS—FIXED CONSTANTS**

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

**INSTRUMENTS—DETERMINED CONSTANTS**

INSTRUMENTS	COMPONENT	T.	V	Q	DETERMINED
Wood-Anderson	N-S	1.0	1370	14 to 1	June 30, 1947
Wood-Anderson	E-W	1.0	1370	18 to 1	June 30, 1947
Bosch-Omori	} Not operating				
Bosch-Omori					

Month October 1947Page No. 20

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
# 88 Oct 3	1P eS F	23	37	22			Approximate distance 1675 miles.
# 89 Oct 5	• F	19	00	29			Distant
# 90 Oct 5	• P • S F	22	40	25 40 42			Approximate distance 73 miles
# 91 Oct 5	• P • S F	23	37	28 43 39			Same source as No. 90
# 92 Oct 6	• F	18	49	56			Faint trace of distant activity



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month October 1947Page No. 21

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
# 93 Oct 9	1 P	0	30	49		N 6.9 E 5.0	Approximate distance 120 miles
	1 S	0	31	14		N 40.2 E 28.9	
	M <sub>N</sub>	0	31	15			
	M <sub>E</sub> F	0	31	19		Lost in the emergence of Quake No. 94	
# 94 Oct 9	P	Lost in tail portion of Quake No. 93					Same source as Quake No. 93
	1 S	0	32	22		N 11.8 E 12.3	
	F	0	42				
# 95 Oct 10	• P	1	26	57		N 2.6 E 2.4	Approximate distance 120 miles
	1 S	1	27	22		N 5.4 E 5.9	
	F	1	30				
# 96 Oct 10	• P	13	23	21		N 3.7 E 2.4	Approximate distance 120 miles
	1 S	13	23	46		N 12.0 E 9.7	
	F	13	30				
Oct 10	No record	from 18:54 OCT to 19:06 OCT.					
# 97 Oct 13	•	11	02	38			Distant.
	•	11	03	57			
	f	11	06				



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month October 1947Page No. 22

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
# 98	•	0	01	31			
Oct 14	•	0	02	06			Nearby.
	F	0	05				
# 99	•	2	21	14			
Oct 16	•	2	30	37			Distant.
	L	2	48				
	F	3	10				
# 100	• P	22	07	32			
Oct 17	• S	22	08	16			Approximate distance 210 miles.
	F	22	11				
# 101	• P	4	03	04			
Oct 18	• S	4	03	57			Approximate distance 355 miles.
	F	4	06				
# 102	• P	23	01	47		N 1.6	
Oct 18	• S	23	02	50		E 2.0	Approximate distance 255 miles.
						N 4.6	
	F	23	06			E 3.1	
# 103	•	1	54	50			
Oct 20	F	2	00				Distant.



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month October 1947Page No. 23

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
# 104 Oct 23	e P e S F	23:38:41					Approximate distance 115 miles
		23:39:05					
		23:41					
# 105 Oct 25	e P e S F	2:34:22				N 0.7 E 1.0 N 3.0 E 2.8	Approximate distance 255 miles
		2:35:10					
		2:38					
# 106 Oct 26	e F	11:47:02					Nearby
		11:49					
# 107 Oct 28	e P e S F	12:17:42				N 1.9 E 2.5 N 4.5 E 3.9	Approximate distance 195 miles
		12:18:23					
		12:23					
Oct 29	No Record from 3:10 OCT to 4:06 OCT						
Oct 30	No Record from 19:36 to 20:14 OCT						
# 108 Oct 31	e P e S F	16:51:53				N 0.7 E 0.8 N 5.0 E 2.7	Approximate distance 160 miles.
		16:52:26					
		16:56					
							G. E. MATTHEW Chief Hydrographer.



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**SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE**

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Lithologic foundation: Basalt.

Time Correction: Within 1.0 sec.

h = 36 meters

International  
Seismological  
Centre

**INSTRUMENTS—FIXED CONSTANTS**

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

**INSTRUMENTS—DETERMINED CONSTANTS**

INSTRUMENTS	COMPONENT	T.	V	€	DETERMINED
Wood-Anderson	N-S	1.0	1370	14 to 1	June 30, 1947
Wood-Anderson	E-W	1.0	1370	18 to 1	June 30, 1947
Bosch-Omori	} Not Operating				
Bosch-Omori					

Month November 1947Page No. 24

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE	REMARKS
		h	m	s			
#109 Nov. 1	ep	15	03	32	2.3	N 5.2 E 4.5	Approximate distance 1475 miles
	ls	15	07	25	9.7	N 4.1 E 4.8	Press reports loss of life and property damage in Peru.
	F	16	51				Provisional epicenter as determined by U.S.C. & G.S. of 11° S. and 75° W., about 150 miles NE of Lima, Peru.
#110 Nov. 1	e	16	52	46			Probably same source as No. 109
	f	17	00				
#111 Nov. 2	e	1	36	51			Probably same source as No. 109
	F	1	43				
#112 Nov. 2	e	7	04	12			Probably same source as No. 109
	F	7	12				
#113 Nov. 2	e	21	33	35			Same source as No. 109
	e	21	37	27			
	F	21	41				
#114 Nov. 6	e	17	14				Distant
	F	17	19				



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

November 1947

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No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#115 Nov. 7	ep	23:05:09					Approximate distance 1475 miles
	es	23:09:00					Same source as No. 109
	F	23:21					
#116 Nov. 8	ep	0:58:31				N 0.7 E 0.6	Approximate distance 180 miles
	es	0:59:09				N 3.5 E 2.5	
	F	1:04					
#117 Nov. 8	e	5:27:19					Distant. Provisional epicenter as determined by U.S. C. & G. S. at 7° N. and 85.5° W. Distance 490 miles.
	F	5:32					
#118 Nov. 8	eP	17:48:06				N 1.0 E 1.1	Approximate distance 180 miles
	es	17:48:44				N 6.5 E 4.0	
	F	17:52					
#119 Nov. 9	1P	10:08:38				N 29.7 E 28.7	Approximate distance 45 miles Felt throughout the Canal Zone by many, and some were awakened from sleep. Intensity III Modified Mercalli Scale.
	1S	10:08:47				N 72+ E 38+	
	F	10:14					
Nov. 12		NO RECORD FROM 15:27 GCT to 16:25 GCT					
#120 Nov. 14	e	6:13:43					Nearby
	F	6:17					



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month November 1947Page No. 26

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#121 Nov. 15	e F	4:32:06 4:35				Nearby	
#122 Nov. 16	eP eS F	11:53:06 11:53:52 11:58				Approximate distance 220 miles	
#123 Nov. 16	eP eS F	13:02:30 13:03:16 13:07				Approximate distance 220 miles	
#124 Nov. 18	e F	16:42 16:48				Distant	
#125 Nov. 18	e F	17:28 17:34				Distant	
#126 Nov. 20-21	eP e F	23:59:18 00:00:09 00:05				Nearby	
#127 Nov. 21	e e F	4:00:17 4:07 4:35	2.8 20			Distant	
#128 Nov. 24	iP iS F	23:01:09 23:01:21 23:05			N 6.8 ES 0 N 31.0 E 33.0	Approximate distance 60 miles	
#129 Nov. 25	eP eS F	3:15:58 3:16:10 3:18			N 0.5 E 0.7 N 3.9 E 3.7	Approximate distance 60 miles	





SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

November 1947

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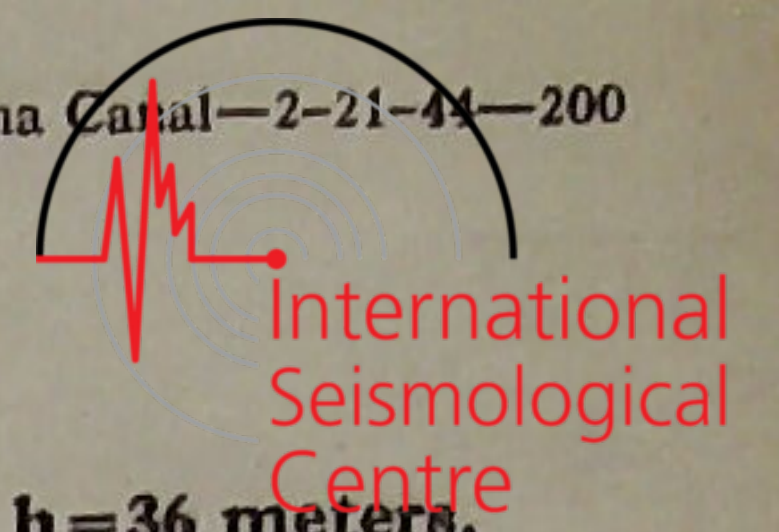
Month

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#130 Nov. 24 25?	P	18	19	43		Distant. Probably in Peru.	
	o	18	23	34			
	F	18	30				
Nov. 24	NO RECORD FROM 20:55 to 21:45 GCT						

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Bosch-Omori	Not in operation.				
Bosch-Omori					

Month December, 1947.

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No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
#131 Dec. 1	eP eS F	16:20:21 16:21:00 16:25					Approximate distance 185 miles
#132 Dec. 5	e F	23:38:49 23:42					Nearby
Dec. 7		No record from 19:55 to 19:58 G.C.T.					
#133 Dec. 19	e F	16:56:05 16:58					Nearby
#134 Dec. 24	e F	04:59:28 05:03					Nearby
#135 Dec. 30	1P 1S F	01:56:25 01:57:18 02:14			5.0N 6.5E 31.0N 22.5E		Approximate distance 255 miles Reported felt in the Province of Chiriqui, Rep. of Panama.

G. E. MATTHEW  
Chief Hydrographer