

PANAMA CANAL COMPANY  
ENGINEERING AND CONSTRUCTION BUREAU  
METEOROLOGICAL AND HYDROGRAPHIC BRANCH

## 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.

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	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 in operation				
Bosch-Omori	Not in operation				

Month JANUARY, 1954Page No. 1

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
Jan. 4 #1	1P	11	17	43			U.S.C.G.S. preliminary determination of epicenter 9° N., 85° W. - Near S. W. coast of Costa Rica. Approximate distance 330 miles
	eS		18	52			
	F		11	26			
Jan. 9 #2	1P	01	44	29			U.S.C.G.S. preliminary determination of epicenter 5-1/2° N., 83° W. - South of Panama Approximate distance 250 miles
	1S		45	21			
	F		01	54			
Jan. 10 #3	1P	07	34	37			Approximate distance 225 miles
	1S		35	24			
	F		07	42			
Jan. 17 #4	eP	01	24	45			Approximate distance 85 miles
	1S		25	03			
	F		01	27			
Jan. 20 #5	eP	04	21	39			Approximate distance 1,750 miles
	eS		26	04			
	F		04	43			
Jan. 20 #6	1P	15	25	51			Approximate distance 20 miles
	1S		25	56			
	F		15	27			
Jan. 21 #7	eP	17	13	18			Faint-distant
	S	Not determined					
	F		17	18			
Jan. 26 #8	1P	11	58	13			Approximate distance 110 miles
	1S		58	36			
	F		12	01			
Jan. 26 #9	1P	15	34	13			Local
	S	not determined					
	F		15	35			
Jan. 27 #10	eP	11	57	25			Weak
	S	not determined					
	F		11	58			
Jan. 30 #11	1P	03	00	10			Approximate distance 280 miles
	1S		03	01	08		
	F		03	06			

W. H. ESSLINGER  
Chief Hydrographer

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Lat. 8° 57' 39" N.

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Wood-Anderson	E-W	1.0	1370	18 to 1	June 30, 1947
Bosch-Omori )	Not in operation				
Bosch-Omori )					

Month FEBRUARY, 1954Page No. 3

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
Feb. 2 #12	eP iS F	16:34:02 34:43 16:37					Distance approximately 195 miles
Feb. 5 #13	eP S F	15:21:28 15:43					U.S.C.G.S. preliminary determination of Epicenter 17-1/2° N., 92-1/2° W., Chiapas, Mexico
Feb. 8 #14	eP S F	14:25:38 14:38					
Feb. 8 #15	eP S F	15:24:38 15:26					
Feb. 15 #16	iP eS F	03:24:00 24:52 03:39					U.S.C.G.S. preliminary determination of epicenter 5-1/2° N., 82-1/2° W., South of Distance approximate 250 miles (Panama.)
Feb. 19 #17	eP eS F	00:42:31 44:02 01:10					Distance approximately 550 miles
Feb. 19 #18	eP S F	21:36:44 22:11					
Feb. 20 #19	eP S F	01:02:49 01:19					
Feb. 20 #20	eP S F	03:29:43 03:38					
Feb. 20 #21	eP S F	18:54:05 19:14					
Feb. 21 #22	eP S F	01:31:01 01:38					
Feb. 21 #23	iP S F	23:41:26 23:46					

## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Page No. 4Month FEBRUARY, 1954

No. and Date	Phase	Time G. C. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
Feb. 22 #24	eP S F	12:15:27					
Feb. 24 #25	eP iS F	08:17:01 17:09 08:18					Distance approximately 40 miles
Feb. 25 #26	iP iS F	22:16:31 17:28 22:26					Distance approximately 275 miles
Feb. 27 #27	iP iS F	15:52:41 52:48 15:54					Distance approximately 35 miles

W. H. ESSLINGER  
 Chief Hydrographer

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International Seismological Centre

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Wood-Anderson	E-W	1.0	1370	18 to 1	June 30, 1947
Bosch-Omori					
Bosch-Omori	Not in operation				

Month MARCH 1954

Page No. 5

No. and Date	Phase	Time G. C. T.			Period	AMPLITUDE mm	REMARKS
		h	m	s			
March 9 #28	eP S F	19	40	36 41 49			U.S.C.G.S. PRELIMINARY DETERMINATION OF EPICENTER - NORTHERN COLOMBIA  DISTANCE APPROXIMATELY 330 MILES
March 11 #29	eP S F	10	33	02 42			U.S.C.G.S. PRELIMINARY DETERMINATION OF EPICENTER 14-1/2° N, 90-1/2° W - GUATAMA
March 13 #30	1P S F	20	34	46 59 38			APPROXIMATE DISTANCE 63 MILES
March 16 #31	1P 1S F	01	03	47 23 12			APPROXIMATE DISTANCE 175 MILES
March 16 #32	1P 1S F	02	28	57 06 32			INTENSITY III - FELT APPROXIMATE DISTANCE 45 MILES
March 18 #33	eP eS F	01	47	44 20 51			APPROXIMATE DISTANCE 175 MILES
March 20 #34	eP eS F	18	03	47 35 08			APPROXIMATE DISTANCE 230 MILES
March 22 #35	eP S F	00	01	33 27			



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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

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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 in Operation				
Bosch-Omori					

Month APRIL, 1954Page No. 7

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE  mm	REMARKS
		h	m	s			
April 1 No. 36	ep	08	33	05			
	es		33	50			
	f	08	37			Approximate distance 215 miles	
April 3 No. 37	ep	03	00	32			
	is		00	38			
	f	03	40			Approximate distance 30 miles	
April 4 No. 38	ep	11	29	49			
	es		30	07			
	f	11	31			Approximate distance 85 miles	
April 8 No. 39	ep	15	41	51			
	es		41	56			
	f	15	43			Approximate distance 25 miles	
April 10 No. 40	ip	10	16	21			
	is		16	44			
	f	10	25			Felt, intensity IV U.S.C.G.S. preliminary determination of epicenter 10 1/2° N, 78° W-off North coast of Panama. Approximate Distance 110 miles	
April 10 No. 41	ip	15	28	21			
	is		28	37			
	f	15	30			Approximate distance 75 miles	
April 11 No. 42	ip	22	36	19			
	es		37	08			
	f	22	40			Approximate distance 235 miles	
April 13 No. 43	ep	07	56	31			
	es		57	42			
	f	08	00			Approximate distance 340 miles	

Correction: Phase designation letters  
should be in upper case

## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

APRIL, 1954

Month

Page No. 8

No. and Date	Phase	Time G. C. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
April 13 No. 44	ep f	13	19	32			
April 15 No. 45	ip is f	04	03	07			Approximate distance 145 miles
April 15 No. 46	ip is f	04	40	42			Approximate distance 150 miles
April 15 No. 47	ip is f	05	06	35			Approximate distance 140 miles
April 15 No. 48	ip is f	05	13	47			Approximate distance 150 miles
April 15 No. 49	ip is f	05-	57-	31			(F merges with beginning of #50) Approximate distance 160 miles
April 15 No. 50	ep es f	06	01	12			Approximate distance 155 miles
April 15 No. 51	ep es f	07	08	33			Approximate distance 145 miles
April 15 No. 52	ip is f	07	49	30			Approximate distance 150 miles
April 15 No. 53	ip is f	08	39	56			Approximate distance 200 miles
April 15 No. 54	ep es f	09	09	59			Approximate distance 175 miles
April 15 No. 55	ip is f	16	11	05			Approximate distance 20 miles
April 15 No. 56	ip is f	16	53	32			Approximate distance 180 miles
April 15 No. 57	ep is f	22	26	55			Note-13 quakes in one day Approximate distance 205 miles



SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month APRIL, 1954

No. and Date	Phase	Time G. C. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
April 21 No. 58	ip	02	45	13			Approximate distance 115 miles
	is		45	37			
	f	02	48				
April 23 No. 59	ep	01	22	-18			(S.S. "Horace Irving" reported "violent tremors for about 5 seconds" April 23 01206.C.T. Lat. 8°12.5 N, Long. 83°29'W) Approximate distance 260 miles
	es		23	-12			
	f	01	27				
April 25 No. 60	ep	03	58	-42			Approximate distance 350 miles
	es		59	-55			
	f	04	03				
April 27 No. 61	ip	10	07	32			Approximate distance 250 miles
	es		08	24			
	f	10	35				
April 29 No. 62	ep	09	40	27			Approximate distance 160 miles
	es		41	00			
	f	09	44				

W. H. ESSLINGER  
Chief Hydrographer



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## INSTRUMENTS—DETERMINED CONSTANTS

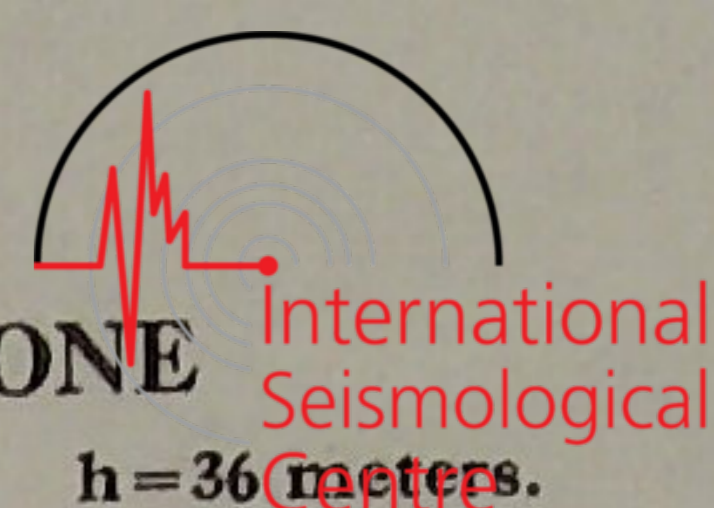
INSTRUMENTS	COMPONENT	T.	V	(C)	DETERMINED
Wood-Anderson	N-S	1.0	1370	14 to 1	June 30, 1947
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Bosch-Omori					

Month May, 1954Page No. 10

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
May 2 No. 63	eP	01:40:49					
	eS	41:40					
	F	01:45			1.0	Approximate distance 245 miles	
May 3 No. 64	iP	04:34:20					
	iS	34:44					
	F	04:37			2.1	Approximate distance 115 miles	
May 3 No. 65	iP	17:15:19					U.S.C.G.S. preliminary determination of epicenter 12° N., 86° W. - near coast of Nicaragua.
	F	17:25			1.0		
May 4 No. 66	eP	17:47:45					
	eS	48:38					
	F	17:52			2.2	Approximate distance 255 miles	
May 13 No. 67	eP	14:50:40					U.S.C.G.S. Preliminary determination of Epicenter 17° N., 95-1/2° W. - Oaxaca, Mexico.
	S	-					
	F	15:06			1.0		
May 14 No. 68	iP	00:55:34					
	iS	56:04					
	F	00:58			5.8	Approximate distance 145 miles	
May 17 No. 69	eP	21:28:37					
	iS	29:08					
	F	21:31			2.4	Approximate distance 150 miles	
May 23 #70	iP	02:56:25					
	iS	56:46					
	F	02:59			4.1	Approximate distance 100 miles	
May 28 No. 71	eP	11:54:35					
	eS	55:20					
	F	11:58			1.0	Approximate distance 210 miles	
May 30 No. 72	eP	05:41:39:20					
	iS	39:42					
	F	05:41			2.0	Approximate distance 105 miles	

W. H. ESSLINGER  
Chief Hydrographer

PANAMA CANAL COMPANY  
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METEOROLOGICAL AND HYDROGRAPHIC BRANCH



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Month June 1954 ?Page No. 12

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
June 4 No. 73	eP eS F	06:54:21 57:27 07:25			1.1	U.S.C.G.S. preliminary determination of epicenter 1/2° S. 91-1/2° W., Galapagos Islands Approximate distance 1,150 miles.	
June 9 No. 74	eP F	22:18:19 22:20			0.6		
June 12 No. 75	eP F	06:28:59 06:34			0.7		
June 12 No. 76	iP iS F	17:40:54 41:02 17:43			10.5	Felt, intensity II Approximate distance 40 miles	
June 15 No. 77	iP iS F	13:33:25 36:20 13:50			1.1	U.S.C.G.S. preliminary determination of Epicenter 5° S., 77° W., Northern Peru Approximate distance 1,100 miles	
June 21 No. 78	eP F	01:55:13 02:08			0.7		
June 21 No. 79	eP F	09:01:29 09:05			0.6		
June 24 No. 80	eP eS F	15:38:44 40:01 15:42			0.8	Approximate distance 480 miles	

W. H. ESSLINGER  
Chief Hydrographer

AUG-6 1954

PANAMA CANAL COMPANY  
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Month July, 1954

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

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
#81 July 3	eP F	22:51:27 23:12			0.4		
#82 July 6	eP iS F	10:10:53 11:35 10:15			3.5	Approximate distance 200 miles	
#83 July 25	eP eS F	11:01:58 11:03:14 11:07			2.5		

*W. H. Esslinger*  
W. H. ESSLINGER  
Chief Hydrographer

COPY

1954 AUG 5 AM 9 12

COAST & GEODETIC SURVEY

40 JUL 19 1954



International  
Seismological  
Centre

4059-5-Continued

MR 45087—Panama Canal—6-1-51-300

# SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

WEEK ENDED July 16, 1954

Page No. ---

Month

No. and Date	Phase	Time G. C. T. h m s	Period s	AMPLI- TUDE mm	REMARKS
<p>There were no earthquakes recorded on the Balboa Heights seismographs during the period from 12:00 G.C.T. July 9 to 12:00 G.C.T. July 16, 1954.</p>					
<p><i>W. H. Esslinger</i> W. H. ESSLINGER Chief Hydrographer</p>					

COPY

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JUL 26 1954



MR 45087—Panama Canal—6-1-51—300

International  
Seismological  
Centre

4059-5—Continued

# SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month WEEK ENDED JULY 23, 1954

Page No. ----

No. and Date	Phase	Time G. C. T.	Period	AMPLI- TUDE	REMARKS
		h m s	s	mm	
<p>There were no earthquakes recorded on the Balboa Heights seismographs during the period from 12:00 G.C.T. July 16 to 12:00 July 23, 1954.</p>					
<p><i>W. H. Esslinger</i>  W. H. ESSLINGER  Chief Hydrographer</p>					

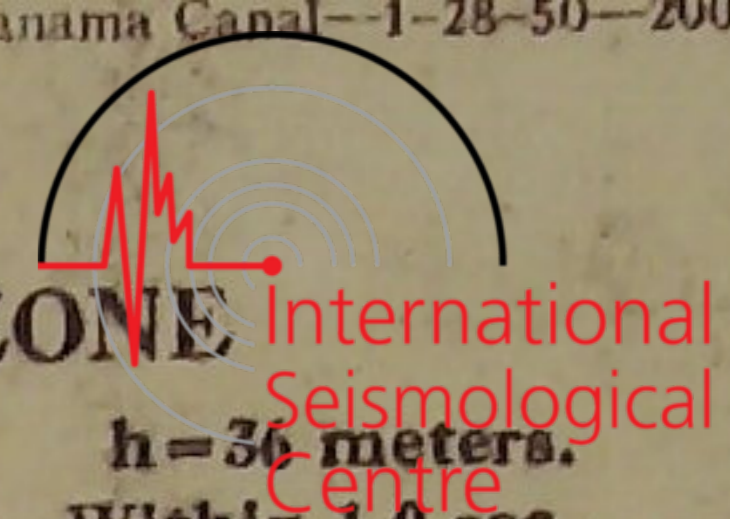
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Bosch-Omori					

Month August, 1954

Page No. 11

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
No. 84	eP	06	40	46			
	eS	06	41	46		1.2	Distance approximately 290 miles
Aug. 8	F	06	45				
No. 85	eP	23	03	45			
	eS	23	04	31			
Aug. 17	F	23	07			1.1	Distance approximately 220 miles
No. 86	eP	23	08	11			
	eS	23	08	55			
Aug. 17	F	23	11			1.5	Distance approximately 210 miles
No. 87	eP	04	59	00			
	eS	05	06	29			
Aug. 18	F	05	13			0.2	Distance approximately 3700 miles
No. 88	eP	13	01	04			
	eS	13	01	53			
Aug. 18	F	13	04			0.8	Distance approximately 235 miles
No. 89	eP	15	08	54			
Aug. 18	F	15	17			0.4	
No. 90	iP	11	24	53			
	iS	11	25	37			
Aug. 23	F	11	29			3.0	Felt strongly at Puerto Armuelles Distance approximately 210 miles
No. 91	iP	12	05	25			
	iS	12	06	09			
Aug. 23	F	-	-	-		9.5	Felt strongly at Puerto Armuelles Distance approximately 210 miles
No. 92	eP	14	36	26			
	iS	14	37	11			
Aug. 23	F	14	43			6.5	Felt strongly at Puerto Armuelles Distance approximately 215 miles
No. 93	eP	06	00	00			
Aug. 24	F	06	45			0.6	
No. 94	eP	01	31	14			
	eS	01	31	57			
Aug. 25	F	01	35			0.5	Distance approximately 205 miles
No. 95	eP	21	32	44			
	iS	21	33	27			
Aug. 28	F	21	36			1.2	Distance approximately 205 miles

W. H. ESSLINGER  
Chief Hydrographer

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AUG-9 1954



4059-5-Continued

MR 45087—Panama Canal—6-1-51—300

# SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

International  
Seismological  
Centre

Month ~~XXXXXX~~ WEEK ENDED AUGUST 6, 1954

Page No. ----

No. and Date	Phase	Time G. C. T. h m s	Period s	AMPLI- TUDE mm	REMARKS
<p>There were no earthquakes recorded on the Balboa Heights seismographs during the period from 12:00 G. C. T. July 31, to August 6, 1954.</p>					
<p><i>S.M.</i></p>					
<p><i>W.H. Esslinger</i> W. H. ESSLINGER Chief Hydrographer</p>					
<p>COPY</p>					

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4059-5-Continued

COAST & GEODETIC

MR 45087—Panama Canal—6-1-51-300



# SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month WEEK ENDED AUGUST 13, 1954

Page No. ----

No. and Date	Phase	Time G. C. T. h m s	Period s	AMPLI- TUDE mm	REMARKS
AUGUST 8	eP eS F	06:40:46 06:41:46 06:45	12 49		
<p><i>Entered in 3x5 cards P.M.</i></p>					

*W. H. Esslinger*  
W. H. ESSLINGER  
Chief Hydrographer

*Copy*



40  
AUG 23 1954



SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month WEEK ENDING AUGUST 20, 1954

Page No. ---

No. and Date	Phase	Time G. C. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
✓ AUG. 17	eP	23	03	45 ✓			
	eS		04	31 ✓			
	F	23	07				
✓ AUG. 17	eP	23	08	11 ✓			
	eS		08	55 ✓			
	F	23	11				
✓ AUG. 18	eP	04	59	00 ✓			
	e	05	06	29 ✓			
	F	05	13				
✓ AUG. 18	eP	13	01	04 ✓			
	eS		01	53 ✓			
	F	13	04				
✓ AUG. 18	eP	15	08	54 ✓			
	F	15	17				

1954 AUG 23 AM 11:12

COAST & GEODETIC SURVEY

Entered on  
3x5 card  
8-23-54

*W. H. Esslinger*  
W. H. ESSLINGER,  
Chief Hydrographer

COPY

THE PANAMA CANAL  
ENGINEERING AND CONSTRUCTION BUREAU  
METEOROLOGICAL AND HYDROGRAPHIC BRANCH



## 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	f	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 in operation				
Bosch-Omori					

September, 1954

Page No. 12

Month

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
No. 96	iP	23	34	02	5.8	Distance approximately 60 miles	
Sep. 2	iS		34	14			
	F	23	35				
No. 97	eP	01	16	37	0.3	U.S.C.G.S. preliminary determination of epicenter 38°N, 01 1/2°E, N. Algeria	
Sep. 9	F	01	21				
No. 98	eP	03	45	34	0.2		
Sept. 9	F	03	50				
No. 99	eP	04	51	08	2.0	Distance approximately 240 miles	
Sept. 9	eS		51	58			
	F	04	55				
No. 100	eP	13	56	20	0.5	Distance approximately 205 miles	
Sept. 13	eS		57	03			
	F	13	59				
No. 101	eP	21	26	38	0.3	Distance approximately 265 miles	
Sept. 13	eS		27	33			
	F	21	30				
No. 102	eP	16	39	26	1.0	Distance approximately 205 miles	
Sept. 14	eS		40	09			
	F	16	42				
No. 103	eP	06	41	14	0.3		
Sept. 15	F	06	43				
No. 104	eP	05	56	56	2.0	Distance approximately 330 miles	
Sept. 16	iS		58	05			
	F	06	00				
No. 105	iP	03	40	28	3.7	Distance approximately 170 miles	
Sept. 17	iS		41	03			
	F	03	43				



## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month September, 1954Page No. 13

No. and Date	Phase	Time G. C. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
No. 106 Sept. 17	P? F	11	26	50 37			
No. 107 Sept. 20	iP iS F	05	35	50 52 37		5.0	Distance approximately 10 miles
No. 108 Sept. 23	iP iS F	18	44	29 48 47		5.5	Distance approximately 90 miles
No. 109 Sept. 23	eP F	21	34	37 36		0.3	
No. 110 Sept. 26	eP eS F	16	59	31 37 00		1.0	Distance approximately 30 miles

W. H. Esslinger,  
Chief Hydrographer

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Lithologic foundation: Basalt.

h = 36 meters.  
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	G	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 in operation				
Bosch-Omori					

Month October, 1954

Page No. 14

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TITUDE mm	REMARKS
		h	m	s			
No. 110 Oct. 1	iP iS F	01	00	26 28		1.5	Approximate distance 15 miles
		01	02				
No. 111 Oct. 1	iP eS F	06	09	32 12		1.6	Approximate distance 190 miles
		06	12				
No. 112 Oct. 3	eP F	11	30	09		0.2	
		11	42				
No. 113 Oct. 4	eP eS F	17	06	09 29		2.2	Approximate distance 95 miles
		17	08				
No. 114 Oct. 4	eP eS F	22	32	34 03		0.8	Approximate distance 140 miles
		22	35				
No. 115 Oct. 4	eP F	23	29	44		1.5	
		23	31				
No. 116 Oct. 5	eP F	20	46	33		1.5	
		20	48				
No. 117 Oct. 8	eP F	22	42	41		0.5	
		22	44				
No. 118 Oct. 9	eP F	17	38	30		0.3	
		17	40				
No. 119 October 10	iP iS F	23	22	21 54		5.4	Approximate distance 160 miles
		23	27				
No. 120 Oct. 12	eP F	22	33	47		1.8	
		22	35				

## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

October, 1954

Page No. 15

Month

No. and Date	Phase	Time G. C. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
No. 121 Oct. 13	eP F	06	03	37 06		2.5	U.S.C.G.S. preliminary determination of epicenter, 200 miles off coast of Panama
No. 122 Oct. 15	eP F	15	51	57 53		1.0	
No. 123 Oct. 16	eP F	17	05	04 06		0.7	
No. 124 Oct. 16	eP eS F	19	50	05 02 55		1.0	Approximate distance 275 miles
No. 125 Oct. 16	eP F	22	33	43 35		0.8	
No. 126 Oct. 18	iP iS F	02	41	07 54 45		1.7	Approximate distance 225 miles
No. 127 Oct. 19	eP eS F	05	29	25 07 32		0.4	Approximate distance 200 miles
No. 128 Oct. 21	iP F	06	54	39 09		0.9	U.S.C.G.S. preliminary determination of epicenter, 14° N, 90 1/2° W- Guatamala
No. 129 Oct. 21	eP iS F	13	17	09 27 19		1.2	Approximate distance 85 miles
No. 130 Oct. 21	eP iS F	13	18	47 07 21		5.2	Approximate distance 95 miles
No. 131 Oct. 26	iP iS F	22	23	18 06 27		1.7	Approximate distance 230 miles
No. 132 Oct. 28	eP eS F	19	34	37 18 37		0.5	Approximate distance 195 miles

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ENGINEERING AND CONSTRUCTION BUREAU  
METEOROLOGICAL AND HYDROGRAPHIC BRANCH

## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

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International  
Seismological  
Centre

## INSTRUMENTS—FIXED CONSTANTS

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Bosch-Omori	} Not in operation				
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November, 1954

Month

Page No. 15

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
No. 133 Nov. 1	eP F	20	59	32 21 01		0.2	U.S.C.G.S. preliminary determination of epicenter, 14°N, 92°W, off coast of Guatemala
No. 134 Nov. 2	P ? F	22	54	25 23 58		0.1	
No. 135 Nov. 5	eP eS F	16	25	03 25 45 16 28		0.3	Distance approximately 200 miles
No. 136 Nov. 14	eP F	21	06	12 21 07		0.8	
No. 137 Nov. 16	iP F	12	04	57 12 08		0.7	
No. 138 Nov. 17	iP F	04	09	49 04 10		27.0	Reported by several persons, Force II
No. 139 Nov. 18	iP iS F	04	18	24 19 04 04 22		3.0	Distance approximately 190 miles
No. 140 Nov. 25	eP F	11	25	48 11 57		0.2	
No. 141 Nov. 27	eP F	03	49	42 03 54		0.1	
No. 142 Nov. 27	eP F	16	04	18 16 14		0.1	
No. 143 Nov. 29	eP eS F	05	52	55 53 57 05 56		0.2	Distance approximately 200 miles

W. H. Esslinger,  
Chief Hydrographer

# SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month \_\_\_\_\_ Week Ending November 12, 1954

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

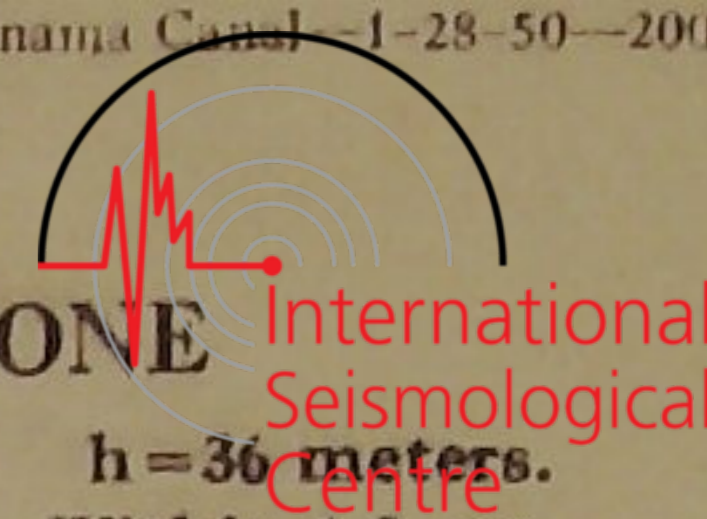
No. and Date	Phase	Time G. C. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
Nov. 5	eP	22	54	25 ✓			1954 NOV 15 AM 9:04
	F	23	58				

*entire  
2x5 card  
11-15-54*

*W. H. Esslinger*  
W. H. Esslinger,  
Chief Hydrographer

COPY

THE PANAMA CANAL  
ENGINEERING AND CONSTRUCTION BUREAU  
METEOROLOGICAL AND HYDROGRAPHIC BRANCH



SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

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Bosch-Omori					

Month December, 1954

Page No. 16

No. and Date	Phase	Time G. C. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
No. 144 Dec. 2	iP iS F	18	14	10 31 17		7.0	Distance approximately 100 miles
No. 145 Dec. 2	eP F	23	15	28 21		0.1	U.S.C.G.S. preliminary determination of epicenter, Nicaragua
No. 146 Dec. 4	eP eS F	18	35	24 38 39 56		1.3	Approximate distance 1200 miles
No. 147 Dec. 6	iP iS F	19	44	02 26 46		2.7	Approximate distance 115 miles
No. 148 Dec. 7	eP F	21	08	58 10		0.9	
No. 149 Dec. 8	iP iS F	14	06	32 43 08		8.0	Felt, force III Approximate distance 50 miles
No. 150 Dec. 10	eP eS F	13	02	49 05 23 25		2.0	Distance approximately 900 miles U.S.C.G.S. preliminary determination of epicenter, 18 1/2°N, 81 1/2°W, west of Jamaica
No. 151 Dec. 11	eP eS F	23	54	55 45 57		0.5	Approximate distance 240 miles
No. 152 Dec. 14	iP eS F	01	22	45 55 27		0.9	Approximate distance 335 miles
No. 153 Dec. 15	iP iS	14	05	35 51 08		11.0	Distance approximately 80 miles



1954

USCGS

File

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE



Wood-Anderson

Date	Phase	Time GCT	Amplitude	Remarks
1954			mm	
Dec. 16	eP	11:15:39		Distance approximately 3600 miles U.S.C.G.S. preliminary determination of epicenter 39 1/2°N, 118°W, Nevada
	eS	23:07	1.6	
		12:11		
Dec. 21	eP	20:05:25		U.S.C.G.S. preliminary determination of epicenter 41°N, 124°W, California
	F	20:15	0.2	

Posted to Pink Cards 3/29/55. DT.

## SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month December, 1954

Page No. 17

No. and Date	Phase	Time G. C. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
No. 154 Dec. 16	eP eS F	11	15	39 23 07 12 11		1.6	Distance approximately 3600 miles U.S.C.G.S. preliminary determination of epicenter 39 1/2°N, 118°W, Nevada
No. 155 Dec. 16	eP eS F	19	04	12 04 52 19 09		3.7	Distance approximately 190 miles
No. 156 Dec. 19	eP iS F	09	56	50 57 38 10 00		1.9	Distance approximately 230 miles Felt at El Volcan, Chiriqui
No. 157 Dec. 19	eP eS F	10	30	09 40 05 10 47		0.8	U.S.C.G.S. preliminary determination of epicenter 23°S, 66 1/2°W, Argentina
No. 158 Dec. 21	eP iS F	17	44	10 44 52 17 47		0.7	Distance approximately 200 miles
No. 159 Dec. 21	eP F	20	05	25 20 15		0.2	U.S.C.G.S. preliminary determination of epicenter 41°N, 124°W, California
No. 160 Dec. 22	iP iS F	01	06	39 07 20 01 10		1.2	Distance approximately 195 miles
No. 161 Dec. 24	iP iS F	02	43	58 44 11 02 46		5.0	Distance approximately 65 miles
No. 162 Dec. 24	eP iS F	22	09	38 10 33 22 14		0.7	Distance approximately 265 miles
No. 163 Dec. 25	iP iS F	13	54	39 54 50 13 57		6.0	Distance approximately 55 miles
No. 164 Dec. 29	iP iS F	16	41	27 41 51 16 43		2.1	Distance approximately 115 miles

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Chief Hydrographer