



PANAMA CANAL COMPANY
Engineering and Construction Bureau
Meteorological and Hydrographic Branch

Lat. 8° 57' 39" N
Long. 79° 33' 29" W

Balboa Heights, Canal Zone

h: 36 meters

SEISMOLOGICAL BULLETIN - JANUARY 1965

-----Standard Seismograph System USC&GS: Sprengnether LP (Z.N.E): Benioff SP (z.n.a)-----

No.	Date	Phase	Time		Amplitude mm	Remarks
			G.C.T.	Period		
1	2	iP iS	11 28 16 ^D 28 53	0.6	4.5	
2	7	iP _z iS _n	16 14 15 ^D 15 26	0.6	5.3	△ = 340 miles
3	8	eZ	21 26 50			
4	9	iP _z	13 52 31 ^D	0.8	13.5	
5	10	iP _z iS _e	17 21 45 ^C 22 07	0.4	1.3	△ = 105 miles
6	14	eP _z iS	08 28 45 ^D 31 36	0.9	4.5	USCGS: 5.5 S 81.3 W Near Coast of Northern Peru △ = 1050 miles
7	14	iP _z iS _n	12 20 35 ^D 21 47	0.7	6.5	USCGS: 6.8 N 72.9 W Northern Colombia △ = 340 miles
8	14	iP _z iS _e	22 05 36 ^D 06 34	0.8	6.1	USCGS: 5.3 N 76.3 W Colombia △ = 280 miles
9	20	iP _z iS _e	12 44 17 ^C 44 41	0.4	3.0	△ = 115 miles
10	22	iP _z iS _e	19 47 05 47 50	0.3	3.3	△ = 215 miles



SEISMOLOGICAL BULLETIN - JANUARY 1965

No.	Date	Phase	Time	Period	Ampli-	Remarks
			G.C.T.		tude	
					mm	
11	23	iP _z	20 08 25 ^C	0.6	8.0	USCGS: 8.8 N 83.1 W Costa Rica FELT: Bambito, Chiriqui Province Republic of Panama
		iS _e	09 06			
12	24	iP _z	00 31 07 ^C	1.0	4.0	
13	24	iP _n	01 21 08			USCGS: 6.8 N 73.1 W Northern Colombia
		iS _n	22 21			
14	30	iP _z	02 46 52 ^D	0.7	4.3	$\Delta = 235$ miles
		iS _n	47 41			
15	30	iP _z	08 26 55 ^D	0.3	4.3	$\Delta = 163$ miles
		iS _n	27 19			

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Chief Hydrographer



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SEISMOLOGICAL BULLETIN - FEBRUARY 1965

----- Standard Seismograph System USC&GS: Sprengnether LP (Z.N.E); Benioff SP (Z.n.e) -----

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
1	1	iP _Z iS _e	06 17 20 17 41	0.7	2.0	Δ = 195 miles
2	4	iP _Z	05 14 29 ^D	1.5	3.5	USCGS: 51.3 N 178.6 W Aleutian Islands
3	4	iZ	20 00 28			
4	6	iZ	01 52 28			USCGS: 53.2 N 161.9 W South of Alaska
5	6	iP _Z	17 02 24 ^D	1.0	8.0	
6	11	iP _Z iS _n	16 12 57 ^D 13 03	0.7	3.9	USCGS: 1.4 S 77.8 W Ecuador
7	15	eP _Z eS _N	10 00 50 ^D 07 36			USCGS: 0.4 N 19.2 W Central Mid-Atlantic Ridge
8	15	iP _Z	11 03 13 ^D	0.8	5.3	USCGS: 3.0 N 125.9 E Taland Island
9	15	iP _Z iS _n	12 29 17 ^D 30 02	0.4	3.6	Δ = 215 miles
10	17	iP _Z iS _e	11 47 22 ^D 48 10	0.3	2.4	USCGS: 7.4 N 82.4 W South of Panama Δ = 230 miles



SEISMOLOGICAL BULLETIN - FEBRUARY 1965

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
11	21	eP _z iS _n	16 14 32 15 11			$\Delta = 185$ miles
12	23	iP _z	22 18 43 ^C	1.1	6.0	USCGS: 25.7 S 70.5 W Near Coast of Northern Chile
13	24	iP _z iS _e	10 45 41 ^D 46 28	0.5	1.7	USCGS: 6.3 N 75.9 W Northern Colombia $\Delta = 275$ miles
14	26	iP _z iS _N	23 37 48.6 ^C 39 10	0.4	26.7	USCGS: 6.9 N 73.0 W Northern Colombia $\Delta = 360$ miles
15	27	iZ	08 04 34			

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SEISMOLOGICAL BULLETIN - MARCH 1965

STANDARD SEISMOGRAPH SYSTEM USC&GS: Sprengnether LP (Z.N.E.); Benioff SP (z.n.e)

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
1	1	iP _z iS _e	21 35 32 ^D 38 26	0.4	4.0	USCGS: 15.4 N 92.5 W Mexico - Guatemala Border Region △ = 925 miles
2	3	eP _z iS _n	11 02 25 ^C 06 06	0.3	2.3	 △ = 195 miles
3	3	iP _z iS _n	11 09 46 ^D 10 10	0.3	7.0	 △ = 115 miles
4	4	eP _z iS _n	01 37 43.5 ^C 38 21	0.4	1.3	 △ = 175 miles
5	5	eP _z iS _e	07 53 03 53 29			 △ = 125 miles
6	5	iP _z	14 39 03 ^D	0.3	30.3	USCGS: 27.0 S 63.3 W Santiago Del Estero Province Argentina
7	6	iP _z iS _e	07 59 24 ^C 59 44.5	0.7	2.8	 △ = 100 miles
8	8	iP _z	12 11 22 ^D	0.3	30.8	USCGS: 6.4 N 83.4 W Off Coast of Central America
9	9	iP _z iS _n	18 38 22 ^D 39 03	0.3	5.0	USCGS: 7.0 N 82.2 W South of Panama △ = 195 miles
10	10	iP _z iS _n	05 39 59 ^C 40 54	0.3	5.5	 △ = 265 miles



SEISMOLOGICAL BULLETIN - MARCH 1965

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
11	13	iP _z	16 11 48 ^D	0.7	19.5	
12	13	iP _z iS _n	22 42 58 ^D 43 30	0.7	17.0	△ = 150 miles
13	19	iP _z iS _n	03 00 48.5 ^C 00 57.5	0.3	5.3	△ = 45 miles
14	21	iP _z	09 44 28 ^C	1.0	2.5	USCGS: 11.7 N 86.4 W Near Coast of Nicaragua
15	21	iP _z iS _n	11 28 05 ^D 28 22	1.0	1.5	△ = 80 miles
16	22	iP _z iS _n	09 47 41 ^C 49 04	1.0	3.5	USCGS: 6.6 N 72.8 W Northern Colombia △ = 380 miles
17	22	iP _z	23 04 07 ^D	1.0	2.3	USCGS: 31.9 S 71.5 W Near Coast of Central Chile
18	25	iP _z iS _n	22 10 18.5 ^D 10 46	0.3	4.0	△ = 130 miles
19	26	iP _z iS _n	12 11 51 ^C 12 45	0.3	2.5	USCGS: 4.8 N 77.6 W Near West Coast of Colombia △ = 260 miles
20	28	iP _z iS _e	16 41 01.4 ^D 47 10	0.6	39.6	△ = 2800 miles
21	29	eP _z iS _n	05 14 05 ^C 14 44			△ = 185 miles
22	30	iP _z iS _n	02 40 08 ^C 42 05	1.5	3.6	△ = 775 miles

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Balboa Heights, Canal Zone

h: 36 meters

Seismological Bulletin - APRIL 1965

----- Standard Seismograph System USC&GS: Sprengnether L. (Z.N.E); Benioff (Z.n.e) -----

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
1	3	iP _z iS _e	11 25 10 ^D 29 00	1.3	3.3	USCGS: 16.0 N 97.9 W Near Coast of Oaxaca, Mexico △ = 1450 miles
2	3	iP _z	11 33 37 ^D	0.8	4.0	USCGS: 16.1 N 97.8 W Oaxaca, Mexico
3	4	iP _z iS _n	13 49 41 ^D 50 27	0.3	3.3	△ = 220 miles
4	4	iP _z	20 13 51 ^D	0.3	2.5	USCGS: 8.8 s 74.5 W Peru-Brazil Border Region
5	4	iP _z iS _n	20 32 53 ^D 33 21	0.3	19.5	USCGS: 4.9 N 76.1 W Colombia △ = 135 miles
6	7	eP _z iS _n	05 03 58.5 ^D 04 49	0.3	2.0	△ = 340 miles
7	8	iP _z iS _n	04 45 31 ^C 46 05	0.3	1.4	USCGS: 8.0 N 82.2 W Panama-Costa Rica Border Region △ = 170 miles
8	9	eP _z iS _n	02 01 50 ^D 02 30	0.3	1.5	△ = 190 miles
9	9	iP _z iS _n	07 02 56 ^D 03 10	0.3	1.6	△ = 70 miles
10	16	iP _z	23 34 09 ^D			
11	18	iP _z iS _n	05 45 17 ^D 45 52	0.3	5.0	USCGS: 7.6 N 82.3 W South of Panama △ = 170 miles

Seismological Bulletin - APRIL 1965

No.	Date	Phase	Time	Period	Ampli-	Remarks
			G.C.T.		tude	
					mm	
12	18	iP _Z	06 43 16 ^C			USCGS: 41.5 N 127.1 W Off Coast of Northern California
13	18	iP _Z	09 51 28 ^C			
14	18	iP _Z	12 54 06 ^C			USCGS: 59.7 S 26.4 W South Sandwich Island Region
15	24	iP _Z iS _e	13 26 48 ^D 27 37	0.3	2.5	USCGS: 12.7 N 82.0 W Caribbean Sea $\Delta = 235$ miles
16	26	iP _Z	08 41 27.5 ^D	0.7	4.0	USCGS: 1.3 S 77.8 W Ecuador
17	26	iP _Z	18 44 54 ^C	0.3	3.0	
18	26	iP _Z	22 35 13.5 ^C	0.5	5.0	
19	27	iP _Z	11 14 06.5 ^D	0.7	2.6	
20	27	iP _Z iS _N	20 11 33 ^C 13 28	1.0	3.0	USCGS: 1.5N 85.2 W Off Coast of Ecuador $\Delta = 725$ miles
21	27	iP _Z iS _n	22 22 47 ^D 22 59.5	0.3	5.5	$\Delta = 60$ miles
22	27	iP _Z iS _n	22 25 43 ^D 26 05	0.3	3.5	$\Delta = 105$ miles
23	28	iP _Z iS _n	04 01 58 ^D 02 19.5	0.3	11.5	USCGS: 7.1 N 82.3 W South of Panama $\Delta = 55$ miles
24	29	iP _Z iS _N	08 13 23 ^C 15 09	0.5	4.5	USCGS: 1.6 N 85.2 W Off Coast of Ecuador $\Delta = 650$ miles

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h: 36 meters

SEISMOLOGICAL BULLETIN - MAY 1965

~~Standard Seismograph System USC&GS: Sprengnether LP (Z.N.E); Benioff SP (z.n.e)~~

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
1	1	iP _z iS _e	16 07 15 ^C 08 33	0.3	8.5	△ = 450 miles
2	3	eP _z	01 21 30			USCGS: 3.4N 84.1 W Off Coast of Central America
3	3	iP _z iS _n	08 34 23.5 ^C 34 43.6	0.3	6.0	△ = 95 miles
4	3	iP _z iS _n	10 04 07 ^D 06 08	0.8	6.3	USCGS: 13.5 N 89.3 W El Salvador - 125 killed; 400 injured; 4000 homes wrecked in San Salvador Cisneros District, San Marcos, and San Tomas. △ = 745 miles
5	6	iP _z iS _n	05 03 08 ^D 03 36.5	0.3	9.0	△ = 130 miles
6	9	iP _z iS _e	14 12 04.5 ^D 12 49	0.2	35.4	USCGS: 6.5 N 82.5 W South of Panama △ = 210 miles
7	12	iP _z	10 53 21.5 ^D	0.4	10.0	
8	13	iP _z iS _n	04 14 25.5 ^D 15 25	0.3	20.0	USCGS: 4.8 N 76.3 W Colombia △ = 285 miles
9	16	iP _z	00 18 12 ^C	0.3	4.5	
10	16	iP _z	11 55 31.5 ^D	0.5	6.0	
11	16	iP _z iS _N	15 52 28 ^C 55 00	0.2	23.0	USCGS: 5.2 N 82.4 W South of Panama △ = 925 miles



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SEISMOLOGICAL BULLETIN - MAY 1965

Standard Seismograph System USC&GS: Sprengnether LP (Z,N,E); Benioff SP (z,n,e)

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
12	17	iP _Z	17 38 55 ^C	0.6	5.0	
13	18	iP _Z iS _n	19 37 31 ^D 38 17	0.3	4.0	USCGS: 8.9N 83.5W Costa Rica △ = 220 miles
14	19	iP _Z iS _n	10 59 44 ^D 00 45	0.2	20.0	USCGS: 4.9 N 76.2 W Colombia △ = 195 miles
15	19	iP _Z iS _e	13 08 45.5 ^C 09 32	0.2	8.0	USCGS: 5.9 N 82.5 W South of Panama △ = 250 miles
16	20	eP _Z	01 00 00			
17	24	iP _Z	23 40 54 ^C	0.5	14.0	
18	26	EP _Z	05 04 36 ^C			USCGS: 13.7 N 90.6 W Near Coast of Guatemala
19	28	iP _Z iS _n	21 02 29 ^D 03 01	0.2	5.8	△ = 155 miles
20	29	eP _Z	11 54 25.4 ^D	0.4	17.0	USCGS: 7.0 N 77.6 W Panama-Colombia Border Region
21	29	iP _Z	16 16 52			
22	31	eP _Z	11 58 16			
23	31	iP _Z iS _E	20 48 32 ^C 51 00	0.5	3.8	USCGS: 11.1 N 86.0 W Nicaragua △ = 920 miles

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SEISMOLOGICAL BULLETIN - JUNE 1965

Standard Seismograph System USCG&S: Sprengnether LP (Z.N.E); Benioff SP (z.n.e)

No.	Date	Phase	Time	Period	Ampli-	Remarks
			G.C.T.		tude	
					mm	
1	2	eP _Z	14 12 00			
2	2	iP _Z	23 46 57.5 ^D	1.4	4.0	USCGS: 16.0 N 46.8 W North Atlantic Ridge △ = 2,225 miles
		iS _E	56 16			
3	3	iP _Z	11 00 11 ^D	0.4	9.8	USCGS: 18.5 N 70.3 W Dominican Republic Region △ = 840 miles
		iS _E	02 27			
4	3	iP _Z	23 30 20 ^D	0.2	5.0	
		iS _e	30 38			△ = 90 miles
5	7	iP _Z	21 42 23 ^D	0.3	4.0	
		iS _n	43 02			△ = 190 miles
6	8	iP _Z	13 55 27 ^D			
7	9	iP _Z	10 21 08 ^C	0.3	2.0	
		iS _e	21 58			△ = 240 miles
8	11	eP _Z	03 52 54			
9	15	eP _Z	23 33 44			
10	16	eP _Z	03 59 27			
11	17	iP _Z	23 03 46 ^C	0.3	25.0	
		iS _e	05 05			△ = 350 miles
12	18	iP _Z	20 49 11 ^D	0.3	8.2	USCGS: 10.5 N 84.0 W Costa Rica
		iS _N	53 42			

Seismological Bulletin - JUNE 1965

No.	Date	Phase	Time	Period	Ampli-	Remarks
			G.C.T.		tude	
				mm		
13	18	iP _z	22 49 53 ^D	0.3	11.0	
14	21	iP _z	01 24 36 ^C	0.5	8.5	USCGS: 8.7 N 75.6 W Northern Colombia
15	25	eP _z	05 16 20 ^D	0.4	1.8	
		iS _n	16 57			
16	27	iP _z	17 11 50 ^C	0.4	6.0	USCGS: 2.5 S 77.0 W Peru-Ecuador Border Region

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SEISMOLOGICAL BULLETIN - JULY 1965

Standard Seismograph System USC&GS: Sprengnether LP (Z.N.E); Benioff SP (z.n.e)

No.	Date	Phase	G.C.T.	Period	Amplitude mm	Remarks
1	1	iP _Z	23 31 53 ^C	0.3	5.2	FELT: Bambito, El Volcan, R. P.
2	2	iP _Z iS _N	21 10 53 ^D 21 00	0.7	8.5	△ = 2,375 miles
3	5	iP _Z iS _N	08 49 34 58 04			USCGS: 52.9 N 34.2 W North Atlantic Ocean △ = 4,300 miles
4	6	eP _Z	03 32 00			USCGS: 38.7 N 22.6 E Greece
5	8	iP _Z iS _n	19 13 45.5 ^D 14 06.5	0.3	9.5	△ = 100 miles
6	14	iP _Z i _N	17 12 40 ^D 25 32			USCGS: 1.3 N 90.8 W Galapagos
7	15	iP _Z	12 39 46	0.2	5.0	
8	15	iP _Z	16 12 28.5	0.3	4.0	
9	15	iP _Z	18 52 20	0.6	9.0	
10	15	iP _Z	18 54 36	0.8	7.5	
11	16	eP _Z	10 39 12			USCGS: 12.1 N 87.7 W Near Coast of Nicaragua
12	16	iP _Z	12 50 14			USCGS: 1.2 N 90.5 W Galapagos Island Region
13	19	iP _Z iS _e	04 15 28 ^D 17 06.5	0.7	9.5	USCGS: 9.2 N 70.4 W Venezuela - moderate property damage in Teujillo △ = 600 miles



Seismological Bulletin - JULY 1965

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
14	19	iP _z	22 15 48 ^D	0.3	8.5	USCGS: 10.9 N 85.3 W Costa Rica
15	26	iP _z iS _n	01 57 16 ^D 57 34	0.2	3.7	△ = 85 miles
16	29	iP _z iS _n	08 41 49.5 ^D 42 46	0.5	13.0	△ = 270 miles
17	29	iP _z	08 58 34.5 ^D	0.5	7.0	
18	30	iP _z	05 51 06 ^D	0.4	3.0	USCGS: 18.0S 70.6 W Near Coast of Northern Chile
19	30	iP _z iS _n	07 21 42 ^D 22 55	0.2	14.0	USCGS: 6.8 N 72.9 W Northern Colombia △ = 300 miles

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SEISMOLOGICAL BULLETIN - AUGUST 1965

Standard Seismograph System USC&GS: Sprengnether LP (Z.N.E); Benioff SP (s.n.e)

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
1	2	iP _z	14 34 51.4 ^C			USCGS: 7.4 N 78.7 W Panama FELT: Balboa Heights Force III = 119 miles
2	2	iP _z iS _n	14 43 24 ^D 43 53	0.2	5.8	△ = 139 miles
3	2	iP _z	15 08 37.5 ^C			USCGS: 7.3 N 78.8 W Panama FELT: Balboa Heights Force II
4	2	iP _z	15 11 25 ^C			
5	2	iP _z	15 26 27 ^C			USCGS: 7.5 N 78.8 W Panama △ = 130 miles
6	2	iP _z	15 36 12 ^C			FELT: Balboa Heights Force II
7	2	iP _z	16 43 42 ^C			USCGS: 7.4 N 78.7 W Panama FELT: Balboa Heights Force II △ = 119 miles
8	2	iP _z	17 01 41.8 ^D	0.2	8.3	FELT: Balboa Heights Force III
9	2	iP _z iS _n	17 51 06 ^C 51 29.5	0.2	4.1	FELT: Balboa Heights Force II △ = 113 miles
10	2	iP _z	18 05 24 ^C			USCGS: 7.5 N 78.5 W Panama △ = 130 miles
11	2	iP _z	18 19 06.8 ^D			

Seismological Bulletin - AUGUST 1965

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
12	2	iP _z	18 21 58			
13	2	iP _z	18 34 47.5 ^D			
14	2	iP _z	18 44 49.7 ^C			USCGS: 7.6 N 78.5 W Panama △ = 130 miles
15	2	iP _z	18 49 31.5 ^C			
16	2	iP _z	19 08 24.3 ^C			USCGS: 7.4 N 78.8 W Panama △ = 130 miles
17	2	iP _z	19 18 12			USCGS: 8.6 N 78.4 W Panama △ = 100 miles
18	2	iP _z	19 22 45.7 ^C			
19	2	iP _z	20 37 26.3 ^C	0.2	8.4	
		iS _n	37 49.5			△ = 113 miles
20	2	iP _z	20 43 47 ^D			USCGS: 7.5 N 78.5 W Panama △ = 120 miles
21	2	iP _z	21 45 29.8 ^C			
		iS _n	45 57			△ = 132 miles
22	2	iP _z	21 50 49 ^C			
		iS _n	51 11.2			△ = 107 miles
23	3	eP _z	02 05 44 ^C			USCGS: 7.7 S 81.3 W Off Coast of Northern Peru
24	3	iP _z	04 25 16.5 ^D			
		iS _n	25 40			△ = 113 miles
25	3	iP _z	22 29 47.8 ^D			
		iS _e	30 12			△ = 117 miles

Seismological Bulletin - AUGUST 1965

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
26	3	iP _z iS _n	22 34 35 ^D 34 59			△ = 115 miles
27	4	iP _z iS _n	00 22 47.4 ^C 23 11			△ = 114 miles
28	4	iP _z	04 35 05 ^C	0.3	28.0	USCGS: 7.9 N 78.5 W Panama △ = 145 miles
29	4	iP _z	06 03 23.3			Equipment out of operation on August 4th and August 5th for annual maintenance.
30	7	iP _z iS _n	14 03 22 ^D 03 44.8	0.2	6.8	△ = 108 miles
31	7	iP _z	16 55 22.6 ^D	0.3	5.0	
32	7	iP _z	23 02 20.6 ^D	0.2	7.0	
33	8	iP _z	06 38 33.5 ^C			USCGS: 20.3 S 68.4 W Chile-Bolivia Border Region
34	8	eP _z	10 06 16.8 ^C			
35	9	iP _z	08 42 51 ^D			USCGS: 1.3 S 78.7 W Ecuador
36	11	eP _z	03 55 49			USCGS: 15.5 S 166.9 E New Hebrides Islands
37	11	iP _z iS _n	18 16 38.5 ^C 17 25.5	0.3	11.4	USCGS: 10.9 N 83.1 W Costa Rica △ = 225 miles
38	11	eP _z iS _n	19 03 23 04 10	0.2	5.0	USCGS: 7.4 N 84.7 W Off Coast of Costa Rica △ = 225 miles
39	11	iP _z iS _n	20 05 50.6 06 03.3	0.2	5.8	USCGS: 6.8 N 72.9 W Northern Colombia △ = 70 miles

Seismological Bulletin - AUGUST 1965

No.	Date	Phase	Time		Period	Ampli- tude mm	Remarks
			G.C.T.				
40	11	eP _z	23 31 40				
41	12	eP _z	08 21 18			USCGS: 15.9 S 167.4 E New Hebrides Islands	
42	12	eP _z	13 16 13.5				
43	13	eP _z	00 57 55			USCGS: 4.3 S 81.0 W Peru-Ecuador Border Region	
44	13	iP _z	13 37 59.4 ^C	0.3	11.5		
45	13	eP _z iS _n	18 41 39 42 14				△ = 167 miles
46	16	iP _z	12 17 53 ^C	0.2	23.7	USCGS: 5.2 N 77.5 W Near West Coast of Colombia	
47	16	iP _z	12 31 31.3 ^C	0.6	11.5		
48	17	eP _z iS _n	18 52 40 53 23				△ = 205 miles
49	17	iP _z iS _n	21 26 52.8 ^D 27 43			USCGS: 5.2 N 77.5 W Near West Coast of Colombia	△ = 242 miles
50	20	iP _z iS _n	04 31 57.5 ^D 32 21				△ = 113 miles
51	20	iP _z iS _n	06 07 55.2 ^D 08 41				△ = 240 miles
52	20	iP _z	06 14 01.5 ^C	0.3	11.0		
53	20	iP _z	09 48 46 ^C	0.5	10.0	USCGS: 19.0 S 69.1 W Northern Chile Felt at Arequipa, Peru and at Afeica, Iquique, Chile	

Seismological Bulletin - AUGUST 1965

<u>No.</u>	<u>Date</u>	<u>Phase</u>	<u>Time</u> <u>G.C.T.</u>	<u>Period</u>	<u>Ampli-</u> <u>tude</u> <u>mm</u>	<u>Remarks</u>
54	23	iP _Z	19 50 08 ^D	0.8	21.0	USCGS: 16.3 N 95.8 W Oaxaca, Mexico Felt throughout Southern Mexico Five people killed in Mexico City and one in Oaxaca.
55	24	iP _Z	01 00 30			USCGS: 15.9 N 96.2 W Near Coast of Oaxaca, Mexico
56	29	eP _Z	01 48 48.5			USCGS: 14.0 N 90.6 W Guatemala

↑ =1000 miles

Harold J. Million
Chief Hydrographer



PANAMA CANAL COMPANY
Engineering and Construction Bureau
Meteorological and Hydrographic Branch

Lat. 8° 57' 39" N
Long. 79° 33' 29" W

Balboa Heights, Canal Zone

h: 36 meters

SEISMOLOGICAL BULLETIN - SEPTEMBER 1965

Standard Seismograph System USC&GS: Sprengnether LP (Z,N,E); Benioff SP (z,n,e)

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
1	4	eP _z	02 59 44			
2	4	iP _z	14 44 20			USCGS: 58.2 N 152.6 W Kodiak Island Region
3	4	eP _z	16 22 53	0.4	3.5	
		iS _n	23 47			△ = 260 miles
4	4	iP _z	21 53 29.5 ^C	0.3	6.3	
5	6	eP _z	00 38 16.2			
		iS _n	38 41.1			△ = 120 miles
6	6	iP _z	21 14 51.6 ^C	0.2	43.0	USCGS: 6.6 N 84.4 W Off Coast of Central America △ = 450 miles
7	6	eP _z	22 54 01			USCGS: 6.7 N 84.3 W Off Coast of Central America
8	6	eP _z	23 21 59			USCGS: 6.7 N 84.5 W Off Coast of Central America △ = 400 miles
9	6	iP _z	23 35 30.5 ^D	0.3	7.8	
		iS _n	36 09.5			△ = 187 miles
10	9	iP _z	01 55 32 ^C	0.3	5.5	
		iS _n	56 05.5			△ = 160 miles
11	9	iP _z	10 03 54.2 ^D	0.2	36.2	USCGS: 6.5 N 84.4 W Off Coast of Central America △ = 400 miles

Seismological Bulletin - SEPTEMBER 1965

No.	Date	Phase	Time		Period	Amplitude mm	Remarks
			G.C.T.				
12	9	eP _z iS _n	15 28 13.5 29 23.5	0.3	4.0	USCGS: 7.0 N 84.3 W Off Coast of Central America △ = 335 miles	
13	10	iP _z iS _n	07 17 29.4 ^D 18 09.6	0.3	7.0	△ = 195 miles	
14	10	iP _z	07 39 41				
15	11	iP _z	07 12 03.5				
16	11	eP _z iS _n	16 45 06 45 25.4			△ = 93 miles	
17	12	iP _z	08 59 19 ^D				
18	12	iP _z iS _n	12 06 36.3 ^D 07 13.5	0.3	5.5	△ = 178 miles	
19	12	iP _z	22 22 21 ^D	0.7	15.6	USCGS: 6.4 S 70.8 E Chagos Archipelago Region	
20	13	iP _z	16 24 22			USCGS: 36.6 S 97.5 W West Chile Rise △ = 3000 miles	
21	13	iP _z	20 47 28.4 ^D			USCGS: 36.5 S 97.5 W Southeast Central Pacific Ocean	
22	14	iP _z	08 47 03			USCGS: 8.4 N 126.8 E Mindanao, Philippine Islands	
23	16	iP _z iS	14 09 44 09 57	0.8	12.0	△ = 65 miles	
24	16	iP iS	22 00 57 01 22	0.8	7.0	△ = 120 miles	
25	17	iP iS	11 01 24 04 34	1.0	50.0	△ = 50 miles	
26	23	iP iS	00 48 20 ^C 48 32	0.5	3.5	△ = 60 miles	



Seismological Bulletin - SEPTEMBER 1965

No.	Date	Phase	Time		Ampli- tude mm	Remarks
			G.C.T.	Period		
27	30	iP iS	01 26 43 ^C 27 50	0.8	8.0	USCGS: 4.1 N 82.6 W South of Panama
28	30	eP _Z	23 58 56			USCGS: 59.7 N 143.4 W Gulf of Alaska

△ = 320 miles

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PANAMA CANAL COMPANY
 Engineering and Construction Bureau
 Meteorological and Hydrographic Branch

Lat. 8° 57' 39" N
 Long. 79° 33' 29" W

Balboa Heights, Canal Zone

h: 36 meters

SEISMOLOGICAL BULLETIN - OCTOBER 1965

----- Standard Seismograph System USC&GS: Sprengnether LP (Z.N.E): Benioff SP (z.n.e) -----

No.	Date	Phase	Time G.C.T.	Period	Ampli- tude mm	Remarks
1	1	iP _z	09 05 07.3 ^D			USCGS: 50.1 N 178.3 E Aleutian Islands
2	3	iP _z	16 24 03			USCGS: 42.9 S 75.4 W Off Coast of Southern Chile
3	4	iP _z	06 23 52 ^D	0.3	49.0	USCGS: 8.9 N 82.7 W Panama-Costa Rica Border Region
4	11	iP iS	18 27 27 ^D 28.12	0.8	4.5	= 215 miles
5	16	iP iS	14 23 53 ^C 27 00	0.6	43.0	USCGS: 9.0 N 83.5 W Costa Rica
6	18	iP iS	22 10 03 ^D 10 28	1.0	2.0	= 120 miles
7	20	iP iS	11 55 08 ^C 56 25	0.6	2.8	USCGS: 6.9 N 73.1 W Northern Colombia
8	20	iP iS	23 56 32 ^C 59 40	0.6	12.0	USCGS: 12.5 N 87.4 W Near Coast of Nicaragua Felt at San Salvador =1050 miles
9	23	iP iS	20 00 12 ^D 00 40	0.4	5.5	= 134 miles
10	25	iP iS	19 23 23 24 07	0.4	4.0	= 210 miles
11	28	iP iS	21 37 36 38 02	0.6	4.5	= 125 miles
12	29	iP iS	04 33 18 33 32	0.5	9.0	USCGS: 4.7 N 82.6 W South of Panama = 68 miles

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 Chief Hydrographer



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Engineering and Construction Bureau
Meteorological and Hydrographic Branch

Lat. 8° 57' 39" N
Long. 79° 33' 29" W

Balboa Heights, Canal Zone

h: 36 meters

SEISMOLOGICAL BULLETIN - NOVEMBER 1965

----- Standard Seismograph System USC&GS: Sprengnether LP (Z.N.E): Benioff SP (z.n.e) -----

No.	Date	Phase	Time		Period	Amplitude mm	Remarks
			G.C.T.				
1	6	iP _z Z	09 30	09.3 ^D			
2	6	eP _z	10 32	26.5	0.2	4.0	
		iS _n	33 11	11.6			△ = 215 miles
3	8	iP _z	14 36	58.2 ^D	0.1	4.0	
		iS _n	37 12	12.5			△ = 68 miles
4	10	iP _z	19 16	12 ^C	0.2	35.5	USCGS: 7.5 N 79.5 W South of Panama
5	10	iP _z	21 16	13 ^D	0.2	27.0	
		iS _n	17 54	54.5			△ = 600 miles
6	10	iP _z	22 20	12 ^D	0.2	61.5	
		iS _n	21 44				△ = 540 miles
7	11	iP _z	01 50	40.5 ^C	0.3	8.0	
		iS _n	51 05				△ = 75 miles
8	11	iP _z	05 09	00 ^C			USCGS: 6.5 N 82.5 W South of Panama
9	12	eP _z	09 01	07.5	0.5	13.5	USCGS: 10.6 N 84.4 W Costa Rica
10	12	eP _z	18 13	16			
11	13	iP _z	04 44	08 ^D	0.6	5.0	
		iS _n	44 19				△ = 53 miles
12	13	eP _z	04 54	50			USCGS: 37.7 S 72.7 W Central Chile

Seismological Bulletin - NOVEMBER 1965

No.	Date	Phase	Time	Period	Ampli-	Remarks
			G.C.T.		tude	
				mm		
13	14	eP _z	03 07 52			USCGS: 1.7 N 90.6 W Galapagos Islands
		eS _N	18 04			
14	14	eP _z	04 23 20			
		eS _E	26 08			
15	15	iP _{zZ}	11 29 08 ^C	1.5	4.0	
16	16	eP _z	14 32 33			
17	18	iP _z	17 54 08.6 ^C	0.2	13.5	
		iS _n	54 24			△ = 75 miles
18	18	iP _z	18 00 32.7 ^D	0.3	4.0	
		iS _n	00 47.5			△ = 73 miles
19	20	iP _z	15 25 15.5 ^C	0.7	2.6	
		iS _n	25 21.6			△ = 30 miles
20	21	iP _{zZ}	10 51 27	0.6	4.0	
		iS _n	51 35			△ = 38 miles
21	21	eP _z	17 05 32			USCGS: 6.8 N 84.3 W Off Coast of Central America
		iS _n	05 44			
22	24	iP _z	05 45 22 ^C	0.5	3.2	
		iS _n	45 30			△ = 58 miles
23	25	iP _z	05 09 44 ^D	1.0	4.5	
		iS _n	09 53			△ = 43 miles
24	25	iP _z	18 53 40 ^D	0.5	5.0	
25	25	eP _z	23 47 00 ^D	1.0	2.8	
		iS _n	47 37			△ = 178 miles

Seismological Bulletin - NOVEMBER 1965

No.	Date	Phase	Time	Period	Ampli-	Remarks
			G.C.T.		tude	
					mm	
26	26	iP _z	13 56 11 ^C	0.5	2.0	△ = 165 miles
		iS _n	56 45.5			
27	27	iP _z	02 28 19.8	0.5	2.5	△ = 100 miles
		iS _n	28 40.6			
28	27	eP _z	03 38 23			△ = 98 miles
		iS _n	38 43.4			
29	28	eP _z	04 06 06			USCGS: 45.6 S 72.4 W Near Coast of Southern Chile
30	29	iP _{zZ}	17 10 32.5 ^D	1.2	4.0	USCGS: 6.0 S 78.6 W Northern Peru
31	30	iP _z	09 17 47 ^D	0.6	3.0	USCGS: 6.9 N 73.0 W Northern Colombia
		iS _n				

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Balboa Heights, Canal Zone

h: 36 meters

SEISMOLOGICAL BULLETIN - DECEMBER 1965

----- Standard Seismograph System USC&GS: Sprengnether LP (Z₂N₂E)_i; Benioff SP (z₂n₂e) -----

No.	Date	Phase	Time	Period	Ampli-	Remarks
			G.C.T.		tude	
					mm	
1	3	iP _z	08 58 11.8	0.5	2.6	
		iS _n	58 56.3			△ = 215 miles
2	3	iP _z	09 03 06.4 ^D	0.3	5.0	
		iS _n	03 38			△ = 153 miles
3	4	iP _z	05 05 45 ^D	0.2	4.5	
		iS _n	05 52			△ = 34 miles
4	4	iP _z	16 59 00 ^C	0.2	5.2	
		iS _n	59 26			△ = 124 miles
5	6	eP _z	04 56 08			
		iS _n	57 59.3			△ = 675 miles
6	6	iP _{zZ}	11 40 46			USCGS: 18.9 N 107.1 W Off Coast of Jalisco, Mexico
7	9	iP _{zZ}	06 12 36	2.1	17.0	USCGS: 17.3 N 100.0 W Guerro, Mexico
		iS _N	16 38			△ = 1545 miles
8	13	iP _z	16 44 53 ^D	0.2	5.5	
		iS _n	45 26			△ = 158 miles
9	15	iP _{zZ}	23 06 08.3 ^D			USCGS: 7.5 N 82.2 W South of Panama Felt Force II, Balboa Heights △ = 200 miles
10	15	eP _z	23 29 04.5	0.2	10.5	
11	15	eP _z	23 45 45	0.2	14.0	

Seismological Bulletin - DECEMBER 1965

No.	Date	Phase	Time	Period	Ampli-	Remarks
			G.C.T.		tude	
					mm	
12	16	iP _{zZ}	01 52 19 ^D	0.3	13.0	
13	16	iP _{zZ}	06 28 10 ^C	0.1	43.0	USCGS: 8.2 N 81.9 W Panama
14	16	iP _z	07 36 41 ^D	0.2	13.0	
15	16	iP _z	20 26 49.2 ^D	0.4	7.8	
		iS _n	27 34			
16	17	iP _z	00 10 08 ^C	0.2	2.5	
		iS _n	10 14			
17	17	iP _z	04 04 37.5 ^D	0.3	8.0	USCGS: 9.3 N 84.3 W Costa Rica
		iS _n	05 26			
18	17	iP _z	14 13 09.3 ^D	0.1	12.0	
19	18	iP _{zZ}	23 55 11 ^D	0.1	32.0	USCGS: 6.7 N 81.8 W South of Panama
20	19	iP _{zZ}	22 26 16 ^C			
21	22	iP _{zZ}	19 52 50 ^D	0.8	6.8	USCGS: 58.4 N 153.0 W Kodiak Island Region
		iS _N	57 50			
22	25	iP _{zZ}	01 22 12 ^D	0.1	7.0	
		iS _n	22 49			
23	28	eP _{zZ}	22 07 50			USCGS: 3.2 S 77.2 W Peru-Ecuador Border Region
24	30	iP _{zZ}	06 21 37 ^D			USCGS: 16.8 S 71.2 W Southern Peru
		iS _E	26 07			