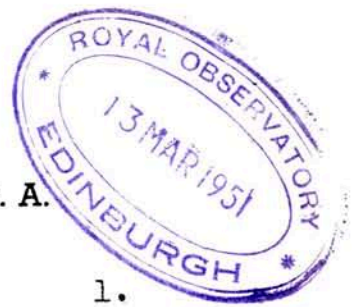


CLEVELAND

SEISMOLOGICAL OBSERVATORY
 JOHN CARROLL UNIVERSITY, CLEVELAND 18, OHIO, U. S. A.

41° 29' 27.90" North, 81° 31' 52.22" West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
 Two Sprengnether short-period horizontal.



1.

Bulletin for January, 1952

Gnwh. Date and Number	Phase and Component	G. M. C. T.	Remarks
January 1 No. 1	iP Z iS N eSR ₁ N M N	07 ^h 13 ^m 29 ^s dil 07 20 48 07 24 21 07 34.6	Epicenter by U.S.C.G.S. 3°5 S., 105°0 W., Pacific Ocean, west of Galapagos Islands. H = 07 ^h 04 ^m 36 ^s * Δ = 50°2
January 3 No. 2	iP Z eS N M N	06 ^h 16 ^m 24 ^s comp 06 26 45 06 52.3	Epicenter by U.S.C.G.S. 40°5 N., 41°5 E., Erzurum Province, Turkey. Heavy casualties and extensive property damage. H = 06 ^h 03 ^m 52 ^s * Δ = 83°7
January 3 No. 3	iP Z eP e iP Z eS e e e e N L N M N	10 ^h 11 ^m 13.0 ^s comp 10 11 13.3 10 11 24.3 comp 10 16 14.9 10 17 00.9 10 17 16 10 20.3 10 25.6	Epicenter by U.S.C.G.S. 16° N., 99° W., off S. coast of Mexico. Felt. H = 10 ^h 05 ^m 05 ^s * Magnitude 6 1/2 by Pasa- dena. Δ = 29°5
January 12 No. 4	eP Z iP e iP n ePS N e N e N	20 ^h 21 ^m 18 ^s dil 20 21 19.8 20 21 19.9 20 29 03 20 30 57 20 32 27	Epicenter by U.S.C.G.S. 53° N., 167° W., Fox Islands, Aleutian Islands H = 20 ^h 11 ^m 38 ^s * Magnitude 6 1/2 by Pasa- dena. Δ = 56°1. Foreshock: January 10 - H = 11 ^h 39 ^m 23 ^s **

Bulletin for January, 1952

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
January 13 No. 5	iP Z iPR ₁ Z ePS ₁ N eSR ₁ N M N	04 ^h 21 ^m 58 ^s comp 04 23 03 comp 04 32 31 04 38 36 04 58.2	Epicenter by U.S.C.G.S. 22° N., 124°5 E., off East coast of Formosa. Felt in Ryukyu Islands. H = 04 ^h 03 ^m 37 ^s . Δ = 112°5
January 21 No. 6	iP Z i Z eS N e N eSR ₁ N	03 ^h 52 ^m 37.0 ^s dil 03 53 53.5 comp 04 00 13 04 02 27 04 04 13	Epicenter by U.S.C.G.S. 53° N., 166°5 W., Fox Islands, Aleutian Islands H = 03 ^h 43 ^m 04 ^s . h about 60 km. Magnitude 6 3/4 by Pasadena. Δ = 55°6
January 24 No. 7	eP e iP Z	09 ^h 23 ^m 53 ^s 09 23 57 dil	Epicenter by U.S.C.G.S. 53° N., 166°5 W., Fox Islands, Aleutian Islands. H = 09 ^h 14 ^m 08 ^s . Δ = 55°6
January 31 No. 8	iP n iP e iPR ₁ n iS ₁ n	20 ^h 23 ^m 40 ^s 20 23 40 20 23 56 20 28 03	Epicenter by U.S.C.G.S. 15°5 N., 93°5 W., near coast of Chiapas, Mexico. Felt. H = 20 ^h 16 ^m 43 ^s . h about 60 km. Magnitude 5 3/4 by Pasadena. Δ = 27°4
January 31 No. 9	iS n L N M N	21 ^h 38 ^m 26.0 ^s 21 43.1 21 48.7	Epicenter by U.S.C.G.S. 4° S., 30°5 E., Ruanda- Urundi, Tanganyika border. H = 20 ^h 55 ^m 12 ^s * Δ = 108°9

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Two Sprengnether short-period horizontal.

Bulletin for February, 1952



Gnwh. Date and Number	Phase and Component		G. M. C. T.			Remarks
			h	m	s	
February 2 No. 10	eP eP eP eS e	Z e n N N	10-30-26	comp		Epicenter by U.S.C.G.S. 51.5° N 179° W Andreanof Islands Aleutian Islands. Felt; Adak H = 10-20-06 h about 100 km. △ = 6397
February 2 No. 11	iP eS eS iS eSR ₁	n n e e N	12-30-06.8			Epicenter by U.S.C.G.S. Off West coast of Puerto Rico H = 12-24-02** △ about 26°
February 11 No. 12	iP' iP' iSKP	n e n	07-19-27.1			Epicenter by U.S.C.G.S. 6° S 110° E Java Sea H = 07-01-04 h about 700 km. Magnitude 7 by Pasadena △ = 14391
February 14 No. 13	iP' ePR ₁ iSKP iPPS (e)	Z ZNE Z E N	03-57-40	dil		Epicenter by U.S.C.G.S. 8° S 125° E Flores Sea North of Timor Island H = 03-38-36 Magnitude 7½ Pasadena △ = 13993

Bulletin for February, 1952

Gnwch. Date and Number	Phase and Component		G. M. C. T.			Remarks
			h	m	s	
February 14 No. 14	eP	Z	21-09-27	dil		Epicenter by U.S.C.G.S. 7.5° N 76.5° W Northwestern Colombia H = 21-01-37 Magnitude 6 3/4 by Pasadena △ = 34.0° Arrival times do not agree
	eP	N	21-09-28			
	eP	n	21-09-28.8			
	e	Z	21-09-35	comp		
	eS	N	21-14-55			
	iS	E	21-14-57			
	e(SR ₁)	E	21-17-23			
February 16 No. 15	eP	e	07-31-44.5			Epicenter by U.S.C.G.S. Near coast of Oaxaca Mexico H = 07-25-15** △ about 29°-30°
	iP	Z	07-31-45	dil		
	iP	n	07-31-45.1			
	eS	N	07-36-35			
February 17 No. 16	eP	e	17-41-56.0			Epicenter by U.S.C.G.S. Southern Gulf of California H = 17-35-45** △ about 29°
	iP	Z	17-41-56	dil		
	e	N	17-44-07			
	e	E	17-44-43			
	i	N	17-44-51			
	eS	E	17-46-44			
	e	NE	17-50-31			
February 20 No. 17	iP	Z	09-19-42	dil		Epicenter by U.S.C.G.S. 16° S 74° W Near coast of Southern Peru H = 09-10-06 h about 150 km. △ = 57.8°
	iP	n	09-19-43.3			
February 25 No. 18	eSKS	NE	01-40-38			Epicenter by U.S.C.G.S. 17° S 173.5° W Tonga Islands Felt; Apia H = 01-17-00 Magnitude 6.9 Pasadena △ = 102.3° Aftershock H = 01-55-23
	eSKKS	E	01-42-12			
	iS	N	01-42-44			
	ePS	E	01-44-31			
	eSR ₁	N	01-49-52			
	eSR ₁	E	01-49-56			

Bulletin for February 1952

Gnwch. Date and Number	Phase and Component	G. M. C. T. h m s	Remarks
February 26 No. 19	iP NZ eP E ipP Z iS E isS E	11-40-20.5 comp 11-40-20.5 11-41-14.9 dil 11-47-49 11-49-28	Epicenter by U.S.C.G.S. 14.5° S 70.0° W H = 11-31-04 h about 300 km Magnitude 7½ Pasadena 7¼ Berkeley Δ = 57.0°
February 26 No. 20	eP NZ iP n iP Z ipP Z ePR ₁ N eS N	15-45-30 comp 15-45-31.3 15-45-31.8 dil 15-45-45 comp 15-46-31 15-50-55	Epicenter by U.S.C.G.S. 11.5° N 86.5° W Near coast of Nicaragua. Felt. H = 15-39-23 h about 100 km. Magnitude 6 Pasadena Δ = 30.3°

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 Two Sprengnether short-period horizontal.



1.

Bulletin for March, 1952

Gnwh. Date and Number	Phase and Component	G. M. C. T. h m s	Remarks
March 2 No. 21	iP NZ ipP Z eS N eSR ₁ E eSR ₂ N L E M E	18-59-06 dil 18-59-15 dil 19-04-31 19-06-13 19-06-50 19-07-58 19-09.4	Epicenter by U.S.C.G.S. 11° N 86.5° W Near coast of Nicaragua H = 18-52-56 h about 100 km. △ = 30.8°
March 3 No. 22	i Z eSP Z M E	07-36-27 comp 07-40-20 comp 08-08.0	Epicenter by U.S.C.G.S. 21.5°S, 174.5° W Tonga Islands H = 07-12-39 △ = 106.1°
March 3 No. 23	iP Z eS N M N	17-48-47 comp 17-53-46 18-01.3	Epicenter by U.S.C.G.S. 11° N 86.5° W Near coast of Nicaragua H = 17-42-07 h about 100 km. △ = 30.8°
March 3 No. 24	eP Z i nZ iSKKS E iPS n	01-35-31 dil 01-35-42 01-46-17 01-46-32	Epicenter by U.S.C.G.S. 42.5° N 143.5° E Near east coast of Hokkaido, Japan Heavy casualties and extensive property damage. Seismic sea wave. H = 01-22-41 Magnitude 8½ Pasadena 8 Berkeley △ = 86.2°

Bulletin for March, 1952

Gnwch. Date and Number	Phase and Component	G. M. C. T. h m s	Remarks
March 4 No. 25	iP Z	04-06-17.3 dil	Epicenter by U.S.C.G.S. 43° N 146° E Off east coast of Hokkaido, Japan H = 03-53-30 △ = 84.8°
March 4 No. 26	iP Z	04-24-01 dil	Epicenter by U.S.C.G.S. Hokkaido, Japan Aftershock H = 04-11-09 △ = 84.8°
March 4 No. 27	iP Z	07-22-53.3	Hokkaido, Japan Aftershock
March 4 No. 28	iP Z iS E	16-43-43 dil 16-54-13	Epicenter by U.S.C.G.S. 43° N 146° E Off east coast of Hokkaido Japan. H = 16-31-00 △ = 84.8°
March 4 No. 29	iP Z eSKKS E ePS E	20-09-00 comp 20-19-32 20-20-17	Epicenter by U.S.C.G.S. 42° N 146° E Off east coast of Hokkaido, Japan. H = 19-56-10 △ = 85.7° Aftershock: March 5 H = 03-49-03
March 4 No. 30	iP Z	21-02-10 comp	Epicenter by U.S.C.G.S. Aftershock Hokkaido, Japan. H = 20-49-20**

Bulletin for March, 1952

Gnwch. Date and Number	Phase and Component	G. M. C. T. h m s	Remarks
March 5 No. 31	iP Z eSKS E	04-01-51 dil 04-12-27	Epicenter by U.S.C.G.S. 42° N 146° E Aftershock of No. 29 H = 03-49-03 △ = 85.7°
March 5 No. 32	iP Z eSKKS E e(PS) E	09-29-55 comp 09-40-30 09-40-44	Epicenter by U.S.C.G.S. 43° N 145.5° E Off east coast of Hokkaido, Japan H = 09-17-08 △ = 85.1°
March 5 No. 33	iP Z	11-03-34	Epicenter by U.S.C.G.S. 43° N 145° E Off east coast of Hokkaido, Japan H = 10-50-52 △ = 85.4°
March 5 No. 34	eP Z eP Z eS N eS E iM NE eM ne	15-52-08 comp 15-52-12 dil 15-56-53 15-56-57 16-01-08 16-01-14	Epicenter by U.S.C.G.S. 24.5° N 108.5° W Gulf of California H = 15-46-08 Magnitude 5-3/4-6, Pasadena △ = 28.2°
March 5 No. 35	iP Z iP n iP e iP Z	16-07-03 dil 16-07-03 16-07-03.4 16-07-12 comp	Epicenter by U.S.C.G.S. 43° N 145.5° E Off east coast of Hokkaido, Japan H = 15-54-18 △ = 85.1°

Bulletin for March, 1952

Gnwch. Date and Number	Phase and Component	G. M. C. T. h m s	Remarks
March 7 No. 36	eP Z iS N ePS NE ePPS E eSR ₁ N eSR ₂ E	07-46-04 dil 07-57-21 07-58-08 07-58-56 08-04-06 08-07-53	Epicenter by U.S.C.G.S. 36° N 136.5° E Honshu, Japan, Felt. H = 07-32-38 Magnitude: 6½ Pasadena △ = 94.6°
March 9 No. 37	eP Z eP Z	02-52-17 dil 02-52-43 dil	Epicenter by U.S.C.G.S. 70.5° N 15° W Jan Mayen Island Region H = 05-44-29 △ = 43.6°
March 9 No. 38	iP Z eS NE iSKKS E i N	17-16-34 comp 17-26-59 17-27-11 17-27-15	Epicenter by U.S.C.G.S. 42° N 143.5° E Near south coast of Hokkaido, Japan Slight property damage H = 17-04-43 Magnitude 7 Pasadena △ = 87.0°
March 9 No. 39	iP Z iP ne iP neZ iS N iSR ₂ N	20-07-38 comp 20-07-38.4 20-07-40.0 dil 20-13-35 20-16-21	Epicenter by U.S.C.G.S. 59.5° N 136° W Alaska-Canada border Felt: Sitka H = 20-00-17 Magnitude 6 Pasadena △ = 37.7°
March 19 No. 40	iP' Z eP' ne ePR ₁ NE iPR ₁ Z eSKKS n ePS e	11-16-10 comp 11-16-11 11-17-49 11-17-51 comp 11-24-48 11-27-29	Epicenter by U.S.C.G.S. 9.5° N 127° E Off east coast of Mindanao, Philippine Islands. H = 10-57-09 Magnitude 7½-7-3/4 Pasadena △ = 122.1°

Bulletin for March, 1952

Gnwch. Date and Number	Phase and Component	G. M. C. T. h m s	Remarks
March 22 No. 41	iP Z eS E e ₁ ^{PS} N e E e N eSR ₁ E	18-25-52 comp 18-33-57 18-34-16 18-35-27 18-35-38 18-38-00	Epicenter by U.S.C.G.S. 52° N 173° W Andreanof Islands, Aleutian Islands. H = 18-15-43 Magnitude $6\frac{1}{4}$ - $6\frac{1}{2}$ Pasadena $\Delta = 59.5^\circ$
March 25 No. 42	eSKS E E	04-32-08 04-32-52	Epicenter by U.S.C.G.S. Tonga Islands Region Felt: Apia H = 04-08-26 h about 250 km. $\Delta = 103.7^\circ$

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Bulletin for April, 1952

Gnwh. Date and Number	Phase and Component	G. M. C. T.	Remarks
April 1 No. 43	iS e e n e n eM n	00 ^h 48 ^m 17 ^s 00 50 01.1 00 50 14 00 50 20.6	Epicenter by U.S.C.G.S. 48° N., 113.8° W. Northwestern Montana. Felt. H=00 ^h 37 ^m 41.5 ^s . Δ =23.7°
April 2 No. 44	iP Z eS E eSR ₁ N	18 ^h 40 ^m 54 ^s dil 18 45 52 18 47 29	Epicenter by U.S.C.G.S. 16.5° N., 99.5° W. Near coast of Guerrero, Mexico. Felt. H=18 ^h 34 ^m 50 ^s . Magnitude 6 ¹ / ₄ - 6 ¹ / ₂ by Pasadena. Δ =29.6°
April 3 No. 45	iP Z	16 ^h 03 ^m 21 ^s dil	
April 4 No. 46	iP Z iP n iP e eS E	03 ^h 04 ^m 26 ^s comp. 03 04 27.2 03 04 27.5 03 13 50	Epicenter by U.S.C.G.S. 52° N., 159.5° E. Near East coast of Kamchatka H=02 ^h 52 ^m 55 ^s . Magnitude 6 ¹ / ₄ by Pasadena. Δ =73.0°
April 9 No. 47	eP Z eS N eS E	08 ^h 06 ^m 06 ^s 08 13 14 08 13 18	Epicenter by U.S.C.G.S. about 1000 miles south- west of Galapos Islands H=07 ^h 57 ^m 10 ^s ** Δ S-P=48.7°
April 9 No. 48	eP Z eP e iP eZ iP n iS n iS n iS e iS Z iS Z iS e iS n iS Z	16 ^h 32 ^m 42 ^s dil 16 32 42.7 16 32 42.9 comp 16 32 43.4 16 35 03.4 16 35 15.1 16 35 16.4 16 35 16.5 16 35 21.5 16 35 21.7 16 35 35.9 16 35 36	Epicenter by U.S.C.G.S. 35.4° N., 97.8° W. slight property damage in central Oklahoma. Felt in seven states. H=16 ^h 29 ^m 29.5 ^s , h about 125 km. Magnitude 5.5 by Pasadena. Δ =13.8°

Bulletin for April, 1952

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
April 10 No. 49	iS E	06 ^h 24 ^m 00 ^s	Epicenter by U.S.C.G.S. 25° N., 126° E., Rejuku Islands H=05 ^h 57 ^m 20 ^s . $\Delta = 109.20$
April 14 No. 50	iP neZ ipF Z epF n eS N eS N	23 ^h 48 ^m 01 ^s dil 23 48 21 23 48 22 23 56 41 23 56 45	Epicenter by U.S.C.G.S. 25° S., 69.5° W., Northern Chile H=23 ^h 37 ^m 30 ^s , h about 100 km. $\Delta = 67.50$
April 15 No. 51	iP Z iS E	06 ^h 12 ^m 36 ^s dil 06 23 11	Epicenter by U.S.C.G.S. 43° N., 143.5° E. Hokkaido, Japan H=05 ^h 59 ^m 53 ^s . $\Delta = 86.50$
April 15 No. 52	eSkS N eSKKS N eS E eFS N	19 ^h 27 ^m 15 ^s 19 28 10 19 28 43 19 30 42	Epicenter by U.S.C.G.S. 56° S., 24° W. Sandwich Island Region. H=19 ^h 02 ^m 12 ^s . $\Delta = 109.10$
April 16 No. 53	iP Z	03 ^h 52 ^m 27 ^s dil	Epicenter by U.S.C.G.S. 47° N., 154° E., Kurile Islands region. H=03 ^h 40 ^m 19 ^s . $\Delta = 78.90$
April 16 No. 54	iP n iP Z iP n	06 ^h 03 ^m 48.1 ^s 06 03 54 dil 06 03 54.5	
April 19 No. 55	iP NZ eP E iP ne eP e ipP n ipP Z ePR ₁ N ePR ₁ E iS E e(SR ₁) E	10 ^h 05 ^m 48 ^s comp. 10 05 48 10 05 49 10 05 49 10 05 55.3 10 05 58 dil 10 05 58 10 07 02 10 11 22 10 14 10	Epicenter by U.S.C.G.S. Colombia-Venezuela bor- der. Minor property damage. H=09 ^h 58 ^m 53 ^s , h about 60 km. Magni- tude 6 3/4-7 by Pasa- dena. $\Delta = 35.50$
April 22 No. 56	e N i(SR ₁) E L E	17 ^h 04 ^m 10 ^s 17 04 39.3 17 06 11	Epicenter by U.S.C.G.S. 46° N., 111.5° W. Western Montana. Felt. H=16 ^h 54 ^m 42.5 ^s . $\Delta = 22.00$

Bulletin for April, 1952

Gnwch. Date and Number	Fhase and Component	G. M. C. T.	Remarks
April 25 No. 57	eP Z iP n eS N	06 ^h 08 ^m 40 ^s 06 08 41.3 06 14 01	Epicenter by U.S.C.G.S. 8° N., 83° W., Near coast of Costa Rica. H=06 ^h 02 ^m 00 ^s . Magnitude 6 $\frac{1}{4}$ -6 $\frac{1}{8}$ by Pasadena. Δ =33.2°
April 28 No. 58	eP neZ iP n iP Z eP e iS E iS N	11 ^h 07 ^m 07 ^s dil 11 07 08.9 11 07 09 dil 11 07 09 11 17 44 11 17 46	Epicenter by U.S.C.G.S. 42.5° N., 143° E. Hokkaido, Japan. H=10 ^h 54 ^m 18 ^s . Magnitude 6 $\frac{1}{2}$ by Pasadena. Δ =87.6°
April 29 No. 59	eSKKS E ePS E e N eSR ₁ E e N	03 ^h 01 ^m 11 ^s 03 03 12 03 03 33 03 09 01 03 10 47	Epicenter by U.S.C.G.S. 26° N., 122.5° E. Off North coast of Formosa. H=02 ^h 35 ^m 00 ^s . Δ =109.4°
April 29 No. 60	eP' Z	03 ^h 26 ^m 26 ^s dil	Epicenter by U.S.C.G.S. 15° S., 44.5° E. Mozambique Channel H=03 ^h 07 ^m 35 ^s *** h about 200 km. Δ =128.0°

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BULLETIN FOR MAY, ~~1956~~

1952

Date and Number	Phase	G.M.C.T.	Remarks
1 #61	iP Z iP n iP e	15 ^h 05 ^m 03 ^s c 15 05 04.0 15 05 04.1	Epicenter by USCGS. Near Aleutian Is. H = 15 ^h 04 ^m 07 ^s ** Δ P-H = 68.1°
4 #62	eSKKS E e(PS) N ePPS E	14 41 25 14 44 13 14 44 52	Epicenter by USCGS: 24 ¹ / ₂ °S, 177 ¹ / ₂ °W Tonga Islands Region. H = 14 ^h 15 ^m 16 ^s Δ = 110.9°
6 #63	iP Z e N	17 27 33.2 d 17 32 18	USCGS: 41 ¹ / ₂ °N, 125°W. Off coast of Northern California H = 17 ^h 21 ^m 02 ^s * Δ = 32.3°
6 #64	iP Z	22 33 01.3 d	USCGS: Off coast of Colima, Mexico. H = 22 ^h 26 ^m 40 ^s ** Δ P-H = 30.9°
8 #65	eP' Z iSKP Z ePS N	21 30 03 d 21 33 18 d 21 42 12	USCGS: 2 ¹ / ₂ °N, 127°E. Molucca Passage H = 21 ^h 10 ^m 40 ^s * Mag: 6 ¹ / ₂ -6 3/4 Pas. Δ = 129.5°
9 #66	ePS E	03 57 18	USCGS: Kermadec Islands Region. H = 03 ^h 29 ^m 00 ^s ** h about 400 km. Δ PS-H = 117.4°
9 #67	eP' Z iPR ₁ Z eSKS E ePS E	18 06 26 d 18 07 46 c 18 13 26 18 17 13	USCGS: 6 ¹ / ₂ °S, 155°E. Solomon Islands H = 17 47 40 *, habout 60 km. Mag: 7 Pasadena Δ = 119.5°
13 #68	iP Z ipP Z isP Z es N esS N	19 38 00 c 19 38 09 d 19 38 14 d 19 42 51 19 43 28	USCGS: 10 ¹ / ₂ °N, 85°W. Costa Rica H = 19 ^h 31 ^m 45 ^s *. h about 100 km. Mag: 6.9 Pasadena Δ = 31.3°
14 #69	iP Z es N	00 49 42 d 01 00 06	USCGS: 43°N, 145 ¹ / ₂ °E. Near East coast of Hokkaido, Japan. H = 00 ^h 36 ^m 59 ^s * Mag: 6 ¹ / ₂ Pas., Δ = 86.0°

(May, 1952)

Date and Number	Phase	G.M.C.T.	Remarks	
14 #70	iP eS	Z E	21 ^h 17 ^m 03.5 ^s c 21 21 29	USCGS: 16½°N, 86½°W. Off North coast of Honduras. H = 21 ^h 11 ^m 36 ^s * Mag: 5.9 Berkeley. Δ = 25.0°
15 #71	iP iPR ₁ eS	Z Z N	18 49 54 d 18 50 50 c 18 55 06	USCGS: 14°N, 92½°W. Near coast of Guatemala. H = 18 ^h 43 ^m 52 ^s *. Mag: 5½ - 5 ¾ Pas. Δ = 29.0°
16 #72	iP eS	Z N	05 48 08 d 05 53 20	USCGS: 14°N, 92½°W. Near coast of Guatemala. H = 05 ^h 42 ^m 09 ^s *. Mag: 5 ¾ Pas. Δ = 29.0°
16 #73	iP eS	Z E	10 58 18 c 11 03 01	USCGS: 16½°N, 96½°W. Oaxaca, Mexico H = 10 ^h 52 ^m 18 ^s *. h about 100 km Δ = 28.0°
16 #74	iP iS	Z N	20 52 33 c 20 50 05	USCGS: 6½°N, 79°W. Off coast of Panama. Felt: Balboa Heights. H = 20 ^h 45 ^m 40 ^s *, Mag: 6.9 Pas., 6½ Berk. Δ = 35.2°
17 #75	eP i iSKKS i	Z Z E E	10 01 00 10 01 11 10 11 39 10 11 54	USCGS: 42½°N, 144½°E. Near East coast of Hokkaido, Japan. H = 09 ^h 48 ^m 16 ^s *. Mag: 6½-6 ¾ Pas. Δ = 86.6°
19 #76	iP eSKS iS iSKKS i eSR ₁	ne N E N N E	19 45 10.6 19 55 28 19 55 33 19 55 45 19 56 00 20 01 32	USCGS: 43°N, 144½°E. Near East coast of Hokkaido, Japan. H = 18 ^h 32 ^m 24 ^s * Δ = 86.3°
23 #77	iP eS	Z N	22 23 16.0 d 22 32 07	USCGS: 20°N, 156°W. Near West coast of Hawaii, T.H., Felt: Hawaii & Maui H = 22 ^h 12 ^m 26 ^s *. Mag: 6. Pas. Δ = 65.5°
24 #78	iP iP iS	Z Z N	02 09 36.5 c 02 09 44.9 c 02	USCGS: 21½°S, 71°W. Near coast of Northern Chile. H = 01 ^h 59 ^m 05 ^s *. Mag: 6 ¾ Pas. Δ = 63.9°
24 #79	eP' ePR ₁	Z Z	16 25 30 d 16 28 16 c	USCGS: Off West coast of Sumatra. H = 16 ^h 05 ^m 53 ^s Mag: 6½-6 ¾ Pas. Δ P-H = 146°
28 #80	eP iP iPR ₁ iSKS iS ePS eSR ₁	Z Z N NE E E E	08 11 57 d 08 11 57.6 d 08 15 55 08 21 56 08 22 13 08 24 48 08 29 28	USCGS: 35½°N, 136°E. Central Honshu, Japan. Felt: H = 07 ^h 59 ^m 09 ^s * h about 400 km. Mag: 6 ¾ - 7 Pas. Δ = 95.9°

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SEISMOLOGICAL OBSERVATORY

JOHN CARROLL UNIVERSITY, CLEVELAND 18, OHIO, U. S. A.

41° 29' 27.90" North, 81° 31' 52.22" West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

BULLETIN FOR JUNE, 1952

Gnwch Date and Number	Phase		G.M.C.T.		Remarks	
#81	5	ip	Z	06 ^h 03 ^m 33 ^s	c	USCGS: 6°N, 72½°W. Near west coast of Colombia. H = 05 ^h 56 ^m 35 ^s . h about 60 km. Mag: 6¼ Pasadena Δ = 36.0°
	ipP	Z	06 03 37	d		
	iPR ₁	N	06 04 57			
	eS	N	06 09 10			
#82	10	eP'	Z	10 16 26	d	USCGS: 15½°S, 178½°W. Fiji Island region. H = 09 ^h 58 ^m 27 ^s * Mag: 6½ - 6¾ Pasadena. Δ = 105.5°
	eS	N	10 24 32			
	esR ₁	N	10 32 04			
#83	11	ip	Z	00 43 13.1	c	USCGS: 32°S, 67½°W. San Juan Province, Argentina. Felt in Chile and Western Argentina. Many casualties and moderate property damage. H = 00 ^h 31 ^m 32 ^s Mag: 7 Pas. Δ = 75.0°
	ePR ₁	N	00 46 01			
	ePR ₂	N	00 47 25			
	iS	NE	00 52 47			
	iPS	E	00 53 25			
#84	11	ip	Z	03 12 08.3	c	USCGS: 32°S, 67½°W. San Juan Province, Argentina. H = 03 ^h 00 ^m 28 ^s Δ = 75.0°
#85	14	ip	Z	02 13 58.8	d	USCGS: 58°N, 153½°W. Near coast of Alaska, Peninsula. h about 60 km. Δ = 47.3°
	ipP	Z	02 14 11.8	d		
	iSP	e	02 14 20.0			
15	eP	Z	15 20 00	c	USCGS: 66°N, 134°W. Yukon, Canada H = 15 ^h 12 ^m 41 ^s * Δ = 38.0°	
#87	16	ePR ₁	Z	03 56 42	c	USCGS: 23°S, 179½°W. Fiji Islands Region. H = 03 ^h 38 ^m 20 ^s h about 500 km. Mag: 6¼ Pas., Δ = 111.4°
	iPPS	Z	04 07 11.9	c		
#88	19	iPR ₁	Z	12 32 52	c	USCGS: 23°N, 100°E. Southern Yunan Province, China. H = 12 ^h 12 ^m 56 ^s * Mag: 6½ Pasadena. Δ = 116.0°
	ePS	N	12 42 22			
	ePPS	N	12 43 21			
#89	19	es	Z	21 23 41	d	USCGS: Tonga Islands. Region. H = 20 ^h 57 ^m 01 ^s ** Δ about 109°
	e	N	21 29 34			
	e	E	21 30 38			
	e	N	21 32 08			

(June, 1952)

Gnwch Date and Number	Phase		G.M.C.T.		Remarks
20 #90	ePR ₁ ePS ₁	Z NE	06 05 33 06 14 57	d	USCGS: 25½°N, 122°E. Near North coast of Formosa. Felt: Taipeh. Mag 6½ Pas., about 6½ Berk. Δ = 109.7° H = 05h46m20s*
21 #91	iP iS	Z E	06 41 04.2 06 50 44	c	USCGS: 46°N, 153½°E. Kurile Islands H = 06h28m57s* Mag: 6¼ Pasadena Δ = 79.9°
22 #92	iP eS	Z E	10 20 23.1 10 30 21	c	USCGS: 46°N, 153½°E. Kurile Islands H = 10h08m14s*. Mag: 6¼ Pasadena. Δ = 79.9°
23 #93	iP ePR ₁ iS esR ₁	Z N E E	21 54 02.7 21 57 07 22 03 59 22 09 23	c	USCGS: 46°N, 153½°E. Kurile Islands H = 21h41m53s*. Mag: 7 Pas. 6½ Berk Δ = 79.9°
22 #94	iP	Zn	22 12 13	d	Probable aftershock of preceding quake.
24 #95	eP eS	Z N	16 41 10.1 16 51 13	c	USCGS: 46½°N, 154°E. Kurile Islands H = 16h29m02s*. Δ = 79.0°
28 #96	iP es	Z N	16 33 47.4 16 38 32		USCGS: 16½°N, 97½°W. Oaxaca, Mexico H = 16h27m47s*. Mag: 53/4 Pas. Δ = 28.2°

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Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

BULLETIN FOR JULY, 1952

Date and Number	Phase		G.M.C.T.		Remarks
3 #97	iP	Z	00 ^h 59 ^m 27.8 ^s	d	USCGS: 5½°N, 78°W. Near west coast of Colombia. H = 00 ^h 52 ^m 23 ^s * Δ = 36.3°
	iPR ₁	Z	01 00 51.6	d	
	iS	E	01 05 06		
7 #98	iP	Z	03 02 25.3	c	USCGS: 54°N, 164°W. Near south coast of Unimak Island. H = 02 ^h 53 ^m 01 ^s * Mag: 6½ Pas. Δ = 53.8°
	iPR ₁	Z	03 04 43.3	d	
9 #99	iP	Z	18 22 06.7	c	USCGS: 7½°N, 82°W. Off coast of Panama, Felt: H = 18 ^h 15 ^m 18 ^s * Mag: 6½ Pas. Δ = 33.8°
	iS	E	18 27 31		
9 #100	iP	Z	20 43 35.7	d	USCGS: 7½°N, 82°W. Off coast of Panama. H = 20 ^h 36 ^m 48 ^s * Mag: 6½ Pas. Δ = 33.8°
	iS	E	20 49 01		
13 #101	e	neZ	12 16 47	d	USCGS: 18½°S, 169½°E. Near Kebrides Islands. H = 11 ^h 58 ^m 34 ^s * Mag: 7 Pasadean Δ = 116.9° Phases sharp but not in agreement
	i	eZ	12 17 54	d	
	i	NE	12 23 10		
	i	NE	12 24 27		
13 #102	eP'	Z	17 53 46	d	USCGS: 3°S, 128°E. Ceram Sea. H = 17 ^h 34 ^m 26 ^s *. Mag: 6 3/4 - 7 Pas. Δ = 135.0°
	ePR ₁	N	17 56 23		
	iSKP	nZ	17 57 16	d	
15 #103	iP	Z	06 12 18	c	USCGS: 14½°N, 92½°W. Near Coast of Guatamala. H = 06 ^h 06 ^m 20 ^s *. Mag. 6 Pasadena. Δ = 28.7°
	eS	E	06 17 17		
16 #104	iP	Z	16 23 17	c	USCGS: 34½°N, 136°E. Southern Honshu Japan. Many casualties and moderate property damage. H = 16 ^h 09 ^m 52 ^s * h about 100 km. Mag: 7 Pasadena Δ = 96.9°
	ipP	Z	16 23 39	d	
	e	NE	16 27 42		
	e	N	16 31 00		
	isKS	N	16 33 46		
	iS	N	16 34 36		
e	N	16 35 03			
18 #105	iP	Z	18 51 01	c	USCGS: 23°S, 114½°W. Easter Island Region. H = 18 ^h 39 ^m 40 ^s * Δ = 71.3°
	eS-	N	19 00 19		
	ePS	E	19 01 10		

(July, 1952)

Date and Number	Phase		G.M.C.T.		Remarks
21 #106	iP eS	Z E	11 58 24 12 03 35	c	USCGS: 35.1°N, 118.9°W. Tulare Valley, Southern California. Several killed and extensive property damage. H = 11 ^h 52 ^m 11.5 ^s *. Mag: 7½ Pasadena $\Delta = 30.0^\circ$
21 #107	eP	Z	19 47 31	d	USCGS: 35°N, 119°W. Southern Cali. aftershock. Felt: H = 19 ^h 41 ^m 18 ^s * Mag: 5½ - 5 3/4 Berk. $\Delta = 30.0^\circ$
23 #108	iP eS	Z E	00 44 39 00 49 30	c	USCGS: 35.1°N, 118.9°W. Southern Cali. aftershock. H = 00 ^h 38 ^m 33 ^s * Mag: 6, Pasadena $\Delta = 30.0^\circ$
23 #109	iP iPR ₁	Z Z	01 05 20 01 06 09	c c	USCGS: 14°N, 91½°W. Near coast of Guatemala. H = 00 ^h 59 ^m 17 ^s * $\Delta = 28.6^\circ$
23 #110	eP eS	Z NE	13 23 24 13 28 16	c	USCGS: 35°N, 119°W. Southern Cali. aftershock. Felt: H = 13 ^h 07 ^m 02 ^s * Mag: 5,4 Berk. $\Delta = 30.0^\circ$
24 #111	iP ipP isP iSKKS isSKKS	Z Z Z E E	22 21 59 22 22 13 22 22 23 22 32 28 22 32 51	c c d	USCGS: 42½°N, 145½°E. Off East coast of Hokkaido, Japan. Felt: Hokkaido and northern Honshu. H = 22 ^h 09 ^m 20 ^s * h about 60 km $\Delta = 86.0^\circ$
25 #112	iP es	Z E	19 15 52 19 20 44	d	USCGS: 35°N, 119°W. Southern Cali. aftershock. Felt: H = 19 ^h 09 ^m 42 ^s * Mag: 5½ - 5 3/4 Berk., 6, Pas. = 30.0° Δ
25 #113	iP	Z	19 49 29	d	USCGS: 35°N, 118½°W. Southern Cali. aftershock. Felt: H = 19 ^h 43 ^m 20 ^s * Mag: 5 3/4 Berk., 6 Pas. $\Delta = 30.5^\circ$
27 #114	eP iPR ₁ iSKS iSKKS is isSKS esSKKS	Z Z E E E E E	08 40 24 08 41 30.7 08 46 46 08 47 41 08 48 29 08 50 17 08 51 02	d c	USCGS: 20½°S, 179°W. Fiji Islands H = 08 ^h 23 ^m 22 ^s *. h about 500 km. $\Delta = 109.3^\circ$

Date and Number	Phase	G. M. C. T.		Remarks	
27 #115	iP eS	Z N	07 ^h 09 ^m 56 ^s 07 14 57	c	USCGS: 35°N, 119°W. Southern Cali. Slight property damage. H = 07 ^h 03 ^m 45 ^s * Mag: 6½ Pas., 6¼ - 6½ Berk. Δ = 30.0°
29 #116	iP	Z	20 04 39	c	USCGS: 53½°N, 175°W. Andreanof Is. Aleutian Islands. Felt: H = 19 ^h 54 ^m 27 ^s * Δ = 60.1°
31 #117	ipP	n	12 28 32		USCH": 34°S, 72½°W. Near coast of center Chile. Felt: H = 12 ^h 16 ^m 35 ^s * h about 100 km. Δ = 76.2°

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Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

BULLETIN FOR AUGUST, 1952

Date and Number	Phase		G.M.C.T.		Remarks
3 #118	eP	Z	13 23 12	c	USCGS: 12½° S, 78° W. Near coast of Peru. H = 13 13 48. Δ = 54.1°
	i	Z	13 23 24	d	
7 #119	iP	Z	22 06 14	d	USCGS: 43° N, 144½° E. Near East coast of Hokkaido, Japan. H = 21 ^h 53 ^m 31 ^s * Δ = 86.0°
	eSKKS	E	22 16 51		
13 #120	eP	Z	21 21 04		USCGS: North Atlantic Ocean, about 900 miles southwest of the Azores. H = 21 ^h 14 ^m 14 ^s **. Δ P-H = 34.2°
	ePR ₁	E	21 21 58		
	eS	E-	21 26 23		
14 #121	ePR ₁	Z	16 23 04	c	USCGS: Near south coast of Indo-China. H = 16 ^h 01 ^m 07 ^s ** Δ PR ₁ - H = 136.3°
	eSKP	Z	16 23 55	d	
14 #122	eP'	Z	22 35 33	d	USCGS: 6° S, 155° E. Solomon Islands H = 23 ^h 16 ^m 42 ^s *. Δ = 119.0°
	iP'	Z	22 35 36	d	
	e(PR ₁)	Z	22 37 05	c	
	eSKS	E	22 42 24		
17 #123	iPR ₁	Z	16 21 03	c	USCGS: 30½° N, 91½° E. Eastern Tibet. H = 16 ^h 02 ^m 05 ^s *. Mag: 7¼ - 7½ Pas. Δ = 108.7°
	eSKS	N	16 27 18		
	eSKKS	N	16 28 12		
	ePS	N	16 30 23		
18 #124	iP	Z	13 16 27	c	USCGS: Central Chile - Argentina border region. H = 13 ^h 04 ^m 50 ^s * Δ P - H = 74.8°
	eS	NE	13 25 39		
	iPS	E	13 26 27		
19 #125	iP	Z	14 09 23		USCGS: 16° N, 60½° W. Leeward Is. H = 14 ^h 03 ^m 00 ^s *. Δ = 31.2°
	eSR ₁	N	14 16 05		
20 #126	iP	Z	05 54 58	d	USCGS: 16° N, 92° W. Mexico-Guatemala border. H = 05 ^h 49 ^m 28 ^s *. h about 200 km. Δ = 27.0°
	epP	Z	05 55 38	d	
	eS	NE	05 59 23		
23 #127	eP	Z	14 29 24	d	USCGS: 7° N, 82° W. Off coast of Panama. H = 14 ^h 22 ^m 33 ^s * Mag: 5½ Pas. Δ = 34.4°
27 #128	eP	Z	11 36 51	c	USCGS: 55½° N, 160° W. Alaska Peninsula. H = 11 ^h 27 ^m 54 ^s *. h about 60 km Δ = 51.4°
	ipP	Z	11 37 02	d	
	ipPR ₁	Z	11 39 04	d	

(August, 1952)

Date and Number	Phase		G.M.C.T.		Remarks
27 #129	iP eS	n n	17 ^h 06 ^m 57 ^s 17 11 26	^s	USCGS: 18 $\frac{1}{2}$ ^o N, 66 $\frac{1}{2}$ ^o W. Puerto Rico, Felt: H = 17 ^h 01 ^m 00 ^s *. h about 100 km. $\Delta = 26.2^{\circ}$
28 #130	iP eS	Z n	11 01 48 11 09 02	c	USCGS: 55 ^o N, 160 ^o W. Near south coast of Alaska, Peninsula. H = 10 ^h 52 ^m 41 ^s * $\Delta = 51.4^{\circ}$
28 #131	eP eS ePs	Z N N	13 09 07 13 19 12 13 19 58	d	USCGS: 34 ^o S, 106 ^o W. Easter Island Region. H = 12 ^h 57 ^m 04 ^s * $\Delta = 79.3^{\circ}$
28 #132	iP eSR ₁	Z N	15 28 48 15 34 32	c	USCGS: 16 ^o N, 91 $\frac{1}{2}$ ^o W. Mexico-Guatemala border. H = 15 ^h 23 ^m 15 ^s . h about 150 km. $\Delta = 26.7^{\circ}$
31 #133	eP iS	Z E	16 22 25 16 33 01	c	USCGS: 42 ^o N, 142 $\frac{1}{2}$ ^o E. Near south coast of Hokkaido, Japan. Felt: Hokkaido and northern Honshu. H = 16 ^h 09 ^m 33 ^s * $\Delta = 87.6^{\circ}$

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BULLETIN FOR SEPTEMBER, 1952

Date	Phase		G. M. C. T.		Remarks
9 #134	iP	Z	13 ^h 01 ^m 12	^s c	USCGS: 9°N, 84½°W. Near coast of Costa Rica. Felt: Panama and Costa Rica. H = 12 ^h 54 ^m 42 ^s *. Mag: 6 3/4 - 7 Pas. and Berk. Δ = 32.6°
	ePR ₂	N	13 02 25		
	e	E	13 06 24		
	eS	N	13 06 33		
11 #135	eP	Z	05 34 53	c	USCGS: 9°N, 85½°W. Near coast of Costa Rica. H = 05 ^h 28 ^m 22 ^s *. Δ = 32.6°
11 #136	eSKS	E	22 52 03		USCGS: 29°S, 177°W. Kermadec Islands H = 22 ^h 26 ^m 41 ^s *. Mat: 6½ - 7 Berk. Δ = 113.0°
	e(PS)	E	22 56 00		
21 #137	iP	Z	02 40 50.5	c	USCGS: 22½°S, 65°W. Argentina-Bolivia border. H = 02 ^h 30 ^m 30 ^s *. h about 250 km. Mag: 7¼ Pas. Δ = 66.3°
	ipP	Z	02 41 54.7	c	
	iS	NE	02 49 09		
	iPS	E	02 50 17		
	isS	NE	02 50 57		
	isSP	E	02 52 04		
24 #138	eP	Z	17 47 30.7	c	USCGS: 7°S, 75°W. Central Peru. H = 17 ^h 38 ^m 41 ^s *. Δ = 49.4°
24 #139	iP	Z	20 38 10.4		USCGS: 56½°N, 157°W. Near South coast of Alaska Peninsula. H = 20 ^h 29 ^m 30 ^s * h about 100 km. Δ = 49.7°
	epP	Z	20 38 33		
	eS	NE	20 45 13		
27 #140	iP	Z	19 17 20.8	c	USCGS: 50½°N, 157°E. Near coast of Kamchatka. H = 19 ^h 05 ^m 46 ^s *. h about 100 km. Δ = 75.2°
	ipP	Z	19 17 35.8	d	
	eS	E	19 26 51		
	esS	E	19 27 15		
30 #141	iP'	Z	13 11 10	c	USCGS: 28½°N, 102°E. Szechwan Province, China. H = 12 ^h 52 ^m 00 ^s *. Mag: 6½ Pas. Δ = 110.3°

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Two Sprengnether short-period horizontal.

BULLETIN FOR OCTOBER, 1952

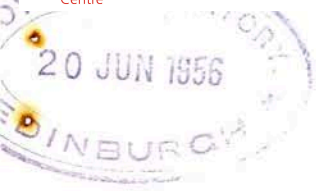


Gnwch date and Number	Phase		G.M.C.T.		Epicenter
3 #142	iP	Z	07 43 42.0		USCGS: 6½°N, 83°W. Off South coast of Panama. H = 07 ^h 36 ^m 45 ^s Mag: 6½ Berk. = 35.3 Foreshock: H = 07 ^h 30 ^m 30 ^s △
	i	Z	07 43 49.4		
	iPR ₂	Z	07 45 09		
	i(S)	N	07 49 11		
	e	E	07 51 52		
14 #143	iP	Z	22 06 12.9	c	Dominion Observatory, Bull, Ottawa, Canada. 48°05.5'N, 69°44.0'W. H = 22 ^h 03 ^m 41.3 ^s △ = 10.6° or 1181 km Phase identifications by Walter-Birkenhauer, Tables.
	iP ₄	Z	22 06 20.5	d	
	iP ₃	Z	22 06 28.5	d	
	iS	n	22 08 02.8		
	iS ₄	n	22 08 16.0		
14 #144	iP	ZN	00 02 43.2	d	USCGS: 8½°N, 83°W. Near South coast of Costa Rica. H = 23 ^h 56 ^m 03 ^s * △ = 32.7°
	ePR ₁	N	00 03 49		
	eS	N	00 08 06		
18 #145	ePR ₁	E	05 42 34		USCGS: 16°S, 168°E. New Hebrides. H = 05 ^h 22 ^m 32 ^s * Mag: 6½ - 6 3/4 Pas. △ = 116.2°
	iSKS	E	05 48 27		
	ePS	E	05 52 14		
18 #146	iP	Z	12 05 24	d	USCGS: 13°N, 46°W. Atlantic Ocean H = 11 ^h 57 ^m 36 ^s *. △ = 42.1°
	eS	N	12 11 48		
20 #147	iP	Z	01 09 31.8		USCGS: 57°W, 57°N. Off coast of Labrador. H = 01 ^h 04 ^m 35 ^s * △ = 21.9°
	iS	N	01 13 29.9		
25 #148	iP	Z	14 37 23.7	c	USCGS: 26°N, 112°W. Lower California H = 14 ^h 31 ^m 09 ^s *. Mag: 5 3/4 Pas. △ = 29.5°
	eSR ₁	N	14 43 49		
26 #149	ePPS	E	09 06 58		USCGS: 34½°N, 137°E. Near South coast of Honshu, Japan. Felt: H = 08 ^h 41 ^m 03 ^s *. h about 300 km. Mag: 5 3/4 - 6 Pas. △ = 96.3°
26 #150	i	Z	16 06 12	d	USGCS: 39°N, 143°E. Off East coast of Honshu, Japan. H = 15 ^h 46 ^m 14 ^s * △ = 90.0°
	iSKKS	E	16 10 03		
	iSR ₁	E	16 16 52		
26 #151	iP	Z	18 15 02.2	c	USCGS: 39°N, 143°E. Off East Coast of Honshu, Japan. Felt: h = 18 02 00 Mag: 6½ Pas. △ = 90.0°
	i	Z	18 15 41	d	
	iSKKS	E	18 25 51		

(October, 1952)

Gnwch Date and Number	Phase		G.M.C.T.		Epicenter
26 #152	iP ePR ₁ eSKKS	Z E E	19 32 24 19 36 09 19 42 57	d	USCGS: 38 $\frac{1}{2}$ ^o N, 143 $\frac{1}{2}$ ^o E. Off East coast of Honshu, P. Japan. Felt: H = 19 ^h 19 ^m 12 ^s *. Mag: 6 Pas. Δ = 90.0
27 #153	eP iSKKS eSR ₁	Z E E	03 30 13 03 41 00 03 47 05	d	USCGS: 39 ^o N, 143 ^o E. Off East coast of Honshu, Japan. H = 03 ^h 17 ^m 12 ^s * Mag: 6 $\frac{1}{2}$ Pas. Δ = 90.0 ^o
28 #154	iP eS	Z E	04 35 13 04 39 28	c	USCGS: 18 $\frac{1}{2}$ ^o N, 73 $\frac{1}{2}$ ^o W. Haiti, Several killed and extensive property damage. H = 04 ^h 29 ^m 51 ^s *. Δ = 23.5 ^o
28 #155	eP eSKKS	Z E	06 44 06 06 54 49	d	USCGS: 40 ^o N, 144 ^o E. Off East Coast of Honshu, Japan. H = 06 ^h 31 ^m 04 ^s * Δ = 89.0 ^o
28 #156	eSKKS	E	17 09 10		USCGS: 39 ^o N, 143 ^o E. Off East Coast of Honshu, Japan. H = 16 ^h 45 ^m 21 ^s * Δ = 90.0
29 #157	iSKS iSKKS isSKS	E E E	19 58 31 19 59 11 19 59 33		USCGS: 17 ^o S, 174 ^o W. Tonga Islands Felt: Apia. H = 19 ^h 34 ^m 14 ^s *. h about 150 km. Δ = 104.0 ^o
31	eSKKS	E	17 01 04		USCGS: 39 ^o N, 143 ^o E. Off East coast of Honshu, Japan. H = 16 ^h 37 ^m 14 ^s * Δ = 90.0 ^o

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Two Sprengnether short-period horizontal.

BULLETIN FOR NOVEMBER, 1952

Date and Number	Phase		G.M.C.T.		Remarks
4 #159	iP	Z	17 ^h 09 ^m 47.2 ^s d		USCGS: 52½°N, 159°E. Near East coast of Kamchatka. Seismic Sea wave. H = 16 58 20 Mag: 8½ Pas. 8½ Berk. Δ = 72.9°
	iS	n	17 19 26		
<u>KAMCHATKA QUAKES:</u>					
4 #160	iP	Z	18 40 26 d		USCGS: 52½°N, 160°E. H = 18h28m52s*
4 #161	iP	Z	19 52 11 d		USCGS: 52½°N, 159½°E. H = 19h40m41s*
	ipP	Z	19 52 23 c		
4 #162	iP	Z	19 52 49 c		
	ipP	Z	19 53 02 d		
4 #163	iP	Z	20 00 30 d		
4 #164	iP	Z	21 12 21 c		USCGS: 52½°N, 159½°E. H = 21h00m53s*
	ipP	Z	21 12 34 c		
4 #165	iP	Z	22 00 18 c		USCGS: 50°N, 158½°E. H = 21h52m50s*
4 #166	iP	Z	22 04 32 d		
4 #167	iP	Z	22 24 22 c		USCGS: 52°N, 161°E. H = 22h12m54s*
	ipP	Z	22 24 34 d		
4 #168	iP	Z	22 29 33 c		
4 #169	iP	Z	22 30 48 d		
	ipP	Z	22 30 58 d		
4 #170	iP	Z	22 43 40 c		
4 #171	iP	Z	22 48 53 d		
4 #172	iP	Z	23 40 42 d		USCGS: 50°N, 158°E. H = 23h28m58s*
	ipP	Z	23 40 51 c		
5 #173	iP	Z	00 01 09 d		
	ipP	Z	00 01 22 d		
5 #174	iP	Z	02 31 43 c		USCGS: 50½°N, 157°E. H = 02h19m58s*
	ipP	Z	02 31 57 c		
5 #175	iP	Z	03 41 24 c		USCGS: 51°N, 159°E. H = 03 ^h 29 ^m 44 ^s *
	ipP	Z	03 41 33 d		

(November, 1952)

Date and Number	Phase		G.M.C.t.		Remarks
5 #176	iP	Z	06 09 38	d	USCGS: 49°N, 156°E. H = 05h57m43s* Kurile Islands
	ipP	Z	06 09 50	c	
5 #177	iP	Z	07 17 48	d	
	ipP	Z	07 18 02	c	
5 #178	iP	Z	07 34 57	c	
5 #179	iP	Z	08 49 59	c	
	ipP	Z	08 50 10	d	
5 #180	iPZ		11 46 11	c	USCGS: 51½°N, 159°E. H = 11 ^h 34 ^m 37 ^s *
	ipP	Z	11 46 19		
5 #181	iP	Z	11 58 19	c	USCGS: 50°N, 157°E. H = 11h46m34s*
	ipP	Z	11 58 31	c	
5 #182	iP	Z	13 17 56		USCGS: 52°N, 159½°E. H = 13h06m24s*
5 #183	iP	Z	15 00 28	c	USCGS: 50°N, 156½°E. H = 14m48m41s*
	ipP	Z	15 00 40	d	
5 #184	iP	Z	16 53 47	c	
	ipP	Z	16 54 02	c	
5 #185	iP	Z	19 19 58	c	USCGS: 53½°N, 161½°E. H = 19h08m26s*
5 #186	iP	Z	19 46 53	c	
	ipP	Z	19 47 02	d	
5 #187	iP	Z	20 42 13	c	USCGS: 49°N, 159°E. H = 20h32m22s*
	ipP	Z	20 42 22	d	
5 #188	iP	Z	21 57 48	c	USCGS: 49½°N, 157°E. H = 21h46m00s*
	ipP	Z	21 58 02	d	
5 #189	iP	Z	22 05 53	c	
	ipP	Z	22 06 09	d	
5 #190	iP	Z	22 57 42	d	
6 #191	iP	Z	01 10 39	d	
	ipp	Z	01 10 49	c	
6 #192	iP	Z	04 06 03	c	USCGS: 50°N, 158½°E. H = 03h54m21s*
	ipP-	Z	04 06 16	d	
6 #193	iP	Z	11 08 42	d	USCGS: 52°N, 159½°E. H = 10h57m11s*
	ipP	Z	11 08 57	c	

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Date and Number	Phase	G.M.C.T.	Remarks
6 #194	iP	Z 19 57 42	c USCGS: $51\frac{1}{2}^{\circ}$ N, $159\frac{1}{2}^{\circ}$ E. H = 19h45m57s*
	ipP	Z 19 57 54	c
	is	E 20 06 57	
	isS	E 20 07 18	
7 #195	iP	n 14 19 16	USCGS: 49° N, 157° E. H = 14h08m25s*
8 #196	iP	Z 19 45 15	c USCGS: $48\frac{1}{2}^{\circ}$ N, 156° E. H = 19h33m18s * Kurile Islands
8 #197	iP	Z 22 28 19	d
	ipP	Z 22 28 36	d
9 #198	iP	Z 00 04 43	d
	ipP	Z 00 04 55	c
9 #199	ip	Z 00 34 13	c
	ipP	Z 00 34 27	d
9 #200	ip	Z 01 29 09	c USCGS: $52\frac{1}{2}^{\circ}$ N, 160° E. H = 01h17m39s*
9 #201	iP	Z 01 50 52	c
9 #202	eP	Z 04 46 55	d USCGS: 49° N, 158° E. H = 04h35m05s*
9 #203	iP	Z 05 17 53	c USCGS: $53\frac{1}{2}^{\circ}$ N, $159\frac{1}{2}^{\circ}$ E. H = 05h06m29s*
9 #204	iP	Z 05 44 05	c USCGS: $49\frac{1}{2}^{\circ}$ N, $156\frac{1}{2}^{\circ}$ E. H = 05h32m 15s*
	ipP	Z 05 44 22	c
9 #205	iP	Z 06 08 44	d USCGS: 49° N, 157° E. H = 05h56m54s*
	ipP	Z 06 08 57	d
9 #206	iP	Z 15 34 22	d
	ipP	Z 15 34 42	d
9 #207	iP	Z 15 43 28	c USCGS: 45° N, $151\frac{1}{2}^{\circ}$ E. Kurile Islands H = 15h31m06s* $\Delta = 82.0^{\circ}$
	ipP	Z 15 43 38	d
9 #208	iP	Z 15 45 12	d
	ipP	Z- 15 45 27	
10 #209	eP	Z 00 48 37	d
	ipP	Z 00 48 50	c
10 #210	iP	Z 01 06 44	d USCGS: 50° N, $158\frac{1}{2}^{\circ}$ E. H = 00h53m00s*
10 #211	iP	Z 20 39 13	d Δ S - P = 58.3°
	eS	E 20 47 21	
10 #212	iP	Z 22 05 38	c
	ipP	Z 22 05 49	

(November, 1952)

Date and Number	Phase	G.M.C.T.	Remarks
11 #213	iP	Z 01 21 44 c	
	ipP	Z 01 21 56 d	
11 #214	iP	Z 05 38 37 d	
12 #215	eP	Z 12 50 12 c	
	epP	Z 12 50 26 d	
12 #216	eP	Z 20 09 09 c	
13 #217	iP	Z 08 10 30.1 c	USCGS: 50 $\frac{1}{2}$ $^{\circ}$ N, 157 $^{\circ}$ E. Near south coast of Kamchatka. H = 07 58 45
	iS	E 08 20 09	$\Delta = 75.7^{\circ}$
	ipS	E 08 20 58	
13 #218	eP	Z 16 57 42.9 c	
	iP	Z 16 57 47	
13 #219	iP	Z 22 37 17.8 d	USCGS: 50 $^{\circ}$ N, 158 $^{\circ}$ E. Off south coast of Kamchatka. H = 22h25m34s*
	ipP	Z 22 37 28.4 d	$\Delta = 75.2^{\circ}$
	eS-	E 22 47 51	
14 #220	iP	Z 05 21 16 c	USCGS: 20 $\frac{1}{2}$ $^{\circ}$ N, 73 $^{\circ}$ W. Windward Passage H = 05h16m00s*. $\Delta = 22.0^{\circ}$
16 #221	iP	Z 01 59 40.6 d	USCGS: 50 $\frac{1}{2}$ $^{\circ}$ N, 157 $^{\circ}$ E. Near south coast of Kamchatka. H = 01h47m54s* $\Delta = 75.5^{\circ}$
18 #222	iP	Z 08 25 16.4 c	USCGS: 49 $\frac{1}{2}$ $^{\circ}$ N, 156 $\frac{1}{2}$ $^{\circ}$ E. Off south coast of Kamchatka. H = 08h13m25s* $\Delta = 75.8^{\circ}$
	ipP	Z 08 25 28.4 c	
18 #223	iP	Z 08 54 32.3 c	USCGS: 50 $\frac{1}{2}$ $^{\circ}$ N, 156 $^{\circ}$ E. Off south coast of Kamchatka. H = 08h42m30s* $\Delta = 75.6^{\circ}$
20 #224	iP	Z 15 43 22.0	USCGS: 12 $\frac{1}{2}$ $^{\circ}$ N, 88 $^{\circ}$ W. Off coast of Nicaragua. H = 15h37m17s*. h about 60 km
	ipP	Z 15 43 35.0	Mag: 6 $\frac{1}{4}$ Pas. 6 3/4-7 Berk. $\Delta = 29.3^{\circ}$
	iPE ₂	Z 15 44 25	
	iS	N 15 48 38	
20 #225	iP	Z 21 46 55 d	
21 #226	iP	Z 02 39 43.7 d	
	ipP	Z 02 39 54.7 d	
22 #227	iS	E 07 58 00	USCGS: 35.8 $^{\circ}$ N, 121.1 $^{\circ}$ W. San Luis Obispo County, California. Slight property damage. H = 07h46m37s. Mag: 6 Pas. 6.1 Berk. $\Delta = 31.1^{\circ}$
	eSR	E 07 59 43	

(November, 1952)

Date and Number	Phase	G.M.C.T.	Remarks
26 #228	eP	Z 13 ^h 36 ^m 43.1 ^s	d USCGS: 53°N, 160°E. Near East coast c of Kamchatka. H = 13h25m18s. Δ = 72.2°
	ipP	Z 13 36 52.5	
28 #229	ip	Z 08 17 08	d USCGS: 52°N, 160°E. Near East coast of Kamchatka. H = 08h05m30s*. Δ = 72.9°
29 #230	ip	Z 08 34 07	d USCGS: 53°N, 160°E. Near East coast d of Kamchatka. H = 08h22m34s*. Mag 7, Pas., 7¼ Berk. Δ = 72.2°
	ipP	Z 08 34 14	
	iS	E 08 43 26	
	iPS	E 08 44 09	
29 #231	ip	Z 23 55 10	c USCGS: 56°N, 155°W. Off south coast of Alaska Peninsula. H = 23h46m25s Mag: 6 3/4 Pas., 7-7¼ Berk. Δ = 48.7°
	iS	N 00 02 02	
30 #232	ip	Z 19 40 16	c USCGS: 52½°N, 159°E. Near east coast d of Kamchatka. H = 19h28m44s* Δ = 72.8°
	ipP	Z 19 40 21	
	eS	N 19 49 34	
	iS	E 19 49 35	

EJW:ard

CLEVELAND

SEISMOLOGICAL OBSERVATORY

JOHN CARROLL UNIVERSITY, CLEVELAND 18, OHIO, U. S. A.

41° 29' 27.90" North, 81° 31' 52.22" West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

BULLETIN FOR DECEMBER, 1952



Gnwch Date and Number	Phase	G.M.C.T.	Epicenter & Remarks
1 No. 233	iP	Z 20 ^h 34 ^m 20 ^s	c
4 No. 234	iP iS e	Z 04 02 03.0 E 04 10 26 E 04 11 23	c USCGS: 52°N, 178°E. Rat Islands, Aleutian Islands. H = 03 ^h 51 ^m 25 ^s * h about 100 km. Mag: 6 Berk. $\Delta = 64.7^\circ$
4 No. 235	iP	Z 11 01 23.7	c USCGS: 49°N, 157°E. Off South coast of Kamchatka. H = 10 ^h 49 ^m 35 ^s *. $\Delta = 76.0^\circ$
6 No. 236	ePR ₁ eS ePS e	E 11 01 34 N 11 09 32 E 11 11 18 NE 11 11 41	USCGS: 8°S, 157°E. Solomon Islands. H = 10 ^h 41 ^m 14 ^s *. Mag: 7 Pas., 7 $\frac{1}{4}$ -7 $\frac{1}{2}$ Berkeley. $\Delta = 119.1^\circ$
7 No. 237	iP iS	Z 01 01 07.0 E 01 09 52	c USCGS: 53°N, 172 $\frac{1}{2}$ °E. Near Islands, Aleutian Islands. H = 00 ^h 50 ^m 12 ^s * Mag: 6 $\frac{1}{4}$ Pas. $\Delta = 66.8^\circ$
7 No. 238	eP	Z 16 45 17	c USCGS: 51 $\frac{1}{2}$ °N, 159°E. Off Southeast coast of Kamchatka. H = 16 ^h 33 ^m 10 ^s * $\Delta = 73.9^\circ$
10 No. 239	iP e(PR ₁) iS i(SR ₁)	Z 06 06 36.9 N 06 08 35 N 06 13 29 N 06 17 03	d USCGS: 71°N, 7°W. Jan Mayen Islands region. H = 05 ^h 58 ^m 06 ^s $\Delta = 46.5^\circ$
11 No. 240	iP iS isS ePS epPS	Z 09 10 10.8 N 09 19 54 N 09 20 20 E 09 20 33 N 09 20 49	d USCGS: 49°N, 155°E. Kurile Islands H = 08 ^h 58 ^m 18 ^s *. h about 60 km. Mag: 6 Pas. $\Delta = 76.8^\circ$
17 No. 241	iP iS iS e	Z 23 16 00.6 E 23 25 53 Z 23 25 53.2 NE 23 26 10	c USCGS: 34 $\frac{1}{2}$ °N, 24°E. Near south coast of Crete. H = 23 ^h 03 ^m 58 ^s *. Mag: 6 $\frac{3}{4}$ Pas. $\Delta = 78.4^\circ$

(December, 1952)

Gnwch Date and Number	Phase	G.M.C.T.	Epicenter
18 No. 242	iP eS	Z 09 ^h 31 ^m 47.8 ^s E 09 40 58	C USCGS: 53 $\frac{1}{2}$ ^o N, 162 ^o E. Off East coast of Kamchatka. H = 09 ^h 20 ^m 28 ^s *. $\Delta = 70.8^{\circ}$
20 No. 243	iP ipP	Z 04 17 12 Z 04 17 25	c USCGS: 53 ^o N, 160 ^o E. Near East Coast of Kamchatka. H = 04 ^h 05 ^m 48 ^s *. $\Delta = 72.0^{\circ}$
22 No. 244	iP ipP iS	Z 22 36 02.8 Z 22 36 16.4 N 22 45 14	d USCGS: 54 ^o N, 160 $\frac{1}{2}$ ^o E. Near East coast of Kamchatka. H = 22 ^h 24 ^m 42 ^s *. Mag: 6 $\frac{3}{4}$ Pas. $\Delta = 71.1^{\circ}$
24 No. 245	iP'	Z 08 52 20	d USCGS: 5 $\frac{1}{2}$ ^o S, 151 $\frac{1}{2}$ ^o E. New Britain. H = 08 ^h 33 ^m 25 ^s *. $\Delta = 121.4^{\circ}$
24 No. 246	iP ipP	Z 16 01 19 Z 16 01 35	c USCGS: 50 ^o N, 155 $\frac{1}{2}$ ^o E. Off South coast of Kamchatka. H = 15 ^h 49 ^m 27 ^s *. $\Delta = 75.9^{\circ}$
24 No. 247	iP' iPR ₁ ePS	Z 18 58 40 Z 19 00 03 E 19 09 46	c USCGS: 5 $\frac{1}{2}$ ^o S, 151 $\frac{1}{2}$ ^o E. New Britain. H = 18 ^h 39 ^m 33 ^s *. Mag: 7 Pas. $\Delta = 121.4^{\circ}$
25 No. 248	ePS	E 02 58 54	USCGS: 5 $\frac{1}{2}$ ^o S, 151 $\frac{1}{2}$ ^o E. New Britain. H = 02 ^h 28 ^m 39 ^s *. $\Delta = 121.4^{\circ}$
25 No. 249	iP	Z 04 27 53	d
27 No. 250	iP	Z 01 37 22.8	c USCGS: 53 ^o N, 160 ^o E. Near East coast of Kamchatka. H = 01 ^h 25 ^m 54 ^s * $\Delta = 72.0^{\circ}$
28 No. 251	eS eSR ₁	E 05 11 36 E 05 15 13	USCGS: 65 $\frac{1}{2}$ ^o N, 167 $\frac{1}{2}$ ^o W. Near west coast of Seward Peninsula, Alaska. H = 04 ^h 55 ^m 06 ^s *. $\Delta = 52.0^{\circ}$
28 No. 252	eP' eSKS	Z 15 20 23 E 15 27 19	d USCGS: 6 ^o N, 127 ^o E. Off East coast of Mindanao P.I. Felt: Davao. H = 15 ^h 01 ^m 19 ^s *. $\Delta = 127.0^{\circ}$
29 No. 253	iP	Z 02 21 00.9	c USCGS: 49 ^o N, 158 ^o E. Off South coast of Kamchatka. H = 02 ^h 09 ^m 13 ^s *. $\Delta = 75.9^{\circ}$
30 No. 254	iP - iS e(SR ₁)	Z 12 13 26 n 12 18 38.8 E 12 20 25	c USCGS: 10 $\frac{1}{2}$ ^o N, 84 ^o W. Costa Rica. Felt. H = 12 ^h 07 ^m 02 ^s *. $\Delta = 31.0^{\circ}$

(December, 1952)



Gnwch Date and Number	Phase		G.M.C.T.		Epicenter
31 No. 255	iP ipP	Z Z	01 45 22 01 45 36	d c	USCGS: 12°N, 59°W. Atlantic Ocean, South of Barbados. H = 01 ^h 38 ^m 14 ^s * Δ = 35.6°
31 No. 256	iP eS	Z N	21 55 45 22 05 37	d	USCGS: 49°N, 156°E. Kurile Islands H = 21 ^h 43 ^m 49 ^s *. Δ = 76.4°

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