

GOVERNMENT OF INDIA  
METEOROLOGICAL DEPARTMENT.

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S E I S M O L O G I C A L                      B U L L E T I N.

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Published under the direction of  
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Director General of Observatories.

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I N T R O D U C T I O N .

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind cooperation of the Surveyor-General of India, the Curator of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, Poona.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of Observatory.
Bombay	18°54'N.	72°49'E	6	Deccan Trap	Director
Calcutta	22°32'N	88°22'E	(i)7 (ii)6	Alluvium	Director.
Colombo	06°54'N	79°52'E	7	Beach-sand	Superintendent.
Dehra Dun	30°19'N.	78°03'E	682	Gravel	Director.
Hyderabad	17°26'N	78°27'E	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	Rock	Director
New Delhi	28°35'N	77°12'E	207	Massive Quartzite	Dy. Director General of Observatories (I. & S.)
Poona	18°32'N	73°51'E	560	Deccan-Trap.	Dy. Director General of Observatories (C&G)

TABLE II.

Instruments and their constants.

Station	Instrument.	Compt.	Period in Secs.	Static magnification.	Damping Ratio.	Paper speed mm/min.
Bombay	Milne-Shaw	N	12	250	24 : 1	8.0
					From 1st to 13th 13 : 1	
					From 14th to 31st.	
	Milne-Shaw	E	12	350	14 : 1	8.0
Calcutta	Omori-Ewing	N	15	32	-	25.4
	Omori-Ewing	E	16	30	-	25.4
	Milne-Shaw	E	12	250	20 : 1	8.0
Colombo	Milne-Shaw	E	12	250	20 : 1	8.0
Dehra Dun	Omori	N	30	12	-	-
Hyderabad	Milne-Shaw	E	12	250	20 : 1	8.0
	Milne-Shaw	N	12	250	20 : 1	8.0
Kodaikanal	Milne-Shaw	E	10	250	20 : 1	8.0
Poona	Milne-Shaw	N	12	250	20 : 1	8.0
	Wood-Anderson	E	4	1100	20 : 1	16.0
	Wood-Anderson	N	2	1900	30 : 1	60.0



DATE	STATION	COMPT.	PHASE	G.M.T. h.m.s.	△ km.	REMARKS
<u>January 1949</u>						
1	Kodaikanal	E	e	19 40 02		Tremor
	Poona	E,N	i	19 41 25		
			e	19 45 26		
		N	e	19 46 30		
	Hyderabad	N	eP	19 41 34	2590	
			S	19 45 40		
			L	19 47 36		
			M	19 48 30		Per.=15 secs. μ=4
	Bombay	N,E	e	19 45 30		Feeble
2	Epicentre 4°N, 97°E; in the North Sumatra. 0 = 04 h.44 m.20s (Poona)					
	Colombo	E	P	04 48 -		
			S	04 52 -		
			L	04 55 -		
			M	04 55 -		Trace overlapping
	Kodaikanal	E	iP	04 48 55	2200	Slight
			iS	04 52 32		
			SS	04 53 02		
			L	04 54 22		
			M	04 56 17		Per.=15 secs. μ=4
	Calcutta	E	eP	04 48 57	2253	Slight
			ePP?	04 49 56		
			eS	04 52 43		
			ScS	05 02 14		
	Bombay	E,N	P	04 49 07	2335	Slight
			S	04 52 57		
			SS	04 57 52		
	Hyderabad	N	P	04 49 13	2445	
			S	04 53 12		
			SS	54 14		
			M	04 55 49		Per.=16 secs. μ=9
	Poona	N,E	eP	04 49 59	2358	Slight
			iS	04 54 26		
			SS	04 55 34		
			SSS	04 55 55		
			M	04 58 30		Per.=23 secs. μ=30
2	Epicentre 25°N, 147°E, 0=08h. 49m. 51s h = 100 ± kms. (J.S.A.)					
	Poona	E	iP	09 00 02	7110	h= 100 ± kms. 0 = 08h.49m.41s. (Poona)
			pP	09 00 23		
			iS	09 03 26		
			sS	09 09 19		
			i( ;	09 09 31		
2	Epicentre 25.5°N, 64°E, on the coast of Baluchistan. 0=12h.50 m.30s. (Poona)					
	Poona	N,E	iP	12 53 04	1165	Slight.
			P*	12 53 37		
			Pg	12 54 05		
		E	iS	12 55 00		
		N	iS	12 55 03		
		N,E	S*	12 55 25		
			SG	12 55 57		
	Hyderabad	N	P	12 54 04	1890	
			S	12 57 09		
			SS	12 57 43		
			M	13 01 22		Per.=12 secs. μ=55

DATE	STATION	COMPT.	PHASE	G.M.T. h.m.s.	△ Km.	REMARKS
January 1949						
2	Contd. ✓ Kodaikanal	E	iP	12 55 02	2300	
			iS	12 58 45		
			L	13 00 35		
			M	13 02 30		Per.=15 secs. $\mu=15$ .
	Calcutta	E	iP	12 55 24	2610	Moderate. First movement East.
			iPP	12 55 56		
			iS	12 59 35		
			iSS	13 00 23		
			M	13 03 01		
	Colombo	E	M <sub>n</sub>	13 06 16		
			P <sub>n</sub>	12 55 25		
			L	13 05 03		
	Dehra Dun	N	M	13 09 38		
			e	12 58 04		
			M	13 00 06		
3	Calcutta	E	e	09 41 51		Slight, Near.
			i	09 42 41		
3	✓ Hyderabad	N	eP	18 16 37	3460	
			S	18 21 43		
			L	18 26 15		
			M	18 28 02		Per.=14secs. $\mu=4$
	Poona	N	i	18 21 32		
			e	18 24 41		
			e	18 26 15		
			e	18 27 30		
	Bombay	E	e	19 21 33		Feeble
4	Calcutta	E	e	02 34 12		Tremor
			e	02 40 22		
	Bombay	N	e	02 40 48		Feeble
		E	e	02 47 03		
	Poona	N,E	e	02 48 05		Feeble surface waves
			Earlier Phases lost while changing paper.			
6	Bombay	E	e	02 27 -		Feeble surface wave waves.
7	Poona	N,E	e(P)	17 32 37	8510	Slight. Phases masked by micro-seisms.
			i	17 33 12		
			e(S)	17 42 24		
	Bombay	E	eP	17 32 46	8600	Slight.
		N	e	17 33 08		
		N,E	eS	17 42 38		
		E	L	17 58 16		
	Hyderabad	N	e	17 33 31		
			S	17 41 34		
	Calcutta	E	e	17 40 04		Tremor
			e	17 42 26		
7	Calcutta	E	e	18 14 48		Tremor
9	Bombay	E	eP	16 44 09		Feeble
	Poona	N	i	16 47 26		
	Calcutta	E	e	16 48 58		Tremor
			e	16 53 23		
	✓ Hyderabad	N	M	17 01 37		Per.=11 Secs. $\mu=2$

DATE	STATION	COMPT.	PHASE	G.M.T. h.m.s.	△ Km.	REMARKS
January 1949.						
13	Poona	E	eP	09 05 35	3445	h=180 kms.±
			pP	09 06 11		
			sP	09 06 30		
			PcP(?)	09 08 02		
			iS	09 10 34		
			sS	09 11 38		
			ScS(?)	09 15 31		
	Bombay	E	eP	09 05 45		Slight
			i	09 10 43		
14	Calcutta	E	e	02 31 49		Slight distant,
			eS?	02 35 59		
	✓ Bombay	N	P	Movement not clear.		Slight.
		E	eP	02 32 50		
		N	M	02 45 35		Per.=11 secs. $\mu=2$
		E	M	02 47 13		Per.=13 secs. $\mu=3$
		N	M	02 48 -		Slight
	Poona		Other phases lost while changing chart.			
14	Bombay	N,E	e	16 09 06		Feeble
	Poona	N,E	e	16 09 18		Slight. Other phases masked by micro-seisms.
	Calcutta	E	e	16 11 48		Slight, distant.
			Mn	16 32 28		
18	Hyderabad	N	P	12 28 17	2600	
			PP	12 28 43		
			S	12 32 24		
			L	12 34 14		Per.=15 secs. $\mu=3$
			M	12 35 20		
				13 52 29		Tremor
19	Calcutta	E	e	13 57 29		
			e	14 03 07		Per.=14 secs. $\mu=3$
	Hyderabad	N	M	14 03 07		
	Poona	E	e	14 46 34		
19	Epicentre 25.5°N, 121°E, North of Formosa Island. O=15h.0.3m(B.C.I.S.) O=15h.00m.07s. (Poona)					
	Calcutta	E	eP	15 06 20	3335	Moderate.
			PP	15 07 14		
			eS	15 11 18		
			iSS	15 14 16		
			M	15 18 46		Per.=15 secs. $\mu=75$
			Mn	15 21 44		
	Poona	E	eP	15 08 22	4945	
			eP	15 08 24		
			i	15 08 52		
			PP	15 10 10		
			PcP(?)	15 10 32		
			eS	15 14 58		
		N	eS	15 15 00		
			SS	15 17 46		
			ScS(?)	15 18 17		
		E	LQ	15 18 41		
		N	LR	15 21 04		
			M	15 25 34		Per.=20 secs. $\mu=2$
			eP	15 08 27	5035	Moderate
	Bombay	E	P	Movement not clear.		
		N,E	PP	15 10 20		
			eS	15 15 08		Per.=15 secs. $\mu=11$
		N	M	15 28 36		Per.=16 secs. $\mu=6$
		E	M	15 29 39		

DATE	STATION	COMPT.	PHASE	G.M.T. h.m.s.	Δ	REMARKS.
January 1949 19 (Contd.)						
	Hyderabad	N	eP	15 07 28	4220	
			PP	16 08 49		
			S	15 13 21		
			SS	15 16 31		
			L	15 19 25		
			M	15 23 20		Per.=15 secs. μ=10
	Colombo	E	i	15 08 40		
			M	15 29 22		
	Kodaikanal Overlapping of lines.					
20	Poona	E	i	00 42 32		
20	Poona	E	i	03 40 17		
			e	03 41 46		
			i	03 42 31		
20	Epicentre 35.6°N, 134.6°E (C.M.O.) O=13h.25.0m (B.C.I.S.)					
	Bombay	N,E	e	13 39 -		Feeble
		N	e	13 42 36		
		E	M	14 01 34		Per.=14 secs. μ=1
		N	M	14 02 19		Per.=13 secs. μ=1
	Calcutta	E	e	13 42 07		Tremor
			Mn	13 54 40		
	Poona	N	Mn	13 57 30		Feeble surface wave.
21	Kodaikanal	E	e	17 34 04		Slight
22	Poona	E	eP	03 53 16		
			i	03 55 37		
			S(?)	03 55 58		
			SS(?)	03 26 08		
	Bombay	N,E	e	03 54 06		Feeble
			e	03 55 30		
		N	M	04 02 17		Per.=8 secs. μ=1
	Calcutta	E	eP	03 57 24	690	Slight
			eS	03 58 36		
			eS*	03 58 59		
			iS	03 59 16		
	Hyderabad	N	S	03 57 29		
			M	03 59 25		Per.=8 secs. μ=4
	Kodaikanal	E	e	03 58 02		Slight
23	Epicentre 10.5°S, 96°E, near Cocos Island in the Indian Ocean O=06h.30m.55s. (Poona)					
						O=06h.31m.15s. (BCIS)
						O=06h.31.2m. (U.S.C.G.S.)
						O=06h.31m.34s. (J.S.A.)
	8°S, 95°E	h = 100 kms ±				
	9°S, 94°E	h = 100 kms ±				
	7°S, 96°E	h = 200 kms ±				
	Kodaikanal	E	iP	06 36 37	3000	Moderate
			iS	06 41 13		
			SS	06 42 15		
			L	06 45 12		
			Mn	06 46 02		Per.=10.5secs. μ=13
	Colombo	E	P	06(37)-		
			S	06(41)-		
			M	06 44 -		
	Hyderabad	N	P	06 37 34	3660	
			PP	06 38 36		
			S	06 42 52		
			SS	06 44 12		
			L	06 46 45		
			M	06 49 53		Per.=18 secs. μ=79

DATE	STATION	COMPT.	PHASE	G.M.T. h.m.s.	Δ	REMARKS.
January 1949 23 (Contd.)						
	Poona	N,E	1P	06 37 59	4011	Moderate
		E	PP	06 39 23		
		N	PP	06 39 19		
		E	PcP	06 40 20		
		N	PcP	06 40 52		
		E	iS	06 43 39		
		N	iS	06 43 38		
		E	SS	06 46 13		
		N	L	06 48 13		
		E	Mn	06 51 30		Per.=17 secs. μ=213
	Calcutta	E	eP	06 38 01	4000	Great
			iS	06 43 40		
			iSS	06 45 26		
			L	06 46 46		
			M	06 49 46		
			Mn	06 59 31		
	Bombay	N	1P)	06 38 09	4080	Moderate
		E	eP)			
		N	PP	06 39 20		
		E	PP	06 39 27		
		N	i	06 39 44		
		N,E	iS	06 43 53		
			iSS	06 46 42		
		N	L	06 48 23		
			M	06 51 30		Per.=16secs. μ=22
	Dehra Dun	N	e	06 44 45		
			e	06 52 15		
			M <sub>1</sub>	06 53 45		
			M <sub>2</sub>	06 57 50		
24	Bombay	N,E	e	01 22 57		Feeble
			e	01 27 00		
24	Epicentre 22°S, 176°W, O=09h.15.7m. h=100 kms.± (U.S.C.G.S.) 22.9°S, 176°W; O=09h.15m.51s. h=150kms.± (J.S.A.) 23°S, 176°W; O=09h.15m.39s. h=100kms.± (B.C.I.S.)					
	Calcutta	E	e	09 33 20		Slight, distant.
			iS(?)	09 40 08		
	Kodaikanal	E	e	09 34 21		Feeble
	Bombay	E	e	09 35 21		
		N	e)	09 41 03		
		E	i)			
		N,E	e	09 45 13		
	Poona	E	e	09 38 00		
			i	09 40 53		
			i	09 41 46		
			S	09 40 35		
			M	10 19 37		Per.=20 secs. μ=7
26	Poona	E	e	00 11 23		
			e	00 12 05		
27	Bombay	N	e	05 58 56		Feeble surface wave
		E	e	06 02 -		
	Hyderabad	N	M	06 09 28		Per.=16 secs. u=4
27	Epicentre: 3°S, 152°E; O=07h.18.2m. (U.S.C.G.S. & B.C.I.S.) 4°S, 151°E; O=07h.18m.10s. (J.S.A.)					
	Poona	E	e	07 30 00		

DATE	STATION	COMPT.	PHASE	G.M.T. h.m.s.	Δ	REMARKS
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3333 4444 January 1949 27 (Contd)					Km.	
	Hyderabad	N	e	07 30 23		
			S	07 39 21		
			L	07 49 45		
			M	07 54 46		
	Bombay	E	eP	07 30 24	8745	Per.=16 secs, μ=4 Slight
		N	e	07 30 41		
		N,E	eS	07 40 23		
		E	L	07 57 21		
		N	L	07 58 17		
	Calcutta	E	e	07 37 42		Slight, distant.

27 Epicentre: 55°N, 164°E O=11h.00.0m.(U.S.C.G.S.) & B.C.I.S.)  
 53°.1N, 162°.3E O=11h.00m.13s. h=150 kms ±(J.S.A.)

	Poona	E	e	11 11 35		
			e	11 21 14		
	Calcutta	E	e	11 19 21		Slight, distant.
			Mn	11 41 57		
	Bombay	E	e	11 19 31		
		L	e	11 21 12		
			M	11 47 30		Per.=15 secs, μ=3
		E	M	11 48 09		Per.=17 secs, μ=3
	Hyderabad	N	e	11 20 54		
			M	11 41 57		Per.=12 secs, μ=5

27. After shock of the shock at 07h.18m. on 27th  
 (U.S.C.G.S.)

	Poona	E	e	15 10 41		
	Bombay	E	eP	15 10 54	8755	Slight.
		N,E	eS	15 20 54		
	Calcutta	E	e	15 11 07		Slight, distant.
			e	15 18 20		
27	Calcutta	E	e	16 45 43		Slight, distant
			e	17 45 23		
28	Hyderabad	N	M	08 26 49		Per.=15 secs, μ=4

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