

KODAIKANAL SOLAR, GEOMAGNETIC AND IONOSPHERIC DATA  
JULY - SEPTEMBER 1953

Curves showing (a) Kodaikanal daily relative sunspot numbers, (b) daily areas of calcium prominences and (c) daily areas of H-alpha dark markings are given on page 76. Tables 1 to 4 below summarise the data on solar and geomagnetic phenomena. The hourly median values of critical frequency and virtual height for the ionospheric layers are given in Table 5. A diagram showing the times of rising and setting of the sun and planets at Kodaikanal for 1954 is given in Plate facing page 76.

TABLE 1  
Prominent sunspot groups

Kodaikanal Serial No. of spotgroup	Mean latitude	Date of central meridian passage	Total area (millionths of the Sun's visible hemisphere) at central meridian passage
9948	11° N	August 17	380

TABLE 2  
Solar Flares

Date	Time in GMT			Co-ordinates		Estimated maximum intensity	Maximum width of H-alpha line observed
	Beg.	Max.	End.	Mean latitude	Mean longitude		
	<i>h m</i>	<i>h m</i>	<i>h m</i>				A
August 17	03 32	—	—	7° N	2° E	1	1.4



TABLE 5

## Ionospheric data

(Median values)

Beginning from January 1952, systematic ionospheric observations are being made at Kodaikanal with the Automatic Multi-frequency Ionosphere Recorder (Type C-3) made by the National Bureau of Standards, U.S.A. The general electrical characteristics of the instrument are given below :

- (a) Supply voltage—90 to 260 volts AC single phase  
 (b) Supply frequency—50 to 60 cps  
 (c) Power load—approximately 30 amperes at 115 volts  
 (d) Pulse recurrence frequency—from 10 to 90 pps  
 (e) Frequency sweep time—7½, 15 or 30 seconds and 30, 60 or 120 seconds  
 (f) Frequency sweep range—1 to 25 megacycles  
 (g) Frequency sweep interval—5, 15, 30 or 60 minutes  
 (h) Height ranges—0-500, 0-1000, 0-4000 kilometres  
 (i) Peak-pulse power—approximately 10 kilowatts

The meanings of the symbols are as follows—

- (1) foE .. Ordinary-wave critical frequency for the E layer  
 (2) foF1 .. Ordinary-wave critical frequency for the F1 layer  
 (3) foF2 .. Ordinary-wave critical frequency for the F2 layer  
 (4) h'E .. Minimum virtual height on the ordinary-wave branch for the E layer  
 (5) h'F1 .. Minimum virtual height on the ordinary-wave branch for the F1 layer  
 (6) h'F2 .. Minimum virtual height on the ordinary-wave branch for the F2 layer  
 (7) fEs .. Highest frequency on which echoes of the sporadic type are observed from the lower part of the E layer  
 (8) (M3000)F2 Maximum usable frequency factor for a path of 3000 km for transmission by the F2 layer

Kodaikanal (10.2° N 77.5° E)		July 1953						
Time (hrs)	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000) F2	
07	280	6.2	220		105	2.5	6.8	3.2
08	320	6.8	200	4.0	105		8.8	2.9
09	355	6.9	200	4.2			10.0	2.6
10	385	6.5	190	4.3			11.0	2.5
11	400	6.4	185	4.4			11.6	2.5
12	400	6.4	185	4.4			11.6	2.5
13	400	6.4	185	4.3			11.4	2.5
14	390	6.7	180	4.2			11.0	2.6
15	355	7.2	200	4.1	105		9.6	2.7
16	320	7.4	205		105	2.7	8.0	2.8
17	285	8.1	220		115	2.4	7.7	3.0

Time : 75.0° E

Sweep : 1.0 Mc. to 25.0 Mc. in 30 seconds

		August 1953						
07	275	6.3	220		110	2.5	6.8	3.2
08	305	7.1	200	4.1	105	2.9	8.4	2.8
09	360	6.6	190	4.3	105		9.8	2.6
10	375	6.4	180	4.3			11.0	2.7
11	380	6.7	180	4.4			11.4	2.6
12	380	6.9	185	4.4	105		11.4	2.6
13	375	7.1	190	4.4	105	3.5	11.2	2.6
14	360	7.3	190	4.2	105	3.2	10.6	2.7
15	330	8.0	200	4.2	105		9.2	2.7
16	305	8.4	200		110	2.8	8.8	2.8
17	280	8.7	200		115	2.4	7.0	3.0

Time : 75.0° E

Sweep : 1.0 Mc. to 25.0 Mc. in 30 seconds

		September 1953						
07	260	7.1	220		110	2.5	5.8	3.3
08	300	7.8	200		105	2.9	8.0	2.9
09	320	7.5	190		105		9.4	2.7
10	350	7.1	180	4.4			11.0	2.6
11	355	7.3	180	4.5			11.4	2.6
12	355	7.6	180	4.5	105	3.5	11.1	2.6
13	345	8.0	190	4.4	105	3.4	10.6	2.7
14	330	9.0	195		105	3.2	9.6	2.8
15	305	9.5	200		105	3.0	7.9	2.9
16	285	10.3	220		115	2.7	7.0	3.0
17	245	10.4	225		120	2.2	6.0	3.1

Time : 75.0° E

Sweep : 1.0 Mc. to 25.0 Mc. in 30 seconds

## MAGNETIC OBSERVATORY, ALIBAG (BOMBAY)

## Three-hourly indices of Geomagnetic Activity

(Scale values of variometers in  $\gamma$ /mm:

(D=11.3 ; H = 4.4 ; Z = 2.5)

(K9=300 $\gamma$ )

Green- wich day	JULY 1953				AUGUST 1953				SEPTEMBER 1953			
	K-indices	Sum	Character of the day*		K-indices	Sum	Character of the day*		K-indices	Sum	Character of the day*	
1	2244	4222	22	Sa	2122	2332	17	S	2333	3232	21	Sa
2	3443	2322	23	Sa	2222	2131	15	S	3333	2432	23	Sa
3	2223	2221	16	S	1121	2131	12	S	2223	2545	25	M
4	2224	2232	19	Sa	2122	3231	16	S	5434	4453	32	M
5	2323	2221	17	S	1211	1132	12	S	4442	3232	24	Sa
6	2222	2113	15	S	2122	1322	15	S	1242	3132	18	Sa
7	2332	2323	20	Sa	2222	2121	14	S	1324	3311	18	Sa
8	2122	1232	15	S	2221	1122	13	Ca	2132	1220	13	S
9	2222	2332	18	Sa	2223	3232	19	S	1221	1111	10	Ca
10	1321	1111	11	S	2243	3322	21	S	1222	3223	17	S
11	1122	1111	10	Ca	2323	2242	20	Sa	4333	3222	22	S
12	1222	3244	20	S	3433	4543	29	Sa	2233	3122	18	S
13	2344	2322	22	Sa	2242	4342	23	Sa	2232	1131	15	Ca
14	2222	2441	19	Sa	2423	2332	21	S	2221	1111	11	Ca
15	2332	3222	19	Sa	2222	2242	18	S	1433	4543	27	M
16	1111	1010	6	Ca	2223	3221	17	S	3333	3342	24	Sa
17	0221	2111	10	Ca	1111	2111	9	Ca	2222	2242	18	S
18	1121	2211	11	S	1121	2211	11	Ca	1222	1345	20	Sa
19	2212	2112	13	S	2211	2211	12	Ca	6445	5654	39	Ma
20	2223	2101	13	S	1111	1111	8	Ca	2322	4454	26	Sa
21	1221	1112	11	Ca	2211	1100	8	Ca	2233	2422	20	Sa
22	0022	1122	10	Ca	2112	1221	12	Ca	3332	2243	22	Sa
23	2245	5535	31	M	3346	5455	35	Ma	2345	4542	29	M
24	4223	2222	19	Sa	3533	3554	31	M	3244	4341	25	M
25	1122	2332	16	Sa	3344	5332	27	Sa	1122	3222	15	Sa
26	3232	2343	22	Sa	3332	2443	24	Sa	1222	2223	16	S
27	4444	5442	31	M	3333	4532	26	Sa	2233	4230	19	Sa
28	2243	2244	23	Sa	3333	3333	24	Sa	1111	1121	9	Ca
29	3234	3232	22	Sa	3435	3544	31	Sa	1111	2311	11	S
30	2223	3313	19	Sa	3434	3332	25	Sa	1123	2342	18	Sa
31	3334	3132	22	Sa	3234	4433	26	Sa				

\*At Bombay, since 1883, a day is classed as (1) a quiet day, or a day of (2) small, (3) moderate, (4) great or (5) very great disturbance, the letters for distinguishing the respective classes being C, S, M, G and VG. For representing intermediate conditions of activity of the smaller period movements, sub-classifications Ca, Sa, and Ma are used. Roughly speaking a storm having a range over 225 $\gamma$  in the variations of the horizontal force during the first twentyfour hours after its commencement is classed as "Very Great", it is "Great" if the range is between 150 $\gamma$  and 225 $\gamma$ , "Moderate" if the range is between 65 $\gamma$  and 150 $\gamma$ , "Small" if the range is less than 65 $\gamma$ . The range is however not the only criterion used in assigning the character of a storm. The oscillations in the magnetograms are duly taken into account in determining the class to which a particular storm should belong.

The corresponding international character figures can be determined from the following—

Bombay Character	International Character	Bombay Character	International Character
C } Ca } S } •Sa }	0	M } Ma }	2
	1	G } VG }	2

Colaba, Bombay

18 November, 1953

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