

KODAIKANAL SOLAR, GEOMAGNETIC AND IONOSPHERIC DATA  
JULY-SEPTEMBER 1952

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 101. 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.

**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 hemi- sphere) at central meridian passage
9881	3° S	July 15	470
9898	3° S	September 2	380

**TABLE 2**  
Solar Flares

Date	Time in GMT						Co-ordinates		Estimated maximum intensity	Maximum width of H-alpha line observed  Å
	Beg.		Max.		End.		Mean latitude	Mean longitude		
	h	m	h	m	h	m				
August 2	06	31	—	—	—	—	11° S	1°·5 W	2	—
August 16	05	34	—	—	05	45	12° S	85° E	1	Nil
September 26	04	22	—	—	05	35	3° N	14° E	2	1·8

TABLE 3  
Sudden disappearance of prominences and H-alpha dark markings

Nature of phenomenon	Date and time (UT) of phenomenon when last seen	Co-ordinates of phenomenon		Remarks
		Mean latitude	Mean longitude	
H-alpha dark marking	September 11 0226	17°N	35°W	Disappeared next day

TABLE 4  
Principal magnetic storms

Greenwich date 1952	Storm-time				Sudden commencement			Degree of activity <sup>4</sup>	Maximal activity Greenwich day	Ranges			
	GMT of beginning		GMT of ending <sup>1</sup>		Type <sup>2</sup>	Amplitude <sup>3</sup>				D	H	Z	
	h	m	d	h		D	H						Z
July ] 5	00	42	6	12	...	...	...	...	m	5	2	158	53
August 17	01	26	18	09	...	...	...	...	m	17	3	203	43
September 1	01	24	2	12	...	...	...	...	m	1	3	154	39
September 28	15	24	30	18	s.c.	0.3	14	5	m	29	3	172	71

The following symbols and conventions have been used according to recognised practice—

- Approximate time of ending of storm construed as the time of cessation of reasonably marked disturbance movements in the traces
- s.c.—Sudden commencement ... = Gradual commencement
- Signs of amplitudes of *D* and *Z* taken algebraically :  
(*D*—reckoned negative being westerly)  
(*Z*—reckoned positive being vertically downwards)
- Storm described by three degrees of activity :  
m—for moderate (when range is between 150  $\gamma$  and 250  $\gamma$ )  
ms—for moderately severe (when range is between 251  $\gamma$  and 400  $\gamma$ )  
s—for severe (when range is above 400  $\gamma$ )

TABLE 5

		Ionospheric data (Median values)						
		Kodaikanal (10°25' N 77°5'E)				July 1952		
	Time (IST)	h' F2	foF2	h' F1	foF1	h' E	foE	fEs
	05	260	2.0					
	06	250	3.1					
	07	220	6.0	220		100	2.2	6.0
	08	290	7.2	200		100	2.9	7.0
	09	305	7.6	195	4.4	100		8.4
	10	340	7.5	180	4.4	100		9.0
	11	355	7.3	180	4.6	100		9.0
	12	360	7.5	180	4.6	100		9.9
	13	370	7.6	180	4.5	100		9.0
	14	355	7.8	185	4.4	100		9.0
	15	340	8.2	185	4.4	100	3.3	9.0
	16	315	8.6	200		100	3.1	8.0
		Time : 82.5°E						
		Sweep : 1.0 Mc. to 25.0 Mc. in 30 seconds						
		August 1952						
	05	240	2.5					
	06	260	2.8					
	07	225	6.0	225		100	2.1	6.0
	08	280	7.6	200		100		8.0
	09	310	8.1	190	4.4	100		8.4
	10	335	7.6	180	4.5	100		9.0
	11	355	7.4	180	4.6	100		10.0
	12	360	7.6	180	4.6	100		10.0
	13	360	8.0	180	4.6	100		10.0
	14	355	8.3	185	4.5	100		10.0
	15	335	8.7	180	4.4	100		9.0
	16	300	9.2	200		100		8.2
		Time : 82.5°E						
		Sweep : 1.0 Mc. to 25.0 Mc. in 30 seconds						
		September 1952						
	05	225	2.7					
	06	250	3.0					
	07	235	6.7	220		100	2.3	
	08	265	8.1	200		100	2.7	7.0
	09	300	8.6	190		100		8.2
	10	315	8.2	180	4.5	100		9.8
	11	325	7.9	180	4.6	100		9.8
	12	300	8.2	180	4.6	100		10.0
	13	320	8.6	185	4.6	100		9.4
	14	320	9.4	190	4.6	100	3.4	9.0
	15	300	10.0	200		100	3.2	8.2
	16	290	10.6	200		100	3.0	7.6
		Time : 82.5°E						
		Sweep : 1.0 Mc. to 25.0 Mc. in 30 seconds						

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 :

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

The meanings of the symbols are as follows—

- foE .. Ordinary-wave critical frequency for the E layer
- foF1 .. Ordinary-wave critical frequency for the F1 layer
- foF2 .. Ordinary-wave critical frequency for the F2 layer
- h' E .. Minimum virtual height on the ordinary-wave branch for the E layer
- h' F1 .. Minimum virtual height on the ordinary-wave branch for the F1 layer
- h' F2 .. Minimum virtual height on the ordinary-wave branch for the F2 layer
- fEs .. Highest frequency on which echoes of the sporadic type are observed from the lower part of the E layer

Kodaikanal  
27 October 1952

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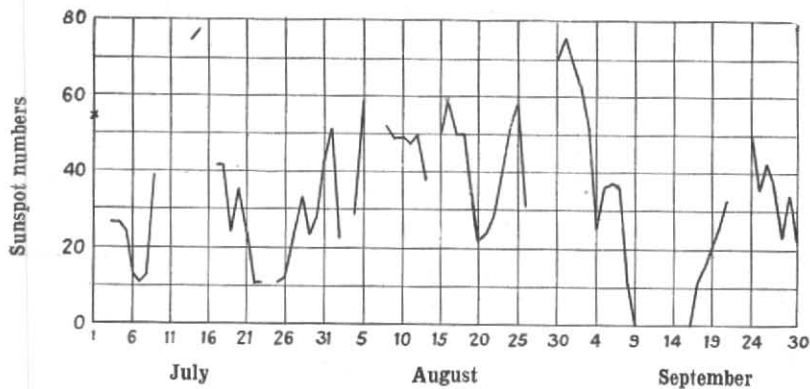


Fig. 1 (a) Kodaikanal daily relative sunspot numbers

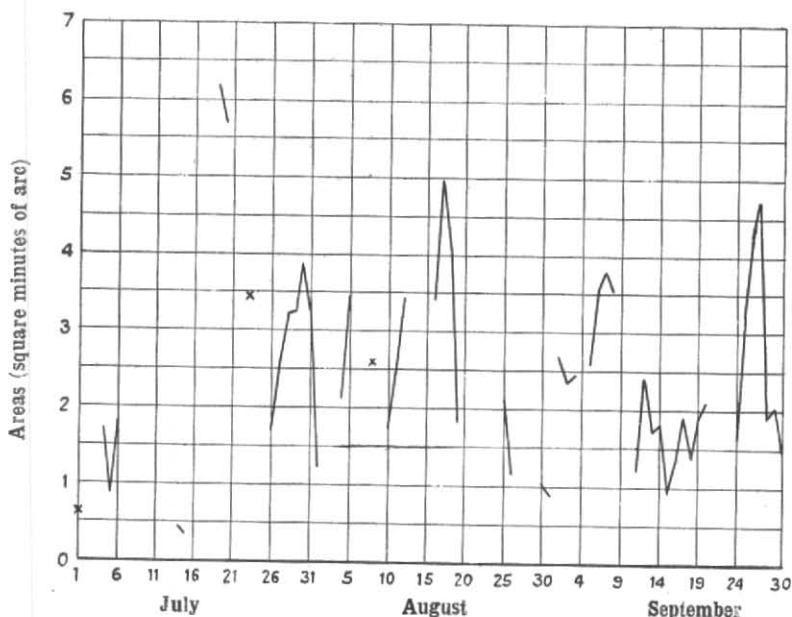


Fig. 1 (b) Daily areas of calcium prominences

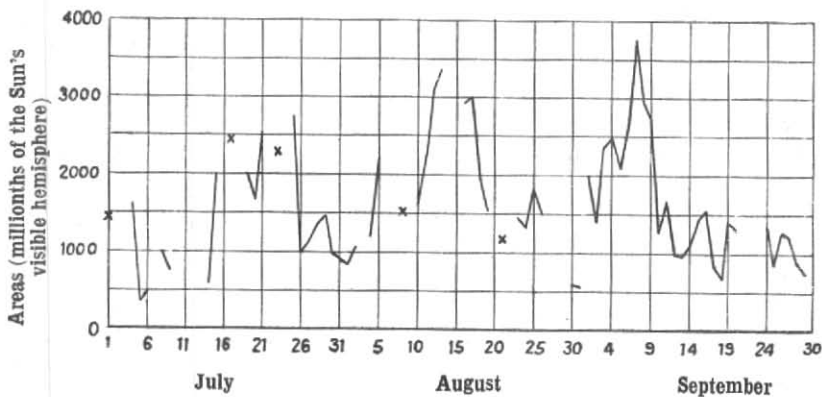


Fig. 1 (c) Daily areas of H-alpha dark markings

Note : Breaks in the graphs are due to lack of observations

## MAGNETIC OBSERVATORY, ALIBAG (BOMBAY)

## Three-hourly indices of Geomagnetic Activity

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

(K9=300 )

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

Greenwich Day	JULY 1952			AUGUST 1952			SEPTEMBER 1952		
	K-indices	Sum	Character of the day*	K-indices	Sum	Character of the day*	K-indices	Sum	Character of the day*
1	2222 2145	20	S	0111 2221	10	Ca	4434 3533	29	Sa
2	2222 1112	13	Ca	1111 1132	11	Ca	2353 3323	24	S
3	2321 3332	19	S	2222 5421	20	S	3434 2322	23	S
4	1222 2221	14	Ca	2222 2242	18	S	2123 2231	16	S
5	3434 5352	29	Sa	1223 2232	17	S	2334 3542	26	Sa
6	3453 3211	22	Sa	2422 2322	19	S	2232 2322	18	S
7	2221 2210	12	Ca	3231 2122	16	S	2331 2234	20	S
8	0223 3322	17	S	2222 2121	14	Ca	4344 3443	29	Sa
9	2134 3422	21	S	1111 1221	10	Ca	4444 3442	29	Sa
10	1213 3322	17	S	2113 3432	19	S	3333 2222	20	S
11	2321 2111	13	Ca	2123 2223	17	Ca	1213 2322	16	S
12	1112 2111	10	Ca	2123 2332	18	Ca	2222 4343	22	Sa
13	2212 3222	16	S	1111 2210	9	Ca	1111 1122	10	Ca
14	1233 2222	17	S	0211 1110	7	Ca	3322 2442	22	S
15	2222 2212	15	Ca	1111 1144	14	S	2122 2222	15	Ca
16	1222 2121	13	Ca	2220 0010	7	Ca	2112 2213	14	Ca
17	1211 1223	13	Ca	3455 4352	31	Ma	2112 2211	12	Ca
18	2211 2221	13	Ca	3422 4424	25	S	1211 1111	9	Ca
19	1111 1122	10	Ca	2232 2211	15	S	1111 1111	8	Ca
20	3246 4335	30	G	2423 2222	19	Sa	1111 1243	14	S
21	2335 4433	27	S	2232 1121	14	S	4222 2122	17	S
22	2332 2222	18	S	1221 0112	10	S	3111 1111	10	Ca
23	2222 2222	16	S	3422 2221	18	S	0411 2111	11	Ca
24	3112 2221	14	Ca	2322 1321	16	S	1221 2423	17	S
25	2212 2422	17	S	0111 1110	6	Ca	1111 2345	18	S
26	2221 2211	13	Ca	1112 1122	11	Ca	5322 1121	17	S
27	1011 2224	13	Ca	1231 1121	12	Ca	2334 2421	21	Sa
28	2331 2110	13	Ca	0210 0110	5	C	2333 3564	29	Sa
29	1111 1111	8	Ca	2122 3343	20	Sa	3544 5355	34	M
30	1100 1112	7	C	4353 2432	26	M	5335 3422	27	Sa
31	2354 3231	23	M	1212 2122	13	S			

\*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 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 24 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 $\gamma$  and "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 } G } VG }	2
	1		2

Colaba, Bombay  
18 November 1952

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