KODAIKANAL SOLAR, GEOMAGNETIC AND IONOSPHERIC DATA APRIL - JUNE 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 366. 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 July-December 1953 is given on page 368.

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
9945	10° N	April 28	770

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		
	h m	*h m*	*h m*				*Å*
April 2	02 09	—	02 30	1° S	35° E	1	1·20
April 27	05 15	—	05 35	11° N	20° E	1	1·48

TABLE 3

Sudden disappearance of prominences and H-alpha dark markings

Nature of phenomenon	Date and time (GMT) of phenomenon when last seen	Co-ordinates of phenomenon		Remarks
		Mean latitude	Mean longitude	
Prominence	April 8 0520	35° N	90° E	Disappeared next day
Prominence	May 22 0208	45° N	90° E	Disappeared at 0308 GMT on the same day

TABLE 4

Principal magnetic storms

Greenwich date 1953	Storm-time		Sudden commencement				Degree of activity[4]	Maximal activity Greenwich day	Ranges		
	GMT of beginning	GMT of ending[1]	Type[2]	Amplitude[3]							
				D	H	Z			D	H	Z
	h m	d h		$'$	γ	γ			$'$	γ	γ
May 6	01 30	9 20	...	...	...	...	m	6	3	188	61
May 15	04 16	17 24	s.c.	+1	+15	+5	m	16	5	238	63
May 26	07 16	27 23	s.c.	+1	+16	+9	m	27	3	176	55
June 2	02 50	4 01	...	...	...	...	m	2	3	206	53
June 29	07 20	1 15	...	...	...	...	m	29	2	204	83

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

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

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 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) April 1953

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000) F2
07	260	7·0	220		110	2·5	5·9	3·3
08	300	8·2	205		105		8·8	2·9
09	320	8·0	200	4·4			11·3	2·6
10	340	7·2	200	4·5			11·8	2·6
11	345	7·3	195	4·5			12·0	2·7
12	340	7·6	190	4·5			12·0	2·6
13	330	8·0	190	4·4	105		11·8	2·6
14	320	8·5	195	4·4	110	3·2	11·0	2·7
15	300	9·3	200		110	3·1	10·2	2·9
16	295	10·1	210		110	2·7	7·2	2·9
17	250	10·5	230				6·6	3·0

Time : 75.0° E

Sweep : 1.0 Mc. to 25·0 Mc. in 30 seconds

May 1953

07	275	6·8	220		110	2·5	6·0	3·3
08	300	7·4	205	4·1	105	3·0	9·0	3·0
09	335	7·6	200	4·3	110		11·4	2·6
10	355	7·1	195	4·4			11·8	2·6
11	370	6·9	190	4·4			12·0	2·6
12	375	7·0	185	4·4			12·0	2·5
13	360	7·2	190	4·4			12·0	2·6
14	340	7·6	185	4·3	110	3·1	11·0	2·7
15	320	8·1	185		110	3·1	8·9	2·8
16	300	8·8	210		110	2·7	7·1	2·9
17	270	9·3	220		120	2·3	4·8	3·1

Time : 75·0° E

Sweep : 1·0 Mc. to 25·0 Mc. in 30 seconds

June 1953

07	280	6·3	215		105	2·5	6·8	3·2
08	310	7·0	205	4·1	105	2·9	8·9	3·0
09	340	7·5	200	4·2			11·4	2·7
10	375	6·9	190	4·3			12·0	2·5
11	390	6·6	185	4·4			12·0	2·5
12	385	6·9	185	4·4			12·0	2·5
13	385	6·9	185	4·3			11·6	2·5
14	360	7·2	185	4·2	105	3·3	11·4	2·6
15	340	7·4	190	4·1	110	3·1	9·0	2·7
16	320	7·9	215		110	2·8	6·6	2·8
17	295	8·1	220		110	2·3	5·4	3·0

Time : 75·0° E

Sweep : 1·0 Mc. to 25·0 Mc. in 30 seconds

Kodaikanal
29 July 1953

A. K. DAS
Director, Solar Physics Observatory

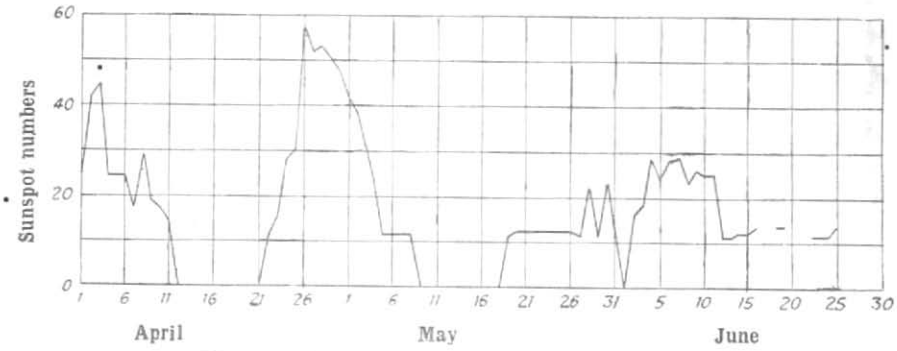


Fig. 1(a) Kodaikanal daily relative sunspot numbers

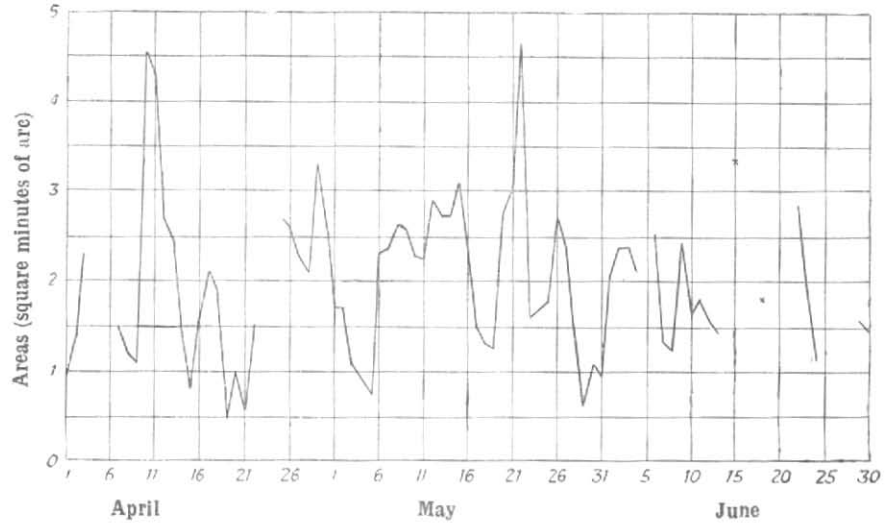


Fig. 1(b) Daily areas of calcium prominences

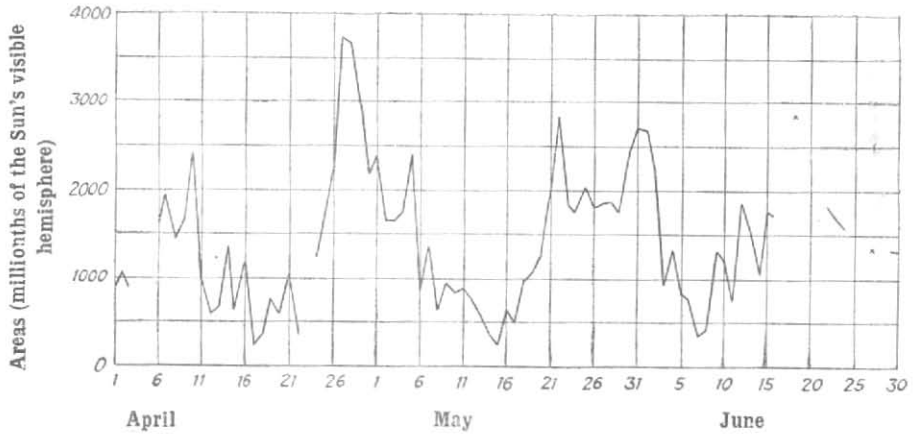


Fig. 1(c) Daily areas of H-alpha dark markings

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

MAGNETIC OBSERVATORY, ALIBAG (BOMBAY)

Three-hourly indices of Geomagnetic Activity

(K9=300γ)

(Scale values of variometers in γ/mm: (D=11·3 ; H = 4·4 ; Z = 2·5)

Greenwich day	APRIL 1953 K-indices		Sum	Character of the day*	MAY 1953 K-indices		Sum	Character of the day*	JUNE 1953 K-indices		Sum	Character of the day*
1	2323	3322	20	S	1112	2211	11	Ca	1210	1222	11	Ca
2	2232	2242	19	S	2011	0011	6	Ca	3355	4453	32	G
3	2122	2232	16	S	1122	2121	12	S	3352	4242	25	Ma
4	4323	4242	24	Sa	1221	1112	11	Ca	3333	2222	20	Sa
5	2222	2222	16	S	2232	2234	20	Sa	1222	2241	16	Sa
6	1112	2122	12	Ca	4456	4344	34	Ma	1222	2221	14	S
7	1111	2211	10	Ca	2434	4222	23	Sa	2132	2122	15	Ca
8	2222	2213	16	Ca	3333	3242	23	Sa	2221	2111	12	Ca
9	2212	2232	16	S	3423	3222	21	Sa	1222	2211	13	Ca
10	2434	3323	24	S	2122	2322	16	S	2322	2232	18	S
11	2423	3432	23	Sa	2223	1122	15	S	1222	1223	15	S
12	2224	3222	19	Sa	2221	1221	13	Ca	2333	3433	24	Sa
13	2143	3421	20	Sa	1212	1111	10	Ca	3222	1132	16	S
14	1222	1111	11	Ca	1111	1222	11	Ca	2221	2232	16	Ca
15	1333	3122	18	Sa	2323	6545	30	G	1121	1111	9	Ca
16	3332	4543	27	M	4535	4465	36	G	1121	1113	11	Ca
17	2224	3212	18	Sa	5432	2322	23	Sa	2222	2322	17	S
18	3222	2222	17	S	2333	2222	19	Sa	2221	1112	12	Ca
19	2322	3423	21	Sa	3234	3133	22	Sa	2212	2211	13	S
20	3443	3334	27	Sa	2242	2221	17	S	1234	4343	24	M
21	2243	2543	25	Sa	2231	1321	15	S	3332	2133	20	Sa
22	2222	2332	18	Sa	2312	3241	18	Sa	1222	3222	16	S
23	2323	3232	20	S	1232	1232	16	S	1120	0011	6	Ca
24	2222	2332	18	Sa	2112	2221	13	S	2321	1222	15	S
25	4322	3342	23	S	2111	1311	11	Ca	2221	1121	12	Ca
26	2332	2313	19	S	2132	2132	16	Sa	0101	1111	6	Ca
27	2222	2322	17	S	4453	2411	24	Ma	1222	1111	11	Ca
28	2223	2210	14	S	1211	3220	12	S	1211	2113	12	Ca
29	2232	2211	15	S	1212	2211	12	Ca	3256	5544	34	G
30	2222	2321	16	S	2211	1111	10	Ca	4453	3333	28	M
31					1312	2241	16	S				

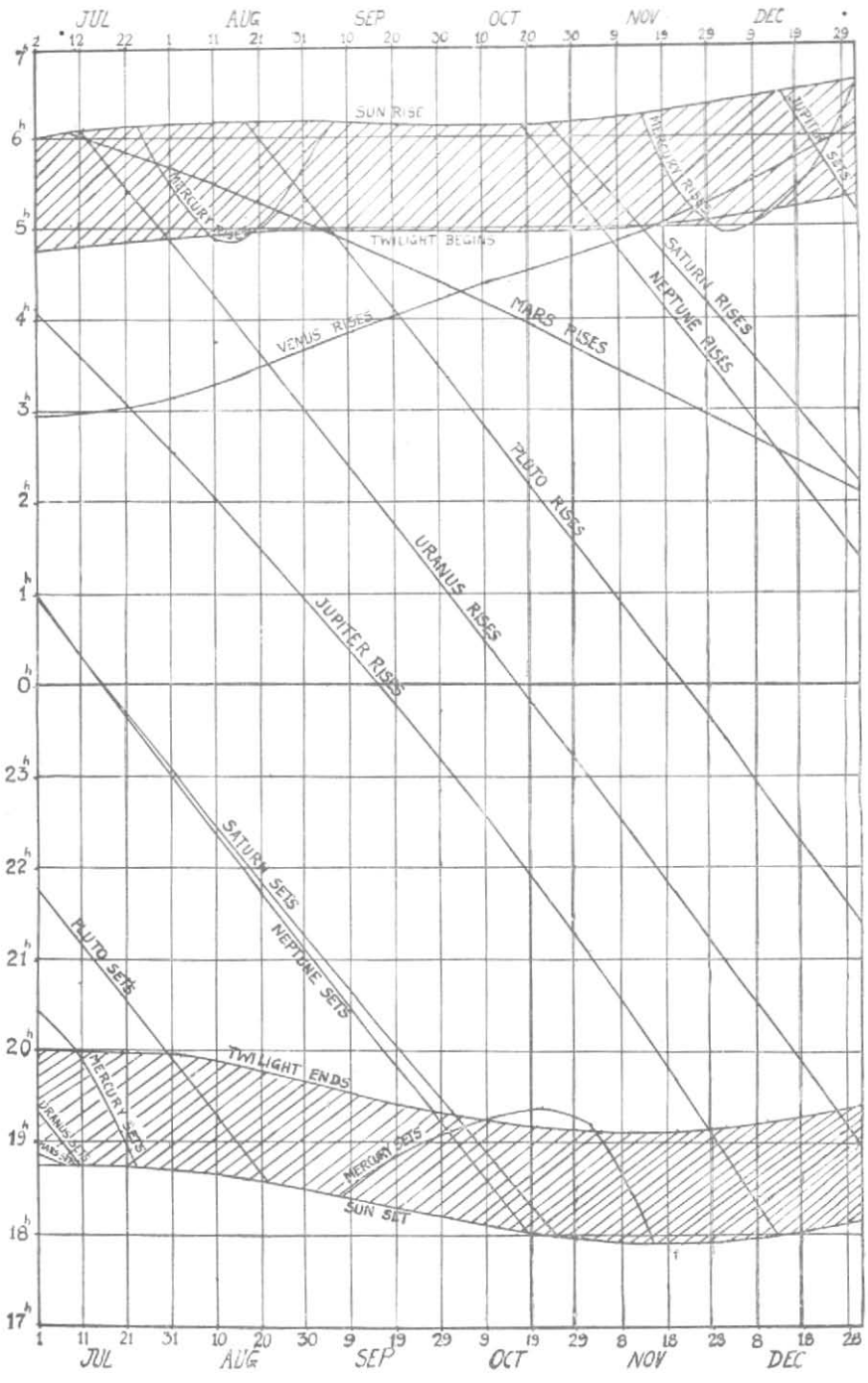
*At Bombay, since 1883, a day is classed as (1) a quiet day, or a day of (2) small, (3) moderate, (4) great or (5) very great disturbance, the letters for distinguishing the respective classes being C, S, M, G and VG. For representing intermediate conditions of activity of the smaller period movements, sub-classifications Ca, Sa, and Ma are used. Roughly speaking a storm having a range over 225γ 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 150γ and 225γ, "Moderate" if the range is between 65γ and 150γ, "Small" if the range is less than 65γ. 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	0	M, Ma	2
S, Sa	1	G, VG	2

Colaba, Bombay
7 August 1953

S. E. MALURKAR,
Director, Colaba and Alibag Observatories



Times (IST) of rising and setting of the Sun and planets at Kodaikanal (10°14′N 77°28′E) for July-December 1953

(Prepared by : S. R. Ganguly, Kodaikanal Observatory)