KODAIKANAL SOLAR, GEOMAGNETIC AND IONOSPHERIC DATA
OCTOBER—DECEMBER 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 182. 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 hemisphere) at central meridian passage
9910	11° N	October 10	260
9916	5° N	November 21	895

TABLE 2

Solar Flares

Date	Time in GMT			Co-ordinates		Estimated maximum intensity	Maximum width of H-alpha line observed
	Beg. h m	Max. h m	End. h m	Mean latitude	Mean longitude		$\overset{\circ}{A}$
November 14	03 57	—	04 16	13°·5 N	90° W	2	—
November 15	02 45	—	04 45	4°·0 N	90° E	2	1·4
December 20	05 50	—	06 00	9°·0 S	41° W	1	1·6

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	November 20	0925	45° N	90° E	
Prominence	November 20	0925	13° S	90° E	Disappeared next day
Prominence	December 5	0234	30° N	90° E	
Prominence	December 10	0744	20° S	90° E	

TABLE 4

Principal magnetic storms

Greenwich date 1952	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
	h	m	d	h		D $'$	H γ	Z γ			$'$	γ	γ
October 3	19	02	6	19	...	...	...	...	m	4	3	193	$\overline{\triangle}$
October 25	17	00	27	01	...	...	...	...	m	26	2	170	46
November 16	03	56	16	19	...	...	...	...	m	16	2	166	29
November 20	17	28	21	19	s.c.(?)	1	+15	+10	m	21	3	169	46
November 26	19	22	28	19	...	...	...	...	m	27	3	175	37
December 13	01	58	13	22	...	...	...	...	m	13	3	200	55

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)

$\overline{\triangle}$ =Loss of record

TABLE 5

Ionospheric data

(Median values)

Kodaikanal (10·2°N 77·5°E) October 1952

Time (IST)	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
05	230	2·9					
06	240	3·1					
07	235	6·8	225		115	2·2	5·8
08	270	8·4	215		100	2·8	7·0
09	290	9·2	200		100		8·4
10	300	8·7	200	4·5	100		9·7
11	300	8·6	190	4·6	100		10·0
12	310	8·6	190	4·6	100		10·0
13	300	9·1	200	4·6	100		10·0
14	300	9·6	195	4·5	100		10·0
15	295	10·4	200		100	3·2	9·0
16	285	10·4	210		100	2·8	7·0
17	235	10·4	225		100		7·0
18	245	10·3					

Time : 82·5°E

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

November 1952

Time (IST)	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
05	240	2·1					
06	260	2·6					
07	240	6·1	230		120	2·3	
08	280	7·8	220		105	2·7	7·0
09	300	8·3	205		100		7·6
10	300	8·0	200	4·5	100		8·5
11	320	8·0	200	4·6	100		9·0
12	320	8·0	200	4·6	100		9·0
13	315	8·7	200	4·5	100	3·5	8·8
14	310	9·1	200	4·5	100		9·0
15	295	9·5	200		100	3·0	7·5
16	295	9·7	220		105	2·8	7·0
17	240	9·7	235				6·0
18	255	9·5					

Time : 82·5°E

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

December 1952

Time (IST)	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
05	250	2·7					
06	260	2·1					
07	240	5·4			125	2·0	
08	275	7·3	220		110	2·5	6·0
09	300	8·3	205		105	3·0	7·0
10	320	8·0	200	4·4	105	3·2	7·6
11	340	7·7	200	4·4	100		8·0
12	345	7·7	200	4·5	100	3·4	8·7
13	335	8·1	200	4·5	105	3·3	8·4
14	335	8·3	200	4·4	105	3·2	8·0
15	320	8·5	200		105	3·1	7·4
16	300	8·5	215		110	2·8	7·0
17	240	8·6	235		115	2·3	6·0
18	245	8·1					5·0

Time : 82·5°E

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

Beginning from January 1952, systematic iono-spheric 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

Kodaikanal

3 February 1953

A. K. DAS
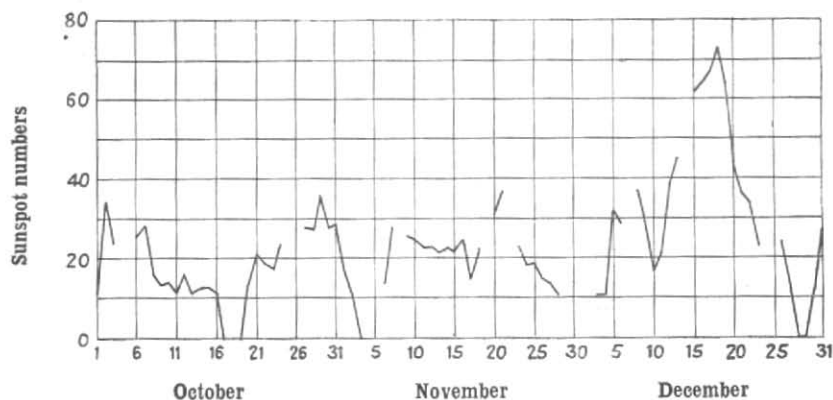
Director, Solar Physics Observatory

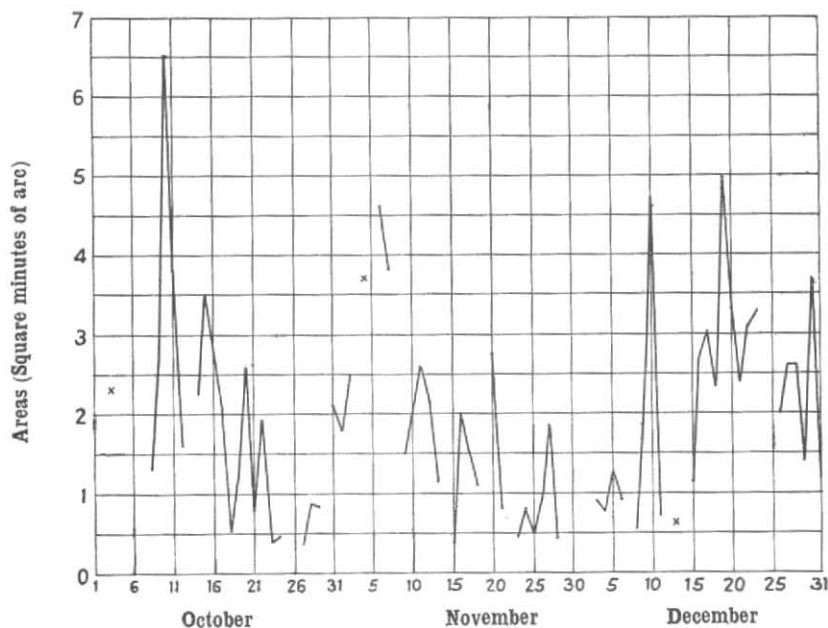Fig. 1 (a) Kodaikanal daily relative sunspot numbers
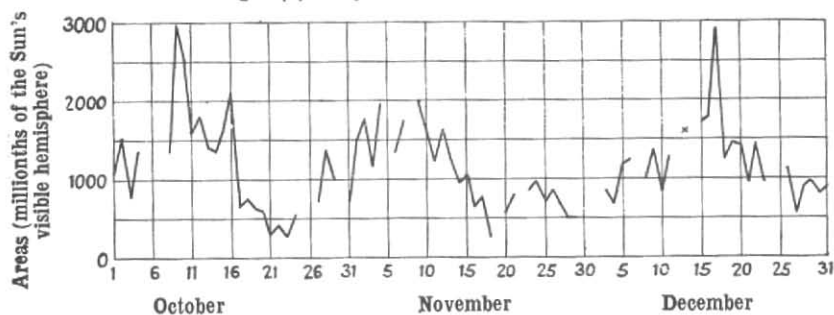

Fig. 1 (b) Daily areas of calcium prominences

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	OCTOBER 1952 K-indices		Sum	Character of the day*	NOVEMBER 1952 K-indices		Sum	Character of the day*	DECEMBER 1952 K-indices		Sum	Character of the day*
1	1322	2222	16	Ca	2222	3333	20	S	1224	4343	23	Sa
2	1212	3342	18	S	3122	3242	19	S	3233	5543	28	M
3	1111	3454	20	Sa	1223	2212	15	Ca	2422	2332	20	Sa
4	4544	3354	32	Sa	1210	1111	8	Ca	5234	3343	27	Sa
5	2444	5452	30	M	2212	2223	16	Ca	3223	4241	21	Sa
6	2333	3531	23	Sa	3452	3321	23	Sa	1311	1222	13	S
7	0232	2222	15	S	2222	2254	21	Sa	2221	2221	14	Ca
8	4222	3344	24	Sa	2222	2242	18	S	1111	2211	10	Ca
9	4212	2123	17	S	2222	1222	15	S	1111	1120	8	Ca
10	2112	1244	17	S	2121	1111	10	Ca	2112	2332	16	S
11	2223	2343	21	Sa	1111	1321	11	Ca	1212	2211	12	S
12	3232	1131	16	S	1121	1111	9	Ca	1232	3422	19	Sa
13	2111	2211	11	Ca	0111	1111	7	Ca	2355	5321	26	Ma
14	1232	1210	12	Ca	2213	3122	16	Ca	0211	2103	10	Ca
15	1111	1221	10	Ca	2333	2231	19	S	2223	3312	18	S
16	2212	3212	15	Ca	1122	5311	16	Sa	2322	1332	18	S
17	2322	2321	17	S	3122	2243	19	Sa	1222	1112	12	Ca
18	1121	2342	16	S	2342	1122	17	S	1222	2233	17	S
19	2123	1201	12	Ca	1112	1121	10	Ca	1111	1111	8	Ca
20	1212	3321	15	S	3113	2322	17	S	1111	1111	8	Ca
21	0124	5554	26	M	4453	3422	27	Ma	1111	1211	9	Ca
22	2421	1111	13	S	3122	2421	17	S	1011	4421	14	S
23	1111	2111	9	Ca	1222	2211	13	Ca	1121	1112	10	S
24	2111	0111	8	C	1222	2421	16	S	3224	5323	24	M
25	1113	2333	17	Sa	2223	2222	17	S	3323	2322	20	Sa
26	3325	4443	28	Ma	2223	2354	23	Sa	2223	3321	18	Sa
27	2232	1221	15	Ca	2334	5552	29	M	2222	2235	20	M
28	2422	2422	20	S	2233	4432	23	Sa	3222	3444	24	Sa
29	2221	3442	20	S	1122	4332	18	Sa	3224	2444	25	Sa
30	2332	3555	28	M	1122	2332	16	S	2323	3522	22	Sa
31	3243	5541	27	M					2232	2443	22	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 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 and " 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 ⎫		M ⎫	
Ca ⎬ 0	0	Ma ⎬	2
S ⎬		G ⎬	
Sa ⎭	1	VG ⎭	2

Colaba, Bombay
16 February 1953

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