

Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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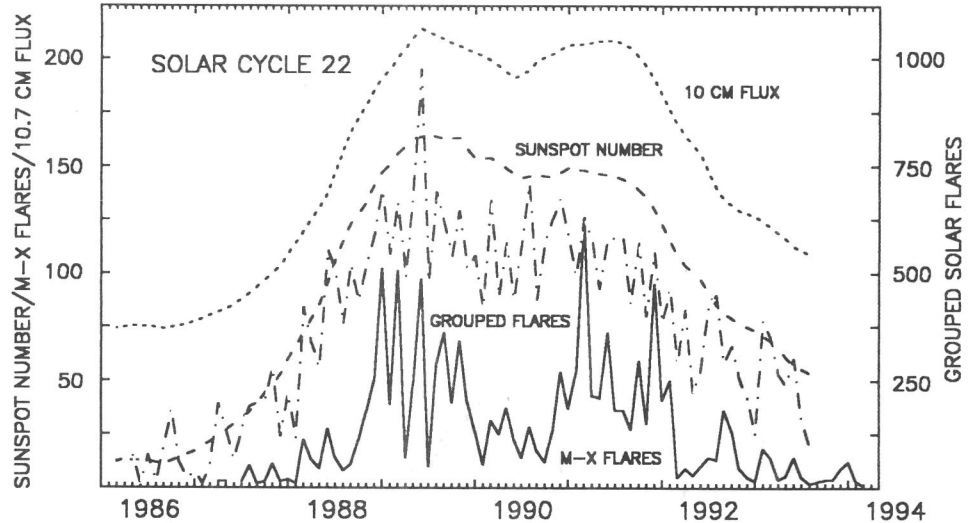


Volume 50 Number 3

March 1994

American Relative Sunspot Numbers for March

		R _a Final			
1)	49	11)	40	21)	19
2)	59	12)	48	22)	29
3)	76	13)	42	23)	25
4)	58	14)	22	24)	34
5)	59	15)	26	25)	44
6)	71	16)	26	26)	28
7)	58	17)	24	27)	22
8)	48	18)	19	28)	19
9)	44	19)	10	29)	19
10)	36	20)	11	30)	31
				31)	35
Mean: 36.5					
Number of reports: 99					



March Summary: Solar activity was low and very low throughout March. For the first month since June 1987, no class M or greater X-ray intensity solar flares were recorded. Daily > 2 MeV electron fluence returned to normal (E + 06/07) levels at the beginning of March, and the geomagnetic field was generally at quiet or active levels. A brief disturbance at high-latitudes was observed on the 3rd. According to Space Environment Services Center, there was no obvious source for this storm.

The geomagnetic field remained relatively quiet until early on the 7th when a period of storm conditions related to a favorably positioned, recurrent coronal hole began. Daily electron fluence related to this system rose to high (E + 09) around March 8th, causing some concern over a renewal of January's geosynchronous-satellite charging events.

The > 2 MeV electron fluence began to decline on the 19th, dropping as low as 7.5E + 07 after the departure of the coronal hole during the third week of March. Thereafter, electron fluence hovered in the E + 08 range, then declined during the last few days of the month. The geomagnetic field continued to be mostly quiet to unsettled with sporadic intervals of storm conditions. The smoothed-mean American Relative Sunspot Number for September 1993 declined to 48.9.

The mean estimated American Relative Sunspot Number for 1-12 April is 6. Solar activity has been very low. Five spotless days have occurred thus far during April.

[A portion of the above information was obtained from SELDADS]

Sudden Ionospheric Disturbances (SES) Recorded During February 1994

Records were received from A9,40,50,59,61,62,63,65,66,67,68,69,70,71,72,73,74,75,76,77,78,80,81,82

Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def
2	1920	2+	5	7	1359	1-	5	9	2153	1-	5	20	1559	1-	5
3	1845	2	5	7	1413	1-	5	10	1825	2+	5	23	1525	1	5
4	1013	1	5	8	1625	2	5	11	1400	1	5	23	1752	1+	5
4	1759	1-	5	8	1754	2	5	11	1507	1	5	23	2050	1	5
5	1935	1-	5	9	1338	2	5	11	1646	1	5	24	1830	2+	5
5	2344	1-	5	9	1544	2+	5	15	0752	1	5	26	1042	1-	5
6	0815	1	5	9	1645	2+	5	17	1108	1	5	26	2336	1+	5
6	1316	1+	5	9	1725	2	5	18	0954	2	5	27	0850	1	5
6	1655	1-	5	9	1745	1	5	18	2151	1-	5	27	0918	2+	5
7	0856	1-	5	9	1807	2+	5	19	1700	2	5	27	1656	1	5
7	1256	1	5	9	2044	2	5	20	1357	1-	5	27	2029	1	5
												28	1912	1-	5

Analysts: J. Ellerbe; S. Hansen; M. Hayden; J. Knight; A. Landry; R. Papp; C. Ranft; A. Stokes; M. Taylor; P. Taylor; L. Witkowski
Frequencies recorded (kHz): 16.8; 18.3; 19.6; 21.4; 23.4; 24.0; 24.8; 28.5; 30.6; 48.5; 51.6; 73.6; 77.15

A Different Type of Solar Butterfly-Diagram

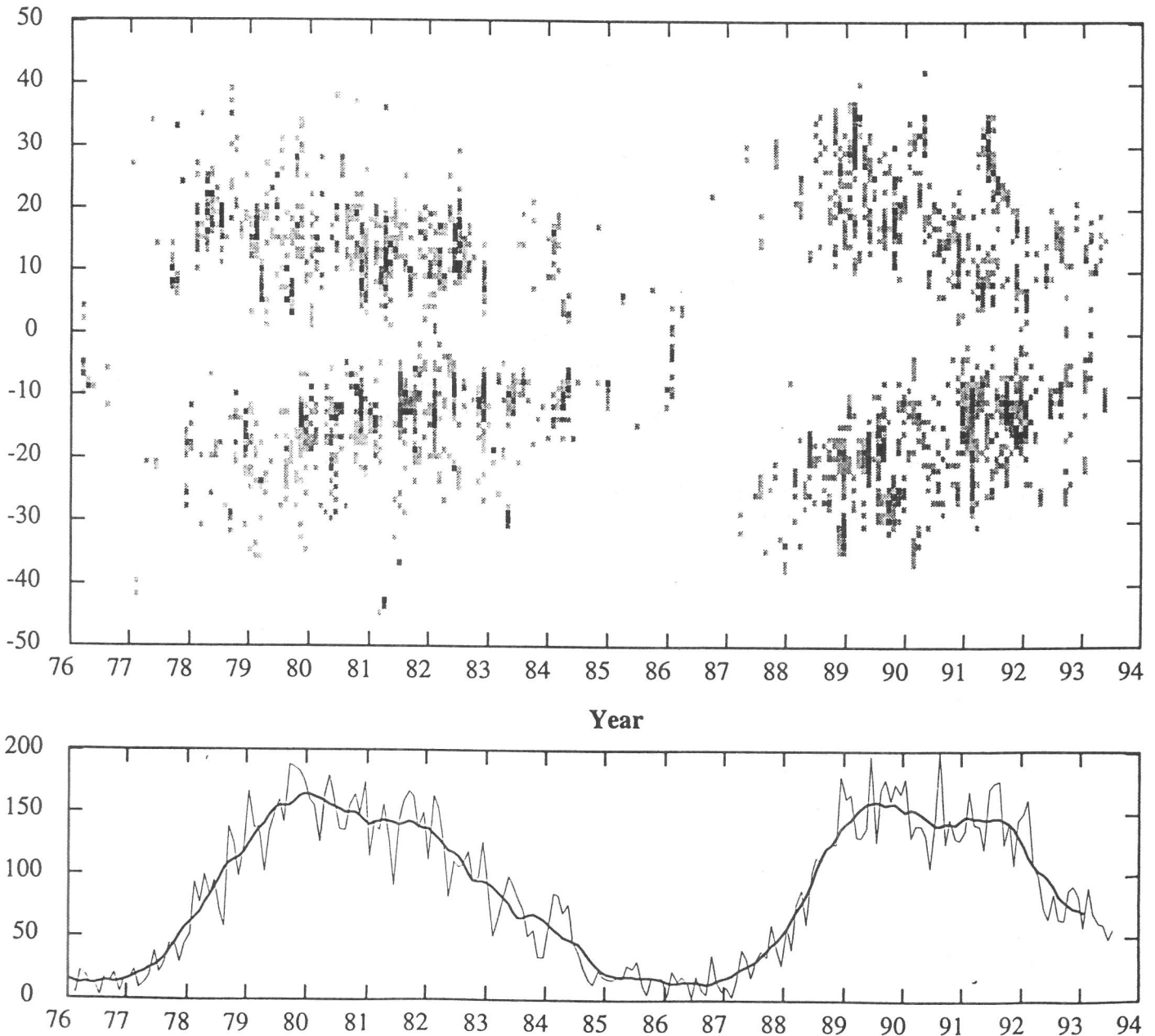
The latitude at which sunspot regions form shows an interesting and distinctive variation during the solar cycle. At the start of the cycle, the first regions tend to be located at mid-latitudes (30-40° either north or south of the equator). During the course of the cycle, regions are formed at progressively lower latitudes until, by the end of the cycle, regions are located within 5-10° of the equator.

This type of behavior is consistent from cycle-to-cycle and, when region latitudes are plotted against time, the results look like the outstretched wings of a butterfly. Not surprisingly, the plot has become known as the 'butterfly-diagram.'

The figure on this page is an example of a butterfly-diagram showing the location of energetic solar flares (which originate from sunspot regions) during the period 1976 until mid-1993. The diagram is based on class 'M' or 'X' flares during the interval with a grey-scale determined by the number and energy (XRI) of the flares occurring during each calendar month.

The diagram shows the drift in latitude towards the equator during Solar Cycle 21 (1976-1986) and again during Cycle 22 (1986 onward). For comparison, the variation of the monthly (thin line) and the yearly smoothed sunspot number (thick line) are shown on the lower graph with identical time-scale.

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