

Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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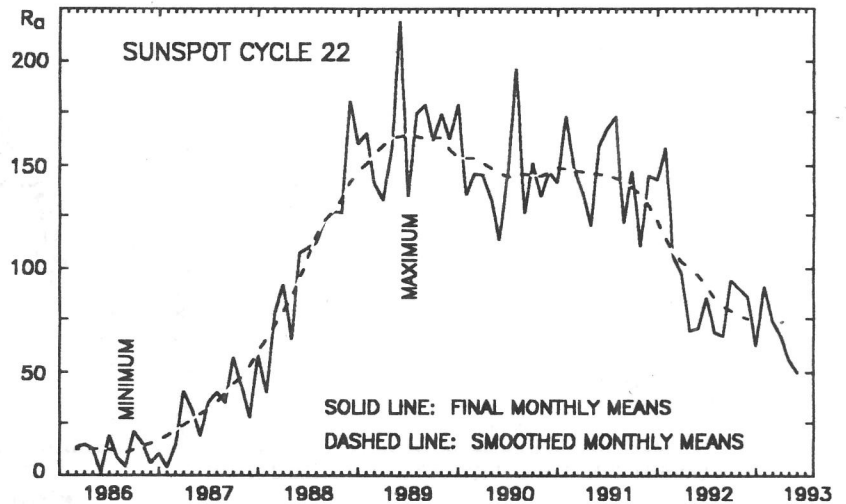
June 1993

American Relative Sunspot Numbers for June

		R _a Final			
1)	99	11)	36	21)	28
2)	98	12)	18	22)	31
3)	97	13)	14	23)	50
4)	83	14)	10	24)	50
5)	76	15)	10	25)	57
6)	84	16)	11	26)	61
7)	66	17)	16	27)	69
8)	56	18)	11	28)	76
9)	49	19)	15	29)	77
10)	47	20)	21	30)	70

Mean: 49.5

Number of reports: 98



June Summary: Solar activity was low and moderate at the beginning of June. On the 3rd, NOAA/USAF Region 7514 (N17, L082, HAX) generated the month's first class M flare. An optically uncorrelated class M event also occurred later on the 3rd. The geomagnetic field ranged between quiet and active conditions during the first few days of June.

Activity increased to high on the 7th, and was mostly in the moderate range for the following several days. The increase in activity occurred when Region 7518 (S09, L015, DK1) spawned a major flare on the 7th, a M5.4/2B Tenflare. This was the first class M flare to erupt in the Sun's Southern Hemisphere since March. A proton enhancement at satellite altitude developed after the event. Region 7518 also produced class M2.2/1B and M1.9/SF events on the 9th and 10th respectively, and was the likely site of an optically uncorrelated class M flare on the 8th.

Brief intervals of major to severe geomagnetic storm conditions were recorded at some high latitude stations on the 4th and 5th, probably due to coronal hole activity. The field was relatively quiet for the next several days, becoming active at all latitudes as the shock front from the major flare mentioned above arrived on the 10th. A short period of minor to major geomagnetic storm conditions followed, but the disturbance subsided by early on the 11th.

Very low levels of activity were the rule between the 12th and 19th. The Sun's Southern Hemisphere was spotless during this interval, with only one small type H group present on the visible hemisphere from the 14th to 16th, and again on the 18th. The geomagnetic field was mostly quiet with occasional periods of active to unsettled conditions.

Solar activity continued to be low until the 24th when the month's second major flare (class M9.7/2B) erupted in Region 7529 (S13, L062, DAO). This event was accompanied by Type II and IV radio sweeps and a 2695 MHz radio burst of 450 flux units. That flare was followed by uncorrelated class M4.2 and M1.3 events from just behind the SE solar limb. The month's third and final major flare, rated class M5.1, occurred early on the 25th in the same area. All of this activity resulted in a number of special warnings and alerts.

On the 24th, Big Bear Observatory noted that Region 7529 carried an unusual magnetic configuration, stating, 'The (group's) magnetic field shows an unusual configuration in that it has a band of opposite polarity just east of the leader spot and may also have an opposite polarity within its penumbra, but it is still too close to the limb to be certain.'

Nobeyama Radio Observatory reported a large active region nearing the SE limb on the 24th. This group, named Region 7530 (S12, L030, EAI) after rounding the limb, has been established as the site of the uncorrelated flare activity listed above. Moreover, Region 7530 is the return of old Region 7518 which spawned at least three class M flares - one a major event - during its previous appearance. The geomagnetic field was quiet or unsettled until the 24th when short periods of storm conditions began; this activity was associated with a Western Hemisphere coronal hole.

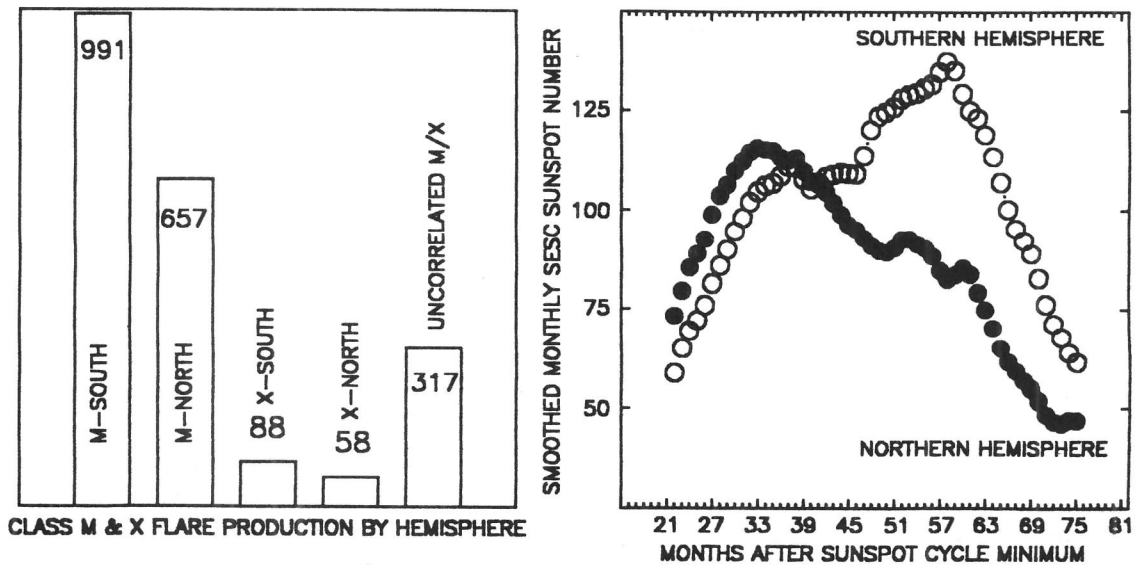
Region 7530 produced several other class M flares during the remainder of June, bringing the total for the month to thirteen. However, due to the extreme easterly location of the spot-group when it was most active, the terrestrial effects

from events associated with Region 7530 was minimal. Hemispherical activity levels were mixed during June. The Sun's Northern Hemisphere was the site of more spot activity, but the Southern Hemisphere was far ahead in the numbers of class M flares (eleven). The smoothed-mean American Relative Sunspot Number for December 1992 declined to 74.1.

The estimated mean American Relative Sunspot Number for 1-13 July is 52. Activity has continued near the June level during this interval. Four class M flares have occurred thus far during July; all in Region 7530.

[References: SELDADS, Big Bear Observatory, Nobeyama Radio Observatory.]

Solar Activity by Hemisphere During Cycle 22



Sudden Ionospheric Disturbances (SES) Recorded During May 1993

Records were received from A9,40,50,59,61,62,63,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81

Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	De
1	2301	3	5	7	2110	3+	5	13	1411	1+	5	27	1754	2+	5
2	1923	1-	5	8	0315	1	5	13	1437	1	5	27	1917	1	5
3	0114	2+	5	8	0533	1-	5	14	0038	1+	5	27	2007	1-	5
3	0640	1	5	8	1230	2	5	14	2208	2	5	27	2136	1	5
3	1030	1-	5	9	1040	1	4	14	2255	2	5	27	2231	2	5
3	1245	1-	5	9	2355	1-	5	16	0500	1-	5	28	0028	2+	5
3	1400	1-	5	10	1007	1-	5	17	1920	1-	5	28	0129	1	5
4	0314	2	5	10	1341	2	5	17	1959	1	5	28	0205	1+	5
4	0455	1-	5	10	1915	1-	5	19	1024	2	5	28	0306	1	5
5	1350	1	5	10	1956	1+	5	23	0415	1+	5	28	1101	1-	5
5	1833	2	5	10	2359	1-	5	23	0859	2+	3	28	1530	1	5
5	2026	1-	5	11	0416	1-	5	24	1602	2	5	28	2058	2+	5
6	0000	1-	4	11	1618	1-	5	26	0933	1-	5	29	0114	1	5
6	1545	1-	5	11	2149	2+	5	26	1227	1	5	29	0804	1-	3
6	1830	1+	5	12	0314	1-	5	26	1410	1	5	29	1030	1	5
6	2021	1	5	12	1636	1	5	26	1945	1+	5	29	1139	1	5
6	2235	1+	5	12	1652	1-	5	26	2110	1-	5	29	1505	2	5
7	0159	1-	5	12	1734	1-	5	26	2159	2	5	29	1715	1	5
7	0215	1-	5	12	1759	2	5	27	0108	2+	5	30	0047	1-	5
7	0800	1	5	12	2146	1-	5	27	1507	1	5	30	0516	2	5
7	1242	2	5	13	0123	1	5	27	1540	1	5	30	0653	2	5
7	1415	1	5	13	0620	1	5	27	1646	1-	5	30	1757	1-	5
7	1429	1-	3	13	1039U	1+	5	27	1657	1	3	31	1544	1	5
7	1459	1-	5	13	1123	1+	5	27	1723	1	5				

SID Analysts: J Ellerbe; S Hansen; M Hayden; J Knight; A Okorogu; 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

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