

## Space Weather Highlights 05 – 11 June 2000

**SWO PRF 1293  
13 June 2000**

Solar activity ranged from low to high levels. The period began with activity at moderate levels due to an M1/1F flare from Region 9031 (S32, L = 150, class/area Cso/110 on 06 June). Activity increased to high levels during 06 - 07 June due to major flare activity from Region 9026 (N21, L = 074, class/area Eko/910 on 03 June). Major flare activity during this period included an X1/2N at 06/1339UT with an associated 560 SFU Tenflare, an M7 at 06/1401UT; an X2/3B at 06/1525UT with associated Type II and IV radio sweeps, a 2300 SFU Tenflare, 11-degree DSF, loop-prominence system, full-halo CME, and a solar proton event (see the description below); and a X1/3B at 07/1553UT with associated Type II and IV radio sweeps, a 200 SFU Tenflare, and a faint full-halo CME. Region 9026 showed minor changes prior to and during the major activity and was a large, magnetically complex with a strong magnetic delta structure reported within its leader spot. Region 9026 began a decay phase on 08 June, which continued through the rest of the period. Region 9031 produced an M2/1B flare at 07/0444UT. Activity decreased to low levels during 08 - 09 June with occasional C-class subflares from Region 9026, which showed significant decay. Region 9033 (N22, L = 016, class/area Fkc/560 on 10 June) showed significant growth during this period, but produced no flares. Activity increased to high levels on 10 June due to an M5/3B flare at 10/1702UT from Region 9026 with an associated Type II radio sweep, 550 SFU Tenflare, loop-prominence system, full-halo CME, and a solar proton event. Activity decreased to moderate levels on the final day of the period as Region 9033 produced an M1/1F flare at 11/1049UT.

Real-time solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the period. A CME passage occurred during 08 June. The shock front preceding the CME passed the spacecraft at 08/0841UT followed shortly thereafter by an abrupt velocity increase (510 to 830 km/sec), a brief density increase, with peaks to 27 p/cc; and strong southward IMF Bz with deflections to minus 24 nT (GSM). Bz turned mostly northward late on 08 June and remained so until about 09/2100UT, at which time it again turned southward until 11/1600UT with a range of minus 1 to minus 12 nT.

There were two solar proton events at geosynchronous orbit, both associated with major flares from Region 9026. The first, a greater than 10 MeV proton event (which followed the X2/3B flare of 06/1525UT), began at 07/1335UT, reached a maximum of 84 PFU at 08/0940UT, and ended at 09/0325UT (there was also a slight enhancement at greater than 100 MeV). The second event followed the M5/3B of 10/1702UT and saw event thresholds exceeded at both the greater than 100 MeV and greater than 10 MeV fluxes. The greater than 100 MeV event began at 10/1750UT, reached a maximum of 1.6 PFU at 10/1755UT, then ended at 10/1830UT; while the greater than 10 MeV event began at 10/1805UT, while the greater than 10 MeV event began at 10/1805UT, reached a maximum of 46 pfu at 10/2045UT and ended at 11/1130UT.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels during 05 - 09 June, then increased to moderate to high levels during 10 - 11 June.

A major geomagnetic storm occurred on 08 June due to a CME passage at Earth (the CME followed the X2/3B flare of 06/1525UT). The storm began with a sudden storm commencement (SSC) of 77nT at 08/0909UT, as measured by the Boulder USGS magnetometer. Major to severe storm levels occurred during the storm with the most intense activity during 08/0900 - 1500UT. A magnetopause crossing was detected by the NOAA GOES-8 spacecraft during 08/1510 - 1615UT. A Forbush decrease commenced at 08/1100UT. Field activity declined to quiet to unsettled levels during 09 June. Unsettled to minor storm levels occurred during the rest of the period with brief major storm intervals at High latitudes.



## **Space Weather Outlook**

### **14 June -10 July 2000**

Solar activity is expected to vary between low and moderate levels during most of the period, with occasional C-class and isolated M-class flares expected. Region 9026 departs the visible disk late on 14 June. It has been decaying since 08 June and is not expected to be a major-flare producer upon its return to the visible disk on 28 June. Region 9033 may produce isolated M-class flares before departing the west limb on 19 June.

There will be a slight chance for a proton event at geosynchronous orbit through 19 June. No proton events are expected for the remainder of the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels through most of the period. However, there will be a chance for high flux levels during 26 - 27 June.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period, barring an Earth-directed CME. However, there will be a chance for active levels during 25 - 26 June.



**Daily Solar Data**

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
05 June	171	132	1430	C1.3	8	1	0	13	3	0	0	0
06 June	186	133	1670	C1.0	7	2	2	8	1	1	1	0
07 June	180	145	1380	C1.6	5	1	1	11	1	0	1	0
08 June	175	203	1420	C1.3	11	0	0	15	0	0	0	0
09 June	169	183	1320	B7.7	1	0	0	7	0	0	0	0
10 June	180	165	1160	B7.1	4	1	0	11	0	0	1	0
11 June	187	224	1440	C1.0	7	1	0	15	2	0	0	0

**Daily Particle Data**

Date	Proton Fluence (protons/cm <sup>2</sup> -day-sr)			Electron Fluence (electrons/cm <sup>2</sup> -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
05 June	1.4E+6	1.3E+4	2.3E+3		5.5E+6	
06 June	6.9E+5	1.2E+4	2.5E+3		1.0E+6	
07 June	2.8E+7	9.7E+5	4.5E+3		3.7E+6	
08 June	3.1E+8	3.5E+6	2.5E+3		1.0E+7	
09 June	6.3E+7	3.7E+5	1.8E+3		1.9E+6	
10 June	1.0E+7	7.9E+5	1.3E+4		2.3E+7	
11 June	1.9E+7	9.0E+5	5.6E+3		3.0E+7	

**Daily Geomagnetic Data**

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	05 June	22	4-3-4-3-4-2-4-4	25	3-4-3-5-5-3-3-3	26
06 June	13	3-3-3-3-3-3-2-1	14	3-3-2-4-4-3-1-1	16	4-3-3-4-3-4-3-2
07 June	13	2-1-3-2-3-3-3-4	11	2-2-3-3-3-2-2-3	14	2-2-4-3-3-3-3-4
08 June	34	2-4-4-5-6-4-4-4	79	2-3-6-7-7-7-6-4	53	3-4-4-7-7-6-5-4
09 June	4	1-1-1-1-1-1-0-2	8	1-2-3-2-3-2-0-2	8	2-2-2-2-3-3-2-3
10 June	16	3-3-4-3-4-2-3-2	38	4-4-5-6-5-5-3-3	25	4-3-5-5-4-3-3-3
11 June	22	2-3-2-4-3-5-5-2	40	3-3-5-6-6-5-4-2	32	3-3-3-6-5-5-5-3



### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
05 Jun 0021	CONTINUED Electron Event $>2\text{MeV} \geq 1000\text{pfu}$	30 May 1340
05 Jun 0423	Type II Radio Emission	05 Jun 0320
05 Jun 0602	K= Observed	05 Jun 03 -6
05 Jun 0829	Type IV Radio Emission	05 Jun 0340
05 Jun 1513	$A \geq 20$ Observed	05 Jun 1500
05 Jun 2048	K = 4 Warning	05/2100 -06/1500
06 Jun 0300	ENDED $A \geq 20$ Observed	05 Jun 1500
06 Jun 1207	K = 4 Observed	06 Jun 09 -12
06 Jun 1353	X-Ray event X1.1/2B	06 Jun 1339
06 Jun 1416	X-Ray event M7.1/2N	06 Jun 1401
06 Jun 1542	X-Ray event X2.3/3B	06 Jun 1525
06 Jun 1552	Proton Event $>10\text{MeV} \geq 10\text{pfu}$ Warning	06/1700 – 07/0300 Jun
06 Jun 1559	10cm Radio Burst 560 F.U.	06 Jun 1333
06 Jun 1801	$A \geq 20$ Observed	06 Jun 1800
06 Jun 1801	K = 5 Observed	06 Jun 18-21
06 Jun 1939	Type II Radio Emission	06 Jun 1523
06 Jun 1952	$A \geq 20$ Watch	11 Jun
06 Jun 1952	$A \geq 30$ Watch	08 Jun
06 Jun 1952	$A \geq 50$ Watch	09 Jun
06 Jun 2050	Type IV Radio Emission	06 Jun 1633
06 Jun 2113	ENDED $A \geq 20$ Observed	06 Jun 1800
07 Jun 0246	Proton Event $>10\text{MeV} \geq 10\text{pfu}$ Warning	07 Jun 0246 -1500
07 Jun 1609	X-Ray event X1.2/3B	07 Jun 1553
07 Jun 1643	10cm Radio Burst 200 F.U.	07 Jun 1642
07 Jun 1650	Protons Event $>10 \text{ MeV} \geq 10\text{pfu}$	07 Jun 1335
07 Jun 1708	Type II Radio Emission	07 Jun 1550
07 Jun 1834	Type IV Radio Emission	07 Jun 1601
08 Jun 0005	K-Index of 4 Observed	07 Jun 21 -00
08 Jun 0039	CONTINUED Protons Event $>10 \text{ MeV} \geq 10\text{pfu}$	07 Jun 1335
08 Jun 0414	K = 4 Warning	08 Jun 0430 -1500
08 Jun 0922	K = 5 Warning	08 Jun 0930 - 1500
08 Jun 0948	Sudden Impulse observed at Boulder	08 Jun 0909
08 Jun 1035	$K \geq 6$ Warning	08 Jun 1040 -1500
08 Jun 1101	$A \geq 50$ Watch	08 Jun
08 Jun 1200	$A \geq 20$ Observed	08 Jun 1200
08 Jun 1200	K = 5 Observed	08 Jun 09-12
08 Jun 1325	Extended K = 5 Warning	08/0930 – 09/1800 Jun
08 Jun 1429	$A \geq 30$ Warning	08/1500-09/1500 Jun
08 Jun 2101	$A \geq 30$ Observed	08 Jun 2100
09 Jun 0026	CONTINUED Protons Event $>10 \text{ MeV} \geq 10\text{pfu}$	07 Jun 1335
09 Jun 0730	ENDED Protons Event $>10 \text{ MeV} \geq 10\text{pfu}$	07 Jun 1335
09 Jun 1507	ENDED $A \geq 20$ Observed	08 Jun 1200
10 Jun 0115	K = 4 Warning	10 Jun 1500

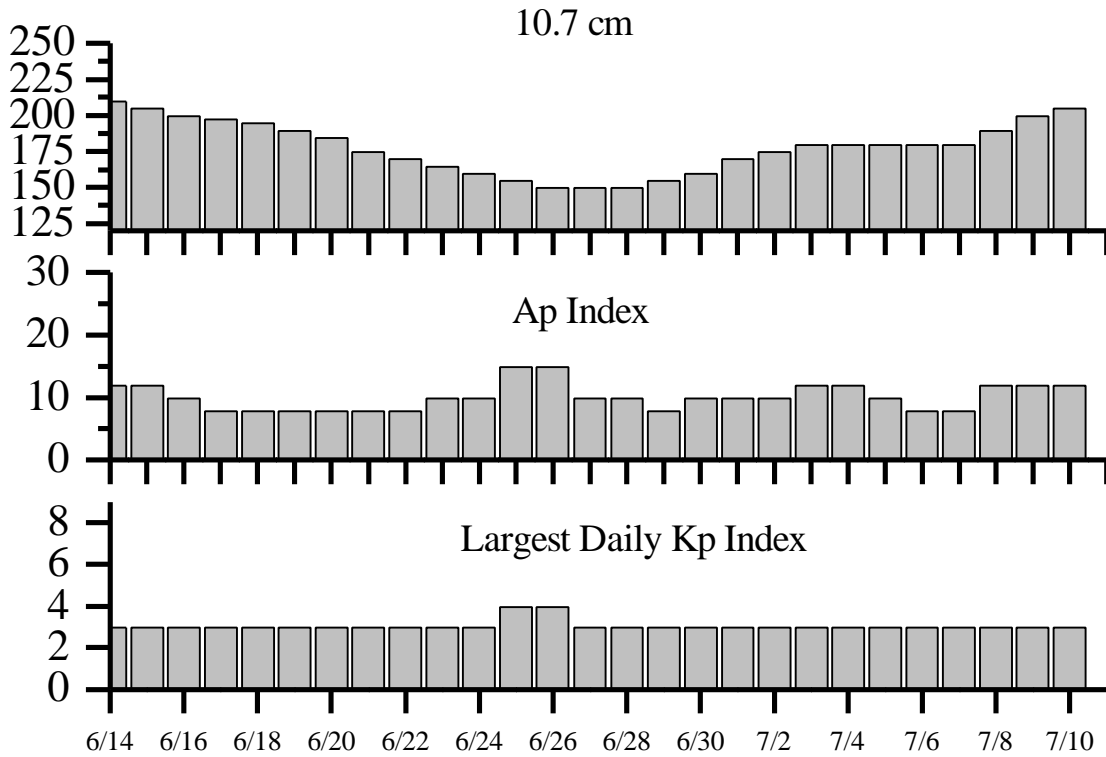


*Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
10 Jun 0600	K = 4 Observed	10 Jun 03 - 06
10 Jun 0900	K = 5 Observed	10 Jun 06 -09
10 Jun 1200	A $\geq$ 20 Observed	10 Jun 1200
10 Jun 1200	K = 5 Observed	10 Jun 09-12
10 Jun 1736	X-Ray event M5.2/3B	10 Jun 1702
10 Jun 1805	Type II Radio Emission	10 Jun 1655
10 Jun 1805	X-Ray event M5.2/3B/N21W39	10 Jun 1702
10 Jun 1810	Proton Event >100 MeV @ >1pfu	10 Jun 1750
10 Jun 1824	Proton Event >10 MeV @ $\geq$ 10pfu	10 Jun 1805
10 Jun 1834	10cm Radio Burst 550 F.U.	10 Jun 1655
10 Jun 2100	ENDED Proton Event >100 MeV @ >1pfu	10 Jun 1750
11 Jun 0103	CONTINUED Proton Event >10 MeV $\geq$ 10pfu	10 Jun 1805
11 Jun 0605	K=4 Observed	11 Jun 03 - 06
11 Jun 0908	ENDED A $\geq$ 20 Observed	10 Jun 1200
11 Jun 1242	K= 4 Warning valid from	11 Jun 1300 -2359
11 Jun 1457	ENDED Proton Event >10 MeV $\geq$ 10pfu	10 Jun 1805
11 Jun 1506	K= 4 Observed	11 Jun 12 - 15
11 Jun 1610	Electron Event >2MeV $\geq$ 1000pfu	11 Jun 1550
11 Jun 1806	A $\geq$ 20 Observed	11 Jun 1800
11 Jun 2017	K= 5 Warning	11/0016 -12 /1500 Jun
11 Jun 2104	K = 5 Observed	11 Jun 18 -21
11 Jun 2106	A $\geq$ 20 Watch	13 Jun



## Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
14 June	210	12	3	28 June	150	10	3
15	205	12	3	29	155	8	3
16	200	10	3	30	160	10	3
17	198	8	3	01 July	170	10	3
18	195	8	3	02	175	10	3
19	190	8	3	03	180	12	3
20	185	8	3	04	180	12	3
21	175	8	3	05	180	10	3
22	170	8	3	06	180	8	3
23	165	10	3	07	180	8	3
24	160	10	3	08	190	12	3
25	155	15	4	09	200	12	3
26	150	15	4	10	205	12	3
27	150	10	3				



***Energetic Events***

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
									245	2695	II	IV
05 Jun	1351	1359	1411	M1.5	.012	1F	S31W46	9031				
06 Jun	1310	1319	1328	M2.7	.019			9026				
06 Jun	1330	1339	1346	X1.1	.081	2N	N18E12	9026	54	560		
06 Jun	1356	1401	1411	M7.1	.050			9026				
06 Jun	1458	1525	1540	X2.3	.360	3B	N20E18	9026	320	2300	2	3
07 Jun	0437	0444	0452	M2.2	.012	1B	S31W69	9031		120		
07 Jun	1534	1553	1606	X1.2	.140	3B	N23E03	9026	97	200	3	1
10 Jun	1640	1702	1719	M5.2	.073	3B	N22W38	9026	110	550	3	
11 Jun	1038	1049	1057	M1.0	.008	1F	N23E07	9033		23		

***Flare List***

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn
	Begin	Max	End				
05 June	0249	0255	0258	C5.4			
	0314	0318	0416	C4.5	1F	S11W32	9024
	0358	0405	0421		SF	N20E30	9026
	0523	0524	0527	C1.6	SF	N24E80	9033
	0711	0715	0720		SF	S32W43	9031
	0805	0823	0854		SF	S31W46	9031
	1042	1043	1053	C1.2	SF	N15W19	9028
	1123	1133	1148	C2.0			
	1218	1220	1226		SF	N19E28	9026
	1312	1316	1326		SF	S30W46	9031
	B1342	U1343	1347		SF	S31W44	9031
	1353	1401	1420	M1.5	1F	S31W46	9031
	1432	1438	1446		SF	S32W47	9031
	1507	1511	1520		SF	N19E24	9026
	1553	1559	1602	C1.8			
	1648	1650	1700		SF	N22E25	9026
	1823	1834	1907	C3.8	1F	N19E22	9026
	2146	2148	2153	C2.1	SF	N23E76	9033
	2239	2242	2247		SF	S11W43	9024
06 June	0021	0039	0102	C4.6	1F	S14W44	9024
	0130	0149	0201	C2.4			
	0420	0424	0434		SF	N25E71	9033
	0521	0521	0531		SF	S10E77	9034
	0808	0813	0843	C2.8	SF	N21E16	9026
	0848	0848	0857	C2.4	SF	N19E14	9026
	0911	0912	0922		SF	N22E19	9026
	1123	1127	1129	C1.8			9026
	1128	1333	1450	X1.1	2N	N18E12	9026
1140	1145	1151	C2.5			9026	



*Flare List – continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
06 June	1200	1218	1225	C7.5			9026
	1206	1521	1843	X2.3	3B	N20E18	9026
	1310	1319	1328	M2.7			9026
	1356	1401	1411	M7.1			9026
	2034	2036	2048		SF	N20E06	9026
	2059	2100	2103		SF	S15W55	9024
	2128	2129	2132		SF	S15W54	9024
07 June	0237	0252	0259	C2.2			
	0357	0401	0416	C2.8	SF	S31W69	9031
	0431	0442	0535	M2.2	1B	S31W69	9031
	1013	1014	1018		SF	N18E01	9026
	1200	1202	1207	C2.1	SF	N21E04	9026
	1223	1224	1226		SF	N20E05	9026
	1230	1232	1251	C1.7	SF	N21E03	9026
	1504	1546	1851	X1.2	3B	N23E03	9026
	1707	1712	1728		SF	N20E50	9033
	1711	1711	1719		SF	S32W72	9031
	2107	2120	2133	C2.1	SF	N19W05	9026
	2134	2135	A2158		SF	N25E59	9033
	B2214	U2219	A2221		SF	N12W52	9028
	2332	2332	2338		SF	N25E59	9033
08 June	0021	0024	0031		SF	N12E04	9030
	0052	0104	0122	C4.7			
	0141	0141	0153	C3.0	SF	S15W66	9024
	0215	0217	0231	C2.5	SF	N14W56	9028
	0435	0436	0445	C2.0	SF	N21W06	9026
	0526	0527	0558	C2.2	SF	N20W10	9026
	0825	0826	0836		SF	N22W08	9026
	0835	0836	0839		SF	N22E39	9033
	0842	0842	0850		SF	N22W08	9026
	0941	0941	0953	C2.5	SF	N23W08	9026
	1232	1233	1241	C1.3	SF	S15W77	9024
	1341	1344	1351		SF	N21W09	9026
	1509	1525	1542	C1.5			
	1517	1556	1627	C1.7	SF	N20W11	9026
	1722	1726	1755		SF	N20W16	9026
	1805	1809	1838	C1.3	SF	N22E43	9033
	2302	2302	2359	C2.0	SF	N22W14	9026
09 June	0213	0214	0223		SF	N20E31	9033
	0616	0620	0624	B9.1			
	0757	0758	0804		SF	N21W20	9026
	1501	1509	1527		SF	N23W22	9026





*Flare List – continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
09 June	2034	2035	2043	C2.2	SF	N21W27	9026
	2235	2240	2305		SF	N21W29	9026
	2327	2329	2332		SF	N22W64	
	2333	2337	2354		SF	N21W30	9026
10 June	0554	0601	0613	C2.2			
	0906	0910	0914	C1.6			
	1021	1027	1032	C2.6			
	1217	1219	1223	C1.8	SF	S27E63	9036
	1330	1335	1343		SF	S25E64	9036
	1602	1605	1611		SF	S24E64	9036
	1624	1625	1636		SF	N20W41	9026
	1632	1638	1648		SF	S24E62	9036
	1637	1655	1854	M5.2	3B	N22W38	9026
	1828	1828	1840		SF	N19E09	9033
	1832	1844	1854		SF	S21E49	9036
	1905	1917	1921		SF	S21E49	9036
	1947	2002	2021		SF	S24E58	9036
	2216	2218	2221		SF	N21E51	9037
	2223	2225	2235		SF	S23E58	9036
	11 June	0040	0043	0047	C1.6		
0300		0302	0313	C3.8	SF	N13W39	9030
0448		0449	0505		SF	N20E48	9037
0702		0708	0722		SF	N12W41	9030
0927		0927	0933	C2.4	SF	S20E44	9036
B1039		U1043	1109	M1.0	1F	N23E07	9033
B1251		U1252	A1307	C7.2	1F	N14W45	9030
1342		1343	1347		SF	N16W05	9033
1438		1439	1454		SF	N20W02	9033
1523		1524	1530		SF	S24E48	9036
1555		1557	1604		SF	N21E03	9033
1632		1637	1642	C3.7			
1740		1740	1744		SF	N22E10	9033
1743		1749	1752		SF	N07W07	9039
1816		1817	1834	C2.9	SF	N25E10	9033
1832		1839	1908		SF	N16W07	9041
1909		1911	1923		SF	N17W08	9041
2137		2148	2200		SF	N17W10	9041
2143		2143	2149		SF	N25E08	9033
2352		2355	0004	C1.8			



### Region Summary

Date	Location		Sunspot Characteristics				Flares													
	( ° Lat ° CMD)	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical									
		Lon						C	M	X	S	1	2	3	4					
<i>Region 9017</i>																				
24 May	S14E76	179	0170	03	HSX	001	A	1				2								
25	S15E68	174	0560	13	EHO	007	B	3				7								
26	S14E55	174	0610	13	EKO	010	B	1				5								
27	S13E42	174	0520	15	EKO	020	B					2								
28	S13E28	175	0710	15	EKO	026	BG	2				3								
29	S13E16	173	0660	16	FKO	028	BG	1				3								
30	S13E02	174	0650	16	FKO	025	BG													
31	S13W10	173	0680	16	FKO	027	B													
01 Jun	S13W23	173	0610	16	FKO	025	B					2								
02 Jun	S12W36	173	0570	15	EKO	017	BG					1								
03 Jun	S12W49	173	0480	15	CKO	012	B													
04 Jun	S13W64	174	0410	13	CKO	006	B													
05 Jun	S13W81	178	0310	04	HHX	001	A													
06 Jun	S13W94	178	0180	02	HSX	001	A													
								8	0	0	25	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 174

#### *Region 9021*

28 May	N03E17	186	0010	03	BXO	005	B													
29	N03E05	184	0010	03	BXO	003	B													
30	N04W10	186	0000	01	AXX	002	A													
31	N04W23	186																		
01 Jun	N04W36	186																		
02 Jun	N04W49	186																		
03 Jun	N04W62	186																		
04 Jun	N04W75	186																		
05 Jun	N04W88	186																		
								0	0	0	0	0	0	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 184



**Region Summary-continued**

Date	Location		Sunspot Characteristics				Flares												
	( ° Lat ° CMD)	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical								
		Lon						C	M	X	S	1	2	3	4				
	<i>Region</i>	<i>9022</i>																	
28 May	S22E66	137	0020	01	BXO	003	B					4							
29	S22E52	137	0040	04	CSO	006	B					2							
30	S22E40	136	0040	06	CSO	008	B					1							
31	S22E25	138	0030	04	CSO	008	B												
01 Jun	S22E10	140	0010	03	BXO	004	B												
02 Jun	S22W03	140	0010	04	BXO	003	B												
03 Jun	S22W16	140																	
04 Jun	S22W29	140																	
05 Jun	S22W42	140																	
												0	0	0	7	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 140

*Region 9024*

29 May	S14E55	134	0000	00	AXX	001	A											
30	S15E42	134	0000	00	AXX	001	A											
31	S15E29	134	0000	00		000												
01 Jun	S17E16	134	0010	02	AXX	003	A	1							1			
02 Jun	S14W00	137	0030	05	DSO	008	B											
03 Jun	S12W17	141	0090	07	DSO	010	B											
04 Jun	S11W31	141	0100	08	DSO	009	B					1						
05 Jun	S12W45	142	0060	08	DSO	008	B	1				1	1					
06 Jun	S13W58	142	0180	11	ESO	011	B	1				2	1					
07 Jun	S14W70	141	0100	10	DAO	008	B											
08 Jun	S14W83	141	0090	10	CRO	006	B	2				2						
								5	0	0	6	2	1	0	0			

Crossed West Limb.

Absolute heliographic longitude: 137



**Region Summary-continued**

Date	Location		Sunspot Characteristics				Flares										
	(° Lat ° CMD)	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
		Lon						C	M	X	S	1	2	3	4		
<i>Region 9026</i>																	
01 Jun	N19E75	075	0260	07	DKO	003	B	3	1		11	1					
02 Jun	N20E61	076	0720	15	EKO	008	B	1	3		4	2	1				
03 Jun	N20E48	076	0910	15	EKO	017	BG	7	2		12	2	1				
04 Jun	N21E36	074	0870	16	FKI	027	BGD	7	1		9						
05 Jun	N21E23	074	0820	15	EKC	022	BGD	1			4	1					
06 Jun	N20E10	074	0800	16	FKI	022	BGD	5	2	2	4		1	1			
07 Jun	N20W03	074	0630	17	FKC	028	BGD	3		1	5				1		
08 Jun	N22W17	075	0470	16	FAI	040	BGD	5			9						
09 Jun	N22W29	072	0400	15	ESI	033	BG	1			5						
10 Jun	N22W40	070	0200	11	EAO	006	B		1		1		1	1			
11 Jun	N21W52	069	0190	10	DSO	008	B										
								33	10	3	64	6	4	3	0		

Still on Disk.

Absolute heliographic longitude: 004

*Region 9027*

01 Jun	N20E04	146	0010	04	BXO	003	B										
02 Jun	N21W10	147	0010	04	BXO	003	B										
03 Jun	N22W22	146	0010	02	BXO	003	B										
04 Jun	N25W37	147	0000	00	AXX	001	A										
05 Jun	N25W50	147	0000	00		000											
								0	0	0	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 146

*Region 9028*

01 Jun	N06E27	123	0010	03	BXO	002	B										
02 Jun	N08E12	125	0000	03	BXO	003	B	1			1						
03 Jun	N08W01	125	0000	00		000											
04 Jun	N10W14	124	0000	00	AXX	001	A										
05 Jun	N13W24	121	0020	03	CRO	005	B	1			1						
06 Jun	N13W38	122	0020	05	CSO	004	B										
07 Jun	N14W52	123	0070	07	DAO	008	B				1						
08 Jun	N13W65	123	0070	08	DAO	008	B	1			1						
09 Jun	N16W79	122	0050	08	CAO	004	B										
10 Jun	N16W92	122	0000	00		000											
								3	0	0	4	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 125



***Region Summary-continued***

Date	Location		Sunspot Characteristics				Flares							
	° Lat ° CMD)	Helio Lon	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
								C	M	X	S	1	2	3

*Region 9030*

03 Jun	N11E58	066	0010	05	BXO	004	B														2	
04 Jun	N10E44	066	0030	07	BXO	008	B															
05 Jun	N12E30	067	0010	04	BXO	003	B															
06 Jun	N12E17	067	0000	00		000																
07 Jun	N11E07	064	0000	00	AXX	001	A															
08 Jun	N11W07	065	0000	00	AXX	001	A															1
09 Jun	N12W24	067	0020	04	DSO	006	B															
10 Jun	N12W39	069	0040	07	DAO	010	B															
11 Jun	N12W51	068	0020	07	CRO	010	B	2														2 1
								2	0	0	0	5	1	0	0	0						0

Still on Disk.

Absolute heliographic longitude: 064

*Region 9031*

04 Jun	S31W40	150	0050	04	DSO	004	B																3
05 Jun	S32W52	149	0080	07	DSO	008	B		1														5 1
06 Jun	S32W65	149	0110	06	CSO	005	B																
07 Jun	S32W78	149	0080	05	CAO	004	B	1	1														2 1
08 Jun	S33W91	149	0120	07	CAO	004	B																
								1	2	0	10	2	0	0	0								0

Crossed West Limb.

Absolute heliographic longitude: 150

*Region 9032*

05 Jun	S18E41	056	0010	03	BXO	003	B																	
06 Jun	S16E25	059	0030	03	CSO	004	B																	
07 Jun	S17E13	058	0030	04	DSO	006	B																	
08 Jun	S17W01	059	0030	05	CSO	008	B																	
09 Jun	S17W16	059	0020	07	CSO	008	B																	
10 Jun	S16W28	058	0020	05	CSO	005	B																	
11 Jun	S17W37	054	0000	01	AXX	001	A																	
								0	0	0	0	0	0	0	0	0							0	

Still on Disk.

Absolute heliographic longitude: 059



**Region Summary-continued**

Date	Location		Sunspot Characteristics				Flares							
	° Lat ° CMD	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
		Lon						C	M	X	S	1	2	3

*Region 9033*

05 Jun	N24E77	020	0120	06	HAX	002	A	2			2						
06 Jun	N22E63	021	0290	15	FSO	005	B				1						
07 Jun	N22E55	016	0380	15	EKO	009	B				3						
08 Jun	N22E42	016	0460	16	EKI	030	B	1			2						
09 Jun	N22E28	015	0550	18	FKC	043	BG				1						
10 Jun	N22E17	013	0560	18	FKC	043	BG				1						
11 Jun	N22E01	016	0540	20	FKO	043	BG	1	1		6	1					
								4	1	0	16	1	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 016

*Region 9034*

06 Jun	S10E68	016	0060	02	HSX	001	A				1						
07 Jun	S10E54	017	0090	02	HSX	001	A										
08 Jun	S10E41	017	0080	02	HSX	001	A										
09 Jun	S10E27	016	0080	02	HSX	001	A										
10 Jun	S10E15	015	0070	04	CSO	005	B										
11 Jun	S10E01	016	0120	02	HSX	002	A										
								0	0	0	1	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 016

*Region 9035*

08 Jun	S17E15	043	0020	03	BXO	004	B										
09 Jun	S18E01	042	0030	06	DAO	006	B										
10 Jun	S17W12	042	0030	08	DSO	006	B										
11 Jun	S16W25	042	0010	08	CRO	003	B										
								0	0	0	0	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 042

*Region 9036*

08 Jun	S23E73	345	0080	02	HSX	001	A										
09 Jun	S23E60	343	0170	03	HAX	002	A										
10 Jun	S24E52	338	0220	14	CAO	009	B	1			8						
11 Jun	S23E40	337	0280	11	EAO	011	B	1			2						
								2	0	0	10	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 337



**Region Summary-continued**

Date	Location		Sunspot Characteristics				Flares								
	° Lat ° CMD	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical				
		Lon						C	M	X	S	1	2	3	4
<i>Region 9037</i>															
10 Jun	N18E51	339	0020	01	HSX	001	A				1				
11 Jun	N19E36	341	0100	05	DSO	008	B				1				
								0	0	0	2	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 341															
<i>Region 9038</i>															
11 Jun	N15W29	046	0030	04	CAO	005	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 046															
<i>Region 9039</i>															
11 Jun	N07W10	027	0040	04	DSO	004	B				1				
								0	0	0	1	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 027															
<i>Region 9040</i>															
11 Jun	N19E73	304	0090	02	HSX	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 304															
<i>Region 9041</i>															
11 Jun	N17W11	028	0020	04	BXO	008	B				3				
								0	0	0	3	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 028															



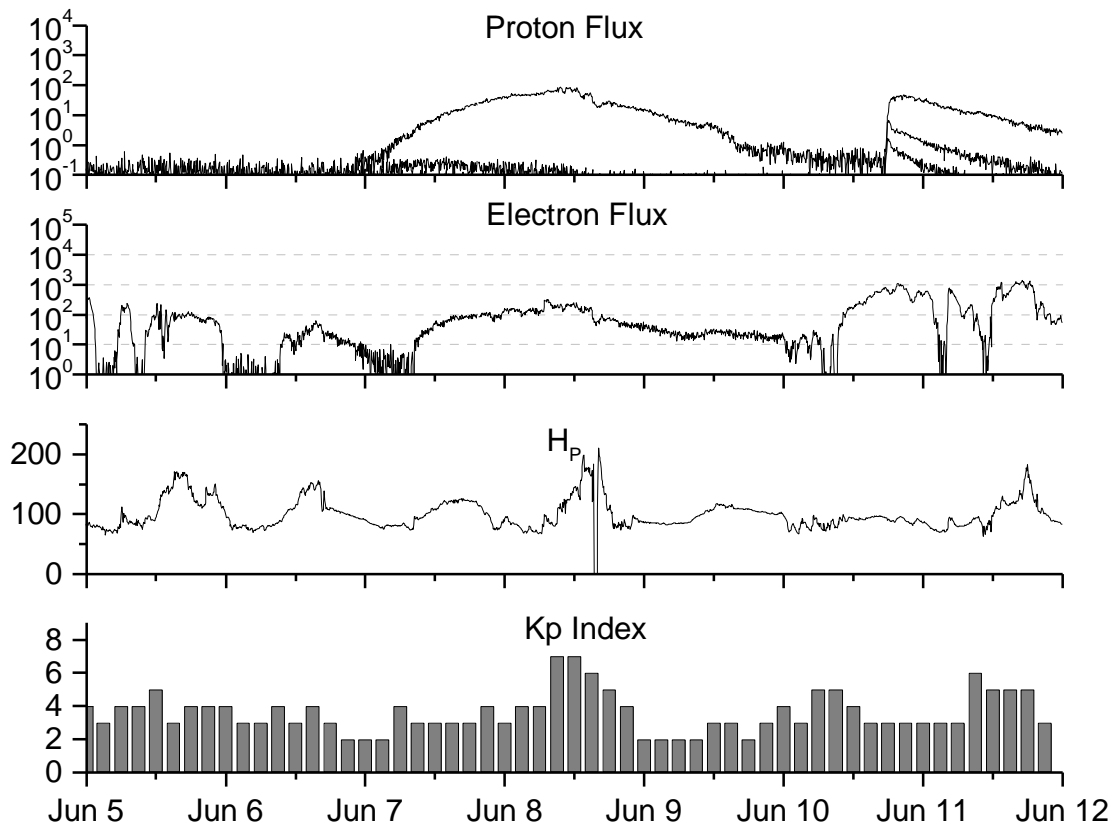
**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers				Radio Flux		Geomagnetic		
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
<b>1998</b>									
June	93.6	70.7	0.76	85.9	62.5	108.4	115.8	10	11.9
July	98.3	66.6	0.68	90.3	65.5	114.0	120.3	11	12.2
August	118.6	92.2	0.78	93.7	67.8	136.0	124.1	18	12.4
September	119.0	92.9	0.78	96.1	69.5	138.3	126.8	13	12.6
October	77.0	55.5	0.72	97.7	70.5	117.3	127.9	13	12.8
November	99.5	74.0	0.74	101.3	73.0	140.2	130.0	16	12.4
December	120.8	81.9	0.68	108.8	77.9	150.1	134.3	08	11.9
<b>1999</b>									
January	94.3	62.0	0.66	116.5	82.6	142.6	139.0	10	11.7
February	93.4	66.3	0.71	120.2	84.6	142.0	142.6	12	11.6
March	100.5	68.8	0.68	120.5	83.8	126.3	144.0	14	11.7
April	92.9	63.7	0.69	123.8	85.5	117.2	145.8	12	12.2
May	140.5	106.4	0.76	131.7	90.5	148.6	149.9	08	12.4
June	208.3	137.7	0.66	136.0	93.1	169.8	152.9	07	12.4
July	169.2	113.5	0.67	138.0	94.4	165.6	154.4	10	12.6
August	136.1	93.7	0.69	142.8	97.5	170.8	156.3	15	12.9
September	107.4	71.5	0.66	150.0	102.3	135.7	161.0	19	12.8
October	167.7	116.7	0.69	158.5	107.7	164.8	167.2	19	12.7
November	199.3	133.2	0.67	164.7	110.9	191.5	171.5	14	13.2
December	123.5	86.4	0.70			169.8		10	
<b>2000</b>									
January	140.8	90.2	0.64			158.1		13	
February	161.9	112.3	0.69			173.2		15	
March	203.6	138.2	0.68			208.2		09	
April	193.4	125.3	0.65			184.2		15	
May	188.8	120.8	0.64			184.5		16	

**NOTE:** All smoothed values after June 1999 and monthly values after December 1999 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 22, RI = 158.5, occurred July 1989. \* After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.







*Weekly Geosynchronous Satellite Environment Summary*  
*Week Beginning 05 June 2000*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

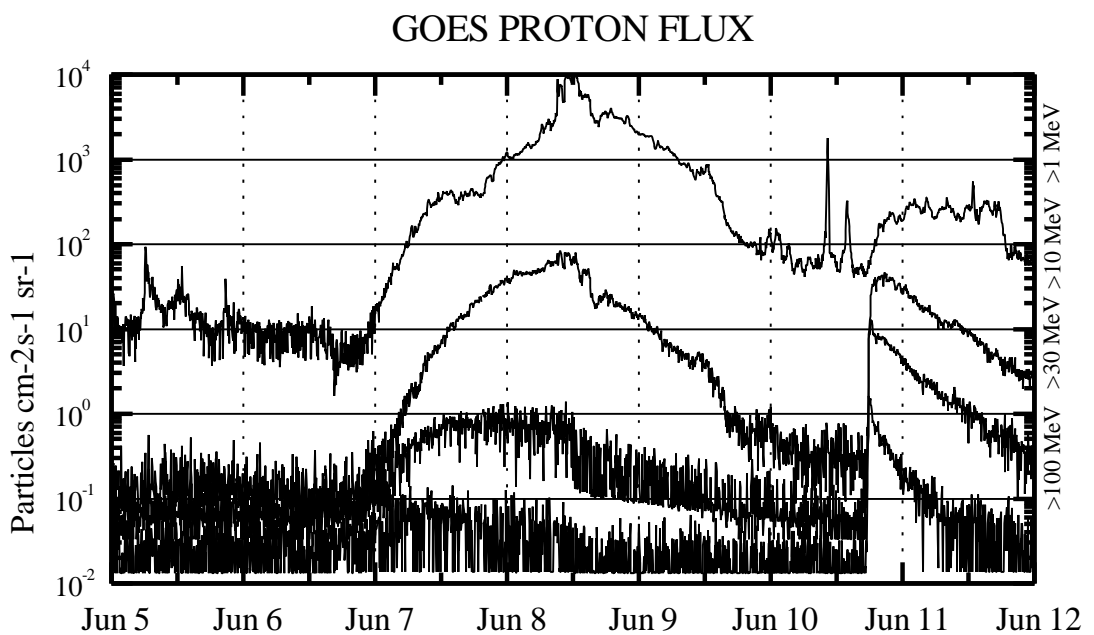
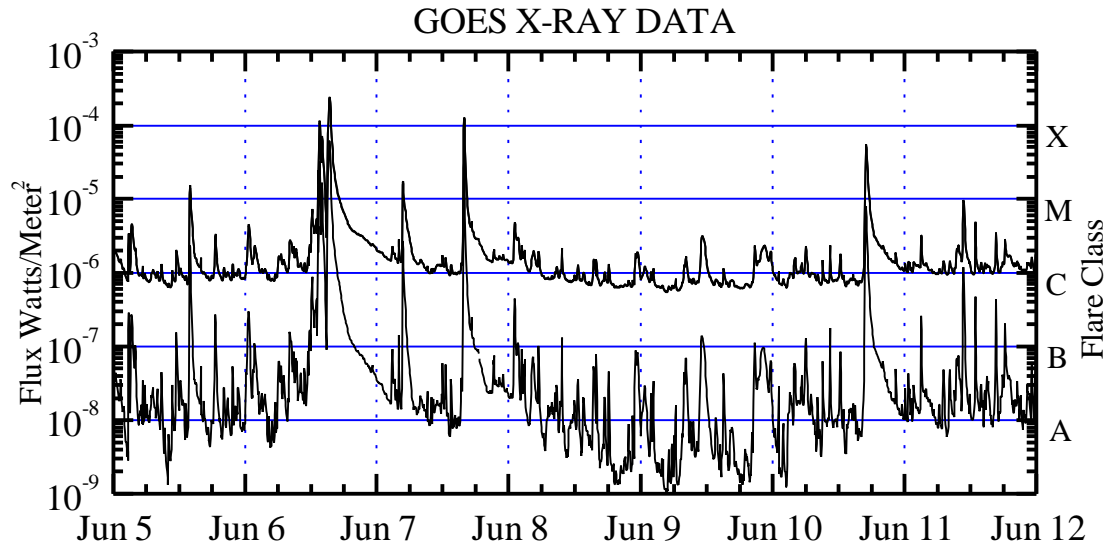
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV at GOES-8.

*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-8. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*K<sub>p</sub>* plot contains the estimated planetary 3-hour K-index (derived by the USAF 55<sup>th</sup> Space Weather Squadron) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Heartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC) and the US Geological Survey. These may differ from the final K<sub>p</sub> values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SWO and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and K<sub>p</sub> are "global" parameters that are applicable to a first order approximation over large areas. H<sub>p</sub> is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





*Weekly GOES Satellite X-ray and Proton Plots*

X-ray plot contains five minute averaged x-ray flux (watts/m<sup>2</sup>) as measured by GOES 8 and 10 in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-8 (W75) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.

