

Space Weather Highlights 19 - 25 August 2002

**SWO PRF 1408
27 August 2002**

Solar activity was at high levels on 20 – 22 August and again on 24 August. Region 69 (S08, L=299, class/area Ekc/1990, on 19 August) produced an X3/1f on 24 August with an associated 1200 sfu Tenflare, Type II and Type IV radio sweeps, and a full halo CME. Region 69 produced the majority of activity throughout the period including numerous M-class and C-class flare with strong radio components. For flare times and magnitudes, please refer to the Energetic Events or Optical Flare lists. Region 69 was a large and magnetically complex spot group early in the period. It entered a gradual decay phase on 20 August and rotated beyond the west limb on 24 August. Other regions of interest were Region 83 (S19, L=231, class/area Fao/170 on 23 August) and Region 87 (S07, L156, class/area Dki/410 on 25 August). Region 83 produced a number of M-class events and developed a beta-gamma magnetic configuration. At the close of the period Region 87 was a moderately sized spot group with a beta-gamma magnetic configuration.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. At the beginning of the period solar wind velocity was elevated to around 550 km/s due to residual CME shock activity on 18 August. Solar wind velocities continued a steady decline until approximately 1700 UTC on 20 August when a small transient shock was observed. Following the transient the IMF entered an 18-hour period of negative Bz. Solar wind velocities were variable on 22 August then continued a steady decline to near 300 km/s at the close of the summary period.

Two proton events were observed this period. The first occurred on 22 August from an M5/2b flare from Region 69. The 10 MeV proton event began at 22/0440 UTC, reached a peak value of 36 pfu at 22/0940 UTC and ended at 23/0040 UTC. A 100 MeV proton event began at 22/0340 UTC, reached a peak value of 1.7 pfu at 22/0510 UTC and ended at 22/0615 UTC. The second proton event was due to the X3/1f flare on 24 August. The 10 MeV proton event began at 24/0140 UTC, reached a peak value of 317 pfu at 24/0835 UTC and was still in progress at the close of the summary period. A 100 MeV also began at 24/0130 UTC, reached a peak value of 29 pfu at 24/0210 UTC, and ended at 24/1825 UTC.

The greater than 2 MeV electron flux at geo-synchronous orbit was at normal to moderate levels throughout the summary period.

The geomagnetic field was at quiet to severe storming levels. Active to minor storming conditions were prevalent on 19 August due to CME shocks that arrived on 18 August. Active to severe storming conditions on 20-21 August were the result of the 18 hour period of negative Bz mentioned above. Geomagnetic activity was mostly quiet to unsettled for the remainder of the summary period (22-25 August).

Space Weather Outlook 28 August - 23 September 2002

Solar activity is expected to be at low to moderate levels for most of the forecast period. There is a chance of high activity, with the return of old Region 69, on 07-22 September.

There is also a chance for greater than 10 MeV proton events in the latter half of the forecast period with the return of Region 69.

The greater than 2 MeV electron flux at geo-synchronous orbit is expected to be at normal to moderate levels during most of the forecast period. However, high flux levels are possible beginning 09 September due to a recurring coronal hole.

The geomagnetic field is expected to be at quiet to unsettled levels for most of the period. Active conditions are possible on 05-08 September due to a recurring coronal hole.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
19 August	237	247	3420	C1.7	11	2	0	16	1	0	0	0
20 August	228	209	2940	C1.5	18	4	0	18	5	0	0	0
21 August	220	238	2710	C1.8	12	1	1	17	2	0	0	0
22 August	220	205	2570	C1.9	14	2	0	26	2	1	0	0
23 August	225	207	2370	C1.7	8	5	0	39	1	4	0	0
24 August	196	199	1440	C3.0	5	2	1	8	2	0	0	0
25 August	179	136	1380	C1.1	4	2	0	5	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day-sr)			Electron Fluence (electrons/cm ² -day-sr)		
	>1MeV	>10MeV	>100MeV	>6MeV	>2MeV	>4MeV
19 August	2.7E+7	1.6E+5	2.8E+3		2.2E+6	
20 August	4.1E+6	6.7E+4	2.4E+3		9.7E+6	
21 August	2.1E+6	1.9E+4	2.5E+3		2.6E+6	
22 August	4.5E+6	1.3E+6	3.9E+4		5.7E+6	
23 August	1.9E+6	2.4E+5	5.2E+3		2.0E+7	
24 August	4.7E+7	1.7E+7	4.0E+5		1.9E+7	
25 August	7.0E+7	6.8E+6	2.1E+4		4.2E+7	

Daily Geomagnetic Data

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
19 August	20	3-3-5-3-3-2-3-4	50	4-5-7-5-5-4-3-5	27	4-4-5-4-4-3-4-4
20 August	16	4-4-1-2-1-2-4-4	28	4-4-5-5-2-3-4-4	23	4-4-2-3-2-4-5-5
21 August	19	4-3-5-2-3-2-3-3	50	3-6-7-6-5-3-2-3	41	5-5-7-4-5-3-4-3
22 August	8	3-2-3-1-1-2-2-1	8	4-3-2-2-0-1-1-1	11	4-3-3-2-2-2-3-3
23 August	6	1-1-1-2-2-1-3-2	7	1-2-3-2-1-1-2-2	11	2-3-2-2-3-3-3-3
24 August	3	2-0-0-1-1-1-1-1	4	2-1-2-2-2-0-0-0	11	3-2-2-2-3-3-3-3
25 August	4	0-1-2-1-1-1-1-2	7	4-1-2-2-1-1-0-1	9	2-2-2-2-2-3-3-3



Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
19 Aug 0028	15 - 245 MHz Bursts	18 Aug
19 Aug 0028	1- 245 MHz Noise Storms	18 Aug
19 Aug 1759	EXTENDED WARNING: Geomagnetic K= 4	18 Aug 2040 - 2359
19 Aug 2319	CANCEL WARNING: Geomagnetic K= 4	18 Aug 2035
20 Aug 0027	4- 245 MHz Bursts	19 Aug
20 Aug 0027	2- 245 MHz Noise Storms	19 Aug
20 Aug 0141	ALERT: X-Ray Flux exceeded M5	20 Aug 0141
20 Aug 0150	SUMMARY: X-ray Event exceeded M5	20 Aug 0140
20 Aug 0230	ALERT: Geomagnetic K= 4	20 Aug 0229
20 Aug 0436	ALERT: Geomagnetic K= 4	20Aug 0435
20 Aug 0438	WARNING: Geomagnetic K= 4 expected	20 Aug 0440 -1500
20 Aug 2052	ALERT: Geomagnetic K= 4	20 Aug 2050
20 Aug 2054	WARNING: Geomagnetic K= 4 expected	20/2055 - 21/1500 Aug
21 Aug 0210	ALERT: Type II Radio Emission	21 Aug 0154
21 Aug 0334	WARNING: Geomagnetic K= 5 expected	21 Aug 0335 -1500
21 Aug 0351	ALERT: Geomagnetic K= 5	21 Aug 0350
21 Aug 0533	ALERT: X-Ray Flux exceeded M5	21 Aug 0532
21 Aug 0544	ALERT: Type II Radio Emission	21 Aug 0534
21 Aug 0546	SUMMARY: X-ray Event exceeded X1	21 Aug 0534
21 Aug 0600	SUMMARY: 10cm Radio Burst	21 Aug 0531 - 0540
21 Aug 0749	ALERT: Geomagnetic K= 6	21 Aug 0745
21 Aug 1452	EXTENDED WARNING: Geomagnetic K= 4	20/2055 - 21/2359 Aug
21 Aug 1458	EXTENDED WARNING: Geomagnetic K= 5	21 Aug 0335 - 2359
21 Aug 2217	EXTENDED WARNING: Geomagnetic K= 4	20/2055 - 22/1500 Aug
21 Aug 2219	EXTENDED WARNING: Geomagnetic K= 5	21/0335 - 22/1500 Aug
22 Aug 0157	ALERT: X-Ray Flux exceeded M5	22 Aug 0156
22 Aug 0208	SUMMARY: X-ray Event exceeded M5	22 Aug 0157 - 0205
22 Aug 0216	SUMMARY: 10cm Radio Burst	22 Aug 0151 - 0159
22 Aug 0222	ALERT: Type II Radio Emission	22 Aug 0156
22 Aug 0253	ALERT: Type IV Radio Emission	22 Aug 0209
22 Aug 0340	WARNING: Proton 100MeV Integral Flux > 1pfu	22 Aug 0350 - Aug 22 1500
22 Aug 0358	ALERT: Proton Event 100MeV Integral Flux > 1pfu	22 Aug 0357
22 Aug 0421	WARNING: Proton 10MeV Integral Flux > 10pfu	22 Aug 0430 - 2359
22 Aug 0456	ALERT: Proton Event 10MeV Integral Flux > 10pfu	22 Aug 0455
22 Aug 1526	SUMMARY: Proton Event 100MeV Integral Flux > 1pfu	22 Aug 0510
22 Aug 2125	WATCH: Geomagnetic A ≥ 20	24 Aug
22 Aug 2338	EXTENDED WARNING: Proton 10MeV Integral Flux > 10pfu	22/0430 - 23/1800 Aug
23 Aug 0102	CONTINUED ALERT: Proton Event 10MeV Integral Flux >10pfu	22 Aug 0455
23 Aug 0638	ALERT: Type II Radio Emission	23 Aug 0550
23 Aug 1414	SUMMARY: Proton Event 10MeV Integral Flux >10pfu	22 Aug 0940
23 Aug 1610	CANCEL WARNING: Proton 10MeV Integral Flux > 10pfu	22 Aug 0421
23 Aug 1741	ALERT: Type IV Radio Emission	23 Aug 1415
24 Aug 0100	ALERT: X-Ray Flux exceeded M5	24 Aug 0059
24 Aug 0131	WARNING: Proton 100MeV Integral Flux > 1pfu expected	24 Aug 0131 - 1800
24 Aug 0139	WARNING: Proton 10MeV Integral Flux > 10pfu expected	24 Aug 0139 - 1800
24 Aug 0141	SUMMARY: X-ray Event exceeded X1	24 Aug 0112
24 Aug 0148	ALERT: Proton Event 100MeV Integral Flux > 1pfu	24 Aug 0130
24 Aug 0153	ALERT: Type II Radio Emission	24 Aug 0109
24 Aug 0155	ALERT: Type IV Radio Emission	24 Aug 0115
24 Aug 0156	ALERT: Proton Event 10MeV Integral Flux > 10pfu	24 Aug 0140
24 Aug 0241	SUMMARY: 10cm Radio Burst	24 Aug 0102
24 Aug 0250	ALERT: Proton Event 10MeV Integral Flux exceeded 100pfu	24 Aug 0235
24 Aug 0613	ALERT: Type IV Radio Emission	24 Aug 0542
24 Aug 1725	EXTENDED WARNING: Proton 100MeV Integral Flux > 1pfu	24 Aug 0131 -2359

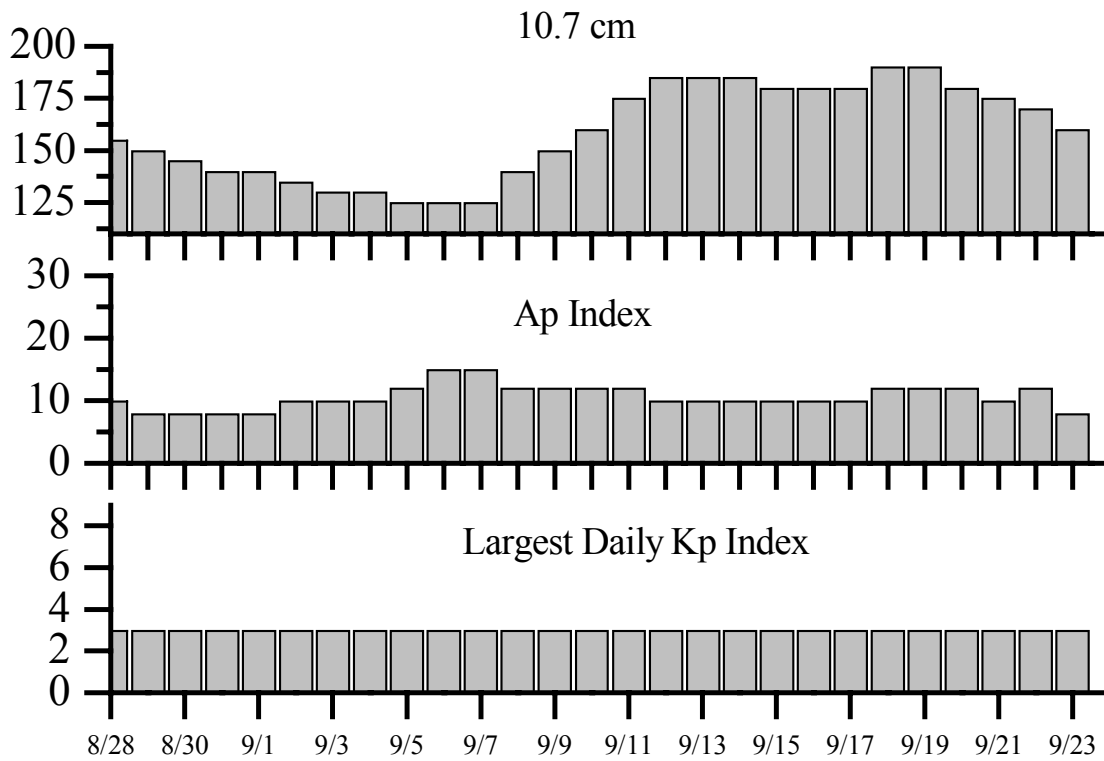


Alerts and Warnings Issued - continued.

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
24 Aug 1727	EXTENDED WARNING: Proton 10MeV Integral Flux > 10pfu	24/0139 - 25/1800 Aug
24 Aug 2314	SUMMARY: Proton Event 100MeV Integral Flux > 1pfu	24 Aug 0210
25 Aug 0012	7 - 245 MHz Bursts	24 Aug
25 Aug 0012	1 - 245 MHz Noise Storms	24 Aug
25 Aug 0115	CONTINUED ALERT: Proton Event 10MeV Integral Flux > 100pfu	24 Aug 0235
25 Aug 0340	ALERT: Type II Radio Emission	25 Aug 0325
25 Aug 1638	EXTENDED WARNING: Proton 10MeV Integral Flux > 10pfu	24/0139 -25/1800 Aug
25 Aug 1713	EXTENDED WARNING: Proton 10MeV Integral Flux > 10pfu	24/0139 - 26/1800 Aug



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
28 Aug	155	10	4	11 Sep	175	12	3
29	150	8	3	12	185	10	3
30	145	8	3	13	185	10	3
31	140	8	3	14	185	10	3
01 Sep	140	8	3	15	180	10	3
02	135	10	3	16	180	10	3
03	130	10	3	17	180	10	3
04	130	10	3	18	190	12	3
05	125	12	3	19	190	12	3
06	125	15	3	20	180	12	3
07	125	15	3	21	175	10	3
08	140	12	3	22	170	12	3
09	150	12	3	23	160	8	3
10	160	12	3				



Energetic Events

Date	Time			X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Class	Integ Flux	Imp/ Brtns	Location		Rgn #	Radio Flux		Intensity	
			Max				Lat	CMD		245	2695	II	IV
19 Aug	1028	1034	1038	M2.0	.006	Sf	S12W25	69	1400	77			
19 Aug	2056	2102	2106	M3.1	.009	1b	S11W33	69	220	21			
20 Aug	0133	0140	0143	M5.0	.012	1n	S11W35	69	21000	58			
20 Aug	0253	0257	0301	M1.4	.005	1n	S10W36	69	63				
20 Aug	0822	0826	0830	M3.4	.009	1b	S10W38	69	1400	160			
20 Aug	1734	1755	1800	C9.9	.009	Sf	S07W45	69					
20 Aug	2053	2114	2124	M1.2	.011	1f	S10E45	85					
21 Aug	0135	0141	0145	M1.4	.005	Sf	S11W47	69	1400	160			
21 Aug	0528	0534	0536	X1.0	.023	1b	S12W51	69	1200	450	1		
22 Aug	0147	0157	0205	M5.4	.033	2b	S07W62	69	260	2			
22 Aug	1739	1802	1815	M1.2	.019	1n	S05E76	87	1200	51			
23 Aug	0531	0549	0554	M1.7	.013	2n	S04E22	85	200	58	2		
23 Aug	0800	0946	1014	M1.5	.088	1n	S07W74	69	100				
23 Aug	1156	1200	1210	M1.2	.008	Sf	S07W75	69					
23 Aug	1305	1314	1324	M1.5	.015	2n	S03E64	87					
23 Aug	2009	2021	2128	M1.4	.041	2f	S17W15	83					
24 Aug	0049	0112	0131	X3.1	.460	1f	S02W81	69	280	1200	2	1	
24 Aug	0538	0548	0559	M1.8	.018	1n	S09E52	87	340	73		2	
24 Aug	1112	1128	1141	M1.5	.016								
25 Aug	1845	1853	1858	M1.1	.005	Sf	S17W40	83	85	46			
25 Aug	2338	2346	2353	M1.9	.012	Sf	S18W42	83	340				

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn
	Begin	Max	End				
19 August	0126	0130	0139	C2.4	Sf	S18E00	0079
	0354	0358	0408	C2.6	Sf	S06W24	0069
	0442	0446	0452	C2.6			
	0501	0510	0521		Sf	N13W53	0066
	0614	0615	0620		Sf	S18E61	0084
	0625	0626	0629	C2.4	Sf	S13E63	
	0806	0807	0816	C2.3	Sf	S20E00	0079
	1031	1041	1103	M2.0	Sf	S12W25	0069
	1124	1124	1148	C1.9	Sf	S09W26	0069
	1148	1151	1154		Sf	S09W27	0069
	1205	1207	1212		Sf	S09W27	0069
	1215	1217	1220		Sf	S07W28	0069
	1258	1301	1309	C3.5	Sf	S09W28	0069
	1417	1417	1426		Sf	S17W04	0079
	1425	1433	1509	C9.5	Sf	S13W30	0069
	1520	1520	1527		Sf	S12W28	0069
	1710	1741	1822	C3.6			
	2038	2041	2045	C2.4			
	B2052	U2102	A2122	M3.1	1b	S11W33	0069



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
19 August	2259	2302	2305	C7.0			
	B2349	U2354	0013		Sf	S07W32	0069
20 August	0135	0144	0217	M5.0	1n	S11W35	0069
	0208	0214	0225	C5.5			0069
	0255	0256	0314	M1.4	1n	S10W36	0069
	0334	0336	0337	C2.6	Sf	S08W36	0069
	0409	0410	0419		Sf	N12W68	0066
	0444	0455	0510		Sf	S18W15	0079
	0445	0454	0502		Sf	N12W66	0066
	0511	0514	0523	C4.0	Sf	S07W37	0069
	0529	0532	0548		Sf	S03W37	0069
	0617	0620	0623	C2.7			0079
	0641	0645	0649		Sf	S10E63	0085
	0805	0807	0809		Sf	S07W40	0069
	0825	0826	0837	M3.4	1b	S10W38	0069
	0933	0936	0938	C1.9			
	0944	0947	0950	C2.6			0079
	1003	1006	1011	C2.0			0079
20 August	1026	1031	1034	C3.3			0079
	1125	1125	1131		Sf	S12W39	0069
	1313	1314	1316		Sf	S06W41	0069
	1429	1438	1508	C5.4	Sf	S17E35	0083
	1547	1552	1555	C3.0			0081
	1558	1600	1616		Sf	N17E13	0081
	B1639	U1641	A1719	C3.3	Sf	S06E62	0085
	1702	1714	1724	C5.2	Sf	S08W44	0069
	B1759	U1759	A1812	C9.9	Sf	S07W45	0069
	1821	1828	1838	C3.3			0069
	2044	2112	2144	M1.2	1f	S10E45	0085
	2114	2115	2129		1f	S09W44	0069
	2206	2211	2213	C3.5			
	2225	2229	2238	C6.2	Sf	S09W45	0069
	2243	2253	2258	C5.4	Sf	S07W48	0069
	2311	2311	2317	C6.4	Sf	S12W45	0069
21 August	0057	0101	0106	C3.3			0069
	0139	0140	0148	M1.4	Sf	S11W47	0069
	0408	0416	0445		1f	S10E40	0084
	0447	0451	0454	C3.6			0083
	0530	0532	0551	X1.0	1b	S12W51	0069
	0554	0555	0558		Sf	S08W53	0069
	0618	0621	0626		Sf	S08W53	0069
	0930	0930	0932		Sf	S07W51	0069
	B1142	U1142	A1153		Sf	S19E16	0083



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn	
	Begin	Max	End		Imp / Brtns	Location Lat CMD		
21 August	1205	1205	1241		Sf	S18E17	0083	
	1205	1206	1236		Sf	S10W54	0069	
	1246	1248	1258	C3.3	Sf	S10W54	0069	
	1300	1309	1311	C3.1	Sf	S10W55	0069	
	1349	1353	1359	C2.5				
	1435	1436	1442		Sf	N10W61	0067	
	1436	1437	1441		Sf	S11E45	0085	
	1443	1445	1449		Sf	S12W55	0069	
	1606	1612	1616	C3.0	Sf	S09W56	0069	
	1701	1701	1705	C3.6	Sf	S14W58	0069	
	1722	1722	1730	C4.8	Sf	S11W60	0069	
	1903	1907	1911	C8.9			0069	
	2102	2102	2105		Sf	S12W64	0069	
	2236	2240	2243	C4.4			0069	
	2323	2326	2329	C3.5			0069	
	2358	2359	0008	C3.1	Sf	S08W61	0069	
	22 August	0013	0016	0019	C3.4			
		0037	0038	0040		Sf	S07W61	0069
		0053	0054	0057		Sf	S10W66	0069
		0105	0113	0119		Sf	S08W62	0069
0144		0159	0208	C3.3	Sf	S18E07	0083	
0151		0153	0225	M5.4	2b	S07W62	0069	
0309		0309	0312	C3.1	Sf	S13W60	0069	
0329		0330	0332		Sf	S07W64	0069	
0359		0402	0406		Sf	S11E41	0085	
0409		0411	0427		Sf	S09E37	0085	
0514		0517	0522	C2.8	Sf	S06E41	0085	
0621		0741	0908	C5.6	1f	S21W41	0079	
0622		0622	0630		Sf	N15W27	0080	
0652		0656	0659		Sf	S06E40	0085	
0716		0716	0726		Sf	S06E39	0085	
0745		0749	0752		Sf	S10W67	0069	
0803		0805	0807	C5.7	Sf	S07W62	0069	
1047		1048	1056	C4.1	Sf	S09E38	0085	
1140		1140	1150		Sf	S07E37	0085	
1157		1157	1204		Sf	S03W66	0069	
1322	1322	1329	C2.9	Sf	S04W67	0069		
1415	1419	1423	C4.8			0069		
1458	1500	1503		Sf	S09W73	0069		
1619	1622	1631	C7.0	Sf	S22W48	0079		
1655	1658	1703	C3.4			0087		
1720	1721	1724		Sf	S05E77	0087		



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
22 August	1739	1751	1842	M1.2	1n	S05E76	0087
	1829	1831	1838		Sf	S21W44	0079
	1830	1830	1850		Sf	S22W44	0079
	1831	1831	1835		Sf	S05E71	0087
	1951	1956	1958	C3.0			
	2035	2038	2044	C4.3	Sf	S12W70	0069
	2054	2055	2103		Sf	S21W46	0079
	2209	2250	2300	C4.5			0069
23 August	0043	0046	0123		Sf	S06E26	0085
	0043	0046	0049	C5.0	Sf	S08W75	0069
	0147	0203	0206		Sf	S07W76	0069
	0236	0239	0244	C3.6			
	0319	0320	0322		Sf	S18W07	0083
	0355	0356	0400		Sf	S03E69	0087
	0418	0420	0430	C9.4	Sf	S07W77	0069
	0432	0436	0440		Sf	S12E12	0084
	0518	0519	0523		Sf	S13E12	0084
	0537	0549	0628	M1.7	2n	S04E22	0085
	0541	0543	0606		Sn	S10W80	0069
	0604	0608	0613		Sf	S17W09	0083
	0619	0623	0712	C8.6	Sn	S03E67	0087
	0624	0625	0631		Sn	S09W81	0069
	0711	0712	0716		Sf	S09W82	0069
	0720	0721	0724		Sf	S09E22	0085
	0728	0731	0733	C3.4			
	0748	0750	0753		Sf	S18W09	0083
	0805	0805	0813		Sf	S18W13	0083
	0823	0823	0827		Sf	S18W58	0079
	0824	0832	0905		Sf	S08E73	0087
	0853	0901	0908		Sf	S09W85	0069
	0855	0856	0858		Sf	S04W77	0068
	0900	0900	0904		Sf	S07W74	0069
	0907	0912	0914		Sf	S07E72	0087
	0916	0918	0921		Sf	S09W86	0069
	0945	0947	0956	M1.5	1n	S07W74	0069
	1106	1106	1111		Sf	S14E09	0084
	1106	1106	1113		Sf	S11W87	0069
	1145	1151	1201	C8.1	Sf	S04W78	0069
	1204	1205	1208	M1.2	Sf	S07W75	0069
	1248	1315	1407	M1.5	2n	S03E64	0087
1307	1307	1311	Sf		S07W82	0069	
1323	1323	1412		2f	S05E61	0087	
1401	1401	1406		Sf	S10W89	0069	



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
23 August	1416	1426	1442		Sn	S08W83	0069
	1444	1448	1456		Sf	S09W79	0069
	1506	1506	1527		Sf	S23W07	0083
	1523	1524	1528		Sf	S10W89	0069
	1543	1544	1549		Sf	S09W89	0069
	1751	1752	1756		Sf	S09W84	0069
	1854	1856	1903	C3.7	Sf	S14E23	0085
	1914	1917	1920	C3.8			
	2004	2004	2019		Sf	S04E60	0087
	2007	2016	2130	M1.4	2f	S17W15	0083
	2026	2031	2034		Sf	S22W29	0088
	2140	2140	2143		Sf	S07W87	0069
	24 August	0002	0005	0025		Sf	S06E12
0055		0103	0123	X3.1	1f	S02W81	0069
0517		0520	0524		Sf	S07E10	0085
0537		0546	0632	M1.8	1n	S09E52	0087
0617		0621	0623		Sf	S08E11	0085
0925		0928	0938		Sf	S06E07	0085
1112		1128	1141	M1.5			
1201		1202	1235		Sf	S17W24	0083
1242		1301	1308	C5.4			
1511		1512	1515	C4.6	Sf	S24W71	0079
1738		1743	1748	C2.9			
1754		1757	1801		Sf	S04E48	0087
1839		1839	1842	C6.0	Sf	S18W27	0083
2103	2108	2114	C3.1				
25 August	0315	0321	0330	C3.1			
	1038	1039	1042		Sf	S19W49	0088
	1059	1118	1152	C3.6			
	1257	1259	1304		Sf	N14W62	0080
	1604	1605	1616	C1.4	Sf	N16W65	0080
	1756	1759	1804	C1.1			
	1851	1855	1910	M1.1	Sf	S17W40	0083
	2340	2345	0009	M1.9	Sf	S18W42	0083



Region Summary

Date	Location		Sunspot Characteristics				Flares										
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
		Lon						C	M	X	S	1	2	3	4		
<i>Region 63</i>																	
06 Aug	N15E75	006	0110	12	Eso	003	B	1			1	1					
07 Aug	N17E66	001	0200	11	Eao	004	B	1			1						
08 Aug	N18E51	003	0220	11	Eao	006	B										
09 Aug	N17E38	003	0250	14	Eao	015	B										
10 Aug	N17E26	001	0220	10	Dao	011	B										
11 Aug	N17E13	001	0160	10	Dso	010	B										
12 Aug	N16E00	001	0130	09	Dao	006	B										
13 Aug	N18W14	002	0180	11	Eao	009	B										
14 Aug	N18W26	001	0110	11	Eso	011	B										
15 Aug	N17W39	360	0140	12	Eso	010	B					1					
16 Aug	N17W51	359	0100	08	Dso	006	B										
17 Aug	N18W62	357	0070	02	Hsx	001	A										
18 Aug	N18W75	357	0080	02	Hax	001	A										
19 Aug	N17W88	357	0060	01	Hsx	001	A										
								2	0	0	3	1	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 001

<i>Region 66</i>																	
09 Aug	N14E70	331	0010	01	Axx	001	A										
10 Aug	N13E57	330	0080	08	Dso	006	B										
11 Aug	N13E42	332	0050	05	Dro	008	B	1			1						
12 Aug	N15E30	331	0030	10	Dro	012	B										
13 Aug	N14E16	332	0070	09	Dao	019	B	1									
14 Aug	N13E03	332	0140	07	Dai	014	Bg	1			2						
15 Aug	N14W10	331	0130	09	Dao	021	B		1		1						
16 Aug	N14W23	331	0090	09	Dso	017	B		1		1						
17 Aug	N13W36	331	0050	06	Dso	013	B				2						
18 Aug	N14W48	330	0060	07	Dao	011	B	1			3						
19 Aug	N14W60	329	0060	04	Dao	005	B				1						
20 Aug	N15W73	329	0040	02	Hsx	003	A				2						
21 Aug	N15W85	327	0040	04	Cao	010	B										
								4	2	0	13	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 332



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
								C	M	X	S	1	2	3	4			
<i>Region 67</i>																		
10 Aug	N09E71	316	0070	02	Hax	001	A											
11 Aug	N09E58	316	0150	08	Dao	010	B											
12 Aug	N10E44	317	0090	05	Dso	009	B											
13 Aug	N11E33	315	0110	10	Dso	012	B	3				3						
14 Aug	N11E20	315	0210	13	Eao	029	B	2	1			5	1					
15 Aug	N12E07	314	0290	14	Eai	040	B											
16 Aug	N12W06	314	0200	13	Esi	032	B											
17 Aug	N12W20	315	0160	12	Eai	028	B											
18 Aug	N12W34	316	0080	13	Eao	033	B											
19 Aug	N10W48	317	0090	07	Dao	009	B											
20 Aug	N10W62	318	0080	07	Dao	011	B											
21 Aug	N11W73	315	0090	09	Dao	010	B							1				
22 Aug	N10W84	313	0070	09	Cao	007	B											
23 Aug	N11W92	308	0070	03	Cao	003	B											
								5	1	0	9	1	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 314

<i>Region 68</i>																		
10 Aug	S07E71	316	0090	02	Hax	001	A											
11 Aug	S08E60	314	0150	10	Dso	009	B											
12 Aug	S07E47	314	0100	11	Eao	008	B											
13 Aug	S07E34	314	0110	11	Eso	007	B											
14 Aug	S08E21	314	0070	12	Eao	004	B											
15 Aug	S07E07	314	0060	12	Eso	008	B											
16 Aug	S07W06	314	0050	12	Eso	003	B							2				
17 Aug	S08W20	315	0040	12	Eso	006	B							1				
18 Aug	S08W39	321	0020	01	Hsx	001	A											
19 Aug	S08W53	322	0030	03	Bxo	002	B											
20 Aug	S10W66	322																
21 Aug	S10W79	322																
22 Aug	S10W92	322																
								0	0	0	3	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 314



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares											
	Helio		Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
	(° Lat ° CMD)	Lon						C	M	X	S	1	2	3	4			
<i>Region 69</i>																		
11 Aug	S08E77	297	0450	13	Eko	005	B	1			1							
12 Aug	S07E65	296	1170	12	Eki	011	Bg											
13 Aug	S07E50	298	1210	11	Ekc	019	Bgd		1				1					
14 Aug	S08E37	298	1520	12	Ekc	025	Bgd	3				5						
15 Aug	S07E24	297	1400	13	Ekc	044	Bgd	3	1			6						
16 Aug	S07E11	297	1750	14	Ekc	037	Bgd		2			3	3	1				
17 Aug	S07W03	298	1950	13	Ekc	058	Bgd	11	1			17	1					
18 Aug	S08W18	300	1960	15	Ekc	074	Bgd	6	3			9	3					
19 Aug	S08W30	299	1990	15	Ekc	060	Bgd	4	2			10	1	1				
20 Aug	S08W44	300	1850	14	Ekc	047	Bgd	9	3			11	4					
21 Aug	S08W58	300	1650	13	Ekc	046	Bgd	10	1	1		13	1					
22 Aug	S07W71	300	1420	13	Ekc	030	Bgd	6	1			11		1				
23 Aug	S08W85	301	0830	13	Cko	017	Bgd	2	2			20	1					
24 Aug	N08W95	298	0120	12	Hkx	002	A				1	1						
								55	17	2	10	1	3	0	0			

Crossed West Limb.

Absolute heliographic longitude: 298

Region 71

11 Aug	N11E68	306	0040	02	Hax	002	A											
12 Aug	N11E56	305	0030	02	Hsx	001	A											
13 Aug	N10E42	306	0020	02	Hax	001	A											
14 Aug	N10E29	306																
15 Aug	N10E16	306																
16 Aug	N10E03	306																
17 Aug	N10W10	306																
18 Aug	N10W23	306																
19 Aug	N10W36	306																
20 Aug	N10W49	306																
21 Aug	N10W68	310	0000	00	Axx	001	A											
22 Aug	N10W81	310																
								0	0	0	0	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 306



Region Summary - continued.

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

Region 75

12 Aug S09E32	329	0010	04	Bxo	005	B										
13 Aug S10E17	331	0040	05	Dro	005	B										
14 Aug S12E04	331	0040	04	Dso	006	B										
15 Aug S11W11	332	0030	04	Cso	005	B										
16 Aug S11W24	332															
17 Aug S11W37	332															
18 Aug S11W50	332															
19 Aug S11W63	332															
20 Aug S11W76	332															
21 Aug S11W89	332															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 331

Region 76

12 Aug N12E75	286	0060	01	Hsx	001	A										
13 Aug N12E64	284	0060	01	Hsx	001	A										
14 Aug N12E51	284	0040	01	Hax	001	A										
15 Aug N12E38	283	0040	01	Hsx	001	A										
16 Aug N12E25	283	0020	01	Hsx	001	A										
17 Aug N12E11	284	0020	01	Hsx	002	A										
18 Aug N12W02	284	0020	03	Cso	002	B										
19 Aug N12W15	284	0020	01	Hsx	001	A										
20 Aug N13W29	285	0010	01	Hsx	001	A										
21 Aug N13W43	285	0010	01	Hsx	001	A										
22 Aug N13W56	285															
23 Aug N13W69	285															
24 Aug N13W82	285															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 284



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
								C	M	X	S	1	2	3	4			
<i>Region 77</i>																		
13 Aug	S18E48	300	0010	00	Hsx	001	A											
14 Aug	S17E33	302	0000	00	Axx	001	A											
15 Aug	S17E20	302																
16 Aug	S17E07	302																
17 Aug	S17W06	302																
18 Aug	S17W19	302																
19 Aug	S17W32	302																
20 Aug	S17W45	302																
21 Aug	S17W58	302																
22 Aug	S17W71	302																
23 Aug	S17W84	302																
								0	0	0	0	0	0	0	0	0	0	0
Crossed West Limb.																		
Absolute heliographic longitude: 302																		
<i>Region 78</i>																		
14 Aug	S13W12	347	0030	04	Dso	009	B											
15 Aug	S13W26	347	0060	06	Dao	008	B	3	1		4							
16 Aug	S13W39	347	0060	05	Dso	005	B				1							
17 Aug	S14W53	348	0060	04	Cro	002	B											
18 Aug	S14W66	348																
19 Aug	S14W79	348																
20 Aug	S14W92	348																
								3	1	0	5	0	0	0	0	0	0	0
Crossed West Limb.																		
Absolute heliographic longitude: 347																		
<i>Region 79</i>																		
14 Aug	S20E55	280	0020	01	Hax	001	A											
15 Aug	S19E42	279	0120	08	Dso	011	B											
16 Aug	S19E29	279	0140	09	Dso	012	B											
17 Aug	S21E18	277	0150	11	Eao	023	B				1							
18 Aug	S22E04	278	0310	11	Eac	038	B	2			5	1						
19 Aug	S22W08	277	0430	12	Eai	038	B	2			3							
20 Aug	S22W22	278	0230	13	Eai	031	B	4			1							
21 Aug	S22W35	277	0170	13	Eao	022	B											
22 Aug	S21W52	281	0140	09	Dao	014	B	2			4	1						
23 Aug	S21W65	281	0160	09	Dao	009	B				1							
24 Aug	S22W82	285	0110	02	Hax	002	A	1			1							
								11	0	0	16	2	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 278



Region Summary - continued.

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

Region 80

14 Aug N16E69	266	0120	11	Eao	004	B												
15 Aug N16E55	266	0160	10	Dso	007	B												
16 Aug N16E42	266	0170	08	Dso	009	B												
17 Aug N16E30	265	0140	09	Dao	011	B												
18 Aug N16E17	265	0110	07	Dao	013	B												
19 Aug N16E03	266	0130	08	Dao	010	B												
20 Aug N16W10	266	0120	09	Cao	013	B												
21 Aug N15W23	265	0070	10	Dao	011	B												
22 Aug N15W33	262	0020	02	Hsx	003	A						1						
23 Aug N14W45	261	0030	01	Hax	001	A												
24 Aug N14W58	261	0000	00		000													
25 Aug N14W70	260	0060	04	Cso	005	B	1					2						
							1	0	0	3	0	0	0	0	0			

Still on Disk.

Absolute heliographic longitude: 266

Region 81

16 Aug N17E61	247	0050	04	Dro	002	B												
17 Aug N17E47	248	0020	01	Hrx	002	A						1						
18 Aug N18E34	248	0010	01	Axx	002	A												
19 Aug N18E21	248																	
20 Aug N18E08	248						1				1							
21 Aug N18W05	248																	
22 Aug N18W18	248																	
23 Aug N18W31	248																	
							1	0	0	2	0	0	0	0	0			

Still on Disk.

Absolute heliographic longitude: 248

Region 82

17 Aug N21E06	289	0020	01	Hrx	002	A												
18 Aug N20W07	289	0010	03	Bxo	004	B												
19 Aug N12W15	284																	
20 Aug N20W34	289																	
21 Aug N20W47	289																	
22 Aug N20W60	289																	
23 Aug N20W73	289																	
							0	0	0	0	0	0	0	0	0			

Crossed West Limb.

Absolute heliographic longitude: 289



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
							C	M	X	S	1	2	3	4
<i>Region 83</i>														
17 Aug	S18E67	228	0050	02	Cao	002	B		1		1			
18 Aug	S18E52	230	0080	09	Dso	008	B	1			3			
19 Aug	S18E36	233	0050	07	Dao	005	B							
20 Aug	S17E25	231	0030	05	Dso	005	B	1			1			
21 Aug	S18E11	231	0050	08	Dao	013	B	1			2			
22 Aug	S18W03	232	0100	11	Eai	022	Bg	1			1			
23 Aug	S19W15	231	0170	16	Fao	021	Bg		1		5		1	
24 Aug	S18W27	230	0170	15	Eao	025	Bg	1			2			
25 Aug	S17W41	231	0120	08	Dao	007	Bg		2		2			
								5	4	0	17	0	1	0 0

Still on Disk.

Absolute heliographic longitude: 232

Region 84

18 Aug	S16E64	218	0110	01	Hax	001	A							
19 Aug	S16E50	219	0100	02	Hax	001	A				1			
20 Aug	S17E39	217	0100	07	Cso	005	B							
21 Aug	S16E26	216	0110	09	Cao	014	B					1		
22 Aug	S17E12	217	0080	09	Dao	018	B							
23 Aug	S15E00	216	0090	08	Dao	019	B				3			
24 Aug	S16W12	215	0070	08	Dao	014	B							
25 Aug	S16W26	216	0070	06	Dao	006	B							
								0	0	0	4	1	0	0 0

Still on Disk.

Absolute heliographic longitude: 216

Region 85

19 Aug	S11E69	200	0460	05	Dho	005	B							
20 Aug	S11E56	200	0480	06	Cko	003	B	1	1		2	1		
21 Aug	S11E42	200	0520	08	Cko	010	B				1			
22 Aug	S10E29	200	0550	07	Cko	013	B	2			7			
23 Aug	S09E16	200	0520	09	Dko	019	B	1	1		3		1	
24 Aug	S09E03	200	0500	09	Dko	024	B				4			
25 Aug	S08W09	199	0520	07	Dko	019	B							
								4	2	0	17	1	1	0 0

Still on Disk.

Absolute heliographic longitude: 200



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 86</i>																		
22 Aug	S21E29	200	0020	04	Bxo	004	B											
23 Aug	S23E17	199	0010	02	Hrx	002	A											
24 Aug	S26E02	201	0010	06	Bxo	006	B											
25 Aug	S26W11	201																
									0	0	0	0	0	0	0	0	0	0
Still on Disk.																		
Absolute heliographic longitude: 201																		
<i>Region 87</i>																		
22 Aug	S07E74	155	0170	04	Cho	004	B	1	1		2	1						
23 Aug	S07E60	156	0450	07	Dko	010	B	1	1		5		2					
24 Aug	S07E47	156	0330	06	Dki	019	Bg		1		1	1						
25 Aug	S07E34	156	0410	06	Dki	015	Bg											
									2	3	0	8	2	2	0	0	0	0
Still on Disk.																		
Absolute heliographic longitude: 156																		
<i>Region 88</i>																		
23 Aug	S22W28	244	0040	03	Cro	006	B				1							
24 Aug	S22W41	244	0120	07	Dai	016	B											
25 Aug	S23W54	244	0200	08	Dai	013	B				1							
									0	0	0	2	0	0	0	0	0	0
Still on Disk.																		
Absolute heliographic longitude: 244																		
<i>Region 89</i>																		
24 Aug	S16E62	141	0010	01	Axx	001	A											
25 Aug	S16E47	143	0000	00	Axx	001	A											
									0	0	0	0	0	0	0	0	0	0
Still on Disk.																		
Absolute heliographic longitude: 143																		

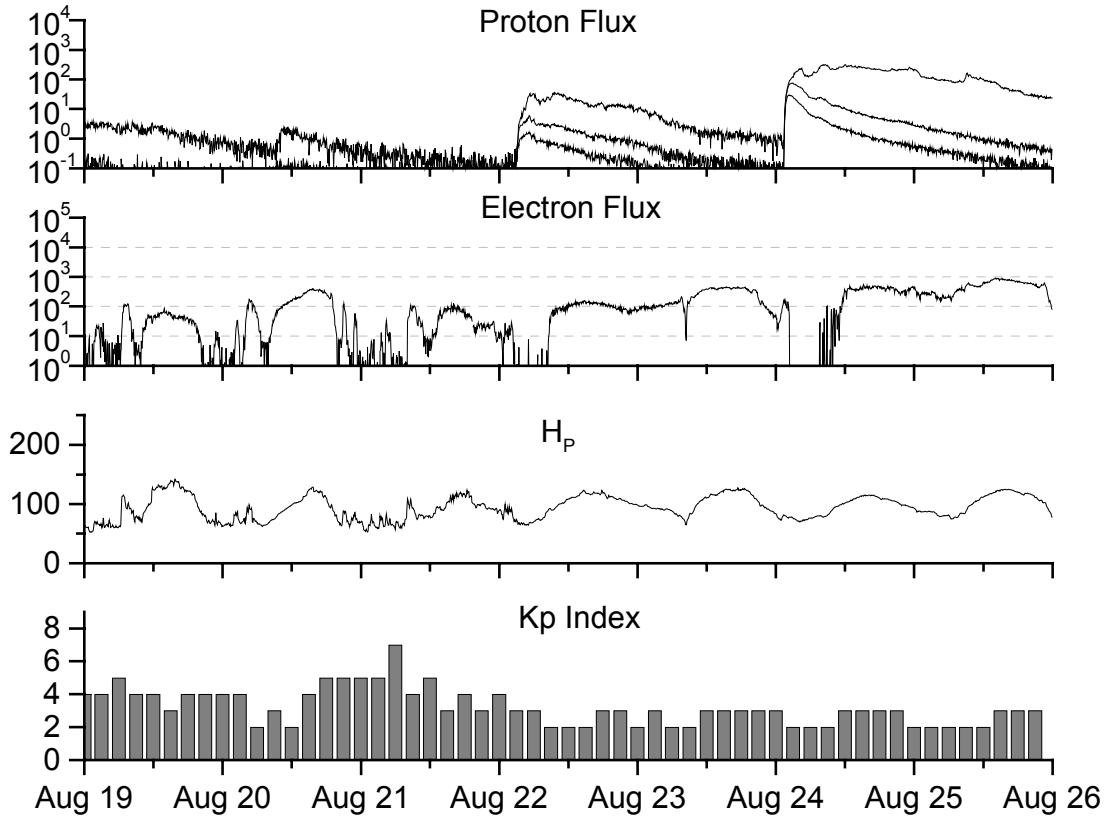


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
2000									
August	166.6	130.5	0.78	171.8	118.6	163.1	179.5	16	14.2
September	157.9	109.9	0.70	169.0	116.2	182.1	177.1	18	14.2
October	138.9	100.1	0.72	166.2	114.4	167.7	175.6	18	14.6
November	149.9	106.5	0.71	162.7	112.7	178.8	173.6	17	14.6
December	146.4	104.5	0.71	160.8	112.1	173.6	172.0	08	14.4
2001									
January	142.7	95.1	0.67	156.3	108.8	166.7	168.8	08	13.8
February	131.0	80.1	0.61	151.4	104.2	147.3	165.8	06	13.3
March	166.7	114.2	0.69	154.0	104.9	177.7	167.9	17	12.9
April	163.6	108.2	0.66	159.4	107.7	178.3	171.7	18	12.7
May	135.1	97.3	0.72	163.1	108.8	148.7	174.8	12	12.5
June	196.7	134.0	0.68	167.2	109.9	173.7	178.8	12	12.4
July	124.6	82.2	0.66	172.1	111.8	131.3	183.9	11	12.4
August	159.4	106.8	0.67	176.7	113.8	163.2	188.8	13	12.5
September	229.1	150.7	0.66	178.8	114.3	233.3	191.3	12	12.3
October	197.4	125.6	0.64	179.5	114.1	208.2	191.9	18	11.9
November	178.6	106.5	0.60	183.7	115.6	212.5	193.6	14	11.9
December	217.5	131.8	0.61	184.5	114.7	236.6	193.8	08	12.0
2002									
January	189.0	113.9	0.60	184.8	113.5	226.4	194.6	07	12.0
February	194.5	108.0	0.56			205.1		09	
March	153.1	98.1	0.64			179.5		10	
April	194.9	120.4	0.62			189.7		15	
May	204.1	120.8	0.59			178.4		15	
June	146.0	88.5	0.61			148.8		11	
July	183.5	99.9	0.54			174.5		13	

NOTE: All smoothed values after June 1999 and monthly values after December 2000 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 19 August 2002

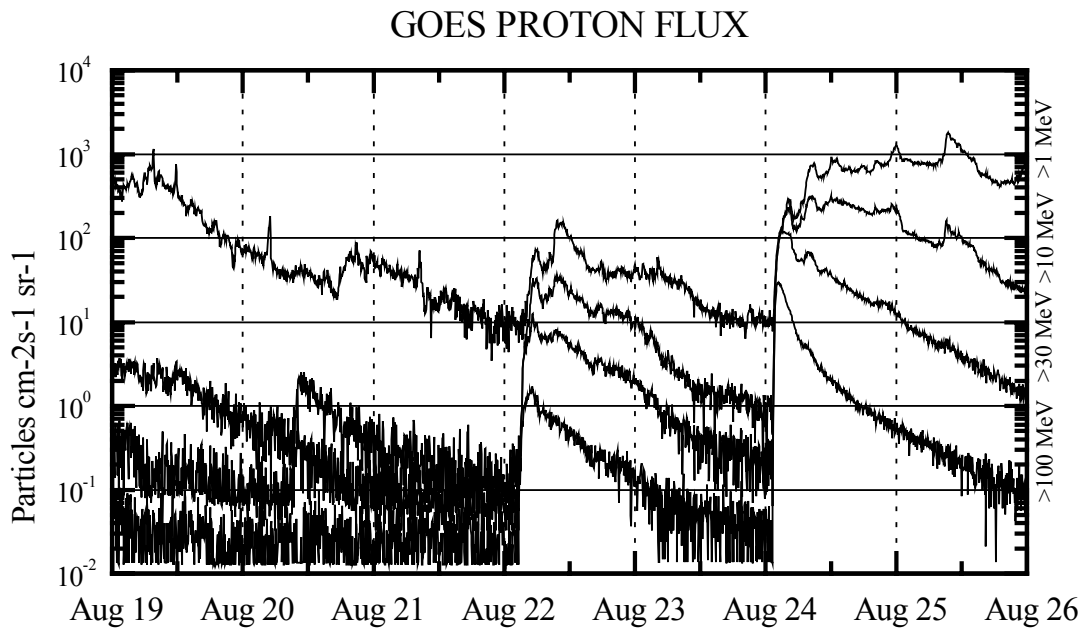
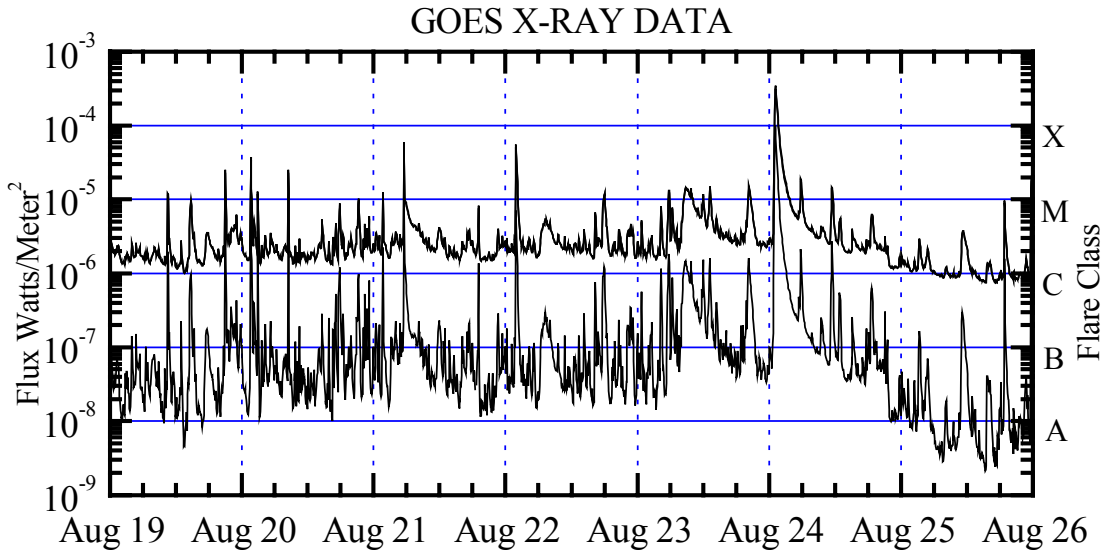
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-8.

H_p 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_p plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) 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_p 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_p are " global " parameters that are applicable to a first order approximation over large areas. H_p 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/m²) 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/cm²-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/cm²-sec-sr) at greater than 10 MeV.

