Space Weather Highlights **SWO PRF 1361**
24 September - 30 September 2001 **02 October 2001**

Solar activity reached high levels for the fourth consecutive week. The period began with activity at high levels due to an X2/2b flare at 24/1038 UTC from Region 9632 (S18, L = 272, class/area Dki/790 on 24 September) associated with a 7500 SFU Tenflare, a Type IV radio sweep, a fast full-halo CME, and a solar proton event (see the description below). This region was large and magnetically complex through the period. It began to gradually decay on 29 September and was approaching the west limb as the period ended. Activity remained high on 25 September due to an M7/1n flare at 25/1027 UTC from Region 9628 (S18, L = 292, class/area Fkc/880 on 25 September) associated with a Type II radio sweep. This region also produced isolated, low-level M-class flares during the period (for flare specifics, please refer to the Energetic Events and Optical Flare lists). Region 9628 began to gradually decay on 29 September, though it remained large and magnetically complex as it began crossing the west limb at the close of the period. Region 9636 (N14, L = 227, class/area Eai/400 on 26 September), a moderately complex, reversed-polarity sunspot group; produced isolated M-class flares during the period including a long-duration M3/2n flare at 28/0830 UTC associated with Type II and IV radio sweeps and a partial-halo CME. The daily (Penticton) 10.7 cm solar radio flux readings of 279 sfu on 24 September and 283 sfu on 26 September were the highest observed since the start of Cycle 23.

Solar Wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the period. SWEPAM data (speed, density, and temperature) were unreliable during 26/1600 - 27/1000 UTC due to proton contamination. A few CME passages and a possible high-speed stream occurred during the period. A CME front passed the ACE spacecraft beginning at about 25/2000 UTC. IMF Bz varied rapidly following the passage with a range of plus 20 to minus 17 nT (GSM) before turning north at around 26/0900 UTC. Velocities were elevated and densities were low during 27 - 29 September, possibly due to a positive-polarity coronal hole. Another CME passage began around 29/0830 UTC accompanied by increased velocities (peak to 750 km/sec) and increased IMF Bz variability (plus 13 to minus 12 nT). Another CME passed the spacecraft beginning around 30/1848 UTC associated with increased velocity (brief peak to 570 km/sec), total IMF field intensity, density, and temperature. IMF Bz was variable in the plus to minus 15 nT range following this passage.

Proton events at greater than 100 MeV and greater than 10 MeV followed the X2 flare on 24 September. The greater than 100 MeV event began at 24/1440 UTC, reached a maximum of 31.2 PFU at 25/0755 UTC, and ended at 26/1940 UTC. The greater than 10 MeV event began at 24/1215 UTC, reached a maximum of 12,900 PFU at 25/2235 UTC, then ended at 30/1710 UTC.

The greater than 2 MeV electron flux at geosynchronous orbit ranged from normal to moderate levels during most of the period. However, there were brief periods of high fluxes observed on 28 September.

The geomagnetic field was quiet until late on 25 September. A CME-induced sudden impulse occurred at 25/2025 UTC (25 nT, as measured by the Boulder USGS magnetometer) followed by active to (brief) major storm levels. Activity declined to quiet to unsettled levels during the latter half of 26 September. Quiet to unsettled levels prevailed until early 29 September. Another CME-induced disturbance began on 29 September with a sudden impulse at 29/0940 UTC (17 nT, as measured by the Boulder USGS magnetometer) followed by active to major storm levels. Active conditions also occurred late on 30 September, following another CME passage at Earth.

Space Weather Outlook
03 October – 29 October 2001

Solar activity is expected to range from low to high levels. Isolated M-class flares are expected. There will be a fair chance for isolated major flare activity during the period.

A greater than 10 MeV proton event began on 01 October and was in progress as the period began (details will be provided in next week's issue). It is expected to end on 03 October. There will be a slight chance for another proton event during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels during most of the period. However, high flux levels will be possible around 28 October.

Active periods will be possible during 12 and 25 – 26 October due to recurrent coronal hole effects. Quiet to unsettled conditions are expected during the remainder of the period.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
24 September	279	315	3160	C1.8	8	0	1	24	1	1	0	0
25 September	275	320	2860	C2.5	3	3	0	23	2	0	0	0
26 September	283	278	2810	C1.9	3	1	0	17	0	0	0	0
27 September	270	279	2670	C1.8	1	1	0	20	0	0	0	0
28 September	266	234	2230	C1.9	7	4	0	25	5	1	0	0
29 September	240	233	2280	C2.9	3	1	0	11	1	0	0	0
30 September	236	230	2540	C2.0	9	2	0	21	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm^2-day-sr) >1MeV	>10MeV	>100MeV	Electron Fluence (electrons/cm^2-day-sr) >.6MeV	>2MeV	>4MeV
24 September	4.8E+7	3.1E+7	2.9E+5		4.2E+4	
25 September	1.1E+9	2.7E+8	1.8E+6		7.0E+6	
26 September	1.4E+9	2.3E+8	2.6E+5		1.2E+7	
27 September	3.0E+8	4.0E+7	3.6E+4		1.9E+7	
28 September	1.2E+8	1.2E+7	9.8E+3		3.5E+7	
29 September	6.1E+7	4.3E+6	3.5E+3		9.5E+6	
30 September	1.9E+7	9.8E+5	2.0E+3		1.1E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
24 September	5	3-2-1-1-1-1-1-1	4	3-1-1-0-1-1-1-1	6	3-1-1-2-2-2-2-1
25 September	17	1-2-2-0-3-0-4-6	23	1-2-2-2-0-0-6-6	18	1-2-2-1-1-2-5-6
26 September	13	5-2-3-2-2-2-2-2	35	5-5-6-5-4-2-3-2	24	5-4-5-4-3-3-2-2
27 September	9	1-1-1-2-2-3-4-2	19	2-2-2-5-3-5-3-2	10	1-1-1-3-3-3-3-3
28 September	10	2-2-3-1-2-3-2-3	28	2-2-5-3-5-5-4-4	13	2-2-3-3-3-3-3-3
29 September	19	3-2-2-4-2-3-4-5	46	4-4-4-6-6-4-5-5	21	3-3-3-4-3-4-3-5
30 September	15	3-2-1-2-3-3-4-4	25	5-3-2-3-4-5-4-3	17	4-3-2-2-3-4-4-4

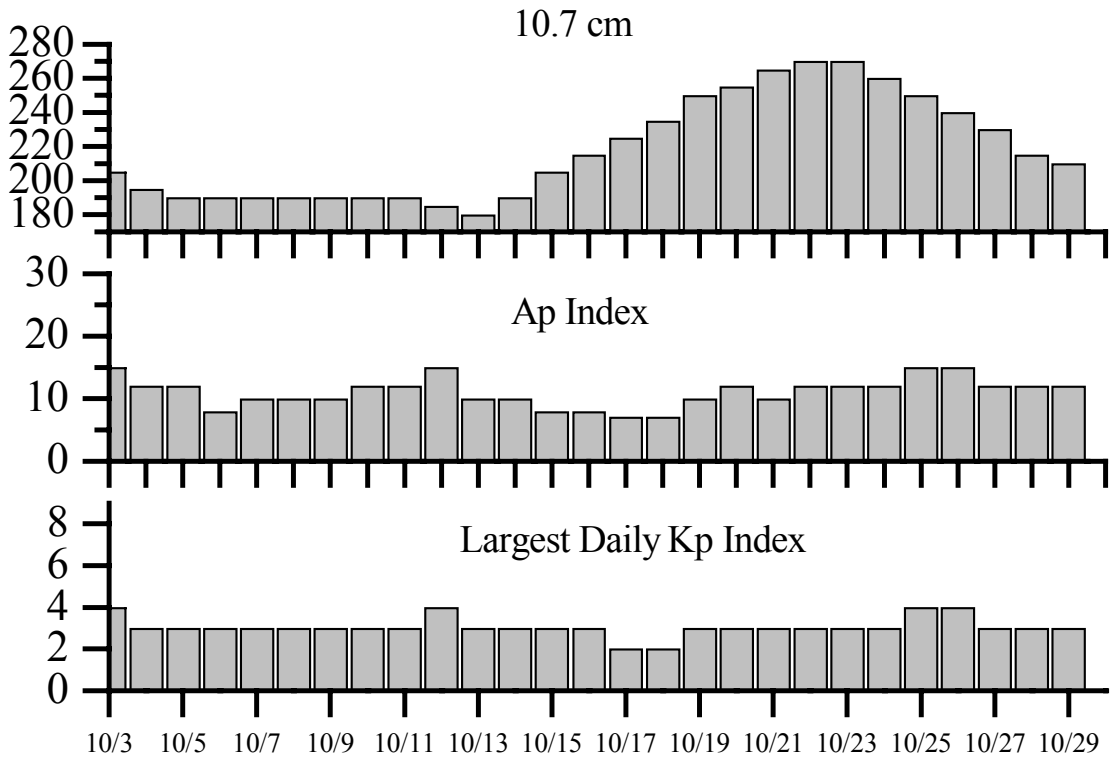
Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
24 Sep 0001	A ≥ 20 Observed	24 Sep 0000
24 Sep 0011	5 – 245 MHz Radio Bursts	23 Sep
24 Sep 0914	ENDED A ≥ 20 Observed	24 Sep 0000
24 Sep 1117	X-Ray event X2.6/2B/S16E23	24 Sep 1038
24 Sep 1128	Type IV Radio Emission	24 Sep 1018
24 Sep 1202	Proton Event >10 MeV ≥10pfu Warning	24/1215 – 25 Sep 1500
24 Sep 1230	Proton Event >10 MeV ≥10pfu	24 Sep 1215
24 Sep 1322	10cm Radio Burst 7500 F.U.	24 Sep 0943
24 Sep 1341	Proton Event >100 MeV ≥1pfu Warning	24/1345 – 25 Sep 1500
24 Sep 1459	Proton Event >100 MeV ≥1pfu	24 Sep 1440
24 Sep 1732	A ≥ 50 Watch	26 Sep
24 Sep 1733	A ≥ 30 Watch	27 Sep
25 Sep 0013	4 – 245 MHz Radio Bursts	24 Sep
25 Sep 0013	245 MHz Noise Storm	24 Sep
25 Sep 0028	CONTINUED Proton Event >100 MeV ≥1pfu	24 Sep 1440
25 Sep 0032	CONTINUED Proton Event >10 MeV ≥10pfu	24 Sep 1215
25 Sep 0458	X-Ray event M7.6	25 Sep 0440
25 Sep 0508	Type II Radio Emission	25 Sep 0440
25 Sep 1056	Type II Radio Emission	25 Sep 1045
25 Sep 1457	CONTINUED Proton Event >100 MeV ≥1pfu Warning	24/1345 – 25 Sep 1500
25 Sep 1523	CONTINUED Proton Event >10 MeV ≥10pfu Warning	24/1215 – 26 Sep 1500
25 Sep 2032	Sudden Impulse observed at Boulder	25 Sep 2025
25 Sep 2051	K = 4 Warning	25/2051 – 26 Sep 1500
25 Sep 2105	K = 4 Observed	25 Sep 1800 – 2100
25 Sep 2114	K ≥ 6 Warning	25/2115 – 26 Sep 2100
26 Sep 0000	K = 6 Observed	25 Sep 2100 – 0000
26 Sep 0020	7 – 245 MHz Radio Bursts	25 Sep
26 Sep 0030	CONTINUED Proton Event >10 MeV ≥10pfu	24 Sep 1215
26 Sep 0239	CONTINUED Proton Event >100 MeV ≥1pfu	24 Sep 1440
26 Sep 0307	A ≥ 20 Observed	26 Sep 0300
26 Sep 1202	A ≥ 30 Observed	26 Sep 1200
26 Sep 1720	CANCELLED K ≥ 6 Warning	25/2115 – 26 Sep 2100
26 Sep 1732	Proton Event >10 MeV ≥10pfu Warning	26/1731 – 28 Sep 1800
26 Sep 2119	ENDED A ≥ 30 Observed	26 Sep 1200
27 Sep 0041	CONTINUED Proton Event >10 MeV ≥10pfu	24 Sep 1215
27 Sep 0049	2 – 245 MHz Radio Bursts	26 Sep
27 Sep 0051	CONTINUED Proton Event >100 MeV ≥1pfu	24 Sep 1440
27 Sep 0300	ENDED A ≥ 20 Observed	26 Sep 0300
27 Sep 1459	ENDED Proton Event >100 MeV ≥1pfu	24 Sep 1440
28 Sep 0043	245 MHz Radio Burst	27 Sep
28 Sep 0043	245 MHz Noise Storm	27 Sep
28 Sep 0045	CONTINUED Proton Event >10 MeV ≥10pfu	24 Sep 1215
28 Sep 1056	Type II Radio Emission	28 Sep 0820
28 Sep 1059	Type II Radio Emission	28 Sep 0830

Alerts and Warnings Issued- continued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
28 Sep 1100	Type IV Radio Emission	28 Sep 0831
28 Sep 1217	CONTINUED Proton Event >10 MeV ≥10pfu Warning	26/1731 – 29 Sep 2359
28 Sep 1901	Electron Event >2MeV >1000pfu	28 Sep 1840
28 Sep 2021	A ≥ 20 Watch	01 Oct
29 Sep 0052	4 – 245 MHz Radio Bursts	28 Sep
29 Sep 0052	245 MHz Noise Storm	28 Sep
29 Sep 0058	CONTINUED Proton Event >10 MeV ≥10pfu	24 Sep 1215
29 Sep 0101	CONTINUED Electron Event >2MeV >1000pfu	28 Sep 1840
29 Sep 0956	Sudden Impulse observed at Boulder	29 Sep 0940
29 Sep 1139	K = 4 Warning	29 Sep 1140 – 1500
29 Sep 1200	K = 4 Observed	29 Sep 0900 – 1200
29 Sep 1731	K = 4 Warning	29/1735 – 30 Sep 1800
29 Sep 1807	K = 4 Observed	29 Sep 1500 – 1800
29 Sep 2012	A ≥ 20 Watch	30 Sep
29 Sep 2221	K = 5 Warning	29/2225 – 30 Sep 1500
29 Sep 2358	K = 5 Observed	29 Sep 2100 – 0000
30 Sep 0003	A ≥ 20 Observed	30 Sep 0000
30 Sep 0012	CONTINUED Proton Event >10 MeV ≥10pfu Warning	26/1731 – 30 Sep 2359
30 Sep 0016	CONTINUED Proton Event >10 MeV ≥10pfu	24 Sep 1215
30 Sep 0055	4 – 245 MHz Radio Bursts	29 Sep
30 Sep 0122	Type IV Radio Emission	28 Sep 1757
30 Sep 1200	ENDED A ≥ 20 Observed	30 Sep 0000
30 Sep 1458	K = 4 Warning	29/1735 – 01 Oct 1500
30 Sep 2130	ENDED Proton Event >10 MeV ≥10pfu	24 Sep 1215

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
03	205	15	4	17 Oct	225	7	2
04	195	12	3	18	235	7	2
05	190	12	3	19	250	10	3
06	190	8	3	20	255	12	3
07	190	10	3	21	265	10	3
08	190	10	3	22	270	12	3
09	190	10	3	23	270	12	3
10	190	12	3	24	260	12	3
11	190	12	3	25	250	15	4
12	185	15	4	26	240	15	4
13	180	10	3	27	230	12	3
14	190	10	3	28	215	12	3
15	205	8	3	29	210	12	3
16	215	8	3				

Energetic Events

Date	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
			½		Integ	Imp/Location		Rgn				
	Begin	Max	Max	Class	Flux	Brtns	Lat CMD	#	245	2695	II	IV
24 Sep	0932	1038	1109	X2.6	.630	2B	S16E23	9632		7500		1
25 Sep	0143	0148	0154	M1.1	.005	SF	S14E03	9628	68	53		
25 Sep	0424	0440	0452	M7.6	.072	1N	S18W01	9628	3600	190	2	
25 Sep	1018	1027	1031	M2.0	.010	1N	S16W03	9628	160	38		
26 Sep	0252	0258	0303	M1.8	.009				81	74		
27 Sep	0855	1213	1406	M1.0	.140							
28 Sep	0810	0830	0910	M3.3	.092	2N	N10E18	9636	2300	180	3	2
28 Sep	0934	1014	1050	M2.4	.091	1N	S18W36	9628	6000	240		
28 Sep	1918	1926	2005	M1.0	.027	1F	S18E22	9637				
28 Sep	2115	2125	2134	M1.2	.012	1F	N13E11	9634	74	50		
29 Sep	1019	1106	1148	M1.8	.062	1F	N13E03	9636	32			
30 Sep	1131	1141	1219	M1.0	.023	SF	S20W75	9628	76	38		
30 Sep	2129	2136	2145	M1.2	.008							

Flare List

Date	Time			X-ray	Optical		Rgn
					Imp /	Location	
	Begin	Max	End	Class.	Brtns	Lat CMD	
24 September	0034	0035	0044	C2.6	SF	S15E05	9628
	0039	0042	0046	C3.3			
	0343	0348	0356	C2.9			
	0449	0450	0456	C5.1	SF	N12E73	
	0611	0613	0617	C2.8	SF	S22E11	9628
	0811	0811	0818	C2.7	SF	N21E10	9635
	0913	0915	0919		SF	N13E75	9636
	0922	0947	A0949		SF	S20E22	9632
	B0936	1019	1217	X2.6	2B	S16E23	9632
	1202	1207	1210		SF	S17E74	9637
	1507	1509	1529		SF	S22E06	9628
	1624	1629	1642		SF	N17W21	9621
	1644	1645	1650		SF	S18E01	9628
	1658	1659	1714		SF	N08E66	9636
	1721	1722	1728		SF	S19E02	9628
	1723	1723	1727		SF	N10E67	9636
	1737	1740	1807		SF	S18E03	9628
	1820	1836	1843	C7.6			
	1835	1852	1900		SF	S20E05	9628
	1939	1939	1942		SF	N11E69	9636
	1950	1956	2015		SF	S17E05	9628
	2028	2031	2041		SF	S16E05	9628
	2139	2139	2143		SF	S21E00	9628
	2205	2212	2223		SF	S16E04	9628
	2207	2207	2213		SF	N08W67	9631
	2257	2259	2301		SF	S12W88	9616

Flare List- continued

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
24 September	2318	2318	2323		SF	N11E59	9636
	2340	0003	0018	C8.6	1F	S16W05	9628
25 September	B0029	U0029	0051		SF	S17W07	9628
	0133	0133	0138		SF	S14E03	9628
	0141	0151	0208	M1.1	SF	S14E03	9628
	0349	0351	0356		SF	N14E76	9636
	0426	0440	0506	M7.6	1N	S18W01	9628
	0455	0458	0503		SF	N14E76	9636
	0517	0518	0520		SF	S17E17	9632
	0644	0645	0702		SF	N17W30	9621
	0817	0823	0835		SF	S16W02	9628
	1020	1027	1040	M2.0	1N	S16W03	9628
	1043	1048	1051		SF	S15W04	9628
	1143	1144	1211		SF	S18W13	9628
	B1152	U1155	1200		SF	S18W10	9628
	1400	1400	1404		SF	S17W05	9628
	1642	1642	1651		SF	S16W15	9628
	1654	1657	1706		SF	S16E07	9632
	1713	1716	1730	C7.0	SF	S17W08	9628
	1726	1730	1745		SF	S20E05	9632
	1847	1850	1908	C2.5	SF	S20W08	9628
	1913	1918	1925		SF	S21W11	9628
	1937	1938	1958		SF	S16W09	9628
	2009	2009	2019		SF	S19E10	9632
	2015	2054	2158		SF	S20W14	9628
	2024	2027	2029	C4.2			9628
	2308	2310	2314		SF	S16W12	9628
	2356	0002	0015		SF	S19E08	9632
26 September	0252	0258	0303	M1.8			
	0637	0639	0725	C4.0	SF	S16W23	9628
	0839	0843	0850	C3.8			
	1118	1118	1131		SF	N12W57	9620
	1228	1229	1305	C5.7	SF	N13E51	9636
	1615	1631	1715		SF	N14E55	9636
	1712	1713	1740		SF	S17W21	9628
	1910	1912	1916		SF	N11E32	9634
	1932	1938	2002		SF	S18W22	9628
	1953	1953	2000		SF	N02W54	9624
	2118	2119	2128		SF	S20W24	9628
	2150	2152	2205		SF	N26W52	9629
	2157	2158	2203		SF	S19W05	9632
	2227	2227	2248		SF	S20W26	9628

Flare List- continued

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
26 September	2236	2255	2347		SF	N11E36	9636
	2239	2240	2256		SF	N00W39	9627
	2249	2257	2313		SF	N15W54	9621
	2307	2316	2323		SF	S20W23	9628
	2309	2310	2313		SF	S13E46	9637
27 September	0259	0259	0304		SF	N04W57	9624
	0351	0357	0404		SF	N12E34	9636
	0424	0424	0437	C3.8	SF	S20W27	9628
	0614	0619	0625		SF	S18W29	9628
	0751	U0808	A0822		SF	S18W38	9628
	0855	1213	1406	M1.0			
	1118	1213	1217		SF	S22W30	9628
	1359	1401	1404		SF	S19W40	9628
	1420	1420	1427		SF	S12E37	9637
	1542	1542	1553		SF	N14E28	9636
	1603	1605	1621		SF	S16E37	9637
	1620	1620	1625		SF	S17W20	9632
	1659	1701	1710		SF	N12E16	9634
	1704	1705	1709		SF	S17W43	9628
	1756	1757	1802		SF	S20W34	9628
	1827	1829	1838		SF	N11E15	9634
	2046	2050	2105		SF	N13E33	9636
	2052	2052	2110		SF	N12E14	9634
	2204	2205	2209		SF	N22W37	9635
	2215	2217	2221		SF	S17W19	9632
28 September	0018	0018	0028		SF	S16W21	9632
	0051	0054	0103		SF	N10E13	9634
	0203	0203	0228	C7.5	1F	S17E32	9637
	B0424	U0425	A0453	C3.5	SF	S17W49	9628
	B0424	U0432	A0453		SF	S12W25	9632
	0637	0647	0657	C2.9	SF	N19W42	9635
	0728	0728	0732		SF	S23W18	9632
	0755	U0757	0802		SF	S19W40	9628
	0812	0822	0934	M3.3	2N	N10E18	9636
	0847	0854	0917		SF	S14W32	9632
	0849	0849	0903		SF	S19E28	9637
	B0931	U0949	1142	M2.4	1N	S18W36	9628
	B0940	U0953	A1044		SF	S17W24	9632
	1354	1357	1411		SF	S18E26	9637
	1357	1359	1408		SF	S17W47	9628
	1422	1426	1430		SF	S20W56	9628
	1454	1523	1629		SF	S20W57	9628

Flare List- continued

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
28 September	1607	1611	1631		SF	S18W31	9632
	1700	1707	1721		SF	N14E14	9634
	1712	1716	1726	C6.3	SF	S17W47	9628
	1750	1800	1812		SF	S17W48	9628
	1813	1824	1917	C8.4	1F	N14E08	9634
	1813	1823	1837		SF	S15W50	9628
	1919	1924	2027	M1.0	1F	S18E22	9637
	1920	1921	1926		SF	N11W10	9634
	1920	1925	1938		SF	S16W50	9628
	2001	2001	2007		SF	N12E21	9636
	2109	2123	2215	M1.2	1F	N13E11	9634
	2113	2118	2157		SF	S11E21	9637
	2306	2306	2321		SF	S16W50	9628
	2358	0015	0051	C8.6	SF	S14W54	9628
29 September	0650	0651	0702	C5.4	SF	S18W54	9628
	0725	0735	0757	C7.5	SF	N12E05	9636
	0811	0813	0822	C4.9	SF	S16W54	9628
	1034	1055	1228	M1.8	1F	N13E03	9636
	1037	1116	1137		SF	N14W05	9634
	1356	1415	1500		SF	N12E02	9634
	1446	1446	1501		SF	N13E09	9636
	1546	1550	1554		SF	N12E01	9634
	1558	1628	1657		SF	N12E00	9634
	1610	1610	1615		SF	S17W68	9628
	1806	1812	1832		SF	N10W01	9634
	1828	1828	1835		SF	N21W60	9635
30 September	0008	0013	0021		SF	N13W08	9636
	0029	0036	0057		SF	N12W05	9636
	0253	0255	0300		SF	S18W51	9632
	0258	0259	0311		SF	N13W09	9636
	0338	0401	0418	C8.3			
	0439	0440	0442		SF	S17W75	9628
	0503	0504	0516		SF	N12W09	9636
	0533	0533	0539		SF	N12W08	9636
	0540	0545	0623	C8.4	SF	N13E01	9636
	0652	0655	0702	C5.8	SF	N13W11	9636
	0831	0837	0854	C6.1	SF	N11W09	9636
	0903	0903	0907		SF	N12W11	9636
	B0941	U0942	A0954	C3.3	SF	S14E03	9637
	1134	1135	1156	M1.0	SF	S20W75	9628
	1728	1734	1807		SF	N11W17	9636
	1733	1735	1739	C6.6	SF	S18W61	9628

Flare List- continued

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
30 September	1744	1752	1757	C5.1			
	1822	1823	1837		SF	N11W16	9636
	1828	1829	1842		SF	S18W79	9628
	1829	1829	1837		SF	S19W60	9632
	1842	1843	1901	C4.4	SF	N11W16	9636
	1928	1928	1934		SF	S24W71	9628
	1946	2014	2029	C5.1			
	2046	2047	2057		SF	S17W56	9632
	2129	2136	2145	M1.2			

Region Summary

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 9616														
11 Sep	S12E80	023	0040	02	HAX	001	A		1		1				
12 Sep	S11E69	021	0260	13	EAO	009	B								
13 Sep	S10E55	021	0320	19	FAO	016	BG	1	1						
14 Sep	S10E44	019	0360	16	FSO	021	BG	2	1		4				
15 Sep	S12E30	020	0320	16	FAI	026	BG	1	1		1	1			
16 Sep	S12E16	021	0280	17	FHI	029	BG	4	2		3				
17 Sep	S12E03	021	0270	17	FKI	025	BG		2		5	1	1		
18 Sep	S13W11	021	0230	17	FAI	031	BG		2						
19 Sep	S13W24	021	0190	18	FAI	020	BG		3						
20 Sep	S12W37	021	0180	19	FAO	018	BG								
21 Sep	S12W51	022	0120	18	FAO	011	BG		1						
22 Sep	S12W64	022	0160	19	FSO	009	BG	1	2						
23 Sep	S12W77	022	0130	20	FSO	005	B								
24 Sep	S09W88	019	0060	06	CSO	002	B		1						
								9	5	0	23	5	1	0	0

Crossed West Limb.
Absolute heliographic longitude: 21

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 9617												
12 Sep	N10E71	019	0180	05	DAO	005	B								
13 Sep	N11E56	020	0120	05	CAO	006	B								
14 Sep	N11E43	020	0070	04	DAO	006	B								
15 Sep	N08E30	020	0060	05	DSO	007	B								
16 Sep	N13E17	020	0040	04	CSO	004	B								
17 Sep	N08E04	020	0020	06	CSO	004	B								
18 Sep	N08W10	020	0020	05	CRO	005	B								
19 Sep	N10W21	018	0020	12	BXO	011	B								
20 Sep	N10W34	018													
21 Sep	N10W47	018													
22 Sep	N10W60	018													
23 Sep	N10W73	018													
24 Sep	N10W86	018													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 20

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 9620												
16 Sep	N12E70	327	0130	02	HSX	003	A	1			1				
17 Sep	N13E57	327	0180	03	HAX	002	A								
18 Sep	N12E44	326	0200	03	HAX	003	B		1			1			
19 Sep	N12E30	327	0210	05	CAO	006	B				3				
20 Sep	N12E17	327	0210	05	DAO	009	BG								
21 Sep	N11E04	327	0140	06	DKO	010	B	2			2				
22 Sep	N12W10	328	0110	04	DAO	006	B								
23 Sep	N12W23	328	0100	04	CAO	005	B								
24 Sep	N12W36	327	0080	04	CSO	005	B								
25 Sep	N12W50	328	0070	02	HSX	002	A								
26 Sep	N12W64	329	0070	02	HSX	001	A				1				
27 Sep	N12W77	329	0040	02	HSX	001	A								
28 Sep	N12W90	329	0030	01	HRX	001	A								
								3	1	0	7	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 327

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9621												
16 Sep	N16E76	321	0120	02	HSX	001	A								
17 Sep	N16E62	322	0130	03	CAO	003	B	1			1				
18 Sep	N14E49	321	0190	03	HSX	007	A	1			1				
19 Sep	N14E36	321	0200	07	DAO	008	B	1			2				
20 Sep	N15E22	322	0180	10	DAO	010	B								
21 Sep	N14E07	324	0150	04	DAO	006	B				1				
22 Sep	N15W04	322	0180	06	CAO	009	B				1				
23 Sep	N14W18	323	0220	05	CKO	009	B								
24 Sep	N14W32	323	0210	06	CAO	007	B				1				
25 Sep	N14W45	323	0150	04	CAO	004	B				1				
26 Sep	N14W59	324	0140	03	HAX	002	A				1				
27 Sep	N14W72	324	0110	03	HAX	001	A								
28 Sep	N15W84	323	0120	03	HSX	001	A								
								3	0	0	9	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 322

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9622												
17 Sep	N12E34	350	0040	07	DSO	005	B								
18 Sep	N12E20	350	0020	05	DSO	004	B								
19 Sep	N13E08	349	0030	05	CSO	005	B								
20 Sep	N13W05	349	0060	05	DAO	014	B								
21 Sep	N12W18	349	0080	06	DAO	017	B				3				
22 Sep	N12W32	350	0300	09	DKI	027	B	1			6				
23 Sep	N13W45	350	0330	10	DKI	023	BG	1			5				
24 Sep	N13W59	350	0270	12	EAO	015	B								
25 Sep	N13W73	351	0200	10	DAO	006	B								
26 Sep	N13W86	351	0180	09	DSO	003	B								
								2	0	0	14	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 349

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 9623												
17 Sep	N21E46	338	0020	01	HSX	001	A								
18 Sep	N21E32	338	0010	01	HSX	001	A								
19 Sep	N22E18	339	0000	01	AXX	001	A								
20 Sep	N21E04	340	0000	01	AXX	001	A								
21 Sep	N21W09	340													
22 Sep	N21W22	340													
23 Sep	N21W35	340													
24 Sep	N21W48	340													
25 Sep	N21W61	340													
26 Sep	N21W74	340													
27 Sep	N21W87	340													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 340

			Region 9624												
17 Sep	N03E70	314	0040	02	HSX	001	A								
18 Sep	N04E56	314	0100	02	HSX	001	A								
19 Sep	N03E42	315	0120	03	HSX	001	A								
20 Sep	N03E29	316	0100	02	HSX	001	A								
21 Sep	N03E14	317	0090	02	HSX	002	A								
22 Sep	N02E00	318	0100	02	HSX	001	A								
23 Sep	N02W13	318	0110	02	HSX	001	A								
24 Sep	N03W26	317	0100	02	HSX	001	A								
25 Sep	N03W40	318	0090	02	HSX	001	A								
26 Sep	N02W54	319	0090	02	HSX	001	A				1				
27 Sep	N03W67	319	0090	02	HSX	001	A				1				
28 Sep	N03W80	319	0060	03	HSX	001	A								
29 Sep	N04W93	318	0030	02	HSX	001	A								
								0	0	0	2	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 318

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 9626												
18 Sep	N25E47	323	0010	01	HSX	001	A								
19 Sep	N26E25	332	0030	04	CRO	006	B				1				
20 Sep	N26E14	330	0040	05	BXO	007	B				1				
21 Sep	N25W01	332	0030	04	CSO	007	B				1				
22 Sep	N25W14	332	0010	04	BXO	004	B				1				
23 Sep	N25W27	332													
24 Sep	N25W40	332													
25 Sep	N25W53	332													
26 Sep	N25W67	332													
27 Sep	N25W80	332													
								0	0	0	4	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 332

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 9627												
18 Sep	N05E73	297	0060	02	HAX	001	A								
19 Sep	N04E58	299	0050	02	HAX	002	A								
20 Sep	N04E43	300	0040	02	CSO	003	B								
21 Sep	N03E30	301	0050	02	CAO	003	B								
22 Sep	N02E17	301	0050	03	CSO	005	B				1				
23 Sep	N01E03	302	0050	04	DSO	006	B								
24 Sep	N01W11	302	0080	06	DSO	016	B								
25 Sep	N01W24	302	0060	07	DAO	016	B								
26 Sep	N01W37	302	0040	07	DSO	009	B				1				
27 Sep	N00W49	301	0000	01	AXX	002	A								
28 Sep	N00W62	301	0000	00	000										
29 Sep	N00W75	301	0000	00	000										
30 Sep	N00W88	301													
								0	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 302

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9628												
18 Sep	S17E79	291	0160	07	DAO	006	B		1		1				
19 Sep	S18E64	293	0410	15	FKC	016	B	2			3				
20 Sep	S18E51	293	0800	17	FKC	033	BG	3			3				
21 Sep	S18E38	293	0790	16	FKC	044	BG				1				
22 Sep	S17E25	293	0630	17	FAC	058	BG	1			5	1			
23 Sep	S18E12	293	0720	19	FAC	058	BGD	2			7				
24 Sep	S18W01	292	0880	19	FKC	066	BGD	3			11	1			
25 Sep	S18W14	292	0880	19	FKC	066	BGD	3	3		15	2			
26 Sep	S18W25	290	0730	19	FKC	049	BGD	1			6				
27 Sep	S18W37	289	0780	15	EKC	037	BGD	1			7				
28 Sep	S18W48	287	0620	17	FKI	027	BGD	3	1		11	1			
29 Sep	S17W62	287	0770	14	EKI	025	BG	2			3				
30 Sep	S17W76	288	0800	14	EKI	020	BG	1	1		5				
								22	6	0	78	5	0	0	0

Still on Disk.
Absolute heliographic longitude: 292

			Region 9629												
19 Sep	N26E38	319	0070	07	CAO	009	B								
20 Sep	N26E23	321	0060	04	DSO	007	B								
21 Sep	N26E11	320	0050	06	DAO	009	B								
22 Sep	N26W02	320	0040	06	DSO	010	B								
23 Sep	N25W15	320	0040	06	DAO	008	B								
24 Sep	N26W28	319	0040	04	CSO	005	B								
25 Sep	N26W42	320	0000	01	BXO	002	B								
26 Sep	N26W55	320									1				
27 Sep	N26W68	320													
28 Sep	N26W81	320													
								0	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 320

			Region 9630												
20 Sep	N27W36	020	0010	03	CSO	003	B								
21 Sep	N27W49														
22 Sep	N27W62	020													
23 Sep	N27W75	020													
24 Sep	N27W88	020													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 20

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9631												
20 Sep	N08W15	359	0060	04	DAO	009	B	1	1		3				
21 Sep	N09W24	355	0120	07	DAC	015	B	2			5				
22 Sep	N08W43	001	0050	06	DAO	009	B				1				
23 Sep	N07W57	002	0010	06	BXO	005	B								
24 Sep	N08W69	360	0000	00	AXX	001	A				1				
25 Sep	N09W85	003	0000	00	AXX	001	A								
								3	1	0	10	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 359

			Region 9632												
20 Sep	S18E76	268	0390	12	EKO	006	B								
21 Sep	S17E56	275	0640	09	DKI	013	B	2			3				
22 Sep	S18E45	273	0710	09	DKO	020	BG	4			8				
23 Sep	S18E32	273	0780	08	DKI	017	BGD	3	1		4				
24 Sep	S19E19	272	0790	09	DKI	023	BGD			1	1		1		
25 Sep	S19E06	272	0700	09	DKI	023	BGD				5				
26 Sep	S19W08	273	0670	11	EKC	021	BGD				1				
27 Sep	S19W21	273	0710	09	DKC	017	BGD				2				
28 Sep	S18W33	272	0640	11	EKI	015	BGD				6				
29 Sep	S19W48	273	0610	08	DKI	021	BGD								
30 Sep	S18W61	273	0620	07	DKI	019	BG				3				
								9	1	1	33	0	1	0	0

Still on Disk.
Absolute heliographic longitude: 272

			Region 9633												
22 Sep	N23E75	243	0090	03	HSX	001	A								
23 Sep	N23E62	243	0090	02	HSX	001	A								
24 Sep	N22E50	241	0090	03	HAX	001	A								
25 Sep	N22E36	242	0070	02	HSX	001	A								
26 Sep	N22E24	241	0080	02	HSX	001	A								
27 Sep	N22E10	242	0070	02	HSX	001	A								
28 Sep	N22W02	241	0070	02	HSX	001	A								
29 Sep	N22W16	241	0070	02	HSX	001	A								
30 Sep	N22W29	241	0080	02	HSX	001	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 241

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9634												
22 Sep	N12E76	242	0090	04	DAO	004	B								
23 Sep	N12E68	237	0230	16	FAO	004	B								
24 Sep	N12E54	237	0120	05	DAO	005	B								
25 Sep	N12E41	237	0080	07	DAO	011	B								
26 Sep	N12E24	241	0090	06	DAO	007	B				1				
27 Sep	N12E11	241	0110	08	DAO	008	B				3				
28 Sep	N12W02	241	0080	09	DSO	009	B	1	1		3	2			
29 Sep	N12W15	240	0060	08	DAO	006	B				5				
30 Sep	N12W29	241	0070	08	DAO	007	B								
								1	1	0	12	2	0	0	0

Still on Disk.
Absolute heliographic longitude: 241

			Region 9635												
23 Sep	N22E13	292	0010	03	BXO	003	B								
24 Sep	N21E02	289	0040	06	DSO	008	B	1			1				
25 Sep	N21W12	290	0050	07	DSO	013	B								
26 Sep	N21W25	290	0060	08	DAO	009	B								
27 Sep	N21W38	290	0060	09	DSO	010	B				1				
28 Sep	N21W51	290	0040	08	DSO	007	B	1			1				
29 Sep	N22W65	290	0130	08	DAO	005	B				1				
30 Sep	N22W78	290	0140	08	DAO	003	B								
								2	0	0	4	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 289

			Region 9636												
24 Sep	N12E65	226	0260	11	EAO	007	B				5				
25 Sep	N13E54	224	0300	14	EAO	017	B				2				
26 Sep	N14E41	224	0400	15	EAI	024	BG	1			3				
27 Sep	N13E26	226	0370	18	FAI	028	BG				3				
28 Sep	N14E13	226	0210	18	FAI	024	BG		1		1		1		
29 Sep	N13W02	227	0220	17	FAI	029	BG	1	1		2	1			
30 Sep	N14W15	227	0350	16	FKC	035	BG	4			12				
								6	2	0	28	1	1	0	0

Still on Disk.
Absolute heliographic longitude: 227

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9637												
24 Sep	S14E71	220	0140	09	DAO	003	B				1				
25 Sep	S15E59	219	0180	09	DAO	005	B								
26 Sep	S15E46	219	0210	08	DSO	007	B				1				
27 Sep	S14E32	220	0200	08	DAO	010	B				2				
28 Sep	S15E18	221	0220	08	DSO	009	B	1	1		3	2			
29 Sep	S13E06	219	0170	08	DSO	012	BG								
30 Sep	S13W07	219	0190	09	DAO	019	BG	1			1				
								2	1	0	8	2	0	0	0

Still on Disk.
Absolute heliographic longitude: 219

			Region 9638												
25 Sep	N03E61	217	0030	01	HSX	002	A								
26 Sep	N03E48	217	0020	01	HSX	001	A								
27 Sep	N03E35	217	0000	01	AXX	001	A								
28 Sep	N03E22	217													
29 Sep	N03E09	217													
30 Sep	N03W04	217													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 217

			Region 9639												
26 Sep	N04E36	229	0030	05	DSO	003	B								
27 Sep	N04E21	231	0030	06	DSO	007	B								
28 Sep	N03E08	231	0050	08	DSO	006	B								
29 Sep	N03W06	231	0070	08	DSO	007	B								
30 Sep	N04W20	232	0100	09	CSO	008	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 231

			Region 9640												
27 Sep	N10E67	185	0040	04	CSO	004	B								
28 Sep	N10E56	183	0020	01	BXO	002	B								
29 Sep	N10E41	184	0030	02	HSX	003	A								
30 Sep	N10E26	186	0020	03	CSO	002	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 186

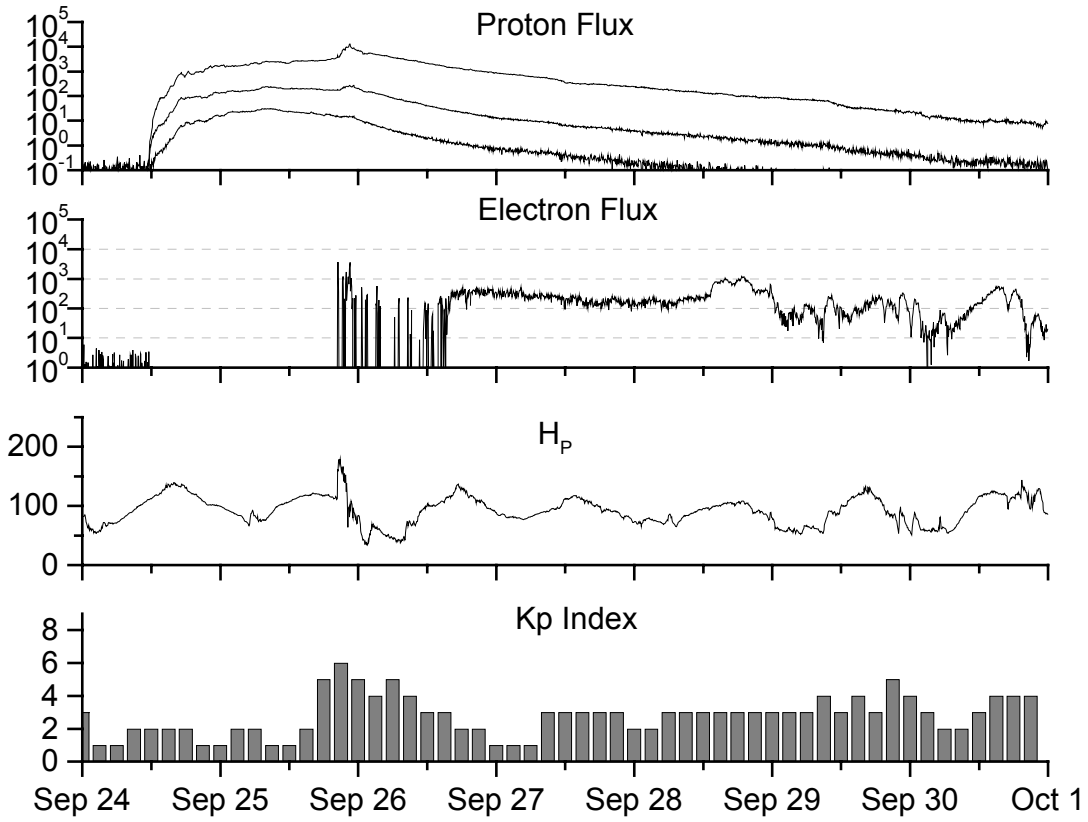
Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 9641												
27 Sep	S14E77	175	0060	02	HSX	001	A								
28 Sep	S14E61	178	0070	03	HAX	001	A								
29 Sep	S14E47	178	0090	04	CSO	002	B								
30 Sep	S15E38	174	0150	12	CSO	005	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		174													
			Region 9642												
29 Sep	N03E71	154	0030	01	HSX	001	A								
30 Sep	N04E56	156	0020	01	HSX	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		156													

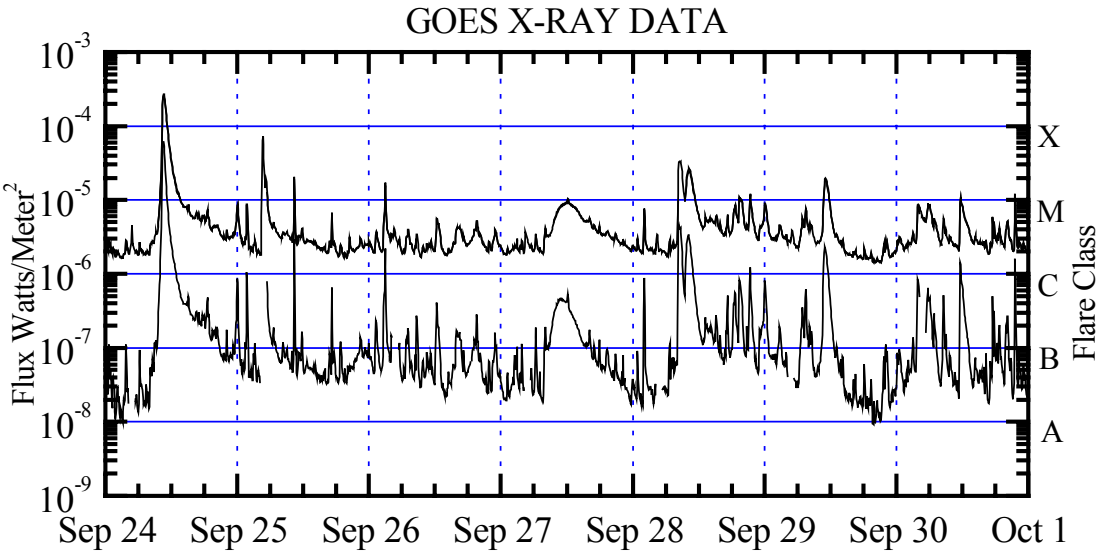
Recent Solar Indices (preliminary)
of the observed monthly mean values

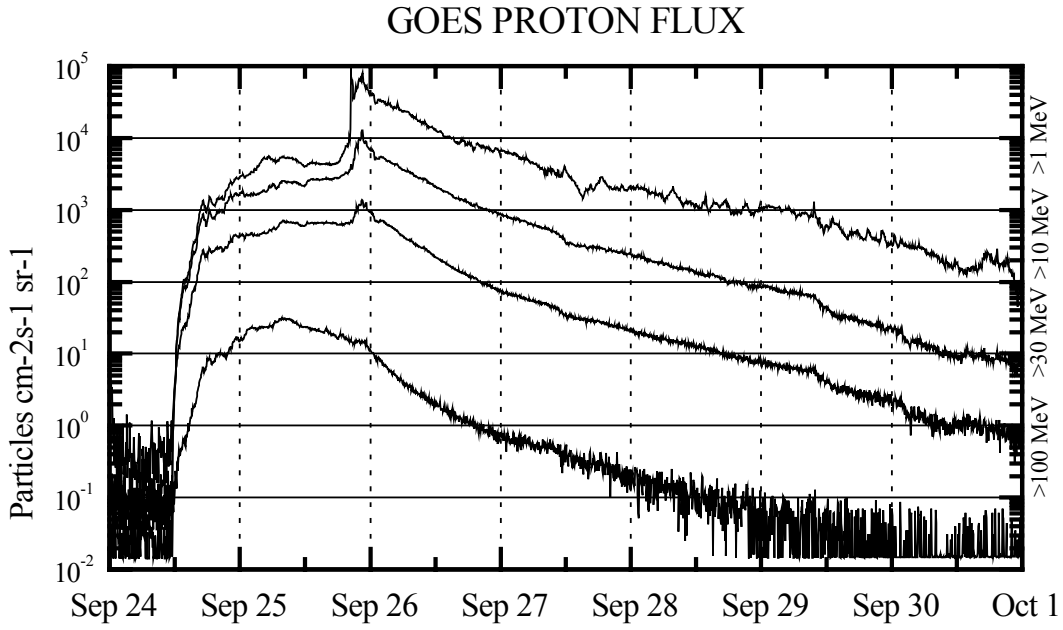
	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
					1999				
September	107.4	71.5	0.67	150.0	102.3	135.7	161.0	19	12.8
October	167.7	116.7	0.70	158.5	107.8	164.8	167.2	19	12.7
November	199.3	133.2	0.67	164.7	110.0	191.5	171.5	14	13.1
December	123.5	86.4	0.69	165.9	111.1	169.8	173.4	10	13.8
					2000				
January	140.8	90.1	0.64	168.0	112.9	158.1	175.5	13	14.5
February	161.9	112.9	0.70	172.1	116.7	173.2	176.8	15	15.0
March	203.6	138.5	0.68	175.4	119.9	208.2	178.4	09	15.0
April	193.4	125.5	0.65	176.3	120.8	184.2	180.5	15	15.0
May	188.8	121.6	0.64	173.1	119.0	184.5	180.0	15	15.0
June	190.3	124.9	0.66	172.0	118.7	179.8	179.7	15	15.1
July	236.7	169.1	0.71	173.0	119.7	204.7	180.2	21	14.8
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			177.7		17	
April	163.6	108.2	0.66			178.3		18	
May	135.1	97.3	0.72			148.7		12	
June	196.7	134.0	0.68			173.7		12	
July	124.6	82.2	0.66			131.3		11	
August	159.4	106.8	0.67			163.2		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 24 September 2001
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2 –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^2 –sec –sr) with energies greater than 2 MeV at GOES-8.
Hp 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.
Kp 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 Kp 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 Kp are " global " parameters that are applicable to a first order approximation over large areas. Hparallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





We*ekly GOES Satellite X-ray and Proton Plots*

X-ray plot contains five-minute averaged x-ray flux (watts/$m^{2)}$ 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^2 –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^2-sec-sr) at greater than 10 MeV.