

Space Weather Highlights
10 - 16 December 2001

SWO PRF 1372
18 December 2001

Activity ranged from low to high levels during the period. High levels occurred on 11 and 13 December due to two major flares from Region 9733 (N14, L = 313, class/area Eki/560 on 12 December). Activity alternated between low and moderate levels during the rest of the period. Region 9733's first major flare was an impulsive X2/2b at 11/0808 UTC, the second a X6/3b at 13/1430 UTC. The X6/3b flare was associated with a partial-halo CME. Region 9733 was large and magnetically complex through most of the period. It produced impulsive low-level M- and C- class flares as it gradually decayed following the X6 flare (for flare times, please refer to the Energetic Events or Optical Flares lists). The other sunspot group of interest was Region 9727 (S21, L = 020, class/area Eki/630 on 13 December), which produced isolated low-level M-class and C-class flares during the period. Region 9727 was in a gradual growth phase through 13 December, then stabilized as a large, magnetically complex group with a possible delta magnetic configuration in its northernmost trailer spots. It produced isolated subflares as it crossed the west limb on 15 December.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the period. A relatively weak high-speed stream associated with a positive-polarity coronal hole was observed during the last two days of the period. Velocities and temperatures were elevated during this time with intermittent "gusts" in the 500 to 600 km/sec range. There were no significant disturbances observed during the rest of the period.

There were no proton events detected at geo-synchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels during most of the period.

Geomagnetic field activity was at quiet to unsettled levels during most of the period.

Space Weather Outlook
19 December - 14 January 2002

Solar activity is expected to range from low to moderate levels with isolated low-level M-class flares likely. Isolated major flare activity will also be possible during the period with the return of previously active longitudes.

There will be a slight chance for a proton event during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal levels during most of the period.

The geomagnetic field is expected to be at quiet to unsettled levels during 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			Optical				
					C	M	X	S	1	2	3	4
10 December	219	224	1410	C1.3	6	0	0	8	2	0	0	0
11 December	221	154	1430	C2.8	4	1	1	7	0	1	0	0
12 December	237	183	1540	C1.6	8	3	0	13	3	0	0	0
13 December	220	212	1440	C2.1	4	2	1	12	1	0	1	0
14 December	245	202	1310	C1.6	2	2	0	20	0	1	0	0
15 December	218	198	1250	C4.1	10	0	0	7	0	0	0	0
16 December	209	204	1740	C1.6	3	2	0	6	1	1	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
	10 December	9.4E+4	1.2E+4	2.8E+3		2.2E+6
11 December	2.7E+5	1.8E+4	3.2E+3		1.5E+6	
12 December	1.0E+7	5.7E+4	3.2E+3		5.4E+5	
13 December	5.6E+6	2.6E+4	3.3E+3		1.0E+5	
14 December	1.4E+6	1.5E+4	3.3E+3		1.2E+5	
15 December	1.4E+6	1.3E+4	3.1E+3		2.8E+5	
16 December	3.4E+6	3.7E+4	2.7E+3		1.1E+5	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	10 December	3	0-0-2-1-2-2-1-1	3	0-0-2-1-3-0-0-0	4
11 December	3	1-2-0-1-1-1-1-1	*	0-0-1-2-0-1-*-*	4	1-1-0-1-1-2-2-2
12 December	8	1-2-2-4-1-1-1-2	*	1-1-3-6-4-3-2-*	12	2-2-2-5-3-2-3-3
13 December	4	2-1-0-0-3-2-0-0	*	1-2-2-0-0-0-*-0	4	2-1-1-0-2-1-1-1
14 December	4	0-1-0-1-2-2-1-2	7	0-1-0-3-3-2-3-1	4	1-1-0-1-2-2-2-2
15 December	10	2-3-3-3-3-2-1-2	13	2-1-3-5-4-1-0-1	11	3-3-3-3-3-2-2-2
16 December	8	2-3-3-3-2-1-1-0	13	1-2-4-4-4-2-2-0	10	2-3-3-3-3-2-2-2

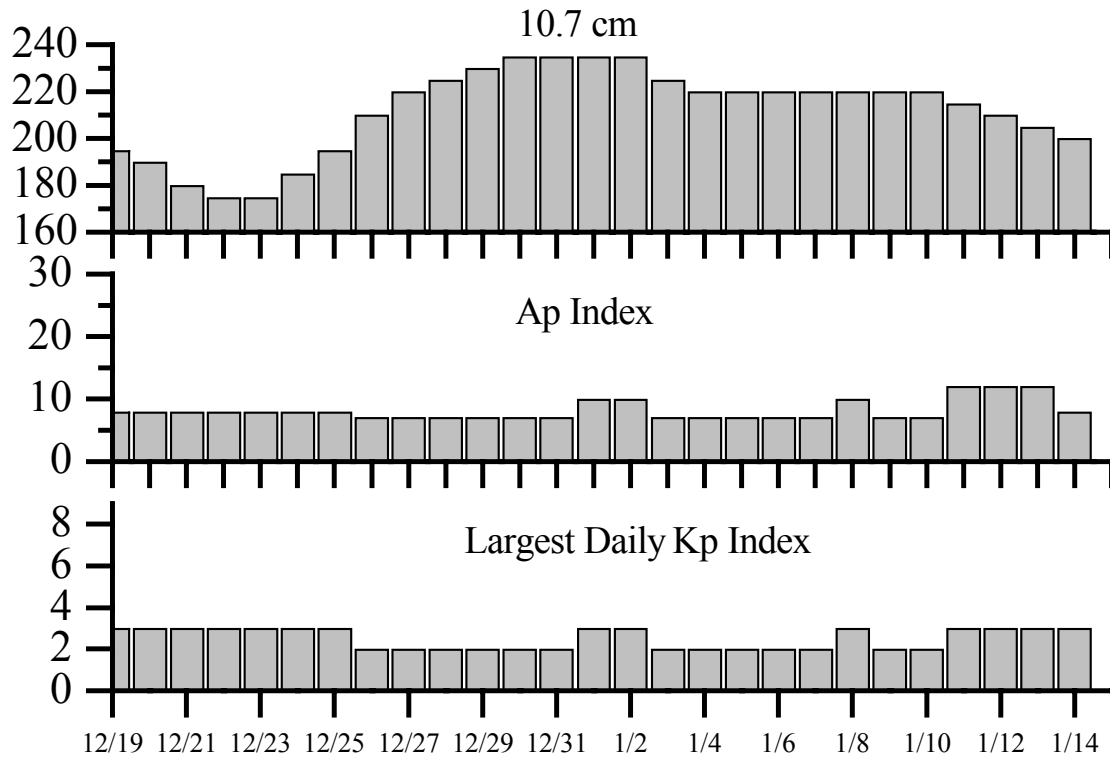


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
10 Dec 1028	Type II Radio Emission	10 Dec 0940
11 Dec 0044	1 - 245 MHz Radio Burst	10 Dec
11 Dec 0824	X-Ray event X2.8/2b	11 Dec 0808
11 Dec 0903	Type II Radio Emission	11 Dec 0807
11 Dec 0905	10cm Radio Burst 2600 F.U.	11 Dec 0802
11 Dec 1158	Type IV Radio Emission	11 Dec 0822
12 Dec 0027	4 - 245 MHz Radio Bursts	11 Dec
12 Dec 1201	K = 5 Observed	12 Dec 0900 - 1200
12 Dec 1921	10cm Radio Burst 420 F.U.	12 Dec 1903
12 Dec 2223	X-Ray event M5.6	12 Dec 2200
13 Dec 0007	4 - 245 MHz Radio Bursts	12 Dec
13 Dec 1441	X-Ray event X6.2/3B	13 Dec 1430
13 Dec 1448	Type II Radio Emission	13 Dec 1429
13 Dec 1508	Type IV Radio Emission	13 Dec 1439
13 Dec 1541	10cm Radio Burst 1800 F.U.	13 Dec 1423
14 Dec 0022	2 - 245 MHz Radio Bursts	13 Dec
14 Dec 0911	Type II Radio Emission	14 Dec 0853
14 Dec 1312	10cm Radio Burst 220 F.U.	14 Dec 0846
14 Dec 1832	A \geq 20 Watch	15 Dec
14 Dec 1833	A \geq 20 Watch	16 Dec
14 Dec 2230	CANCELLED A \geq 20 Watch	16 Dec



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
19 Dec	195	8	3	02 Jan	235	10	3
20	190	8	3	03	225	7	2
21	180	8	3	04	220	7	2
22	175	8	3	05	220	7	2
23	175	8	3	06	220	7	2
24	185	8	3	07	220	7	2
25	195	8	3	08	220	10	3
26	210	7	2	09	220	7	2
27	220	7	2	10	220	7	2
28	225	7	2	11	215	12	3
29	230	7	2	12	210	12	3
30	235	7	2	13	205	12	3
31	235	7	2	14	200	8	3
01 Jan	235	10	3				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	$\frac{1}{2}$	Class	Integ Flux	Imp/Location	Rgn #	Radio Flux		Intensity		
			Max					245	2695	II	IV	
11 Dec	0758	0808	0814	X2.8	.130	Sf	N16E41	9733	450	2600	2	1
11 Dec	1442	1451	1457	M1.3	.009	2n	S26W35	9727	1200	50		
12 Dec	1900	1911	1918	M3.0	.022	1n	N15E24	9733	250	420		
12 Dec	2141	2200	2218	M5.6	.086			9727	520			
12 Dec	2313	2322	2328	M4.8	.026	1f	S19W55	9727				
13 Dec	0632	0640	0700	M1.8	.022	Sf	S20W58	9727				
13 Dec	1420	1430	1435	X6.2	.250	3b	N16E09	9733	30	1800	3	
13 Dec	2244	2307	2317	M1.4	.022	1f	S18W67	9727				
14 Dec	0840	0913	0953	M3.5	.110				50	220	1	
14 Dec	1941	1954	2002	M4.4	.030	2n	N16W04	9733	100			
16 Dec	0114	0124	0129	M1.5	.008	2n	N15W23	9733				
16 Dec	0309	0328	0348	M1.0	.015	1f	N13W26	9733				

Flare List

Date	Time			X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
	Begin	Max	End				
10 December	0133	0230	0315		1f	S19W16	9727
	0710	0713	0717		Sf	S20W16	9727
	0718	0735	0739		Sf	S19W17	9727
	0934	0935	0951	C8.6	Sf	S25W19	9727
	1011	1014	1019	C2.6			
	1220	1223	1234	C2.3	Sf	S20W19	9727
	1330	1334	1340		Sf	S14E74	9734
	1628	1628	1659		Sf	N12E51	9733
	1749	1750	1826	C4.2	Sf	S19W24	9727
	1806	1806	1811		Sf	N12E50	9733
	1816	1821	1827	C4.3			
11 December	2241	2244	2318	C7.0	1f	N10E52	9733
	0330	0343	0347	C3.4			
	0412	0416	0421	C2.7			
	0802	U0803	0803	X2.8	Sf	N16E41	9733
	0830	0832	0836		Sf	S10W33	9736
	1006	1019	1029	C4.6			
	1354	1355	1358		Sf	S26W32	9727
	1445	1449	1510	M1.3	2n	S26W35	9727
	1625	1625	1632		Sf	S10W38	9736
	1719	1720	1722		Sf	S22W31	9727
	1809	1810	1813		Sf	S10W39	9736
1854	1901	1908	C3.4				
2123	2124	A2130		Sf	S10W39	9736	



Flare List - continued.

Date	Time			X-ray	Optical		Rgn Lat CMD	
	Begin	Max	End		Imp / Class.	Location Brtns		
12 December	0007	0015	0029	C3.7	Sf	S10W42	9736	
	0306	0311	0317		Sf	S16W40	9727	
	0333	0349	0410	C3.4	Sf	S16W42	9727	
	0449	0453	0505		Sf	S14W44	9727	
	0450	0455	0514	C5.6	Sf	S10W43	9736	
	0849	0849	0852	C3.2	Sf	S26W44	9727	
	1141	1145	1149	C2.6				
	1211	1212	1220		1f	S19W39	9727	
	B1227	U1228	A1238	C4.8	Sf	N14E28	9733	
	1415	1429	1439		C4.4			
	B1441	U1447	A1501		Sf	N14E27	9733	
	B1441	U1441	A1500		Sf	S19W52	9727	
	1549	1550	1553		Sf	N15E28	9733	
	12 December	1714	1715	1721		Sf	N15E27	9733
		B1801	U1926	A2013		Sf	S18W54	9727
B1811		U1923	A2017	M3.0	1n	N15E24	9733	
1838		1838	1844		Sf	S17W53	9726	
2020		2024	2028	C9.3			9727	
2141		2200	2218	M5.6			9727	
2316		2318	2349	M4.8	1f	S19W55	9727	
13 December	0022	0023	0045			Sf	S19W56	9727
	0100	0135	0410		Sf	S18W57	9727	
	0238	0248	0255	C4.1	Sf	N15E20	9733	
	0634	0638	0656	M1.8	Sf	S20W58	9727	
	1006	1012	1024	C3.1				
	1322	1326	1331	C3.4				
	1358	1403	1407	C2.4				
	1424	1430	1545	X6.2	3b	N16E09	9733	
	1555	1600	1609		Sf	S18W61	9727	
	1616	1616	1623		Sf	S19W64	9727	
	1656	1657	1708		Sf	S18E58	9738	
	1714	1715	1722		Sf	N15E12	9733	
	1752	1755	1814		Sf	S18W65	9727	
	1815	1815	1819		Sf	S21W59	9727	
	1909	1916	1929		Sf	S20E54	9738	
1931	1931	1936		Sf	S28E16	9737		
2245	2301	2318	M1.4	1f	S18W67	9727		
14 December	0046	0052		0126	Sf	S20W69	9727	
	0050	0050	0058	Sf	S14W03	9739		
	0145	0150	0201	Sf	S20W69	9727		
	0335	0338	0411	Sf	S20W69	9727		
	0404	0406	0411	Sf	S20W70	9727		



Flare List - continued.

Date	Time			X-ray	Optical		Rgn Lat CMD	
	Begin	Max	End		Imp/ Class.	Location Brtns		
14 December	0417	0418	0424		Sf	S12W72	9736	
	0648	0650	0719	C5.9	Sf	S20W70	9727	
	0653	0653	0656		Sf	S14W63	9730	
	0840	0913	0953	M3.5				
	0848	0849	0853		Sf	S12W75	9736	
	1250	1257	1310	C7.0	Sf	N14W02	9733	
	1536	1536	1547		Sf	S27E06	9737	
	1539	1539	1543		Sf	S22W74	9727	
	1545	1547	1555		Sf	N17W02	9733	
	1557	1557	1603		Sf	N17W01	9733	
	1626	1628	1632		Sf	N14W05	9733	
	1710	1713	1728		Sf	N18W05	9733	
	1842	1844	1846		Sf	N18W05	9733	
	1944	1950	2124	M4.4	2n	N16W04	9733	
	2218	2218	2221		Sf	N15W07	9733	
	2222	2223	2225		Sf	N17W07	9733	
	2233	2235	2250		Sf	N14W10	9733	
	15 December	0016	0028	0037	C6.5	Sf	N16W10	9733
		0054	0058	0110	C8.3	Sf	S19W90	9727
		1004	U1008	A1018	C4.9	Sf	N14W16	9733
1239		1253	1303	C9.4				
1656		1659	1701	C5.0				
1731		1733	1738	C4.3	Sf	N18W17	9733	
1824		1825	1829	C2.9	Sf	N17W13	9733	
1917		1920	1922		Sf	N14W21	9733	
1950		1953	1958	C3.3				
2124		2129	2132	C3.3				
16 December	2313	2316	2320	C3.5	Sf	N12W25	9733	
	0114	0121	0229	M1.5	2n	N15W23	9733	
	0317	0328	0440	M1.0	1f	N13W26	9733	
	0404	0407	0410		Sf	N10E75	9742	
	0434	0435	0443		Sf	N08E78	9742	
	0531	0534	0536		Sf	N11E79	9742	
	0735	0741	0816	C8.5	Sf	N13W29	9733	
	1043	1111	1119	C2.7				
	1415	1424	1434	C3.2			9743	
	1435	1437	1441		Sf	S12E81	9743	
1856	1858	1920		Sf	N11E70	9742		



Region Summary

Date	Location		Sunspot Characteristics				Flares										
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶)	Extent hemi)	Spot (helio)	Spot Class	Mag Count	X-ray		Optical							
		Lon						Class	C	M	X	S	1	23	4		
<i>Region 9718</i>																	
27 Nov	S06E84	084	0060	02	Hax	006	A	3		7	1						
28 Nov	S07E70	084	0410	10	Dai	005	B	1		10							
29 Nov	S07E58	083	0440	11	Eki	013	B	1		1							
30 Nov	S07E42	086	0500	12	Eko	012	B	3	1	3	1						
01 Dec	S07E30	085	0540	12	Eki	016	Bg		2	2	1	1					
02 Dec	S06E17	085	0600	12	Eki	030	Bg	1		2							
03 Dec	S07E03	085	0650	12	Eki	030	Bg	3		4							
04 Dec	S06W09	085	0660	11	Eki	027	Bg	4	2	6							
05 Dec	S07W24	086	0660	11	Eai	034	Bg	1		1							
06 Dec	S07W38	087	0720	11	Eki	023	Bg										
07 Dec	S06W51	087	0540	10	Dki	017	Bg										
08 Dec	S06W63	086	0470	10	Dki	015	B	1		1							
09 Dec	S06W76	085	0280	09	Dao	010	B	1		1							
10 Dec	S06W89	085	0200	08	Dao	003	B										
								19	5	0	38	3	1	0	0		

Crossed West Limb.

Absolute heliographic longitude: 085

Region 9720

28 Nov	S18E72	082	0150	09	Dao	004	B										
29 Nov	S18E54	087	0120	10	Dao	009	B			3							
30 Nov	S18E46	082	0150	12	Eao	009	B		1								
01 Dec	S18E33	082	0070	11	Eao	010	B										
02 Dec	S18E20	082	0040	09	Cao	012	B										
03 Dec	S18E05	083	0040	08	Dao	011	B										
04 Dec	S20W08	083	0040	11	Eso	006	B										
05 Dec	S22W16	078	0060	12	Eso	011	B										
06 Dec	S23W29	078	0040	09	Dso	009	B	1			1						
07 Dec	S26W41	077	0070	09	Dso	009	B										
08 Dec	S27W52	075	0050	10	Dao	010	B				1						
09 Dec	S28W63	072	0040	10	Dso	009	B										
10 Dec	S28W73	069	0010	01	Hsx	001	A										
11 Dec	S28W86	069															
								1	1	0	4	1	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 083



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 9721</i>																						
28 Nov	N10E78	076	0120	01	Hax	001	A															
29 Nov	N12E70	071	0130	08	Cao	003	B															
30 Nov	N13E57	071	0140	10	Dso	003	B															
01 Dec	N13E43	072	0160	09	Dao	004	B															
02 Dec	N13E30	072	0170	16	Cao	007	B															
03 Dec	N13E16	072	0190	12	Cao	006	B															
04 Dec	N12E02	073	0200	06	Cso	003	B															
05 Dec	N11W11	073	0210	02	Hsx	001	A															
06 Dec	N11W25	074	0220	03	Hsx	003	A															
07 Dec	N12W37	073	0130	08	Cao	004	B															
08 Dec	N11W52	075	0100	03	Dao	004	B															
09 Dec	N11W64	073	0110	05	Dao	003	B															
10 Dec	N11W79	075	0100	04	Dso	002	B															
11 Dec	N11W93	076	0060	04	Dso	002	B															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 073

<i>Region 9723</i>																					
01 Dec	S09E45	070	0020	01	Hsx	001	A														
02 Dec	S06E31	071	0020	04	Cso	003	B														
03 Dec	S04E16	072	0010	02	Axx	002	A														
04 Dec	S05E03	072	0040	04	Dso	005	B														
05 Dec	S04W11	073	0040	06	Dao	007	B														
06 Dec	S04W25	074	0040	06	Dso	007	B														
07 Dec	S04W38	074	0040	05	Dro	005	B														
08 Dec	S04W54	077	0040	05	Dso	003	B														
09 Dec	S05W68	077	0040	05	Cso	003	B														
10 Dec	S05W81	077	0010	01	Hsx	001	A														

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 072



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 9724</i>																	
01 Dec	N09E74	041	0070	03	Hsx	001	A	1			1						
02 Dec	N09E59	043	0050	02	Hsx	001	A										
03 Dec	N10E47	041	0060	03	Cso	003	B										
04 Dec	N10E33	042	0050	03	Cso	003	B										
05 Dec	N10E19	043	0060	03	Dso	003	B										
06 Dec	N10E06	043	0040	03	Dso	003	B										1
07 Dec	N10W07	043	0060	03	Dso	006	B										1
08 Dec	N10W20	043	0040	04	Cso	005	B										
09 Dec	N10W33	042	0030	02	Hsx	001	A										
10 Dec	N10W48	044	0030	01	Hsx	001	A										
11 Dec	N08W61	044	0050	01	Hsx	001	A										
12 Dec	N09W75	045	0030	01	Hsx	001	A										
13 Dec	N09W88	045	0010	01	Axx	001	A										
								0	1	0	3	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 043

<i>Region 9726</i>																	
02 Dec	S15E69	033	0070	03	Dso	002	B										
03 Dec	S16E55	033	0070	03	Cso	002	B										
04 Dec	S16E42	033	0060	04	Cso	004	B										
05 Dec	S16E29	033	0060	05	Dso	005	B										
06 Dec	S17E16	033	0070	03	Cso	003	B										
07 Dec	S16E03	033	0080	05	Dso	007	B										
08 Dec	S17W09	032	0060	06	Dso	008	B										
09 Dec	S16W22	031	0040	05	Dso	008	B										
10 Dec	S16W37	033	0020	06	Dro	006	B										
11 Dec	S16W50	033															
12 Dec	S16W63	033															1
13 Dec	S16W76	033															
								0	0	0	1	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 033



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 9727</i>																							
03 Dec	S22E68	020	0120	04	Cso	003	B																
04 Dec	S22E57	018	0220	07	Cko	004	B																
05 Dec	S21E42	020	0320	08	Dko	014	Bgd	2				4	1										
06 Dec	S21E29	020	0400	08	Dko	012	Bgd	1	1			1		1									
07 Dec	S22E16	020	0430	05	Dkc	008	Bgd	1						1	1								
08 Dec	S22E03	020	0370	07	Dki	021	Bgd	2				1	1										
09 Dec	S20W10	019	0360	09	Dai	023	Bgd	2				2	1										
10 Dec	S21W24	020	0550	10	Dkc	031	Bgd	3				5	1										
11 Dec	S21W37	020	0570	14	Ekc	026	Bgd		1			2		1									
12 Dec	S21W52	022	0600	11	Ekc	023	Bgd	3	2			6	2										
13 Dec	S21W66	023	0630	12	Eki	024	Bgd		2			7	1										
14 Dec	S21W77	020	0550	12	Eki	012	Bgd	1				6											
15 Dec	S22W88	018	0320	12	Eai	004	Bgd	1				1											
								16	6	0	35	8	3	0	0								

Crossed West Limb.

Absolute heliographic longitude: 020

Region 9728

04 Dec	N36W07	082	0020	03	Dso	003	B														
05 Dec	N36W20	082	0060	07	Dso	009	B														
06 Dec	N35W34	083	0100	09	Dao	009	B					2									
07 Dec	N36W47	083	0110	12	Eao	005	B														
08 Dec	N36W60	083	0070	12	Eso	004	B														
09 Dec	N35W71	080	0050	12	Eso	005	B														
10 Dec	N35W90	086	0020	02	Hsx	001	A														
								0	0	0	2	0	0	0	0						

Crossed West Limb.

Absolute heliographic longitude: 082

Region 9729

05 Dec	N24E04	058	0040	04	Cao	006	B														
06 Dec	N24W11	060	0020	05	Dro	003	B														
07 Dec	N23W22	058	0020	00	Hrx	001	A					1									
08 Dec	N23W35	058																			
09 Dec	N23W48	058																			
10 Dec	N23W61	058																			
11 Dec	N23W74	058																			
12 Dec	N23W87	058																			
								0	0	0	1	0	0	0	0						

Crossed West Limb.

Absolute heliographic longitude: 058



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 9730</i>																		
05 Dec	S13E49	013	0020	01	Hrx	002	A											
06 Dec	S12E34	015	0010	03	Cro	002	B											
07 Dec	S12E21	015											1					
08 Dec	S12E08	015																
09 Dec	S12W05	015																
10 Dec	S12W18	015																
11 Dec	S12W31	015																
12 Dec	S12W44	015																
13 Dec	S12W57	015																
14 Dec	S12W70	015											1					
15 Dec	S12W83	015																
								0	0	0	0	2	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 015

<i>Region 9731</i>																		
06 Dec	N24E36	013	0040	03	Dso	004	B											
07 Dec	N24E23	013	0030	05	Dso	003	B											
08 Dec	N24E09	014	0020	05	Cro	003	B											
09 Dec	N25W04	013	0010	06	Bxo	005	B						1					
10 Dec	N25W17	013																
11 Dec	N25W30	013																
12 Dec	N25W43	013																
13 Dec	N25W56	013																
14 Dec	N25W69	013																
15 Dec	N25W82	013																
								0	0	0	0	1	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 013



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 9732</i>																		
07 Dec	N03E64	332	0070	08	Dso	003	B						1					
08 Dec	N04E52	331	0080	09	Dso	005	B											
09 Dec	N04E36	333	0060	08	Cso	004	B	1										
10 Dec	N04E20	336	0040	02	Hsx	002	A											
11 Dec	N04E08	335	0060	07	Cso	002	B											
12 Dec	N04W05	335	0080	06	Cso	005	B											
13 Dec	N04W18	335	0070	07	Cao	006	B											
14 Dec	N03W33	336	0060	02	Hsx	001	A											
15 Dec	N03W49	339	0050	02	Hsx	001	A											
16 Dec	N02W62	339	0060	01	Hsx	001	A											
								1	0	0	1	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 335

<i>Region 9733</i>																		
08 Dec	N14E67	316	0240	12	Eao	019	B	2				1						
09 Dec	N14E58	311	0290	15	Eai	021	B	4				1						
10 Dec	N14E44	312	0360	14	Eai	027	Bg	1				2	1					
11 Dec	N14E32	311	0470	14	Eai	031	Bg				1	1						
12 Dec	N14E18	312	0560	14	Eki	042	Bgd	1	1			4	1					
13 Dec	N14E04	313	0490	15	Ekc	046	Bg	1		1	2						1	
14 Dec	N14W10	313	0450	15	Eac	058	Bgd	1	1			9					1	
15 Dec	N14W23	313	0430	15	Eai	057	Bgd	5				6						
16 Dec	N14W36	313	0420	15	Eai	047	Bg	1	2			1	1	1				
								16	4	2	27	3	2	1	0			

Still on Disk.

Absolute heliographic longitude: 313

<i>Region 9734</i>																		
09 Dec	S12E81	288	0050	10	Cao	002	B	2										
10 Dec	S12E65	291	0030	02	Hsx	001	A					1						
11 Dec	S12E52	291	0070	02	Hax	001	A											
12 Dec	S12E38	292	0030	02	Cso	002	B											
13 Dec	S12E24	293	0020	01	Hsx	001	A											
14 Dec	S13E12	291	0010	01	Axx	001	A											
15 Dec	S14E01	289	0020	04	Cao	005	B											
16 Dec	S15W09	286	0010	02	Axx	002	A											
								2	0	0	1	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 289



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

Region 9735

10 Dec	N10W34	030	0020	03	Bxo	002	B											
11 Dec	N10W47	030	0000	00		000												
12 Dec	N05W61	031	0020	02	Bxo	002	B											
13 Dec	N05W74	031																
										0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 030

Region 9736

10 Dec	S09W27	023	0010	03	Bxo	003	B											
11 Dec	S10W42	025	0030	05	Dao	006	B					4						
12 Dec	S09W55	025	0090	08	Dao	007	B	2				2						
13 Dec	S10W69	026	0090	07	Dso	006	B											
14 Dec	S10W82	025	0060	06	Cso	003	B					2						
										2	0	0	8	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 023

Region 9737

10 Dec	S27E52	304	0010	03	Bxo	003	B											
11 Dec	S27E39	304	0120	05	Dso	005	B											
12 Dec	S28E26	304	0080	06	Dao	008	B											
13 Dec	S28E13	304	0030	07	Dso	006	B					1						
14 Dec	S28E00	303	0040	07	Dso	008	B					1						
15 Dec	S27W12	302	0070	07	Dao	006	B											
16 Dec	S28W24	301	0040	06	Dso	004	B											
										0	0	0	2	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 303

Region 9738

12 Dec	S21E67	263	0050	07	Cso	003	B											
13 Dec	S19E53	264	0060	08	Dao	003	B					2						
14 Dec	S20E40	263	0060	11	Eso	007	B											
15 Dec	S18E27	263	0060	13	Eao	013	B											
16 Dec	S19E15	262	0060	12	Eso	012	B											
										0	0	0	2	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 262



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 9739</i>																					
13 Dec	S13W02	319	0010	03	Cso	003	B														
14 Dec	S13W15	318	0060	07	Dao	009	B						1								
15 Dec	S13W30	320	0120	09	Dao	016	B														
16 Dec	S13W43	320	0390	09	Dao	015	B														
													0	0	0	1	0	0	0	0	0
Still on Disk.																					
Absolute heliographic longitude: 319																					
<i>Region 9740</i>																					
13 Dec	S06E56	261	0020	03	Cso	003	B														
14 Dec	S06E42	261	0010	01	Hsx	001	A														
15 Dec	S06E29	261																			
16 Dec	S06E16	261																			
													0	0	0	0	0	0	0	0	0
Still on Disk.																					
Absolute heliographic longitude: 261																					
<i>Region 9741</i>																					
13 Dec	N07E72	245	0010	02	Bxo	003	B														
14 Dec	N06E56	247	0010	02	Axx	002	A														
15 Dec	N05E43	247	0030	01	Hrx	001	A														
16 Dec	N05E30	247	0020	04	Cso	004	B														
													0	0	0	0	0	0	0	0	0
Still on Disk.																					
Absolute heliographic longitude: 247																					
<i>Region 9742</i>																					
15 Dec	N09E73	217	0150	11	Eao	005	B														
16 Dec	N08E64	213	0470	10	Dki	011	B							4							
													0	0	0	4	0	0	0	0	0
Still on Disk.																					
Absolute heliographic longitude: 213																					
<i>Region 9743</i>																					
16 Dec	S11E73	204	0240	03	Hax	002	A	1					1								
								1	0	0	1	0	0	0	0	0	0	0	0	0	0
Still on Disk.																					
Absolute heliographic longitude: 204																					
<i>Region 9744</i>																					
16 Dec	S06E25	252	0030	04	Cao	006	B														
													0	0	0	0	0	0	0	0	0
Still on Disk.																					
Absolute heliographic longitude: 252																					

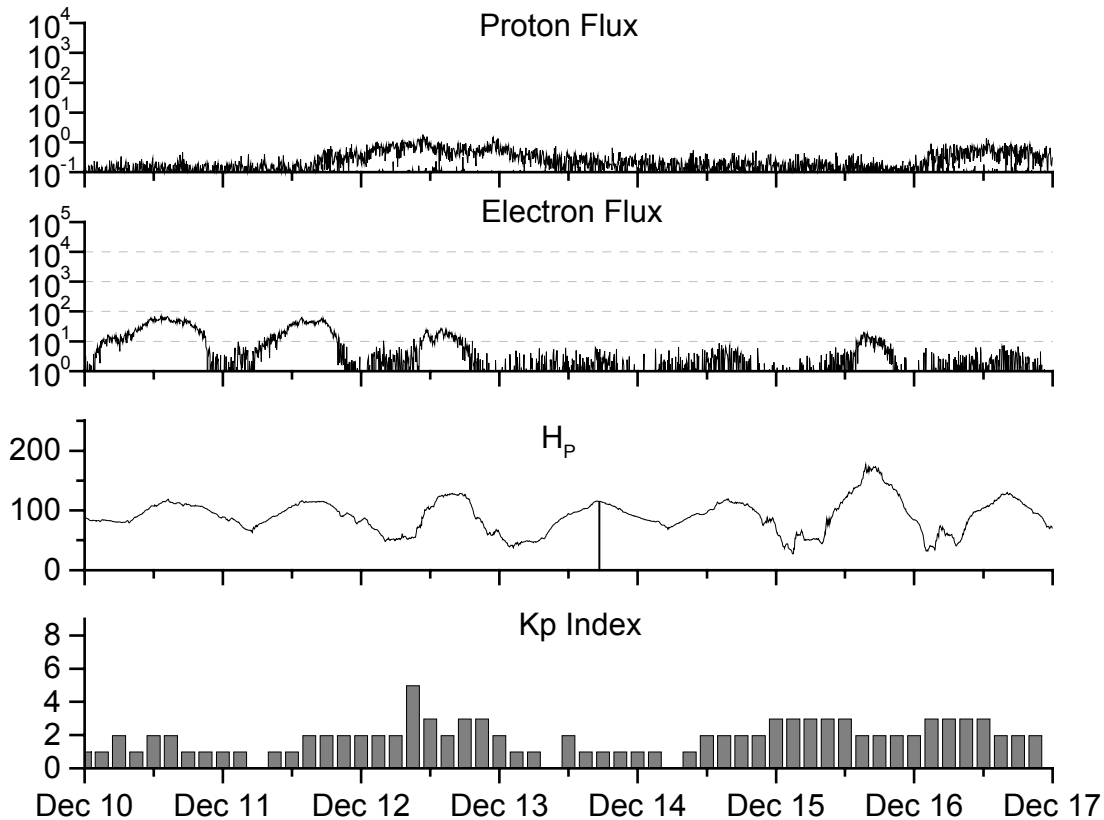


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
1999									
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	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			173.7		12	
July	124.6	82.2	0.66			131.3		11	
August	159.4	106.8	0.67			163.2		13	
September	229.1	150.7	0.66			233.3		12	
October	197.4	125.6	0.64			208.2		18	
November	178.6	106.5	0.60			212.5		14	

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 10 December 2001

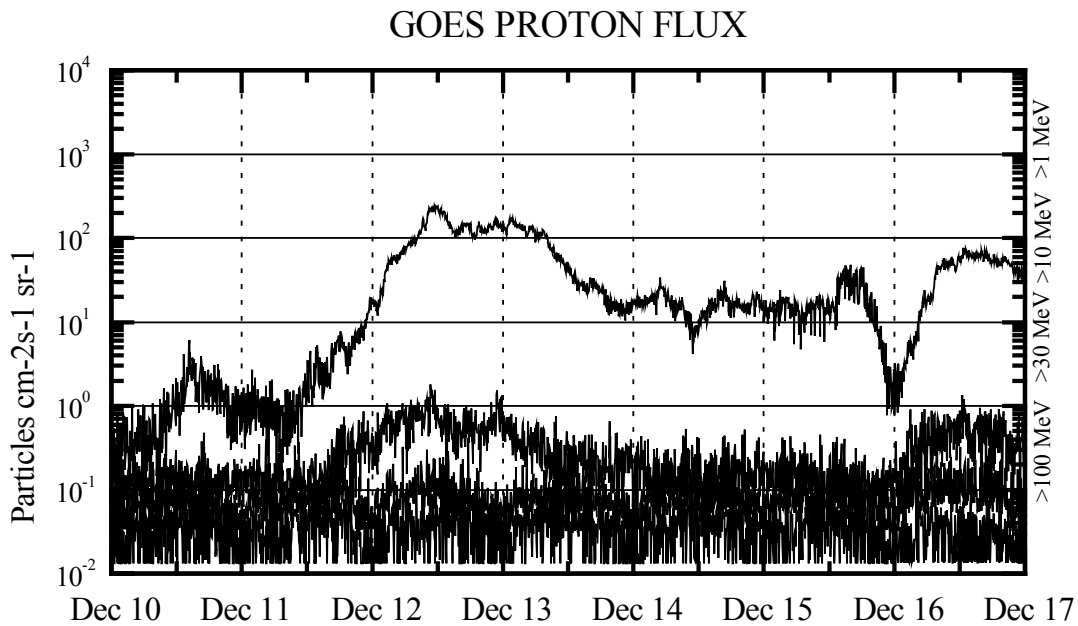
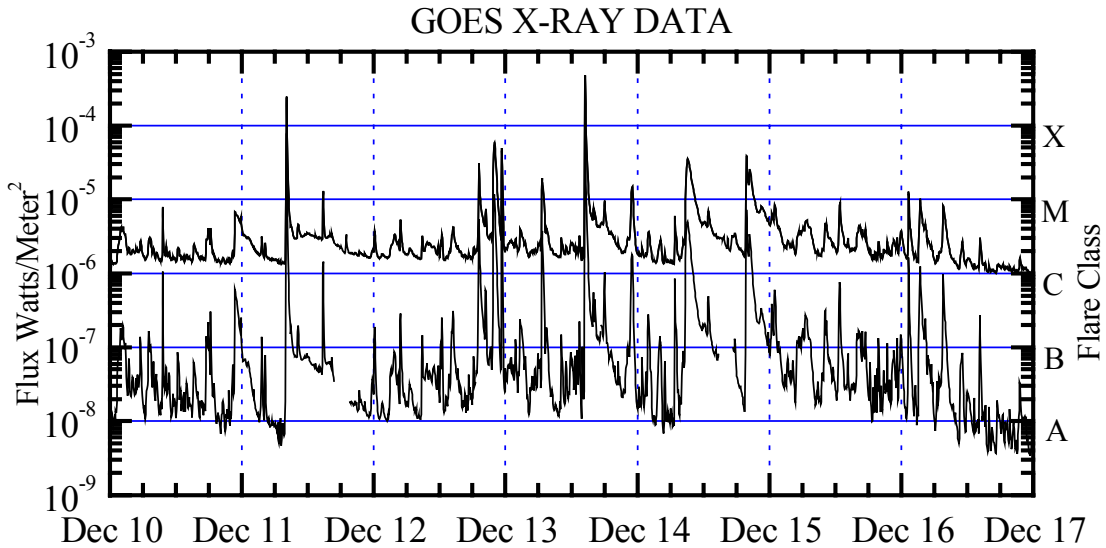
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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.

