

**Space Weather Highlights
14-20 December 1998**

Solar activity ranged from low to high. Activity rose to high levels on 18 December as Region 8415 (N20, L = 253, class/area Eai/270 on 19 December) produced an M8/2N flare at 18/1722UT following a period of moderate growth. Spotless plage Region 8414 (N26, L = 287) produced a long-duration M2 X-ray flare that was time-coincident with the M8 flare above. A weak Type II radio sweep, 880 SFU Tenflare and halo-CME were associated with the M8/M2 event. Region 8415 slowly decayed during the remainder of the period but produced an M1/1N flare at 20/0900UT associated with minor radio emission. Region 8409 (S28, L = 021, class/area Esi/270 on 15 December) produced an M3/1N at 17/0745UT accompanied by a Type II radio sweep and a 200 SFU Tenflare. It also produced a C7/SN flare at 17/1418UT with a Type II radio sweep.

Solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft during most of the period. A coronal hole wind stream was evident on 16 December as velocities increased from 380 to 550 km/sec, particle densities dropped to 02 p/cc, and IMF Bz became more variable (maximum southerly deflections to minus 10 nT (GSM)). No significant changes were noted during the rest of the period.

No significant proton flux enhancements were detected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude was at normal to moderate levels.

The geomagnetic field was quiet to unsettled during most of the period. However, the field was mildly disturbed on 16 December due to the effects of a coronal hole wind stream. Brief active to minor storm periods occurred during the disturbance with the storm periods limited to the high latitudes.

**Space Weather Forecast
23 December - 18 January 1999**

Solar activity is expected to be low during most of the period with C-class flares expected daily.

There is also a chance for isolated M-class flares sometime during the period.

No significant proton enhancements are expected at geosynchronous altitude.

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

The geomagnetic field is expected to be at quiet to unsettled levels throughout the period, barring any Earth-directed CMEs.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No. (10 ⁶ hemi.)	Sunspot Area	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
14 December	144	113	690	B7.2	9	0	0	6	1	0	0	0
15 December	142	108	650	B5.1	4	0	0	6	0	0	0	0
16 December	141	118	570	B4.6	8	0	0	5	1	0	0	0
17 December	146	93	460	B5.8	7	1	0	18	3	0	0	0
18 December	155	76	510	C1.0	9	1	0	20	1	1	0	0
19 December	138	88	550	B8.7	5	0	0	5	0	0	0	0
20 December	135	98	340	B6.1	4	1	0	7	1	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
14 December	1.4E+5	1.3E+4	2.8E+3		1.2E+7	
15 December	1.1E+5	1.4E+4	3.0E+3		7.5E+6	
16 December	2.0E+5	1.5E+4	3.2E+3		6.4E+6	
17 December	1.7E+5	1.6E+4	3.6E+3		1.0E+7	
18 December	2.0E+5	1.6E+4	3.7E+3		7.3E+6	
19 December	7.7E+5	1.6E+4	3.9E+3		7.2E+6	
20 December	4.4E+5	1.9E+4	3.8E+3		2.4E+6	

Daily Geomagnetic Data

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
14 December	5	1-1-1-1-2-2-1-2	*	0-1-0-3-*-1-*-0	4	1-1-1-2-1-2-0-1
15 December	4	2-0-1-1-1-0-1-3	3	1-0-2-2-0-1-0-1	5	2-1-2-1-1-2-1-2
16 December	9	3-2-4-2-1-2-1-0	18	3-2-4-5-4-3-1-0	11	3-2-4-3-3-3-2-0
17 December	0	0-0-0-0-0-0-0-0	1	0-0-0-0-0-0-2-0	2	0-0-0-0-0-1-1-0
18 December	1	0-0-0-1-1-1-0-0	3	0-0-0-3-2-0-0-0	3	0-0-0-2-1-1-1-0
19 December	6	1-0-1-1-3-2-2-2	10	0-0-0-3-4-4-2-2	7	1-1-0-1-2-3-2-3
20 December	9	2-3-2-3-3-1-2-1	23	2-2-5-4-5-4-3-2	11	2-3-3-3-3-3-2-2

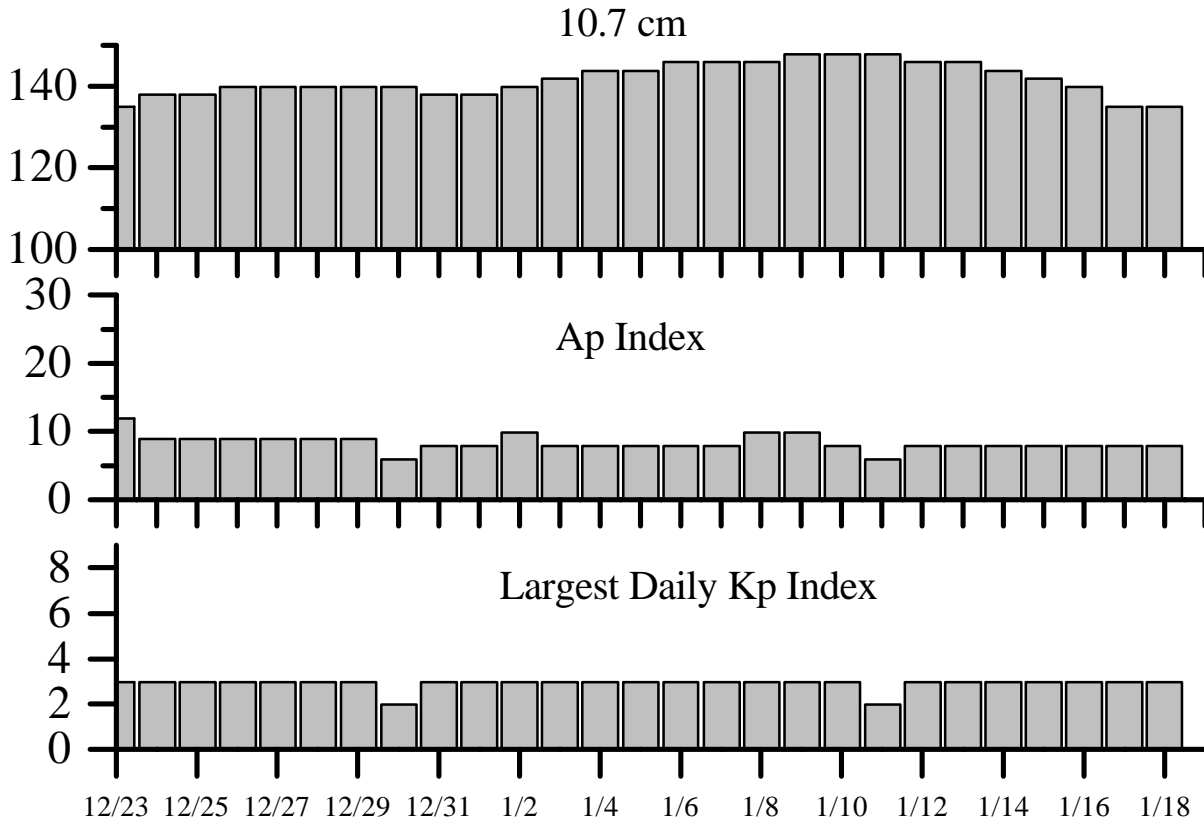


Alerts and Warnings Issued

<u>Date and Time of Issue (UT)</u>	<u>Type of Alert or Warning</u>	<u>Date and Time of Event (UT)</u>
14 Dec 0046	245 MHz Noise Storm	13 Dec
14 Dec 1318	Stratwarm Alert Exists Monday	14 Dec
15 Dec 0041	245 MHz Noise Storm	14 Dec
15 Dec 1324	Stratwarm Alert Exists Tuesday	15 Dec
16 Dec 0039	1-245 MHz Burst	15 Dec
16 Dec 1248	Stratwarm Alert Exists Wednesday	16 Dec
17 Dec 0802	10cm Radio Burst 230 F.U.	17 Dec 0742
17 Dec 0815	Type II Radio Emission	17 Dec 0750
17 Dec 1315	Stratwarm Alert Exists Thursday	17 Dec
17 Dec 1453	Type II Radio Emission	17 Dec 1420
18 Dec 0028	5-245 MHz Bursts	17 Dec
18 Dec 1410	Stratwarm Alert Exists Friday	18 Dec
18 Dec 1733	X-Ray event M8.0	18 Dec 1722
18 Dec 1819	Type II Radio Emission	18 Dec 1727
18 Dec 1845	10cm Radio Burst 880 F.U.	18 Dec 1717
19 Dec 0143	6-245 MHz Bursts	18 Dec
19 Dec 1448	Stratwarm Alert Exists Saturday	19 Dec
19 Dec 2022	A \geq 20 Watch	22 Dec
20 Dec 0025	3-245 MHz Bursts	19 Dec
20 Dec 1359	Stratwarm Alert Exists Sunday	20 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
23 Dec	135	12	3	06 Jan	146	8	3
24	138	9	3	07	146	8	3
25	138	9	3	08	146	10	3
26	140	9	3	09	148	10	3
27	140	9	3	10	148	8	3
28	140	9	3	11	148	6	2
29	140	9	3	12	146	8	3
30	140	6	2	13	146	8	3
31	138	8	3	14	144	8	3
01 Jan	138	8	3	15	142	8	3
02	140	10	3	16	140	8	3
03	142	8	3	17	135	8	3
04	144	8	3	18	135	8	3
05	144	8	3				



Energetic Events

Date	Time (UT)			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	½ Max	Class	Integ Flux	Imp Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
									245	2695	II	IV
17 Dec	0740	0745	0749	M3.2	.009	1N	S27W46	8409	6500	200	3	
18 Dec	1713	1722	1727	M8.0	.035	2N	N19E64	8415	880		1	
20 Dec	0849	0900	0903	M1.8	.006	1N	N21E46	8415	28			

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn #
	Begin	Max	End				
14 December	0007	0010	0029	C7.0	SN	S19W12	8408
	0152	0153	0201		SF	S16W14	8408
	0358	0400	0407	C1.2	1F	S20W15	8408
	0516	0520	0525	B7.3			
	0624	0628	0631	C3.6			
	0734	0735	0739		SF	S19W17	8408
	0743	0743	0746		SF	S20W17	8408
	0847	0847	0854		SF	S19W16	8408
	0941	0944	1008	C7.3	SN	S19W19	8408
	1106	1110	1120	C1.3			
	1136	1140	1143	C1.7			
	1214	1218	1225	C1.9			
	1425	1425	1430		SF	S19W20	8408
	1654	1655	1703		SF	S18W24	8408
	1727	1734	1738	C1.9			
	1913	1919	1923	C2.6			
2222	2226	2231	C8.2				
15 December	0224	0231	0238	C1.3			
	0738	0738	0742		SF	S20W30	8408
	0825	0829	0835	B7.3	SF	S20W30	8408
	B1052	U1052	1055	C1.0	SF	S28W15	8409
	B1309	U1310	1323		SF	N24E49	
	1414	1417	1420	B7.0			
	1752	1801	1815	C1.3			
	1925	1926	1934	C1.0	SF	S19W37	8408
B2040	U2041	A2049	B7.5	SF	S18W36	8408	
2332	2336	2339	B6.4				
16 December	0133	0133	0141	C1.0	SF	N21E21	8410
	0208	0209	0217	C1.5	SF	S19W40	8408
	0944	1001	1012	C1.8			
	1045	1047	1057	C1.0	SF	S25W33	8409
	1200	1203	1209	C1.2	SF	S28W28	8409
	1614	1614	1632		SF	S17W50	8408
	1905	1910	1925	C5.4	SN	S28W40	8409



Flare List-continued

Date	Time			X-ray Class.	Optical		Rgn #
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
16 December	2012	2015	2019	C1.0			
	2153	2201	2227	C4.0	1F	S18W53	8408
17 December	0213	0216	0219	B9.2	SF	S16W55	8408
	0226	0229	0241	C2.2	SF	S17W54	8408
17 December	0743	0746	0804	M3.2	1N	S27W46	8409
	1101	1101	1105	C1.4	SF	S28W50	8409
	B1124	U1125	A1131		SF	S29W47	8409
	1240	1241	1245		SF	S29W50	8409
	1339	1344	1348		SF	N19E78	
	1416	1416	1442	C7.2	SN	S28W51	8409
	1425	1425	1428		SF	N19E78	8415
	1459	1501	1504		SF	S29W50	8409
	1548	1549	1551		SF	S30W46	8409
	1716	1717	1722		SF	N19E79	8415
	1739	1751	1802	C6.4	1F	N17E70	8415
	1808	1840	1911	C4.5	SF	S16W66	8408
	1812	1813	1828		SF	S28W53	8409
	1841	1843	1849		SF	N19E75	8415
	1900	1902	1914		SF	N19E75	8415
	1956	1957	2005		SF	N19E75	8415
	2043	2055	2102		SF	N19E73	8415
	2112	2119	2127	C5.9			
	2246	2246	2251		SF	N19E72	8415
	2253	2301	2315	C8.3	1F	N19E71	8415
18 December	0127	0127	0130		SF	S31W54	8409
	0302	0305	0315	C3.1	SF	N18E71	8415
	0344	0346	0400	C2.5	SF	N18E69	8415
	0354	0357	0402		SF	S27W64	8406
	0450	0453	0500		SF	N19E69	8415
	0527	0527	0529	C3.4	SF	N18E69	8415
	0712	0716	0720	C1.3			
	0748	0751	0759	C3.4	SF	N19E73	8415
	0804	0806	0812		SF	N19E69	8415
	0937	0939	0943		SF	N19E68	8415
	0944	0945	0952	C1.6	SF	S30W57	8409
	1251	1253	1257	C2.9	SF	S29W66	8409
	1333	1338	1342		SF	N18E67	8415
	1346	1346	1350		SF	N19E67	8415
	1532	1535	1545	C1.3	SF	N20E63	8415
	1601	1611	1616	C2.0	SF	N19E65	8415
	1714	1726	1951		1F	N29E33	8414



Flare List-continued

Date	Time			X-ray Class.	Optical		Rgn #
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
18 December	1717	1722	1845	M8.0	2N	N19E64	8415
	2028	2029	2032		SF	N20E60	8415
	2118	2119	2123		SF	N20E68	8415
	2150	2151	2155		SF	N20E67	8415
	2228	2232	2240		SF	N20E66	8415
19 December	0647	0652	0656	C2.8			
	0949	0950	0952	C1.7	SF	S27W84	8406
	1004	1005	1009		SF	S30W75	8409
	1425	1428	A1428	C4.4	SF	N19E54	8415
	1835	1835	1838		SF	N19E57	8415
	2039	2044	2050	C1.6			
	2315	2325	2332	C5.5	SF	N20E50	8415
20 December	0415	0417	0439		SF	N24W33	8410
	0442	0447	0454		SF	N24W33	8410
	0511	0525	0535	C3.4	SF	N20E44	8415
	0557	0557	0607	C1.5	SF	N18E44	8415
	0725	0730	0736	C1.1			
	0849	0859	0916	M1.8	1N	N21E46	8415
	1234	1238	1243	C2.2			
	1854	1854	1857		SF	N18E73	8416
	2028	2028	2033		SF	N20E89	8416
2157	2158	2204		SF	N20E89	8416	



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

Region 8405

06 Dec	S16E64	051	0110	04	CSO	003	B												
07 Dec	S16E49	053	0060	07	CSO	009	B	2				4							
08 Dec	S15E35	054	0040	08	CSO	012	B	2				4							
09 Dec	S15E21	054	0030	09	CSO	007	B	4				3	1						
10 Dec	S15E06	056	0020	07	CSO	007	B					2							
11 Dec	S14W08	057	0020	05	BXO	004	B	1				3							
12 Dec	S14W21	057						1				2	1						
13 Dec	S14W34	057																	
14 Dec	S14W47	057																	
15 Dec	S14W60	057																	
16 Dec	S14W73	057																	
17 Dec	S14W86	057																	
								10	0	0	0	18	2	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 056

Region 8406

07 Dec	S27E71	031	0100	14	CSO	003	B												
08 Dec	S27E62	027	0180	15	ESO	007	B												
09 Dec	S28E48	027	0140	17	FAO	006	B	1				1							
10 Dec	S27E28	034	0050	02	HSX	001	A												
11 Dec	S28E16	033	0070	02	HSX	001	A												
12 Dec	S28E02	033	0030	01	HSX	001	A												
13 Dec	S26W09	031	0030	03	CSO	002	B												
14 Dec	S28W22	031	0030	01	HSX	001	A												
15 Dec	S27W35	030	0020	01	HSX	001	A												
16 Dec	S27W48	030	0020	01	HSX	001	A												
17 Dec	S26W59	028	0030	03	CSO	003	B												
18 Dec	S26W72	028										1							
19 Dec	S26W85	028						1				1							
								2	0	0	0	3	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 033



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 8407</i>																				
08 Dec	S17E07	082	0050	06	DSO	008	B					1								
09 Dec	S17W07	082	0050	07	DRO	006	B													
10 Dec	S17W20	082	0020	06	BXO	008	B													
11 Dec	S16W33	082	0010	03	BXO	003	B													
12 Dec	S16W46	082																		
13 Dec	S16W59	082																		
14 Dec	S16W72	082																		
15 Dec	S16W85	082																		
											0	0	0	1	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 082

<i>Region 8408</i>																				
10 Dec	S18E27	035	0010	05	BXO	005	B	1				2								
11 Dec	S18E15	034	0020	07	BXO	010	BG	2				6								
12 Dec	S18E01	034	0090	09	DSO	019	BG	1				6								
13 Dec	S18W13	035	0190	07	DAO	019	BGD	3				8								
14 Dec	S19W28	037	0250	10	DAO	018	BG	3				8	1							
15 Dec	S18W40	035	0270	08	DAO	011	B	1				4								
16 Dec	S17W53	035	0220	08	DAO	012	B	2				2	1							
17 Dec	S17W65	034	0180	09	DSO	006	B	2				3								
18 Dec	S17W79	035	0120	09	DAO	003	B													
19 Dec	S18W91	034	0040	03	HRX	002	A													
											15	0	0	39	2	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 034

<i>Region 8409</i>																				
10 Dec	S29E43	019	0150	06	DSO	004	B													
11 Dec	S29E27	022	0210	11	EAO	013	BG	1				2								
12 Dec	S29E13	022	0200	12	ESO	021	BG	2				6								
13 Dec	S28E01	021	0190	13	ESO	024	BG					1								
14 Dec	S29W10	019	0260	13	ESI	022	BG													
15 Dec	S28W25	020	0270	13	ESI	020	BG	1				1								
16 Dec	S27W38	020	0250	14	ESI	026	BG	3				3								
17 Dec	S28W50	019	0190	13	ESI	016	BG	2	1			7	1							
18 Dec	S26W63	019	0150	14	ESI	016	BG	2				3								
19 Dec	S28W75	018	0210	16	FAO	010	BG					1								
20 Dec	S28W87	016	0100	12	CSO	003	B													
											11	1	0	24	1	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 021



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 8410

11 Dec	N23E77	332	0080	04	HSX	001	A											
12 Dec	N23E61	334	0070	01	HSX	001	A											
13 Dec	N24E48	334	0060	02	HSX	001	A											
14 Dec	N26E37	332	0070	15	CSO	004	B											
15 Dec	N25E22	333	0090	02	HSX	001	A											
16 Dec	N23E09	333	0060	04	CSO	002	B	1			1							
17 Dec	N24W04	333	0050	02	HAX	002	A											
18 Dec	N24W17	333	0050	03	CAO	006	B											
19 Dec	N24W29	332	0030	04	CSO	005	B											
20 Dec	N24W42	331	0010	00	AXX	002	A					2						
								1	0	0	3	0	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 333

Region 8411

11 Dec	S28E64	345	0010	00	AXX	001	A											
12 Dec	S29E52	343	0030	05	CSO	005	B				1							
13 Dec	S28E39	343	0030	05	BXO	007	B				1							
14 Dec	S30E28	341	0040	05	CRO	004	B											
15 Dec	S29E14	341	0000	05	BXO	002	B											
16 Dec	S28E00	342	0010	04	BXO	002	B											
17 Dec	S28W13	342																
18 Dec	S28W26	342																
19 Dec	S28W39	342																
								0	0	0	2	0	0	0	0	0		

Died on Disk.

Absolute heliographic longitude: 342

Region 8412

13 Dec	S15W26	048	0010	01	AXX	002	B											
14 Dec	S17W36	045	0040	05	CSO	004	B											
15 Dec	S15W53	048	0000	00	AXX	001	A											
16 Dec	S15W67	049	0000	00	AXX	001	A											
17 Dec	S15W80	049																
18 Dec	S15W93	049																
								0	0	0	0	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 048



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 8413</i>																	
15 Dec	N18E13	342	0000	03	BXO	002	B										
16 Dec	N18E00	342															
17 Dec	N18W13	342															
18 Dec	N18W26	342															
19 Dec	N18W39	342															
								0	0	0	0	0	0	0	0	0	0
Died on Disk.																	
Absolute heliographic longitude: 342																	
<i>Region 8414</i>																	
16 Dec	N21E49	293	0010	04	BXO	004	B										
17 Dec	N25E34	295	0000	00	AXX	001	A										
18 Dec	N25E21	295												1			
19 Dec	N27E13	290	0000	04	BXO	003	B										
20 Dec	N26E02	287	0000	01	AXX	001	A										
								0	0	0	0	0	1	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 287																	
<i>Region 8415</i>																	
17 Dec	N19E72	257	0010	06	BXO	005	B	2			7	2					
18 Dec	N19E61	255	0190	11	EAI	011	B	6	1		15		1				
19 Dec	N20E49	254	0270	13	EAI	018	B	2			3						
20 Dec	N20E36	253	0170	13	EAI	016	BG	2	1		2	1					
								12	2	0	27	3	1	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 253																	
<i>Region 8416</i>																	
20 Dec	N19E68	221	0060	10	DSO	002	B				3						
								0	0	0	3	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 221																	
<i>Region 8417</i>																	
20 Dec	N22W64	353	0000	02	BXO	002	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 353																	
<i>Region 8418</i>																	
20 Dec	S23E43	246	0000	03	BXO	002	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 246																	



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

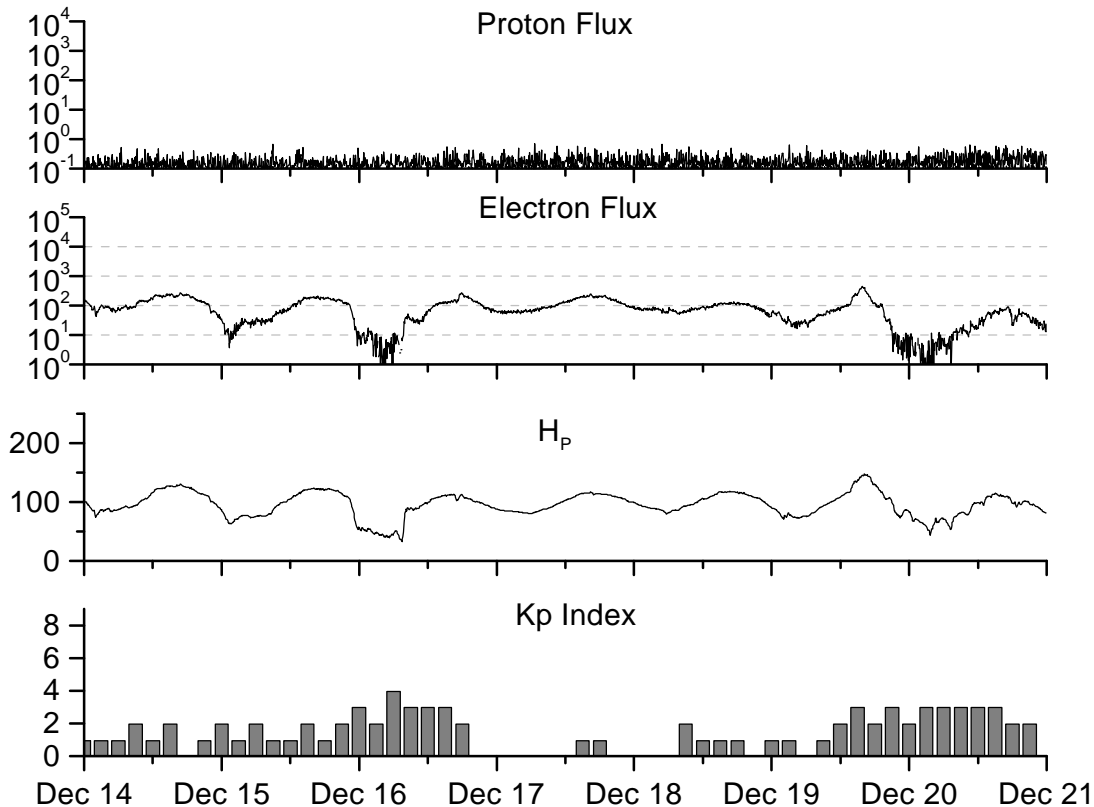
Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth Value	**Penticton 10.7 cm	Planetary Ap	Smooth Value	
1996									
December	21.1	13.3	0.63	16.2	10.4	77.8	73.3	07	09.3
1997									
January	09.0	05.7	0.63	16.5	10.5	74.0	73.4	09	09.3
February	11.3	07.6	0.67	17.4	11.0	73.8	73.7	11	09.2
March	14.4	08.7	0.60	20.4	13.5	73.5	75.1	08	08.9
April	24.5	15.5	0.63	24.0	16.5	74.5	76.8	10	08.6
May	28.6	18.5	0.65	26.4	18.3	74.6	78.4	08	08.6
June	22.1	12.7	0.57	29.0	20.3	71.7	80.1	07	08.6
July	17.0	10.4	0.61	32.4	22.6	71.1	81.8	06	08.5
August	36.7	24.4	0.66	35.9	25.0	79.0	83.4	07	08.3
September	52.8	51.3	0.88	40.5	28.3	96.2	85.7	10	08.4
October	33.6	22.8	0.68	45.4	31.8	84.9	88.6	11	08.6
November	53.5	39.0	0.73	49.3	35.0	99.5	91.3	11	09.0
December	57.9	41.2	0.71	54.2	39.0*	98.8	94.2*	05	09.5
1998									
January	51.8	31.9	0.62	60.6	43.7*	93.4	97.5*	08	09.9*
February	54.4	40.3	0.74	67.4	48.8*	93.4	101.7*	08	10.5*
March	81.8	54.8	0.67	73.3	53.4*	109.1	105.8*	13	11.2*
April	73.6	53.4	0.73	77.7	56.5*	108.3	109.1*	10	11.4*
May	74.3	56.3	0.76			106.7		18	
June	93.6	70.7*	0.76*			108.4*		10	
July	98.3	66.2*	0.67*			114.0*		11*	
August	118.6	91.7*	0.77*			136.0*		18*	
September	119.0	92.9*	0.78*			138.4*		14*	
October	77.0	55.6*	0.72*			121.9*		13*	
November	99.5	73.6*	0.74*			140.2*		16*	

*Preliminary estimates.

The lowest smoothed sunspot indices 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.

** From June 1991 onward, 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 14 December 1998

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.

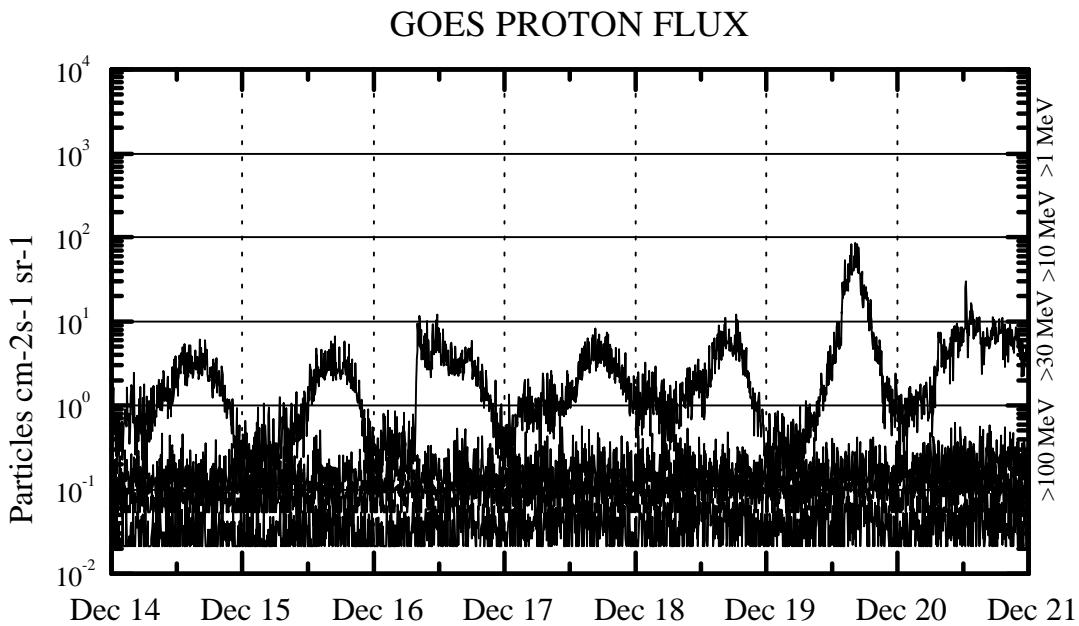
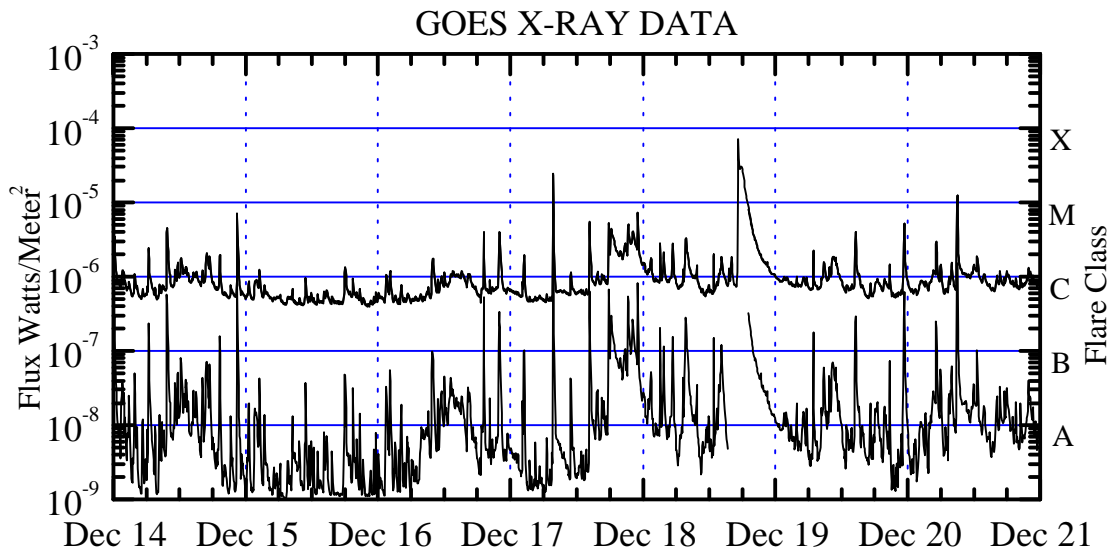
Electrons plot contains the five-minute averaged integral electron flux (electrons/ cm^2 -sec-sr) with energies greater than 2 MeV at GOES-8.

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 USAF 55th Space Weather Squadron) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Heartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC) and the US Geological Survey. These may differ from the final K_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 a more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five minute averaged x-ray flux (watts/m^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 ($\text{protons/cm}^2\text{-sec-sr}$) as measured by GOES-8 (W75) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu ($\text{protons/cm}^2\text{-sec-sr}$) at greater than 10 MeV.

