

**Space Weather Highlights**  
**13 – 19 Dec 1999**

Solar activity ranged from low to moderate levels. Activity was low through 16 December due to isolated C-class subflares, most of which came from Region 8798 (S13, L = 171, class/area Dkc/550 on 17 December). This region began a gradual growth phase on 15 December and by the end of the period had become large and magnetically complex. An optically unassociated Type II radio sweep at 16/0744UT may have been associated with flare activity in Region 8798. Region 8806 (N19, L = 115, class/area Fkc/890 on 19 December) rotated into view on 17 December as a large, magnetically complex sunspot group. It produced an M1 X-ray flare at 17/2141UT with an associated loop prominence system and an M1/1N flare at 18/1912UT. Activity decreased to low levels on 19 December due to occasional C-class flares from Region 8806.

Real-time solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. Solar wind characteristics commonly associated with CME effects were observed on 13 December with velocities as high as 600 km/sec and sustained periods of southward IMF Bz with deflections to minus 13 nT (GSM). Solar wind flow returned to nominal conditions by 14 December. No significant changes were observed in the solar wind flow for the rest of the period.

No proton events were detected at geosynchronous orbit during the period.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels as the period began, but dropped to normal levels by midday on 13 December. Fluxes remained normal for the rest of the period.

The geomagnetic field was disturbed on 13 December due to CME effects. Active to major storm levels occurred during the disturbance. Activity dropped to mostly quiet levels late on 13 December, then remained so for the balance of the period.

**Space Weather Outlook**  
**22 December 1999 - 17 January 2000**

Solar activity is expected to range from low to moderate levels. Occasional to frequent C-class flares and isolated M-class flares likely throughout the period. Regions 8798 and 8806 each provide a chance for an isolated major flare sometime during the period. There is an increasing chance for a proton event at geosynchronous orbit from Regions 8798 and 8806.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be at moderate to high levels during 01 - 05 January. Otherwise, normal to moderate levels are expected.

The geomagnetic field is expected to be at unsettled to minor storm levels during 31 December - 03 January due to recurrent coronal hole effects. Quiet to unsettled levels are expected for the rest of the period, barring any Earth-directed CMEs.



### Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No. (10 <sup>6</sup> hemi.)	Sunspot Area	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
13 December	166	147	440	B5.5	2	0	0	2	0	0	0	0
14 December	168	139	490	B6.8	3	0	0	4	0	0	0	0
15 December	179	148	540	B7.2	3	0	0	7	0	0	0	0
16 December	194	146	710	C1.0	4	0	0	6	0	0	0	0
17 December	201	179	1180	C1.5	9	1	0	8	3	0	0	0
18 December	206	190	1470	C1.5	10	1	0	16	4	0	0	0
19 December	207	154	1750	B9.4	11	0	0	14	0	0	0	0

### Daily Particle Data

Date	Proton Fluence (protons/cm <sup>2</sup> -day-sr)			Electron Fluence (electrons/cm <sup>2</sup> -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
13 December	5.7E+5	1.1E+4	2.1E+3		2.1E+7	
14 December	5.9E+4	1.1E+4	2.0E+3		8.7E+4	
15 December	3.4E+4	1.1E+4	2.3E+3		1.3E+5	
16 December	4.9E+4	1.2E+4	2.5E+3		2.7E+5	
17 December	3.5E+4	1.3E+4	3.4E+3		4.4E+5	
18 December	5.5E+4	1.3E+4	3.6E+3		7.9E+5	
19 December	4.1E+4	1.4E+4	3.5E+3		9.9E+5	

### Daily Geomagnetic Data

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
13 December	26	3-4-4-6-4-4-2-1	43	3-4-6-6-6-5-2-1	26	3-4-5-5-5-4-2-1
14 December	3	2-1-1-1-0-2-2-0	1	1-1-0-0-0-0-0-0	3	1-0-0-0-2-1-1-1
15 December	2	0-0-0-0-0-1-2-2	1	0-0-0-0-0-0-1-1	4	0-0-0-0-1-1-1-3
16 December	6	2-1-2-1-2-2-2-2	2	1-0-2-0-0-1-1-1	5	1-1-2-1-1-2-2-2
17 December		2-**-**-**-**-**	5	1-1-0-3-3-1-1-0	5	1-2-1-1-2-2-2-1
18 December		**-*-**-**-**-**	3	0-0-0-2-1-2-2-1	5	2-0-1-1-1-2-2-2
19 December	6	1-1-1-2-3-3-1-1	6	0-1-0-2-4-2-1-0	4	1-0-0-2-2-2-1-1



*Alerts and Warnings Issued*

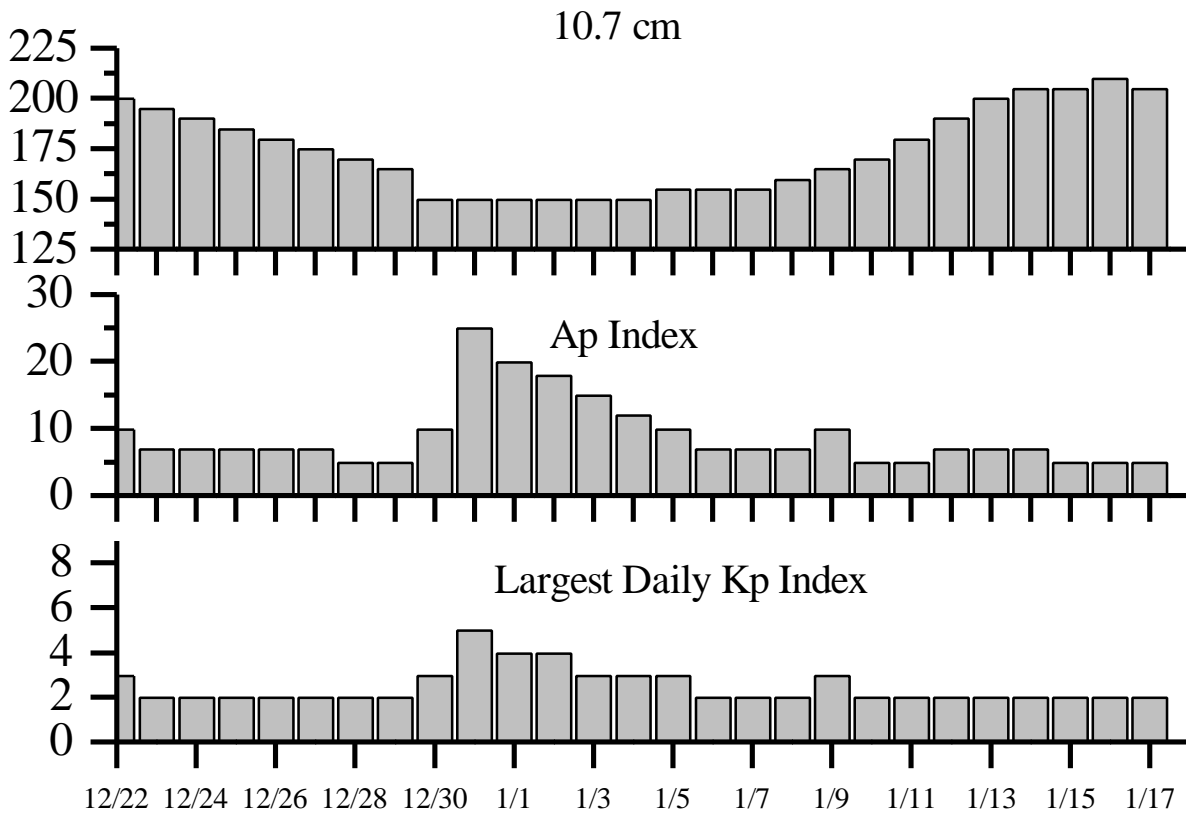
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Date & Time of Issue (UT)	Type of Alert or Warning	Date & Time of Event (UT)
13 Dec 0948	K= 5 Warning	13 Dec 12 - 18
13 Dec 1202	K= 6 Observed	13 Dec 09 - 12
13 Dec 1203	A >=20 Observed	13 Dec 1200
13 Dec 1204	CONTINUED Electron Event >=1000pfu @ >2MeV	05 Dec 1120
14 Dec 0017	3 - 245 MHz Bursts	13 Dec
14 Dec 0017	1 - 245 MHz Noise Storms	13 Dec
15 Dec 0017	1 - 245 MHz Bursts	14 Dec
16 Dec 0033	2 - 245 MHz Bursts	15 Dec
17 Dec 0028	10 - 245 MHz Bursts	16 Dec
16 Dec 0858	Type II Radio Emission	16 Dec 0744
18 Dec 0016	5 - 245 MHz Bursts	17 Dec
19 Dec 0010	2 - 245 MHz Bursts	18 Dec
19 Dec 1304	Type II Radio Emission	19 Dec 1231

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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
22 Dec	200	10	3	05 Jan	155	10	3
23	165	7	2	06	155	7	2
24	190	7	2	07	155	7	2
25	185	7	2	08	160	7	2
26	180	7	2	09	165	10	2
27	175	7	2	10	170	5	2
28	170	5	2	11	180	5	2
29 Dec	165	5	2	12	190	7	2
30	150	10	3	13	200	7	2
31	150	25	5	14	205	7	2
01 Jan 2000	150	20	4	15	205	5	2
02	150	18	4	16	210	5	2
03	150	15	3	17	205	5	2
04	150	12	3				



### *Energetic Events*

Date	Time (UT)			X-ray	Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
			Max						245	2695	II	IV
17 Dec	2135	2141	2158	M1.0	.009							
18 Dec	1909	1912	1915	M1.5	.003	1N	N20E69	8806				

### *Flare List*

Date	Time			X-ray Class.	Optical Imp / Brtns	Location Lat CMD	Rgn #
	Begin	Max	End				
13 December	1302	1304	1307	C1.1			
	1924	1924	1928		SF	N16W59	8788
	2009	2010	2014	C1.0			
	2145	2147	2150		SF	N13W60	8788
14 December	0655	0700	0705	C1.1			
	0957	1001	1005	B9.6			
	1127	1132	1137	C1.0			
	1503	1504	1506		SF	S13E63	8798
	1649	1657	1713	C1.1	SF	S14E63	8798
	1901	1907	1913		SF	S14E62	8798
15 December	1923	1925	1928		SF	S14E62	8798
	0307	0318	0328		SF	S15E61	8798
	1217	1221	1223	C1.2			
	1415	1416	A1439	C2.5	SF	S15E51	8798
	1521	1530	1536	C1.3	SF	S14E52	8798
	1622	1626	1639		SF	S14E53	8798
	1641	1644	1650		SF	S14E53	8798
	1702	1703	1706		SF	S14E53	8798
	1829	1831	1835		SF	S14E52	8798
	16 December	0249	0251	0306		SF	S15E49
0311		0313	0332	C2.5	SF	S15E48	8798
0723		0723	0734	C2.4	SF	S13E46	8798
0833		0836	0851	C2.2	SF	S15W17	8794
0838		0838	0844		SF	S14E46	8798
1715		1722	1748		SF	S13E37	8798
2010		2015	2019	C3.5			
17 December	0013	0021	0024	C7.0			
	0121	0127	0138		SF	S13E35	8798
	0238	0239	0252	C3.4	SF	S13E34	8798
	0344	0349	0355		SF	S12E30	8798
	0358	0403	0415		SF	S11E34	8798
	0526	0537	0603	C6.8	1N	S13E31	8798
	0738	0739	0747		SF	S12E28	8798
	0753	0757	0801	C3.0			
	0932	0935	0946	C4.9	1F	S13E28	8798
	0953	1004	1015	C3.1			
1438	1444	1451	C2.2				



*Flare List-continued*

Date	Time			X-ray Class.	Optical		Rgn #
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
17 December	1749	1750	1759	C1.6	SF	S15E15	8803
	1845	1845	1849		SF	S14E23	8798
	1856	1858	1925	C6.8	1N	S12E23	8798
	2135	2141	2158	M1.0			
	B2205	U2206	2214		SF	N19E73	8806
18 December	0107	0112	0116	C2.7			
	0120	0127	0144	C9.4	1F	N19E82	8806
	0249	0304	0314		SF	S13E18	8798
	0343	0345	0357		SF	N16E70	8806
	0350	0405	0434		SF	S08E20	8798
	0410	0430	0435	C5.3	SF	N18E72	8806
	0706	0710	0712	C2.0			
	0744	0744	0747		SF	N18E70	8806
	0836	0841	0850		SF	N18E69	8806
	1317	1317	1324	C2.5	SF	N20E78	8806
	1344	1344	1353	C2.2	SF	S14E13	8798
	B1429	U1444	1511		SF	N20E73	8806
	1514	1519	1528		SF	N20E73	8806
	1535	1541	1606		SF	N20E73	8806
	1629	1651	1655	C1.9	SF	N20E73	8806
	1714	1726	1746	C3.0	1F	S11E13	8798
	1807	1810	1824	C5.8	SF	N18E67	8806
	1830	1835	1845	C5.7	1N	N20E69	8806
	1911	1912	1948	M1.5	1N	N20E69	8806
	1949	1954	1959		SF	N21E68	8806
2017	2018	2028		SF	S11E10	8798	
2250	2251	2310		SF	N20E66	8806	
19 December	0100	0106	0113		SF	N18E60	8806
	0916	0917	0920	C2.1	SF	N17E63	8806
	1117	1122	1134	C2.7			
	1429	1432	1434	C1.7			
	1622	1622	1635	C1.8	SF	N19E58	8806
	1819	1824	1827	C3.4			
	1915	1915	1925	C2.3	SF	N19E57	8806
	1929	1929	1937	C2.1	SF	S14W68	8794
	2001	2001	2005		SF	N11E61	8807
	2017	2018	2021	C2.0	SF	S15W03	8798



**Flare List-continued**

Date	Time			X-ray Class.	Imp / Brtns	Optical	Rgn #
	Begin	Max	End			Location Lat CMD	
19 December	2118	2120	2133		SF	N13E60	8807
	2209	2210	2218		SF	N19E55	8806
	2213	2214	2219		SF	S15W67	8794
	2225	2228	2306	C5.6	SF	N21E52	8806
	2231	2234	2241		SF	S15W04	8798
	2250	2251	2254		SF	S15W05	8798
	2312	2312	2319	C2.6	SF	N09E56	8807
	2358	0003	0012	C4.0			

**Region Summary**

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

*Region 8785*

01 Dec	N14E71	332	0060	02	HSX	001	A										
02 Dec	N14E58	331	0160	03	HAX	002	A										
03 Dec	N13E43	333	0100	03	HSX	002	A										
04 Dec	N13E30	333	0120	02	HSX	002	A										
05 Dec	N13E18	332	0130	03	CSO	006	B										
06 Dec	N13E05	332	0130	04	CAO	004	B										
07 Dec	N14W08	332	0150	03	HSX	002	A										
08 Dec	N14W21	331	0150	05	CSO	005	B										
09 Dec	N14W35	332	0110	03	CSO	002	B										1
10 Dec	N15W48	332	0100	02	HSX	001	A										
11 Dec	N16W62	333	0090	02	HAX	001	A										
12 Dec	N14W73	331	0080	09	CAO	002	B										
13 Dec	N16W87	331	0030	02	HAX	001	A										
0 0 0 1 0 0 0 0																	

Crossed West Limb.

Absolute heliographic longitude: 332







**Region Summary-continued**

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

*Region 8790*

06 Dec	N09E47	290	0020	05	BXO	004	B											4
07 Dec	N10E35	289	0020	04	CRO	004	B	1										1
08 Dec	N11E20	290	0020	04	CSO	006	B	2										2
09 Dec	N11E07	290	0050	05	DSO	010	B											1
10 Dec	N12W07	291	0090	08	DAO	014	B											1
11 Dec	N13W20	291	0040	09	CRO	016	B	1										1
12 Dec	N12W35	293	0010	10	BXO	007	B											
13 Dec	N12W49	293	0000	03	BXO	003	B											
14 Dec	N15W69	300	0000	00	AXX	001	A											
								4	0	0	9	1	0	0	0			

Crossed West Limb.

Absolute heliographic longitude: 290

*Region 8791*

07 Dec	S13E68	256	0010	01	AXX	001	A	1	1									2
08 Dec	S14E53	257	0010	04	BXO	003	B	1										1
09 Dec	S14E36	261	0010	03	BXO	002	B	1										1
10 Dec	S15E22	262	0000	00	AXX	001	A											
11 Dec	S15E09	262																
12 Dec	S15W04	262																
13 Dec	S15W17	262																
14 Dec	S15W30	262																
15 Dec	S15W43	262																
16 Dec	S15W56	262																
17 Dec	S15W69	262																
								3	1	0	4	0	0	0	0			

Still on Disk.

Absolute heliographic longitude: 262





**Region Summary-continued**

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

*Region 8794*

08 Dec	S14E74	236	0030	03	HSX	001	A											
09 Dec	S15E58	239	0050	01	HSX	001	A	1				1						
10 Dec	S14E44	240	0030	01	HSX	001	A					1						
11 Dec	S15E31	240	0030	03	CSO	002	B	1				1						
12 Dec	S14E19	239	0030	03	CSO	002	B											
13 Dec	S13E05	239	0020	05	CSO	005	B											
14 Dec	S13W08	239	0010	01	HSX	001	A											
15 Dec	S14W20	238	0020	09	BXO	006	B											
16 Dec	S14W27	232	0030	11	BXO	010	B	1				1						
17 Dec	S14W40	232	0020	09	BXO	010	B											
18 Dec	S16W53	231	0000	01	AXX	002	A											
19 Dec	S16W66	231						1				2						
								4	0	0	0	6	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 239

*Region 8795*

09 Dec	S11E19	278	0030	03	DRO	004	B											
10 Dec	S12E06	278	0070	05	DAO	004	B											
11 Dec	S12W08	279	0060	05	DAO	010	B											
12 Dec	S13W21	279	0040	05	DAO	004	B											
13 Dec	S13W34	278	0010	05	BXO	004	B											
14 Dec	S14W47	278	0030	04	DRO	003	B											
15 Dec	S12W57	275																
16 Dec	S12W70	275																
17 Dec	S12W83	275																
									0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 278

*Region 8796*

13 Dec	S27W03	247	0010	03	CRO	002	B											
14 Dec	S27W18	249	0000	01	AXX	001	A											
15 Dec	S26W32	250	0000	00	AXX	001	A											
16 Dec	S25W45	250	0000	00	AXX	001	A											
17 Dec	S25W58	250	0000	00	AXX	001	A											
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 247





**Region Summary-continued**

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

*Region 8801*

14 Dec	S23W01	232	0000	02	BXO	002	B										
15 Dec	S22W13	231	0010	05	BXO	004	B										
16 Dec	S22W26	231															
17 Dec	S22W39	231															
18 Dec	S22W52	231															
19 Dec	S22W65	231															
																	0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 232

*Region 8802*

16 Dec	S23E04	201	0010	03	BXO	004	B										
17 Dec	S23W09	201															
																	0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 201

*Region 8803*

16 Dec	S14E24	181	0040	04	CRO	012	B										
17 Dec	S13E10	182	0070	06	DAO	012	B	1			1						
18 Dec	S13W02	180	0100	06	DAO	019	BG										
19 Dec	S13W16	181	0070	06	DAO	013	B										
																	1 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 180

*Region 8804*

16 Dec	S18E78	127	0120	05	HSX	001	A										
17 Dec	S17E66	126	0150	03	HAX	001	A										
18 Dec	S19E54	124	0210	05	CHO	003	B										
19 Dec	S19E43	122	0250	05	CHO	003	B										
																	0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 122

*Region 8805*

17 Dec	N18W27	219	0010	01	AXX	002	A										
18 Dec	N18W41	219	0000	00	AXX	001	A										
19 Dec	N18W54	219															
																	0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 219



***Region Summary-continued***

Location		Sunspot Characteristics					Flares							
Date	( ° Lat ° CMD)	Helio Lon	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
							C	M	X	S	1	2	3	4
<i>Region 8806</i>														
17 Dec	N18E71	121	0320	16	FHO	004	B				1			
18 Dec	N19E62	116	0630	17	FKI	013	BG	6	1		12	3		
19 Dec	N19E50	115	0890	17	FKC	020	BG	4			6			
								10	1	0	19	3	0	0
Still on Disk.														
Absolute heliographic longitude: 115														
<i>Region 8807</i>														
18 Dec	N11E68	110	0030	06	CSO	004	B							
19 Dec	N11E57	108	0040	04	CSO	004	B	1			3			
								1	0	0	3	0	0	0
Still on Disk.														
Absolute heliographic longitude: 108														
<i>Region 8808</i>														
19 Dec	S19E06	159	0000	03	BXO	002	B							
								0	0	0	0	0	0	0
Still on Disk.														
Absolute heliographic longitude: 159														

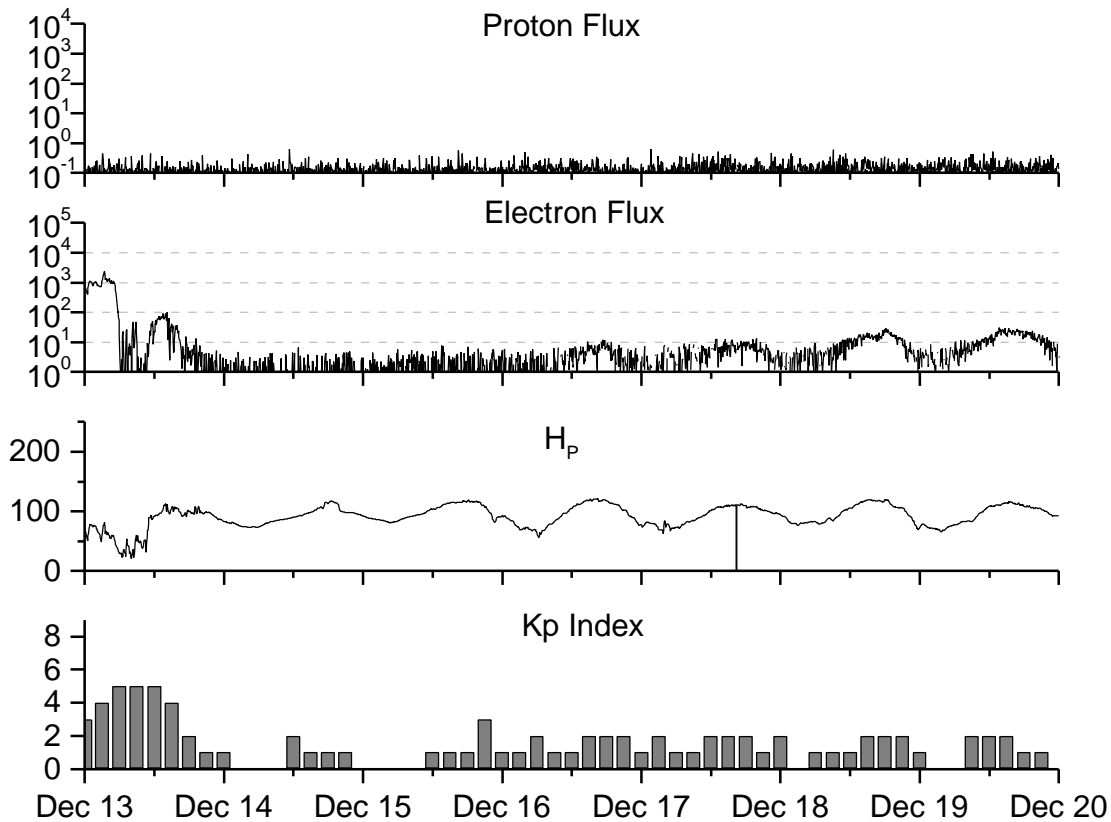


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers				Radio Flux		Geomagnetic		
	Observed values SWO	values RI	Ratio RI/SWO	Smooth values SWO	values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>1997</b>									
December	57.9	41.2	0.71	54.2	39.0	98.8	94.2	05	09.5
<b>1998</b>									
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	11.1
April	73.6	53.4	0.73	77.7	56.5	108.3	109.1	10	11.3
May	74.3	56.3	0.76	81.4	59.3	106.7	112.4	18	11.6
June	93.6	70.7	0.76	85.9	62.4	108.4	116.2	10	11.9
July	98.3	66.2	0.67	90.3	65.4	114.0	120.3	11	12.2
August	118.6	91.7	0.77	93.7	67.8	136.0	124.1	18	12.4
September	119.0	92.9	0.78	96.1	69.4	138.4	126.8	13	12.5
October	77.0	55.5	0.72	97.7	70.5	117.3	127.9	13	12.5
November	99.5	74.0	0.74	101.3	73.0	140.2	130.0	16	12.3
December	120.8	81.9	0.69	108.8	77.9	150.1	134.3	08	11.9
<b>1999</b>									
January	94.3	62.4	0.66	116.5	82.6	142.6	139.0	10	11.7
February	93.4	66.3	0.71	120.2	84.6	142.0	142.6	12	11.6
March	100.5	68.8	0.68	120.5	83.8	126.3	144.0	14	11.6
April	092.9	063.9	0.69	123.8	85.4	117.2	145.8	12	12.1
May	140.5	106.3	0.76	131.7	90.4	148.6	150.0	08	12.1
June	208.3	137.4	0.66			169.8		07	
July	169.2	113.5	0.67			165.6		10	
August	136.1	93.7	0.69			170.8		15	
September	107.4	70.9	0.66			135.7		18	
October	167.7	116.4	0.69			164.9		18	
November	199.3	132.7	0.67			191.7		12	

**NOTE:** All smoothed values after January 1998 and monthly values after September 1998 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 13 December 1999*

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

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

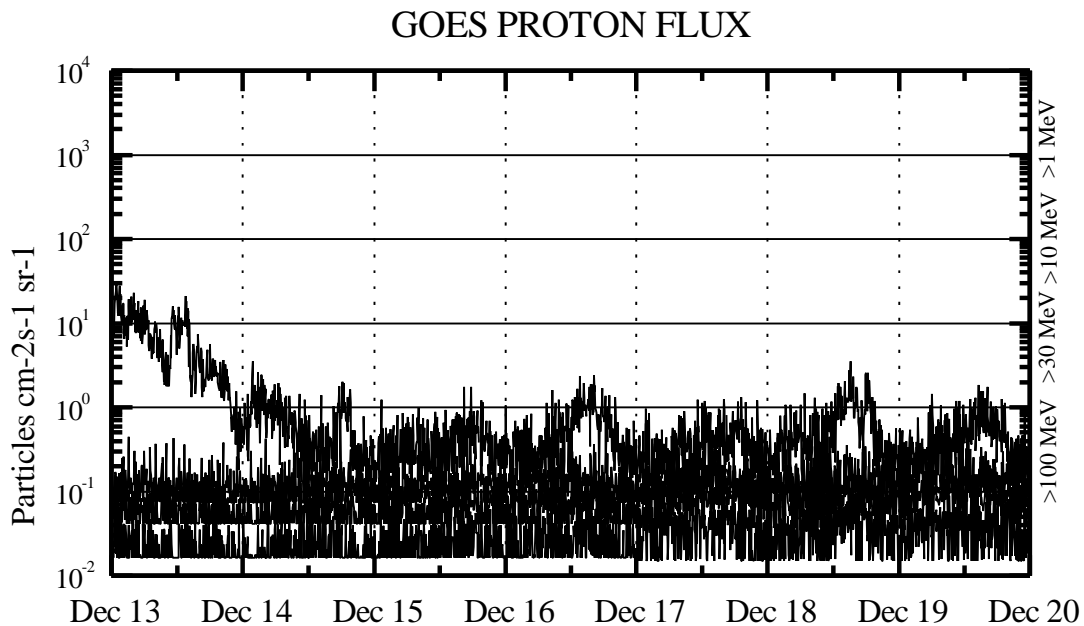
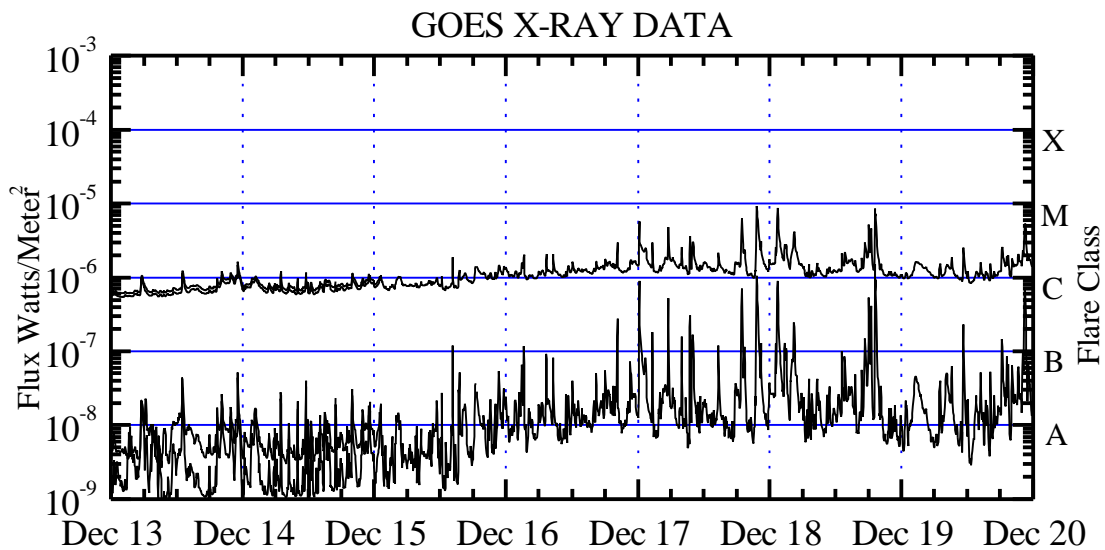
*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-8. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

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

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







#### *Weekly GOES Satellite X-ray and Proton Plots*

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

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

