

Space Weather Highlights
27 Dec 1999– 02 Jan 2000

Solar activity ranged from low to moderate levels. Activity was at moderate levels during 27 - 28 December as Region 8806 (N19, L = 114, class/area FHC/1100 on 23 December) produced three M-class flares. The flares included a M1/1N at 27/0154UT with an associated Type II radio sweep, a M2/SN at 27/1206UT, and a M4/2B parallel-ribbon flare at 28/0048UT accompanied by a Type II radio sweep and a 1400 SFU Tenflare. Region 8806 was large and magnetically complex, but in a state of gradual decay as the period began. It continued to decay until it crossed the west limb on 29 December. Activity decreased to low levels following the passage of Region 8806. As the period ended, the visible disk was populated by four stable, simply-structured sunspot groups.

Real-time solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the period. A recurrent, high-speed coronal hole wind stream began to affect Earth during the latter half of 30 December, with effects continuing through the remainder of the period. Coronal hole effects included elevated velocities with peaks to 800 km/sec, low particle densities (01 to 03 p/cc), frequent north/south fluctuations of IMF Bz with maximum southward deflections to minus 17 nT (GSM), and a shift to an away (positive polarity) solar sector.

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

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels during 01 - 02 January.

The geomagnetic field was disturbed during 30 December - 02 January due to a recurrent coronal hole wind stream. Field activity ranged from unsettled to minor storm levels during the disturbance with major storm levels detected at high latitudes.

Space Weather Outlook
05 January - 31 January 2000

Solar activity is expected to range from low to moderate levels during most of the period. Occasional to frequent C-class flares and isolated M-class flares are likely throughout the period. In addition, there will be an increased chance for isolated major flare activity during 08 - 26 January with the expected return of old Regions 8798 (S13, L = 171) and 8806 (N19, L = 115).

There will be an increased chance for a proton event at geosynchronous orbit during 08 - 26 January.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at moderate to high levels through 05 January. Normal to moderate levels are expected during 06 - 27 January. Fluxes are expected to increase to moderate to high levels during 28 - 31 January.

Geomagnetic field activity is expected to be at quiet to unsettled levels through 26 January, barring an Earth-directed CME. Active to minor storm levels are expected during 27 - 30 January due to recurrent coronal hole effects.



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
27 December	162	109	1450	B7.4	7	2	0	9	1	0	0	0
28 December	150	77	1130	B7.6	5	1	0	8	0	1	0	0
29 December	144	123	1030	B4.6	3	0	0	3	1	0	0	0
30 December	136	88	530	B4.7	3	0	0	1	0	0	0	0
31 December	130	91	530	B4.4	2	0	0	1	0	0	0	0
01 January	130	69	540	B5.7	3	0	0	1	0	0	0	0
02 January	133	69	460	B3.7	1	0	0	2	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day-sr)			Electron Fluence (electrons/cm ² -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
27 December	1.0E+5	1.2E+4	2.5E+3		2.1E+5	
28 December	1.5E+5	1.8E+4	2.7E+3		6.7E+5	
29 December	8.2E+4	1.4E+4	2.7E+3		3.1E+5	
30 December	3.7E+5	1.3E+4	3.1E+3		4.4E+5	
31 December	2.5E+6	1.6E+4	3.2E+3		2.8E+6	
01 January	5.9E+6	1.6E+4	2.8E+3		1.3E+8	
02 January	2.1E+6	1.4E+4	2.9E+3		1.7E+8	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	27 December	6	4-2-1-1-0-1-1-1	*	1-2-3-*-1-*-*.*	6
28 December	8	1-3-1-1-1-1-2-4	7	0-1-1-1-3-1-1-4	7	0-3-1-1-2-2-2-2
29 December	5	3-2-1-0-0-2-1-2	4	3-1-1-0-0-2-1-1	7	3-2-1-0-1-2-2-2
30 December	7	1-1-1-2-1-2-3-3	8	0-1-2-3-1-1-3-3	8	2-0-2-2-2-2-3-3
31 December	20	4-3-2-3-3-3-3-5	40	4-4-4-5-5-5-5-5	27	4-4-4-4-4-4-4-5
01 January	21	5-5-3-3-3-2-3-2	44	4-3-6-6-6-4-4-3	27	4-5-4-4-5-3-3-2
02 January	13	3-3-3-3-2-3-3-2	25	3-3-4-5-4-4-3-4	14	3-3-3-4-3-3-3-3

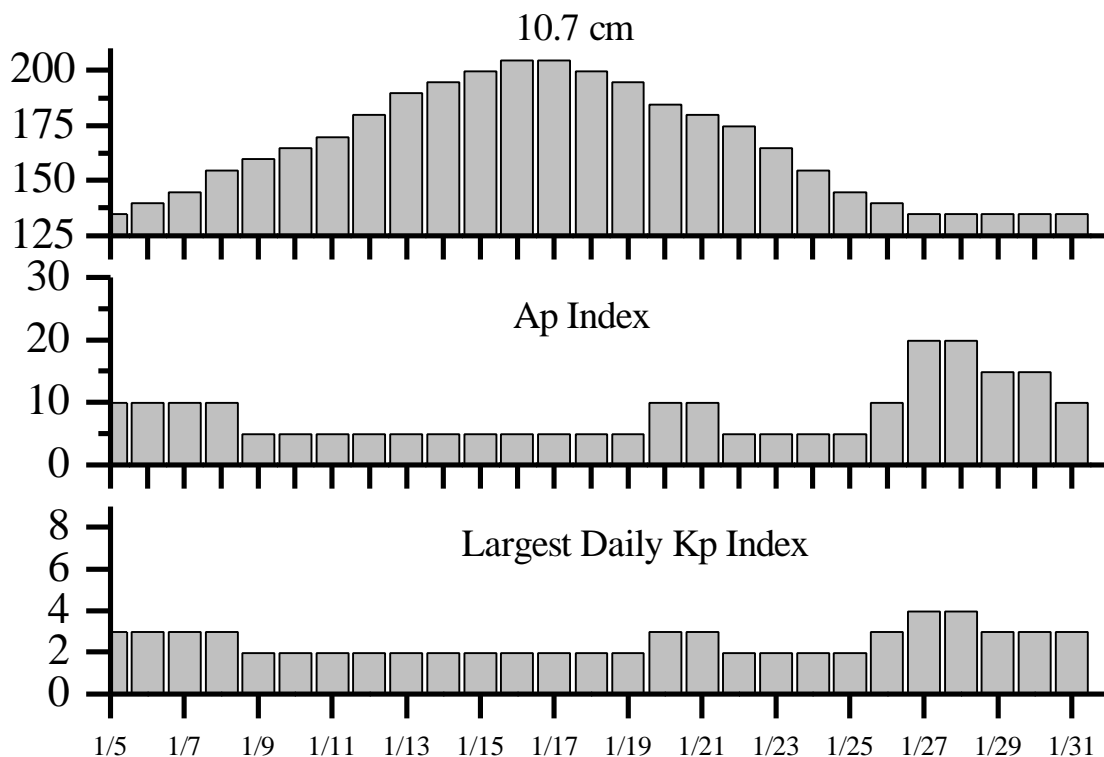


Alerts and Warnings Issued

Date & Time of Issue (UT)	Type of Alert or Warning	Date & Time of Event (UT)
27 Dec 0029	8 – 245 MHz Radio Bursts	26 Dec
27 Dec 0029	1 – 245 MHz Radio Noise Storm	26 Dec
27 Dec 0308	Type II Radio Emission	27 Dec 0158
28 Dec 0034	2 – 245 MHz Radio Bursts	27 Dec
28 Dec 0104	Type II Radio Emission	28 Dec 0056
28 Dec 0111	10cm Radio Burst 1400 sfu	28 Dec 0041
28 Dec 0125	Type II Radio Emission	28 Dec 0112
28 Dec 0231	Type IV Radio Emission	28 Dec 0120
29 Dec 0028	4 – 245 MHz Radio Bursts	28 Dec
29 Dec 1117	Type IV Radio Emission	29 Dec 0937
30 Dec 0116	4 – 245 MHz Radio Bursts	29 Dec
30 Dec 2114	A ≥ 20 Watch	01 Jan
30 Dec 2203	A ≥ 20 Watch	02 Jan
30 Dec 2213	K= 4 Warning	30/2215 – 31/1800 Dec
31 Dec 0128	1 – 245 MHz Radio Burst	30 Dec
31 Dec 0306	K= 4 Observed	31 Dec 00 - 03
31 Dec 1506	A ≥ 20 Observed	31 Dec 1500
31 Dec 2320	K= 4 Warning	01 Jan 00 - 18
01 Jan 0002	K= 4 Observed	31 Dec 21 - 24
01 Jan 0119	1 – 245 MHz Radio Burst	31 Dec
01 Jan 0238	K= 5 Warning	01 Jan 03 - 12
01 Jan 0301	K= 5 Observed	01 Jan 00 - 03
01 Jan 0642	>2MeV Electron Event @ ≥1000pfu	01 Jan 0305
02 Jan 0045	1 – 245 MHz Radio Burst	01 Jan
02 Jan 0107	>2MeV Electron Event @ ≥1000pfu CONTINUED	01 Jan 0305
02 Jan 0113	K= 4 Warning	02 Jan 03 - 15
02 Jan 0602	A ≥ 20 Observed ENDED	31 Dec 1500
02 Jan 0901	K= 4 Observed	02 Jan 06 - 09



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
05 Jan	135	10	3	19 Jan	195	5	2
06	140	10	3	20	185	10	3
07	145	10	3	21	180	10	3
08	155	5	2	22	175	5	2
09	160	5	2	23	165	5	2
10	165	5	2	24	155	5	2
11	170	5	2	25	145	5	2
12	180	5	2	26	140	10	3
13	190	5	2	27	135	20	4
14	195	5	2	28	135	20	4
15	200	5	2	29	135	15	3
16	205	5	2	30	135	15	3
17	205	5	2	31	135	10	3
18	200	5	2				



Energetic Events

Date	Time (UT)			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	½	Class	Flux	Imp/ Brtns	Location		Radio Flux		Intensity	
			Max				Lat	CMD	245	2695	II	IV
27 Dec	0146	0154	0209	M1.0	.009	1N	N24W36		3100	120	3	
27 Dec	1154	1206	1209	M2.0	.009	SN	N22W42					
28 Dec	0039	0048	0052	M4.5	.018	2B	N20W56		21000	1400		

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn #
	Begin	Max	End			Location	Lat CMD	
27 December	0035	0039	0043	C1.2				
	0048	0048	0051	C1.4	SF	N24W35	8806	
	0142	0143	0146		SF	N23W31	8806	
	0148	0150	0227	M1.0	1N	N24W36	8806	
	0828	0832	0836		SF	N20W47	8806	
	0947	0948	0952		SF	N20W48	8806	
	1038	1050	1102	C2.5				
	1203	1205	1221	M2.0	SN	N22W42	8806	
	1708	1719	1734	C1.1	SF	N25W43	8806	
	2144	2144	2147	C1.2	SF	N21W54	8806	
	2159	2203	2206		SF	S16W62	8804	
	2233	2236	2243	C1.6	SF	N20W55	8806	
	2356	0001	0006	C1.8				
	28 December	0042	0044	0111	M4.5	2B	N20W56	8806
0112		0120	0123	C2.8				
0447		0452	0503	C1.1	SF	N23W52	8806	
0647		0657	0707	C1.0	SF	N22W53	8806	
0802		0804	0806		SF	N19W59	8806	
0921		0921	0928	B9.6	SF	N37E40	8810	
0956		0958	1003		SF	N19W60	8806	
1041		U1042	1050	C3.0	SF	N21W64	8806	
1214		1217	1226	C1.7	SF	N24W54	8806	
B2140		U2141	A2204		SF	N39E36	8810	
29 December	0133	0138	0146	B9.8	SF	N20W70	8806	
	0902	0902	0907		SF	S28W14	8812	
	0925	0926	0939	C8.8	1B	N22W66	8806	
	1710	1717	1723	C1.7				
	2148	2152	2159	C2.9	SF	N23W72	8806	
30 December	0345	0354	0401	C1.5				
	0634	0636	0643	C1.0	SF	N37E07	8810	
	1305	1308	1311	B8.4				
31 December	2247	2316	2322	C2.4				
	1628	1643	1656	C1.9				
	1846	1846	1911	C2.7	SF	N09E64		



Flare List-continued

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD		
01 January	0001	0008	0014	C1.7				
	0106	0120	0134	C3.1				
	2015	2017	2023	B8.0	SF	N11E32	8814	
	2245	2251	2300	C1.2				
02 January	1945	1946	1950		SF	S17E10	8813	
	B2230	U2230	2237	C5.1	SF	S15E03	8813	

Region Summary

Date	Location		Sunspot Characteristics					Flares											
	(° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical								
		Lon						C	M	X	S	1	2	3	4				
<i>Region 8804</i>																			
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												
20 Dec	S20E29	123	0290	07	CHO	002	B												
21 Dec	S18E15	124	0280	03	HHX	001	A												
22 Dec	S18E02	124	0240	03	HSX	001	A												
23 Dec	S18W11	124	0250	03	HHX	001	A												
24 Dec	S18W25	124	0300	05	HHX	002	A												
25 Dec	S17W38	124	0220	07	CHO	003	B												
26 Dec	S17W51	124	0260	08	CHO	005	B												
27 Dec	S18W64	124	0190	03	HSX	003	A							1					
28 Dec	S17W78	125	0170	04	HSX	002	A												
29 Dec	S18W91	124	0100	04	HSX	001	A												
											0	0	0	1	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 124



Region Summary-continued

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio Lon	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
								C	M	X	S	1	2	3	4			
<i>Region 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						
20 Dec	N19E37	115	1040	19	FKI	028	BGD	5				13						
21 Dec	N19E24	115	0940	19	FHC	033	BGD	2	1			6	1					
22 Dec	N19E12	114	1050	19	FKC	037	BG		1			5	1					
23 Dec	N19W01	114	1100	20	FHC	028	BGD	3				6						
24 Dec	N20W14	113	1050	19	FKC	048	BD	2				3						
25 Dec	N20W28	114	0930	19	FKC	043	BGD	1				2						
26 Dec	N21W41	114	0900	19	FKC	039	BGD	2				4						
27 Dec	N20W54	114	0810	20	FHC	048	BGD	4	2			8	1					
28 Dec	N19W66	113	0520	19	FHI	020	BGD	4	1			6		1				
29 Dec	N18W83	116	0390	13	EAO	007	B	2				2	1					
30 Dec	N22W96	116	0060	05	CAO	002	B											
								35	6	0	74	7	1	0	0			

Crossed West Limb.

Absolute heliographic longitude: 114

<i>Region 8807</i>																		
18 Dec	N11E68	110	0030	06	CSO	004	B											
19 Dec	N11E57	108	0040	04	CSO	004	B	1				3						
20 Dec	N10E44	108	0040	06	CAO	006	B	2				1	1					
21 Dec	N11E29	110	0030	05	CSO	007	B	1				1						
22 Dec	N10E16	110	0030	05	DAO	006	B	1	1			1		1				
23 Dec	N11E02	111	0020	05	CAO	005	B					1						
24 Dec	N12W11	110	0020	08	BXO	010	B					3						
25 Dec	N11W23	109	0010	06	BXO	006	B	1				1						
26 Dec	N11W37	110	0010	06	BXO	005	B											
27 Dec	N11W50	110																
28 Dec	N11W63	110																
29 Dec	N11W76	110																
30 Dec	N11W89	110																
								6	1	0	11	1	1	0	0			

Crossed West Limb.

Absolute heliographic longitude: 111



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 8809

24 Dec	N21E67	032	0010	06	BXO	003	B										
25 Dec	N21E54	032	0030	06	CSO	006	B										
26 Dec	N21E41	032	0030	07	BXO	007	B										
27 Dec	N22E27	033	0040	07	DAO	007	B										
28 Dec	N22E15	032	0040	06	DAO	004	B										
29 Dec	N22E02	031	0030	08	CRO	006	B										
30 Dec	N24W08	028	0000	06	BXO	003	B										
31 Dec	N24W20	027	0000	06	BXO	002	B										
01 Jan	N24W33	027															
02 Jan	N24W46	027															
									0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 031

Region 8810

24 Dec	N35E75	024	0030	01	HSX	001	A										
25 Dec	N36E64	022	0150	13	ESO	005	B					2					
26 Dec	N36E54	019	0350	15	EKO	008	B	1				2					
27 Dec	N38E44	016	0410	17	FKO	011	B										
28 Dec	N38E32	015	0400	17	FKO	011	B					2					
29 Dec	N37E19	014	0350	16	FKO	017	B										
30 Dec	N37E06	014	0320	16	FAO	016	B	1				1					
31 Dec	N38W05	012	0330	16	FAO	016	B										
01 Jan	N38W18	012	0270	16	FAO	011	B										
02 Jan	N37W29	011	0180	15	EAO	007	B										
									2	0	0	7	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 012

Region 8811

25 Dec	S28W16	102	0000	01	AXX	002	A										
26 Dec	S28W29	102	0000	00	AXX	001	A										
27 Dec	S28W42	102															
28 Dec	S28W55	102															
29 Dec	S30W63	096	0010	02	BXO	002	B										
30 Dec	S30W76	096															
31 Dec	S30W89	096															
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 102



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 8812</i>																				
29 Dec	S28W21	054	0010	05	BXO	003	B					1								
30 Dec	S28W35	055	0000	00	AXX	001	A													
31 Dec	S27W47	054	0000	00	AXX	001	A													
01 Jan	S27W60	054																		
02 Jan	S27W73	054																		
													0	0	0	1	0	0	0	0
Still on Disk.																				
Absolute heliographic longitude: 054																				
<i>Region 8813</i>																				
29 Dec	S15E64	329	0040	06	DRO	005	B													
30 Dec	S17E50	330	0040	08	DRO	004	B													
31 Dec	S17E38	329	0040	08	DRO	008	B													
01 Jan	S17E21	333	0050	07	DSO	006	B													
02 Jan	S16E08	334	0060	08	DAO	007	B	1				2								
								1	0	0	2	0	0	0	0	0	0			
Still on Disk.																				
Absolute heliographic longitude: 334																				
<i>Region 8814</i>																				
29 Dec	N11E73	320	0100	04	HSX	002	A													
30 Dec	N10E60	320	0110	03	HAX	002	A													
31 Dec	N10E47	320	0130	03	HAX	002	A													
01 Jan	N10E34	320	0180	03	HHX	003	A					1								
02 Jan	N10E21	321	0150	03	HAX	003	A													
													0	0	0	1	0	0	0	0
Still on Disk.																				
Absolute heliographic longitude: 321																				
<i>Region 8815</i>																				
31 Dec	N10E61	306	0030	05	CRO	002	B													
01 Jan	N10E48	306	0040	08	CRO	009	B													
02 Jan	N08E35	307	0070	08	CAO	012	B													
													0	0	0	0	0	0	0	0
Still on Disk.																				
Absolute heliographic longitude: 307																				

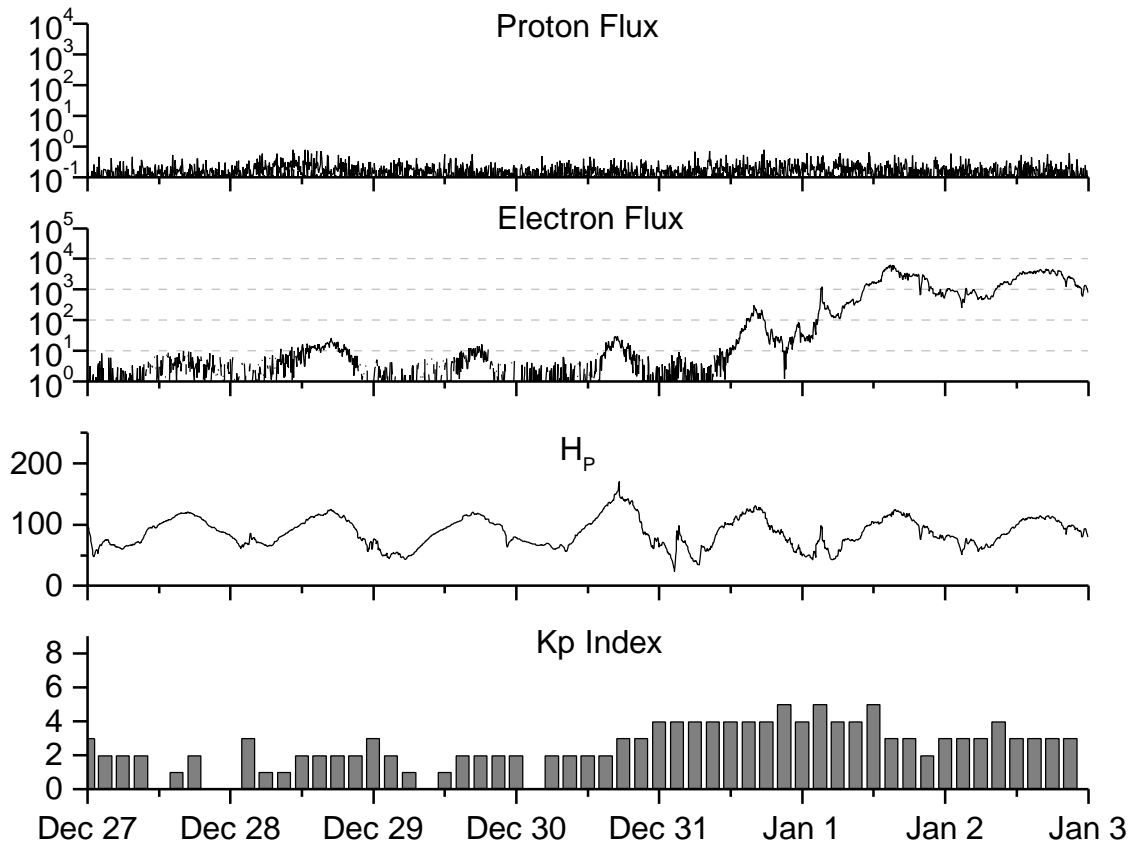


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
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	11.1
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
1999									
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	136.0	93.0	169.8	152.9	07	12.0
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	
December	123.5	86.4	0.70			169.8		9	

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 27 December 1999

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.

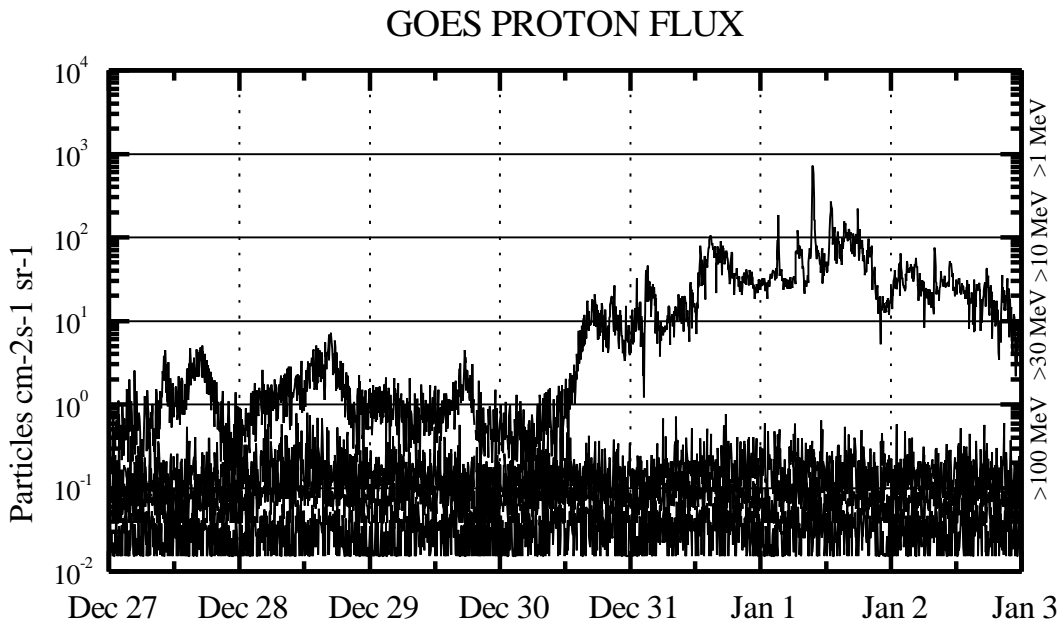
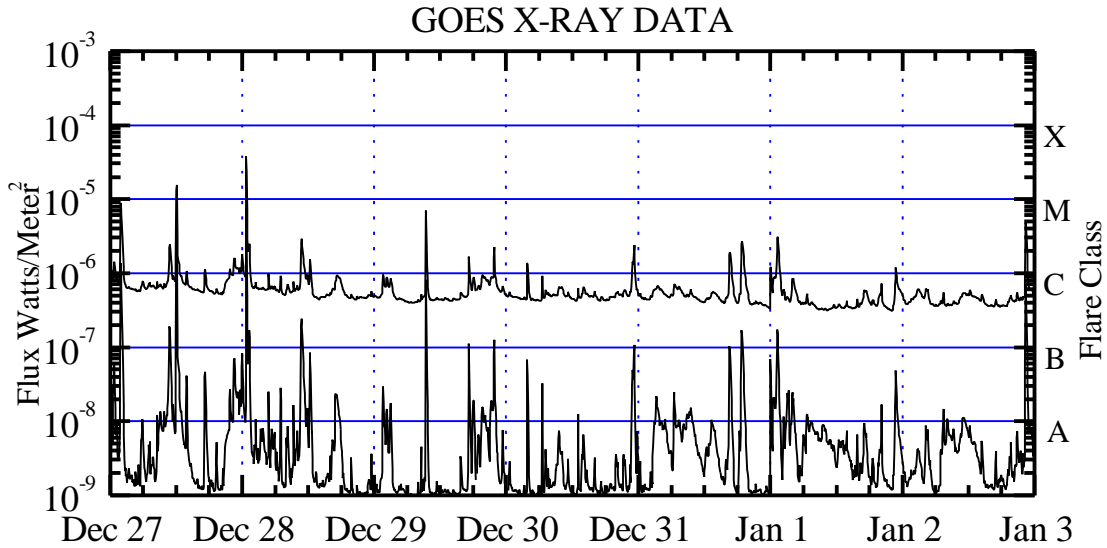
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm² -sec -sr) with energies greater than 2 MeV at GOES-8.

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 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 more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



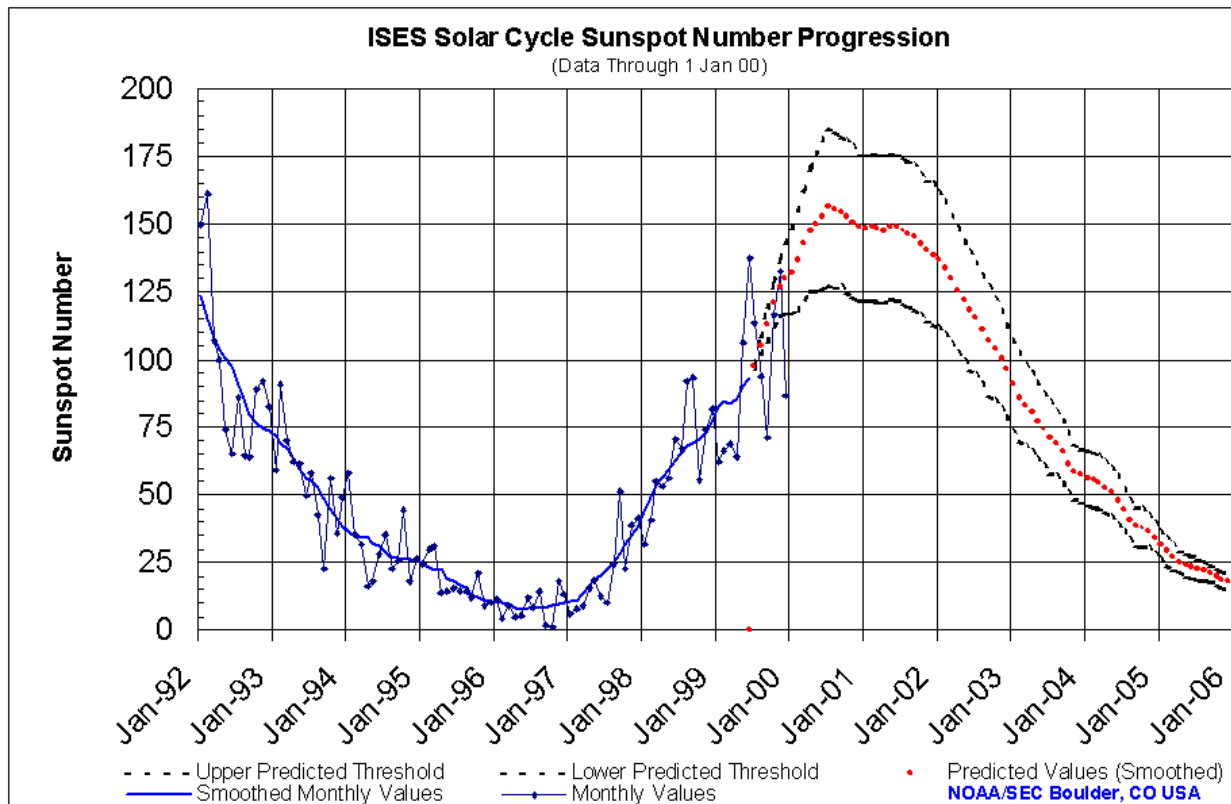


Weekly GOES Satellite X-ray and Proton Plots

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.

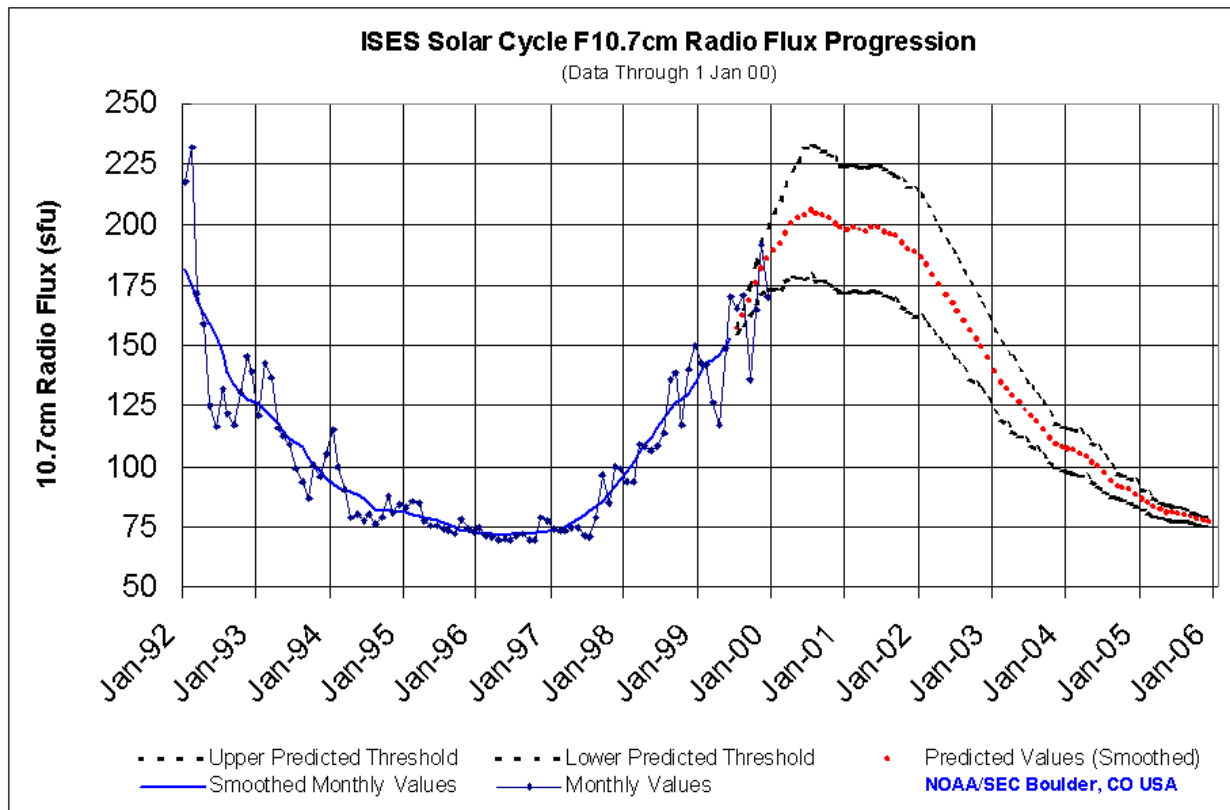




SEC Prediction of Smoothed Sunspot Number

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	10 (***)	10 (***)	10 (***)	9 (***)	8 (***)	9 (***)	8 (***)	8 (***)	8 (***)	9 (***)	10 (***)	10 (***)
1997	11 (***)	11 (***)	14 (***)	17 (***)	18 (***)	20 (***)	23 (***)	25 (***)	28 (***)	32 (***)	35 (***)	39 (***)
1998	44 (***)	49 (***)	53 (***)	57 (***)	59 (***)	63 (***)	66 (***)	68 (***)	70 (***)	71 (***)	73 (***)	78 (***)
1999	83 (***)	85 (***)	84 (***)	85 (***)	90 (***)	93 (***)	97 (1)	105 (3)	113 (6)	120 (8)	127 (11)	130 (13)
2000	132 (16)	137 (18)	143 (20)	148 (23)	150 (25)	153 (28)	156 (29)	155 (29)	154 (28)	153 (28)	151 (28)	148 (27)
2001	148 (27)	149 (27)	148 (27)	148 (27)	149 (27)	149 (27)	147 (27)	146 (27)	145 (27)	143 (26)	140 (26)	139 (26)
2002	137 (25)	134 (25)	130 (24)	125 (23)	122 (22)	118 (22)	115 (21)	111 (20)	107 (20)	104 (19)	100 (18)	96 (17)
2003	91 (17)	86 (16)	83 (15)	81 (15)	77 (14)	74 (13)	71 (13)	69 (12)	66 (12)	62 (11)	59 (10)	57 (10)
2004	56 (10)	56 (10)	55 (10)	53 (9)	51 (9)	48 (9)	44 (8)	41 (7)	38 (7)	38 (7)	36 (6)	34 (6)
2005	31 (5)	29 (5)	27 (5)	25 (4)	24 (4)	23 (4)	23 (4)	22 (4)	21 (3)	20 (3)	19 (3)	18 (3)





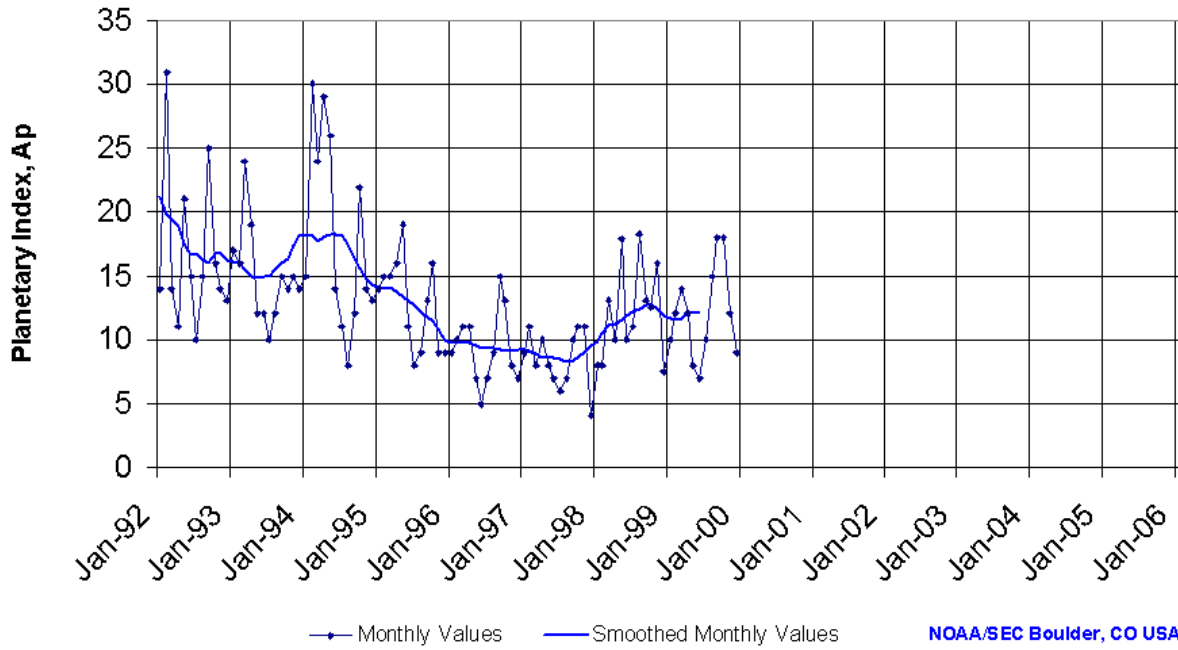
SEC Prediction of Smoothed F10.7cm Radio Flux

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	72 (***)	72 (***)	72 (***)	72 (***)	71 (***)	72 (***)	72 (***)	72 (***)	72 (***)	73 (***)	73 (***)	73 (***)
1997	73 (***)	74 (***)	75 (***)	77 (***)	78 (***)	80 (***)	82 (***)	83 (***)	86 (***)	89 (***)	91 (***)	94 (***)
1998	98 (***)	102 (***)	106 (***)	109 (***)	112 (***)	116 (***)	120 (***)	124 (***)	127 (***)	128 (***)	130 (***)	134 (***)
1999	139 (***)	143 (***)	144 (***)	146 (***)	150 (***)	153 (***)	156 (1)	162 (3)	168 (6)	175 (8)	182 (11)	186 (13)
2000	189 (16)	192 (18)	196 (20)	201 (22)	202 (24)	204 (27)	206 (27)	204 (28)	204 (27)	202 (27)	200 (27)	198 (26)
2001	198 (26)	198 (26)	198 (26)	197 (26)	198 (26)	198 (26)	197 (26)	196 (26)	195 (26)	192 (26)	190 (26)	188 (26)
2002	187 (25)	184 (25)	179 (24)	175 (23)	171 (22)	167 (22)	164 (21)	160 (20)	156 (20)	153 (19)	149 (18)	145 (17)
2003	140 (17)	135 (16)	132 (15)	130 (15)	126 (14)	123 (12)	120 (12)	118 (11)	115 (11)	112 (10)	110 (9)	108 (9)
2004	107 (9)	106 (9)	105 (9)	104 (8)	102 (8)	100 (8)	97 (7)	94 (6)	92 (5)	91 (5)	90 (5)	88 (5)
2005	87 (4)	85 (4)	83 (4)	82 (3)	81 (3)	81 (3)	80 (3)	80 (3)	79 (2)	78 (2)	78 (2)	77 (2)



ISES Solar Cycle Ap Progression

(Data Through 1 Jan 00)





Space
Environment
Center

Sunspot Number (RI)

December 1999
(Month 39)

Preliminary data



Comparison of Cycles
at current month in cycle

