

Space Weather Highlights
29 December 2003 - 04 January 2004

SWO PRF 1479
06 January 2004

Solar activity was at very low to moderate levels during the period. Activity was at low levels for most of the period. Region 528 (N10, L=261, class/area Fkc/740 on 25 December) increased activity to moderate levels on 31 December with an impulsive M1 at 1824 UTC on 31 December. Region 528 rotated beyond the west limb on 31 December. Late on 31 December, new Region 536 (S12, L= 073, class/area Eko/910 on 03 January) rotated around the east limb, and subsequently developed into a moderate sized Eko spot group. Initially, Region 536 was a magnetic beta configuration, but at the time of this report this region had developed more complexity as a beta-gamma-delta configuration. The region produced two long duration C8 flares on 31 December and 01 January as well as numerous minor C-class flares. Subsequent to the summary period, Region 536 produced a long duration M6 at 0345 UTC on 05 January and at the time of this report (06 January) newly numbered Region 537 (N04 E84) on the east limb produced an M5 flare at 0629 UTC.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. The period began with wind speeds near 400 km/s. A small coronal hole on 31 December - 01 January increased wind speeds to near 575 km/s with the average Bz component slightly southward. Wind speeds diminished on 02 January to about 450 km/s. A large transequatorial coronal hole rotated into a geoeffective position early on 03 January with solar wind speeds increasing to near 625 km/s and remaining elevated for the rest of the period. The Bz component from this large coronal hole fluctuated between +/- 8 nT with an average around -3 nT.

There were no greater than 10 MeV proton events at geosynchronous orbit during the summary period.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 01 - 02 January and again on 04 January.

The geomagnetic field ranged from quiet to minor storm levels. Activity was at quiet to unsettled levels early in period. On 31 December - 01 January, a coronal hole driven high speed stream produced unsettled to minor storm levels. Activity decreased on 02 January to quiet to active levels. A large transequatorial coronal hole rotated into a geoeffective position on 03 January and produced unsettled to minor storm levels on 03 - 04 January.

Space Weather Outlook
07 January 2004 - 02 February 2004

Solar activity is expected to be at very low to low levels with a chance of isolated M-class activity. Region 536 is expected to produce C-class flares and possibly an isolated M-class event through 14 January. The new region currently rotating onto the east limb is likely to have the potential for isolated M-class flares for the first half of the period. Activity during the second half of the period is expected to be at low levels.

There is a slight chance for a greater than 10 MeV proton event from 536, and perhaps from new Region 537 as it rotates onto the disk.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 07 - 14 January, 17 - 19 January and again on 28 -29 January due to recurrent coronal holes.

Geomagnetic activity is expected to range from quiet to major storm levels. Unsettled to major storm levels are possible early in period due to the large coronal hole driven high speed stream. Two smaller recurrent coronal holes are expected to return on 16 - 17 January and 27 - 28 January, and are expected to produce active to minor storm level activity.



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	
29 December	115	56	470	B2.7	0	0	0	0	0	0	0	0	0
30 December	108	15	100	B2.8	1	0	0	0	0	0	0	0	0
31 December	106	25	130	B3.9	4	1	0	0	0	0	0	0	0
01 January	116	47	490	B7.5	8	0	0	2	0	0	0	0	0
02 January	117	51	950	B3.0	4	0	0	1	0	0	0	0	0
03 January	116	65	1150	B2.6	1	0	0	2	0	0	0	0	0
04 January	119	80	920	B3.2	5	0	0	1	0	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
29 December	3.5E+5	1.1E+4	2.4E+3		1.4E+7	
30 December	3.8E+5	1.2E+4	2.7E+3		1.0E+7	
31 December	8.8E+5	1.3E+4	2.9E+3		4.5E+6	
01 January	1.5E+6	1.3E+4	2.8E+3		3.3E+7	
02 January	8.9E+5	1.3E+4	3.1E+3		8.8E+7	
03 January	1.3E+6	1.2E+4	2.9E+3		2.5E+7	
04 January	2.3E+6	1.2E+4	2.9E+3		7.2E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	29 December	4	1-0-1-2-2-3-0-0	7	1-0-1-2-2-4-2-0	6
30 December	3	0-1-1-0-1-1-2-2	6	0-0-3-1-1-1-3-2	8	2-1-3-2-2-3-3-2
31 December	9	2-1-1-2-2-3-3-3	32	3-1-2-5-5-6-4-4	17	3-2-2-3-4-5-4-3
01 January	12	2-3-2-3-4-2-2-2	55	3-4-7-5-7-4-4-3	27	3-4-5-5-5-4-3-3
02 January	9	4-2-1-1-2-2-2-2	24	2-2-3-3-6-5-3-2	13	3-2-2-2-3-4-3-3
03 January	11	2-2-3-3-3-2-3-2	41	2-3-6-6-6-4-3-4	26	2-3-5-5-4-4-4-3
04 January	13	2-2-3-3-3-4-2-2	42	2-3-4-4-6-7-4-3	24	3-3-4-4-4-4-4-3

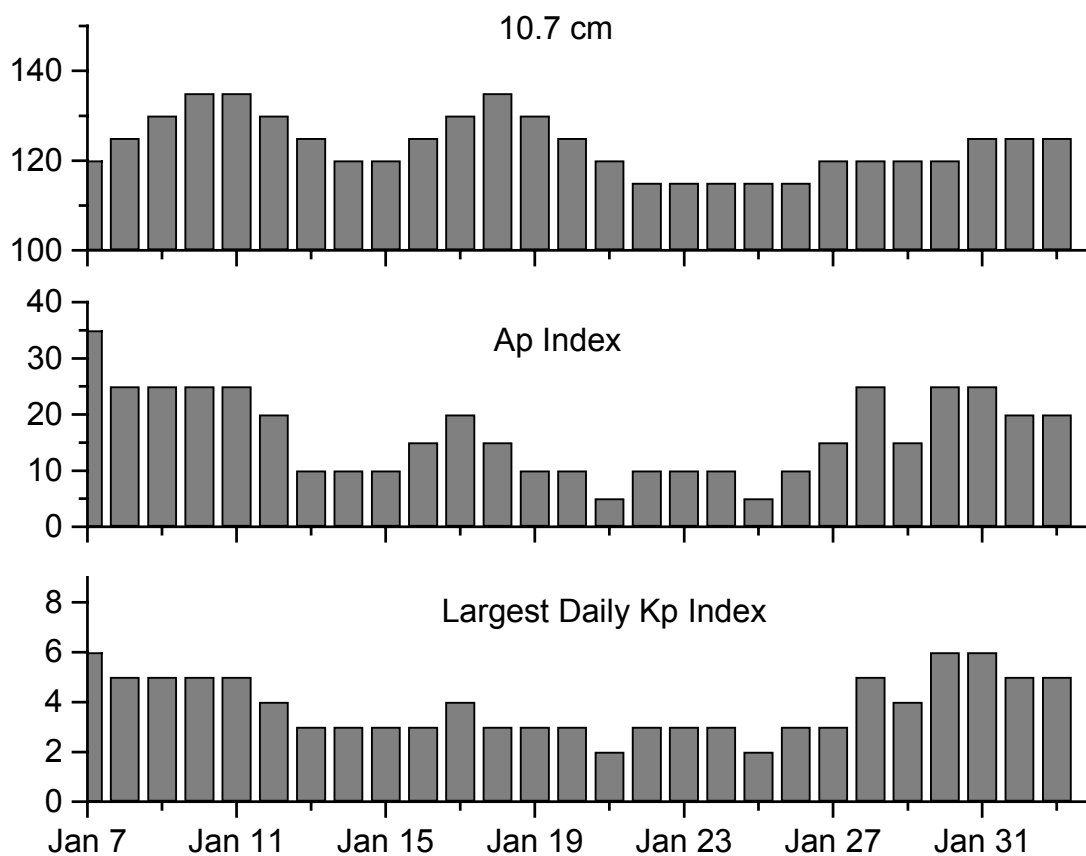


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
29 Dec 0836	ALERT: STRATWARM	29 Dec
29 Dec 2059	WATCH: Geomagnetic $A \geq 20$	01 Jan
30 Dec 1225	ALERT: STRATWARM	30 Dec
31 Dec 1234	ALERT: STRATWARM	31 Dec
31 Dec 1502	WARNING: Geomagnetic $K = 4$	31 Dec 1502 -01 Jan 1500
31 Dec 1541	ALERT: Geomagnetic $K = 4$	31 Dec 1538
31 Dec 1639	WARNING: Geomagnetic $K = 5$	31 Dec 1640 - 2359
31 Dec 1707	ALERT: Geomagnetic $K = 5$	31 Dec 1704
01 Jan 0847	WARNING: Geomagnetic $K = 5$	01 Jan 0848 - 1500
01 Jan 1035	ALERT: Geomagnetic $K = 5$	01 Jan 1035
01 Jan 1357	ALERT: Electron 2MeV Integral Flux > 1000pfu	01 Jan 1350
01 Jan 1402	ALERT: STRATWARM	01 Jan
01 Jan 1445	EXTENDED WARNING: Geomagnetic $K = 4$	31 Dec 1502 - 02 Jan 1500
01 Jan 2214	WATCH: Geomagnetic $A \geq 20$	04 Jan
02 Jan 0018	9 - 245 MHz Radio Bursts	01 Jan
02 Jan 0018	1 - 245 MHz Radio Noise Storm	01 Jan
02 Jan 1334	ALERT: STRATWARM	02 Jan
02 Jan 1354	ALERT: Electron 2MeV Integral Flux > 1000pfu	02 Jan 1335
02 Jan 2008	WATCH: Geomagnetic $A \geq 20$	05 Jan
03 Jan 0005	6 - 245 MHz Radio Bursts	02 Jan
03 Jan 0005	1 - 245 MHz Radio Noise Storm	02 Jan
03 Jan 0342	WARNING: Geomagnetic $K = 4$	03 Jan 0345 - 1500
03 Jan 0729	ALERT: Geomagnetic $K = 4$	03 Jan 0729
03 Jan 0859	ALERT: Geomagnetic $K = 5$	03 Jan 0859
03 Jan 0933	WARNING: Geomagnetic $K = 5$	03 Jan 0935 - 1500
03 Jan 1426	ALERT: STRATWARM	03 Jan
03 Jan 1456	EXTENDED WARNING: Geomagnetic $K = 5$	03 Jan 0935 - 2359
03 Jan 2056	WATCH: Geomagnetic $A \geq 20$	06 Jan
03 Jan 2346	EXTENDED WARNING: Geomagnetic $K = 5$	03 Jan 0935 - 04 Jan 1500
04 Jan 0024	1 - 245 MHz Radio Burst	03 Jan
04 Jan 0834	WARNING: Geomagnetic $K = 6$	04 Jan 0835 - 1500
04 Jan 1138	ALERT: STRATWARM	04 Jan
04 Jan 1300	ALERT: Electron 2MeV Integral Flux > 1000pfu	04 Jan 1235
04 Jan 1426	EXTENDED WARNING: Geomagnetic $K = 4$	03 Jan 0345 - 05 Jan 1500
04 Jan 2106	WATCH: Geomagnetic $A \geq 20$	07 Jan



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
07 Jan	120	35	6	21 Jan	120	5	2
08	125	25	5	22	115	10	3
09	130	25	5	23	115	10	3
10	135	25	5	24	115	10	3
11	135	25	5	25	115	5	2
12	130	20	4	26	115	10	3
13	125	10	3	27	120	15	3
14	120	10	3	28	120	25	5
15	120	10	3	29	120	15	4
16	125	15	3	30	120	25	6
17	130	20	4	31	125	25	6
18	135	15	3	01 Feb	125	20	5
19	130	10	3	02	125	20	5
20	125	10	3				



Energetic Events

Date	Time			X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location		Rgn #	Radio Flux		Intensity	
							Lat	CMD		245	2695	II	IV
31 Dec	1821	1824	1826	M1.0	.002				528	870			

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
29 December	0304	0321	0327	B4.7			532
	0343	0359	0421	B6.0			532
	1341	1354	1359	B8.9			525
	1409	1415	1421	B5.5			528
	1743	1757	1813	B8.6			528
	1954	2014	2038	B6.3			528
	2211	2223	2248	B6.8			528
30 December	1148	1152	1155	B4.5			
	1406	1411	1428	B5.2			528
	1725	1729	1731	B7.9			528
	1934	1940	1947	C1.0			528
31 December	0211	0215	0218	B6.5			
	1725	1733	1736	C2.3			
	1759	1808	1816	C2.2			
	1821	1824	1826	M1.0			528
	1918	1922	1926	B6.6			
	1943	1947	1952	B9.9			
	2010	2019	2029	C1.0			
	2131	2217	2327	C8.3			
01 January	0122	0133	0141	C4.0			
	0141	0146	0149	C3.7			
	0316	0321	0323	C6.4			528
	0411	0412	0418		Sf	S07E40	534
	0535	0540	0547	C2.5			534
	0604	0654	0700	C8.0			
	1023	1026	1030	C1.8			
02 January	2240	2241	2245	C3.0	Sf	S07E73	536
	2330	2337	2340	C2.0			536
	0153	0157	0201	C1.0			536
	0254	0257	0311	C2.8	Sf	S04E28	534
	0941	0946	0949	B8.7			536
	1346	1359	1406	C1.2			536
	1656	1700	1709	C1.2			536
	2107	2121	2133	B9.4			536
03 January	0000	0005	0014	B5.9			536
	0545	0548	0551	B6.4			536



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
03 January	0559	0608	0611	B6.9	Sf	S14E64	536
	0844	0845	0852	B6.7	Sf	S15E64	536
	1808	1815	1823	C1.1			536
	1832	1837	1849	B8.7			536
	1903	1906	1910	B7.8			536
	2008	2012	2015	B4.9			536
	2056	2100	2103	B5.2			536
	2304	2309	2312	B7.7			536
04 January	0340	0343	0348	B4.0			536
	0526	0532	0540	B8.3			
	0636	0639	0643	B6.8			
	0942	0952	1001	C2.8			536
	1437	1440	1443	B5.3			536
	1511	1522	1544	C3.5	Sf	S06E45	536
	1552	1558	1604	C3.7			536
	1741	1820	1825	C3.8			536
	2025	2035	2042	C1.5			536

Region Summary

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 528</i>																						
18 Dec	N08E71	264	0170	03	Hax	006	A															
19 Dec	N09E62	260	0290	16	Fac	015	B	1														
20 Dec	N09E49	260	0360	18	Fsi	020	B															
21 Dec	N09E37	259	0390	18	Fho	019	Bg	2			1											
22 Dec	N09E23	259	0410	18	Fko	045	Bg	7			3											
23 Dec	N09E09	260	0520	18	Fkc	043	Bg	3			3											
24 Dec	N10W05	261	0650	17	Fkc	029	Bg	2			2											
25 Dec	N10W18	261	0740	17	Fkc	022	Bg	3			3											
26 Dec	N10W31	261	0690	18	Fkc	036	Bg	4	1		1	2										
27 Dec	N10W44	261	0640	18	Fkc	019	Bg															
28 Dec	N10W57	261	0500	17	Fkc	012	Bg															
29 Dec	N08W69	259	0430	17	Fkc	012	B															
30 Dec	N10W81	258	0100	16	Fao	005	B	1														
31 Dec	N09W93	258	0120	06	Cao	003	B			1												
											23	2	0	13	2	0	0	0	0			

Crossed West Limb.

Absolute heliographic longitude: 261



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

Region 530

21 Dec	S20E64	232	0030	02	Hax	001	A											
22 Dec	S21E50	232	0020	01	Hax	001	A	2			1							
23 Dec	S22E37	232	0040	04	Dso	005	B											
24 Dec	S22E24	232	0010	05	Bxo	005	B											
25 Dec	S22E11	232																
29 Dec	S22W50	241	0010	03	Bxo	002	B											
30 Dec	S21W49	226																
31 Dec	S21W62	226																
01 Jan	S21W75	226																
02 Jan	S21W88	226																
									2	0	0	1	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 232

Region 532

25 Dec	S11E02	241	0030	04	Cso	004	B											
26 Dec	S11W11	241	0050	04	Dao	009	B											
27 Dec	S11W25	241	0040	04	Dao	008	B											
28 Dec	S11W38	241	0020	04	Cso	003	B											
29 Dec	S12W51	241	0020	01	Hsx	001	A											
30 Dec	S12W64	241																
31 Dec	S12W77	241																
									0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 241

Region 533

28 Dec	N16E54	149	0040	03	Dso	002	B											
29 Dec	N16E38	152	0010	01	Axx	001	A											
30 Dec	N16E25	152																
31 Dec	N16E12	152																
01 Jan	N16W01	152																
02 Jan	N16W14	152																
03 Jan	N16W27	152																
04 Jan	N16W40	152																
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 152



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 534

31 Dec	S05E40	124	0010	03	Bxo	002	B											
01 Jan	S06E28	123	0090	08	Dso	013	B	1				1						
02 Jan	S06E15	122	0100	09	Dsi	013	B	1				1						
03 Jan	S05E02	122	0110	10	Dao	015	B											
04 Jan	S05W13	125	0070	10	Dao	014	B											
								2	0	0	0	2	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 122

Region 535

01 Jan	S19W38	189	0020	03	Cro	003	B											
02 Jan	S19W51	188	0080	04	Dso	005	B											
03 Jan	S18W64	188	0130	05	Dao	008	B											
04 Jan	S21W76	188	0110	06	Dao	007	B											
								0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 189

Region 536

01 Jan	S11E73	078	0380	05	Hkx	001	A	2				1						
02 Jan	S11E63	074	0770	11	Eko	003	B	3										
03 Jan	S12E51	073	0910	11	Eko	012	B	1				2						
04 Jan	S10E38	074	0740	11	Eki	029	B	5				1						
								11	0	0	0	4	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 074

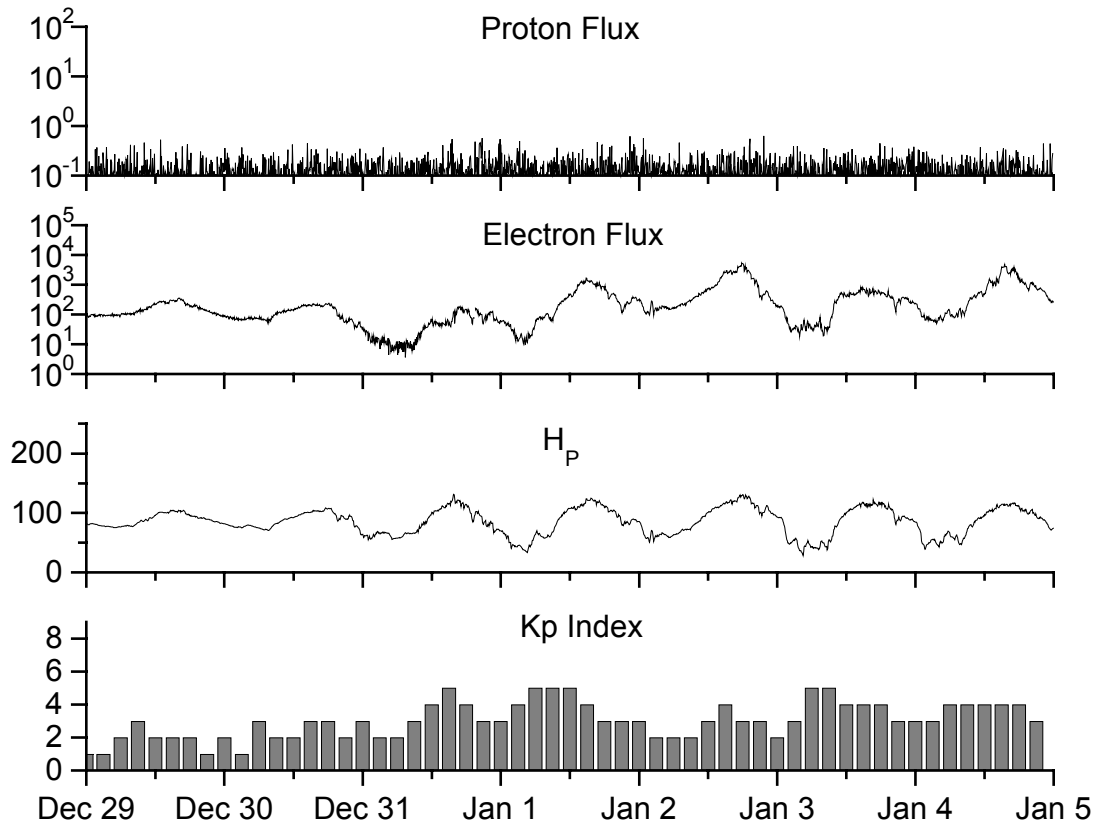


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2002									
January	189.0	114.1	0.60	184.8	113.5	227.3	194.6	08	12.3
February	194.5	107.4	0.55	188.6	114.7	205.0	197.2	10	12.8
March	153.1	98.4	0.64	188.9	113.3	180.3	195.7	10	12.9
April	194.9	120.7	0.62	186.2	110.5	189.8	191.5	15	13.2
May	204.1	120.8	0.59	183.6	108.9	178.4	188.0	15	13.3
June	146.0	88.3	0.60	179.9	106.3	148.7	183.0	11	13.5
July	183.5	99.6	0.54	175.4	102.7	173.5	176.3	11	13.7
August	191.0	116.4	0.61	169.2	98.7	183.9	169.5	16	14.2
September	206.4	109.6	0.53	163.4	94.6	175.8	164.1	14	15.0
October	153.9	97.5	0.63	158.8	90.5	167.0	159.4	23	15.6
November	159.8	95.5	0.60	150.9	85.2	168.7	154.8	16	16.3
December	147.9	80.8	0.55	144.6	82.1	158.6	150.9	13	17.0
2003									
January	149.3	79.7	0.53	141.7	81.0	144.0	149.2	13	18.2
February	87.0	46.0	0.53	136.4	78.5	124.5	144.7	17	18.9
March	119.7	61.1	0.51	128.1	74.2	132.2	139.5	21	19.4
April	119.7	60.0	0.50	121.5	70.3	126.3	136.3	20	20.0
May	89.6	55.2	0.62	118.3	67.8	129.3	135.0	26	21.0
June	118.4	77.4	0.65	113.6	65.2	129.4	132.6	24	21.8
July	132.8	85.0	0.64			127.8		20	
August	114.3	72.7	0.64			122.1		23	
September	82.6	48.8	0.59			112.3		19	
October	118.9	65.6	0.55			153.1		32	
November	118.9	67.2	0.57			153.1		31	
December	75.4	47.0	0.62			115.1		17	

NOTE: All smoothed values after September 2002 and monthly values after March 2003 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 23, RI= 120.8, occurred April 2000. *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 29 December 2003

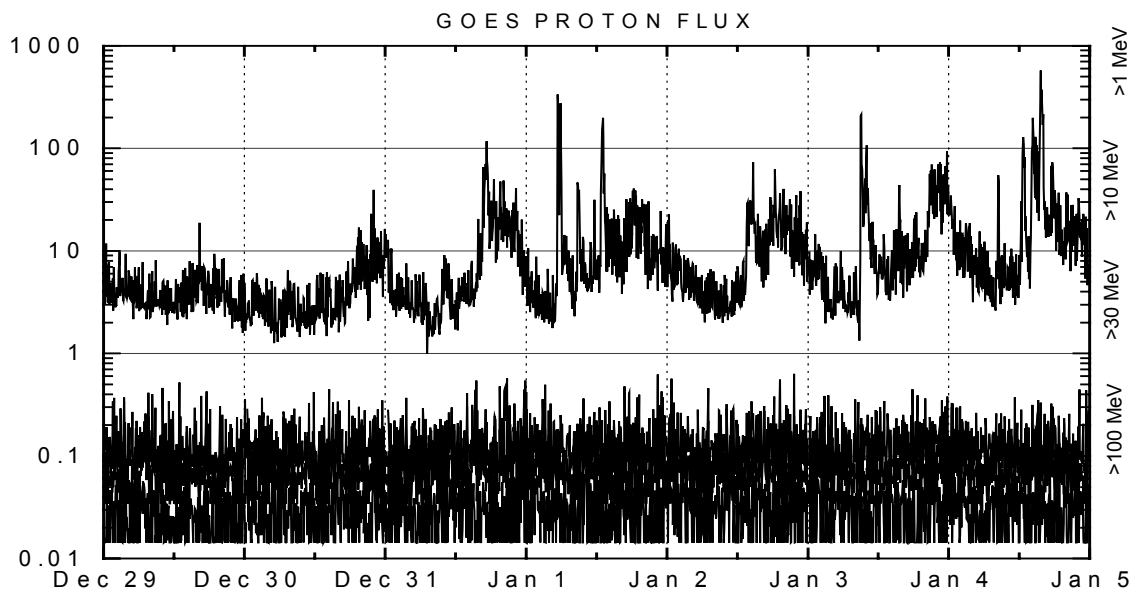
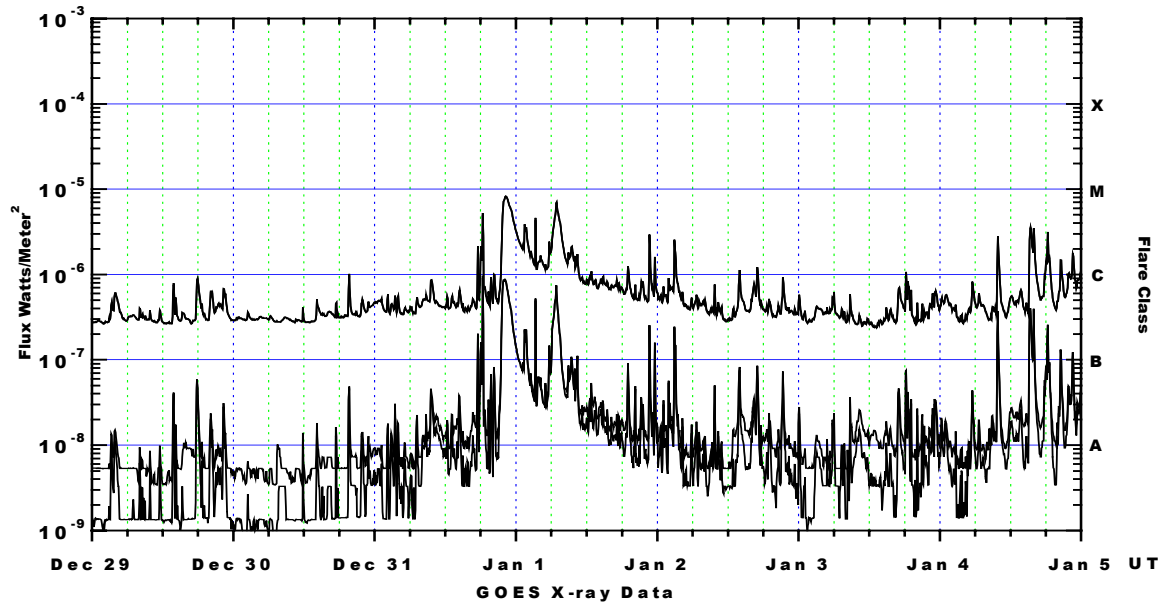
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-11 (W113) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-12.

H_p plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. 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_{parallel} 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

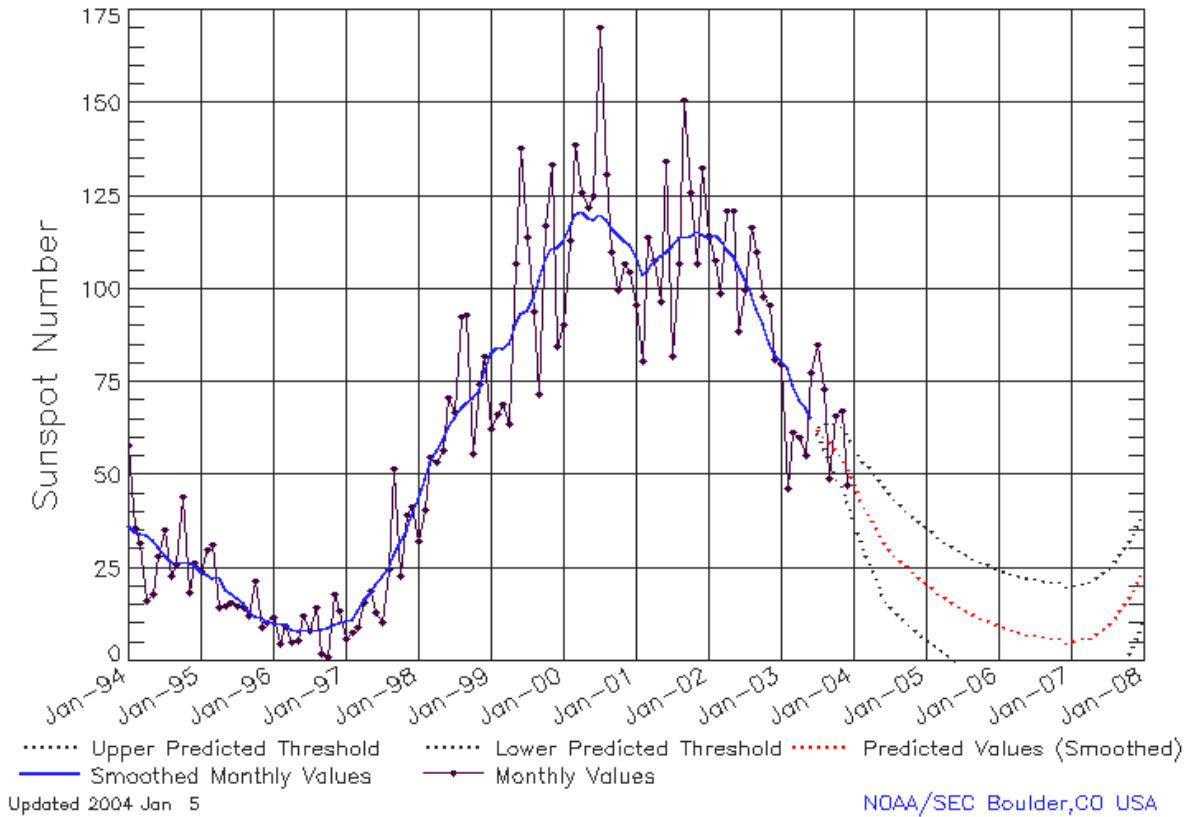
X-ray plot contains five-minute averaged x-ray flux (watts/m²) as measured by GOES 12 and 10 in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W113) 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.



ISES Solar Cycle Sunspot Number Progression

Data Through 31 Dec 03



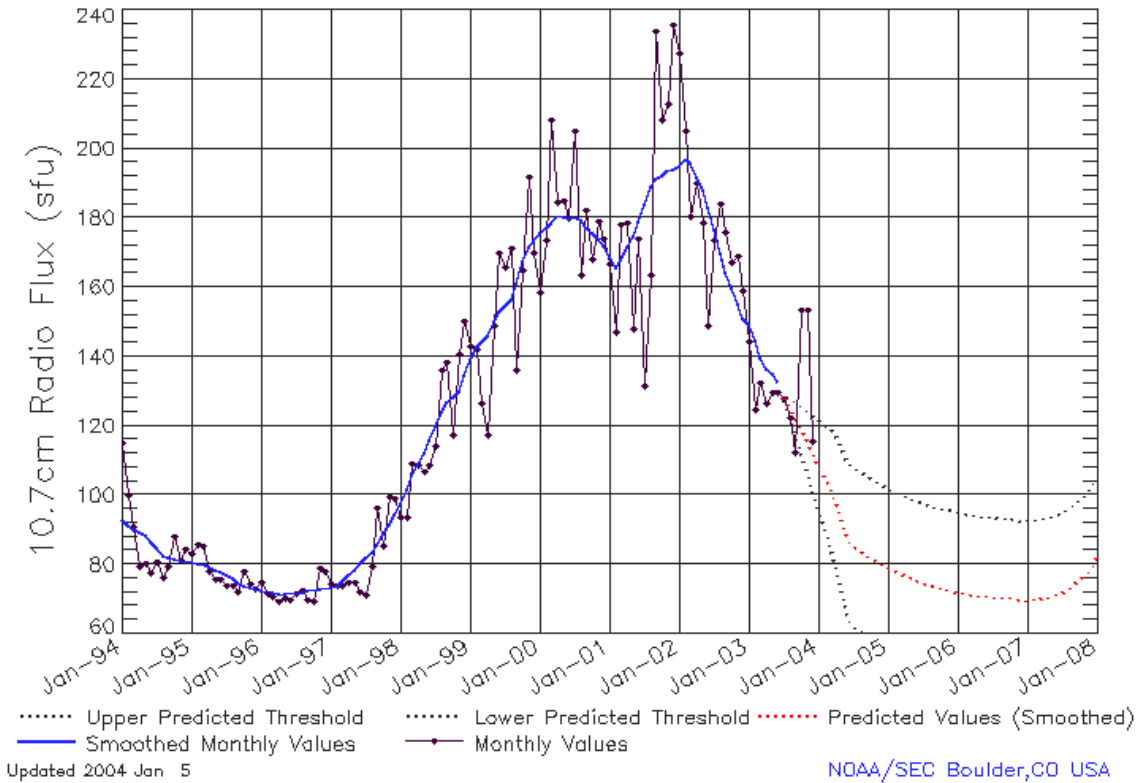
SEC Prediction of Smoothed Sunspot Number

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	44 (***)	49 (***)	53 (***)	57 (***)	59 (***)	63 (***)	66 (***)	68 (***)	70 (***)	71 (***)	73 (***)	78 (***)
1999	83 (***)	85 (***)	84 (***)	86 (***)	91 (***)	93 (***)	94 (***)	97 (***)	102 (***)	108 (***)	111 (***)	111 (***)
2000	113 (***)	117 (***)	120 (***)	121 (***)	119 (***)	119 (***)	120 (***)	119 (***)	116 (***)	114 (***)	113 (***)	112 (***)
2001	109 (***)	104 (***)	105 (***)	108 (***)	109 (***)	110 (***)	112 (***)	114 (***)	114 (***)	114 (***)	116 (***)	115 (***)
2002	114 (***)	115 (***)	113 (***)	110 (***)	109 (***)	106 (***)	103 (***)	99 (***)	95 (***)	91 (***)	85 (***)	82 (***)
2003	81 (***)	79 (***)	74 (***)	70 (***)	68 (***)	65 (***)	62 (1)	60 (3)	59 (5)	57 (7)	55 (8)	52 (9)
2004	48 (10)	44 (11)	41 (12)	38 (13)	35 (14)	32 (15)	30 (15)	28 (15)	27 (15)	25 (15)	24 (15)	22 (15)
2005	21 (15)	20 (15)	18 (15)	17 (15)	16 (15)	15 (15)	14 (15)	13 (15)	12 (15)	12 (15)	11 (15)	10 (15)
2006	10 (15)	9 (15)	8 (15)	8 (15)	8 (15)	7 (15)	7 (15)	7 (15)	7 (15)	6 (15)	6 (15)	5 (15)
2007	5 (15)	6 (15)	6 (15)	6 (15)	7 (15)	8 (15)	10 (15)	11 (15)	13 (15)	16 (15)	18 (15)	21 (15)



ISES Solar Cycle F10.7cm Radio Flux Progression

Data Through 31 Dec 03



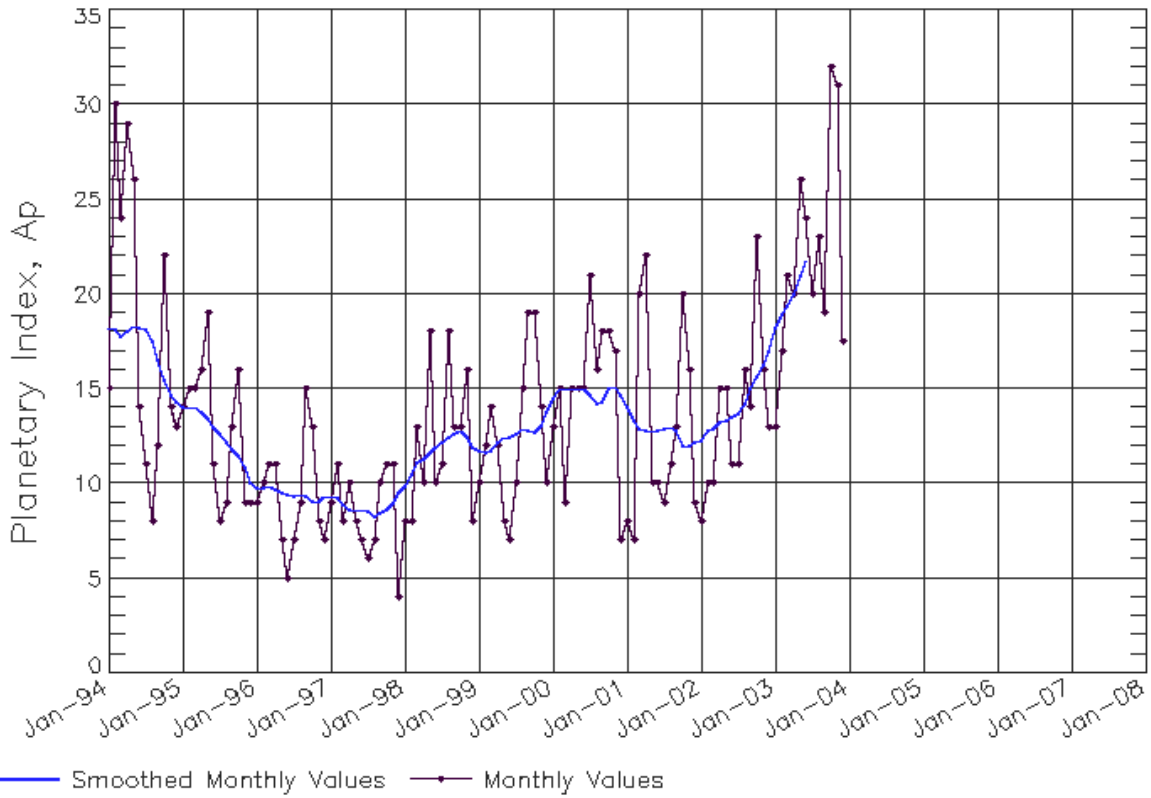
SEC Prediction of Smoothed F10.7cm Radio Flux

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	98 (***)	102 (***)	106 (***)	109 (***)	112 (***)	116 (***)	120 (***)	124 (***)	127 (***)	128 (***)	130 (***)	134 (***)
1999	139 (***)	143 (***)	144 (***)	146 (***)	150 (***)	153 (***)	154 (***)	156 (***)	161 (***)	167 (***)	172 (***)	173 (***)
2000	175 (***)	176 (***)	178 (***)	181 (***)	180 (***)	180 (***)	180 (***)	180 (***)	177 (***)	176 (***)	174 (***)	172 (***)
2001	169 (***)	166 (***)	168 (***)	172 (***)	175 (***)	179 (***)	184 (***)	189 (***)	191 (***)	192 (***)	194 (***)	194 (***)
2002	195 (***)	197 (***)	196 (***)	192 (***)	188 (***)	183 (***)	176 (***)	170 (***)	164 (***)	159 (***)	155 (***)	151 (***)
2003	149 (***)	145 (***)	140 (***)	136 (***)	135 (***)	133 (***)	129 (1)	125 (3)	122 (5)	119 (7)	116 (9)	112 (11)
2004	109 (13)	105 (15)	102 (17)	98 (19)	92 (21)	88 (22)	85 (23)	84 (23)	83 (23)	82 (23)	81 (23)	80 (23)
2005	79 (23)	78 (23)	78 (23)	77 (23)	76 (23)	75 (23)	75 (23)	74 (23)	74 (23)	73 (23)	73 (23)	73 (23)
2006	72 (23)	72 (23)	71 (23)	71 (23)	71 (23)	71 (23)	71 (23)	71 (23)	70 (23)	70 (23)	70 (23)	70 (23)
2007	70 (23)	70 (23)	70 (23)	70 (23)	71 (23)	71 (23)	72 (23)	73 (23)	74 (23)	76 (23)	77 (23)	79 (23)



ISES Solar Cycle Ap Progression

Data Through 31 Dec 03



Updated 2004 Jan 5

NOAA/SEC Boulder, CO USA

