Space Weather Highlights **SWO PRF 1484**
02 - 08 February 2004 **10 February 2004**

Solar activity ranged from very low to moderate levels. The period began at low levels with occasional C-class flares from Region 547 (S09, L=116, class/area Dai/150 on 03 February) and Region 551 (S06, L=024, class/area Eko/370 on 08 February). Region 549 (N14, L=049, class/area Eai/240 on 02 February) produced a C9/1f flare on 04 February with an associated 350 sfu Tenflare. A small CME was observed with this event, but it did not appear to be Earth directed. Low C-class activity continued through 05 February from Regions 547 and 549. Activity levels dropped to very low on 06 February. Low C-class activity from the SE limb on 07 February indicated that a new active region was rotating onto the visible disk. The new region was numbered 554 (S08, L=308, class/area Dkc/170 on 08 February) and was responsible for elevating activity levels to moderate on 08 February. This region was responsible for several C-class flares on the 8th, and produced an M1/Sf flare at 08/2051UTC.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. The period began quietly with solar wind speed at around 500 km/s, but quickly began an upward trend as a coronal hole rotated into a geoeffective position. Solar wind speed increased to over 650 km/s on 03 February and IMF Bz experienced occasional sustained southward periods. Solar wind speed was in gradual decline through 05 February before the onset of another high speed coronal hole stream. Solar wind speed increased to just over 600 km/s on 06 February, but began a slow decline late on the 6th to under 400 km/s by 08 February. The IMF Bz was mostly southward during this high speed stream.

There were no greater than 10 MeV proton events at geosynchronous orbit during the summary period. There was a slight enhancement in the greater than 10 MeV protons following the C9 flare on 04 February.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels every day this period.

The geomagnetic field ranged from quiet to major storm levels. Quiet to unsettled conditions early on 02 February quickly gave way to active to major storm periods following the onset of a high speed coronal hole stream. The storming was short-lived and quiet to unsettled levels with isolated active periods persisted from 03 February through 06 February. The disturbed periods were in response to moderately high speed solar wind and periods of sustained southward Bz. The geomagnetic field was predominantly quiet to unsettled on the 7th and 8th, as the high speed solar wind subsided.

Space Weather Outlook
11 February - 08 March 2004

Solar activity is expected to range from very low to moderate levels. Regions 551 and 554 contain moderate complexity and size and have potential for low M-class activity during the first week of the period. Predominantly very low to low activity levels are expected from late February through early March as the active longitudes rotate out of view.

No greater than 10 MeV proton event are expected during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 14 - 17 February, and again on 24 February - 05 March, due to recurrent coronal holes.

Geomagnetic activity is expected to range from quiet to minor storm levels with a chance of isolated major storm levels. A coronal hole high speed stream will become geoeffective on 13 - 16 February and produce occasional active to minor storm conditions. Recurrent coronal hole high speed streams are expected by late February through early March and will likely produce occasional active to minor storm periods with isolated major storm periods possible.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
02 February	102	106	440	B1.6	2	0	0	0	0	0	0	0
03 February	99	103	520	B1.5	5	0	0	0	0	0	0	0
04 February	101	85	440	B2.3	1	0	0	0	1	0	0	0
05 February	106	109	440	B1.6	2	0	0	3	0	0	0	0
06 February	107	98	380	B1.5	0	0	0	0	0	0	0	0
07 February	111	92	400	B2.1	1	0	0	0	0	0	0	0
08 February	116	74	620	B3.0	7	1	0	3	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2}-day-sr) >1MeV	>10MeV	>100MeV	Electron Fluence (electrons/cm^2-day-sr) >.6MeV	>2MeV	>4MeV
02 February	1.0E+6	1.2E+4	2.7E+3		5.5E+7	
03 February	1.0E+6	1.2E+4	2.6E+3		7.1E+7	
04 February	1.6E+6	1.2E+4	2.7E+3		1.6E+8	
05 February	1.3E+6	1.4E+4	2.8E+3		2.4E+8	
06 February	1.4E+6	1.3E+4	2.7E+3		2.0E+8	
07 February	1.0E+6	1.2E+4	3.2E+3		2.0E+8	
08 February	9.2E+5	1.2E+4	3.1E+3		2.5E+8	

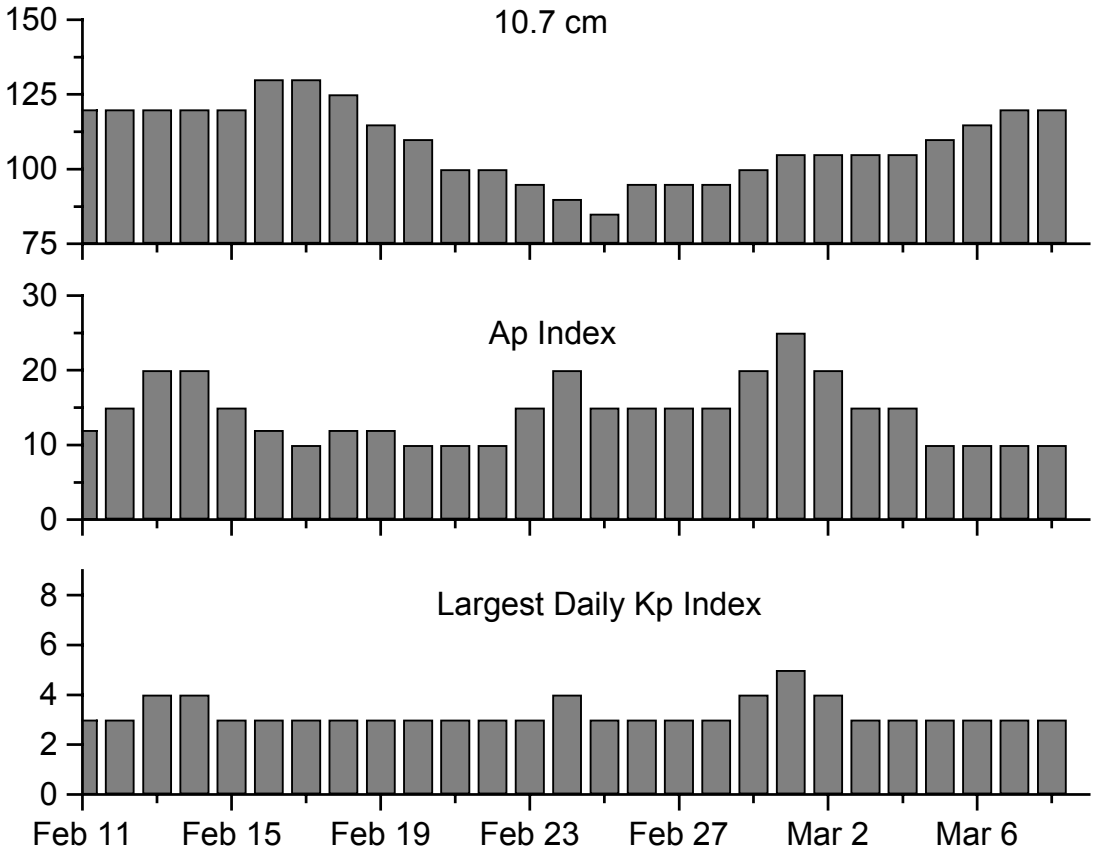
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
02 February	28	2-2-6-5-4-4-3-3	34	1-1-4-6-6-5-3-3	21	2-1-5-4-4-4-3-3
03 February	16	3-3-4-3-3-3-3-2	31	3-3-5-5-5-5-3-2	17	4-3-4-3-3-3-3-2
04 February	12	4-1-3-3-3-2-2-2	25	3-2-4-5-6-3-2-1	15	3-2-3-3-4-3-3-3
05 February	8	3-2-3-2-1-1-2-1	18	4-2-4-5-3-2-2-1	14	3-3-3-4-3-3-3-2
06 February	13	1-3-3-4-2-3-3-1	30	3-3-5-6-4-4-4-1	21	2-5-4-4-3-4-4-2
07 February	5	1-2-3-2-1-0-1-0	23	2-2-4-5-5-4-1-3	11	2-2-3-3-3-3-2-0
08 February	2	0-0-0-0-1-1-1-2	1	0-0-0-0-0-0-1-1	8	1-1-1-2-3-3-2-3

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
02 Feb 0010	2 - 245 MHz Bursts	01 Feb
02 Feb 0704	WARNING: Geomagnetic K= 4	02 Feb 0705 - 1500
02 Feb 0714	ALERT: Geomagnetic K= 4	02 Feb 0707
02 Feb 0733	WARNING: Geomagnetic K= 5	02 Feb 0734 - 1000
02 Feb 0738	ALERT: Geomagnetic K= 5	02 Feb 0736
02 Feb 0743	WARNING: Geomagnetic K= 6	02 Feb 0743 - 1100
02 Feb 0746	ALERT: Geomagnetic K= 6	02 Feb 0746
02 Feb 1452	EXTENDED WARNING: Geomagnetic K= 4	02 Feb 0705 - 2359
02 Feb 1608	ALERT: Electron 2MeV Integral Flux > 1000pfu	02 Feb 1550
03 Feb 0012	2 - 245 MHz Bursts	02 Feb
03 Feb 0327	WARNING: Geomagnetic K= 4	03 Feb 0330 - 1500
03 Feb 0647	ALERT: Geomagnetic K= 4	03 Feb 0643
03 Feb 1441	ALERT: Electron 2MeV Integral Flux > 1000pfu	03 Feb 1415
04 Feb 0005	1 - 245 MHz Burst	03 Feb
04 Feb 0146	WARNING: Geomagnetic K= 4	04 Feb 0147 - 1500
04 Feb 0155	ALERT: Geomagnetic K= 4	04 Feb 0152
04 Feb 1122	SUMMARY: 10cm Radio Burst	04 Feb 1114
04 Feb 1217	ALERT: Electron 2MeV Integral Flux > 1000pfu	04 Feb 1145
05 Feb 0236	ALERT: Geomagnetic K= 4	05 Feb 0235
05 Feb 0514	ALERT: Electron 2MeV Integral Flux > 1000pfu	05 Feb 0500
05 Feb 0846	WARNING: Geomagnetic K= 4	05 Feb 0845 - 1500
05 Feb 0857	ALERT: Geomagnetic K= 4	05 Feb 0856
06 Feb 0546	WARNING: Geomagnetic K= 4	06 Feb 0546 - 1500
06 Feb 0553	ALERT: Geomagnetic K= 4	06 Feb 0552
06 Feb 0612	ALERT: Electron 2MeV Integral Flux > 1000pfu	06 Feb 0550
06 Feb 0644	WARNING: Geomagnetic K= 5	06 Feb 0644 - 1500
06 Feb 1455	EXTENDED WARNING: Geomagnetic K= 4	06 Feb 0546 - 2359
06 Feb 2355	EXTENDED WARNING: Geomagnetic K= 4 expected	06 Feb 0546 - 07 Feb 1600
07 Feb 0856	ALERT: Electron 2MeV Integral Flux > 1000pfu	07 Feb 0835
08 Feb 0625	ALERT: Electron 2MeV Integral Flux > 1000pfu	08 Feb 0550

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
11 Feb	120	12	3	25 Feb	85	15	3
12	120	15	3	26	95	15	3
13	120	20	4	27	95	15	3
14	120	20	4	28	95	15	3
15	120	15	3	29	100	20	4
16	130	12	3	01 Mar	105	25	5
17	130	10	3	02	105	20	4
18	125	12	3	03	105	15	3
19	115	12	3	04	105	15	3
20	110	10	3	05	110	10	3
21	100	10	3	06	115	10	3
22	100	10	3	07	120	10	3
23	95	15	3	08	120	10	3
24	90	20	4				

Energetic Events

Date	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	245	2695	II	IV
04 Feb	1112	1118	1122	C9.9	.003	1f	S05W48	547	2700	350		
08 Feb	2024	2051	2102	M1.2	.013	Sf	S08E68	554				

Flare List

Date	Time			X-ray	Optical		Rgn
	Begin	Max	End	Class.	Imp / Brtns	Location Lat CMD	
02 February	0051	0054	0059	B2.0			549
	0144	0153	0157	B3.6			549
	0751	0759	0804	C2.5			547
	1118	1124	1129	C1.3			
	1201	1206	1211	B4.2			549
	1309	1314	1318	B3.8			547
	2151	2155	2159	B5.4			549
	2205	2209	2212	B8.6			549
03 February	0009	0013	0018	B3.4			
	0047	0055	0103	B2.8			549
	0439	0443	0453	B2.6			551
	0624	0629	0634	B3.6			551
	0701	0706	0711	B3.9			549
	0838	0852	0902	C1.1			551
	1009	1014	1019	B7.3			549
	1144	1150	1157	B4.5			551
	1255	1259	1305	B5.7			551
	1336	1340	1345	C3.2			551
	1434	1439	1457	B5.0			551
	1531	1534	1538	B2.4			551
	1630	1635	1651	B3.5			
	1818	1825	1833	C1.2			551
	2125	2145	2210	C1.1			549
	2241	2246	2256	C1.4			551
04 February	1115	U1119	A1138	C9.9	1f	S05W48	547
	1211	1216	1223	B4.8			551
	1336	1341	1345	B6.4			551
	1424	1430	1441	B3.7			551
	1508	1514	1521	B7.6			551
	1528	1536	1540	B5.7			551
	1656	1700	1704	B3.7			551
	1859	1903	1905	B2.3			551
	2225	2231	2236	B3.8			549
05 February	0031	0032	0050	B8.3	Sf	S07W55	547
	0158	0204	0208	B2.6			552
	0631	0633	0646	C1.3	Sf	N11E14	549

Flare List - continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
05 February	0702	0706	0712	B8.2			549
	0753	0757	0804	C1.5	Sf	S06W60	547
	1146	1206	1227	B6.5			
	1909	1922	1925	B3.3			547
	2114	2117	2119	B3.7			551
06 February	0327	0345	0355	B3.6			549
	0832	0835	0838	B2.3			551
	1233	1237	1243	B3.6			549
	2041	2048	2058	B4.4			549
	2243	2258	2315	B4.0			551
07 February	0803	0831	0838	B5.7			554
	1046	1052	1055	B4.8			554
	1321	1326	1328	C2.5			554
	1854	1858	1910	B6.6			554
08 February	0220	0224	0226	B4.8			551
	0340	0345	0355	C1.0			554
	0359	0403	0409	C1.0			554
	0411	0420	0430	C1.4			554
	0447	0452	0500	C1.3			553
	0828	0918	0949	C1.3			554
	1251	1256	1303	B8.6			554
	1552	1601	1617	C2.0			554
	2028	2053	2059	M1.2	Sf	S08E68	554
	2143	2143	2147	C1.6	Sf	S07E67	554
	2347	2348	2356	B6.0	Sf	S07E65	554

Region Summary

Date	Location (° Lat ° CMD)	Location Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
		Region 545													
29 Jan	S20W19	161	0020	05	Dso	004	B								
30 Jan	S20W32	161	0040	05	Dso	005	B								
31 Jan	S20W45	161													
01 Feb	S20W58	161													
02 Feb	S20W71	161													
03 Feb	S20W84	161													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 161

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 546												
29 Jan	S12E68	074	0050	02	Hsx	001	A								
30 Jan	S11E55	074	0050	04	Cso	003	B								
31 Jan	S12E41	075	0040	01	Hsx	001	A								
01 Feb	S12E27	076	0030	04	Cso	003	B								
02 Feb	S12E15	075	0020	01	Hsx	002	A								
03 Feb	S12E02	074	0020	07	Hsx	001	A								
04 Feb	S12W11	074													
05 Feb	S12W24	074													
06 Feb	S12W37	074													
07 Feb	S12W50	074													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 074

			Region 547												
30 Jan	S09E14	115	0030	05	Cso	004	B								
31 Jan	S10E01	115	0020	04	Dso	004	B								
01 Feb	S10W12	115	0060	04	Dso	006	B								
02 Feb	S09W27	117	0080	08	Dai	012	Bg	1							
03 Feb	S09W40	116	0150	08	Dai	012	Bg								
04 Feb	S08W55	118	0060	03	Dao	006	B	1				1			
05 Feb	S08W70	120	0040	01	Hsx	002	A	1			2				
06 Feb	S08W83	120	0030	01	Hsx	001	A								
								3	0	0	2	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 115

			Region 548												
31 Jan	N06E30	086	0010	01	Hsx	001	A								
01 Feb	N06E17	086	0010	03	Bxo	003	B								
02 Feb	N06E04	086													
03 Feb	N06W09	086													
04 Feb	N06W22	086													
05 Feb	N06W35	086													
06 Feb	N06W48	086													
07 Feb	N06W61	086													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 086

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	M	X	Optical S	1	2	3	4
			Region 549												
31 Jan	N13E70	046	0090	08	Dso	003	B	1							
01 Feb	N14E57	046	0180	11	Eao	005	B	2			2				
02 Feb	N14E41	049	0240	11	Eai	020	B								
03 Feb	N14E30	046	0220	11	Eai	018	B	1							
04 Feb	N14E17	046	0200	12	Eao	014	B								
05 Feb	N14E04	046	0120	12	Eao	026	B	1			1				
06 Feb	N14W09	046	0070	12	Eao	020	B								
07 Feb	N14W22	046	0090	12	Eac	022	B								
08 Feb	N13W36	046	0080	12	Esc	015	B								
								5	0	0	3	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 046

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	M	X	Optical S	1	2	3	4
			Region 550												
02 Feb	S08W14	104	0030	04	Dso	004	B								
03 Feb	S09W26	102	0030	04	Dso	002	B								
04 Feb	S09W39	102	0020	02	Cao	002	B								
05 Feb	S09W52	102													
06 Feb	S09W65	102													
07 Feb	S09W78	102													
08 Feb	S09W91	102													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 104

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	M	X	Optical S	1	2	3	4
			Region 551												
02 Feb	S06E64	026	0040	02	Hax	001	A								
03 Feb	S05E51	025	0050	06	Cao	003	B	4							
04 Feb	S06E39	024	0110	09	Dao	008	B								
05 Feb	S06E26	024	0220	08	Dko	021	B								
06 Feb	S06E13	024	0260	10	Dao	021	Bg								
07 Feb	S06W00	024	0300	09	Dao	026	Bg								
08 Feb	S06W14	024	0370	12	Eko	023	Bg								
								4	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 024

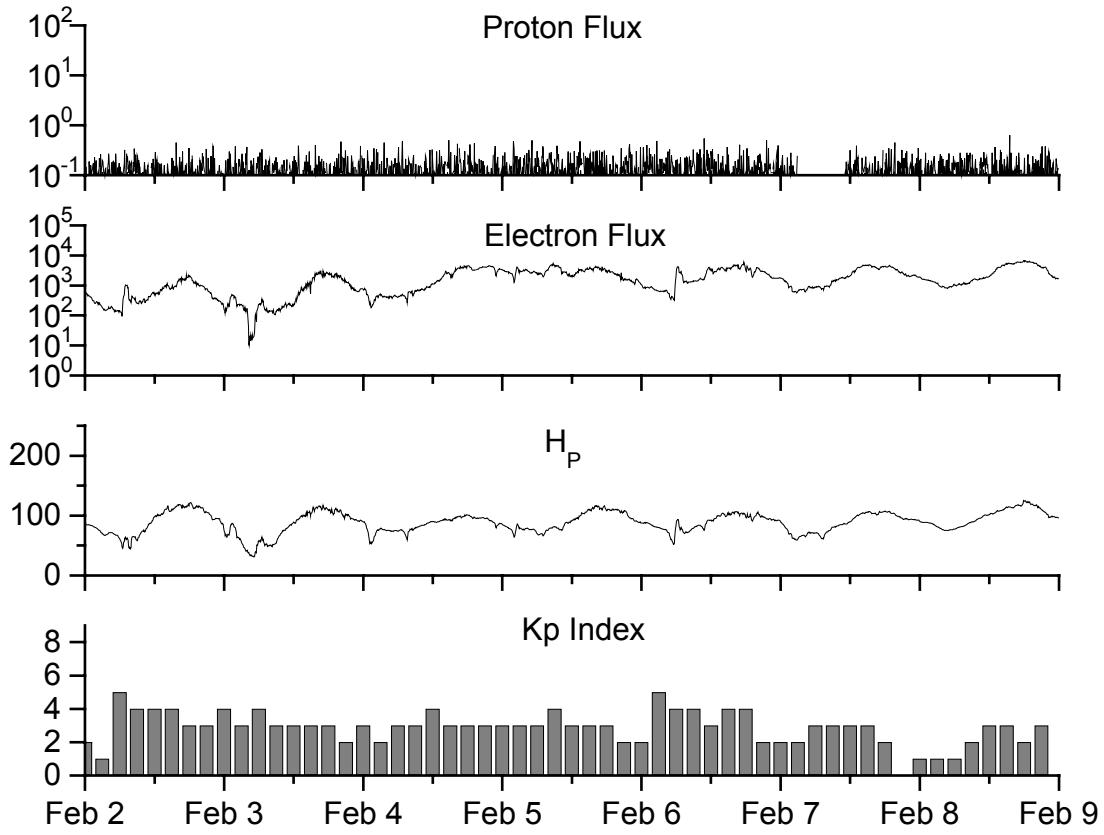
Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
					Region 552										
02 Feb	S08E18	072	0030	05	Cso	007	B								
03 Feb	S07E06	070	0050	04	Cso	007	B								
04 Feb	S08W06	069	0050	04	Cso	005	B								
05 Feb	S08W20	070	0030	04	Dao	006	B								
06 Feb	S08W33	070	0010	01	Axx	001	A								
07 Feb	S08W46	070													
08 Feb	S08W59	070													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		070													
					Region 553										
05 Feb	S05E01	049	0030	04	Dso	004	B								
06 Feb	S05W12	049	0010	03	Bxo	005	B								
07 Feb	S04W25	049	0010	01	Axx	003	A								
08 Feb	S04W38	049						1							
								1	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		049													
					Region 554										
07 Feb	S08E76	308	0000	01	Axx	001	A	1							
08 Feb	S08E62	308	0170	06	Dkc	006	B	6	1		3				
								7	1	0	3	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		308													

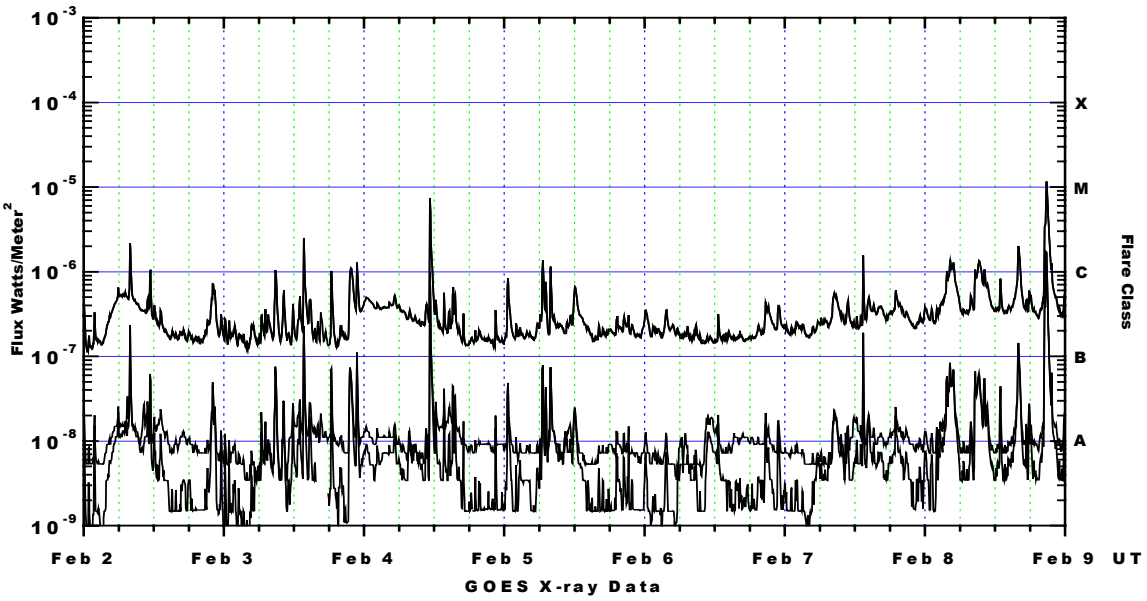
Recent Solar Indices (preliminary)
of the observed monthly mean values

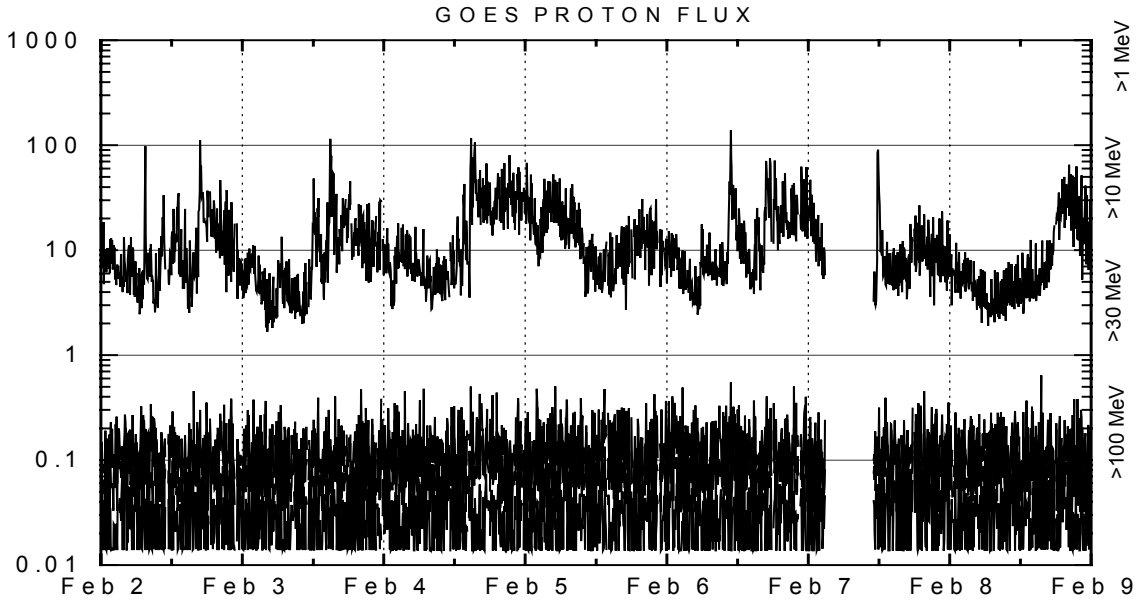
	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
					2002				
February	194.5	107.4	0.55	188.6	114.7	205.0	197.2	10	12.8
March	153.1	98.4	0.64	188.9	113.3	180.3	195.7	10	12.9
April	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	106.9	62.0	127.8	129.5	20	22.3
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		18	
					2004				
January	62.3	37.2	0.60			114.1		20	

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 02 February 2004
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2 –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/cm^2 –sec –sr) with energies greater than 2 MeV at GOES-12.
Hp 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.
Kp 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 Kp 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 Kp are " global " parameters that are applicable to a first order approximation over large areas. Hparallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.

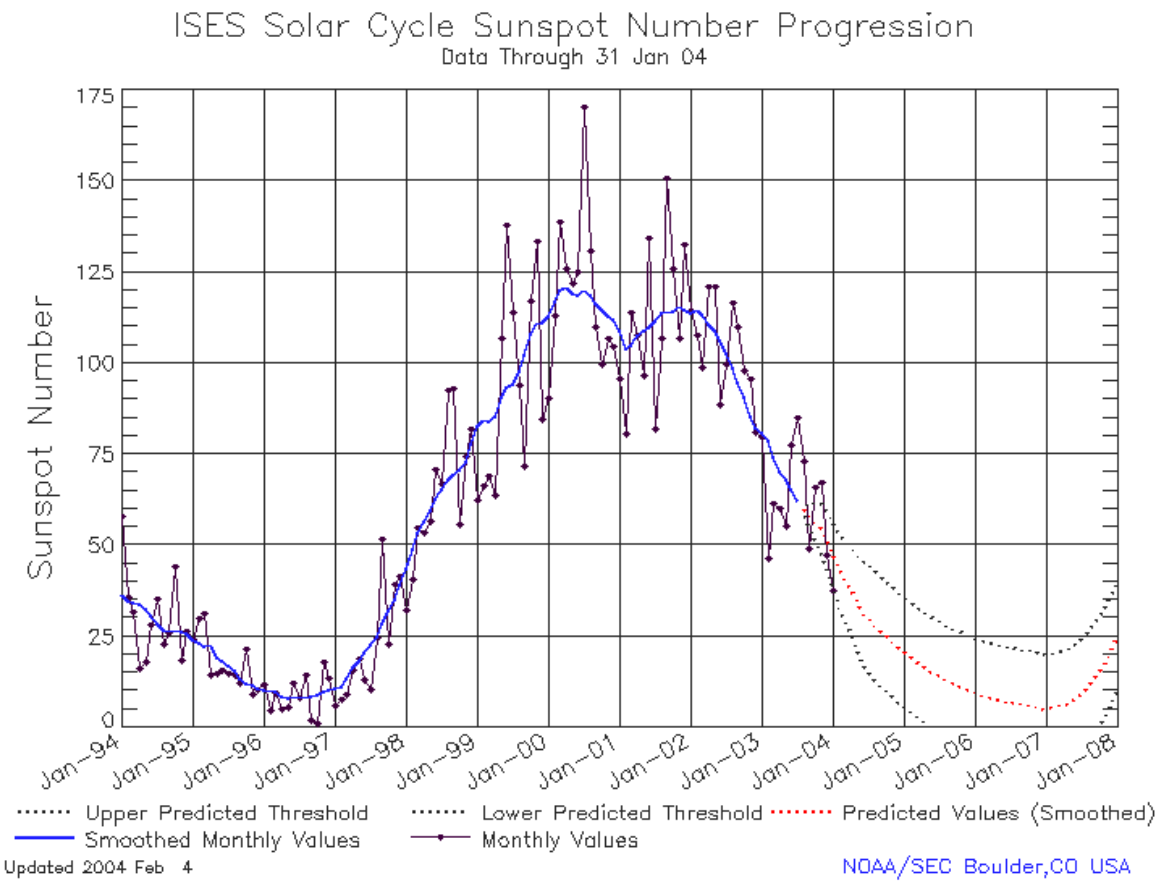




Weekly GOES Satellite X-ray and Proton Plots

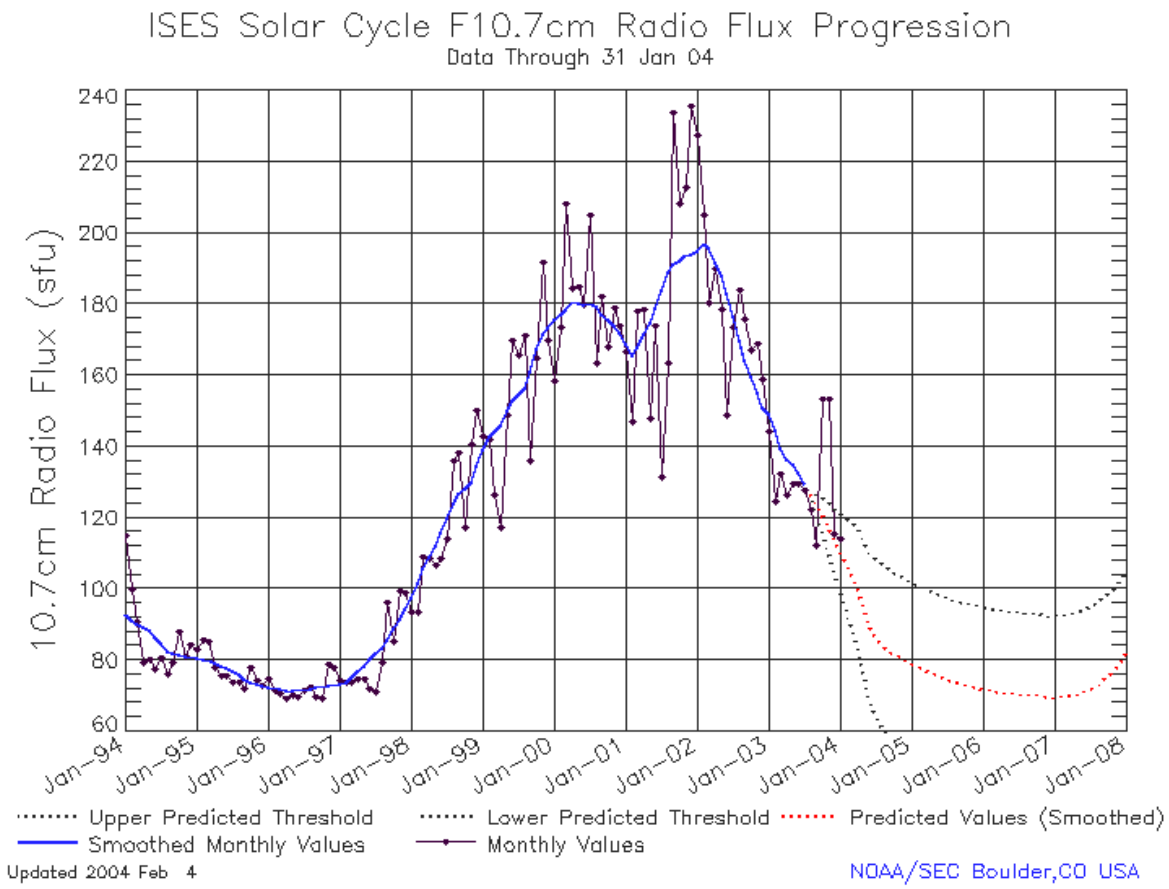
X-ray plot contains five-minute averaged x-ray flux (watts/m$^{2)}$ as measured by GOES 12 and 10 in two wavelength bands, .05 -. 4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm^2 –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/cm^2-sec-sr) at greater than 10 MeV.



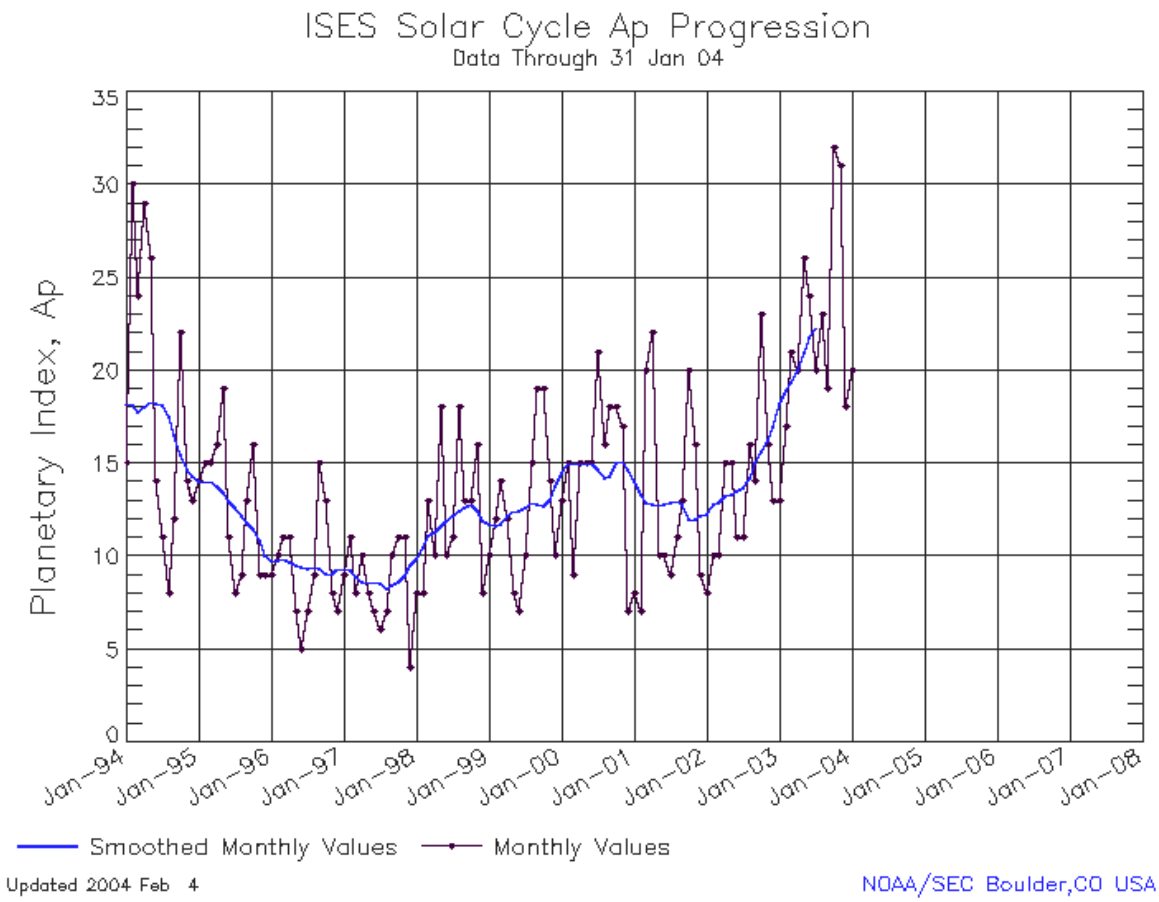
SEC Prediction of Smoothed Sunspot Number

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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	**60**	**59**	**57**	**55**	**52**
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(3)	(5)	(7)	(8)
2004	**48**	**43**	**41**	**38**	**35**	**32**	**30**	**28**	**27**	**25**	**24**	**22**
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(15)	(15)	(15)	(15)	(15)
2005	**21**	**20**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**12**	**11**	**10**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2006	**10**	**9**	**8**	**8**	**8**	**7**	**7**	**7**	**7**	**6**	**6**	**5**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2007	**5**	**6**	**6**	**6**	**7**	**8**	**10**	**11**	**13**	**16**	**18**	**21**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)



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	130	**127**	**124**	**121**	**117**	**114**
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(3)	(5)	(7)	(9)
2004	**110**	**107**	**104**	**100**	**94**	**89**	**87**	**84**	**83**	**82**	**81**	**80**
	(11)	(12)	(13)	(15)	(17)	(19)	(21)	(22)	(23)	(23)	(23)	(23)
2005	**79**	**78**	**78**	**77**	**76**	**75**	**75**	**74**	**74**	**73**	**73**	**73**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2006	**72**	**72**	**71**	**71**	**71**	**71**	**71**	**71**	**70**	**70**	**70**	**70**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2007	**70**	**70**	**70**	**70**	**71**	**71**	**72**	**73**	**74**	**76**	**77**	**79**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)


ISES Solar Cycle Ap Progression
Data Through 31 Jan 04
Planetary Index, Ap
35
30
25
20
15
10
5
0
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Smoothed Monthly Values
Monthly Values
Updated 2004 Feb 4
NOAA/SEC Boulder,CO USA

Sudden Storm Commencements and Impulses

Space Environment Center

January 2004
(Month 88)

Preliminary data