

## **Space Weather Highlights 20 - 26 January 2003**

**SWO PRF 1430  
28 January 2003**

Solar activity was at low to moderate levels. The period began at low levels, highlighted by several minor C-class flares from Region 260 (N14, L=025, class/area Dao/70 on 21 January). Moderate activity was observed on 21 – 24 January with three low M-class flares observed in Region 266 (S22, L=345, class/area Fai/170 on 26 January), the largest being an M2.5/1n on 23 January. This region also produced an M1/1n flare on 24/0327Z with strong radio bursts including a 12,000 sfu burst on 410 Mhz. Region 266 grew steadily in size and complexity early in the period. On 23 January, it developed a beta-gamma magnetic configuration and maintained this moderate complexity through the remainder of the period. Regions 269 (S07, L=307, class/area Dso/130 on 25 January) and 260 contributed to the moderate solar activity levels with single minor M-class flares on 21 and 22 January respectively. For flare times and magnitudes please refer to the Energetic Event and Flare List. The period ended with low solar activity, highlighted by a C4 flare with moderate centimetric bursts from Region 268 (N14, L=001, class/area Dao/130 on 26 January).

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. On 20 January, solar wind velocity increased to near 780 km/s due to a northern extension of a southern coronal hole rotating into a geo-effective position. By 22 January, speed decreased, but remained elevated at over 500 km/s. The speed began to increase again late on the 22nd due to the onset of another high-speed coronal hole stream and peaked at near 800 km/s on 24 January. We observed a gradual decrease since, to just over 500 km/s by the end of the period. The Bz component of the interplanetary magnetic field ranged from +5 to –8 nT. There were occasional, mostly short-lived periods of sustained southward Bz.

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

The greater than 2 MeV electron flux at geo-synchronous orbit were at moderate levels on 20 January, but exceeded high levels each day for the remainder of the period.

The geomagnetic field was at quiet to minor storm levels. Minor storm conditions were observed on 20, 22-23, and 25 January due to high-speed coronal hole flow. The most active periods occurred on 25 January when the solar wind speed increased to near 800 km/s and Bz was sustained southward for almost seven hours. Major storm levels were observed at higher latitudes during this period.

## **Space Weather Outlook 29 January - 24 February 2003**

Solar activity is expected to be mostly low with occasional moderate levels during the period. The active regions that produced the M-class flares during this past week are all in decay. Further M-class activity from these regions is unlikely.

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

The greater than 2 MeV electron flux is expected to reach high levels on 01 – 02 February and again on 16 – 22 February due to recurring coronal holes.

The geomagnetic field is expected to be at quiet to isolated major storm levels during the period. Isolated active conditions are possible on 30 – 31 January due to a small recurring coronal hole. Minor storming with isolated major storm conditions are possible on 15 - 22 February due to a returning equatorial coronal hole.



### *Daily Solar Data*

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
20 January	138	184	690	B4.2	5	0	0	5	0	0	0	0
21 January	134	167	770	B5.4	7	1	0	5	0	0	0	0
22 January	130	152	600	B3.4	2	1	0	3	1	0	0	0
23 January	136	123	650	B4.2	2	2	0	9	2	0	0	0
24 January	130	129	770	B4.4	3	1	0	3	2	0	0	0
25 January	129	103	470	B3.2	4	0	0	1	0	0	0	0
26 January	125	133	510	B2.6	1	0	0	1	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
	20 January	2.0E+5	1.3E+4	2.6E+3		4.7E+6
21 January	1.5E+6	1.4E+4	2.4E+3		9.1E+7	
22 January	5.0E+5	1.3E+4	2.5E+3		7.6E+7	
23 January	1.6E+6	1.2E+4	2.5E+3		2.9E+7	
24 January	1.3E+6	1.2E+4	2.2E+3		2.2E+7	
25 January	4.0E+6	1.1E+4	2.4E+3		6.5E+7	
26 January	1.5E+6	1.1E+4	2.4E+3		1.5E+8	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	20 January	12	4-4-2-2-2-2-2-2	32	5-6-2-5-4-4-3-2	17
21 January	9	3-3-2-2-2-2-2-2	31	3-3-5-6-5-4-2-2	17	3-3-3-4-3-3-3-3
22 January	14	3-3-2-2-2-2-2-5	24	3-4-3-5-4-4-3-3	17	3-3-3-3-3-3-3-5
23 January	16	5-4-1-2-3-3-2-2	28	4-3-1-4-6-4-4-3	19	5-4-1-3-3-3-3-3
24 January	13	4-1-2-2-3-3-3-3	35	3-2-3-5-5-6-5-3	15	4-2-2-3-3-4-3-3
25 January	19	4-4-5-3-3-2-1-2	83	3-5-8-7-7-5-3-3	28	4-4-5-5-4-3-2-2
26 January	12	4-3-3-2-2-1-1-3	39	3-2-6-6-6-4-2-3	17	4-3-4-4-4-3-3-2

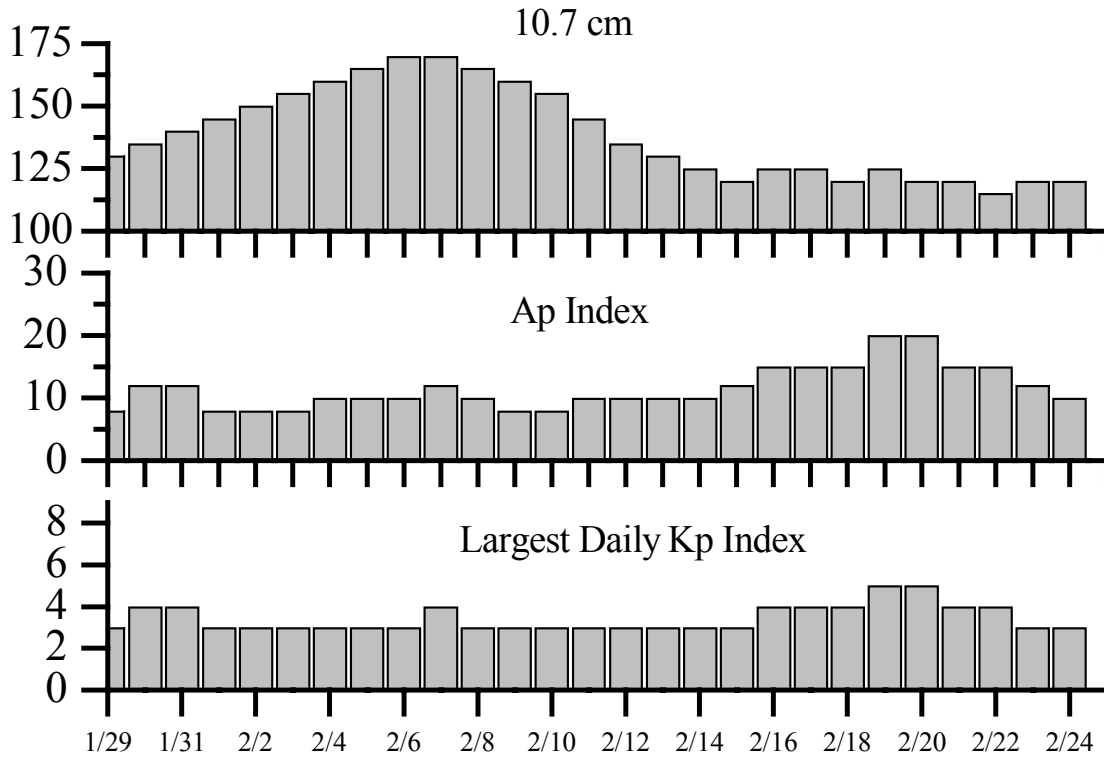


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
20 Jan 0019	1 - 245 MHz Radio Burst	19 Jan
20 Jan 0216	ALERT: Geomagnetic K= 4	20 Jan 0215
20 Jan 0220	WARNING: Geomagnetic K= 4 expected	20 Jan 0220 - 1500
20 Jan 1332	ALERT: STRATWARM	20 Jan
20 Jan 2231	WATCH: Geomagnetic A $\geq$ 20	23 Jan
21 Jan 0010	1 - 245 MHz Radio Burst	20 Jan
21 Jan 0240	ALERT: Type II Radio Emission	21 Jan 0227
21 Jan 0612	ALERT: Type II Radio Emission	21 Jan 0558
21 Jan 0616	SUMMARY: 10cm Radio Burst	21 Jan 0552
21 Jan 0853	WARNING: Geomagnetic K= 4	21 Jan 0855 - Jan 21 1500
21 Jan 0857	ALERT: Geomagnetic K= 4	21 Jan 0856
21 Jan 1227	ALERT: STRATWARM	21 Jan
21 Jan 1250	ALERT: Electron 2MeV Integral Flux > 1000pfu	21 Jan 1230
21 Jan 1455	EXTENDED WARNING: Geomagnetic K= 4	21 Jan 0855 - 2359
21 Jan 1553	SUMMARY: 10cm Radio Burst	21 Jan 1505
21 Jan 2106	WATCH: Geomagnetic A $\geq$ 20	24 Jan
21 Jan 2333	EXTENDED WARNING: Geomagnetic K = 4	21 Jan 0855 - 22 Jan 1500
22 Jan 0016	4 - 245 MHz Radio Bursts	21 Jan
22 Jan 1238	ALERT: STRATWARM	22 Jan
22 Jan 1321	ALERT: Electron 2MeV Integral Flux > 1000pfu	22 Jan 1255
22 Jan 1742	ALERT: Geomagnetic K = 4	22 Jan 1740
22 Jan 2332	ALERT: Geomagnetic K = 4	22 Jan 2330
22 Jan 2342	ALERT: Geomagnetic K = 5	22 Jan 2341
22 Jan 2353	WARNING: Geomagnetic K = 5	22 Jan 2355 - 23 Jan 1500
23 Jan 0021	1 - 245 MHz Radio Burst	22 Jan
23 Jan 0508	ALERT: Type II Radio Emission	23 Jan 0432
23 Jan 1245	ALERT: STRATWARM	23 Jan
23 Jan 1321	ALERT: Type II Radio Emission	23 Jan 1239
23 Jan 1504	WARNING: Geomagnetic K = 4	23 Jan 1505 - 1600
23 Jan 1555	EXTENDED WARNING: Geomagnetic K = 4	23 Jan 1505 -24 Jan 1600
23 Jan 1606	ALERT: Electron 2MeV Integral Flux > 1000pfu	23 Jan 1455
24 Jan 0130	5 - 245 MHz Radio Bursts	23 Jan
24 Jan 0134	ALERT: Geomagnetic K= 4	24 Jan 0130
24 Jan 0354	ALERT: Type II Radio Emission	24 Jan 0319
24 Jan 1226	ALERT: STRATWARM	24 Jan
24 Jan 1422	ALERT: Type IV Radio Emission	24 Jan 0317
24 Jan 1556	EXTENDED WARNING: Geomagnetic K= 4	23 Jan 1505 - 24 Jan 2359
24 Jan 1654	ALERT: Electron 2MeV Integral Flux > 1000pfu	24 Jan 1625
24 Jan 2356	EXTENDED WARNING: Geomagnetic K = 4	23 Jan 1505 - 25 Jan 1500
25 Jan 0551	ALERT: Geomagnetic K = 5	25 Jan 0545
25 Jan 0842	WARNING: Geomagnetic K = 5	25 Jan 0842 - 1500
25 Jan 0847	ALERT: Geomagnetic K = 5	25 Jan 0845
25 Jan 1052	ALERT: Electron 2MeV Integral Flux > 1000pfu	25 Jan 1035
25 Jan 1337	ALERT: STRATWARM	25 Jan
25 Jan 1450	EXTENDED WARNING: Geomagnetic K= 4	23 Jan 1505
25 Jan 1922	SUMMARY: 10cm Radio Burst	25 Jan 1845
25 Jan 2113	WATCH: Geomagnetic A $\geq$ 20	26 Jan
26 Jan 523	ALERT: Geomagnetic K = 4	26 Jan 0520
26 Jan 827	WARNING: Geomagnetic K = 4	26 Jan 0827 - 1500
26 Jan 832	ALERT: Geomagnetic K = 4	26 Jan 0832
26 Jan 1222	ALERT: Electron 2MeV Integral Flux > 1000pfu	26 Jan 1200
26 Jan 1349	ALERT: STRATWARM	26 Jan
26 Jan 2138	CANCEL WARNING: Geomagnetic K = 4	26 Jan 0827



*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
29 Jan	130	8	3	12 Feb	135	10	3
30	135	12	4	13	130	10	3
31	140	12	4	14	125	10	3
01 Feb	145	8	3	15	120	12	3
02	150	8	3	16	125	15	4
03	155	8	3	17	125	15	4
04	160	10	3	18	120	15	4
05	165	10	3	19	125	20	5
06	170	10	3	20	120	20	5
07	170	12	4	21	120	15	3
08	165	10	3	22	115	15	3
09	160	8	3	23	120	12	3
10	155	8	3	24	120	10	3
11	145	10	3				



### *Energetic Events*

Date	Time			X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Class	Integ Flux	Imp/ Brtns	Location		Rgn #	Radio Flux		Intensity	
			Max				Lat	CMD		245	2695	II	IV
21 Jan 03	1459	1526	1552	M1.9	.040					380			
22 Jan 03	0435	0444	0450	M1.2	.006	1f	N15W05		260				
23 Jan 03	0442	0448	0456	M1.0	.007							3	
23 Jan 03	1228	1243	1249	M2.5	.014	1n	S22E17		266	3400	76	2	
24 Jan 03	0312	0327	0340	M1.9	.021	1n	S22E10		266	7200	97	3	3

### *Flare List*

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn
	Begin	Max	End				
20 January	0240	0252	0302	B7.1			
	0707	0709	0724	C4.3	Sf	N16E21	260
	1445	1445	1448	B6.3	Sf	S24E58	266
	1451	1452	1456	B7.6	Sf	S22E62	266
	1830	1921	1933	C1.7			
	2145	2146	2151	C1.5	Sf	S19E82	267
	2324	2325	A2330	C1.6	Sf	N16E10	260
21 January	2353	2358	0001	C1.5			
	0121	0134	0140	C2.0			
	0223	0228	0233	C8.1			
	0607	0607	A0610	C4.1	Sf	N14E08	260
	0757	0822	0843	C2.9			
	0920	0927	0933	C1.8			
	1254	1310	1328	C3.0	Sf	N15E05	260
	1305	1309	1317		Sf	S12W38	263
	1459	1526	1552	M1.9			
	1824	1825	A1901		Sf	S12W41	263
22 January	2137	2137	2155	C2.3	Sf	N15W01	260
	2302	2306	2310	B7.4			
	0247	0251	0253	B6.2			
	0439	0442	0509	M1.2	1f	N15W05	260
	B1220	U1220	1228	B4.2	Sf	S23E36	266
	B1225	U1225	1228		Sf	S11W50	263
	1258	1324	1348	C1.6			
23 January	1356	1358	1400	C1.3	Sf	S09W52	263
	0216	0218	0233	C4.5	Sf	S12W57	263
	0400	0447	0511	C6.0	1n	S22E21	266
	0442	0448	0456	M1.0			
	0612	0613	0619		Sf	S12W60	263
	0706	0715	0720		Sf	S21E19	266
	0723	0724	0726		Sf	S12W61	263
	0807	0814	0822		Sf	S21E17	266
	B1151	U1151	1234		Sf	S10W61	263
	1236	U1244	A1324	M2.5	1n	S22E17	266
B1442	U1442	1524		Sf	S10W64	263	



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
23 January	1449	1455	1541		Sf	S13W60	263
	1543	1543	1551		Sf	S12W64	263
	1804	1808	1812	B8.6			
	2330	2333	2337	B7.4			
24 January	0255	0255	0259		Sf	S24E12	266
	0301	0326	0417	M1.9	1n	S22E10	266
	0502	0504	0513	C2.8	Sf	S23E17	266
	1521	U1544	A1544	C5.6	1f	S22E05	266
	2208	2208	2215	C1.3	Sf	S20E02	266
25 January	0401	0405	0409	B5.7			
	0509	0513	0515	C1.2			
	0718	0836	0919	C1.9			268
	1125	1129	1133	B5.1			
	1201	1206	1211	B6.6			
	1322	1327	1329	B8.8			
	1846	U1853	1927	C4.4	Sf	N13W26	268
	2131	2136	2144	C1.3			
26 January	2243	2247	2252	B4.7			
	0114	0117	0122	B7.6			
	0918	0923	0928	B4.6			
	1032	1039	1056	C2.6	Sf	N17W35	268
	1319	1325	1330	B6.6			
	1529	1532	1534	B4.7			
	1540	1546	1557	B6.2			



### 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	4			
<i>Region 250</i>																		
07 Jan	S27E79	131	0100	02	Hsx	002	A											
08 Jan	S28E66	131	0190	05	Cao	003	B											
09 Jan	S27E53	130	0160	07	Cao	005	B											
10 Jan	S26E37	133	0170	06	Cao	007	B											
11 Jan	S27E27	130	0180	04	Cko	007	B											
12 Jan	S27E13	131	0180	05	Cko	009	B											
13 Jan	S26E00	131	0130	03	Cao	004	B	1				1						
14 Jan	S26W12	129	0170	06	Cao	012	B	1										
15 Jan	S24W24	128	0150	05	Cao	005	B					1						
16 Jan	S27W36	127	0130	04	Cao	004	B											
17 Jan	S26W50	128	0120	06	Cao	005	B											
18 Jan	S27W63	128	0140	05	Dao	008	B											
19 Jan	S27W77	128	0120	05	Cao	007	B											
20 Jan	S26W90	128	0070	01	Hax	001	A											
								2	0	0	2	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 131

<i>Region 251</i>																		
07 Jan	S14E81	129	0060	02	Hax	001	A		1			1						
08 Jan	S14E70	127	0280	10	Dki	011	Bg	1				2						
09 Jan	S13E58	125	0330	11	Eao	012	Bg	4	1			10	1					
10 Jan	S13E44	126	0340	12	Eho	012	B											
11 Jan	S14E32	125	0380	15	Eko	034	B					1						
12 Jan	S14E21	123	0120	11	Eai	024	B											
13 Jan	S14E09	122	0080	09	Cao	016	B											
14 Jan	S14W05	122	0070	07	Dao	016	B											
15 Jan	S15W14	118	0050	08	Cro	014	B											
16 Jan	S15W28	119	0040	06	Cso	007	B											
17 Jan	S16W41	119	0010	05	Bxo	006	B											
18 Jan	S13W55	120	0010	01	Axx	002	A											
19 Jan	S13W68	120																
20 Jan	S13W81	120																
21 Jan	S13W94	120																
								5	2	0	14	1	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 122



***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 252*

09 Jan	S04E61	122	0010	01	Axx	001	A												
10 Jan	S03E46	124	0020	02	Hsx	002	A												
11 Jan	S03E33	124	0020	02	Hax	003	A												
12 Jan	S03E18	126	0010	02	Axx	002	A												
13 Jan	S03E05	126																	
14 Jan	S03W08	126																	
15 Jan	S03W21	126																	
16 Jan	S03W34	126																	
17 Jan	S03W47	126																	
18 Jan	S03W60	126																	
19 Jan	S03W73	126																	
20 Jan	S03W86	126																	

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 126

*Region 254*

10 Jan	S15E72	098	0070	02	Hsx	001	A												
11 Jan	S16E63	094	0190	11	Eao	011	B												
12 Jan	S16E44	100	0130	05	Cao	006	B												
13 Jan	S14E29	102	0100	02	Hax	002	A	1											
14 Jan	S14E17	100	0110	04	Cso	006	B												
15 Jan	S15E04	100	0120	04	Cso	005	B												
16 Jan	S14W11	102	0090	03	Hax	001	A												
17 Jan	S14W24	102	0110	02	Hsx	001	A												
18 Jan	S14W37	102	0090	03	Hax	001	A												
19 Jan	S14W51	102	0090	02	Hsx	002	A												
20 Jan	S14W64	102	0090	02	Hsx	001	A												
21 Jan	S14W77	102	0100	02	Hsx	001	A												
22 Jan	S14W90	102	0060	02	Hsx	001	A												

1 0 0 2 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 100





**Region Summary - continued.**

Date	Location		Sunspot Characteristics				Flares												
	Helio		Area (10 <sup>-6</sup> 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 255</i>																			
12 Jan	S13E14	117	0200	05	Cko	009	B												
13 Jan	S13E01	130	0200	05	Cko	009	B												1
14 Jan	S13W12	129	0240	05	Cko	007	A												
15 Jan	S13W23	127	0160	08	Cao	013	B												
16 Jan	S13W39	130	0150	05	Dso	007	B	1											1
17 Jan	S12W53	131	0130	06	Cao	006	B												
18 Jan	S13W67	132	0110	02	Hax	002	A												
19 Jan	S13W81	132	0130	02	Hsx	001	A												
20 Jan	S13W94	132	0070	02	Hax	001	A												
																			1 0 0 1 1 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 130

<i>Region 256</i>																			
12 Jan	S17E55	089	0080	03	Cao	005	B												
13 Jan	S17E41	090	0070	02	Hsx	001	A												
14 Jan	S16E28	089	0060	02	Hsx	001	A												
15 Jan	S17E16	088	0050	02	Hsx	001	A												
16 Jan	S16E03	088	0040	02	Hax	002	A												
17 Jan	S16W12	090	0040	05	Cao	005	B												
18 Jan	S16W25	090	0020	05	Cso	006	B												
19 Jan	S16W39	090	0010	03	Cro	003	B												
20 Jan	S16W52	090																	
21 Jan	S16W65	090																	
22 Jan	S16W78	090																	
23 Jan	S16W91	090																	
																			0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 088



***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 257*

13 Jan	N16E23	108	0010	03	Bxo	003	B
14 Jan	N16E09	108	0020	04	Cso	006	B
15 Jan	N16W03	107	0020	05	Cso	004	B
16 Jan	N15W19	110	0010	01	Axx	001	A
17 Jan	N16W36	114	0010	04	Bxo	003	B
18 Jan	N16W48	113	0020	06	Cso	006	B
19 Jan	N16W62	113	0050	06	Dso	004	B
20 Jan	N16W75	113	0110	06	Cao	005	B
21 Jan	N16W88	113	0080	04	Dao	002	B

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 107

*Region 258*

14 Jan	N07E56	061	0050	03	Cao	005	B
15 Jan	N07E44	060	0060	09	Cso	005	B
16 Jan	N08E27	064	0070	02	Hsx	002	A
17 Jan	N07E12	066	0070	02	Hsx	001	A
18 Jan	N07W01	066	0080	02	Hax	002	A
19 Jan	N07W15	066	0100	02	Hsx	002	A
20 Jan	N07W28	066	0070	02	Hsx	002	A
21 Jan	N07W41	066	0050	01	Hsx	001	A
22 Jan	N07W54	066	0060	01	Hsx	001	A
23 Jan	N08W68	067	0050	01	Hsx	001	A
24 Jan	N08W82	068	0060	01	Hsx	001	A

1 0 0 0 1 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 066



**Region Summary - continued.**

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

*Region 259*

14 Jan	N13E72	045	0050	02	Hax	002	A												
15 Jan	N11E58	046	0030	02	Hsx	003	A												
16 Jan	N10E41	050	0040	07	Cso	007	B												
17 Jan	N09E26	052	0060	11	Eao	017	B						1						
18 Jan	N10E12	053	0070	10	Dao	014	B												
19 Jan	N10W02	053	0060	11	Eao	019	B												
20 Jan	N10W15	053	0050	10	Eao	010	B												
21 Jan	N10W28	053	0020	07	Cro	004	B												
22 Jan	N10W34	053	0010	03	Bxo	003	B												
23 Jan	N12W50	049																	
24 Jan	N12W63	049																	
25 Jan	N12W76	049																	
26 Jan	N12W89	049																	

0 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 053

*Region 260*

15 Jan	N14E77	027	0070	03	Hsx	001	A												
16 Jan	N14E65	026	0070	02	Hax	001	A												
17 Jan	N14E53	025	0070	03	Cao	003	B												
18 Jan	N14E40	025	0030	02	Hax	003	A												
19 Jan	N14E26	025	0050	03	Cao	010	B						1						
20 Jan	N14E13	025	0070	05	Dao	010	B	2					2						
21 Jan	N14W00	025	0070	05	Dao	010	B	3					3						
22 Jan	N14W13	025	0040	05	Dso	012	B		1					1					
23 Jan	N16W26	025	0010	03	Bxo	005	B												
24 Jan	N16W40	026	0010	01	Axx	001	A												
25 Jan	N15W54	026	0000	00	Axx	001	A												
26 Jan	N15W67	026	0000	00	Axx	001	A												

5 1 0 6 1 0 0 0

Still on Disk.

Absolute heliographic longitude: 025

*Region 261*

19 Jan	N26W47	098	0040	04	Cso	004	B												
20 Jan	N26W60	098	0040	05	Cro	004	B												
21 Jan	N26W73	098	0040	04	Dao	003	B												

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 098



**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 262*

19 Jan	S05W45	096	0050	04	Dso	003	B											
20 Jan	S05W60	098	0010	01	Axx	001	A											
21 Jan	S05W73	098	0010	01	Axx	001	A											
22 Jan	S05W86	098																
												0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 096

*Region 263*

19 Jan	S13W11	062	0010	02	Axx	003	A											
20 Jan	S13W24	062	0010	03	Cro	003	B											
21 Jan	S13W40	065	0050	03	Cao	004	B						2					
22 Jan	S13W53	065	0060	06	Dso	008	B	1					2					
23 Jan	S11W68	067	0150	06	Dao	010	B	1					7					
24 Jan	S11W82	068	0190	04	Dao	008	B											
												2	0	0	11	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 062

*Region 264*

20 Jan	S20W02	040	0010	00	Axx	001	A											
21 Jan	S20W15	040																
22 Jan	S20W28	040																
23 Jan	S20W41	040																
24 Jan	S20W54	040																
25 Jan	S20W67	040																
26 Jan	S20W80	040																
												0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 040

*Region 265*

20 Jan	N04E31	007	0010	03	Bxo	002	B											
21 Jan	N04E18	007																
22 Jan	N04E05	007																
23 Jan	N04W08	007																
24 Jan	N04W21	007																
25 Jan	N04W34	007																
26 Jan	N04W47	007																
												0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 007



**Region Summary - continued.**

Date	Location		Sunspot Characteristics				Flares							
	( ° 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

*Region 266*

20 Jan	S23E56	342	0030	01	Hrx	002	A				2				
21 Jan	S23E43	342	0100	06	Dao	009	B								
22 Jan	S23E30	342	0080	11	Eso	016	B				1				
23 Jan	S22E13	346	0140	11	Eao	017	Bg	1	1		2	2			
24 Jan	S19E01	345	0140	14	Eai	029	Bg	3	1		3	2			
25 Jan	S21W10	342	0140	16	Fai	028	Bg								
26 Jan	S22W26	345	0170	16	Fai	021	Bg								
								4	2	0	8	4	0	0	0

Still on Disk.

Absolute heliographic longitude: 345

*Region 267*

20 Jan	S20E77	321	0050	02	Hax	001	A	1			1				
21 Jan	S20E64	321	0120	05	Cao	005	B								
22 Jan	S20E51	321	0150	11	Eao	010	B								
23 Jan	S20E43	316	0110	11	Eao	009	B								
24 Jan	S19E31	315	0130	12	Eao	011	B								
25 Jan	S20E16	316	0100	12	Eao	013	B								
26 Jan	S20E03	316	0070	12	Eso	012	B								
								1	0	0	1	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 316

*Region 268*

21 Jan	N12E23	002	0070	03	Cao	003	B								
22 Jan	N12E10	002	0030	04	Cao	009	B								
23 Jan	N13W03	002	0080	04	Cao	008	B								
24 Jan	N14W17	003	0110	03	Dao	006	Bd								
25 Jan	N14W29	001	0130	05	Dao	007	B	2			1				
26 Jan	N15W42	001	0100	05	Dao	006	B	1			1				
								3	0	0	2	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 002

*Region 269*

21 Jan	S09E76	309	0060	02	Hax	004	A								
22 Jan	S09E63	309	0110	05	Dso	002	B								
23 Jan	S08E52	307	0110	04	Dso	003	B								
24 Jan	S07E39	307	0130	04	Dso	003	B								
25 Jan	S08E25	307	0100	04	Dso	004	B								
26 Jan	S07E12	307	0080	05	Dso	003	B								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 307



***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	4								
<i>Region 270</i>																							
26 Jan	S04W36	355	0040	04	Dso	003	B																
								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Still on Disk.																						
	Absolute heliographic longitude: 355																						
<i>Region 271</i>																							
26 Jan	S06W21	340	0020	05	Cso	004	B																
								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Still on Disk.																						
	Absolute heliographic longitude: 340																						
<i>Region 272</i>																							
26 Jan	S05E26	293	0030	04	Dso	003	B																
								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Still on Disk.																						
	Absolute heliographic longitude: 293																						

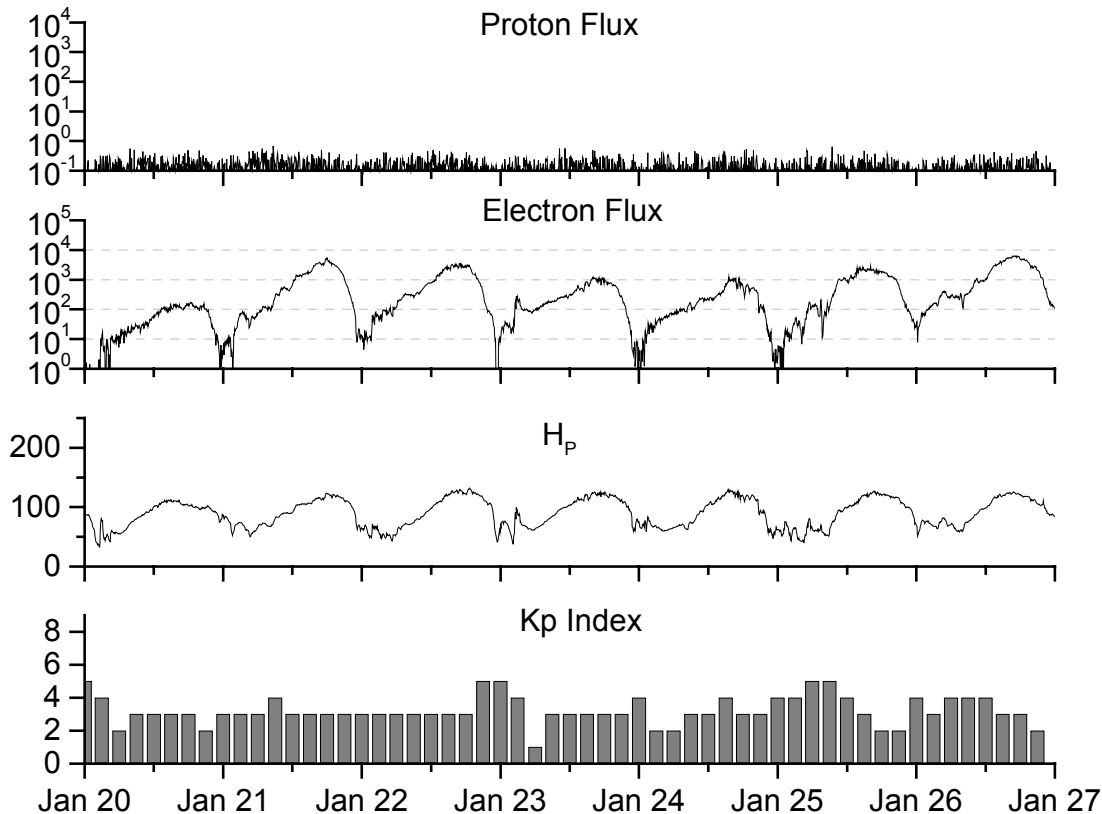


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2001</b>									
January	142.7	95.1	0.67	156.3	108.8	166.6	168.8	08	13.8
February	131.0	80.1	0.61	151.4	104.2	146.7	165.8	06	13.3
March	166.7	114.2	0.69	154.0	104.9	177.7	167.9	17	12.9
April	163.6	108.2	0.66	159.4	107.7	178.1	171.7	18	12.7
May	135.1	97.3	0.72	163.1	108.8	147.9	174.8	12	12.5
June	196.7	134.0	0.68	167.2	109.9	173.7	178.8	12	12.4
July	124.6	82.2	0.66	172.1	111.8	131.3	183.9	11	12.4
August	159.4	106.8	0.67	176.7	113.8	163.1	188.8	13	12.5
September	229.1	150.7	0.66	178.8	114.3	233.8	191.3	13	12.8
October	197.4	125.6	0.64	179.5	114.1	208.1	191.9	20	12.0
November	178.6	106.5	0.60	183.7	115.6	212.7	193.7	16	12.0
December	217.5	131.8	0.61	184.5	114.7	235.6	193.9	09	12.2
<b>2002</b>									
January	189.0	113.9	0.60	184.8	113.5	227.3	194.6	08	12.4
February	194.5	108.0	0.56	188.6	114.7	205.0	197.2	10	12.8
March	153.1	98.1	0.64	188.9	113.3	180.3	195.7	10	13.0
April	194.9	120.4	0.62	186.2	110.4	189.8	191.5	15	13.2
May	204.1	120.8	0.59	183.6	108.8	178.4	188.0	15	13.3
June	146.0	88.5	0.61	179.9	106.2	148.7	183.0	11	13.5
July	183.5	99.9	0.54			173.5		13	
August	191.0	116.4	0.61			183.9		16	
September	206.4	109.3	0.53			175.8		14	
October	153.9	97.5	0.63			167.0		23	
November	159.8	95.0	0.59			168.7		16	
December	147.9	81.6	0.55			158.6		13	

**NOTE:** All smoothed values after June 1999 and monthly values after December 2000 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 20 January 2003*

*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.

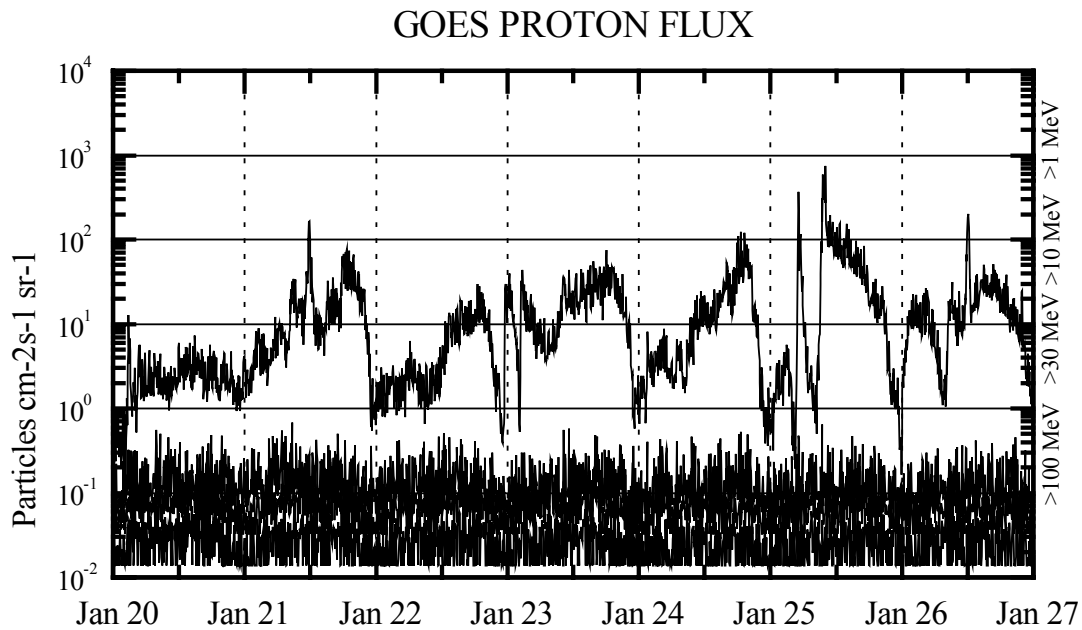
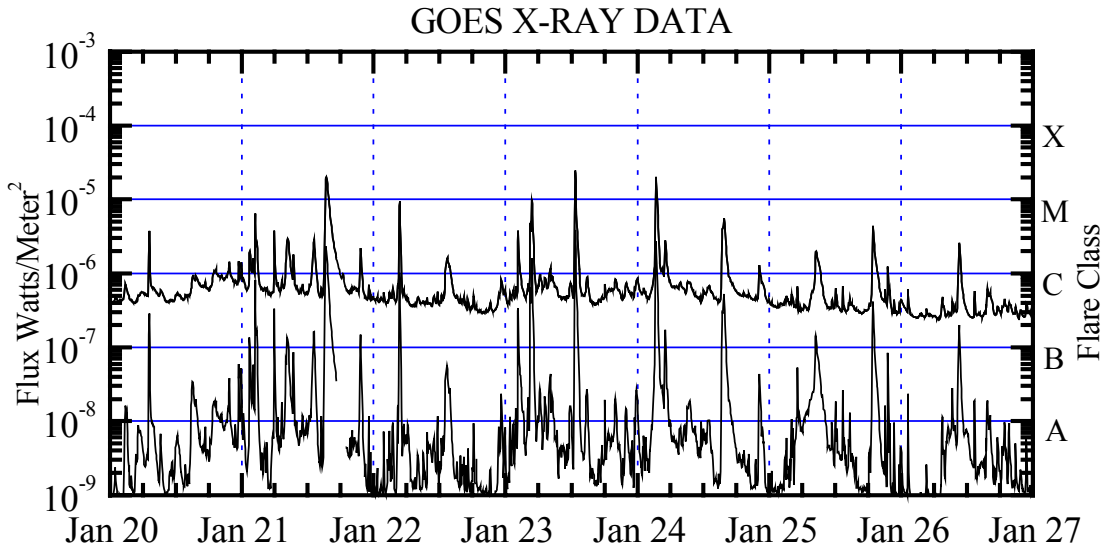
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-8.

*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 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<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.

