

## **Space Weather Highlights 26 January - 02 February 2003**

**SWO PRF 1431  
04 February 2003**

Solar activity was at very low to moderate levels. The period began at low levels, highlighted by a long duration C2 flare on 27 January associated with a filament eruption from near S19W19. Low levels persisted through the 29th with just occasional minor C-class flares observed. All active regions on the visible disk appeared to be stable or in decay, resulting in very low conditions on 30 January. However, the most energetic event of the period occurred on the 30th when a large filament erupted from the north-central disk and produced an earthbound coronal mass ejection (CME). We returned to low levels on the 31st with considerable activity on the SE limb, indicating that a new active region was rotating onto the visible disk. This new region was the likely source of minor C-class activity. A prominence was observed erupting off the Northwest limb late on the 31st, which had an associated Type II radio sweep with a shock velocity of 500 km/s. New Region 276 (S14, L=161, class/area Eai/240 on 02 February) rotated further into view on 01 Feb and quickly brought activity levels to moderate, with an M1 flare at 0905 UTC. This region was the dominant source of activity for the remainder of the period producing several C-class flares, the largest being a C9/Sf late on 01 February. For flare times and magnitudes please refer to the Energetic Event and Flare List.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. The period began in a diminishing high-speed coronal hole stream. Solar wind speed was elevated between 500 – 600 km/s early, but had declined to more nominal speeds of 400 – 450 km/s by the 28th. Occasional sustained periods of southward Bz in the interplanetary magnetic field occurred on the 28-29th. Solar wind speed increased on the 30th with the onset of another coronal hole. Speed gradually increased to over 600 km/s on the 31st before the effects of the coronal hole started to wane. A dramatic increase in solar wind speed to over 800 km/s was observed to begin at around 1300 UTC on the 1st as the CME observed on 30 January impacted the ACE spacecraft. A marked increase in density, temperature and total magnetic field also occurred with this transient passage. The Bz component of the interplanetary magnetic field was initially northward as the CME passed ACE, but periods of southward Bz were observed late on the 1st through the 2nd. Speed had returned to near 450 km/s by the end of the period.

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 reached high levels on 27 and 29 January and again on 31 January through 1 February.

The geomagnetic field was at quiet to major storm levels. Occasional active periods occurred on the 28th and 29th as the Bz component of the interplanetary magnetic field rotated southward for extended periods. Active to minor storm periods were observed on 30 – 31 January with the onset of high-speed coronal hole stream. Minor to major storm periods occurred late on the 01 February through the 2nd following the passage of the 30 January filament eruption and CME.

## **Space Weather Outlook 05 February - 03 March 2003**

Solar activity is expected to be mostly low with occasional moderate levels during the period. Region 276 has potential for M-class activity early in the period. There are also indications of new active regions rotating around the east limb in the next few days.

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 15 – 19 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 05-06 February due to a small recurring coronal hole. Minor storming with isolated major storm conditions are possible on 14 -18 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
27 January	121	134	380	B2.0	1	0	0	3	0	0	0	0
28 January	126	133	490	B2.0	1	0	0	1	0	0	0	0
29 January	124	173	680	B2.5	2	0	0	2	0	0	0	0
30 January	121	105	470	B1.9	0	0	0	0	1	0	0	0
31 January	120	96	410	B2.8	3	0	0	0	0	0	0	0
01 February	126	75	460	B4.5	8	1	0	3	0	0	0	0
02 February	127	61	430	B4.2	7	0	0	5	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
	27 January	9.9E+5	1.1E+4	2.2E+3		8.1E+7
28 January	4.3E+5	1.2E+4	2.3E+3		1.4E+7	
29 January	1.2E+6	1.2E+4	2.3E+3		2.2E+7	
30 January	7.0E+5	1.1E+4	2.5E+3		1.6E+7	
31 January	5.6E+5	1.3E+4	2.7E+3		6.1E+7	
01 February	1.9E+5	1.3E+4	3.0E+3		1.8E+8	
02 February	1.0E+6	1.3E+4	2.7E+3		1.4E+7	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	27 January	5	2-2-0-0-0-2-2-3	5	2-2-0-0-0-1-3-2	8
28 January	9	2-4-2-2-2-1-2-1	17	4-3-5-4-2-1-1-1	12	3-3-4-3-2-3-2-2
29 January	9	1-1-1-2-3-2-3-3	25	2-1-1-5-6-4-3-3	14	2-2-2-3-3-4-4-4
30 January	18	5-3-3-3-3-4-2-1	45	4-3-4-6-6-6-5-1	26	5-4-4-4-4-5-4-2
31 January	11	2-2-3-4-3-1-1-1	29	2-3-4-6-5-5-2-1	18	3-2-4-5-4-3-2-1
01 February	10	3-1-1-1-2-2-4-3	21	1-1-1-2-4-4-5-5	13	3-2-1-2-2-2-5-4
02 February	29	6-4-4-4-3-4-3-3	58	5-4-4-6-7-6-5-3	45	5-5-5-5-6-5-4-4

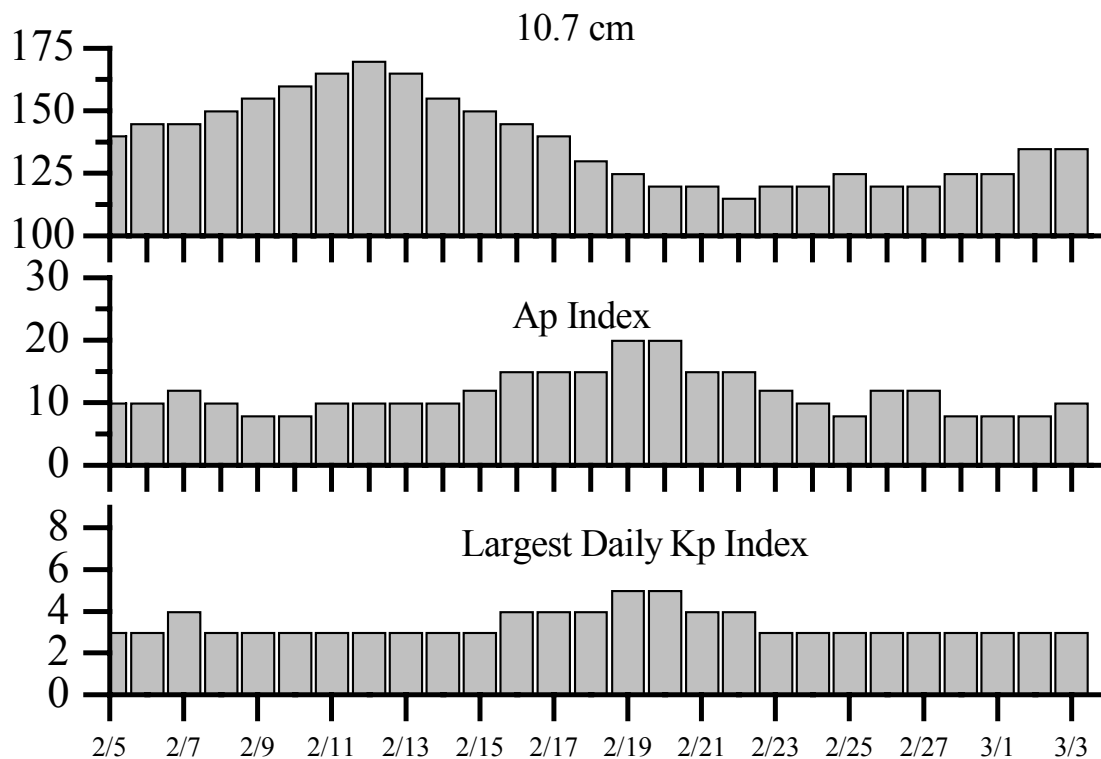


### *Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UT</u>
27 Jan 1302	ALERT: STRATWARM	27 Jan
27 Jan 1409	ALERT: Electron 2MeV Integral Flux > 1000pfu	27 Jan 1345
28 Jan 0801	ALERT: Geomagnetic K= 4	28 Jan 0751
28 Jan 1254	ALERT: STRATWARM	28 Jan
29 Jan 0031	1 - 245 MHz Radio Burst	28 Jan
29 Jan 1403	ALERT: STRATWARM	29 Jan
29 Jan 1648	ALERT: Geomagnetic K= 4	29 Jan 1635
29 Jan 1652	ALERT: Electron 2MeV Integral Flux > 1000pfu	29 Jan 1630
30 Jan 0031	1 - 245 MHz Radio Burst	29 Jan
30 Jan 0151	ALERT: Geomagnetic K= 4	30 Jan 0151
30 Jan 0558	ALERT: Geomagnetic K= 4	30 Jan 0557
30 Jan 1137	ALERT: Geomagnetic K= 4	30 Jan 1137
30 Jan 1352	ALERT: STRATWARM	30 Jan
30 Jan 1635	WARNING: Geomagnetic K= 4	30 Jan 1635 - 31 Jan 1500
30 Jan 1637	ALERT: Geomagnetic K= 4	30 Jan 1635
30 Jan 1742	WARNING: Geomagnetic K= 5	30 Jan 1741 - 31 Jan 1500
30 Jan 1744	ALERT: Geomagnetic K= 5	30 Jan 1741
30 Jan 1820	WATCH: Geomagnetic A $\geq$ 20	02 Feb
31 Jan 1216	ALERT: Electron 2MeV Integral Flux > 1000pfu	31 Jan 1200
31 Jan 1340	ALERT: STRATWARM	31 Jan
31 Jan 2312	ALERT: Type II Radio Emission	31 Jan 2209
01 Feb 0656	ALERT: Electron 2MeV Integral Flux > 1000pfu	01 Feb 0640
01 Feb 1344	WARNING: Geomagnetic Sudden Impulse	01 Feb 1345 - 1400
01 Feb 1347	WARNING: Geomagnetic K= 4	01 Feb 1350 - 1500
01 Feb 1351	ALERT: STRATWARM	01 Feb
01 Feb 2020	WARNING: Geomagnetic K= 4	01 Feb 2021 - 02 Feb 1500
01 Feb 2026	ALERT: Geomagnetic K= 4	02 Feb 2022
02 Feb 0200	WARNING: Geomagnetic K= 5	02 Feb 0200 - 02 Feb 1500
02 Feb 0434	ALERT: Geomagnetic K= 5	02 Feb 0431
02 Feb 1233	ALERT: STRATWARM	02 Feb
02 Feb 1457	EXTENDED WARNING: Geomagnetic K= 4	01Feb 2021 - 02 Feb 2359
02 Feb 1619	ALERT: Geomagnetic K-index of 5	02 Feb 1619
02 Feb 1817	WARNING: Geomagnetic K= 5 expected	02 Feb 1820 - 2359
02 Feb 2353	EXTENDED WARNING: Geomagnetic K= 4	01 Feb 2021 - 03 Feb 1500



### 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 Feb	140	10	3	19 Feb	125	20	5
06	145	10	3	20	120	20	5
07	145	12	4	21	120	15	4
08	150	10	3	22	115	15	4
09	155	8	3	23	120	12	3
10	160	8	3	24	120	10	3
11	165	10	3	25	125	8	3
12	170	10	3	26	120	12	3
13	165	10	3	27	120	12	3
14	155	12	3	28	125	8	3
15	150	15	4	01 Mar	125	8	3
16	145	15	4	02	135	8	3
17	140	15	4	03	135	10	3
18	130	15	4				



### *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
01 Feb	0848	0905	0938	M1.2	.024								

### *Flare List*

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location Lat CMD		
27 January	0849	0853	0856	B3.5				
	1023	1026	1029	B5.3				
	B1150	U1150	1159		Sf	N06W13	273	
	B1601	U1601	1611		Sf	S02W37	266	
	1926	1929	1932	B3.3				
	2131	2134	2136	B3.5				
	2149	2151	2222	C2.4	Sf	S17W23	0	
28 January	0303	0307	0309	B3.1				
	0745	0748	0750	B3.6				
	0900	0905	0908	B3.1				
	1115	1119	1127	B3.1				
	1403	1420	1428	B5.9				
29 January	2343	0002	A0013	C3.2	Sf	S22W55	266	
	0618	0621	0623	B4.0				
	1230	1234	1239	B4.9				
	1304	1304	1334	C1.1	Sf	N09W39	273	
	2030	2035	2048	C1.1	Sf	S22W65	266	
30 January	2111	2115	2128	B7.7				
	0330	0333	0336	B3.0				
	1026	1028	A1030	B4.8	1f	S11E52	274	
	1158	1208	1234	B5.5				
31 January	1925	1928	1930	B3.5				
	0530	0606	0643	C2.2				
	0709	0720	0737	C1.5				
	1259	1321	1343	C1.4				
	2045	2048	2051	B7.1				
	2241	2245	2250	B7.9				
01 February	2332	2335	2338	B7.5				
	0013	0019	0025	C1.5				276
	0354	0359	0404	B9.5				276
	0605	0613	0617	C2.6				276
	0712	0716	0720	B9.7				276
	0740	0744	0749	B8.1				276
	0800	0804	0807	B7.7				276
	0848	0905	0938	M1.2				276
	1133	1141	1145	C2.7				276
	1159	1203	1208	C1.4				276



**Flare List - continued.**

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
01 February	1322	1325	1329	B6.0			276
	1457	1501	1503	B8.5			276
	1542	1545	1553		Sf	S15E86	276
	1702	1715	1723	C1.3			276
	1904	1908	1910	C1.0			276
	1946	1948	2019	C9.9	Sf	S14E89	276
	2324	2325	2345	C1.0	Sf	S15E78	276
02 February	0118	U0122	0132	C1.3	Sf	S15E78	276
	0327	0333	0337	C2.8	Sf	S15E77	276
	0357	0400	0405		Sf	S15E77	276
	0442	0447	0452	C1.1			276
	0535	0543	0548	C1.4	Sf	S15E67	276
	0632	0636	0639	C1.1	Sf	S15E67	276
	0853	0910	0936	C1.4			276
	0958	1001	1003	B9.1			276
	1127	1130	1132	B6.7			276
	1530	1533	1535	C1.0			276
	2147	2150	2153	B7.4			

**Region Summary**

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		
<i>Region 260</i>																
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									
27 Jan	N15W80	026														
									5	1	0	6	1	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 025



***Region Summary - continued.***

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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

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*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															
27 Jan	N04W60	007															
28 Jan	N04W73	007															
29 Jan	N04W86	007															
								0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 007

*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										
27 Jan	S21W40	346	0130	12	Eao	015	Bg					1					
28 Jan	S20W55	348	0130	07	Dso	006	B	1				1					
29 Jan	S21W68	348	0100	05	Dao	007	B	1				1					
30 Jan	S21W83	349	0060	01	Hsx	001	A										
31 Jan	S21W95	348	0070	02	Hax	003	A										
								6	2	0	11	4	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 345



***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

*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								
27 Jan	S19W13	319	0030	11	Cso	007	B								
28 Jan	S19W28	321	0020	02	Hsx	002	A								
29 Jan	S19W37	317	0020	03	Hsx	003	A								
30 Jan	S17W52	318	0020	09	Bxo	009	B								
31 Jan	S16W66	319	0000	00	Axx	001	A								
01 Feb	S16W79	319													

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					
27 Jan	N16W56	002	0060	04	Cao	005	B								
28 Jan	N16W72	005	0030	02	Hrx	003	A								
29 Jan	N15W84	004	0030	05	Cso	003	B								

3 0 0 2 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 002





**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

*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											
27 Jan	S07W02	308	0080	06	Dso	003	B											
28 Jan	S08W16	309	0070	05	Cso	003	B											
29 Jan	S07W29	309	0080	07	Cso	004	B											
30 Jan	S07W45	311	0060	01	Hsx	001	A											
31 Jan	S06W59	312	0050	02	Hsx	001	A											
01 Feb	S06W72	312	0050	04	Cao	002	B											
02 Feb	S07W86	313	0050	01	Hax	001	A											

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 308

*Region 270*

26 Jan	S04W36	355	0040	04	Dso	003	B											
27 Jan	S03W50	356	0020	04	Cso	003	B											
28 Jan	S03W65	358	0030	02	Hrx	002	A											
29 Jan	S04W79	359	0020	01	Hsx	001	A											

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 355

*Region 271*

26 Jan	S06W21	340	0020	05	Cso	004	B											
27 Jan	S05W35	341	0030	06	Dao	006	B											
28 Jan	S06W49	342	0040	06	Cso	007	B											
29 Jan	S06W62	342	0070	07	Dao	007	B											
30 Jan	S06W78	344	0060	02	Hsx	001	A											
31 Jan	S05W91	344	0060	02	Hax	002	A											

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 340



**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

*Region 272*

26 Jan	S05E26	293	0030	04	Dso	003	B
27 Jan	S08E11	295	0010	05	Bxo	007	B
28 Jan	S06W02	295	0030	06	Dro	008	B
29 Jan	S06W15	295	0070	07	Dao	025	B
30 Jan	S06W32	298	0060	07	Dso	012	B
31 Jan	S05W44	297	0050	05	Dso	008	B
01 Feb	S05W57	297	0070	05	Dao	009	B
02 Feb	S04W71	298	0060	05	Dao	007	B

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 295

*Region 273*

27 Jan	N06W18	324	0020	04	Cso	008	B
28 Jan	N06W33	326	0090	06	Dso	011	B
29 Jan	N06W45	325	0110	07	Dso	020	B
30 Jan	N06W59	325	0120	08	Dao	010	B
31 Jan	N07W73	326	0120	08	Cao	010	B
01 Feb	N07W87	327	0090	06	Cao	003	B

1 0 0 2 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 324

*Region 274*

28 Jan	S06E71	222	0050	02	Hax	001	A
29 Jan	S07E57	223	0170	02	Hsx	001	A
30 Jan	S07E45	221	0090	02	Hsx	001	A
31 Jan	S07E32	221	0060	02	Hsx	001	A
01 Feb	S07E18	222	0070	04	Hsx	004	A
02 Feb	S06E05	222	0080	05	Dso	005	B

0 0 0 0 1 0 0 0

Still on Disk.

Absolute heliographic longitude: 222

*Region 275*

29 Jan	S11W08	288	0010	02	Cao	002	B
30 Jan	S11W23	289					
31 Jan	S11W36	289					
01 Feb	S11W49	289					
02 Feb	S11W62	289					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 288



***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	
<i>Region 276</i>															
01 Feb	S15E78	162	0180	09	Dao	007	B	8	1	3					
02 Feb	S14E66	161	0240	11	Eai	008	B	7		5					
								15	1	0	8	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 161

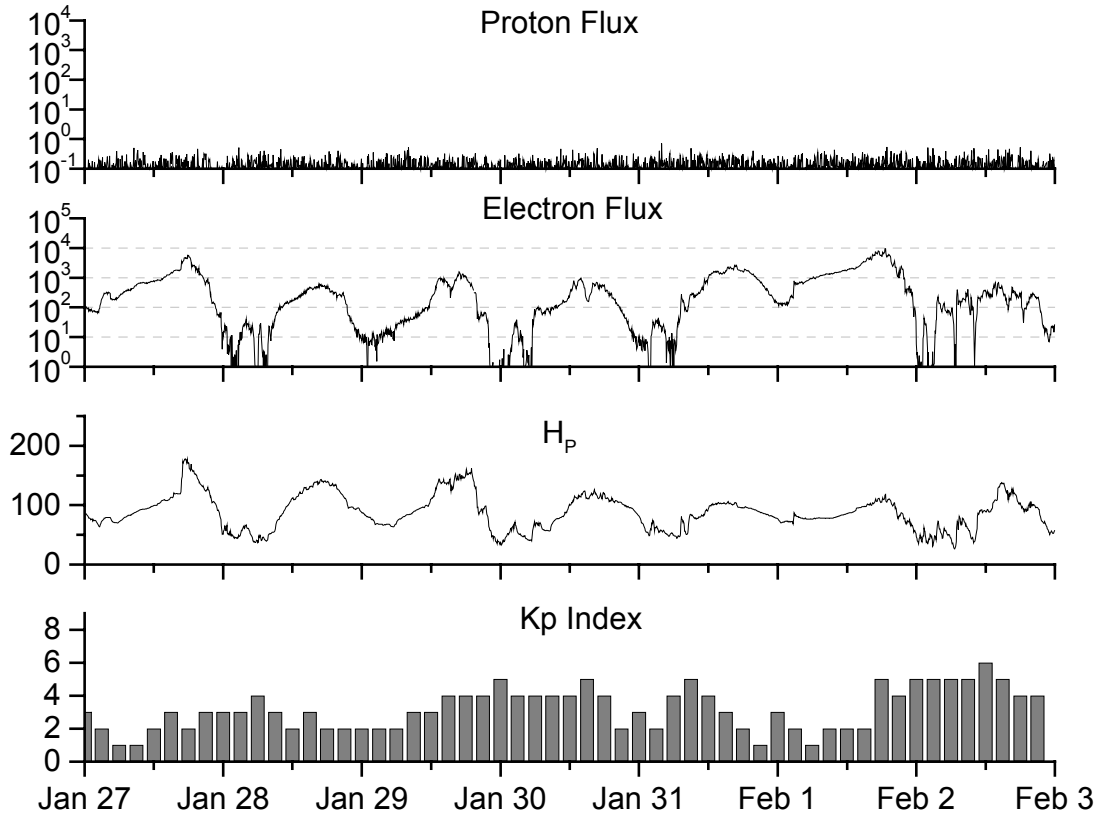


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers			Smooth values		Radio Flux		Geomagnetic	
	Observed SWO	values RI	Ratio RI/SWO	SWO	RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2001</b>									
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	175.4	102.7	173.5	176.3	13	13.9
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	
<b>2003</b>									
January	150.0	79.5	0.53			144.0		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 27 January 2003*

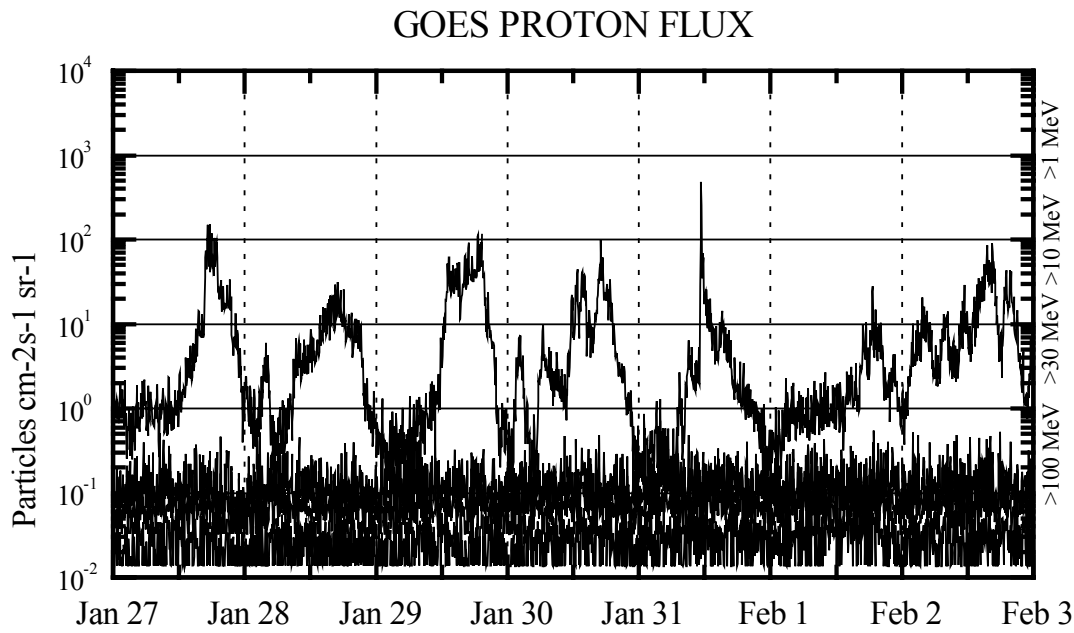
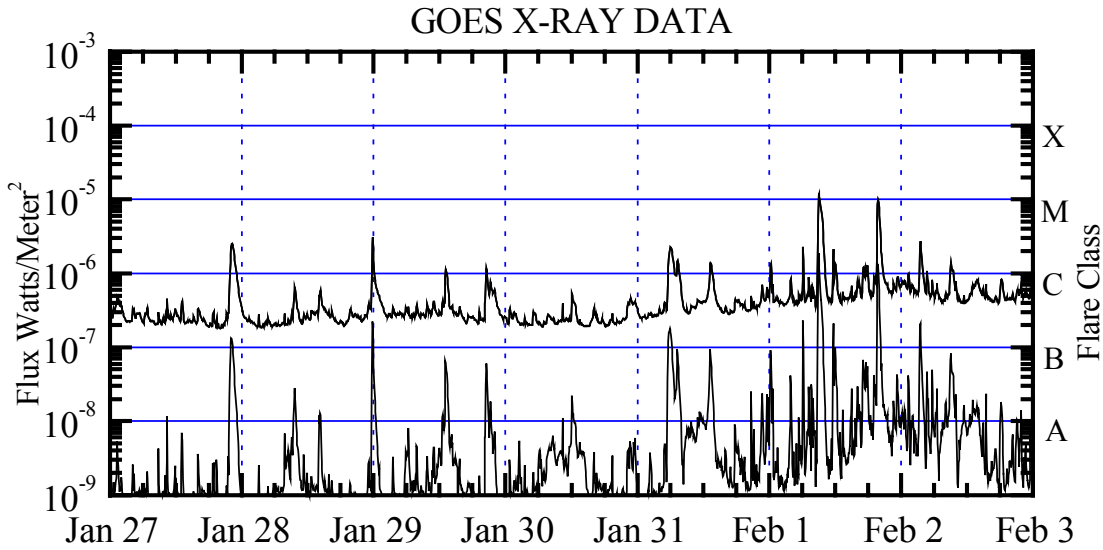
*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

*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.



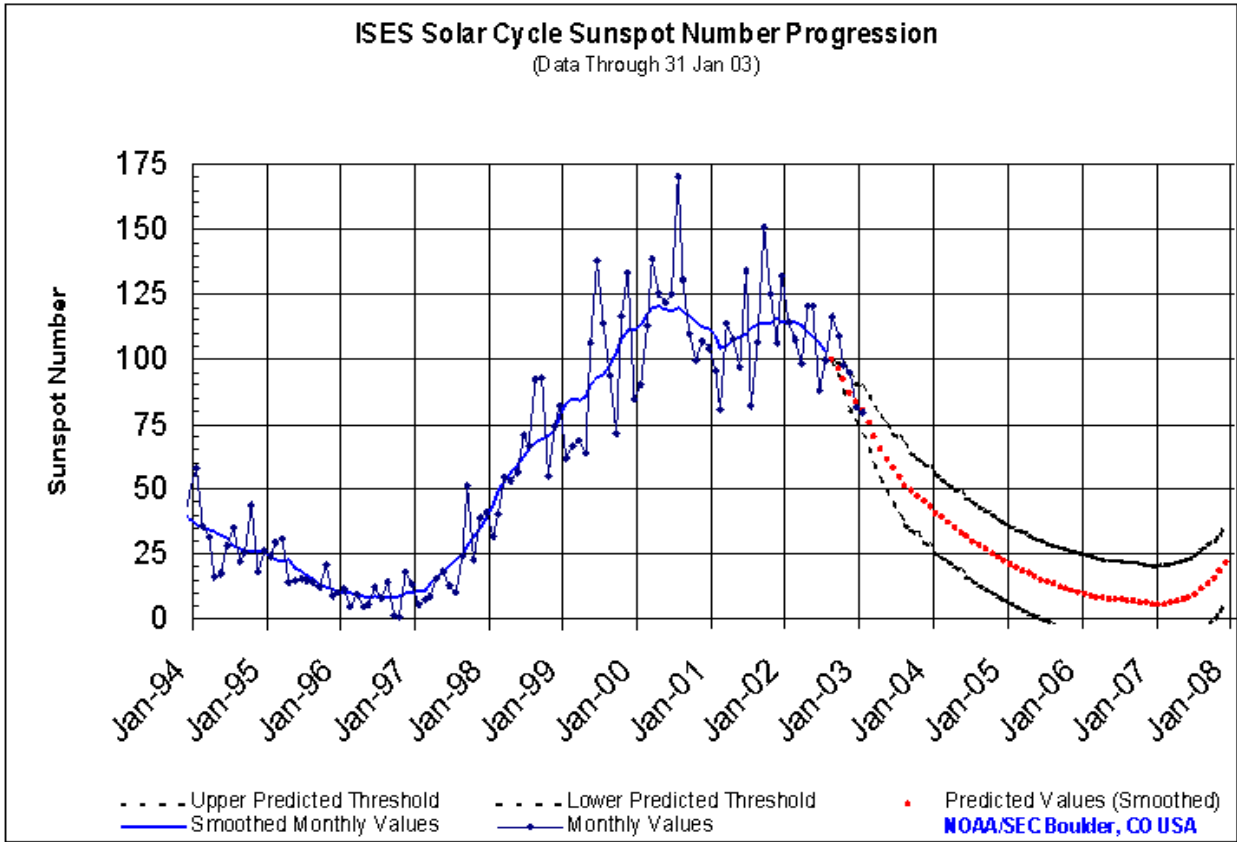


*Weekly GOES Satellite X-ray and Proton Plots*

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.

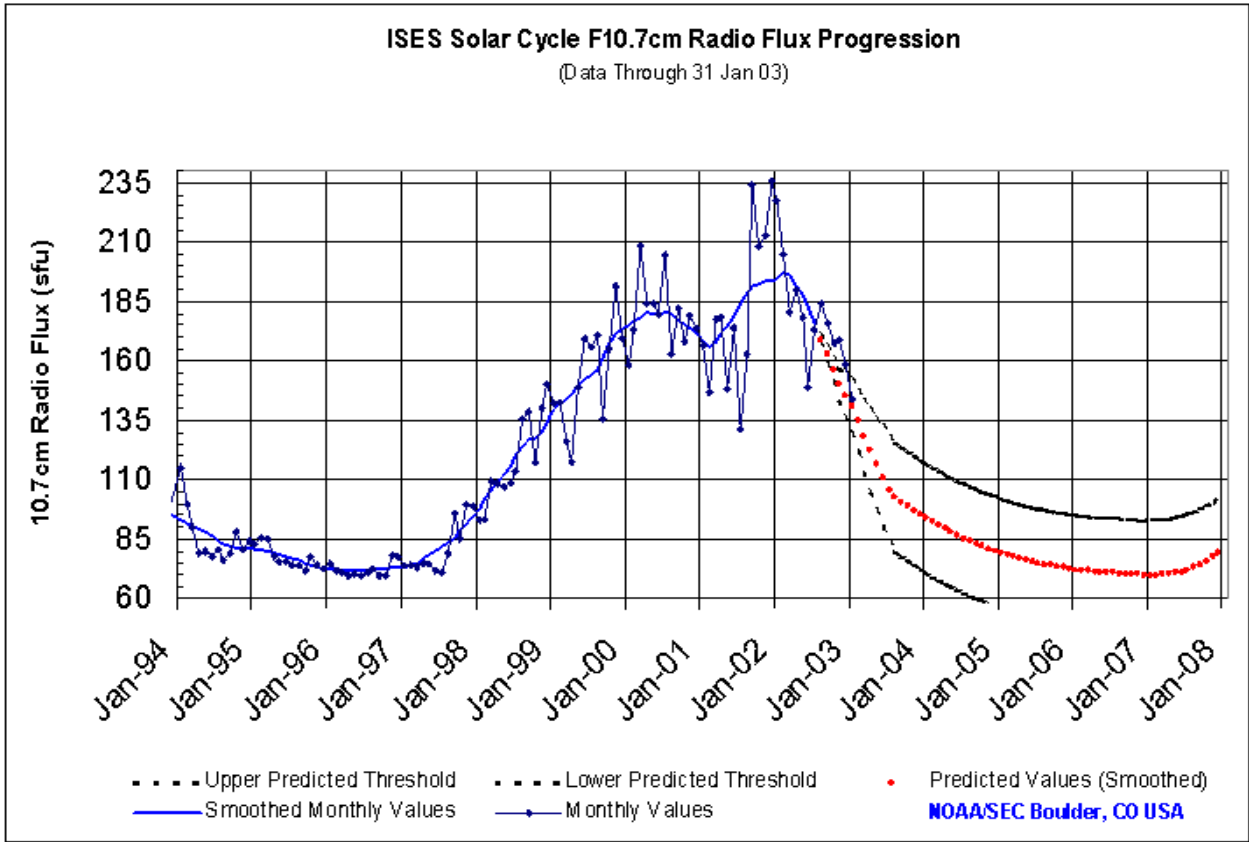




### SEC Prediction of Smoothed Sunspot Number

	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 (***)	<b>100</b> (1)	<b>96</b> (3)	<b>92</b> (5)	<b>87</b> (7)	<b>83</b> (8)
2003	<b>80</b> (9)	<b>75</b> (10)	<b>70</b> (11)	<b>65</b> (12)	<b>61</b> (13)	<b>58</b> (14)	<b>54</b> (15)	<b>51</b> (15)	<b>49</b> (15)	<b>47</b> (15)	<b>45</b> (15)	<b>43</b> (15)
2004	<b>41</b> (15)	<b>39</b> (15)	<b>37</b> (15)	<b>35</b> (15)	<b>33</b> (15)	<b>31</b> (15)	<b>30</b> (15)	<b>28</b> (15)	<b>27</b> (15)	<b>25</b> (15)	<b>24</b> (15)	<b>22</b> (15)
2005	<b>21</b> (15)	<b>20</b> (15)	<b>18</b> (15)	<b>17</b> (15)	<b>16</b> (15)	<b>15</b> (15)	<b>14</b> (15)	<b>13</b> (15)	<b>12</b> (15)	<b>12</b> (15)	<b>11</b> (15)	<b>10</b> (15)
2006	<b>10</b> (15)	<b>9</b> (15)	<b>8</b> (15)	<b>8</b> (15)	<b>8</b> (15)	<b>7</b> (15)	<b>7</b> (15)	<b>7</b> (15)	<b>7</b> (15)	<b>6</b> (15)	<b>6</b> (15)	<b>5</b> (15)
2007	<b>5</b> (15)	<b>6</b> (15)	<b>6</b> (15)	<b>6</b> (15)	<b>7</b> (15)	<b>8</b> (15)	<b>10</b> (15)	<b>11</b> (15)	<b>13</b> (15)	<b>16</b> (15)	<b>18</b> (15)	<b>21</b> (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 (***)	<b>169</b> (1)	<b>163</b> (3)	<b>156</b> (5)	<b>150</b> (7)	<b>146</b> (9)
2003	<b>141</b> (11)	<b>135</b> (13)	<b>128</b> (15)	<b>122</b> (17)	<b>116</b> (19)	<b>111</b> (21)	<b>106</b> (22)	<b>103</b> (23)	<b>101</b> (23)	<b>99</b> (23)	<b>97</b> (23)	<b>95</b> (23)
2004	<b>94</b> (23)	<b>92</b> (23)	<b>91</b> (23)	<b>89</b> (23)	<b>88</b> (23)	<b>87</b> (23)	<b>85</b> (23)	<b>84</b> (23)	<b>83</b> (23)	<b>82</b> (23)	<b>81</b> (23)	<b>80</b> (23)
2005	<b>79</b> (23)	<b>78</b> (23)	<b>78</b> (23)	<b>77</b> (23)	<b>76</b> (23)	<b>75</b> (23)	<b>75</b> (23)	<b>74</b> (23)	<b>74</b> (23)	<b>73</b> (23)	<b>73</b> (23)	<b>73</b> (23)
2006	<b>72</b> (23)	<b>72</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>70</b> (23)	<b>70</b> (23)	<b>70</b> (23)	<b>70</b> (23)
2007	<b>70</b> (23)	<b>70</b> (23)	<b>70</b> (23)	<b>70</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>72</b> (23)	<b>73</b> (23)	<b>74</b> (23)	<b>76</b> (23)	<b>77</b> (23)	<b>79</b> (23)





### ISES Solar Cycle Ap Progression

(Data Through 31 Jan 03)

