

Space Weather Highlights

28 April - 04 May 2003

SWO PRF 1444
06 May 2003

Solar activity ranged from low to moderate levels. Region 349 (S14, L= 154, class/area Ekc/1120 on 01 May) was the largest spot group of the period and exhibited significant growth through most of the period. However, activity from this region was low, producing only C-class flares.

The period began on 28 April with low level activity due to a C4/Sf flare from Region 337 (S14, L=240, class/area Dac/270 on 28 April). Moderate levels were observed on 29 April with an M1/1f flare from Region 337 at 0459 UTC. Region 337 rotated beyond the west limb on 01 May. Activity was at low levels on 30 April – 01 May. Nearly all of the C-class activity on these two days was from Region 349 with the largest flare a C5/Sf on 01 May. Region 345 (S17, L=167, class/area Dao/130 on 02 May) produced a long duration M1/Sf flare on 02 May. This region was of moderate complexity and developed an east-west inversion line on 01 – 02 May. On 03 – 04 May, activity returned to low levels with minor C-class flares.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. Solar wind increased to near 550 km/s on 29 April due to the combination of a coronal hole high speed flow and transient flow from earlier activity. On 30 April, solar wind speed further increased to 650 km/s. Velocity gradually declined over the remainder of the period and ended the period around 400 km/s. The Bz component of the interplanetary magnetic field exhibited transient flow signatures during most 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 everyday of the period, 28 April – 04 May.

The geomagnetic field was at quiet to major storm levels. The period began on 28 April with quiet to minor storming due to a weak transient passage detected by the ACE spacecraft. Activity on 29 April – 02 May, reached minor storming with isolated major storming on 30 April and 01 May. This activity was due to the elevated solar wind speed from a negative polarity coronal hole high speed stream and transient flow. On 03 – 04 May activity was at quiet to unsettled conditions as solar wind speed declined.

Space Weather Outlook

07 May 2003 - 02 June 2003

Solar activity is expected to range from low to moderate activity. Activity is expected to be at low levels early in the period until Region 338 returns to the visible disk on 11 May. Region 345/349 are due to return on 19 May. These regions are expected to present isolated M-class potential for the remainder of the period.

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 early in the period, 07 – 09 May. High levels are also expected on 12 – 23 May and again on 27 May – 02 June.

The geomagnetic field is expected to range from quiet to isolated major storm levels. Early in the period a large negative polarity coronal hole high speed flow is expected to produce unsettled to minor storm conditions. On 13 – 14 May, isolated major storm levels are possible with the return of a large coronal hole high speed flow. Late in the period a positive polarity is due to return and may produce unsettled to major storming on 27 - 30 May.



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
28 April	152	175	1460	B5.7	7	0	0	2	0	0	0	0
29 April	155	224	1640	B5.8	13	1	0	4	1	0	0	0
30 April	154	160	1390	B4.2	2	0	0	1	0	0	0	0
01 May	149	171	1710	B5.2	14	0	0	7	0	0	0	0
02 May	144	175	1750	B3.6	3	1	0	6	0	0	0	0
03 May	148	134	1440	B5.5	2	0	0	2	0	0	0	0
04 May	142	172	1850	B5.8	4	0	0	6	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
28 April	2.8E+6	1.5E+4	6.7E+3		1.8E+8	
29 April	3.2E+6	1.2E+4	4.3E+3		1.7E+8	
30 April	2.8E+6	1.2E+4	4.0E+3		7.6E+7	
01 May	5.7E+6	1.1E+4	3.7E+3		1.8E+8	
02 May	3.3E+6	1.1E+4	4.2E+3		4.7E+8	
03 May	3.2E+6	1.1E+4	3.8E+3		8.0E+8	
04 May	3.3E+6	1.0E+4	3.9E+3		9.0E+8	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	28 April	9	2-3-3-3-2-1-1-2	29	3-6-4-6-3-2-1-1	20
29 April	13	2-2-1-0-3-3-4-4	39	2-2-2-0-6-6-6-5	20	2-3-2-1-4-4-5-5
30 April	34	6-6-3-3-3-3-4-4	43	5-5-6-5-4-5-4-3	40	5-6-5-5-4-4-4-5
01 May	29	6-5-4-3-3-3-3-3	48	5-5-6-6-5-5-3-3	40	6-5-5-5-4-4-4-3
02 May	11	2-5-2-2-2-1-1-2	24	4-5-3-5-4-3-1-2	17	3-5-3-3-3-2-2-3
03 May	7	2-3-1-2-2-2-1-2	14	2-3-3-4-4-3-1-1	10	2-3-3-3-2-2-2-2
04 May	4	2-2-0-2-1-1-1-1	10	3-2-2-4-2-2-1-1	7	3-2-1-2-2-2-2-2

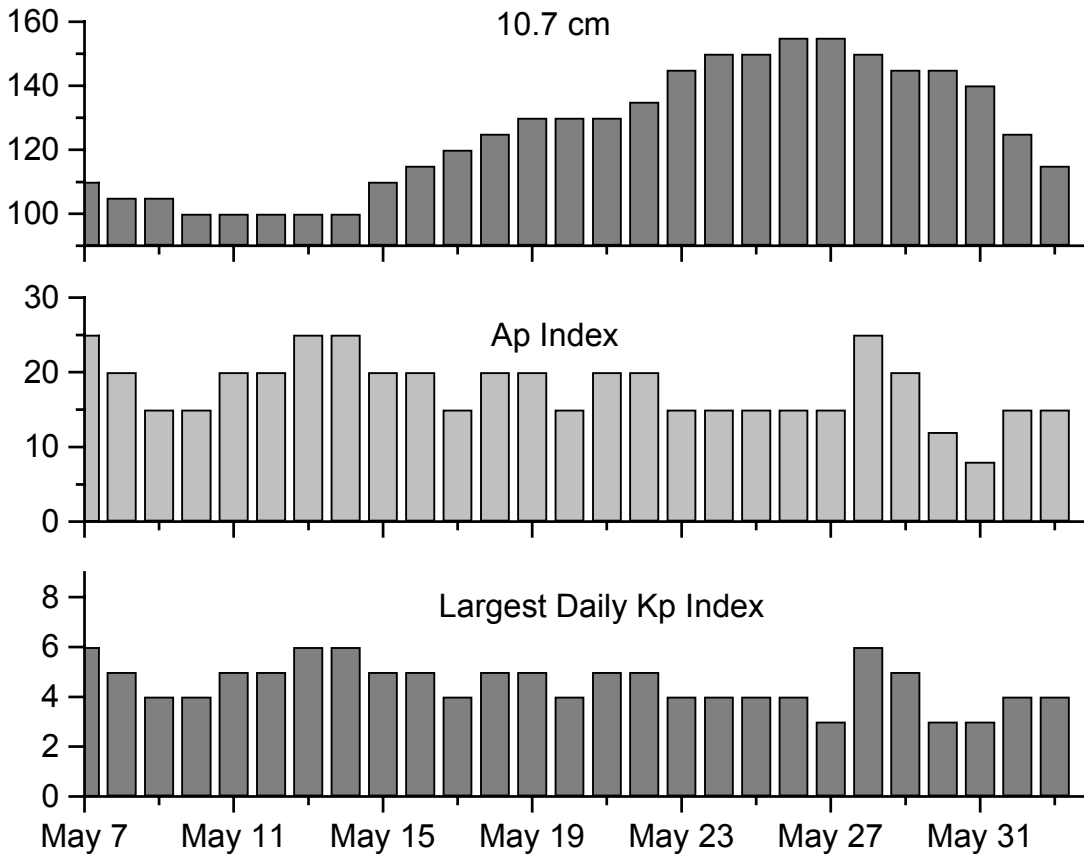


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
28 Apr 0109	6 - 245 MHz Radio Bursts	27 Apr
28 Apr 0109	245 MHz Radio Noise Storm	27 Apr
28 Apr 0534	ALERT: Geomagnetic K= 5	28 Apr 0533
28 Apr 1020	ALERT: Electron 2MeV Integral Flux > 1000pfu	28 Apr 0940
29 Apr 0111	1 - 245 MHz Radio Burst	28 Apr
29 Apr 0111	245 MHz Radio Noise Storm	28 Apr
29 Apr 0001	EXTENDED WARNING: Geomagnetic K= 4	27 Apr 0515 -29 Apr 1500
29 Apr 0432	WARNING: Geomagnetic Sudden Impulse	29 Apr 0445 - 0515
29 Apr 0500	SUMMARY: Geomagnetic Sudden Impulse	29 Apr 0453
29 Apr 0930	ALERT: Electron 2MeV Integral Flux > 1000pfu	29 Apr 0930
29 Apr 1442	EXTENDED WARNING: Geomagnetic K= 4	27 Apr 0515 -29 Apr 2359
29 Apr 1757	ALERT: Geomagnetic K= 5	29 Apr 1757
29 Apr 2326	EXTENDED WARNING: Geomagnetic K= 4	27 Apr 0515 -30 Apr 1500
30 Apr 0258	ALERT: Geomagnetic K= 5	30 Apr 0258
30 Apr 0323	ALERT: Geomagnetic K= 5	30 Apr 0320
30 Apr 0330	WARNING: Geomagnetic K= 5	30 Apr 0332 - 1500
30 Apr 0341	ALERT: Geomagnetic K= 6	30 Apr 0340
30 Apr 1458	EXTENDED WARNING: Geomagnetic K- 4	27 Apr 0515 -01 May 1500
30 Apr 1623	ALERT: Electron 2MeV Integral Flux > 1000pfu	30 Apr 1605
01 May 0108	1 - 245 MHz Radio Burst	30 Apr
01 May 0124	ALERT: Geomagnetic K= 5	01 May 0123
01 May 0148	ALERT: Geomagnetic K= 6	01 May 0147
01 May 0210	WARNING: Geomagnetic K= 5	01 May 0215 - 1500
01 May 1443	EXTENDED WARNING: Geomagnetic K= 4	27 Apr 0515 -02 May 1500
01 May 1509	ALERT: Electron 2MeV Integral Flux > 1000pfu	01 May 1445
01 May 1948	WATCH: Geomagnetic A \geq 20	02 May
01 May 2354	WARNING: Geomagnetic K= 5	01 May 2355 - 02 May 1500
02 May 0137	5 - 245 MHz Radio Bursts	01 May
02 May 0137	245 MHz Radio Noise Storm	01 May
02 May 0352	ALERT: Geomagnetic K= 5	02 May 0348
02 May 0449	ALERT: Geomagnetic K= 6	02 May 0445
02 May 1045	ALERT: Electron 2MeV Integral Flux > 1000pfu	02 May 0900
02 May 1439	EXTENDED WARNING: Geomagnetic K= 4	27 Apr 0515 -02 May 2359
02 May 1924	EXTENDED WARNING: Geomagnetic K= 4	27 Apr 0515 -03 May 1500
03 May 0125	11 - 245 MHz Radio Bursts	02 May
03 May 0125	2 - 245 MHz Radio Noise Storms	02 May
03 May 0924	ALERT: Electron 2MeV Integral Flux > 1000pfu	03 May 0900
04 May 0120	1 - 245 MHz Radio Burst	03 May
04 May 0918	ALERT: Electron 2MeV Integral Flux > 1000pfu	04 May 0900



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 May	110	25	6	21 May	130	20	5
08	105	20	5	22	135	20	5
09	105	15	4	23	145	15	4
10	100	15	4	24	150	15	4
11	100	20	5	25	150	15	4
12	100	20	5	26	155	15	4
13	100	25	6	27	155	15	3
14	100	25	6	28	150	25	6
15	110	20	5	29	145	20	5
16	115	20	5	30	145	12	3
17	120	15	4	31	140	8	3
18	125	20	5	01 Jun	125	15	4
19	130	20	5	02	115	15	4
20	130	15	4				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
									245	2695	II	IV
29 Apr	0432	0459	0510	M1.1	.016	1f	S12W55	337				
02 May	0247	0308	0344	M1.0	.024	Sf	S15W22	345	110	37		

Flare List

Date	Time			X-ray Class.	Optical Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
28 April	0357	0436	0520	C4.4			337
	1010	1017	1026	C1.5			338
	1340	1346	1349	B8.9			337
	1405	1417	1423	C1.3			338
	1523	1523	1550	C2.1	Sf	S14W43	337
	1714	1719	1726	C2.0			338
	1815	1815	1826	C3.3	Sf	N16W13	344
	2122	2130	2142	C1.8			
29 April	2211	2215	2222	B9.3			
	0022	0025	0031	C1.0			337
	0055	0115	0132	C1.4			338
	0445	0448	A0521	M1.1	1f	S12W55	337
	0647	0659	0711	C1.1			349
	0748	0751	0755	C1.0			345
	0855	0859	0903	C1.3			338
	0940	0948	0950	C1.6			338
	1053	1057	1100	C2.1			349
	1249	1252	1254	B8.9			349
	1401	1402	1410	B9.9	Sf	S13E27	349
	1534	1538	1541	B8.0			349
	1653	1659	1704	C1.7			349
	1933	1936	1938	C1.5			349
	1954	1959	2007	C1.2			349
30 April	2117	2117	2128	C1.7	Sf	S13E24	349
	2241	2242	2245	C1.4	Sf	S13E17	349
	2337	2347	0036	C3.1	Sf	S13E22	349
	0125	0128	0131	C1.0			349
	0506	0509	0512	B8.8			349
	0842	0846	0848	B8.5			349
	1251	1252	1259		Sf	S12W52	340
	1549	1553	1558	B9.2			349
	1718	1815	1919	C1.1			345
	2250	2254	2300	B7.8			349
01 May	0029	0111	0141	C1.1			
	0333	0338	0348	B9.3			349
	0357	0406	0411	C1.3			349
	0716	0817	0902	C1.8			



Flare List - continued

Date	Time			X-ray Class.	Optical		Rgn	
	Begin	Max	End		Imp / Brtns	Location Lat CMD		
01 May	0929	0944	1017	C1.7				
	1041	1044	1049	C1.5			349	
	1118	1122	1127		Sf	S12E00	349	
	1131	1142	1205	C5.3	Sf	S14E03	349	
	1234	1238	1240	C1.2			349	
	1328	1333	1340	C1.7			337	
	1359	1402	1429	C1.1	Sf	S12W02	349	
	1410	1411	1421	C3.5	Sf	S12W03	349	
	1846	1846	1852	C1.8	Sf	S14W01	349	
	1917	1923	1936	C4.9	Sf	S12W03	349	
	2157	2158	2218	C2.2	Sf	S12W06	349	
	2300	2303	2307	C1.4				
	02 May	0253	0256	0329	M1.0	Sf	S15W22	345
		0624	0624	0634	C2.0	Sf	N14W57	344
1211		1248	1345	C1.4				
1640		1641	1653		Sf	S13W29	345	
1745		1749	1753	B6.6				
1807		1807	1840	C5.4	Sf	S17W30	345	
1824		1830	1837		Sf	S19W35	347	
1841		1843	1846		Sf	S17W31	345	
03 May	0948	0950	0953	C1.4				
	1456	1458	1505		Sf	S32W32	348	
	1833	1833	1839	C2.7	Sf	S15W45	345	
04 May	0148	0301	0333	C1.8			349	
	0624	0637	0648	B9.3			349	
	0810	0810	0816	C1.4	Sf	S14W35	349	
	1344	1349	1355	C1.3			349	
	1500	1505	1513	C1.2			349	
	1816	1817	1830		Sf	S32W46	348	
	1857	1857	1908		Sf	S34W36	348	
	1923	1926	1928		Sf	S33W45	348	
	1932	1940	1951		Sf	S32W46	348	
	2135	2135	2153		Sf	S32W47	348	



Region Summary

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

Region 336

17 Apr	N12E75	257	0100	02	Hsx	001	A												
18 Apr	N13E62	257	0160	02	Hax	001	A												
19 Apr	N13E50	256	0120	03	Hax	001	A												
20 Apr	N13E37	256	0150	03	Hax	002	A												
21 Apr	N13E23	257	0120	04	Cao	005	B												
22 Apr	N14E10	256	0070	03	Dso	005	B												
23 Apr	N13W03	256	0060	04	Cso	006	B												
24 Apr	N14W16	256	0030	04	Cso	008	B												
25 Apr	N14W29	256	0010	03	Bxo	006	B												
26 Apr	N14W42	256	0010	04	Bxo	006	B												
27 Apr	N14W56	256	0010	03	Bxo	004	B												
28 Apr	N14W69	256	0010	04	Bxo	004	B												
29 Apr	N14W82	256																	
									0	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 256

Region 337

18 Apr	S12E74	245	0180	03	Hkx	002	A		1										
19 Apr	S14E66	239	0240	09	Cao	006	B												
20 Apr	S14E55	238	0340	10	Dko	010	B					1							
21 Apr	S13E43	237	0370	09	Dki	022	Bd	2				2							
22 Apr	S14E29	237	0270	09	Dki	019	Bg												
23 Apr	S14E15	238	0310	08	Dko	019	Bg												
24 Apr	S14E00	240	0280	06	Dko	022	Bg	1				1							
25 Apr	S14W13	240	0270	07	Dko	018	Bg												
26 Apr	S14W26	240	0220	06	Dko	013	B												
27 Apr	S14W40	240	0220	08	Dki	021	Bgd												
28 Apr	S14W53	240	0270	09	Dac	019	Bgd	2				1							
29 Apr	S16W67	241	0290	12	Eao	015	Bg	1	1				1						
30 Apr	S16W81	242	0080	06	Dso	004	B												
01 May	S15W92	240	0060	02	Hsx	001	A		1										
									7	2	0	5	1	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 240



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 338</i>																		
19 Apr	N18E26	280	0020	11	Bxo	004	B											
20 Apr	N18E09	284	0040	08	Dso	008	B											
21 Apr	N18W05	285	0050	10	Dai	025	Bg		1				1					
22 Apr	N18W20	286	0100	10	Dai	020	Bg	3				2						
23 Apr	N18W32	285	0170	12	Eai	031	Bg	1	2				2					
24 Apr	N18W45	285	0200	11	Eai	025	Bg	1	1			1	1					
25 Apr	N18W58	285	0210	11	Eao	028	Bgd	7				5						
26 Apr	N18W71	285	0250	13	Eac	019	Bgd	8	4			9	1					
27 Apr	N18W85	285	0200	08	Dai	007	Bg	8	1			3		1				
28 Apr	N18W98	285										3						
								31	9	0	20	5	1	0	0			

Crossed West Limb.

Absolute heliographic longitude: 285

<i>Region 340</i>																		
21 Apr	S04E55	225	0010	02	Axx	002	A	1										
22 Apr	S06E43	223	0010	01	Hrx	002	A											
23 Apr	S06E30	223	0010	00	Hsx	002	A											
24 Apr	S07E13	227	0010	01	Axx	002	A											
25 Apr	S07E00	227																
26 Apr	S07W13	227																
27 Apr	S07W26	227																
28 Apr	S07W39	227																
29 Apr	S09W50	224	0130	07	Dao	017	B											
30 Apr	S12W66	227										1						
01 May	S12W79	227																
								1	0	0	1	0	0	0	0			

Crossed West Limb.

Absolute heliographic longitude: 227



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 341

21 Apr	S10E74	206	0010	04	Cro	004	B										
22 Apr	S10E61	205	0020	04	Cro	004	B										
23 Apr	S10E50	203	0010	01	Axx	001	A										
24 Apr	S10E37	203															
25 Apr	S10E24	203															
26 Apr	S10E11	203															
27 Apr	S10W02	203															
28 Apr	S10W15	203															
29 Apr	S10W28	203															
30 Apr	S10W41	203															
01 May	S10W54	203															
02 May	S10W67	203															
03 May	S10W80	203															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 203

Region 342

22 Apr	N18W07	273	0020	02	Axx	006	A										
23 Apr	N18W21	274	0020	02	Axx	004	A										
24 Apr	N17W35	275	0020	03	Bxo	006	B										
25 Apr	N17W48	275	0040	05	Cso	009	B										
26 Apr	N17W61	275	0050	04	Cso	005	B										
27 Apr	N17W75	275	0030	01	Hsx	001	A										
28 Apr	N17W88	275															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 273



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 343

23 Apr	N06E60	193	0030	06	Cro	004	B											
24 Apr	N06E45	195	0040	06	Dso	006	B											
25 Apr	N06E32	195	0020	06	Cso	006	B											
26 Apr	N06E19	195	0020	01	Axx	001	A											
27 Apr	N06E05	195	0010	03	Bxo	005	B											
28 Apr	N06W08	195																
29 Apr	N07W23	197	0000	01	Axx	002	A											
30 Apr	N07W36	197																
01 May	N07W49	197																
02 May	N07W62	197																
03 May	N07W75	197																

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 195

Region 344

24 Apr	N16E39	201	0030	06	Dso	007	B											
25 Apr	N16E26	201	0170	07	Dao	017	B											
26 Apr	N16E13	201	0400	08	Dki	020	Bgd											
27 Apr	N16W00	201	0450	08	Dki	020	Bgd											
28 Apr	N16W14	201	0450	09	Dki	016	Bgd	1				1						
29 Apr	N16W27	201	0370	08	Dao	018	Bg											
30 Apr	N15W41	202	0220	07	Dko	009	Bg											
01 May	N15W54	202	0210	08	Dao	010	Bg											
02 May	N15W67	200	0270	09	Dao	011	B	1				1						
03 May	N16W81	201	0160	04	Dso	004	B											
04 May	N14W94	201	0120	04	Dao	006	B											

2 0 0 2 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 201



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 345

24 Apr	S17E74	166	0030	05	Cso	004	B										
25 Apr	S17E61	166	0170	06	Dao	008	B										
26 Apr	S17E48	166	0170	07	Dao	006	B										
27 Apr	S17E34	166	0190	05	Dao	006	B										
28 Apr	S17E21	166	0210	05	Dao	013	B										
29 Apr	S16E08	166	0190	05	Dao	015	B	1									
30 Apr	S17W06	167	0110	05	Dao	009	B	1									
01 May	S17W19	167	0120	04	Dao	007	B										
02 May	S17W34	167	0130	08	Dao	012	Bg	1	1		4						
03 May	S17W46	166	0110	05	Dao	006	B	1			1						
04 May	S17W60	167	0100	04	Dao	004	B										
										4	1	0	5	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 167

Region 346

24 Apr	N16E74	166	0050	02	Hsx	001	A										
25 Apr	N16E61	166	0060	02	Hsx	001	A		1		1						
26 Apr	N16E48	166	0060	04	Cso	003	B										
27 Apr	N16E35	165	0060	02	Hsx	001	A										
28 Apr	N16E23	165	0090	02	Hsx	002	A										
29 Apr	N16E12	162	0090	04	Cso	004	B										
30 Apr	N16W02	163	0060	02	Hsx	001	A										
01 May	N15W15	163	0060	02	Hsx	001	A										
02 May	N15W28	161	0070	02	Hsx	001	A										
03 May	N14W40	160	0070	01	Hsx	001	A										
04 May	N14W54	161	0070	02	Hsx	001	A										
										0	1	0	1	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 163

Region 347

26 Apr	S20E36	178	0040	03	Bxo	004	B										
27 Apr	S20E22	178	0020	03	Dro	003	B										
28 Apr	S20E09	178	0010	03	Bxo	003	B										
29 Apr	S18W02	176	0010	04	Bxo	009	B										
30 Apr	S18W15	176															
01 May	S18W28	176															
02 May	S18W41	176									1						
03 May	S18W54	176															
										0	0	0	1	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 176



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 348

26 Apr	S36E58	156	0020	06	Bxo	004	B												
27 Apr	S36E44	156	0030	06	Cso	007	B												
28 Apr	S36E31	156	0030	07	Dso	009	B												
29 Apr	S35E19	155	0050	09	Dso	010	B												
30 Apr	S36E11	150	0020	04	Cso	005	B												
01 May	S34W01	149	0010	01	Axx	002	A												
02 May	S35W13	146	0010	02	Axx	004	A												
03 May	S35W27	147	0040	09	Cro	010	B					1							
04 May	S35W44	151	0250	16	Fki	023	Bg					5							
								0	0	0	0	6	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 149

Region 349

26 Apr	S14E60	154	0030	01	Hrx	002	A												
27 Apr	S14E46	154	0150	06	Dao	015	B					2							
28 Apr	S14E33	154	0390	09	Dki	029	Bg												
29 Apr	S13E20	154	0510	10	Dkc	044	Bg	8				4							
30 Apr	S13E07	154	0740	12	Eki	045	Bg	1											
01 May	S14W06	154	1020	12	Ekc	051	Bg	9				7							
02 May	S13W21	154	1010	14	Ekc	057	Bg												
03 May	S14W34	154	0820	14	Ekc	052	Bg												
04 May	S15W47	154	1030	15	Ekc	054	Bg	4				1							
								22	0	0	0	14	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 154

Region 350

30 Apr	S12W58	219	0070	08	Dao	006	B												
01 May	S11W70	218	0060	09	Dao	005	B												
02 May	S11W84	217	0060	10	Dao	005	B												
								0	0	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 219



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares										
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
		Lon						C	M	X	S	1	2	3	4		
<i>Region 351</i>																	
30 Apr	N06E76	085	0090	03	Hkx	001	A										
01 May	N08E65	083	0150	03	Hax	001	A										
02 May	N08E51	082	0180	04	Hsx	001	A										
03 May	N08E38	082	0240	03	Hax	001	A										
04 May	N08E25	082	0220	04	Hhx	001	A										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 082																	
<i>Region 352</i>																	
01 May	S24E43	105	0020	04	Bxo	003	B										
02 May	S25E30	103	0020	05	Bxo	004	B										
03 May	S25E17	103															
04 May	S25E04	103															
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 103																	
<i>Region 353</i>																	
04 May	S16E33	074	0020	02	Axx	002	A										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 074																	
<i>Region 354</i>																	
04 May	N19E58	049	0040	01	Hsx	001	A										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 049																	

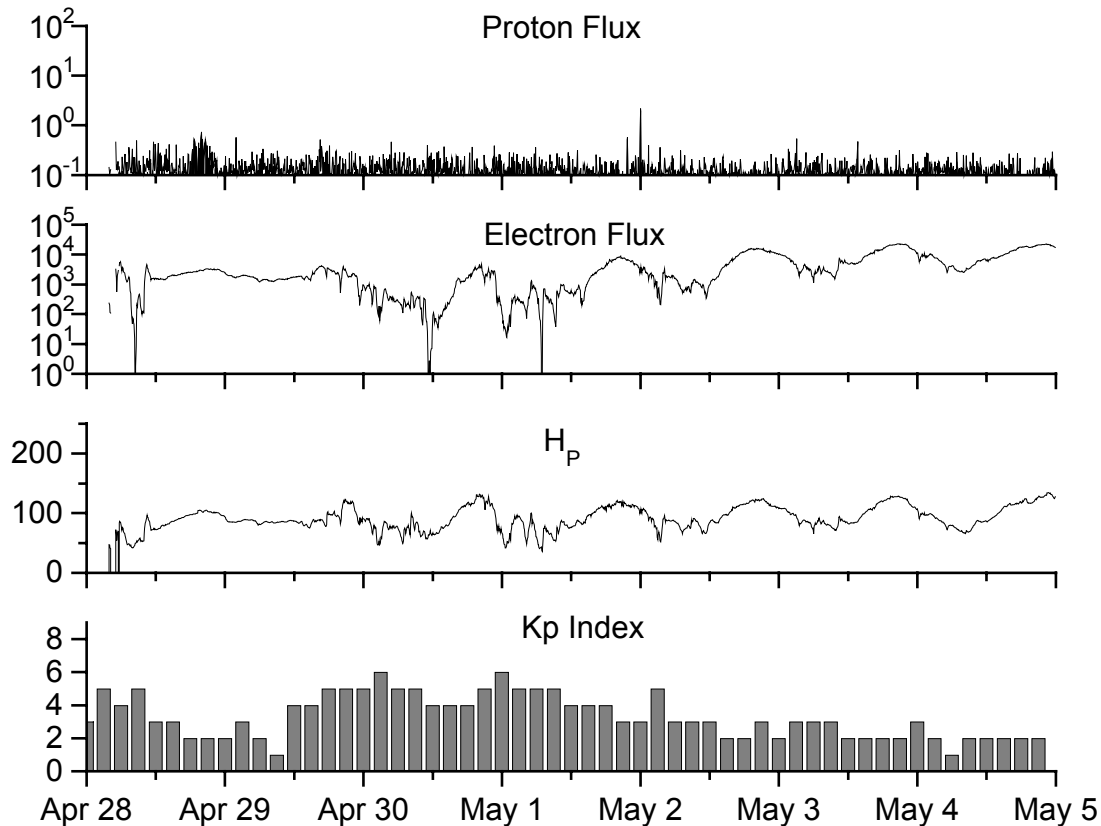


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2001									
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	132.2	0.61	184.5	114.6	235.6	193.9	09	12.2
2002									
January	189.0	114.1	0.60	184.8	113.5	227.3	194.6	08	12.4
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	113.4	180.3	195.7	10	13.0
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	99.9	0.54	175.4	102.7	173.5	173.5	13	13.9
August	191.0	116.4	0.61	169.3	98.7	183.9	169.5	16	14.3
September	206.4	109.6	0.53	163.4	94.6	175.8	164.2	14	14.9
October	153.9	97.5	0.63	158.7	90.5	167.0	159.5	23	15.5
November	159.8	95.5	0.60			168.7		16	
December	147.9	80.8	0.55			158.6		13	
2003									
January	149.3	79.5	0.53			144.6		13	
February	87.9	46.2	0.53			124.6		15	
March	119.7	61.5	0.51			132.3		19	
April	114.3	60.0	0.52			126.5		20	

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 28 April 2003

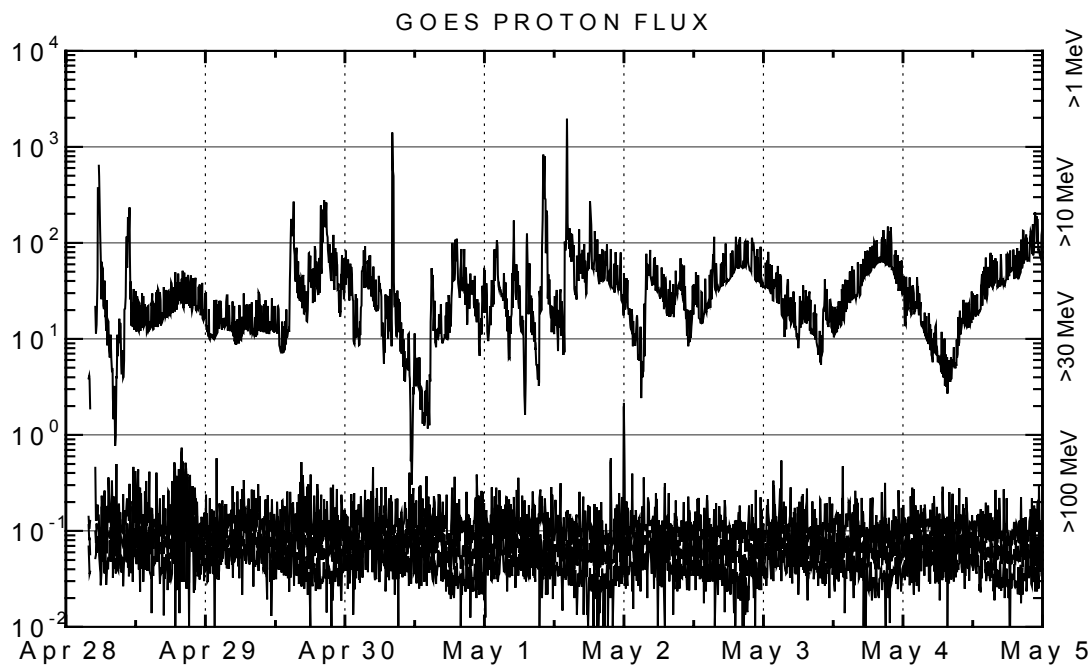
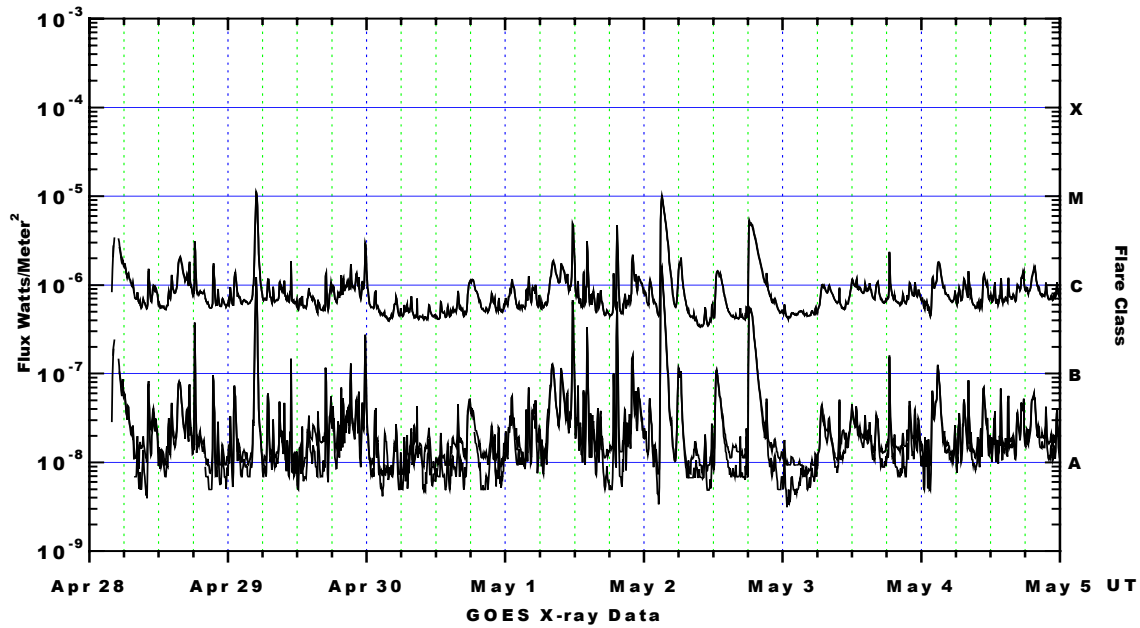
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-10 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-10.

H_p plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-10. 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_p is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





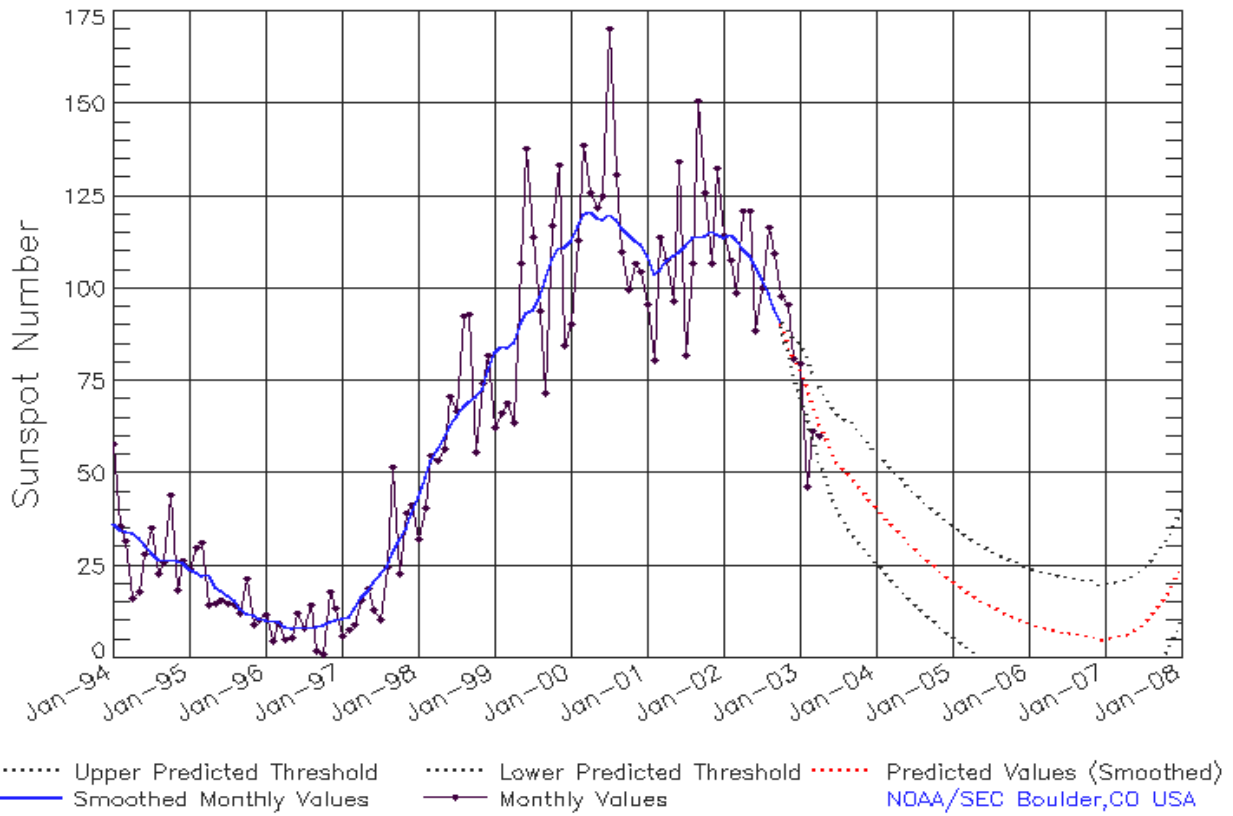
Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five-minute averaged x-ray flux (watts/m²) as measured by GOES 10 and 12 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-10 (W75) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm²-sec-sr) at greater than 10 MeV.



ISES Solar Cycle Sunspot Number Progression Data Through 30 Apr 03



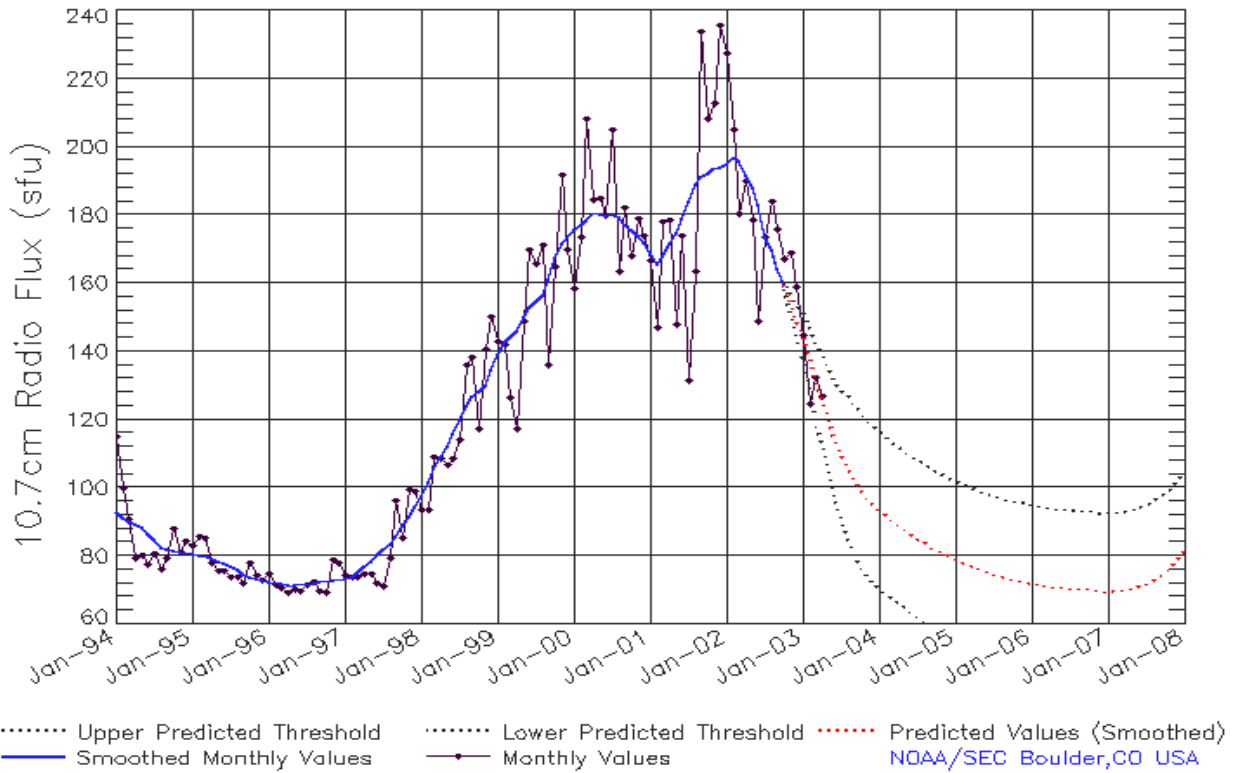
SEC Prediction of Smoothed Sunspot Number

	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 (1)	81 (3)
2003	78 (5)	74 (7)	68 (8)	64 (9)	60 (10)	56 (11)	53 (12)	51 (13)	49 (14)	47 (15)	45 (15)	43 (15)
2004	41 (15)	39 (15)	37 (15)	35 (15)	33 (15)	31 (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 30 Apr 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 (***)	174 (***)	170 (***)	164 (***)	160 (***)	154 (1)	149 (3)
2003	145 (5)	138 (7)	132 (9)	126 (11)	120 (13)	114 (15)	110 (17)	106 (19)	103 (21)	100 (22)	97 (23)	95 (23)
2004	94 (23)	92 (23)	91 (23)	89 (23)	88 (23)	87 (23)	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 30 Apr 03

