

**Space Weather Highlights**  
**31 December 2001 - 06 January 2002**

**SWO PRF 1375**  
**08 January 2002**

Solar activity was at low to moderate levels. Low activity occurred during the first two days of the period due to isolated C-class subflares. Activity increased to moderate levels on 02 January due to an impulsive low-level M-class flare from Region 9754 (S08, L = 121, class/area Eai/270 on 25 December), which departed the visible disk on 04 January (please refer to the Energetic Events or Optical Flares lists for flare specifics). Activity decreased to low levels on 03 January with occasional C-class subflares from Regions 9754 and 9767 (S23, L = 016, class/area Eki/510 on 31 December). Region 9767 exhibited moderate size and magnetic complexity, but began to show signs of decay late in the period (Region 9767 was the return of old Region 9727, which had a history of major flare production). Activity returned to moderate levels during 04 – 05 January due to a couple low-level M-class flares from Region 9773 (N13, L = 324, class/area Dao/140 on 06 January), which rotated into view on 04 January. Region 9773 was also moderate in size and magnetic complexity, but began to gradually decay late in the period. Another event of interest was a long-duration C3 X-ray flare at 04/0952 UTC associated with an eruptive prominence on the northeast limb, a Type II radio sweep, and a coronal mass ejection. Activity decreased to low levels on the final day of the period.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the period. A coronal mass ejection (CME) passage was in progress at the start of the period with wind velocities as high as 670 km/sec early on 31 December. However, CME effects subsided by late on 31 December as velocities gradually decreased. There were no significant disturbances observed during the rest of the period.

A greater than 10 MeV proton event was in progress at the start of the period. It began at 30/0240 UTC, reached a peak of 108 PFU at 31/1620 UTC, and ended at 04/2355 UTC following a very gradual decay.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels during the period.

Geomagnetic field activity was at quiet to active levels on 31 December with intermittent unsettled to active periods due to subsiding CME effects. Quiet to unsettled conditions occurred during the rest of the period.

**Space Weather Outlook**  
**09 January - 04 February 2002**

Solar activity is expected to range from low to moderate levels. Isolated low-level M-class flares are likely. The return of old Region 9742 (N10, L = 214) on 11 January may bring an increased chance for isolated major flare activity.

There will be a chance for a proton flare during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels during most of the period. However, high flux levels will be possible during 12 – 14 January.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period. However, active conditions are expected during 10 - 13 and 20 January due to coronal hole effects.



### 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
31 December	246	209	1290	C2.7	3	0	0	4	1	0	0	0
01 January	232	222	1360	C1.6	1	0	0	1	0	0	0	0
02 January	231	241	1205	C2.7	7	2	0	14	1	0	0	0
03 January	220	229	1170	C2.3	12	0	0	15	1	0	0	0
04 January	218	248	1190	C1.9	5	1	0	8	2	0	0	0
05 January	212	201	1120	C1.9	5	1	0	18	1	0	0	0
06 January	197	143	850	C1.4	10	0	0	15	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
31 December	5.5E+7	5.9E+6	3.6E+3		1.0E+7	
01 January	5.2E+7	5.0E+6	3.1E+3		1.2E+7	
02 January	3.5E+7	3.7E+6	2.8E+3		1.1E+7	
03 January	2.0E+7	2.3E+6	2.5E+3		9.3E+6	
04 January	1.6E+7	1.4E+6	2.3E+3		8.3E+6	
05 January	1.0E+7	6.7E+5	2.3E+3		5.7E+6	
06 January	5.9E+6	2.8E+5	2.4E+3		6.5E+6	

### Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	24 December	13	1-3-4-3-3-3-2-2	36	0-3-6-4-6-5-4-2	19
25 December	11	2-2-2-3-3-3-2-3	*	*_*_*_*_*_*_*_*	8	3-2-1-3-2-2-1-3
26 December	10	2-1-1-1-3-4-3-2	*	*_*_*_*_*_*_*_*	7	2-0-0-1-2-3-3-2
27 December	10	2-1-2-2-3-3-3-2	*	*_*_*_*_*_*_*_*	6	2-1-1-2-2-3-3-1
28 December	9	1-0-2-2-3-3-3-3	*	*_*_*_*_*_*_*_*	5	1-0-1-2-2-2-2-2
29 December	13	2-4-2-2-2-4-2-3	*	*_*_*_*_*_*_*_*	10	2-4-2-2-2-3-3-2
30 December	15	3-3-3-2-2-2-4-4	*	*_*_*_*_*_*_*_*	17	3-4-4-2-3-2-4-4

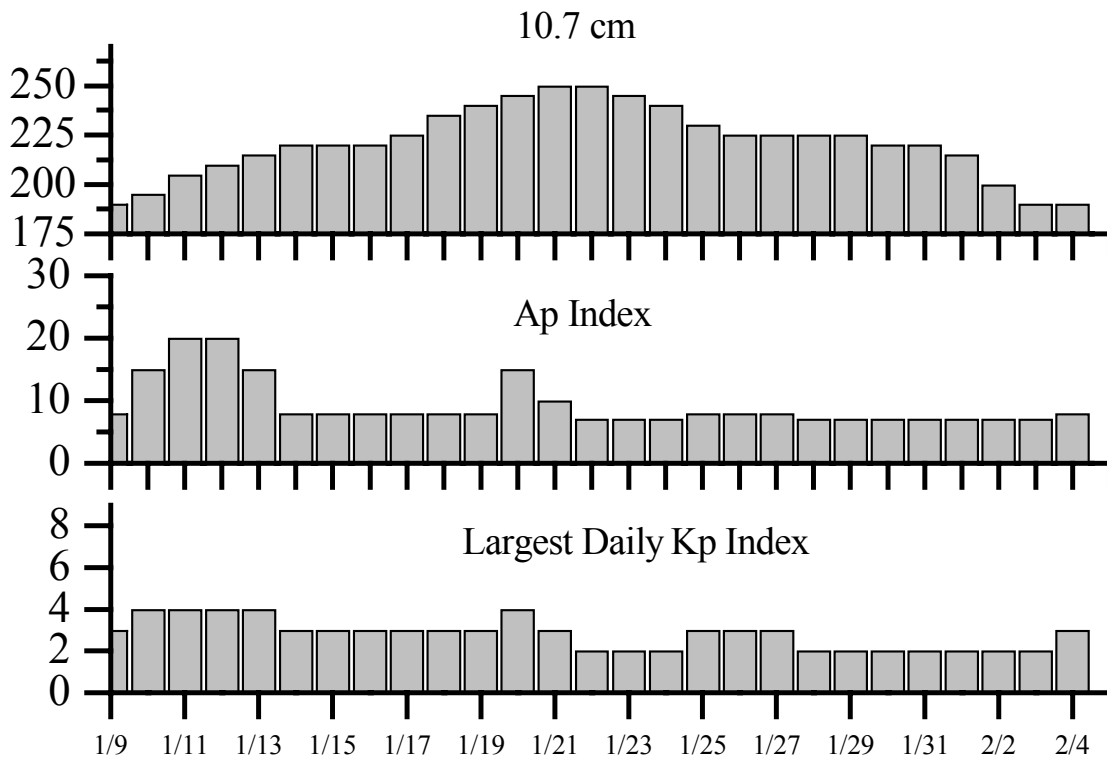


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
31 Dec 0010	Proton Event >10MeV $\geq$ 10pfu Warning	31 Dec 0015 - 1500
31 Dec 0024	CONT'D Protons Event >10 MeV $\geq$ 10pfu	30 Dec 0245
31 Dec 0028	2 - 245 MHz Bursts	30 Dec
31 Dec 1248	Stratwarm Alert Exists Monday	
31 Dec 1449	CONT'D Proton Event >10MeV $\geq$ 10pfu Warning	31 Dec 0015 - 1500
01 Jan 0007	CONT'D Protons Event >10 MeV $\geq$ 10pfu	30 Dec 0245
01 Jan 0034	2 - 245 MHz Bursts	31 Dec
01 Jan 1156	Stratwarm Alert Exists Tuesday	
01 Jan 1701	CONT'D Proton Event >10MeV $\geq$ 10pfu Warning	31 Dec 0015 - 1500
02 Jan 0017	CONT'D Protons Event >10 MeV $\geq$ 10pfu	30 Dec 0245
02 Jan 0029	1 - 245 MHz Burst	01 Jan
02 Jan 1216	Stratwarm Alert Exists Wednesday	
02 Jan 1711	CONT'D Proton Event >10MeV $\geq$ 10pfu Warning	31 Dec 0015 -03 Jan 2100
03 Jan 0013	CONT'D Protons Event >10 MeV $\geq$ 10pfu	30 Dec 0245
03 Jan 0016	1 - 245 MHz Burst	02 Jan
03 Jan 0241	Type II Radio Emission	03 Jan 0219
03 Jan 1400	Stratwarm Alert Exists Thursday	
03 Jan 1626	CONT'D Proton Event>10MeV $\geq$ 10pfu Warning	31 Dec 0015-04 Jan 1800
04 Jan 0007	1 - 245 MHz Burst	03 Jan
04 Jan 1013	Type II Radio Emission	04 Jan 0935
04 Jan 1257	CONT'D Protons Event >10 MeV $\geq$ 10pfu	30 Dec 0245
05 Jan 0012	CONT'D Protons Event >10 MeV $\geq$ 10pfu	30 Dec 0245
05 Jan 0016	Proton Event >10MeV $\geq$ 10pfu Warning	31 Dec 0015 - 5 Jan1500
05 Jan 0036	3 - 245 MHz Bursts	04 Jan
05 Jan 0036	1 - 245 MHz Noise Storm	04 Jan
05 Jan 1458	ENDED Protons Event >10 MeV $\geq$ 10pfu	30 Dec 0245



### 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
09 Jan	190	8	3	23 Jan	245	7	2
10	195	15	4	24	240	7	2
11	205	20	4	25	230	8	3
12	210	20	4	26	225	8	3
13	215	15	4	27	225	8	3
14	220	8	3	28	225	7	2
15	220	8	3	29	225	7	2
16	220	8	3	30	220	7	2
17	225	8	3	31	220	7	2
18	235	8	3	01	215	7	2
19	240	8	3	02	200	7	2
20	245	15	4	03	190	7	2
21	250	10	3	04	190	8	3
22	250	7	2				



### *Energetic Events*

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/Location		Rgn #	Radio Flux		Intensity	
						Brtns	Lat CMD		245	2695	II	IV
02 Jan 02	1248	1252	1255	M2.4	.007	1n	S07W68	9754			33	
02 Jan 02	2144	2148	2151	M1.1	.004				260	120		
04 Jan 02	1743	1749	1754	M1.0	.005	Sf	N16E71					
05 Jan 02	1819	1840	1851	M1.9	.025	1f	N14E53	9773				

### *Flare List*

Date	Time			X-ray Class.	Optical Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
31 December	0415	0419	0422	C3.8			
	0457	0458	0503		Sf	S20E74	9767
	0616	0619	0626		Sf	S20E68	9767
	1234	1238	1240	C3.7			
	1504	1504	1508		Sf	N06W56	9751
	1838	1844	1859	C6.7	1f	S09W46	9754
	1920	1923	2014		Sf	S31E11	9756
01 January	0533	0533	0538		Sf	S14E51	9767
	0859	0910	0917	C4.5			
02 January	0115	0123	0143		Sf	N13W40	9764
	0308	0426	0445		Sf	N13W42	9764
	0313	0319	0325	C5.2	Sf	N04W90	9751
	0336	0341	0403	C4.6	Sf	S06W58	9754
	0407	0410	0423		Sf	S06W60	9754
	0504	0513	0516		Sf	N13W44	9764
	0517	0542	0556	C3.1	Sf	N13W43	9764
	0757	0800	0808	C7.2	Sf	S07W56	9754
	0905	0912	0919	C6.7	Sf	S08W57	9754
	1136	1136	1155		Sf	S20E36	9767
	1230	1231	1306		Sf	S25E40	9767
	1231	1232	1236		Sf	S06W60	9754
	1249	1252	1326	M2.4	1n	S07W68	9754
	1444	1451	1455		Sf	S22E42	9767
	1543	1548	1554	C3.2			
	1739	1739	1747		Sf	N14W49	9764
1751	1757	1804	C5.1				
2144	2148	2151	M1.1				
03 January	0016	0019	0023	C3.5			
	0034	0035	0037		Sf	S07W69	9754
	0105	0105	0110		Sf	S21E37	9767
	0212	0216	0242	C5.9	1f	S11E12	9767
	0235	0236	0238		Sf	S06W66	9754
	0401	0401	0408	C4.0	Sf	S05W69	9754
	0412	0412	0416		Sf	S06W67	9754
	0712	0714	0731	C2.8	Sf	S06W75	9754



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
03 January	0841	0843	0848	C2.1	Sf	N14W60	9764
	0952	0959	1003	C2.6			
	1147	1147	1155	C2.7	Sf	N07W35	9770
	1215	1216	1224		Sf	S23E31	9767
	1343	1344	1349		Sf	N12W82	9758
	1431	1435	1441	C2.3	Sf	N07W37	9770
	1440	1441	1447		Sf	N12W82	9758
	1505	1514	1519		Sf	N12W82	9758
	1712	1716	1722	C4.4	Sf	S26E30	9767
	1928	1934	1942	C2.2			
	2051	2054	2058	C1.9			
	04 January	2303	2309	2334	C6.3	Sf	S17E16
0705		0707	0710		Sf	S04W62	9754
0818		0822	0841	C3.6	Sf	S11W05	
0924		0952	1035	C3.7			
1237		1239	1247		Sf	S05W53	9768
1740		1740	1745	M1.0	Sf	N16E71	
1827		1829	1842	C5.6	1f	N13E58	9773
1856		1857	1907		Sf	N14E64	9773
1900		1902	1908		Sf	S24E14	9767
2013		U2039	2100	C8.7	1f	N14E67	9773
2039		2039	2043		Sf	S22E04	9767
2255		2256	2300	C7.2	Sf	S20E03	9767
05 January	0059	0100	0106	C3.1	Sf	S19E02	9767
	0221	0238	0244		Sf	N14E62	9773
	0247	0251	0258		Sf	S19E01	9767
	0257	0303	0308		Sf	N16E61	9773
	0305	0309	0322		Sf	S11W16	
	0310	0313	0318	C4.1	Sf	S06W67	9768
	0611	0634	0658	C8.0	Sf	N18E62	9773
	0616	0617	0624		Sf	S04W66	9768
	0617	0619	0621		Sf	S03W75	9755
	0707	0710	0715		Sf	S18W01	9767
	0748	0750	0755		Sf	S04W67	9768
	1013	1013	1016		Sf	S06W67	9768
05 January	1028	1037	1100	C7.4	Sf	N16E58	9773
	1123	1124	1131		Sf	S07W72	9755
	1501	1601	1644		Sf	S04W69	9768
	1708	1709	1744	C3.1	Sf	N13E57	9773
	1821	1841	1907	M1.9	1f	N14E53	9773
	2001	2005	2010		Sf	S24E01	9767
	2202	2202	2208		Sf	S21W21	9771



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
06 January	0155	0202	0211	C2.8	Sf	N16E50	9773
	0456	0500	0515	C3.4	Sf	S05W82	9768
	0523	0555	0616	C5.9			
	0548	0549	0551		Sf	N16E49	9773
	0552	0552	0555		Sf	N17E49	9773
	0558	0600	0602		Sf	N16E49	9773
	0606	0606	0615		Sf	N16E49	9773
	0648	0651	0702	C5.3	Sf	S08W84	9768
	0931	0933	0937	C1.6	Sf	S18W16	9767
	1138	1140	1203	C3.1	Sf	S17W13	9767
	1212	1213	1221		Sf	N14E49	9773
	1234	1248	1259	C3.2			
	1310	1310	1318	C2.7	Sf	S21W09	9767
	1354	1356	1406	C3.1	Sf	N15E40	9773
	1440	1444	1448	C6.2	Sf	S18W18	9767
	1839	1842	1844		Sf	S18W20	9767
	2052	2053	2056		Sf	S18W21	9767



### Region Summary

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 9751</i>																						
21 Dec	N04E68	143	0220	05	Hax	001	A															
22 Dec	N04E55	143	0330	09	Cho	003	B															
23 Dec	N04E44	141	0320	13	Eko	014	B															
24 Dec	N05E30	142	0380	13	Eko	013	B															
25 Dec	N04E18	140	0380	13	Eki	025	Bg														3	
26 Dec	N04E04	141	0500	14	Eki	033	Bg	2													11	
27 Dec	N04W10	142	0410	14	Eai	038	Bg														3	
28 Dec	N04W24	143	0380	14	Eai	034	Bg	1													2	1
29 Dec	N04W38	144	0300	14	Eai	031	Bg		1												1	1
30 Dec	N05W51	142	0230	13	Eai	018	Bg	2													3	
31 Dec	N04W64	142	0190	12	Eai	017	Bg														1	
01 Jan	N03W77	142	0150	14	Eai	012	Bg															
02 Jan	N04W89	141	0080	09	Dao	004	B	1													1	
								6	1	0	25	2	0	0	0	0						

Crossed West Limb.

Absolute heliographic longitude: 141

<i>Region 9753</i>																						
22 Dec	S20E67	131	0030	02	Hax	001	A															
23 Dec	S20E53	132	0060	08	Cao	003	B															1
24 Dec	S18E37	135	0080	08	Cao	008	B															
25 Dec	S18E12	146	0040	09	Dso	007	B															
26 Dec	S19E09	136	0050	10	Dso	015	B															
27 Dec	S18W06	138	0050	08	Dso	012	B															
28 Dec	S19W19	138	0060	11	Eso	013	B															
29 Dec	S19W33	139	0050	09	Dao	010	B															
30 Dec	S18W48	139	0090	09	Dao	015	B															
31 Dec	S17W60	138	0060	09	Dso	010	B															
01 Jan	S17W73	138	0070	10	Cso	007	B															
02 Jan	S17W87	139																				
								0	0	0	1	0	0	0	0	0						

Crossed West Limb.

Absolute heliographic longitude: 138





**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 9754</i>																		
23 Dec	S09E61	124	0090	11	Eao	006	B					1						
24 Dec	S08E48	124	0080	11	Eao	006	B		2					2				
25 Dec	S09E38	120	0270	14	Eai	025	Bg	1	1			2	2					
26 Dec	S09E24	121	0250	15	Eai	026	Bg					4	1					
27 Dec	S08E11	121	0140	15	Eai	023	Bg	2				3						
28 Dec	S08W02	121	0200	17	Fai	028	Bg	1	1			4	1					
29 Dec	S08W17	123	0250	17	Fai	033	Bg					1						
30 Dec	S08W30	121	0160	16	Fai	028	Bg					1						
31 Dec	S08W42	120	0070	11	Eai	020	Bg	1						1				
01 Jan	S07W55	120	0100	09	Dai	019	B											
02 Jan	S07W68	120	0175	11	Eai	017	B	3	1			5	1					
03 Jan	S05W81	121	0160	11	Eao	010	B	2				5						
04 Jan	S07W92	119	0020	02	Cso	005	B							1				
								10	5	0	27	8	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 121

<i>Region 9755</i>																		
25 Dec	S05E64	094	0180	06	Cao	003	B											
26 Dec	S04E50	095	0200	05	Cao	006	B											
27 Dec	S04E37	095	0150	05	Cao	008	B											
28 Dec	S04E23	096	0170	04	Cso	006	B					1						
29 Dec	S04E10	096	0180	06	Dso	012	B					1						
30 Dec	S04W03	094	0150	05	Dso	010	B											
31 Dec	S04W16	094	0140	04	Dso	010	B											
01 Jan	S08W29	094	0140	05	Dso	012	B											
02 Jan	S04W42	094	0090	05	Dso	006	B											
03 Jan	S04W55	095	0070	05	Cso	004	B											
04 Jan	S03W71	098	0090	02	Hsx	002	A											
05 Jan	S05W83	096	0060	02	Hsx	001	A					2						
								0	0	0	4	0	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 094



**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 9756*

26 Dec	S28E72	073	0040	02	Hsx	001	A												
27 Dec	S29E60	072	0070	02	Hsx	001	A												
28 Dec	S29E47	072	0120	03	Cao	005	B												
29 Dec	S28E34	072	0080	03	Cao	004	B												
30 Dec	S29E20	071	0060	03	Cao	003	B												
31 Dec	S29E08	070	0030	03	Cao	004	B												1
01 Jan	S28W05	070	0020	01	Hsx	001	A												
02 Jan	S28W17	069																	
03 Jan	S28W30	069																	
04 Jan	S28W43	069																	
05 Jan	S28W56	069																	
06 Jan	S28W69	069																	

0 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 070

*Region 9757*

26 Dec	S09E02	143	0010	03	Cso	003	B												
27 Dec	S08W12	144	0020	03	Cro	006	B												
28 Dec	S10W26	145	0010	02	Bxo	003	B												
29 Dec	S09W39	145	0000	01	Axx	003	A												
30 Dec	S10W51	142	0000	00	Axx	001	A												
31 Dec	S10W63	141	01 JanS10W76			141													
02 Jan	S10W89	141																	

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 143

*Region 9758*

26 Dec	N13E20	125	0000	01	Axx	001	A												
27 Dec	N13E07	125	0000	00		000													
28 Dec	N13W06	125	0000	00		000													
29 Dec	N13W19	125	0000	00		000													
03 Jan	N13W84	125																	

3  
0 0 0 3 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 125



**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 9761*

26 Dec	N09E75	070	0050	02	Hsx	001	A										
27 Dec	N10E61	071	0050	02	Hsx	001	A										
28 Dec	N10E47	072	0070	02	Hsx	001	A										
29 Dec	N10E34	072	0070	02	Hsx	001	A										
30 Dec	N10E21	070	0070	02	Hsx	001	A										
31 Dec	N11E08	070	0040	02	Hsx	001	A										
01 Jan	N10W05	070	0050	02	Hsx	001	A										
02 Jan	N11W18	070	0030	04	Cso	002	B										
03 Jan	N11W31	071	0020	02	Hsx	003	A										
04 Jan	N11W45	072	0010	01	Hsx	001	A										
05 Jan	N12W56	069	0020	01	Hsx	001	A										
06 Jan	N10W70	070	0010	01	Axx	001	A										

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 070

*Region 9762*

27 Dec	N03E07	125	0020	01	Hsx	001	A										
28 Dec	N02W07	126	0000	01	Axx	001	A										
29 Dec	N02W16	122															
30 Dec	N02W29	122															
31 Dec	N02W42	122															
01 Jan	N02W55	122															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 125

*Region 9763*

27 Dec	N06E76	056	0060	03	Hsx	001	A										
28 Dec	N06E61	058	0080	07	Cso	004	B										
29 Dec	N06E49	057	0090	08	Cao	006	B					1					
30 Dec	N06E35	056	0060	06	Cso	004	B										
31 Dec	N07E20	058	0040	02	Hsx	001	A										
01 Jan	N06E07	058	0040	02	Hsx	001	A										
02 Jan	N06W06	058	0040	02	Hsx	001	A										
03 Jan	N07W20	059	0050	02	Hsx	001	A										
04 Jan	N06W34	061	0020	02	Hsx	003	A										
05 Jan	N06W45	058	0010	01	Hsx	001	A										
06 Jan	N06W59	059	0020	01	Hrx	001	A										

0 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 058



**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 9764*

28 Dec	N12E15	104	0010	04	Bxo	005	B												
29 Dec	N13E02	104	0010	04	Bxo	004	B												
30 Dec	N13W11	102	0020	05	Dso	006	B												
31 Dec	N15W24	102	0070	06	Dao	011	B												
01 Jan	N14W37	102	0170	08	Dao	014	B												
02 Jan	N14W50	102	0200	09	Dao	014	B	1				5							
03 Jan	N14W64	104	0170	10	Dao	007	B	1				1							
04 Jan	N14W80	107	0170	10	Dao	006	B												
05 Jan	N13W89	102	0090	06	Dao	003	B												
								2	0	0	0	6	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 104

*Region 9765*

28 Dec	N05E78	041	0070	07	Dso	003	B												
29 Dec	N06E63	043	0150	06	Dao	004	B												
30 Dec	N06E50	041	0110	06	Dao	005	B												
31 Dec	N06E36	042	0120	06	Dso	006	B												
01 Jan	N06E24	041	0080	04	Dso	007	B												
02 Jan	N06E11	041	0080	04	Dso	005	B												
03 Jan	N06W03	043	0070	03	Cso	004	B												
04 Jan	N06W16	043	0070	07	Cso	009	B												
05 Jan	N07W25	038	0070	07	Cso	003	B												
06 Jan	N06W41	041	0070	01	Hsx	001	A												
								0	0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 043

*Region 9766*

30 Dec	N05E62	029	0040	03	Cso	003	B												
31 Dec	N05E48	030	0020	04	Cso	002	B												
01 Jan	N04E35	030	0020	01	Hrx	001	A												
02 Jan	N04E21	031	0000	00	Axx	001	A												
03 Jan	N07E08	032	0010	03	Bxo	002	B												
04 Jan	N07W05	032	0000	00		000													
05 Jan	N07W18	032	0000	00		000													
06 Jan	N07W31	032	0000	00		000													
								0	0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 32



**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 9767*

30 Dec	S23E73	018	0210	09	Eki	004	Bg	2			1	1						
31 Dec	S23E60	018	0510	13	Eki	017	Bg				2							
01 Jan	S23E49	016	0510	14	Ehi	022	Bg				1							
02 Jan	S23E36	016	0410	14	Eai	037	Bg				3							
03 Jan	S23E23	017	0310	14	Eai	039	Bg	3			4	1						
04 Jan	S22E08	019	0340	17	Fki	051	Bg	1			3							
05 Jan	S22W03	016	0320	17	Fki	034	Bg	1			4							
06 Jan	S22W17	017	0280	16	Fai	029	Bg	4			6							
											11	0	0	24	2	0	0	0

Still on Disk.

Absolute heliographic longitude: 016

*Region 9768*

01 Jan	S06W15	080	0010	03	Bxo	005	B											
02 Jan	S06W28	080	0030	06	Dso	007	B											
03 Jan	S07W43	083	0040	07	Cso	005	B											
04 Jan	S06W58	085	0050	05	Dso	011	B				1							
05 Jan	S04W70	083	0160	08	Dso	012	B	1			5							
06 Jan	S05W84	084	0220	09	Dao	006	Bg	2			2							
											3	0	0	8	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 080

*Region 9769*

02 Jan	S19W33	085	0030	04	Dso	004	B											
03 Jan	S19W45	085	0060	06	Dso	005	B											
04 Jan	S19W61	088	0170	05	Dso	002	B											
05 Jan	S18W72	085	0090	05	Dso	003	B											
06 Jan	S18W88	088	0030	01	Hsx	001	A											
											0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 085

*Region 9770*

02 Jan	N08W29	081	0030	04	Cso	008	B											
03 Jan	N09W41	081	0050	04	Cso	009	B	2			2							
04 Jan	N07W55	082	0050	05	Cso	008	B											
05 Jan	N07W62	075	0090	06	Cso	010	B											
06 Jan	N07W75	075																
											2	0	0	2	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 081



**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 9771</i>																						
02 Jan	S20E17	035	0010	05	Bxo	005	B															
03 Jan	S20E05	035	0040	07	Cro	009	B															
04 Jan	S20W10	037	0060	09	Cso	013	B															
05 Jan	S23W20	033	0030	04	Dso	004	B						1									
06 Jan	S23W34	034	0010	09	Bxo	005	B															
																					0 0 0 1 0 0 0 0	
Still on Disk.																						
Absolute heliographic longitude: 035																						
<i>Region 9772</i>																						
03 Jan	S18E83	317	0120	02	Hax	001	A															
04 Jan	S16E65	322	0060	02	Hax	001	A															
05 Jan	S17E52	321	0050	02	Hsx	001	A															
06 Jan	S17E38	322	0070	02	Hsx	001	A															
																						0 0 0 0 0 0 0 0
Still on Disk.																						
Absolute heliographic longitude: 322																						
<i>Region 9773</i>																						
04 Jan	N14E64	323	0080	07	Cso	006	B	2				1	2									
05 Jan	N13E52	321	0130	08	Dso	008	B	3	1			5	1									
06 Jan	N13E36	324	0140	07	Dao	008	B	2				7										
								7	1	0	13	3	0	0	0							
Still on Disk.																						
Absolute heliographic longitude: 324																						

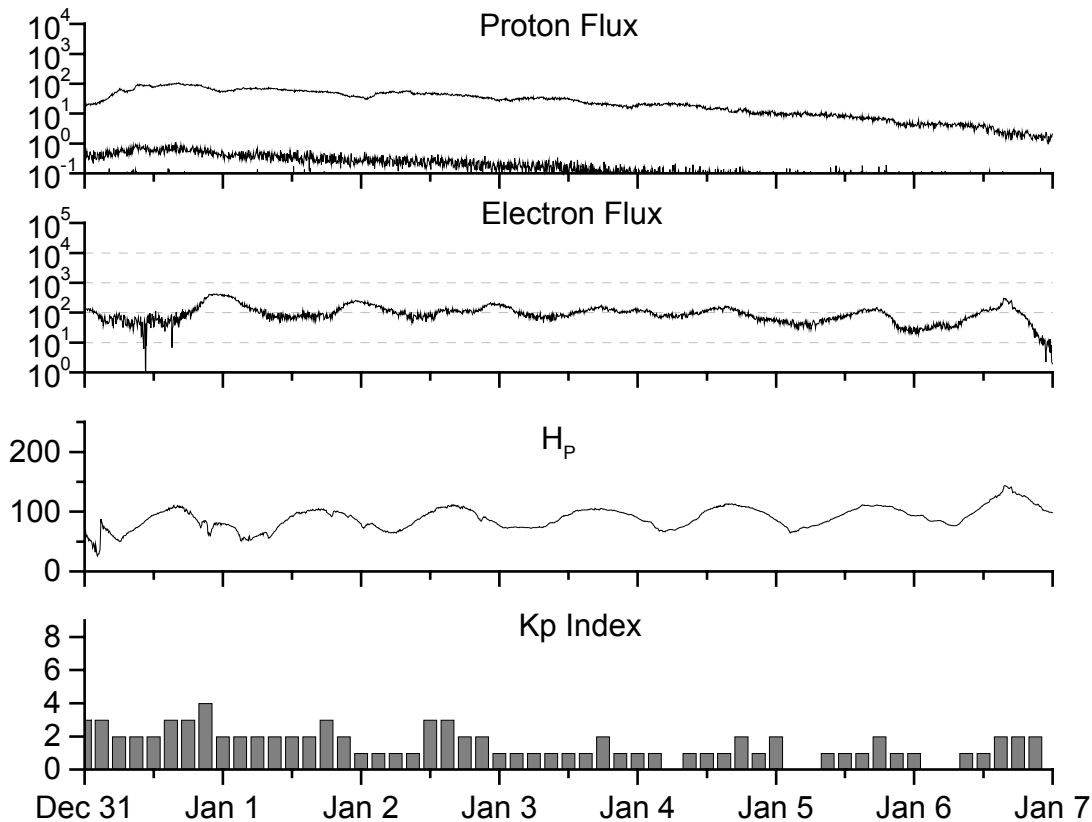


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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
<b>2000</b>									
January	140.8	90.1	0.64	168.0	112.9	158.1	175.5	13	14.5
February	161.9	112.9	0.70	172.1	116.7	173.2	176.8	15	15.0
March	203.6	138.5	0.68	175.4	119.9	208.2	178.4	09	15.0
April	193.4	125.5	0.65	176.3	120.8	184.2	180.5	15	15.0
May	188.8	121.6	0.64	173.1	119.0	184.5	180.0	15	15.0
June	190.3	124.9	0.66	172.0	118.7	179.8	179.7	15	15.1
July	236.7	169.1	0.71	173.0	119.7	204.7	180.2	21	14.8
August	166.6	130.5	0.78	171.8	118.6	163.1	179.5	16	14.2
September	157.9	109.9	0.70	169.0	116.2	182.1	177.1	18	14.2
October	138.9	100.1	0.72	166.2	114.4	167.7	175.6	18	14.6
November	149.9	106.5	0.71	162.7	112.7	178.8	173.6	17	14.6
December	146.4	104.5	0.71	160.8	112.1	173.6	172.0	08	14.4
<b>2001</b>									
January	142.7	95.1	0.67	156.3	108.8	166.7	168.8	08	13.8
February	131.0	80.1	0.61	151.4	104.2	147.3	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	178.3	171.7	18	12.7
May	135.1	97.3	0.72	163.1	108.8	148.7	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			131.3		11	
August	159.4	106.8	0.67			163.2		13	
September	229.1	150.7	0.66			233.3		12	
October	197.4	125.6	0.64			208.2		18	
November	178.6	106.5	0.60			212.5		14	
December	217.5	131.8	0.61			236.6		08	

**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 31 December 2001*

*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.

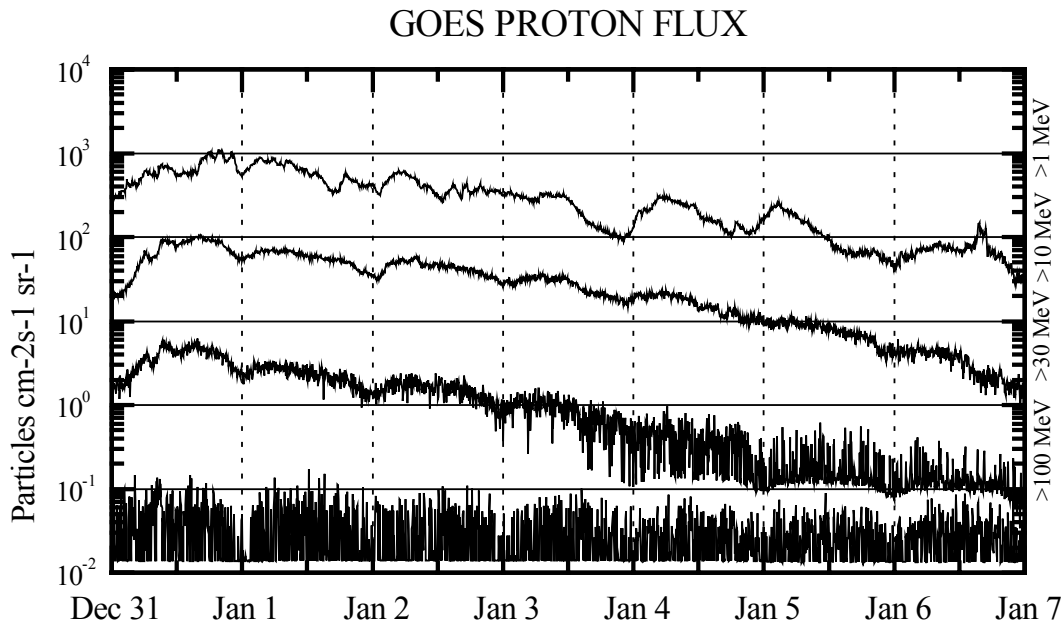
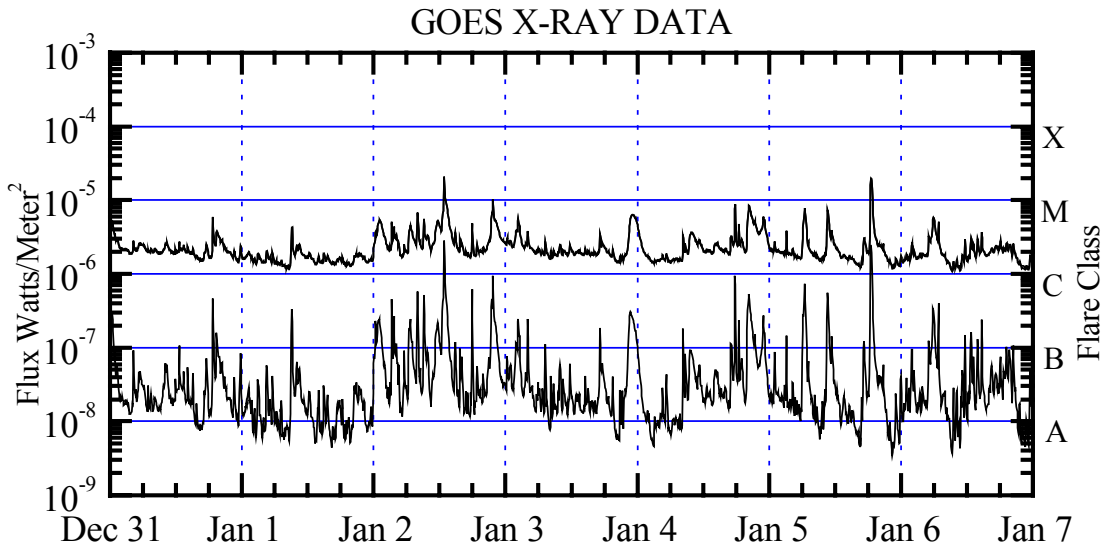
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-8.

*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.





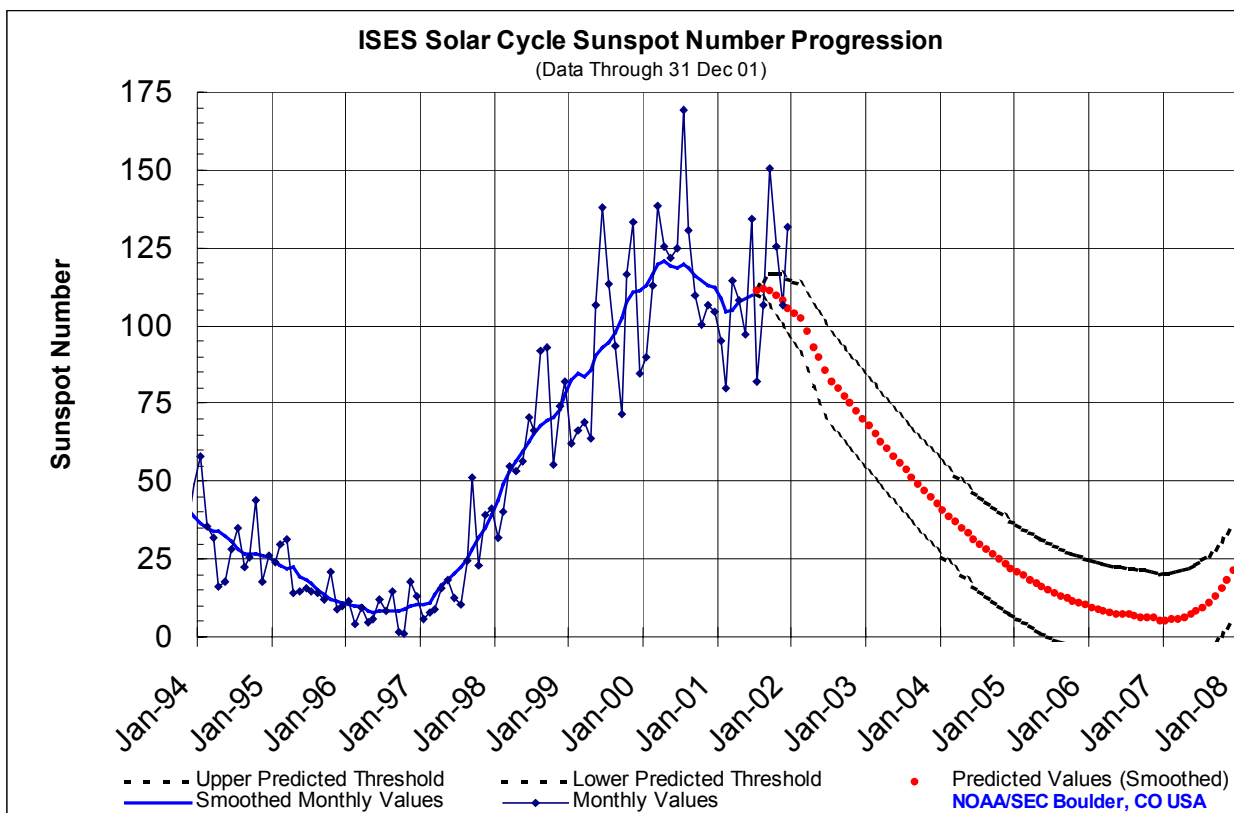


#### Weekly GOES Satellite X-ray and Proton Plots

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.

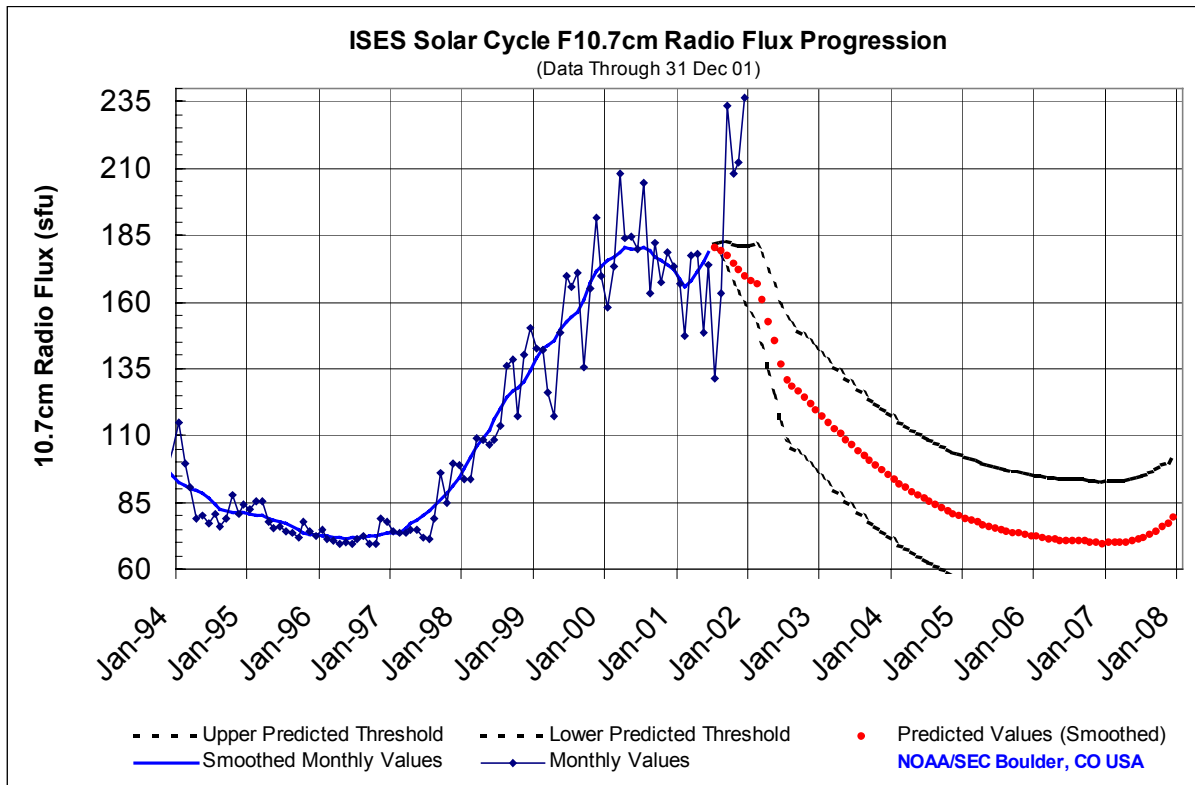




#### SEC Prediction of Smoothed Sunspot Number

	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 (***)	<b>111</b> (1)	<b>112</b> (3)	<b>111</b> (5)	<b>110</b> (7)	<b>108</b> (8)	<b>106</b> (9)
2002	<b>104</b> (10)	<b>103</b> (11)	<b>98</b> (12)	<b>93</b> (13)	<b>90</b> (14)	<b>86</b> (15)	<b>82</b> (15)	<b>80</b> (15)	<b>77</b> (15)	<b>75</b> (15)	<b>73</b> (15)	<b>70</b> (15)
2003	<b>68</b> (15)	<b>65</b> (15)	<b>63</b> (15)	<b>61</b> (15)	<b>58</b> (15)	<b>56</b> (15)	<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)





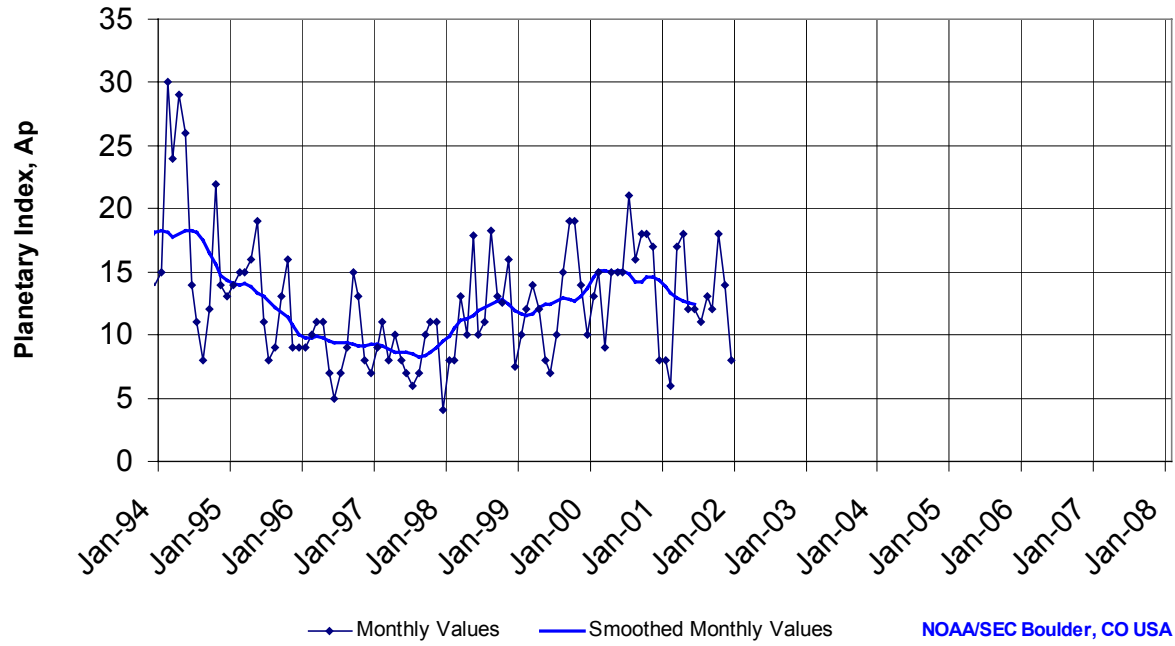
### SEC Prediction of Smoothed F10.7cm Radio Flux

	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 (***)	<b>181</b> (1)	<b>179</b> (3)	<b>178</b> (5)	<b>174</b> (7)	<b>172</b> (9)	<b>170</b> (11)
2002	<b>168</b> (13)	<b>167</b> (15)	<b>161</b> (17)	<b>153</b> (19)	<b>146</b> (21)	<b>137</b> (22)	<b>131</b> (23)	<b>129</b> (23)	<b>126</b> (23)	<b>124</b> (23)	<b>122</b> (23)	<b>120</b> (23)
2003	<b>117</b> (23)	<b>115</b> (23)	<b>113</b> (23)	<b>111</b> (23)	<b>109</b> (23)	<b>107</b> (23)	<b>104</b> (23)	<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 Dec 01)





Space  
Environment  
Center

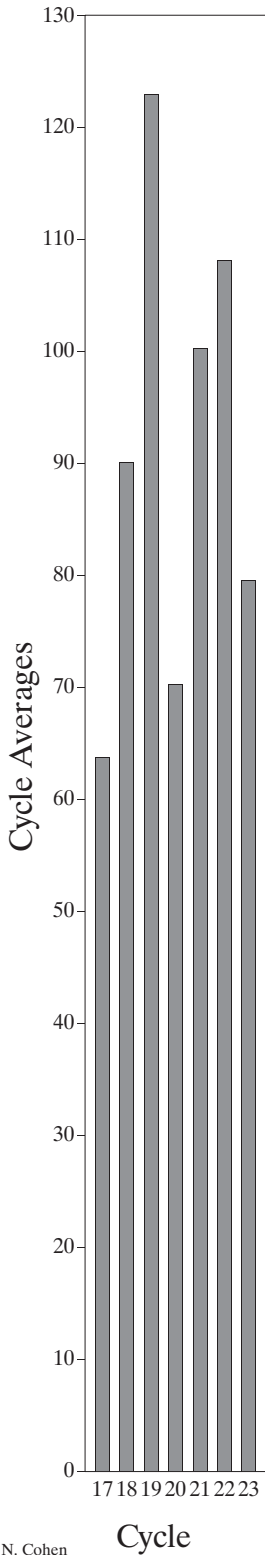
# Sunspot Number (RI)

December 2001  
(Month 63)

Preliminary data



Comparison of Cycles  
at current month in cycle



N. Cohen

