

Space Weather Highlights
01 – 07 January 2001

SWO PRF 1323
09 January 2001

Solar activity was at low levels during most of the period. However, activity rose to moderate levels on 03 January by virtue of a optically uncorrelated M1 X-ray flare at 03/2355 UTC. This flare likely came from a source beyond the northeast limb. Isolated to occasional C-class subflares occurred during the rest of the period. Region 9289 (S07, L = 201, class/area Eki/890 on 30 December) was the most interesting spot group on the disk. It was large with a minor degree of magnetic complexity and produced isolated C-class subflares. It was crossing the west limb at the end of the period. Region 9206 (N12, L = 054, class/area Dai/110 on 08 January) produced a few subflares as it began to rotate into view late on 07 January. Aside from Region 9206, there were about a dozen small, stable sunspot groups on the disk as the period ended.

Data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. A weak high speed stream (HSS) occurred during 02 - 06 January associated with a recurrent, but declining, negative-polarity coronal hole. Wind velocities gradually increased during January 02 - 04, peaking at about 450 km/sec. Increases in total field intensity and proton densities accompanied the onset of the HSS, along with a period of sustained southward IMF Bz with maximum southerly deflections to minus 11 nT (GSM).

There were no proton events detected at geosynchronous orbit. However, a greater than 10 MeV proton flux enhancement began late on 05 January, possibly related to a large back side halo CME, first seen in the SOHO/LASCO images at 05/1706 UTC.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels.

Geomagnetic field activity was at quiet to active levels during 03 - 04 January with some brief storm periods at high latitudes. Activity was at mostly quiet levels for the remainder of the period.

Space Weather Outlook
10 January - 05 February 2001

Solar activity is expected to be at mostly low levels with isolated M-class flares possible sometime during the period.

No proton events are expected during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels.

Geomagnetic field activity is expected to be at quiet to unsettled levels, barring an Earth-directed CME.



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
01 January	171	119	1190	B4.9	7	0	0	4	0	0	0	0
02 January	176	143	1060	B5.4	4	0	0	0	0	0	0	0
03 January	170	128	930	B6.5	9	1	0	3	0	0	0	0
04 January	175	180	900	C3.9	4	0	0	3	0	0	0	0
05 January	176	158	1040	B6.9	7	0	0	4	0	0	0	0
06 January	179	172	1060	B6.0	4	0	0	3	0	0	0	0
07 January	177	183	890	C1.0	5	0	0	0	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
01 January	8.8E+4	1.5E+4	2.5E+3		1.6E+6	
02 January	1.1E+5	1.2E+4	2.5E+3		1.0E+6	
03 January	1.4E+5	1.1E+4	2.4E+3		1.0E+5	
04 January	3.5E+5	1.1E+4	2.4E+3		2.0E+5	
05 January	1.4E+5	1.4E+4	2.5E+3		9.2E+4	
06 January	4.2E+5	6.6E+4	2.8E+3		2.3E+5	
07 January	5.0E+5	2.0E+4	2.4E+3		1.7E+5	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	01 January	2	0-0-2-2-0-1-1-0	*	0-1-*-0-0-0-0-0	3
02 January	2	1-0-0-0-0-1-1-2	0	0-0-0-0-0-0-0-1	4	1-0-0-0-2-2-2-2
03 January	7	2-3-2-3-1-0-1-1	22	1-3-3-6-5-0-0-3	11	2-4-2-3-3-2-2-2
04 January	11	2-1-3-2-2-4-3-2	8	0-1-3-2-3-3-1-1	10	2-1-3-2-3-3-3-2
05 January	5	2-2-1-1-0-0-1-3	2	0-0-1-1-2-0-0-1	6	1-1-1-1-1-3-2-3
06 January	5	3-2-1-1-0-1-0-2	4	2-0-0-2-3-1-0-0	6	2-1-2-1-2-3-2-2
07 January	6	2-2-2-1-1-2-2-2	*	0-1-**-**-**-**	5	2-2-1-1-1-2-2-2

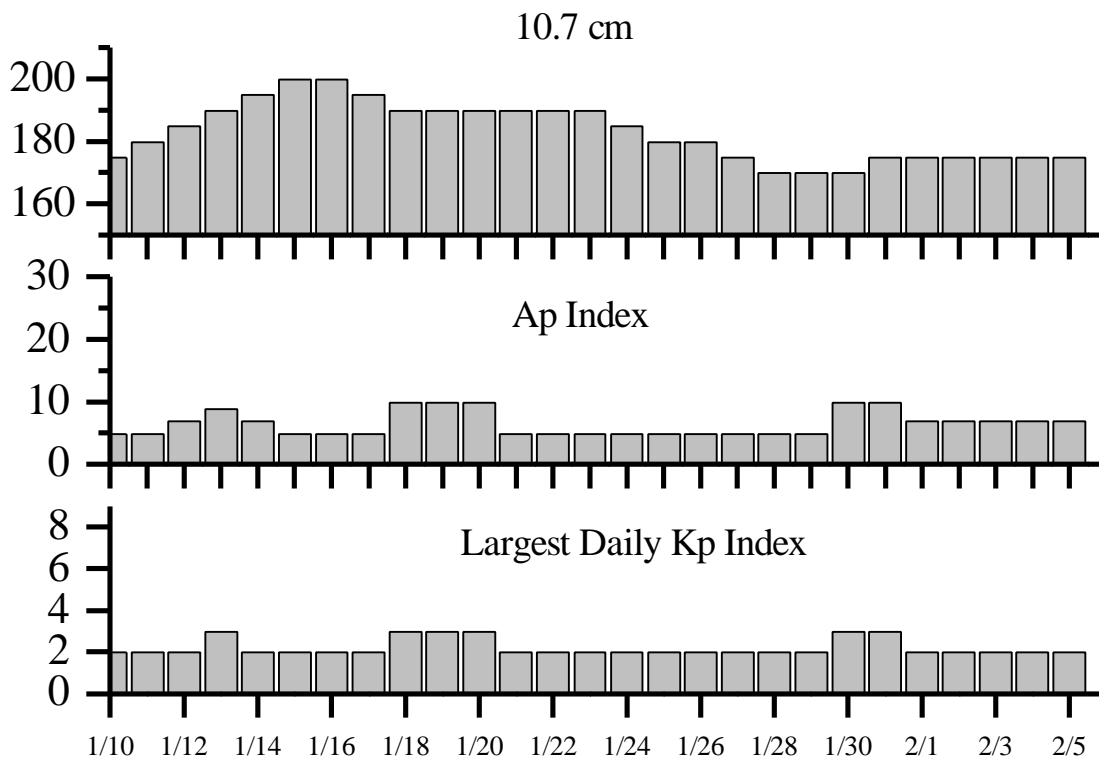


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
02 Jan 0049	245 MHz Noise Storm	01 Jan
03 Jan 0053	1 - 245 MHz Bursts	02 Jan
03 Jan 0053	245 MHz Noise Storm	02 Jan
03 Jan 1154	K = 4 Warning	03 Jan 1200 - 1500
03 Jan 1201	K= 4 Observed	03 Jan 0900 - 1200
04 Jan 0206	3 - 245 MHz Bursts	03 Jan
04 Jan 0206	245 MHz Noise Storm	03 Jan
04 Jan 1757	K= 4 Observed	04 Jan 1500 - 1800
05 Jan 0008	3 - 245 MHz Bursts	04 Jan
07 Jan 0221	1 - 245 MHz Bursts	06 Jan



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
10 Jan	175	5	2	24 Jan	185	5	2
11	180	5	2	25	180	5	2
12	185	7	2	26	180	5	2
13	190	9	3	27	175	5	2
14	195	7	2	28	170	5	2
15	200	5	2	29	170	5	2
16	200	5	2	30	170	10	3
17	195	5	3	31	175	10	3
18	190	10	3	01 Feb	175	7	2
19	190	10	3	02	175	7	2
20	190	10	3	03	175	7	2
21	190	5	2	04	175	7	2
22	190	5	2	05	175	7	2
23	190	5	2				



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
03 Jan	2342	2355	0012	M1.0	.012							48

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn
	Begin	Max	End				
01 January	0007	0013	0020	C1.2			
	0118	0121	0127	C1.0			
	0347	0349	0352		SF	N25E45	9292
	0735	0735	0738	C1.2	SF	S09E13	9289
	0946	0954	A1015	C1.0	SF	S11W46	9283
	1252	1257	1301	C1.0			
	1641	1643	1659	C1.4	SF	S12W52	9283
02 January	1653	1702	1707	C1.7			
	0744	0811	0852	C7.5			
	1436	1445	1453	C2.1			
	1701	1807	1916	C6.9			
03 January	2240	2313	2331	C2.7			
	0614	0631	0657	C4.4			
	0746	0757	0807	C1.4			
	0851	0858	0911	C1.6			
	0931	0933	0940	C1.4	SF	S03W16	9289
	1037	1047	1102	C2.6			
	1802	1804	1816	C2.7	SF	N29W52	9290
	1920	1921	1927	C1.9	SF	N27E52	9294
	2125	2128	2135	C1.7			
	2253	2259	2305	C1.8			
04 January	2342	2355	0012	M1.0			
	0717	0721	0724	C1.6			
	0850	0900	0911	C4.5			
	1207	1207	1210		SF	N06E81	
	1259	1303	1308	B9.8			
	1919	1920	1926	C2.5	SF	N06E76	9301
05 January	2007	2007	2012	C3.6	SF	S08W41	9289
	0302	0305	0308	C1.0			
	0422	0425	0427	C1.1			
	0705	0714	0716	C3.2	SF	N19E76	9302
	0717	0718	0723		SF	N19E74	9302
	0821	0823	0831		SF	N10E42	9296
	1012	1015	1018	C1.2			
	1544	1553	1620	C2.0			
	1827	1836	1917	C6.8	SF	N20E72	9302
	2143	2146	2148	C1.4			



Flare List – continued.

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location Lat CMD		
06 January	0626	0628	0632	C1.4	SF	N25E64		
	1503	1522	1602		SF	S11W67		9291
	1530	1533	1541	C3.6	SF	N21E58		9302
	2122	2130	2140	C2.2				
	2335	2350	0011	C5.5				9302
07 January	0431	0447	0524	C1.6				
	0834	0840	0847	C2.0				9289
	1116	1142	1153	C1.3				
	1204	1218	1228	C1.9				
	2111	2118	2124	C2.0				9302

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 9282

21 Dec	N19E68	280	0050	02	HAX	001	A										
22 Dec	N19E54	281	0040	01	HSX	001	A										
23 Dec	N20E43	279	0040	01	HSX	001	A										
24 Dec	N20E30	279	0040	02	HSX	001	A										
25 Dec	N20E17	279	0030	01	HSX	001	A										
26 Dec	N21E04	279	0040	01	HSX	001	A										
27 Dec	N21W09	278	0030	01	HSX	001	A										
28 Dec	N20W22	278	0020	02	HSX	001	A										
29 Dec	N20W34	277	0020	01	HSX	001	A										
30 Dec	N22W47	277	0010	01	HSX	001	A										
31 Dec	N21W61	278	0010	01	HSX	001	A										
01 Jan	N21W74	278															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 279



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 9287

25 Dec	S16E60	236	0010	06	DRO	007	B										
26 Dec	S16E45	238	0020	04	DRO	003	B										
27 Dec	S16E30	239	0000	00	AXX	001	A										
28 Dec	S16E17	239															
29 Dec	S16E04	239															
30 Dec	S16W09	239															
31 Dec	S16W22	239															
01 Jan	S16W35	239															
02 Jan	S16W48	239															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 239

Region 9288

26 Dec	S21E26	257	0010	03	DRO	002	B										
27 Dec	S21E13	256	0000	03	AXX	002	A										
28 Dec	S21E00	256															
29 Dec	S21W13	256															
30 Dec	S21W26	256															
31 Dec	S21W39	256															
01 Jan	S21W52	256															
02 Jan	S21W65	256															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 256



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 9291

29 Dec	S13E34	209	0030	05	CSO	013	B												
30 Dec	S12E21	209	0070	06	CAO	007	B												
31 Dec	S12E09	208	0080	08	DAO	012	B												
01 Jan	S12W06	210	0120	07	DSO	009	B												
02 Jan	S12W21	212	0080	07	CAO	011	B												
03 Jan	S12W34	212	0080	08	DSO	007	B												
04 Jan	S12W50	215	0050	02	HSX	001	A												
05 Jan	S13W63	215	0070	02	HSX	001	A												
06 Jan	S13W76	214	0070	02	HAX	002	A												1
07 Jan	S12W91	216	0030	01	HSX	001	A												
																			0 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 210

Region 9292

30 Dec	N25E63	167	0060	01	HSX	001	A												
31 Dec	N24E47	170	0000	00	HRX	001	A												1
01 Jan	N24E34	170																	1
02 Jan	N24E21	170																	
03 Jan	N24E08	170																	
04 Jan	N25W04	169	0030	03	CRO	006	B												
05 Jan	N24W18	170	0040	01	HSX	001	A												
06 Jan	N24W29	167	0010	01	AXX	002	A												
07 Jan	N24W42	167																	
																			0 0 0 2 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 169

Region 9293

01 Jan	N13E41	163	0040	03	CAO	004	B												
02 Jan	N13E26	165	0040	05	DSO	005	B												
03 Jan	N13E13	165	0030	07	DAO	007	B												
04 Jan	N14W03	168	0020	05	CSO	004	B												
05 Jan	N14W18	170	0000	01	AXX	001	A												
06 Jan	N11W26	164	0010	03	CSO	003	B												
07 Jan	N11W39	164																	
																			0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 168



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 9294

01 Jan	N22E69	135	0040	02	HSX	001	A										
02 Jan	N22E55	136	0030	02	HSX	001	A										
03 Jan	N22E43	135	0050	03	CSO	003	B	1				1					
04 Jan	N23E31	134	0040	06	CSO	005	B										
05 Jan	N22E18	134	0030	03	CSO	002	B										
06 Jan	N22E06	132	0020	02	HSX	002	A										
07 Jan	N22W10	135	0020	01	HSX	001	A										
								1	0	0	1	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 132

Region 9295

02 Jan	S12E73	118	0070	02	HSX	001	A										
03 Jan	S14E60	119	0060	10	CSO	002	B										
04 Jan	S13E45	120	0080	02	HSX	001	A										
05 Jan	S14E30	122	0080	04	CAO	003	B										
06 Jan	S14E19	119	0070	03	CAO	004	B										
07 Jan	S13E05	120	0050	02	CSO	002	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 120

Region 9296

02 Jan	N10E76	116	0070	02	HAX	001	A										
03 Jan	N08E59	119	0100	09	CSO	004	B										
04 Jan	N08E47	118	0070	02	HSX	001	A										
05 Jan	N08E34	118	0150	02	HSX	001	A					1					
06 Jan	N09E22	116	0130	03	CSO	002	B										
07 Jan	N08E08	117	0130	03	HSX	001	A										
								0	0	0	1	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 117

Region 9297

04 Jan	N24W16	181	0030	04	CSO	004	B										
05 Jan	N23W28	180	0080	07	DAO	006	B										
06 Jan	N23W41	179	0080	08	DAO	012	B										
07 Jan	N23W55	180	0080	09	DSO	011	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 181



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 9298</i>																	
04 Jan	S22W04	169	0010	02	AXX	002	A										
05 Jan	S22W17	169															
06 Jan	S22W30	169															
07 Jan	S22W43	169															
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 169																	
<i>Region 9299</i>																	
04 Jan	N09E39	126	0010	02	AXX	002	A										
05 Jan	N09E26	126	0000	00	AXX	001	A										
06 Jan	N09E13	126															
07 Jan	N10W03	128	0010	02	BXO	002	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 128																	
<i>Region 9300</i>																	
04 Jan	S14E55	110	0010	01	AXX	002	A										
05 Jan	S13E44	108	0000	00	AXX	001	A										
06 Jan	S13E32	106	0020	03	CSO	004	B										
07 Jan	S14E18	107	0020	03	CRO	006	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 107																	
<i>Region 9301</i>																	
04 Jan	N07E73	092	0020	01	AXX	002	A	1				1					
05 Jan	N07E61	091	0040	01	HSX	001	A										
06 Jan	N07E48	090	0040	06	CAO	003	B										
07 Jan	N08E34	091	0040	05	DSO	004	B										
								1	0	0	1	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 091																	
<i>Region 9302</i>																	
05 Jan	N19E66	086	0110	09	CSO	005	B	2				3					
06 Jan	N19E52	086	0090	08	DSO	005	B	1				1					
07 Jan	N20E39	086	0080	06	CSO	005	B	1									
								4	0	0	4	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 086																	



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 9303</i>																						
06 Jan	S04W47	185	0040	04	DSO	004	B															
07 Jan	S04W62	187	0090	06	DAO	007	B															
								0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Still on Disk.																						
Absolute heliographic longitude: 185																						
<i>Region 9304</i>																						
07 Jan	N11E58	067	0080	16	FSO	007	B															
								0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Still on Disk.																						
Absolute heliographic longitude: 067																						
<i>Region 9305</i>																						
07 Jan	S07E64	061	0020	02	CRO	002	B															
								0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Still on Disk.																						
Absolute heliographic longitude: 061																						

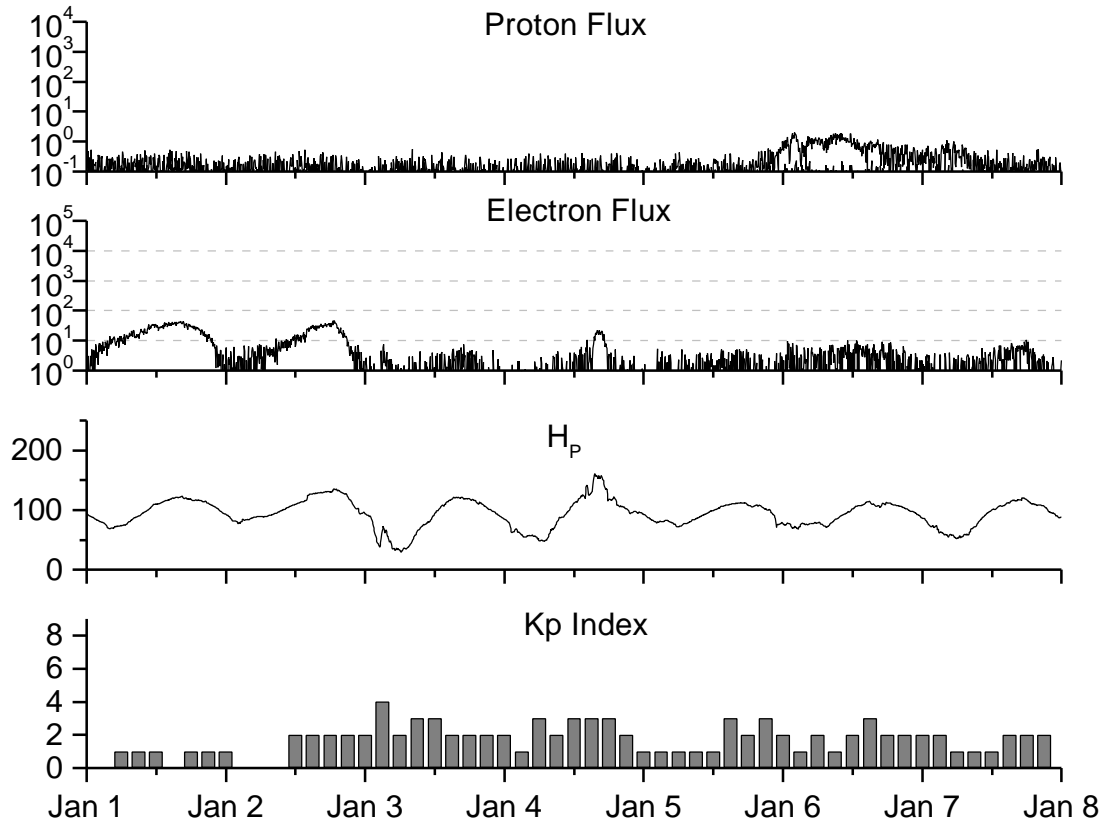


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers				Radio Flux		Geomagnetic		
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
1999									
January	94.3	62.0	0.66	116.5	82.6	142.6	139.0	10	11.7
February	93.4	66.3	0.71	120.2	84.6	142.0	142.6	12	11.6
March	100.5	68.8	0.68	120.5	83.8	126.3	144.0	14	11.7
April	92.9	63.7	0.69	123.8	85.5	117.2	145.8	12	12.2
May	140.5	106.4	0.76	131.7	90.5	148.6	149.9	08	12.4
June	208.3	137.7	0.66	136.0	93.1	169.8	152.9	07	12.4
July	169.2	113.5	0.67	138.0	94.3	165.6	154.4	10	12.6
August	136.1	93.7	0.69	142.8	97.5	170.8	156.3	15	12.9
September	107.4	71.5	0.67	150.0	102.3	135.7	161.0	19	12.8
October	167.7	116.7	0.70	158.5	107.8	164.8	167.2	19	12.7
November	199.3	133.2	0.67	164.7	110.9	191.5	171.5	14	13.1
December	123.5	86.4	0.69	165.9	111.0	169.8	173.4	10	13.8
2000									
January	140.8	90.1	0.64	168.0	112.8	158.1	175.5	13	14.5
February	161.9	112.9	0.70	172.1	116.6	173.2	176.8	15	15.1
March	203.6	138.5	0.68	175.4	119.8	208.2	178.4	09	15.1
April	193.4	125.3	0.65	176.3	120.7	184.2	180.5	15	14.9
May	188.8	120.8	0.64	173.1	118.9	184.5	180.1	15	14.8
June	190.3	124.9	0.66	172.0	118.6	179.8	179.7	15	14.8
July	236.7	169.1	0.71			204.7		21	
August	166.6	130.5	0.78			163.1		18	
September	157.9	109.9	0.70			182.1		16	
October	138.9	100.1	0.72			167.8		16	
November	149.9	106.5	0.71			178.8		16	
December	146.4	104.5	0.71			173.8		07	

NOTE: All smoothed values after September 1999 and monthly values after March 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 01 January 2001

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

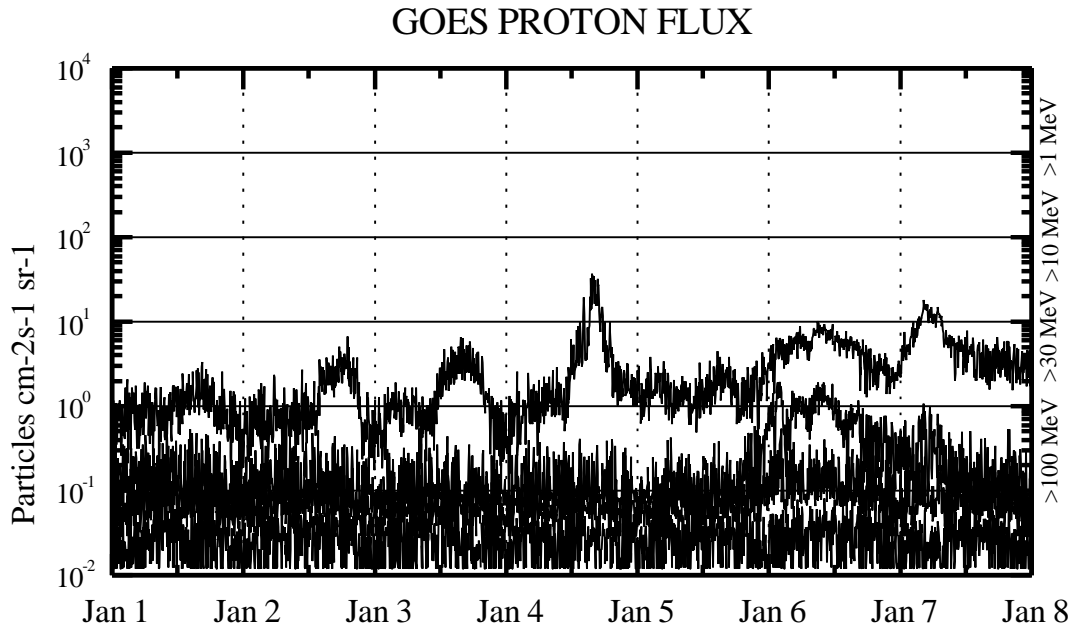
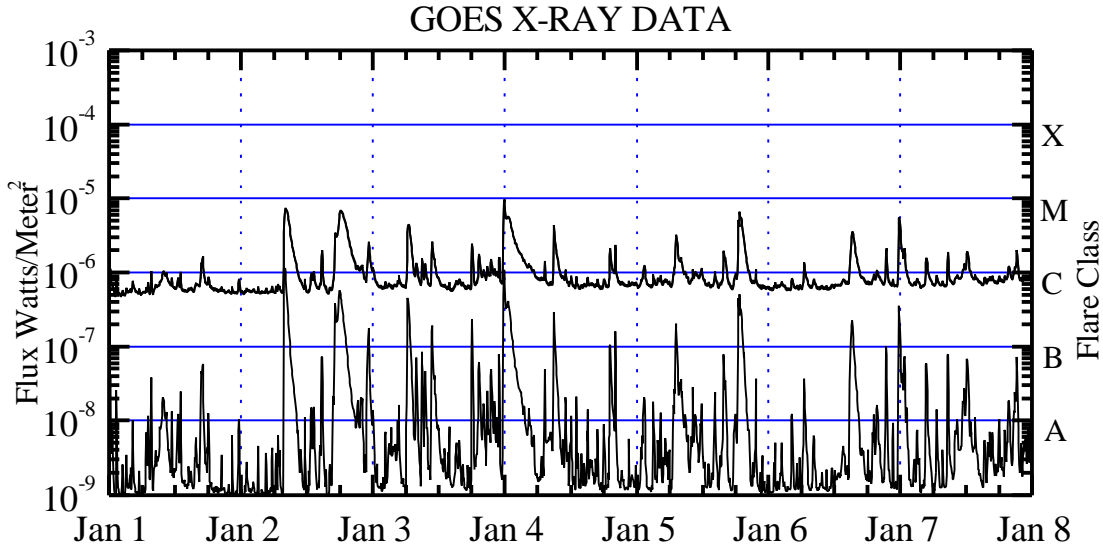
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm² -sec -sr) with energies greater than 2 MeV at GOES-8.

H_p 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_p plot contains the estimated planetary 3-hour K-index (derived by the USAF 55th Space Weather Squadron) 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 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/cm²-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/cm²-sec-sr) at greater than 10 MeV.





Space
Environment
Center

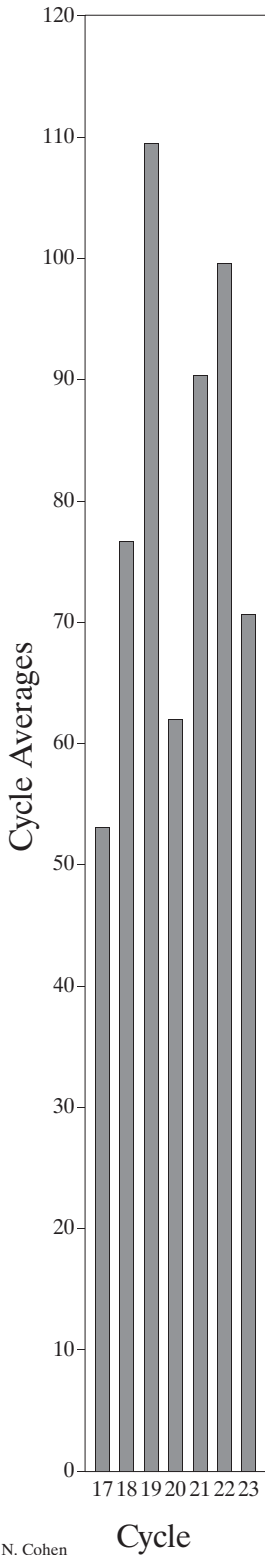
Sunspot Number (RI)

December 2000
(Month 51)

Preliminary data



Comparison of Cycles
at current month in cycle



N. Cohen

