Space Weather Highlights
06-12 Dec 1999

Solar activity was low through much of the period with isolated C-class flares observed during most days. However, activity briefly rose to moderate levels on 07 December by virtue of an M1/SN flare at 07/2120UT from Region 8791 (S14, L = 262, class/area Bxo/010 on 09 December). Most visible regions were small and simple, which accounted for the relatively low activity levels. The anticipated strong return of old active Regions 8765 (S12, L = 234) and 8766 (N18, L = 213) did not materialize and appeared to interrupt the recurrent pattern of moderate to high activity witnessed during the last few solar rotations.

Real-time solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. Recurrent coronal hole effects were evident during 06 December with elevated velocities (peak 710 km/sec) and low densities. The solar wind flow was unremarkable during 07 - 11 December. A coronal transient passed the spacecraft late on 12 December accompanied by a sudden velocity increase which briefly peaked at 820 km/sec, increased IMF Bz variance with southerly deflections to minus 10 nT (GSM), and a minor density increase. Earth was within an away (positive polarity) sector throughout the period.

No proton events were detected at geosynchronous orbit during the period.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels for the period.

Active to minor storm levels occurred on 06 December due to recurrent coronal hole effects. Activity dropped to quiet to unsettled levels during 07 - 11 December. Active to minor storm levels occurred on the last day of the period as a coronal transient impacted the geomagnetic field.

Space Weather Outlook
15 December 1999 - 10 January 2000

Solar activity is expected to range from low to moderate levels. Occasional C-class flares are likely with isolated M-class flares possible sometime during the period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be at moderate to high levels during 01 - 05 January. Otherwise, normal to moderate levels are expected.

The geomagnetic field is expected to be at unsettled to active levels during 31 December - 03 January due to recurrent coronal hole effects. Quiet to unsettled levels are expected for the rest of the period, barring any Earth-directed CMEs.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
06 December	143	80	770	B4.2	8	0	0	6	0	1	0	0
07 December	153	76	760	C1.1	4	1	0	5	0	0	0	0
08 December	150	116	900	C1.0	8	0	0	3	0	0	0	0
09 December	156	132	910	B4.7	6	0	0	4	0	0	0	0
10 December	164	130	840	B5.5	3	0	0	3	0	0	0	0
11 December	159	134	750	B5.0	3	0	0	1	1	0	0	0
12 December	159	97	570	B5.8	0	0	0	1	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2}-day-sr) >1MeV	>10MeV	>100MeV	Electron Fluence (electrons/cm^2-day-sr) >.6MeV	>2MeV	>4MeV
06 December	1.4E+6	1.3E+4	2.8E+3		3.0E+8	
07 December	5.8E+5	1.2E+4	2.7E+3		3.4E+8	
08 December	2.5E+5	1.2E+4	2.8E+3		2.3E+8	
09 December	3.6E+5	1.2E+4	2.7E+3		2.6E+8	
10 December	1.4E+6	1.6E+4	3.0E+3		2.9E+8	
11 December	1.1E+6	1.5E+4	2.9E+3		2.6E+8	
12 December	5.5E+5	1.3E+4	2.9E+3		2.0E+8	

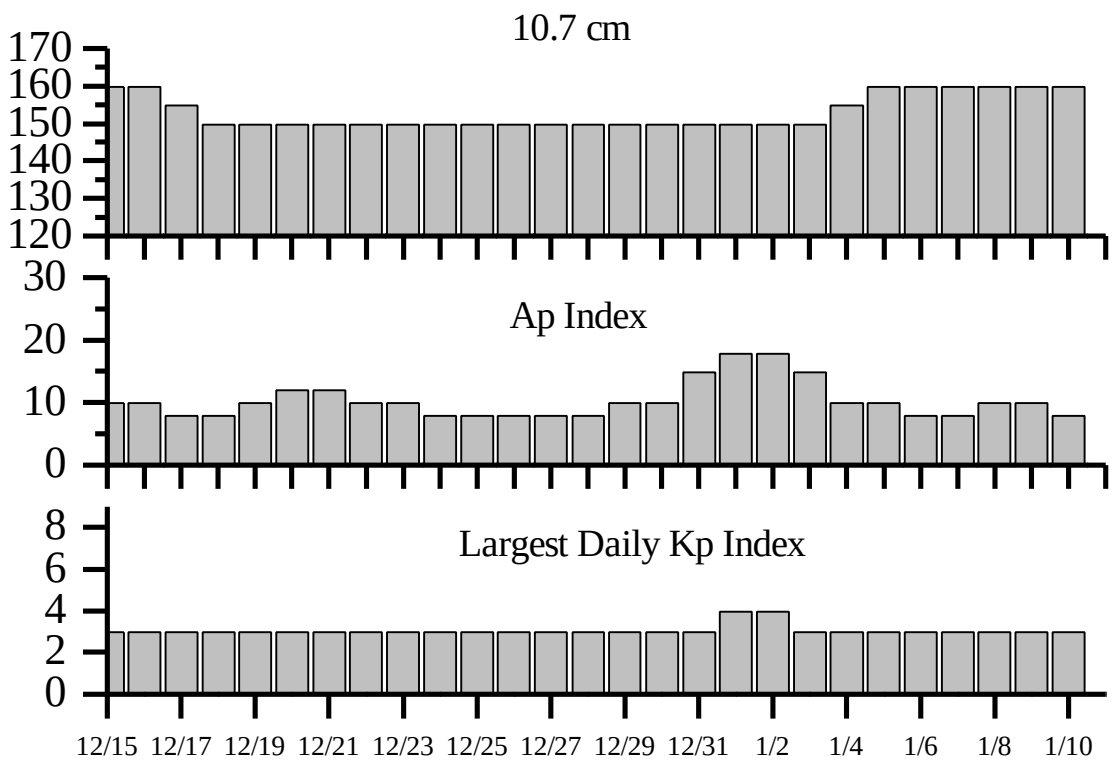
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
06 December	14	2-4-3-3-3-2-3-2	42	3-3-5-5-7-4-4-3	19	2-4-4-4-4-3-3-2
07 December	8	3-2-2-2-2-1-2-2	23	2-3-4-5-3-4-4-3	14	3-2-4-3-2-3-3-3
08 December	9	2-2-3-1-1-3-2-3	30	3-2-6-4-4-5-4-2	13	3-2-4-3-2-3-3-3
09 December	14	3-4-3-3-2-2-3-3	*	2-3-3-5-*-*-*-*	12	3-4-3-3-2-3-3-3
10 December	8	1-3-2-1-2-2-2-2	*	*-*-*-*-*-*-*-*	7	2-3-2-2-2-2-3-2
11 December	6	1-2-2-2-3-2-0-0	12	1-2-2-4-5-2-0-0	7	1-2-3-2-3-2-1-1
12 December	11	1-3-1-3-2-4-3-2	20	0-1-1-5-5-4-4-2	9	1-3-1-3-2-3-3-2

Alerts and Warnings Issued

Date & Time of Issue (UT)	Type of Alert or Warning	Date & Time of Event (UT)
06 Dec 0027	Type II Radio Emission	05 Dec 2222
06 Dec 0036	Type II Radio Emission	05 Dec 2232
06 Dec 0620	Sudden Impulse Observed at Boulder	06 Dec 0601
06 Dec 0738	10cm Radio Burst 350 s.f.u.	06 Dec 0703
06 Dec 1157	≥2MeV Electron Event @ ≥1000pfu CONTINUED	05 Dec 1120
06 Dec 1357	K= 4 Warning EXTENDED through	06 Dec 2359
06 Dec 2114	A≥20 Watch	07 Dec
06 Dec 2311	K= 4 Warning EXTENDED through	08 Dec1500
07 Dec 0011	3 - 245 MHz Bursts	06 Dec
07 Dec 0301	A≥20 Observed	07 Dec 0300
07 Dec 1157	≥2MeV Electron Event @ ≥1000pfu CONTINUED	05 Dec 1120
08 Dec 0008	3 - 245 MHz Bursts	07 Dec
08 Dec 1157	≥2MeV Electron Event @ ≥1000pfu CONTINUED	05 Dec 1120
09 Dec 0009	245 MHz Noise Storm	08 Dec
09 Dec 0601	K= 4 Observed	09 Dec 03 - 06
09 Dec 1201	≥2MeV Electron Event @ ≥1000pfu CONTINUED	05 Dec 1120
10 Dec 0011	4 - 245 MHz Bursts	09 Dec
10 Dec 0011	245 MHz Noise Storm	09 Dec
10 Dec 1140	≥2MeV Electron Event @ ≥1000pfu CONTINUED	05 Dec 1120
11 Dec 1145	≥2MeV Electron Event @ ≥1000pfu CONTINUED	05 Dec 1120
11 Dec 1436	K= 4 Warning	11/1500 - 12/1500 Dec
11 Dec 1507	K= 4 Observed	11 Dec 12 - 15
11 Dec 0025	5 - 245 MHz Bursts	10 Dec
11 Dec 0025	245 MHz Noise Storms	10 Dec
12 Dec 0013	6 - 245 MHz Bursts	11 Dec
12 Dec 1158	≥2MeV Electron Event @ ≥1000pfu CONTINUED	05 Dec 1120
12 Dec 1746	K= 4 Warning	12/1745 - 13/1200 Dec
12 Dec 1800	K= 4 Observed	12 Dec 15 - 18

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
15 Dec	160	10	3	29 Dec	150	10	3
16	160	10	3	30	150	10	3
17	155	8	3	31	150	15	3
18	150	8	3	01 Jan 2000	150	18	4
19	150	10	3	02	150	18	4
20	150	12	3	03	150	15	3
21	150	12	3	04	155	10	3
22	150	10	3	05	160	10	3
23	150	10	3	06	160	8	3
24	150	8	3	07	160	8	3
25	150	8	3	08	160	10	3
26	150	8	3	09	160	10	3
27	150	8	3	10	160	8	3
28	150	8	3				

Energetic Events

Date	Time (UT)			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat	CMD	Rgn #	245	2695	II	IV
07 Dec	2115	2120	2123	M1.0	.003	SN	S13E66		8791	340	31		

Flare List

Date	Time Begin	Max	End	X-ray Class.	Optical Imp / Brtns	Location Lat CMD	Rgn #
06 December	0101	0101	0107		SF	N11E61	8790
	0234	0238	0242	B9.5	SF	N11E60	8790
	0358	0406	0436		SF	N12E05	8787
	0413	0420	0436	C3.4	SF	N11E60	8790
	0511	0516	0521	C1.0			
	0702	0715	0805	C8.4	2N	N10E43	8788
	0756	0758	0801		SF	N11E57	8790
	0833	0838	0844	C1.0			
	0940	0951	0957	C1.2			
	1104	1114	1120	B8.0			
	1359	1403	1407	C1.1			
	2118	2123	2126	C4.7			
	2219	2220	2231	C4.9	SF	N11E34	8788
07 December	0107	0112	0114	C8.7			
	0202	0204	0208		SF	N10E28	8788
	0647	0648	0650		SF	N10E30	8788
	1014	1018	1025	C4.3	SF	S14E74	8791
	1612	1613	1618	C1.1	SF	N15E39	8790
	2044	2053	2112	C2.9			
	2117	2119	2137	M1.0	SN	S13E66	8791
08 December	0037	0113	0132	C1.6			
	0232	0240	0317	C2.8	SF	N10E29	8790
	0531	0531	0542	C2.5	SF	S16E64	8791
	0622	0624	0641	C1.1	SF	N15E30	8790
	1649	1654	1703	C1.0			
	1911	1922	1930	C4.3			
	2324	2330	2335	C1.9			
	2345	2352	2356	C1.1			
09 December	0038	0043	0047	B8.6			
	0454	0457	0501	B8.8			
	0603	0603	0612		SF	N15W22	8785
	0935	0944	0958		SF	N12E13	8790
	1117	1140	1147	C1.6			
	1620	1633	1648	C1.2			
	1655	1658	1701	C1.1			

Flare List-continued

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn #
09 December	1717	1734	1826	C1.1			
	1952	1953	2005	C2.2	SF	S13E69	8794
	2014	2015	2021		SF	S11E40	8791
	2309	2313	2319	C1.3			
10 December	0208	0210	0215	C3.7	SF	N17E58	8792
	0351	0356	0403	C1.0			
	0409	0414	0417	C1.1			
	0516	0522	0530		SF	N16E05	8790
	0737	0743	0751		SF	S12E63	8794
11 December	0324	0329	0420	C2.8	1F	N09W12	8790
	0733	0740	0749	C1.1	SF	S14E51	8794
	1416	1419	1421	B8.0			
	2219	2231	2243	C2.4			
12 December	0304	0307	0312	B8.3			
	0534	0537	0541		SF	N13E27	8792

Region Summary

Date	Location (° Lat ° CMD)	Location Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 8781												
24 Nov	S13E71	065	0050	03	HAX	001	A								
25 Nov	S13E58	064	0070	02	HSX	001	A								
26 Nov	S13E47	062	0080	08	CSO	004	B				1				
27 Nov	S13E34	061	0100	09	DSO	013	B								
28 Nov	S13E22	060	0170	09	DAI	027	B				2				
29 Nov	S13E09	060	0230	09	DAI	023	B								
30 Nov	S12W03	059	0230	10	DAI	021	B								
01 Dec	S12W16	059	0250	10	DKI	016	B								
02 Dec	S12W29	058	0280	11	EAO	020	B				1				
03 Dec	S12W42	058	0190	10	DAO	013	B								
04 Dec	S12W58	061	0160	03	HSX	004	A								
05 Dec	S13W71	061	0140	05	CAO	004	B								
06 Dec	S12W88	065	0050	02	CAO	002	B								
								0	0	0	4	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 059

Region Summary-continued

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
		Region 8784													
30 Nov	N30E32	024	0020	03	BXO	004	B								
01 Dec	N30E18	025	0030	06	CAO	004	B								
02 Dec	N30E05	024	0030	06	CRO	004	B								
03 Dec	N30W08	024													
04 Dec	N30W21	024													
05 Dec	N30W34	024													
06 Dec	N30W47	024													
07 Dec	N30W60	024													
08 Dec	N30W73	024													
09 Dec	N30W86	024													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 024

		Region 8785													
01 Dec	N14E71	332	0060	02	HSX	001	A								
02 Dec	N14E58	331	0160	03	HAX	002	A								
03 Dec	N13E43	333	0100	03	HSX	002	A								
04 Dec	N13E30	333	0120	02	HSX	002	A								
05 Dec	N13E18	332	0130	03	CSO	006	B								
06 Dec	N13E05	332	0130	04	CAO	004	B								
07 Dec	N14W08	332	0150	03	HSX	002	A								
08 Dec	N14W21	331	0150	05	CSO	005	B								
09 Dec	N14W35	332	0110	03	CSO	002	B				1				
10 Dec	N15W48	332	0100	02	HSX	001	A								
11 Dec	N16W62	333	0090	02	HAX	001	A								
12 Dec	N14W73	331	0080	09	CAO	002	B								
								0	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 332

		Region 8786													
02 Dec	N22W07	036	0010	04	CRO	004	B								
03 Dec	N22W23	039	0000	03	BXO	002	B								
04 Dec	N22W39	042													
05 Dec	N22W52	042													
06 Dec	N22W65	042													
07 Dec	N22W78	042													
08 Dec	N22W91	042													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 036

Region Summary-continued

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 8787												
02 Dec	N14E46	343	0000	04	BXO	002	B								
03 Dec	N11E30	346	0000	00	AXX	001	A								
04 Dec	N12E18	345	0010	06	BXO	002	B								
05 Dec	N12E03	347	0000	03	BXO	002	B								
06 Dec	N11W08	345	0020	04	DSO	003	B				1				
07 Dec	N10W20	344	0010	05	BXO	005	B								
08 Dec	N12W32	342	0000	00	AXX	001	A								
09 Dec	N13W48	345	0010	01	HSX	001	A								
10 Dec	N13W63	347	0010	03	BXO	003	B								
11 Dec	N17W72	343	0000	04	BXO	002	B								
12 Dec	N17W85	343													
								0	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 347

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 8788												
02 Dec	N13E78	311	0180	05	HKX	001	A								
03 Dec	N10E66	310	0270	03	HKX	001	A				1				
04 Dec	N10E56	307	0510	17	FKI	019	BG	1			2	1			
05 Dec	N10E43	307	0510	17	FKO	013	B	1			1				
06 Dec	N09E29	308	0550	17	FKO	017	BG	2			1		1		
07 Dec	N10E16	308	0570	18	FKO	014	B				2				
08 Dec	N11E04	306	0590	18	FKO	017	B								
09 Dec	N10W10	307	0560	18	FHO	013	B								
10 Dec	N11W23	307	0460	18	FHO	012	B								
11 Dec	N12W37	308	0440	18	FHO	014	B								
12 Dec	N10W51	309	0380	18	FHO	007	B								
								4	0	0	7	1	1	0	0

Still on Disk.
Absolute heliographic longitude: 306

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 8789												
02 Dec	N29W10	039	0000	04	BXO	003	B								
03 Dec	N29W23	039	0010	03	BXO	003	B								
04 Dec	N29W36	039													
05 Dec	N29W48	038	0000	03	BXO	003	B								
06 Dec	N29W61	038													
07 Dec	N29W74	038													
08 Dec	N29W87	038													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 039

Region Summary-continued

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 8790												
06 Dec	N09E47	290	0020	05	BXO	004	B				4				
07 Dec	N10E35	289	0020	04	CRO	004	B	1			1				
08 Dec	N11E20	290	0020	04	CSO	006	B	2			2				
09 Dec	N11E07	290	0050	05	DSO	010	B				1				
10 Dec	N12W07	291	0090	08	DAO	014	B				1				
11 Dec	N13W20	291	0040	09	CRO	016	B	1				1			
12 Dec	N12W35	293	0010	10	BXO	007	B								
								4	0	0	9	1	0	0	0
Still on Disk.															
Absolute heliographic longitude:		290													
			Region 8791												
07 Dec	S13E68	256	0010	01	AXX	001	A	1	1		2				
08 Dec	S14E53	257	0010	04	BXO	003	B	1			1				
09 Dec	S14E36	261	0010	03	BXO	002	B	1			1				
10 Dec	S15E22	262	0000	00	AXX	001	A								
11 Dec	S15E09	262													
12 Dec	S15W04	262													
								3	1	0	4	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		262													
			Region 8792												
08 Dec	N17E69	241	0090	02	HAX	001	A								
09 Dec	N16E56	241	0080	02	HSX	001	A								
10 Dec	N17E43	241	0060	02	CAO	003	B	1			1				
11 Dec	N16E30	241	0080	03	CAO	004	B								
12 Dec	N17E16	242	0030	03	CAO	004	B				1				
								1	0	0	2	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		242													
			Region 8793												
08 Dec	S18E25	285	0010	05	BXO	002	B								
09 Dec	S16E11	286	0010	10	BXO	008	B								
10 Dec	S16W04	288	0020	01	HSX	001	A								
11 Dec	S16W17	288	0010	06	BXO	005	B								
12 Dec	S17W33	291	0000	00	AXX	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		288													

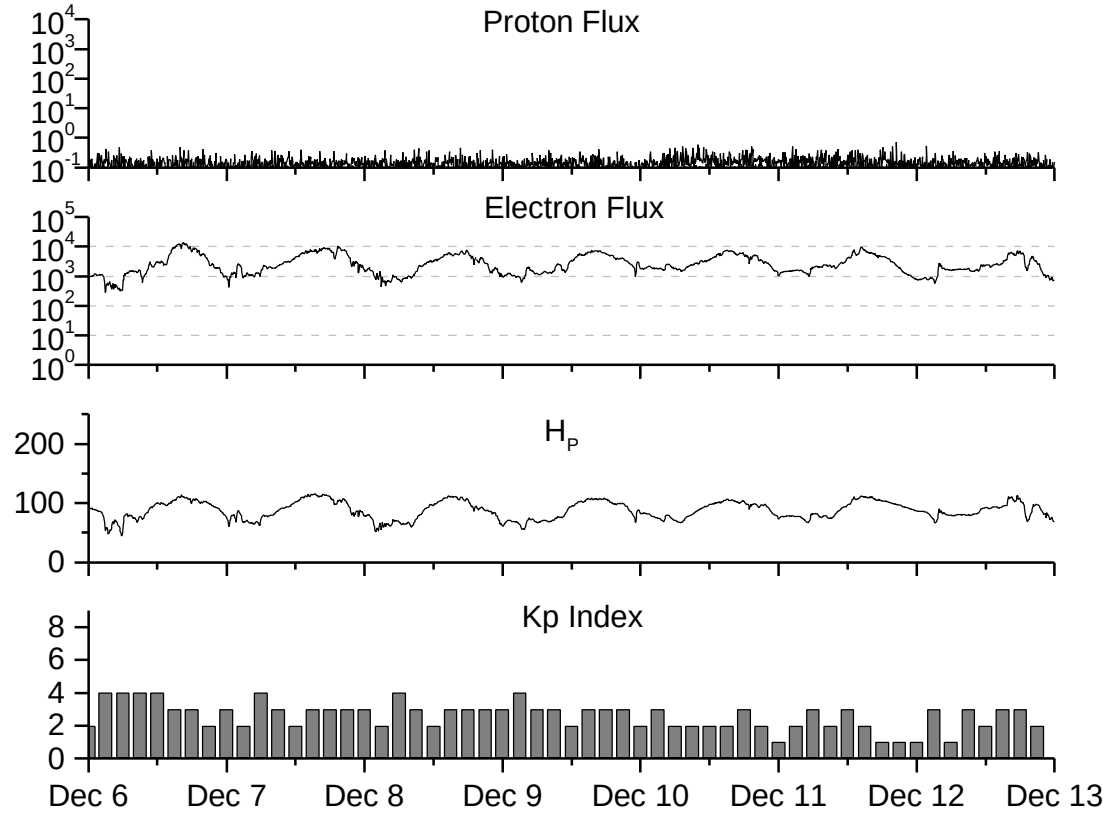
Region Summary-continued

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 8794												
08 Dec	S14E74	236	0030	03	HSX	001	A								
09 Dec	S15E58	239	0050	01	HSX	001	A	1			1				
10 Dec	S14E44	240	0030	01	HSX	001	A				1				
11 Dec	S15E31	240	0030	03	CSO	002	B	1			1				
12 Dec	S14E19	239	0030	03	CSO	002	B								
								2	0	0	3	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		239													
			Region 8795												
09 Dec	S11E19	278	0030	03	DRO	004	B								
10 Dec	S12E06	278	0070	05	DAO	004	B								
11 Dec	S12W08	279	0060	05	DAO	010	B								
12 Dec	S13W21	279	0040	05	DAO	004	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		278													

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

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
					1997				
December	57.9	41.2	0.71	54.2	39.0	98.8	94.2	05	09.5
					1998				
January	51.8	31.9	0.62	60.6	43.7	93.4	97.5	08	09.9
February	54.4	40.3	0.74	67.4	48.8	93.4	101.7	08	10.5
March	81.8	54.8	0.67	73.3	53.4	109.1	105.8	13	11.1
April	73.6	53.4	0.73	77.7	56.5	108.3	109.1	10	11.3
May	74.3	56.3	0.76	81.4	59.3	106.7	112.4	18	11.6
June	93.6	70.7	0.76	85.9	62.4	108.4	116.2	10	11.9
July	98.3	66.2	0.67	90.3	65.4	114.0	120.3	11	12.2
August	118.6	91.7	0.77	93.7	67.8	136.0	124.1	18	12.4
September	119.0	92.9	0.78	96.1	69.4	138.4	126.8	13	12.5
October	77.0	55.5	0.72	97.7	70.5	117.3	127.9	13	12.5
November	99.5	74.0	0.74	101.3	73.0	140.2	130.0	16	12.3
December	120.8	81.9	0.69	108.8	77.9	150.1	134.3	08	11.9
					1999				
January	94.3	62.4	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	11.6
April	092.9	063.9	0.69	123.8	85.4	117.2	145.8	12	12.1
May	140.5	106.3	0.76	131.7	90.4	148.6	150.0	08	12.1
June	208.3	137.4	0.66			169.8		07	
July	169.2	113.5	0.67			165.6		10	
August	136.1	93.7	0.69			170.8		15	
September	107.4	70.9	0.66			135.7		18	
October	167.7	116.4	0.69			164.9		18	
November	199.3	132.7	0.67			191.7		12	

NOTE: All smoothed values after January 1998 and monthly values after September 1998 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 06 December 1999

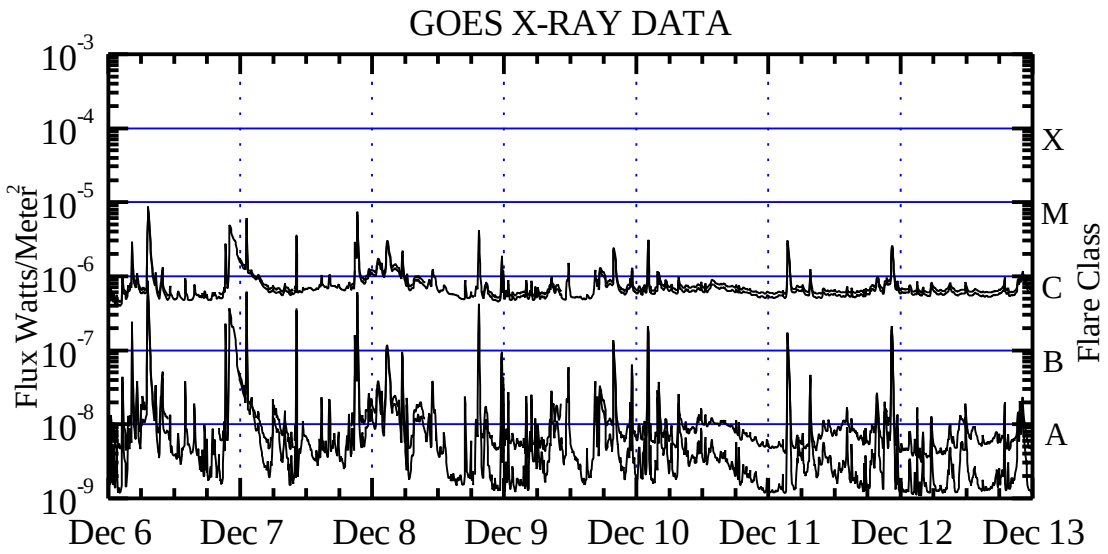
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2–sec –sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

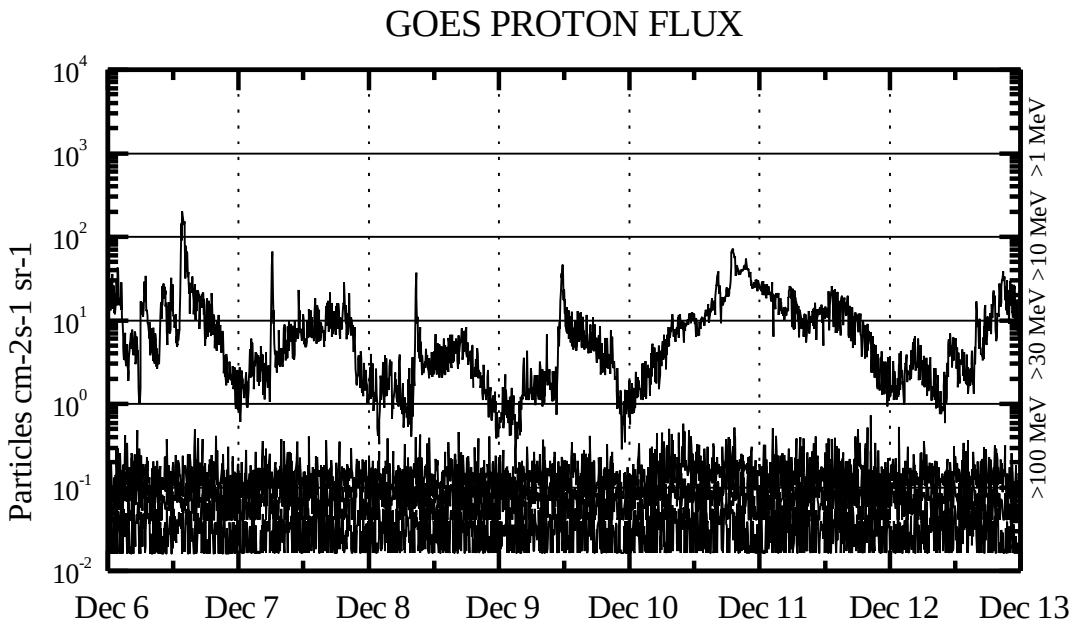
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm^2 –sec –sr) with energies greater than 2 MeV at GOES-8.

Hp 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.

Kp 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 Kp 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 Kp are " global " parameters that are applicable to a first order approximation over large areas. Hparallel 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^2) 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/cm^2-sec-sr) at greater than 10 MeV.

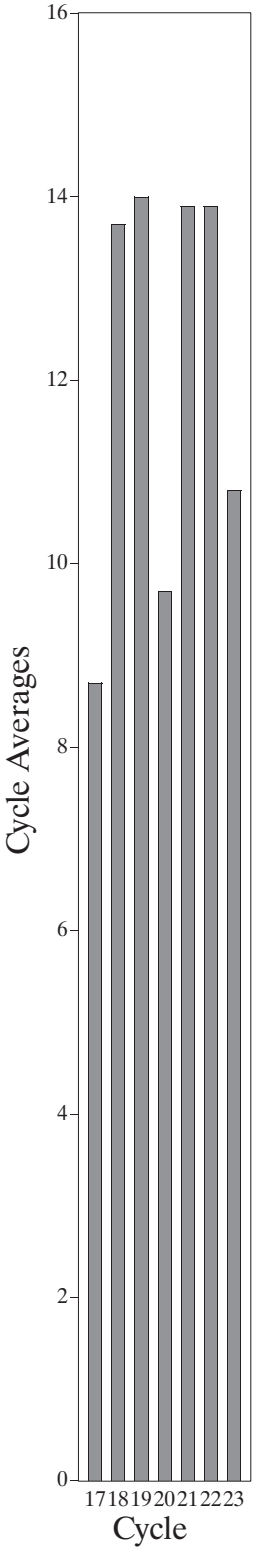
Geomagnetic Activity (Ap)

Space Environment Center

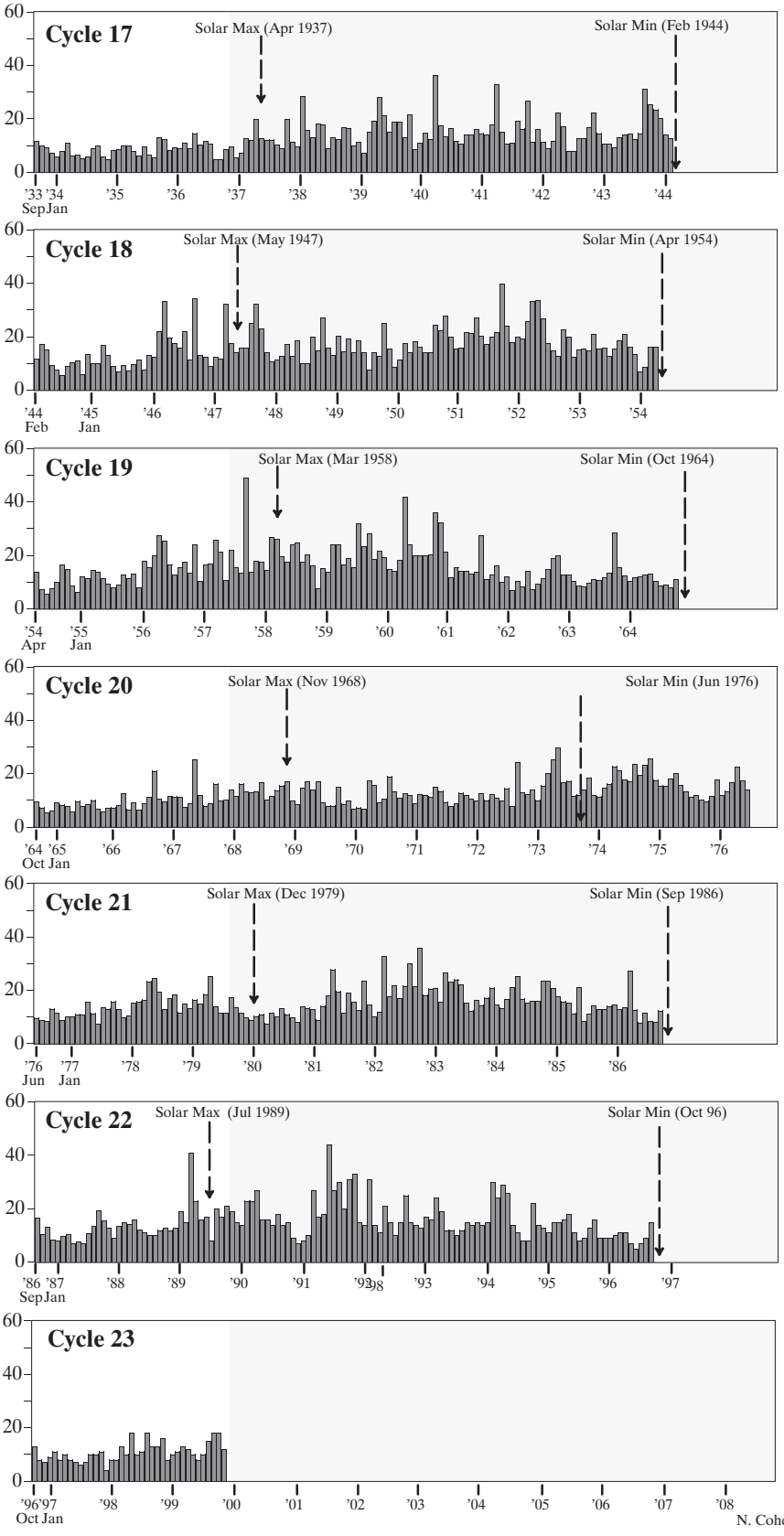
November 1999
(Month 38)

Preliminary data

Comparison of Cycles at current month in cycle



Monthly Averages



N. Cohen