

**Space Weather Highlights
15-21 February 1999**

Solar activity was low during most of the period. However, activity briefly rose to moderate levels on 16 and 21 February by virtue of isolated, low-level M-class flares. Region 8458 (S22, L = 270, class/area Dko/660 on 11 February) produced a long-duration M3/SF flare at 16/0312UT with associated Type II and IV radio sweeps. This region also produced two C-class flares on 20 February associated with radio sweeps. Region 8462 (N20, L = 266, class/area Dao/170 on 17 February) produced an M1/1F flare at 16/0016UT and an M1/SF 21/1345UT. A decreasing trend began late in the period as historically active solar longitudes began to depart the visible disk.

Real-time solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft during most of the period. Two transient (CME) structures passed the spacecraft during the period. The first, preceded by a relatively weak shock, passed the spacecraft around 17/0500UT accompanied by a modest velocity increase, enhanced particle densities, and a period of southward IMF Bz (maximum southerly deflections to minus 14 nT (GSM)). The second CME, preceded by a much stronger shock, passed the spacecraft about 18/0200UT accompanied by a velocity increase from 400 to 700 km/sec, increased particle densities, and strong, sustained southward IMF Bz (maximum southerly deflections to minus 28 nT). This CME passage resulted in a major geomagnetic storm (see the geomagnetic activity summary below). Phi data indicated that Earth was within an away (positive polarity) solar sector during most of the period.

There were no significant proton enhancements detected at geo-synchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude began an increasing trend on 19 February and reached high levels on 19 and 21 February.

The geomagnetic field was at quiet to unsettled levels during 15 - 16 February. Activity increased on 17 February with active to minor storm levels detected during 17/0900 - 1800UT, then declined to quiet to unsettled levels for the rest of the day. A major geomagnetic storm occurred during 18 - 19 February following a sudden storm commencement (SSC) at 18/0250UT (43 nT, as measured by the Boulder USGS magnetometer). Minor to severe storm levels occurred during this disturbance. The storm ended late on 19 February. Quiet to unsettled levels occurred during the remainder of the period.

Space Weather Outlook

24 February - 22 March 1999

Solar activity is expected to be low during most of the period. However, an increasing trend is expected during 07 - 21 March as previously active solar longitudes (roughly L = 275 - 260) return to the visible disk. Isolated M-class flares are possible during this period.

No significant proton enhancements are expected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be at normal to moderate levels during most of the period. However, fluxes may reach high levels during 11 - 12 March.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period. However, active levels are possible during 10 - 11 March due to recurrent coronal hole effects.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No. (10 ⁶ hemi.)	Sunspot Area	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
15 February	190	167	1710	C1.4	9	0	0	15	3	0	0	0
16 February	192	176	1660	B9.2	8	2	0	7	3	0	0	0
17 February	190	135	1460	B7.2	6	0	0	11	0	0	0	0
18 February	168	135	1350	B8.9	11	0	0	15	0	0	0	0
19 February	164	122	1300	B6.0	3	0	0	7	0	0	0	0
20 February	157	118	1020	B7.9	10	0	0	9	0	0	0	0
21 February	147	103	620	B5.9	2	1	0	4	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
15 February	2.3E+5	1.4E+4	3.2E+3		3.4E+6	
16 February	3.2E+5	1.6E+4	3.1E+3		4.6E+6	
17 February	4.0E+6	1.7E+4	3.0E+3		2.9E+6	
18 February	6.5E+6	1.2E+4	2.4E+3		8.7E+5	
19 February	7.9E+6	1.2E+4	2.3E+3		3.9E+7	
20 February	1.8E+5	1.4E+4	3.6E+3		2.7E+7	
21 February	2.8E+5	1.5E+4	3.9E+3		6.3E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	15 February	13	4-2-3-3-3-2-2-2	*	2-2-3-4-*-3-*-2	13
16 February	3	2-0-0-1-2-1-0-1	3	2-0-1-2-2-0-0-0	4	1-0-0-2-1-1-1-1
17 February	15	1-2-3-4-5-2-1-2	39	0-1-5-6-7-4-2-2	16	0-2-3-4-5-3-2-2
18 February	41	4-4-6-6-5-4-3-4	89	5-5-6-8-7-6-5-4	54	4-6-5-6-7-5-4-4
19 February	24	4-4-5-4-4-3-2-3	69	3-5-7-7-7-5-3-4	38	5-5-5-5-5-4-3-3
20 February	2	0-0-0-0-1-0-2-1	3	1-0-0-0-1-2-2-1	5	1-0-0-0-2-2-3-2
21 February	3	0-1-0-0-0-1-1-3	2	0-0-0-2-0-0-1-2	5	0-1-0-1-2-2-2-3



Alerts and Warnings Issued

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
15 Feb 0009	1-245 MHz Radio Burst	14 Feb
15 Feb 0009	245 MHz Radio Noise Storm	14 Feb
15 Feb 1345	Type II Radio Emission	15 Feb 1224
15 Feb 1345	Type IV Radio Emission	15 Feb 1304
16 Feb 0016	4-245 MHz Bursts	15 Feb
16 Feb 312	Type II Radio Emission	16 Feb 0257
16 Feb 342	Type IV Radio Emission	16 Feb 0300
16 Feb 352	10cm Radio Burst 560 s.f.u.	16 Feb 0252
16 Feb 2200	Type II Radio Emission	16 Feb 2126
17 Feb 0053	17- 245 MHz Radio Bursts	16 Feb
17 Feb 0053	1- 245 MHz Radio Noise Storm	16 Feb
17 Feb 1200	K= 4 Observed	17 Feb 09 - 12
17 Feb 1200	K= 4 Warning valid	17 Feb 12 - 18
17 Feb 1504	K= 5 Observed	17 Feb 12 - 15
18 Feb 0112	14 - 245 MHz Bursts	17 Feb
18 Feb 0112	1 - 245 MHz Radio Noise Storm	17 Feb
18 Feb 232	K= 4 Warning valid from	18 Feb 03 -15
18 Feb 238	K= 5 Warning valid from	18 Feb 03 -15
18 Feb 255	Sudden Impulse of 43 nT Boulder	18 Feb 0250
18 Feb 300	K= 4 Observed	18 Feb 00 - 03
18 Feb 314	A ≥ 30 Warning valid	18 Feb 0312 - 2359
18 Feb 517	K= 6 Warning valid	18 Feb 05 - 15
18 Feb 600	A ≥ 20 Observed	18 Feb 0600
18 Feb 600	K= 5 Observed	18 Feb 03 - 06
18 Feb 859	A ≥ 30 Observed	18 Feb 0900
18 Feb 859	K ≥ 6 Observed	18 Feb 06 - 09
18 Feb 859	CONTINUED K= 6 Warning valid	18 Feb 05 - 15
18 Feb 1016	A ≥ 50 Warning valid	18 Feb 1014 - 2359
18 Feb 1317	Stratwarm Alert EXISTS Stratwarm Thursday	
18 Feb 1452	A ≥ 50 Observed	18 Feb 1500
18 Feb 1452	K= 7 Observed	18 Feb 12 - 15
18 Feb 1653	CONTINUED A ≥ 30 Warning valid	18 Feb 0312 - 2359
19 Feb 0015	K-Index of 4 Observed	18 Feb 21- 24
19 Feb 0157	20 - 245 MHz Radio Bursts	18 Feb
19 Feb 0157	1 - 245 MHz Radio Noise Storm	18 Feb
19 Feb 0045	K= 4 Warning valid	19 Feb 00 - 15
19 Feb 0600	K= 5 Observed	19 Feb 03 - 06
19 Feb 0816	>2MeV Electron Event ≥1000pfu	19 Feb 0755
19 Feb 0858	K= 5 Observed	19 Feb 06 - 09
19 Feb 0858	K= 5 Warning valid from	19 Feb 09 - 15
19 Feb 1201	CONTINUED A ≥ 30 Observed	18 Feb 0900
19 Feb 1358	Stratwarm Alert EXISTS Stratwarm Friday	
19 Feb 1500	CONTINUED K=4 Warning valid	19 Feb 00 - 15
19 Feb 1506	CONTINUED K= 4 Warning valid	19 Feb 00 - 15

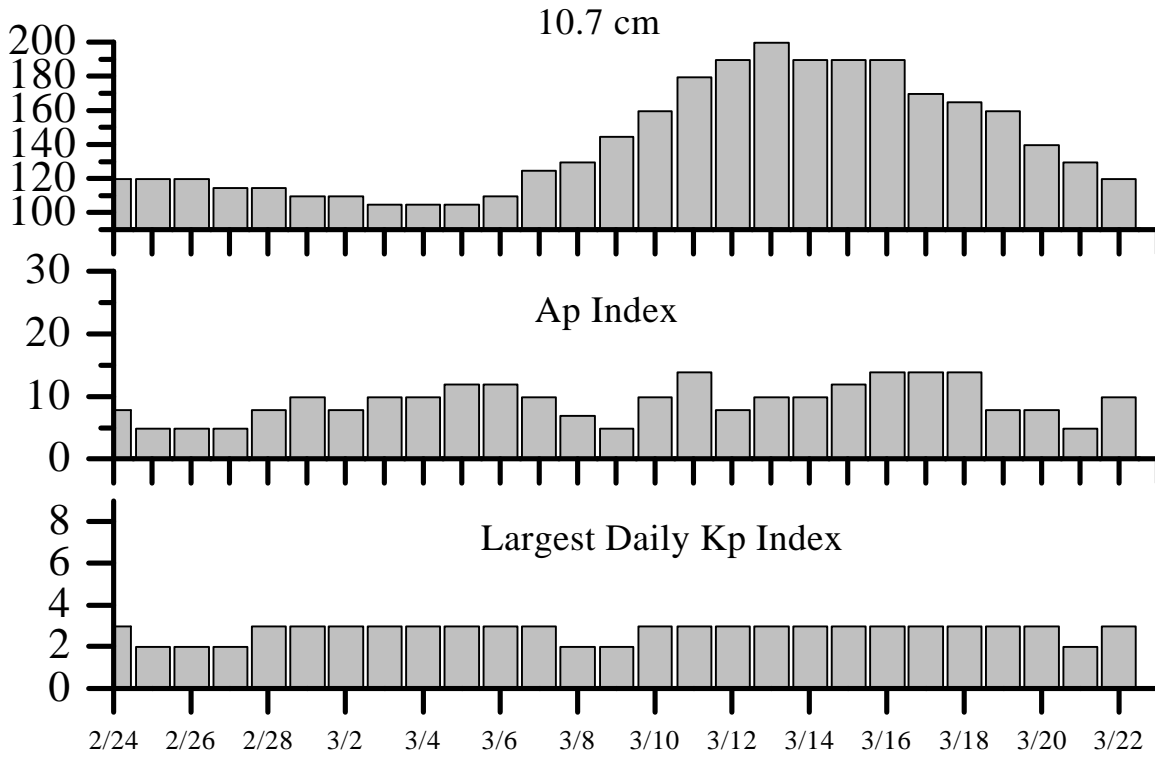


Alerts and Warnings Issued- continued.

<u>Date and Time of Issue (UT)</u>	<u>Type of Alert or Warning</u>	<u>Date and Time of Event (UT)</u>
20 Feb 0020	7 - 245 MHz Radio Bursts	19 Feb
20 Feb 0020	1 - 245 MHz Radio Noise Storm	19 Feb
20 Feb 0443	Type II Radio Emission	20 Feb 0416
20 Feb 0454	Type IV Radio Emission	20 Feb 0422
20 Feb 0612	ENDED A \geq 30 Warning 20/0000 Feb	18 Feb 0312 - 2359
20 Feb 1200	CONTINUED $>2\text{MeV}$ Electron Event $\geq 1000\text{pfu}$	19 Feb 0755
20 Feb 1356	Stratwarm Alert EXISTS Stratwarm Saturday	
20 Feb 1517	ENDED A \geq 30 Observed @ 20/0000 Feb	18 Feb 0900
20 Feb 1517	ENDED A \geq 50 Observed @ 19/0900 Feb	18 Feb 1500
20 Feb 1648	Type II Radio Emission	20 Feb 1527
21 Feb 1300	Stratwarm Alert EXISTS Stratwarm Sunday	
21 Feb 1717	$>2\text{MeV}$ Electron Event $\geq 1000\text{pfu}$	21 Feb 1700
21 Feb 2313	Sudden Impulse of 20 nT	21 Feb 2257



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
24 Feb	120	8	3	10 Mar	160	10	3
25	120	5	2	11	180	14	3
26	120	5	2	12	190	8	3
27	115	5	2	13	200	10	3
28	115	8	3	14	190	10	3
01 Mar	110	10	3	15	190	12	3
02	110	8	3	16	190	14	3
03	105	10	3	17	170	14	3
04	105	10	3	18	165	14	3
05	105	12	3	19	160	8	3
06	110	12	3	20	140	8	3
07	125	10	3	21	130	5	2
08	130	7	2	22	120	10	3
09	145	5	2				



Energetic Events

Date	Time (UT)			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Max	Class	Flux	Imp Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
									245	2695	II	IV
16 Feb 99	0249	0312	0345	M3.2	.079	SF	S23W14	8458	710	560	2	2
16 Feb 99	0404	0408	0414	M1.5	.007							
21 Feb 99	1303	1345	1408	M1.3	.038	SF	N24W81	8462	150			

Flare List

Date	Time			X-ray Class	Optical Imp / Brtns	Location Lat CMD	Rgn #	
	Begin	Max	End					
15 February	0444	0447	0451	C1.3	SF	N17W05	8457	
	0624	0626	0639	C2.0	SF	N16E61		
	0921	0929	A0955	C7.3	1N	N20E03	8462	
	0945	0947	A1020		SF	N23W28	8456	
	1316	1317	1319	C1.7	SF	N15W08	8457	
	1321	1321	1327		SF	N18W07	8457	
	1535	1535	1539		SF	N18W06	8457	
	1614	1614	1617		SF	N19W02	8462	
	1621	1637	1706	C4.0	1F	N20W02	8462	
	1632	1634	1654		SF	N14W13	8457	
	1722	1722	1726		SF	N16W10	8457	
	1827	1828	1830		SF	N14W15	8457	
	1831	1833	1839		SF	N22W34	8456	
	1832	1837	1856	C2.4	SF	N19E34	8464	
	1901	1904	1909	C4.2	1N	N16W11	8457	
	2139	2139	2203	C2.7	SF	N21W01	8462	
	2220	2229	2235		SF	N21W01	8462	
	2358	0001	0015	C9.4	SF	N20E30	8464	
	16 February	0001	0003	A0043		1F	N20W07	8462
		0123	0128	0131	C6.1			
0213		0217	0222	C2.8				
B0333		U0352	A0409	M3.2	SF	S23W14	8458	
0404		0408	0414	M1.5				
0730		0753	0822	C3.1				
1136		1144	1147	C2.8				
1459		1500	1507		SF	N20W09	8462	
1659		1735	1821	C6.8	1F	N20W14	8462	
1853		1855	1858		SF	N20W13	8462	
1855		1857	1901		SF	S26W16	8458	
1901		1901	1905		SF	N19W16	8462	
1910		1917	1927	C1.8	SF	S28W17	8458	
2003		2004	2011		SF	N19W16	8462	
2117		2121	2128	C5.3	1N	N19W12	8462	
2325	2329	2333	C1.9					



Flare List - continued.

Date	Time			X-ray	Optical		Rgn Lat CMD #
	Begin	Max	End		Imp / Class.	Location Brtns	
17 February	0059	0059	0106	C3.2	SF	N18W15	8462
	0115	0119	0121	C1.2			
	B0531	U0532	0537		SF	N19W18	8462
	1222	1222	1227		SF	N20W24	8462
	1237	1238	1247	C1.2	SF	S21W33	8458
	1243	1244	1247		SF	N20W20	8462
	1311	1321	1328	C1.2	SF	N20W23	8462
	1520	1520	1528		SF	N20W23	8462
	1531	1531	1532		SF	N20W23	8462
	1548	1552	1603		SF	N20W24	8462
	1627	1646	1708	C3.4			
	1736	1743	1753		SF	N20W24	8462
	1902	1905	1942		SF	S29W68	8459
	2021	2029	2037	C6.0			
	18 February	0029	0035	0042	C3.4		
0124		0131	0141	C2.0			
0316		0329	0336	C5.1			
0829		0829	A0843	C1.4	SF	N21W34	8462
1009		1014	1018	C2.1			
1209		1209	1213		SF	N20W34	8462
1229		1230	1241	C2.0	SF	N20W34	8462
1324		1325	1329		SF	S21W47	8458
1414		1414	1418		SF	N20W39	8462
1418		1420	1424		SF	S27W82	8459
1603		1604	1610	C1.4	SF	S29W80	8459
1713		1720	1728	C2.0			
1746		1748	1756		SF	N20W42	8462
1838		1852	1905	C1.6	SF	S21W50	8458
1921		1921	1925		SF	S28W86	8459
1929		1930	1938		SF	S28W87	8459
1936		1936	1938		SF	N14W55	8457
2021		2022	2034		SF	S23W48	8458
2027		2027	2031		SF	N20W39	8462
2242		2247	2252	C1.3			
2356	0000	0003	C1.1	SF	N20W11	8464	
19 February	0048	0054	0111	C3.2			8459
	0731	0732	0739	C1.0	SF	N20W15	8464
	0940	0943	0946	B9.8			
	1343	1344	1347		SF	N20W48	8456
	1344	1345	1346		SF	N20W48	8462

Flare List - continued.



Date	Time			X-ray	Imp / Class	Optical		Rgn Lat CMD #
	Begin	Max	End			Location Brtns		
19 February	1441	1441	1447		SF	S19W56	8458	
	1617	1623	1629	C3.8	SF	N21W52	8462	
	1621	1623	1630		SF	N14W66	8457	
	1627	1630	1642		SF	S23W59	8458	
20 February	0016	0016	0019		SF	N19W54	8462	
	0217	0310	0331	C8.2				
	0404	0404	0418	C8.2	SF	S21W63	8458	
	0642	0647	0655	C2.0				
	0913	0913	0921	C1.1	SF	N19W61	8462	
	0952	0952	0959	C1.7	SF	N18W60	8462	
	1000	1000	1010	C1.7	SF	N20W61	8462	
	1241	1243	1246		SF	N20W61	8462	
	1411	1412	1413	C2.1	SF	N20W63	8462	
	1514	1514	1531	C4.2	SF	S17W71	8458	
	1617	1617	1621		SF	N34W62	8468	
	1739	1742	1754	C1.0				
	2034	2040	2045	C1.0				
21 February	0528	0536	0543	B9.1				
	0857	0858	0909		SF	N19W45	8464	
	0938	0950	1001	C8.6				
	B1322	1326	1338	M1.3	SF	N24W81	8462	
	1637	1637	1639		SF	N21W79	8462	
	1700	1700	1704		SF	N21W81	8462	
	2202	2210	2230	C1.6				
2341	2347	2356	B9.0					

Region Summary

Date	Location		Sunspot Characteristics					Flares			
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray		Optical	
								C	M X	S	1 2 3 4

Region 8455

06 Feb	S19E33	346	0010	01	HRX	002	A						
07 Feb	S18E19	346	0000	00	AXX	001	A						
08 Feb	S18E05	347	0010	00	AXX	001	A						
11 Feb	S18W34	347											
12 Feb	S18W47	347											
13 Feb	S18W60	347											
14 Feb	S18W73	347											
15 Feb	S18W86	347											

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 347

Region Summary- continued.

Location	Sunspot Characteristics	Flares
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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 8458</i>																							
08 Feb	S23E76	276	0250	05	HHX	002	A																
09 Feb	S22E65	274	0390	06	HHX	003	A																
10 Feb	S19E55	271	0640	10	DHO	007	B	1				6											
11 Feb	S22E42	271	0660	08	DKO	009	BGD																
12 Feb	S23E29	270	0650	09	DKO	014	BG					2	1										
13 Feb	S22E16	270	0560	08	DKO	016	BG					2											
14 Feb	S22E03	270	0590	10	DKO	030	B	3				4											
15 Feb	S22W09	269	0640	12	EKC	025	B																
16 Feb	S22W23	270	0610	10	DKI	013	B	1	1			3											
17 Feb	S23W36	270	0580	09	DKO	008	B	1				1											
18 Feb	S22W48	268	0590	09	DHO	006	B	1				3											
19 Feb	S23W61	267	0610	09	DKO	008	B	1				2											
20 Feb	S22W74	267	0560	09	DKO	009	B	2				2											
21 Feb	S23W86	266	0360	09	HHX	001	A																
								10	1	0	25	1	0	0	0	0							

Still on Disk.

Absolute heliographic longitude: 270

<i>Region 8459</i>																							
08 Feb	S29E48	304	0000	00	AXX	001	A																
09 Feb	S30E39	300	0000	00	AXX	002	A																
10 Feb	S30E26	300																					
11 Feb	S30E13	300																					
12 Feb	S30E00	300																					
13 Feb	S30W13	300																					
14 Feb	S30W30	303	0070	05	DRO	006	B																
15 Feb	S30W43	303	0090	09	DRO	009	B																
16 Feb	S30W57	304	0090	08	DAO	007	B																
17 Feb	S30W69	303	0140	10	DAO	006	B					1											
18 Feb	S29W80	300	0120	08	DAO	006	B	1				4											
19 Feb	S28W94	300	0130	10	DAO	009	B	1															
								2	0	0	5	0	0	0	0	0							

Crossed West Limb.

Absolute heliographic longitude: 300



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 8460

10 Feb	S17E70	256	0050	02	HSX	001	A										
11 Feb	S17E61	252	0100	14	ESO	003	B										
12 Feb	S16E50	249	0050	03	CSO	005	B										
13 Feb	S16E30	256	0030	03	HSX	004	A										
14 Feb	S17E17	256	0030	04	CSO	009	B										
15 Feb	S17E04	256	0050	03	CSO	005	B										
16 Feb	S18W10	257	0020	02	CSO	003	B										
17 Feb	S17W22	256	0020	03	DAO	003	B										
18 Feb	S17W35	255	0010	03	BXO	005	B										
19 Feb	S17W48	255															
20 Feb	S17W61	255															
21 Feb	S17W74	255															

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 256

Region 8461

12 Feb	S32E27	272	0010	03	CSO	004	B										
13 Feb	S31E10	276	0000	03	BXO	002	B										
14 Feb	S31W03	276															
15 Feb	S31W16	276															
16 Feb	S31W29	276															
17 Feb	S31W42	276															
18 Feb	S31W55	276															
19 Feb	S31W68	276															
20 Feb	S31W81	276															

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 276



Region Summary- continued.

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

Region 8462

12 Feb	N20E34	265	0030	05	CRO	007	B	1			1				
13 Feb	N21E21	265	0050	07	DSO	016	B	6				11			
14 Feb	N20E07	266	0080	08	DAO	021	B	3				3			
15 Feb	N19W06	266	0130	10	DAO	017	B	3	1		3	2			
16 Feb	N18W20	267	0150	11	EAO	015	B	2	1		4	3			
17 Feb	N20W27	261	0170	06	DAO	009	B	2				9			
18 Feb	N20W40	260	0160	06	DAO	006	B	2				6			
19 Feb	N20W50	256	0160	05	DAO	006	B					2			
20 Feb	N21W65	258	0130	05	CAO	005	B	4				6			
21 Feb	N20W79	259	0010	01	AXX	001	A		1			3			
								23	3	0	48	5	0	0	0

Still on Disk.

Absolute heliographic longitude: 266

Region 8463

12 Feb	S16E59	240	0040	02	HSX	001	A								
13 Feb	S15E45	241	0070	02	HSX	001	A								
14 Feb	S16E33	240	0060	01	HSX	001	A								
15 Feb	S16E20	240	0080	02	HSX	002	A								
16 Feb	S17E06	241	0070	02	HSX	001	A								
17 Feb	S17W07	241	0070	02	HSX	001	A								
18 Feb	S17W19	239	0050	02	HSX	001	A								
19 Feb	S18W33	239	0050	01	HSX	001	A								
20 Feb	S17W46	239	0040	01	HSX	001	A								
21 Feb	S17W62	242	0040	10	CSO	002	B								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 241

Region 8464

12 Feb	N19E64	235	0070	13	EAO	001	B								
13 Feb	N21E55	231	0160	13	ESO	004	B								
14 Feb	N20E42	231	0090	12	CSO	007	B								
15 Feb	N20E28	232	0090	11	CSO	006	B	2				2			
16 Feb	N19E15	232	0080	09	CSO	007	B								
17 Feb	N20E02	232	0070	09	DSO	007	B								
18 Feb	N18W11	231	0070	06	CSO	010	B	1				1			
19 Feb	N18W26	232	0050	05	CSO	006	B	1				1			
20 Feb	N18W40	233	0030	03	CSO	003	B								
21 Feb	N18W53	233	0020	03	CSO	003	B					1			
								4	0	0	5	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 232



Region Summary- continued.

Date	Location		Sunspot Characteristics				Flares										
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
								C	M	X	S	1	2	3	4		
<i>Region 8465</i>																	
13 Feb	S33W60	346	0000	03	BXO	002	B										
14 Feb	S32W76	349	0000	00	AXX	001	A										
15 Feb	S32W89	349															
								0	0	0	0	0	0	0	0	0	0
Crossed West Limb.																	
Absolute heliographic longitude: 346																	
<i>Region 8466</i>																	
16 Feb	S23E59	188	0000	00	AXX	001	A										
17 Feb	S24E44	190	0000	00	AXX	001	A										
18 Feb	S24E32	188	0000	00	AXX	001	A										
19 Feb	S22E20	186	0000	01	BXO	002	B										
20 Feb	S22E05	188	0000	03	BXO	002	B										
21 Feb	S22W14	194	0010	03	BXO	002	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 188																	
<i>Region 8467</i>																	
16 Feb	N16E65	182	0060	01	HSX	001	A										
17 Feb	N16E56	178	0080	02	HSX	001	A										
18 Feb	N16E43	177	0090	02	HSX	002	A										
19 Feb	N16E29	177	0110	03	HSX	002	A										
20 Feb	N16E16	177	0100	03	HAX	005	A										
21 Feb	N16E03	177	0080	03	CAO	005	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 177																	
<i>Region 8468</i>																	
20 Feb	N35W66	259	0050	09	CSO	008	B						1				
21 Feb	N35W75	255	0070	07	CSO	005	B										
								0	0	0	1	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 259																	
<i>Region 8469</i>																	
21 Feb	N15W18	198	0030	04	CSO	004	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 198																	



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

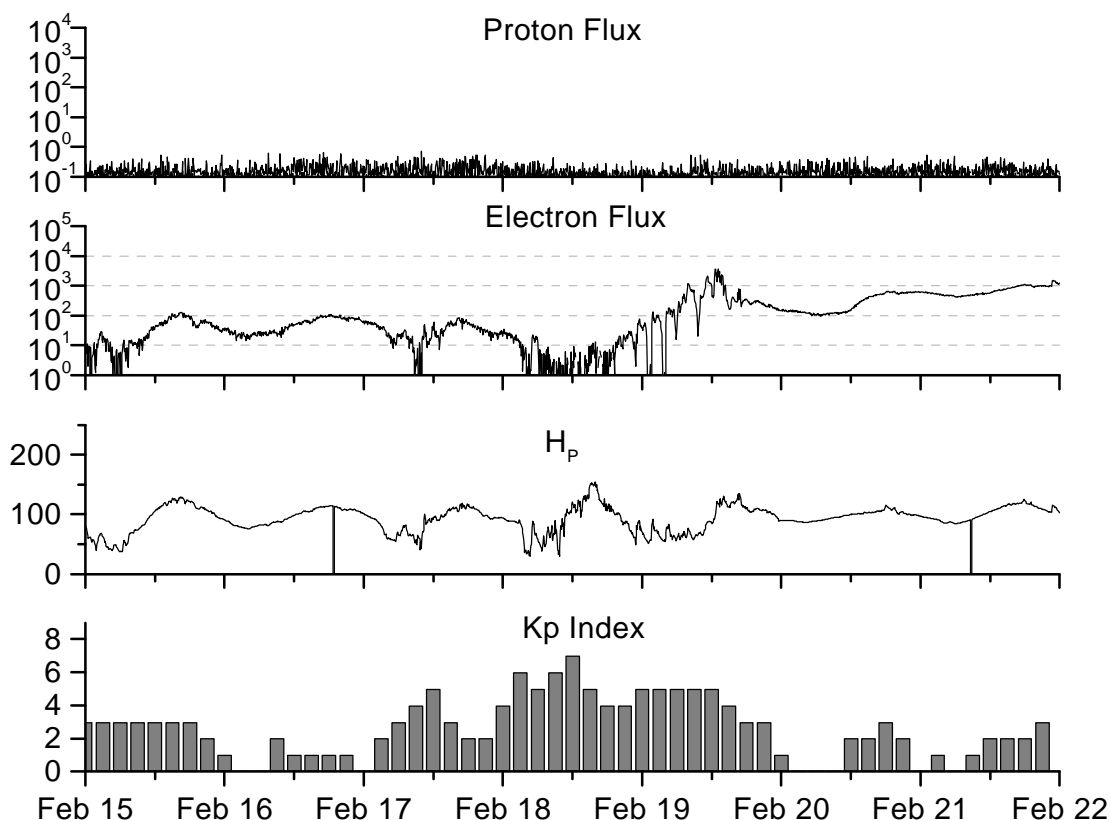
Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Smooth values RI/SWO	Smooth values SWO	**Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value	
1997									
February	11.3	07.6	0.67	17.4	11.0	73.8	73.7	11	09.2
March	14.4	08.7	0.60	20.4	13.5	73.5	75.1	08	08.9
April	24.5	15.5	0.63	24.0	16.5	74.5	76.8	10	08.6
May	28.6	18.5	0.65	26.4	18.3	74.6	78.4	08	08.6
June	22.1	12.7	0.57	29.0	20.3	71.7	80.1	07	08.6
July	17.0	10.4	0.61	32.4	22.6	71.1	81.8	06	08.5
August	36.7	24.4	0.66	35.9	25.0	79.0	83.4	07	08.3
September	52.8	51.3	0.88	40.5	28.3	96.2	85.7	10	08.4
October	33.6	22.8	0.68	45.4	31.8	84.9	88.6	11	08.6
November	53.5	39.0	0.73	49.3	35.0	99.5	91.3	11	09.0
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	11.2*
April	73.6	53.4	0.73	77.7	56.5*	108.3	109.1*	10	11.4*
May	74.3	56.3	0.76	81.4	59.3*	106.7	112.4*	18	11.7*
June	93.6	70.7*	0.76*	85.9	62.4*	108.4*	116.2*	10	12.0*
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*			136.0*		18*	
September	119.0	92.9*	0.78*			138.4*		14*	
October	77.0	55.6*	0.72*			121.9*		13*	
November	99.5	73.6*	0.74*			140.2*		16*	
December	120.8	81.6*	0.68*			150.1*		08*	
1999									
January	94.3	62.4*	0.66*			140.6*		08*	

*Preliminary estimates.

The lowest smoothed sunspot indices 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.

** From June 1991 onward, 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 15 February 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.

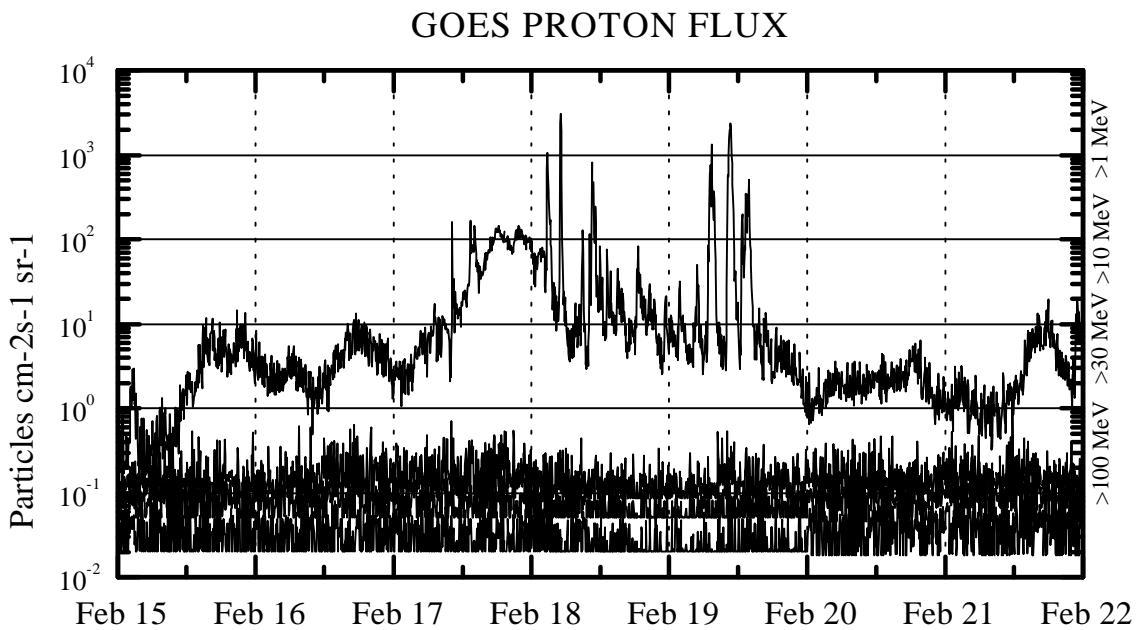
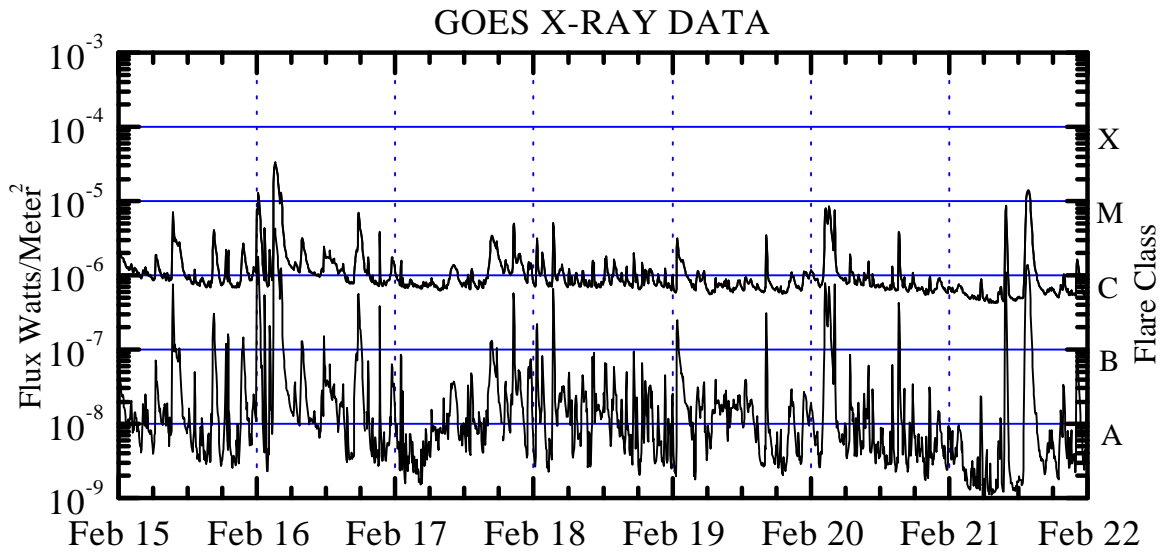
Electrons plot contains the five-minute averaged integral electron flux (electrons/ cm^2 -sec-sr) with energies greater than 2 MeV at GOES-8.

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 a 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

