

**Space Weather Highlights**  
**28 March – 03 April 2005**

**SWO PRF 1544**  
**05 April 2005**

Solar activity was very low the entire period. Before rotating around the west limb on 01 April, Region 745 (N12, L=345, class/area, Dai/190 on 25 March), was the largest sunspot group on the disk, but decayed to an area of plage late in its life cycle. The remainder of the disk and limb were quiet and stable.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. Solar wind speed ranged from a high of near 600 km/s early on 28 March to a low of near 325 km/s midday on 03 April. The period began on 28 March with solar wind speed near 600 km/s and the IMF Bz fluctuated +/- 6 nT as a recurrent coronal hole wind stream rotated out of a geoeffective position. For the remainder of the summary period, wind speed slowly declined and the IMF Bz did not fluctuate much beyond +/- 5 nT.

No greater than 10 MeV proton events were observed this period.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels 30 March – 02 April.

The geomagnetic field ranged from quiet to minor storming. Isolated periods of active to minor storm conditions were observed at higher latitudes midday on 30 March while isolated active conditions were observed early on 30 March and again on 01 April. Otherwise, the period was dominated by quiet to unsettled conditions.

**Space Weather Outlook**  
**06 April - 02 May 2005**

Solar activity is expected to be at very low to low levels.

A greater than 10 MeV proton event is not expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels 06 - 08 April and again on 22 – 25 April.

The geomagnetic field is expected to range from quiet to active levels. A recurrent coronal hole high speed wind stream is expected to produce unsettled to active levels on 06 April. On 21 – 23 April, a small coronal is expected to produce unsettled to active conditions. Otherwise, expect quiet to unsettled conditions.



### *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
28 March	80	15	60	A2.8	0	0	0	0	0	0	0	0
29 March	79	15	30	A2.7	0	0	0	0	0	0	0	0
30 March	78	11	10	A2.0	0	0	0	0	0	0	0	0
31 March	77	22	30	A1.7	0	0	0	0	0	0	0	0
01 April	78	26	60	A2.5	0	0	0	0	0	0	0	0
02 April	80	30	100	A3.4	0	0	0	0	0	0	0	0
03 April	81	38	120	A3.2	0	0	0	0	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
	28 March	6.7E+5	1.4E+4	3.0E+3		2.2E+8
29 March	1.3E+6	1.3E+4	3.0E+3		2.2E+8	
30 March	4.7E+5	1.3E+4	2.9E+3		7.1E+7	
31 March	6.0E+5	1.4E+4	3.0E+3		8.0E+7	
01 April	5.8E+5	1.4E+4	3.0E+3		4.9E+7	
02 April	6.6E+5	1.5E+4	3.0E+3		6.7E+7	
03 April	5.4E+5	1.5E+4	3.1E+3		1.7E+7	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	28 March	2	1-2-1-0-0-0-1-1	1	1-1-1-0-0-0-0-0	4
29 March	3	0-1-1-0-1-1-1-2	2	0-0-0-0-0-1-1-2	5	0-1-1-0-1-2-2-3
30 March	6	2-2-3-1-2-1-0-1	15	2-2-4-5-3-3-0-0	9	2-3-4-2-1-2-1-1
31 March	5	1-2-2-1-1-1-2-2	5	1-2-3-1-0-1-2-1	9	1-3-3-2-1-2-3-2
01 April	6	1-3-3-1-1-1-1-1	4	1-2-3-0-1-1-0-0	8	1-3-4-2-2-2-1-1
02 April	1	0-0-0-1-1-1-0-0	3	1-0-0-3-0-1-0-0	4	1-0-1-1-1-2-1-1
03 April	4	2-2-1-1-1-1-1-1	4	1-1-1-3-1-1-1-0	6	1-2-1-1-1-2-2-2



### *Alerts and Warnings Issued*

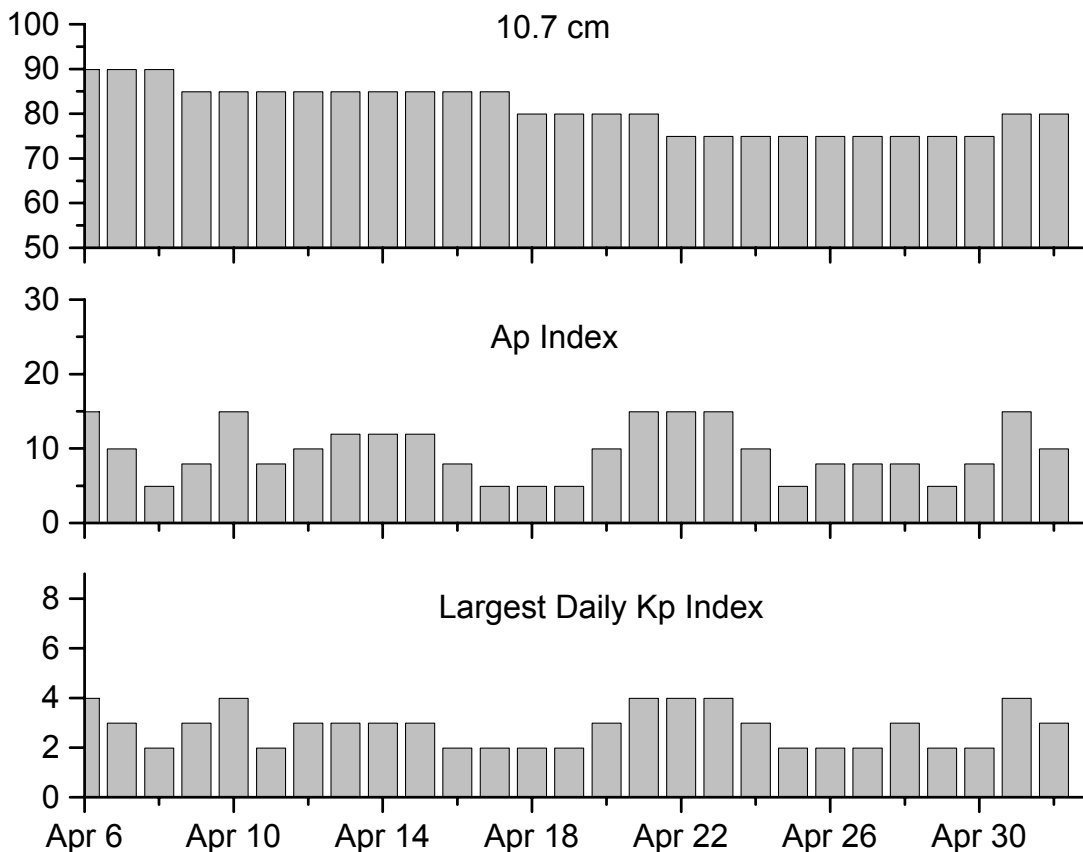
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<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UTC</u>
28 Mar 0516	ALERT: Electron 2MeV Integral Flux > 1000pfu	28 Mar 0500
29 Mar 0517	ALERT: Electron 2MeV Integral Flux > 1000pfu	29 Mar 0500
30 Mar 0645	WARNING: Geomagnetic K= 4	30 Mar 0645 -Mar 30 0900
30 Mar 0648	ALERT: Geomagnetic K = 4	30 Mar 0647
30 Mar 0823	WARNING: Geomagnetic K= 4	30 Mar 0645 - Mar 30 0900
30 Mar 0837	ALERT: Geomagnetic K= 4	30 Mar 0647
30 Mar 1318	ALERT: Electron 2MeV Integral Flux > 1000pfu	30 Mar 1255
31 Mar 1206	ALERT: Electron 2MeV Integral Flux > 1000pfu	31 Mar 1145
01 Apr 1402	ALERT: Electron 2MeV Integral Flux > 1000pfu	01 Apr 1340
02 Apr 1326	ALERT: Electron 2MeV Integral Flux > 1000pfu	02 Apr 1305
02 Apr 2109	WATCH: Geomagnetic A $\geq$ 20	04 Apr

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### 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
06 Apr	90	15	4	20 Apr	80	10	3
07	90	10	3	21	80	15	4
08	90	5	2	22	75	15	4
09	85	8	3	23	75	15	4
10	85	15	4	24	75	10	3
11	85	8	2	25	75	5	2
12	85	10	3	26	75	8	3
13	85	12	3	27	75	8	3
14	85	12	3	28	75	8	3
15	85	12	3	29	75	5	2
16	85	8	2	30	75	8	3
17	85	5	2	01 May	80	15	4
18	80	5	2	02	80	10	3
19	80	10	3				



### ***Energetic Events***

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Class	Flux	Imp/	Location	Rgn	Radio Flux		Intensity	
					Brtns	Lat CMD	#	245	2695	II	IV

***No Events Observed***

### ***Flare List***

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	Class.			
28 March	No Flares Observed						
29 March	0539	0542	0544	B1.9			
30 March	No Flares Observed						
31 March	No Flares Observed						
01 April	No Flares Observed						
02 April	No Flares Observed						
03 April	0337	0349	0356	B1.2			
	1716	1723	1729	B2.6			747
	2228	2239	2253	B2.7			747

### ***Region Summary***

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 745***

21 Mar	N12E54	346	0020	03	Bxo	004	B	1									
22 Mar	N12E43	344	0110	07	Cao	007	B										
23 Mar	N12E30	344	0090	08	Dao	017	B										
24 Mar	N12E15	346	0100	09	Dai	020	B	1			1						
25 Mar	N12E03	345	0190	09	Dai	022	B				1						
26 Mar	N12W11	346	0090	10	Dao	008	B										
27 Mar	N12W24	345	0090	09	Cao	007	B										
28 Mar	N12W39	347	0060	07	Cao	005	B										
29 Mar	N12W55	349	0030	06	Cro	005	B										
30 Mar	N12W68	349	0010	01	Axx	001	A										
31 Mar	N11W80	348															
01 Apr	N11W93	348															
								2	0	0	2	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 345



**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 746*

23 Mar	S11E07	007	0030	03	Cao	002	B										
24 Mar	S11W06	007	0040	05	Dso	006	B										
25 Mar	S12W21	009	0080	06	Dao	011	B										
26 Mar	S12W35	010	0050	06	Dao	013	B										
27 Mar	S11W47	008	0030	04	Dso	008	B										
28 Mar	S11W60	008															
29 Mar	S11W73	008															
30 Mar	S11W86	008															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 007

*Region 747*

31 Mar	S07E23	245	0010	01	Hsx	001	A										
01 Apr	S09E10	245	0040	03	Dao	005	B										
02 Apr	S07W04	245	0070	05	Dso	009	B										
03 Apr	S05W19	247	0060	06	Dao	006	B										

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 245

*Region 748*

31 Mar	N09E59	209	0020	01	Hsx	001	A										
01 Apr	N09E46	209	0020	01	Hsx	001	A										
02 Apr	N09E33	208	0030	01	Hax	001	A										
03 Apr	N11E20	208	0010	01	Hsx	001	A										

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 208

*Region 749*

03 Apr	S06E63	165	0050	01	Hsx	001	A										
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0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 165

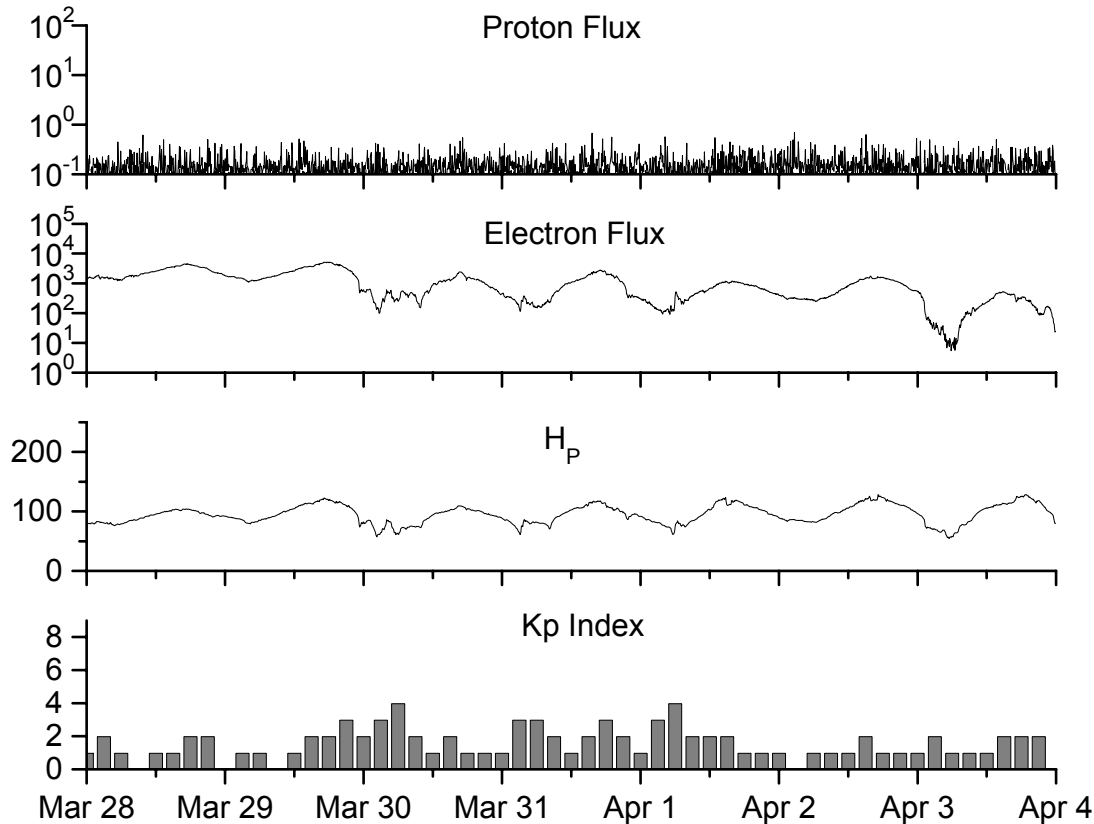


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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>2003</b>									
March	119.7	61.1	0.51	128.1	74.2	132.2	139.5	21	19.4
April	119.7	60.0	0.50	121.5	70.3	126.3	135.0	20	20.1
May	89.6	55.2	0.62	118.3	67.8	129.3	133.1	26	21.0
June	118.4	77.4	0.65	113.6	65.2	129.4	130.2	24	21.5
July	132.8	85.0	0.64	106.9	62.0	127.8	127.2	19	22.0
August	114.3	72.7	0.64	102.8	60.3	122.1	125.2	23	22.2
September	82.6	48.8	0.59	100.7	59.8	112.3	123.7	18	21.8
October	118.9	65.5	0.55	96.6	58.4	153.1	121.8	35	21.1
November	118.9	67.3	0.57	93.6	57.0	153.1	120.1	28	20.0
December	75.4	46.5	0.62	91.4	55.0	115.1	118.0	16	18.6
<b>2004</b>									
January	62.3	37.7	0.61	87.9	52.0	114.1	116.3	22	18.1
February	75.6	45.8	0.61	84.2	49.4	107.0	115.5	13	17.7
March	81.0	49.1	0.61	80.9	47.2	112.2	114.6	14	16.9
April	59.3	39.3	0.66	77.9	45.6	101.2	112.3	11	15.5
May	77.3	41.5	0.54	74.1	43.9	99.8	109.2	8	14.3
June	78.9	43.2	0.55	70.4	41.7	97.4	107.2	8	14.0
July	87.8	51.0	0.58	68.3	40.2	118.5	105.9	23	13.8
August	69.5	40.9	0.59	66.6	39.3	110.1	105.0	11	13.8
September	50.0	27.7	0.55			103.1		10	
October	77.9	48.4	0.62			105.7		9	
November	70.5	43.7	0.62			113.2		26	
December	34.7	17.9	0.52			94.6		11	
<b>2005</b>									
January	52.0	31.3	0.60			102.4		22	
February	45.4	29.1	0.64			97.3		11	

**NOTE:** All smoothed values after September 2002 and monthly values after March 2003 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 23, RI= 120.8, occurred April 2000. \*After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.





*Weekly Geosynchronous Satellite Environment Summary*  
*Week Beginning 28 March 2005*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W112) 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-12 (W75).

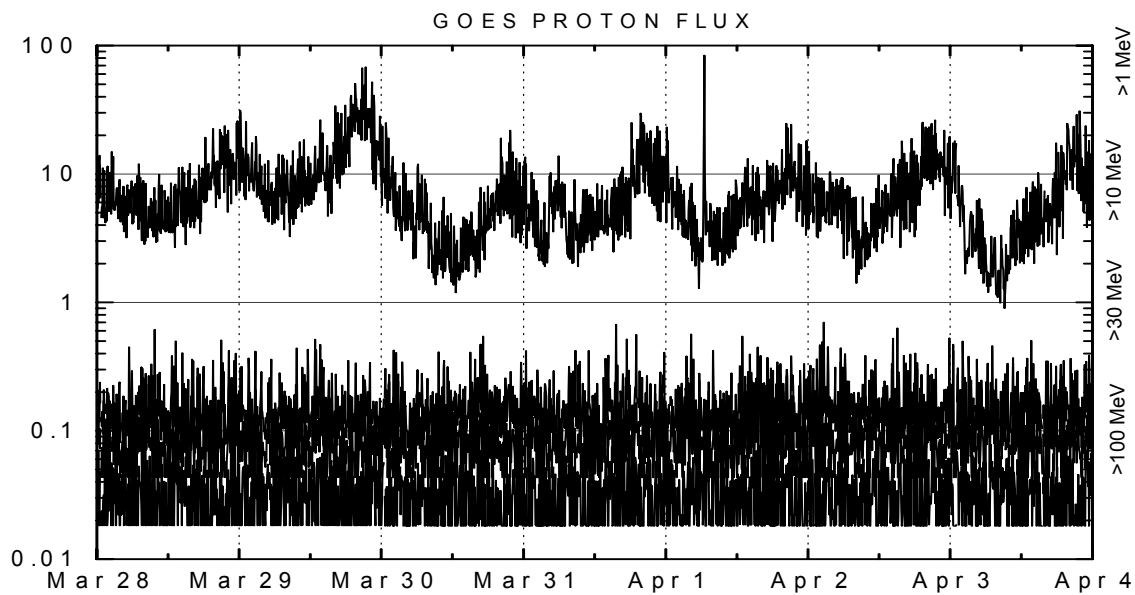
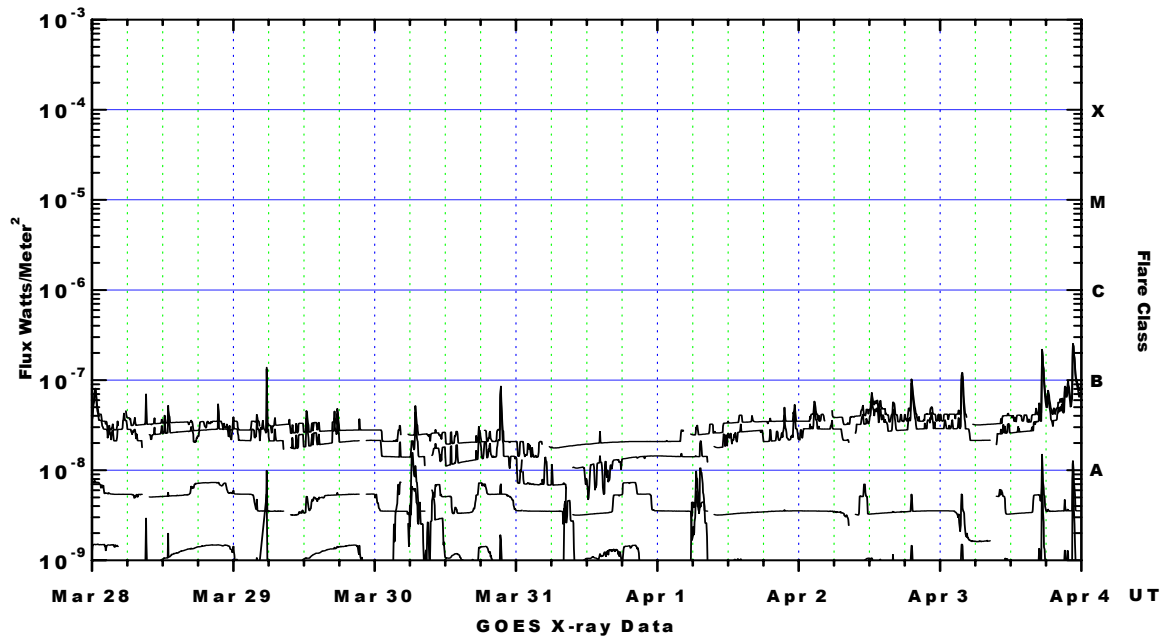
*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*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 Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) 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 parallel 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 12 (W75) and GOES 10 (W135) 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-11 (W112) 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.

