Space Weather Highlights **SWPC PRF 2199**
16 October - 22 October 2017 **23 October 2017**

Solar activity was at very low levels with the exception of 20 Oct when an M1 flare was observed on the southeastern limb. The M1 flare occurred at 20/2328 UTC from Region 2685 (S09, L=131, class/area Hax/070 on 22 Oct) with an associated Type II (344 km/s) radio sweep and a coronal mass ejection (CME) off the east limb first observed at 21/0012 UTC in SOHO/LASCO C2 imagery. By the time Region 2685 rotated fully into view, it was a simple alpha spot group and has been quiet since the M-class event. No Earth-directed CMEs were observed during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached moderate levels on 20 and 22 Oct with high levels on 16, 19 and 21 Oct. Very high levels were observed on 17-18 Oct. The largest flux of the period was 56,839 pfu observed at 17/1535 UTC.

Geomagnetic field activity ranged from quiet to active levels. The period began under the weakening influence of a polar connected, positive polarity coronal hole high speed stream (CH HSS). Solar wind speed declined from approximately 550 km/s early in the period to near 350 km/s by late on 18 Oct. Total field was at 5 nT and below during this timeframe. The geomagnetic field responded with quiet to unsettled levels on 16 Oct and quiet levels on 17-18 Oct. By 19 Oct, a weak connection with the positive polarity polar CH was observed resulting in a brief increase of solar wind speed to near 470 km/s and total field at 10 nT. Solar wind speed again decreased to nominal levels by early on 21 Oct. The geomagnetic field responded with quiet to unsettled levels on 19 Oct and quiet to active levels on 20 Oct. A solar sector boundary crossing into a negative sector was observed at 21/0730 UTC followed by a weak enhancement from a negative polarity CH HSS. Solar wind speed increased to near 490 km/s late on 21 Oct with total field increasing to near 10 nT. By late on 22 Oct, solar wind parameters had once again decreased to nominal levels. The geomagnetic field responded with quiet to unsettled levels on 21-22 Oct.

Space Weather Outlook
23 October - 18 November 2017

Solar activity is expected to be at very low to low levels with a slight chance for M-class flares (R1-Minor) on 23-06 Nov due to potential flare activity from Region 2685 and the return of old Region 2683 (N13, L=111) to the visible disk. From 07-18 Nov, only very low levels are expected.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is likely to be at high levels on 25-26 Oct, 28 Oct-01 Nov, 08-10 Nov, 12 Nov, 15 Nov and 17 Nov with very high levels on 27

Oct, 11 Nov and13-14 Nov due to CH HSS influence.

Geomagnetic field activity is expected to be unsettled to active levels on 24-29 Oct, 01-02 Nov, 07-11 Nov and 15-17 Nov with G1 (Minor) storm levels likely on 24-26 Oct, 07-11 Nov and G2 (Moderate) levels likely on 25-26 Oct and 09-10 Nov due to recurrent CH HSS effects.

Daily Solar Data

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background		Flares						
						X-ray			Optical			
						C	M	X	S	1	2	3	4
16 October	71	0	0	A3.4	0	0	0	0	0	0	0	0	0
17 October	70	0	0	A4.1	0	0	0	0	0	0	0	0	0
18 October	73	0	0	A5.7	0	0	0	0	0	0	0	0	0
19 October	73	0	0	A5.3	0	0	0	0	0	0	0	0	0
20 October	76	0	0	A6.6	0	1	0	0	0	0	0	0	0
21 October	77	11	50	A7.8	0	0	0	0	0	0	0	0	0
22 October	77	13	70	A7.4	0	0	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)		
	>1 MeV	>10 MeV	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
16 October	8.8e+06	1.4e+04	3.5e+03	1.2e+09		
17 October	2.8e+07	1.4e+04	3.6e+03	2.6e+09		
18 October	3.2e+06	1.5e+04	3.8e+03	2.9e+09		
19 October	2.0e+07	1.6e+04	3.5e+03	2.1e+08		
20 October	8.8e+06	1.5e+04	3.5e+03	2.5e+07		
21 October	1.2e+07	1.4e+04	3.3e+03	8.6e+07		
22 October	2.5e+06	1.4e+04	3.3e+03	9.1e+06		

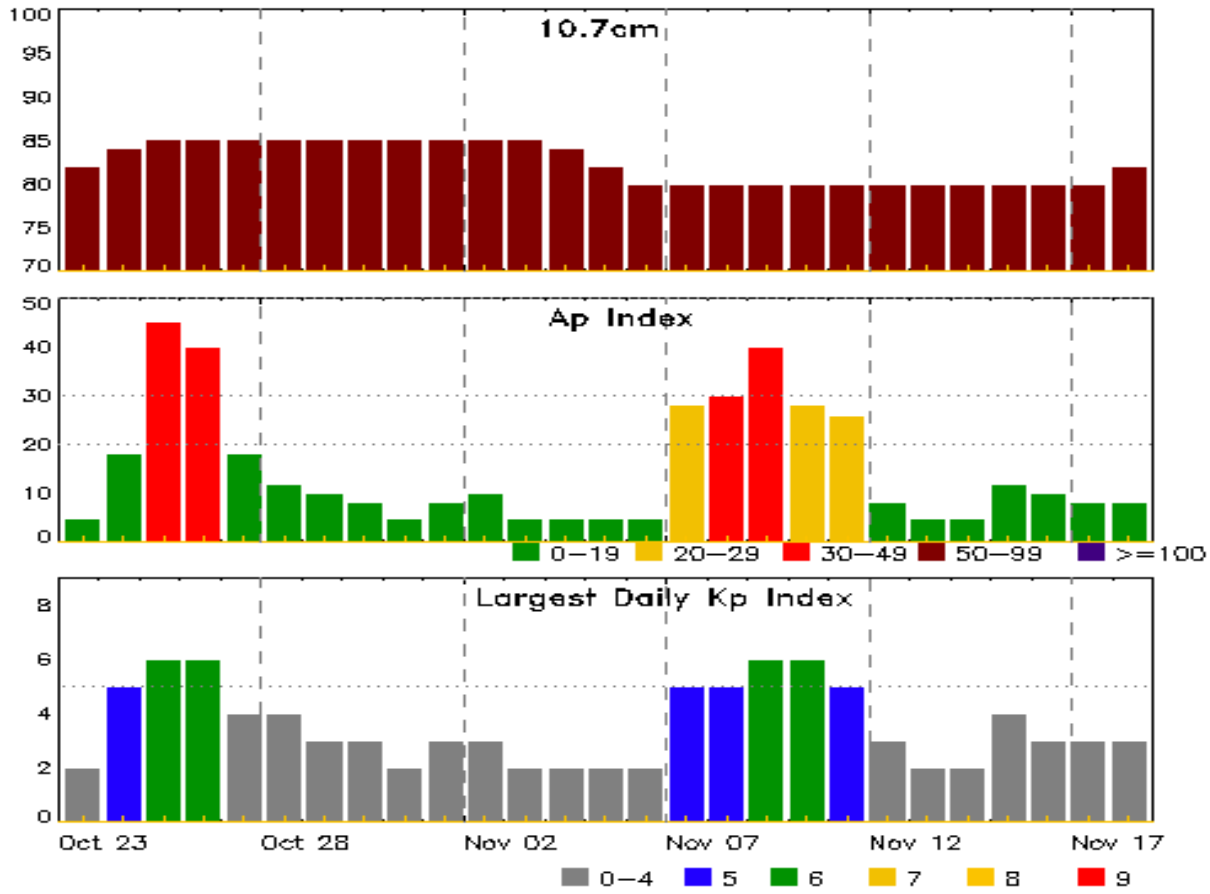
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
16 October	6	1-2-1-2-2-1-3-1	10	1-2-3-4-3-1-2-1	9	2-3-2-2-2-1-3-2
17 October	4	1-1-2-2-2-1-1-0	13	2-1-2-5-4-2-1-0	6	2-1-2-2-2-1-1-1
18 October	4	1-1-2-1-1-1-1-2	7	0-0-2-4-3-0-1-1	5	1-2-1-1-1-0-1-2
19 October	9	3-2-2-2-3-2-2-2	22	2-2-5-4-4-5-2-2	12	3-3-2-2-2-3-3-3
20 October	5	3-2-2-1-1-1-0-1	21	2-2-5-5-5-1-0-1	8	4-2-2-2-2-1-1-2
21 October	13	2-2-2-1-2-5-2-3	11	0-0-3-4-4-2-2-1	10	2-2-2-2-2-3-3-3
22 October	6	3-1-1-1-2-1-1-2	3	2-2-1-1-1-0-0-1	18	3-2-1-1-1-1-1-2

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
16 Oct 0500	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	12/1350
17 Oct 0500	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	12/1350
18 Oct 0500	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	12/1350
18 Oct 0610	ALERT: Type IV Radio Emission	18/0537
18 Oct 0610	ALERT: Type II Radio Emission	18/0539
19 Oct 0501	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	12/1350
19 Oct 1723	WARNING: Geomagnetic K = 4	19/1723 - 20/0300
20 Oct 0145	ALERT: Geomagnetic K = 4	20/0145
20 Oct 0249	EXTENDED WARNING: Geomagnetic K = 4	19/1723 - 20/1300
21 Oct 0027	ALERT: Type II Radio Emission	20/2335
21 Oct 1146	ALERT: Electron 2MeV Integral Flux >= 1000pfu	21/1130
21 Oct 1612	WATCH: Geomagnetic Storm Category G1 predicted	
22 Oct 1621	WATCH: Geomagnetic Storm Category G2 predicted	

Twenty-seven Day Outlook



Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index
23 Oct	82	5	2	06 Nov	80	5	2
24	84	18	5	07	80	28	5
25	85	45	6	08	80	30	5
26	85	40	6	09	80	40	6
27	85	18	4	10	80	28	6
28	85	12	4	11	80	26	5
29	85	10	3	12	80	8	3
30	85	8	3	13	80	5	2
31	85	5	2	14	80	5	2
01 Nov	85	8	3	15	80	12	4
02	85	10	3	16	80	10	3
03	85	5	2	17	80	8	3
04	84	5	2	18	82	8	3
05	82	5	2				

Energetic Events

	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
Date	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	245	2695	II	IV
20 Oct	2310	2328	2337	M1.1		0.009		2685	110		1	

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
20 Oct	0006	0049	0101	B1.4			2685
20 Oct	1352	1403	1409	B3.4			2685
20 Oct	2245	2253	2258	B3.9			2685
20 Oct	2310	2328	2337	M1.1			2685
21 Oct	1907	2106	2154	B3.3			
22 Oct	1208	1241	1301	B2.2			

Region Summary

	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
		Region 2684													
15 Oct	N11W32	312	10	2	Bxo	2	B								
16 Oct	N11W46	314	plage												
17 Oct	N11W60	315	plage												
18 Oct	N11W74	315	plage												
19 Oct	N11W88	316	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 312

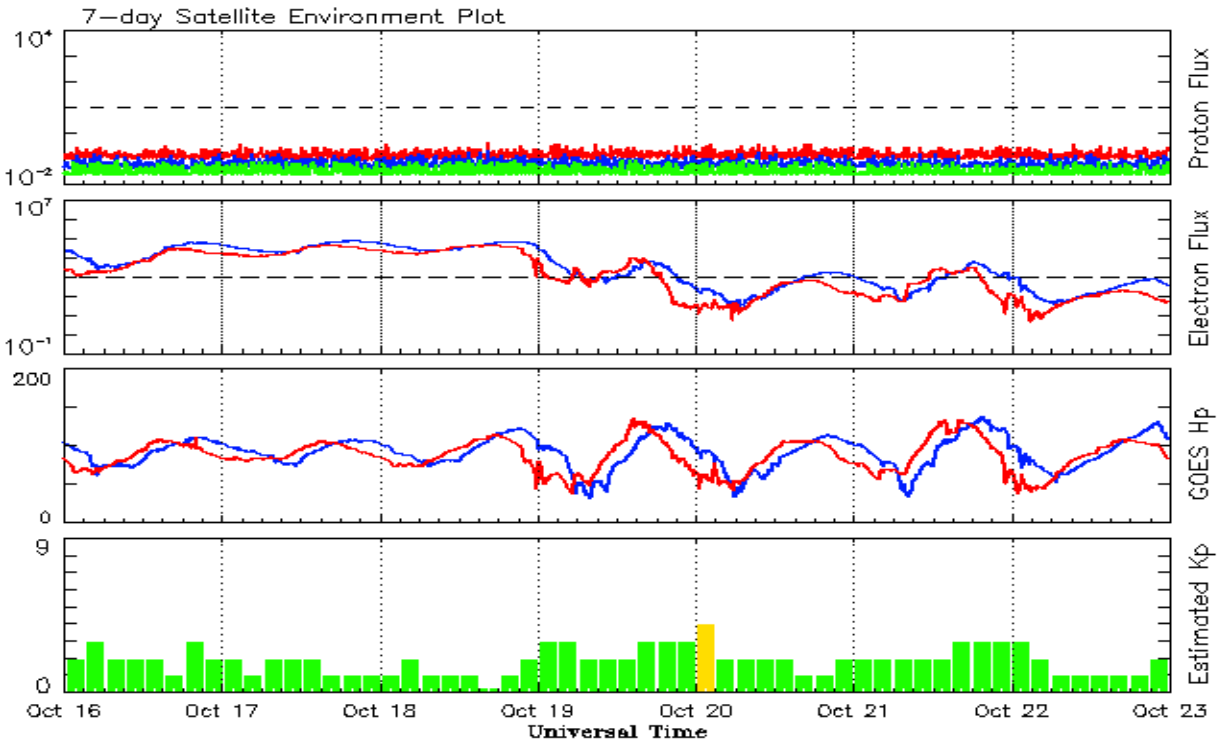
		Region 2685													
20 Oct	S10E85	129	plage						1						
21 Oct	S11E74	128	50	2	Hax	1	A								
22 Oct	S09E58	131	70	2	Hax	3	A								
								0	1	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 131

Recent Solar Indices (preliminary)
Observed monthly mean values

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		Penticton	Smooth	Planetary	Smooth
Month	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
				2015					
October	59.5	38.2	0.62	61.8	38.6	104.1	107.9	15	12.5
November	61.8	37.3	0.61	59.0	36.7	109.6	105.3	13	12.5
December	54.1	34.8	0.64	55.1	34.7	112.8	102.5	15	12.5
				2016					
January	50.4	34.2	0.67	51.4	32.6	103.5	99.9	10	12.3
February	56.0	33.8	0.61	49.6	31.5	103.5	98.1	10	12.0
March	40.9	32.5	0.80	47.7	30.2	91.6	96.6	11	11.8
April	39.2	22.7	0.58	45.0	28.7	93.4	95.3	10	11.8
May	48.9	30.9	0.64	42.1	26.9	93.1	93.2	12	11.7
June	19.3	12.3	0.65	39.0	24.9	81.9	90.4	9	11.4
July	36.8	19.4	0.53	36.5	23.1	85.9	87.7	10	11.2
August	50.4	30.1	0.60	34.2	21.6	85.0	85.5	10	11.2
September	37.4	26.8	0.72	32.1	19.9	87.8	83.7	16	11.3
October	30.0	20.0	0.67	31.1	18.9	86.1	82.5	16	11.6
November	22.4	12.8	0.57	29.4	17.9	78.7	81.1	10	11.6
December	17.6	11.1	0.64	28.1	17.1	75.1	80.0	10	11.4
				2017					
January	28.1	15.7	0.55	27.3	16.7	77.4	79.4	10	11.3
February	22.0	15.8	0.71	25.5	15.9	76.9	78.7	10	11.3
March	25.4	10.6	0.42	24.6	15.5	74.6	78.6	15	11.5
April	30.4	19.4	0.64			80.9		13	
May	18.1	11.3	0.62			73.5		9	
June	18.0	11.5	0.64			74.8		7	
July	18.8	11.0	0.59			77.7		9	
August	25.0	19.9	0.80			77.9		12	
September	42.2	26.2	0.62			92.0		19	

Note: Values are final except for the most recent 6 months which are considered preliminary. Cycle 24 started in Dec 2008 with an RI=1.7.



Weekly Geosynchronous Satellite Environment Summary
Week Beginning 16 October 2017

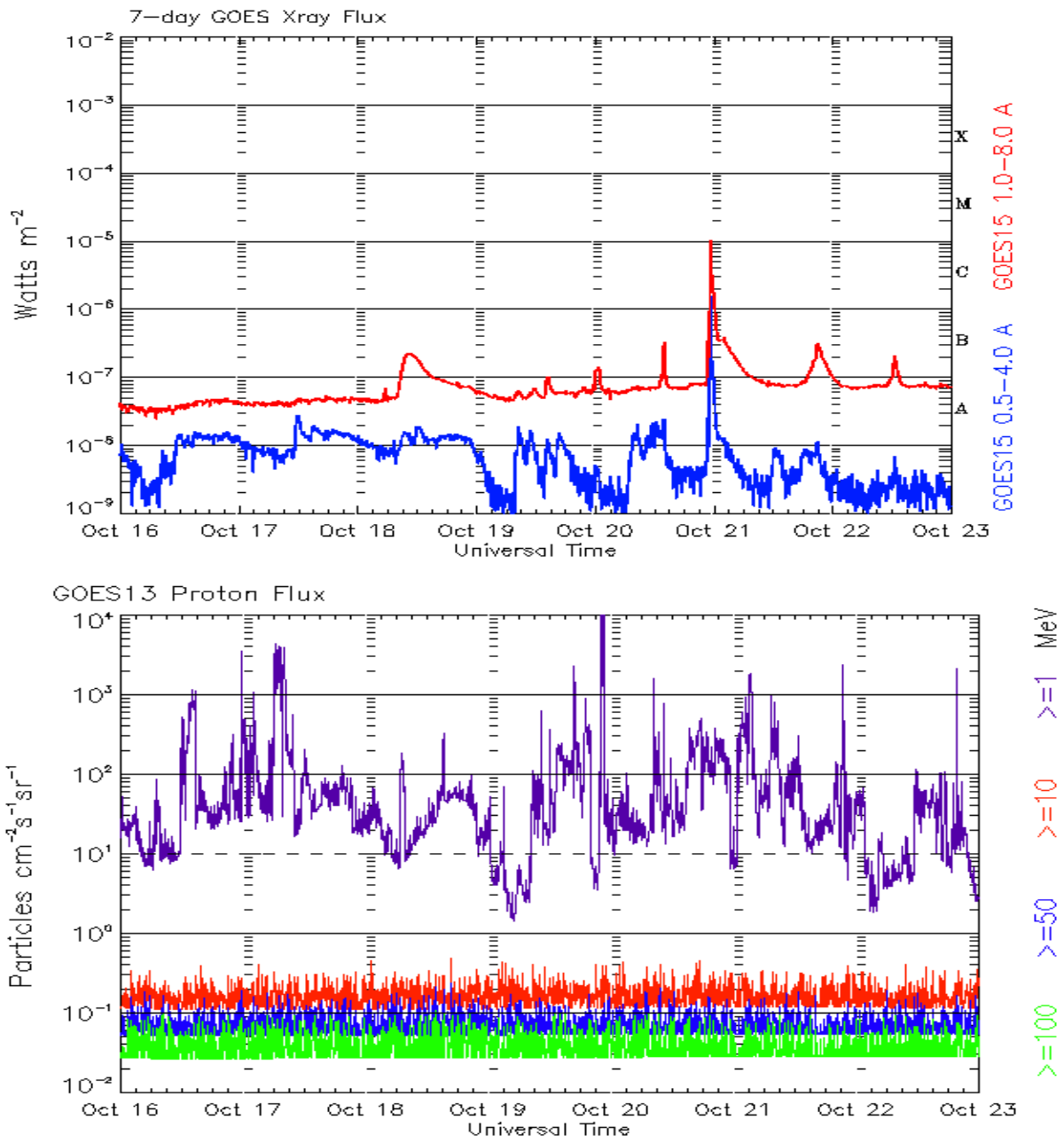
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm^2-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm^2-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

The Estimated 3-hour Planetary Kp-index is derived at the NOAA Space Weather Prediction Center using data from the following ground-based magnetometers: Boulder, Colorado; Chambon la Foret, France; Fredericksburg, Virginia; Fresno, California; Hartland, UK; Newport, Washington; Sitka, Alaska. These data are made available thanks to the cooperative efforts between SWPC and data providers around the world, which currently includes the U.S. Geological Survey, the British Geological Survey, and the Institut de Physique du Globe de Paris.

The data included here are those now available in real time at the SWPC 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. 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
Week Beginning 16 October 2017

The x-ray plots contains five-minute averages x-ray flux (Watt/m^2) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral flux units (pfu = protons/cm^2 -sec -sr) as measured by the primary SWPC GOES Proton satellite for each of the energy thresholds: >1, >10, >30, and >100 MeV. The P10 event threshold is 10 pfu at greater than 10 MeV.

Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce
NOAA / National Weather Service
Space Weather Prediction Center
325 Broadway, Boulder CO 80305

Notice: The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

The Weekly has been published continuously since 1951 and is available online since 1997.

http://spaceweather.gov/weekly/ -- Current and previous year
http://spaceweather.gov/ftpmenu/warehouse.html -- Online achive from 1997
http://spaceweather.gov/ftpmenu/ -- Some content as ascii text
http://spaceweather.gov/SolarCycle/ -- Solar Cycle Progression web site

http://spaceweather.gov/contacts.html -- Contact and Copyright information
http://spaceweather.gov/weekly/Usr_guide.pdf -- User Guide