

Space Weather Highlights
18 April - 24 April 2016

SWPC PRF 2121
25 April 2016

Solar activity was high on 18 Apr due to an M6/1f flare observed at 18/0029 UTC from old Region 2529 (N09, L=342, class/area Eki/850 on 11 Apr). Type II (1869 km/s) and Type IV radio sweeps were observed in conjunction with this event, as well as a 120 sfu Tenflare. Activity dropped to low levels on 19 Apr with a C1/Sf observed at 19/2302 UTC. Very low levels were observed for the remainder of the period after the region departed the disk.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels throughout the period.

Geomagnetic field activity was mostly quiet on 18-21 Apr. Quiet to unsettled conditions were observed on 22-24 Apr. Isolated active periods were observed on 22 and 24 Apr along with an isolated minor storm period on 23 Apr due to CH HSS effects.

Space Weather Outlook
25 April - 21 May 2016

Solar activity is expected to be very low to low for the majority of the period with a chance for M-class flares from 03-16 May due to the return of old Region 2529.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels with the exception of 01-03 May and 10-13 May following recurrent CH HSS events.

Geomagnetic field activity is expected to be quiet to unsettled on 25-26 Apr as CH HSS effects subside followed by quiet conditions on 27-28 Apr. Quiet to unsettled conditions are expected on 29 Apr to 01 May with active periods likely due to effects from a recurrent, negative polarity CH HSS. An isolated minor storm period is possible on 30 Apr. Mostly quiet conditions are expected on 02-08 May with unsettled to active periods possible on 04 May due to a SSBC. Quiet to active levels are expected on 09-11 May with minor storm periods likely due to negative polarity CH HSS effects. Mostly quiet conditions are expected from 12-18 May. Isolated unsettled to active periods are possible on 14 May due to another SSBC. Quiet to unsettled conditions are expected from 19-21 May with isolated active periods possible due to effects from a recurrent, positive polarity CH HSS.



Daily Solar Data

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background Flux			Flares						
							X-ray			Optical			
				C	M	X	S	1	2	3	4		
18 April	95	28	640	B2.5	0	1	0	0	1	0	0	0	
19 April	89	28	640	B2.2	1	0	0	1	0	0	0	0	
20 April	83	24	90	B2.1	0	0	0	0	0	0	0	0	
21 April	77	35	160	B1.4	0	0	0	0	0	0	0	0	
22 April	77	22	70	A8.8	0	0	0	0	0	0	0	0	
23 April	79	11	80	A8.2	0	0	0	0	0	0	0	0	
24 April	82	46	210	B1.0	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
	18 April	3.1e+05	2.4e+04	3.2e+03	8.4e+06	
19 April	4.5e+05	1.6e+04	3.2e+03	1.9e+07		
20 April	2.1e+05	1.3e+04	3.0e+03	8.1e+06		
21 April	1.5e+05	1.3e+04	3.1e+03	5.5e+06		
22 April	1.3e+05	1.2e+04	2.7e+03	7.0e+06		
23 April	1.4e+05	1.3e+04	2.9e+03	5.7e+06		
24 April	4.0e+05	1.2e+04	3.0e+03	4.9e+06		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	18 April	7	3-2-2-1-2-1-2-1	4	2-1-1-2-1-0-1-1	5
19 April	3	0-0-1-1-2-1-2-1	0	0-1-0-0-0-0-0-0	3	0-1-1-1-1-0-0-1
20 April	4	0-1-1-2-2-1-1-1	5	0-1-2-4-1-0-0-0	5	0-2-2-2-1-0-0-1
21 April	23	0-2-1-1-3-2-7-2	2	0-1-0-1-1-1-1-1	5	1-2-1-1-1-2-1-2
22 April	13	2-2-2-2-4-3-3-3	17	2-1-1-4-5-4-2-3	13	3-2-2-2-3-3-3-4
23 April	11	1-2-1-2-2-2-2-5	9	1-1-0-3-4-1-2-3	12	2-2-1-2-2-2-3-5
24 April	11	2-1-2-2-3-4-3-2	19	2-1-2-3-4-6-2-1	7	2-2-2-2-3-4-3-1

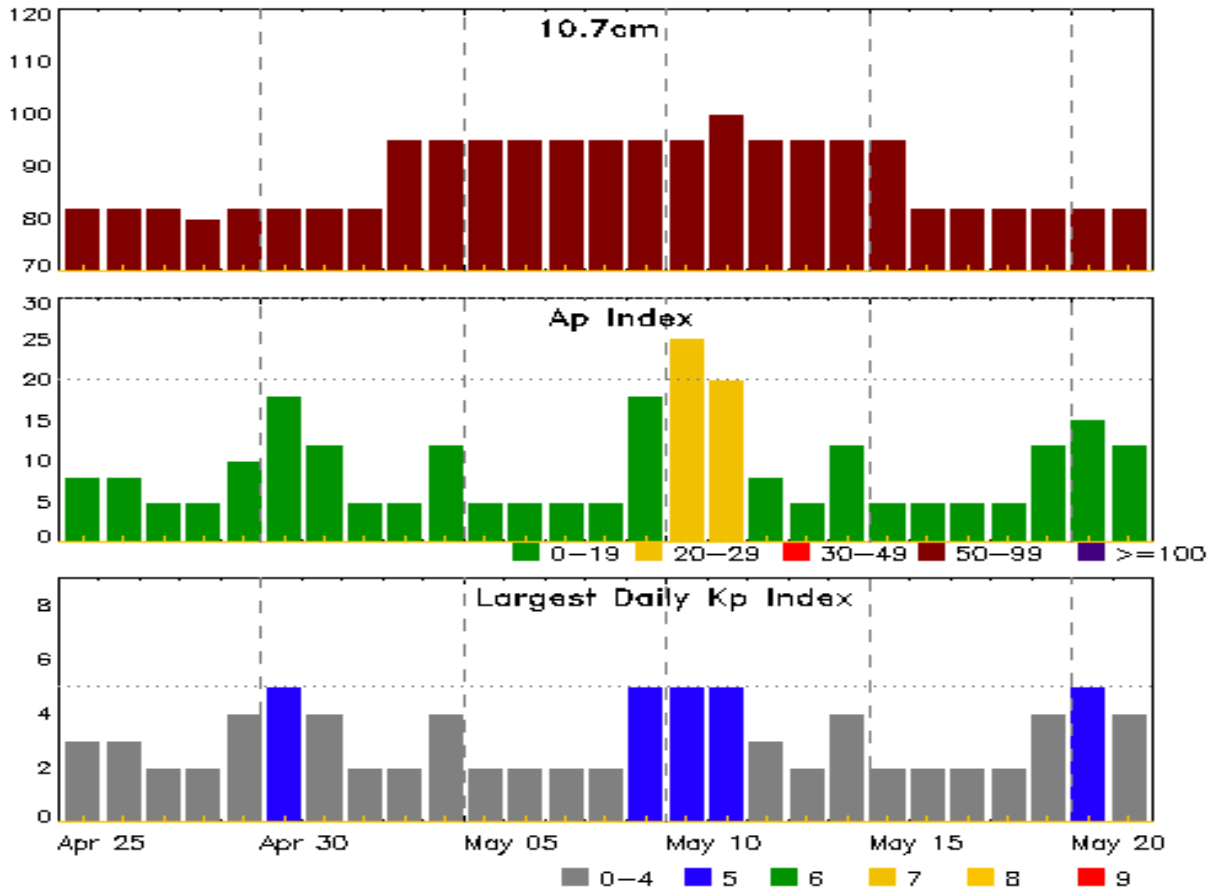


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
18 Apr 0027	ALERT: X-ray Flux exceeded M5	18/0026
18 Apr 0044	SUMMARY: X-ray Event exceeded M5	18/0014 - 0039
18 Apr 0049	SUMMARY: 10cm Radio Burst	18/0023 - 0024
18 Apr 0052	ALERT: Type II Radio Emission	18/0030
18 Apr 0053	ALERT: Type IV Radio Emission	18/0034
21 Apr 1348	WATCH: Geomagnetic Storm Category G1 predicted	
21 Apr 1355	WATCH: Geomagnetic Storm Category G1 predicted	
22 Apr 1435	WARNING: Geomagnetic K = 4	22/1435 - 23/0600
23 Apr 0005	ALERT: Geomagnetic K = 4	22/2359
23 Apr 0858	CANCELLATION: Geomagnetic Storm Category G1 predicted	
23 Apr 2135	WARNING: Geomagnetic K = 4	23/2135 - 24/0600
23 Apr 2144	ALERT: Geomagnetic K = 4	23/2143
23 Apr 2154	WARNING: Geomagnetic K = 5	23/2153 - 24/0600
23 Apr 2205	ALERT: Geomagnetic K = 5	23/2204
24 Apr 0557	EXTENDED WARNING: Geomagnetic K = 4	23/2135 - 24/1400
24 Apr 1646	WARNING: Geomagnetic K = 4	24/1645 - 2359
24 Apr 1731	ALERT: Geomagnetic K = 4	24/1130
24 Apr 2325	EXTENDED WARNING: Geomagnetic K = 4	24/1645 - 25/0900



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
25 Apr	82	8	3	09 May	95	18	5
26	82	8	3	10	95	25	5
27	82	5	2	11	100	20	5
28	80	5	2	12	95	8	3
29	82	10	4	13	95	5	2
30	82	18	5	14	95	12	4
01 May	82	12	4	15	95	5	2
02	82	5	2	16	82	5	2
03	95	5	2	17	82	5	2
04	95	12	4	18	82	5	2
05	95	5	2	19	82	12	4
06	95	5	2	20	82	15	5
07	95	5	2	21	82	12	4
08	95	5	2				



Energetic Events

Date	Time			X-ray	Optical Information			Peak		Sweep Freq		
	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	245	2695	II	IV
18 Apr	0014	0029	0039	M6.7	0.049	1F	N12W62	2529	150	120	2	2

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Optical Location Lat CMD	Optical Rgn #
	Begin	Max	End				
18 Apr	0014	0029	0039	M6.7	1F	N12W62	2529
18 Apr	1230	1246	1258	B4.0			2532
18 Apr	1318	1334	1339	B5.0			2529
18 Apr	1411	1423	1436	B4.3			2532
18 Apr	1444	1452	1500	B5.7			2529
18 Apr	1755	1800	1802	B5.1			2529
19 Apr	1218	1234	1242	B5.4			2529
19 Apr	1249	1257	1305	B6.6			2529
19 Apr	1812	1817	1822	B4.4			2529
19 Apr	1926	1934	1942	B4.3			2529
19 Apr	2252	2302	2309	C1.0	SF	N14W74	2529
20 Apr	0224	0236	0246	B8.5			2529
20 Apr	0627	0630	0632	B3.8			2529
20 Apr	0731	0741	0746	B4.7			2529
20 Apr	1433	1436	1439	B3.2			2529
20 Apr	1452	1537	1637	B6.4			2529
20 Apr	2122	2144	2159	B4.6			2529
21 Apr	0428	0439	0454	B3.5			2532
21 Apr	0458	0510	0523	B4.7			2529
23 Apr	2118	2121	2125	B1.3			
24 Apr	0221	0224	0226	B1.7			
24 Apr	1556	1603	1609	B5.9			2532



Region Summary

Date	Location		Sunspot Characteristics				Flares											
	Lat CMD	Lon	Helio 10 ⁻⁶ hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
								C	M	X	S	1	2	3	4			
Region 2523																		
16 Mar	S10W22		15	10	3	Bxo	3	B										
17 Mar	S09W35		15	10	2	Axx	3	A										
18 Mar	S07W50		17	plage														
19 Mar	S07W65		19	plage														
20 Mar	S07W80		21	plage														
									0	0	0	0	0	0	0	0	0	

Crossed West Limb.
Absolute heliographic longitude: 15

Region 2529																		
06 Apr	N10E91		346	plage					1									
07 Apr	N10E77		346	330	5	Hkx	1	A	3									
08 Apr	N10E66		344	350	10	Dhi	5	B	1									
09 Apr	N10E54		343	820	12	Ehi	8	B	8		14							
10 Apr	N09E42		341	820	11	Eki	16	B	2		3							
11 Apr	N09E28		342	850	12	Eki	19	B	4		5							
12 Apr	N09E14		343	800	12	Eho	12	B	1		2							
13 Apr	N09W00		344	780	12	Eko	8	B	1		2							
14 Apr	N10W13		344	790	12	Eki	12	B	2		4							
15 Apr	N10W24		341	740	13	Eki	36	BG	1		7	1						
16 Apr	N10W37		340	720	14	Eki	18	BG	2		5							
17 Apr	N10W52		342	780	14	Eki	10	BG	1		2							
18 Apr	N10W67		344	610	9	Cko	5	B		1		1						
19 Apr	N10W81		346	600	5	Cko	5	B	1		1							
									28	1	0	45	2	0	0	0		

Crossed West Limb.
Absolute heliographic longitude: 344



Region Summary - continued

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

Region 2531

13 Apr	N14E59	285	10	1	Axx	1	A										
14 Apr	N14E45	286	10	1	Axx	1	A										
15 Apr	N13E34	283	10	1	Axx	1	A										
16 Apr	N13E20	284	plage														
17 Apr	N13E06	285	plage														
18 Apr	N13W08	286	plage														
19 Apr	N13W22	287	plage														
20 Apr	N13W36	288	plage														
21 Apr	N13W50	288	plage														
22 Apr	N13W64	289	plage														
23 Apr	N13W78	290	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 285

Region 2532

16 Apr	N07E62	240	20	5	Cao	2	B										
17 Apr	N07E53	238	50	2	Cao	5	B										
18 Apr	N06E40	237	30	5	Hax	3	A										
19 Apr	N06E27	238	40	6	Cao	3	B										
20 Apr	N06E13	239	30	4	Cao	3	B										
21 Apr	N06W01	239	20	4	Cro	3	B										
22 Apr	N06W12	237	10	1	Axx	1	A										
23 Apr	N06W27	239	plage														
24 Apr	N05W41	239	40	4	Cao	3	B										
									0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 239

Region 2533

20 Apr	S02E68	184	60	2	Hsx	1	A										
21 Apr	S02E54	184	60	2	Hsx	1	A										
22 Apr	S02E43	182	60	1	Hsx	1	A										
23 Apr	S02E30	180	80	1	Hsx	1	A										
24 Apr	S02E15	182	100	2	Hsx	1	A										
									0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 182



Region Summary - continued

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

Region 2534

24 Apr	N06E48	149	10	1	Axx	1	A	0	0	0	0	0	0	0	0	0
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Still on Disk.
Absolute heliographic longitude: 149

Region 2535

24 Apr	N05E74	124	60	1	Hax	1	A	0	0	0	0	0	0	0	0	0
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Still on Disk.
Absolute heliographic longitude: 124

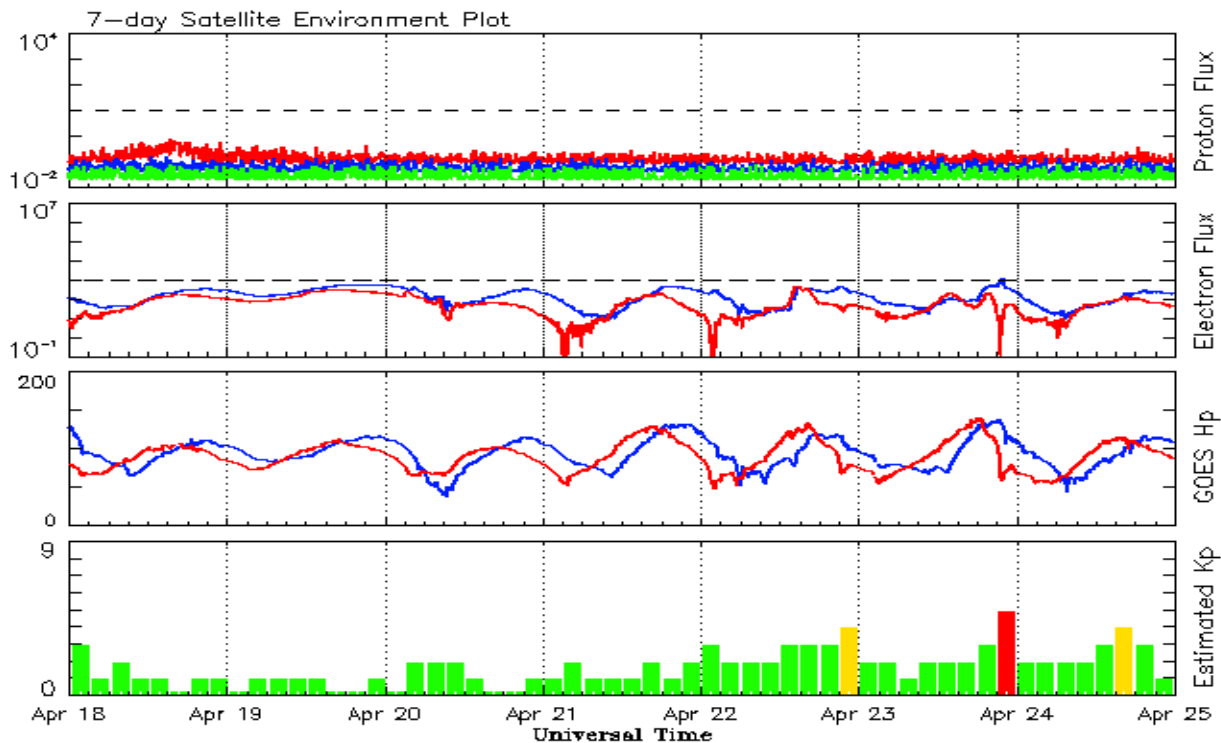


Recent Solar Indices (preliminary)
Observed monthly mean values

Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		Penticton	Smooth	Planetary	Smooth
	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
2014									
April	130.5	67.5	0.65	124.8	69.8	144.3	143.5	9	7.5
May	116.8	67.5	0.64	122.3	69.0	130.0	144.7	7	7.9
June	107.7	61.7	0.66	121.4	68.5	122.2	145.5	7	8.4
July	113.6	60.1	0.64	120.4	67.6	137.3	145.2	5	8.8
August	106.2	64.1	0.70	115.1	65.0	124.7	142.8	9	8.9
September	127.4	78.0	0.69	107.4	61.1	146.1	140.1	11	9.3
October	92.0	54.0	0.66	101.7	58.4	153.7	138.4	10	9.9
November	101.8	62.2	0.69	97.9	56.8	155.3	137.4	10	10.1
December	120.0	67.7	0.65	95.2	55.3	158.7	137.0	12	10.5
2015									
January	101.2	55.8	0.66	92.1	53.6	141.7	135.8	10	11.0
February	70.6	40.0	0.63	88.3	51.7	128.8	133.8	10	11.5
March	61.7	32.7	0.62	84.2	49.3	126.0	131.2	17	12.0
April	72.5	45.2	0.75	80.5	47.3	129.2	127.3	12	12.4
May	83.0	53.3	0.71	77.5	45.7	120.1	123.3	9	12.7
June	77.3	39.9	0.53	73.1	43.3	123.2	119.5	14	13.0
July	68.4	39.5	0.58	68.2	41.0	107.0	116.0	10	13.1
August	61.6	38.6	0.63	65.5	39.8	106.2	113.3	16	13.1
September	72.5	47.2	0.65	64.0	39.6	102.1	110.8	16	12.8
October	59.5	38.2	0.62			104.1		15	
November	61.8	37.3	0.61			109.6		13	
December	54.1	34.8	0.64			112.8		15	
2016									
January	50.4	34.0	0.67			103.5		10	
February	56.0	34.3	0.61			103.5		10	
March	40.9	32.9	0.80			91.6		11	

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 18 April 2016*

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-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.

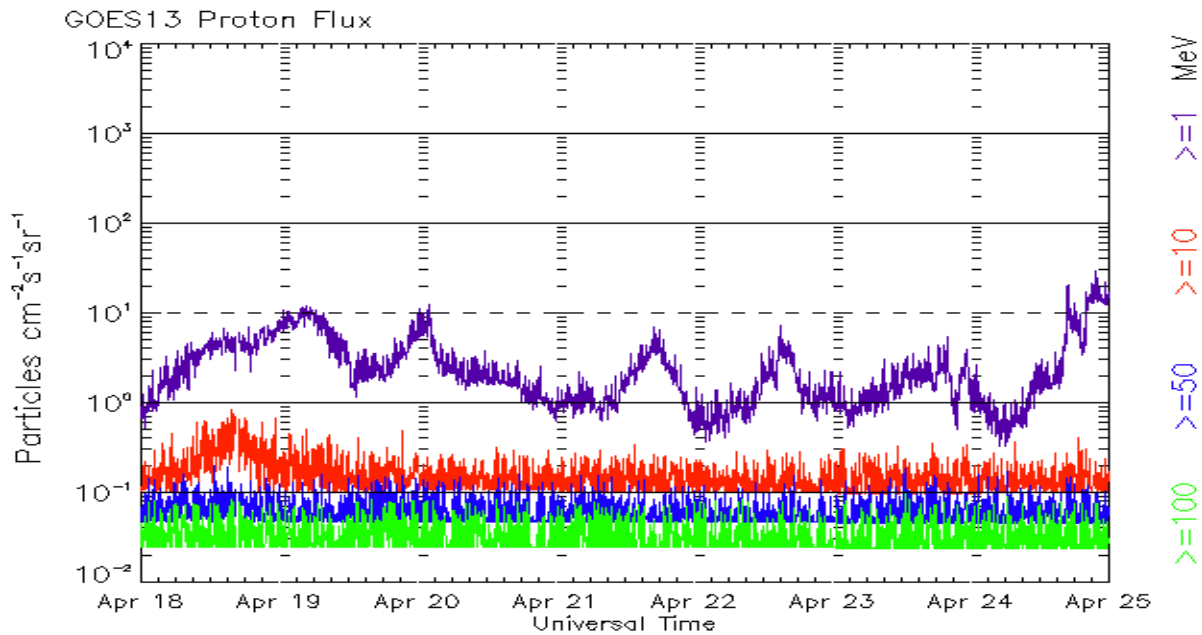
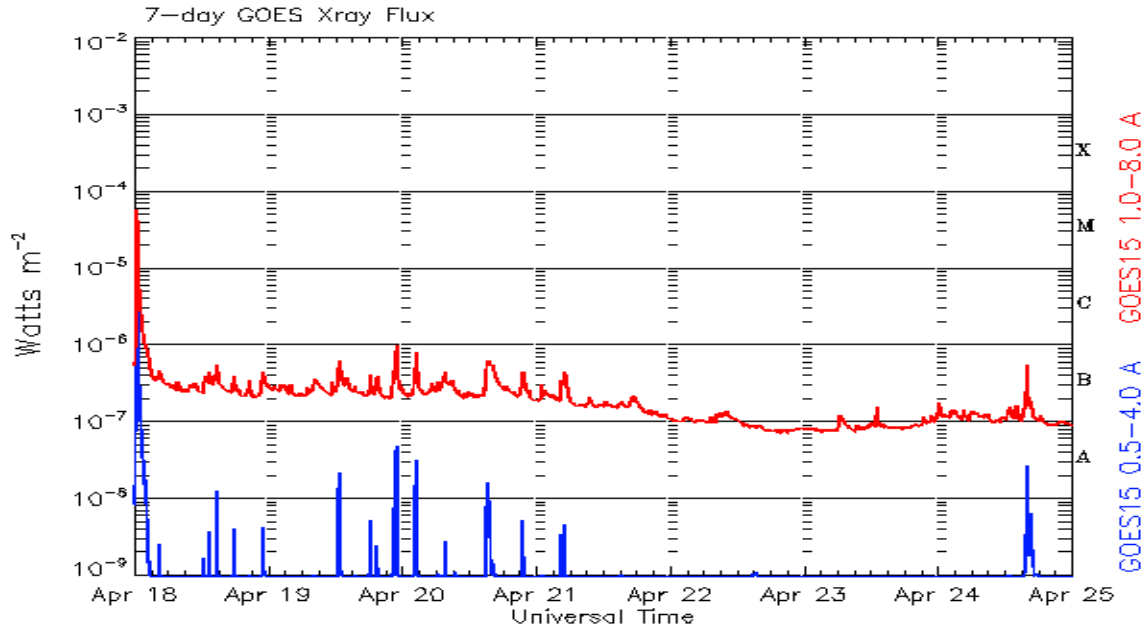
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 18 April 2016*

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 integral 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.



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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

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