Space Weather Highlights
07 March - 13 March 2016

SWPC PRF 2115
14 March 2016

Solar activity reached low levels on 08-09 and 12 March. The largest event of the period was a C3 flare from Region 2519 (N05, L=007, class/area=Cso/80 on 13 Mar) at 09/1250 UTC. Very low levels of solar activity were observed throughout the remainder of the period. No coronal mass ejections (CMEs) observed in coronagraph imagery were determined to be Earth-directed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 07-11 Mar and decreased to moderate levels on 12-13 Mar.

Geomagnetic field activity reached G1 (Minor) geomagnetic storm levels early on 07 Mar due to the influence of a positive polarity coronal hole high speed stream (CH HSS). Activity levels subsided to quiet to unsettled levels on 08 Mar and quiet levels by 09 Mar. Quiet to unsettled conditions were observed on 10 Mar and continued into early on 11 Mar when the co-rotating interaction region (CIR) ahead of a positive polarity CH HSS caused G2 (Moderate) geomagnetic storm conditions. As the CH HSS progressed, conditions tapered down to active levels early on 12 Mar and into quiet to unsettled for the remainder of the day. Activity continued to subside with only quiet conditions observed on 13 Mar.

Space Weather Outlook
14 March - 09 April 2016

Solar activity is expected to be at very low levels with a chance for C-class flares throughout the forecast period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 16-21 Mar and 04-06 Apr. Moderate levels are expected on 22 Mar-03 Apr and 07-09 Apr. Normal levels are expected on 14-15 Mar.

Geomagnetic field activity is expected to reach G1 (Minor) storm levels on 15-16 Mar and 02-03 Apr due to the influence of a negative polarity CH HSS. Active conditions are expected on 17 Mar and 08 Apr. Unsettled conditions are expected 18 Mar and 01, 04, 07, 08 Apr. Quiet conditions are expected throughout the remainder of the outlook period under a nominal solar wind regime.

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
07 March	94	61	120	B1.4	0	0	0	0	0	0	0	0	0
08 March	96	48	90	B1.6	1	0	0	1	0	0	0	0	0
09 March	97	61	190	B1.8	2	0	0	0	0	0	0	0	0
10 March	95	61	160	B1.6	0	0	0	0	0	0	0	0	0
11 March	94	48	110	B1.4	0	0	0	0	0	0	0	0	0
12 March	95	56	210	B1.4	1	0	0	2	0	0	0	0	0
13 March	93	43	200	B1.0	0	0	0	1	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
07 March	2.3e+05	1.2e+04	2.9e+03	8.4e+06		
08 March	1.5e+05	1.3e+04	3.0e+03	1.1e+08		
09 March	1.5e+05	1.3e+04	3.2e+03	1.9e+08		
10 March	7.8e+04	1.3e+04	3.8e+03	6.3e+07		
11 March	3.4e+05	1.3e+04	3.3e+03	9.8e+06		
12 March	3.0e+05	1.3e+04	3.1e+03	6.5e+06		
13 March	1.4e+05	1.3e+04	3.1e+03	3.9e+06		

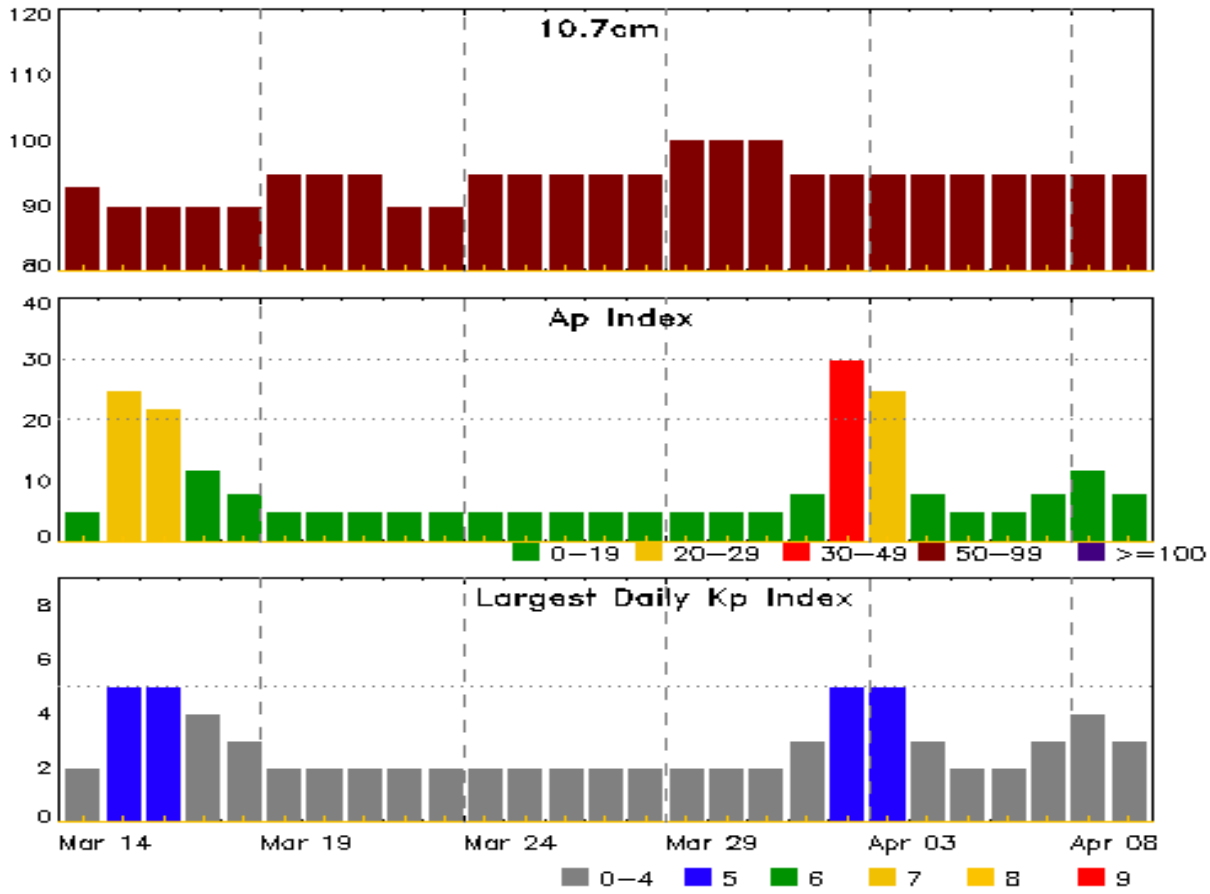
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
07 March	17	4-4-3-2-2-2-3-4	30	3-4-4-5-5-5-3-3	24	5-5-4-2-3-3-4-4
08 March	6	2-2-2-2-2-1-2-0	18	2-2-3-4-5-4-2-1	8	3-2-2-2-2-1-2-1
09 March	6	2-1-2-2-2-1-1-2	12	1-2-3-4-4-3-1-0	7	2-2-2-2-2-2-2-2
10 March	7	2-3-2-1-2-1-1-2	12	1-1-3-4-4-3-0-1	10	3-3-2-2-3-2-2-2
11 March	21	1-3-3-3-6-3-3-2	33	1-3-4-4-7-4-3-2	23	2-3-3-3-6-4-4-3
12 March	11	3-2-2-3-2-3-3-1	10	2-2-2-2-1-4-3-1	13	4-3-2-3-1-3-3-1
13 March	4	1-2-1-1-2-1-1-0	3	1-2-1-0-2-0-0-0	4	1-2-1-1-1-0-0-1

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
07 Mar 0001	ALERT: Geomagnetic K = 7	06/2359
07 Mar 0256	ALERT: Geomagnetic K = 5	07/0255
07 Mar 0433	ALERT: Geomagnetic K = 5	07/0432
07 Mar 0906	CANCELLATION: Geomagnetic K = 5	
07 Mar 0906	CANCELLATION: Geomagnetic K = 6	
07 Mar 1203	CANCELLATION: Geomagnetic Storm Category G1 predicted	
07 Mar 2012	WARNING: Geomagnetic K = 4	07/2012 - 08/0300
07 Mar 2101	ALERT: Geomagnetic K = 4	07/2059
07 Mar 2222	WARNING: Geomagnetic K = 5	07/2222 - 2359
08 Mar 1208	ALERT: Electron 2MeV Integral Flux >= 1000pfu	08/1150
09 Mar 1040	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	08/1150
10 Mar 1416	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	08/1150
11 Mar 1152	WARNING: Geomagnetic K = 5	11/1150 - 1800
11 Mar 1152	WARNING: Geomagnetic K = 4	11/1150 - 2100
11 Mar 1152	WARNING: Geomagnetic K = 6	11/1150 - 1500
11 Mar 1246	ALERT: Geomagnetic K = 4	11/1246
11 Mar 1301	ALERT: Geomagnetic K = 5	11/1300
11 Mar 1441	ALERT: Geomagnetic K = 6	11/1441
11 Mar 2047	EXTENDED WARNING: Geomagnetic K = 4	11/1150 - 12/1300
12 Mar 1817	WATCH: Geomagnetic Storm Category G1 predicted	
12 Mar 1847	WARNING: Geomagnetic K = 4	12/1845 - 13/0800
13 Mar 1124	WATCH: Geomagnetic Storm Category G1 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
14 Mar	93	5	2	28 Mar	95	5	2
15	90	25	5	29	100	5	2
16	90	22	5	30	100	5	2
17	90	12	4	31	100	5	2
18	90	8	3	01 Apr	95	8	3
19	95	5	2	02	95	30	5
20	95	5	2	03	95	25	5
21	95	5	2	04	95	8	3
22	90	5	2	05	95	5	2
23	90	5	2	06	95	5	2
24	95	5	2	07	95	8	3
25	95	5	2	08	95	12	4
26	95	5	2	09	95	8	3
27	95	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

No Events Observed

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
08 Mar	0326	0330	0337	B2.4			2510
08 Mar	1303	1306	1308	C1.5	SF	S00W30	2511
08 Mar	1309	1312	1314	B8.4			2511
08 Mar	1812	1816	1822	B7.1			2511
08 Mar	2234	2239	2242	B4.1			2519
09 Mar	0242	0258	0311	C1.3			2519
09 Mar	0500	0504	0508	B4.0			2519
09 Mar	1226	1230	1232	B4.1			2519
09 Mar	1236	1250	1306	C3.3			2519
10 Mar	1827	1830	1832	B3.3			2519
10 Mar	1842	1854	1906	B8.4			2512
11 Mar	0211	0216	0220	B3.4			2511
11 Mar	0312	0315	0317	B2.7			2518
12 Mar	0343	0405	0420	B8.8			2519
12 Mar	0615	0619	0623	C1.1	SF	N09W46	2513
12 Mar	1900	1901	1904		SF	N19E22	2521
13 Mar	2144	2148	2152	B6.4	SF	N18E07	2521

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 2509													
29 Feb	N09E17	186	20	3	Bxo	4	B								
01 Mar	N08W00	189	20	10	Bxo	2	B								
02 Mar	N09W14	192	plage												
03 Mar	N09W28	193	plage												
04 Mar	N09W42	194	plage												
05 Mar	N09W56	194	plage												
06 Mar	N09W70	195	plage												
07 Mar	N09W84	196	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 189

		Region 2510													
02 Mar	N05E51	127	30	10	Cro	3	B								
03 Mar	N05E43	124	30	1	Cro	3	B								
04 Mar	N05E30	122	30	4	Cro	3	B								
05 Mar	N05E18	120	30	4	Cao	4	B								
06 Mar	N06E03	122	20	4	Cro	4	B								
07 Mar	N04W10	122	10	2	Axx	1	A								
08 Mar	N07W23	122	plage												
09 Mar	N07W38	124	plage												
10 Mar	N07W53	125	plage												
11 Mar	N07W68	127	plage												
12 Mar	N07W83	129	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 122

Region Summary - continued

	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 2511												
02 Mar	N05E57	121	10	1	Bxo	3	B								
03 Mar	N06E32	131	plage												
04 Mar	N06E19	133	plage												
05 Mar	N06E04	134	plage												
06 Mar	N06W11	136	plage												
07 Mar	N06W26	138	plage												
08 Mar	N02W36	135	10	1	Bxo	5	B	1			1				
09 Mar	N03W50	136	20	5	Cao	2	B								
10 Mar	N03W66	138	20	1	Hrx	2	A								
11 Mar	N02W79	138	10	1	Axx	2	A								
								1	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 134

			Region 2512												
02 Mar	N11E28	150	10	3	Bxo	3	B								
03 Mar	N12E13	152	20	4	Bxo	4	B								
04 Mar	N11W00	152	20	4	Cro	3	B								
05 Mar	N11W16	154	10	1	Hrx	1	A								
06 Mar	N11W30	155	30	2	Cao	7	B				2				
07 Mar	N12W42	154	50	3	Cao	4	B								
08 Mar	N10W56	155	30	5	Hax	1	A								
09 Mar	N11W70	156	30	2	Hsx	2	A								
10 Mar	N12W83	155	30	2	Hsx	1	A								
								0	0	0	2	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 152

Region Summary - continued

	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 2513												
02 Mar	N11E84	94	60	1	Hsx	1	A								
03 Mar	N11E63	12	30	3	Hsx	1	A								
04 Mar	N12E49	103	40	2	Hsx	1	A								
05 Mar	N12E36	102	50	2	Hsx	1	A								
06 Mar	N12E23	102	50	2	Hsx	1	A								
07 Mar	N11E09	103	40	1	Hsx	1	A								
08 Mar	N10W03	102	40	2	Hsx	1	A								
09 Mar	N10W17	103	40	2	Hsx	1	A								
10 Mar	N10W31	103	40	2	Hsx	1	A								
11 Mar	N10W44	103	40	2	Hsx	1	A								
12 Mar	N10W57	103	50	2	Hsx	1	A	1			1				
13 Mar	N09W72	105	40	1	Hsx	1	A								
								1	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 102

			Region 2514												
04 Mar	N14W11	163	20	6	Cro	9	B				1				
05 Mar	N14W26	164	50	6	Cao	9	B								
06 Mar	N14W39	164	30	7	Cao	4	B								
07 Mar	N13W54	166	10	1	Axx	3	A								
08 Mar	N12W69	168	10		Axx	1	A								
09 Mar	N12W83	169	plage												
								0	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 163

			Region 2515												
04 Mar	S03W14	166	10	3	Bxo	2	B								
05 Mar	S03W29	167	plage								1				
06 Mar	S03W44	169	plage												
07 Mar	S03W59	171	plage												
08 Mar	S03W74	173	plage												
09 Mar	S03W89	175	plage												
								0	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 166

Region Summary - continued

	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 2516												
04 Mar	S04W05	157	10	3	Bxo	3	B								
05 Mar	S04W20	158	plage												
06 Mar	S04W35	160	plage												
07 Mar	S04W50	162	plage												
08 Mar	S04W65	164	plage												
09 Mar	S04W80	166	plage												
								0	0	0	0	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude: 157															
			Region 2517												
06 Mar	N24W38	163	10	4	Bxo	2	B								
07 Mar	N24W51	162	10	2	Bxo	2	B								
08 Mar	N24W65	164	plage												
09 Mar	N24W79	165	plage												
								0	0	0	0	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude: 163															
			Region 2518												
09 Mar	N04W29	115	30	3	Cao	5	B								
10 Mar	N04W41	113	20	4	Cro	5	B								
11 Mar	N04W54	113	10	2	Axx	2	A								
12 Mar	N04W69	115	plage												
13 Mar	N04W84	117	plage												
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 115															
			Region 2519												
09 Mar	N06E76	10	70	1	Hsx	1	A	2							
10 Mar	N06E61	11	50	2	Cao	2	B								
11 Mar	N06E48	11	50	5	Cao	3	B								
12 Mar	N05E39	7	80	7	Cso	4	B								
13 Mar	N05E26	7	80	11	Cso	5	B								
								2	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 7															

Region Summary - continued

	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 2520												
12 Mar	N04E17	29	10	3	Bxo	2	B								
13 Mar	N04E02	31	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 31

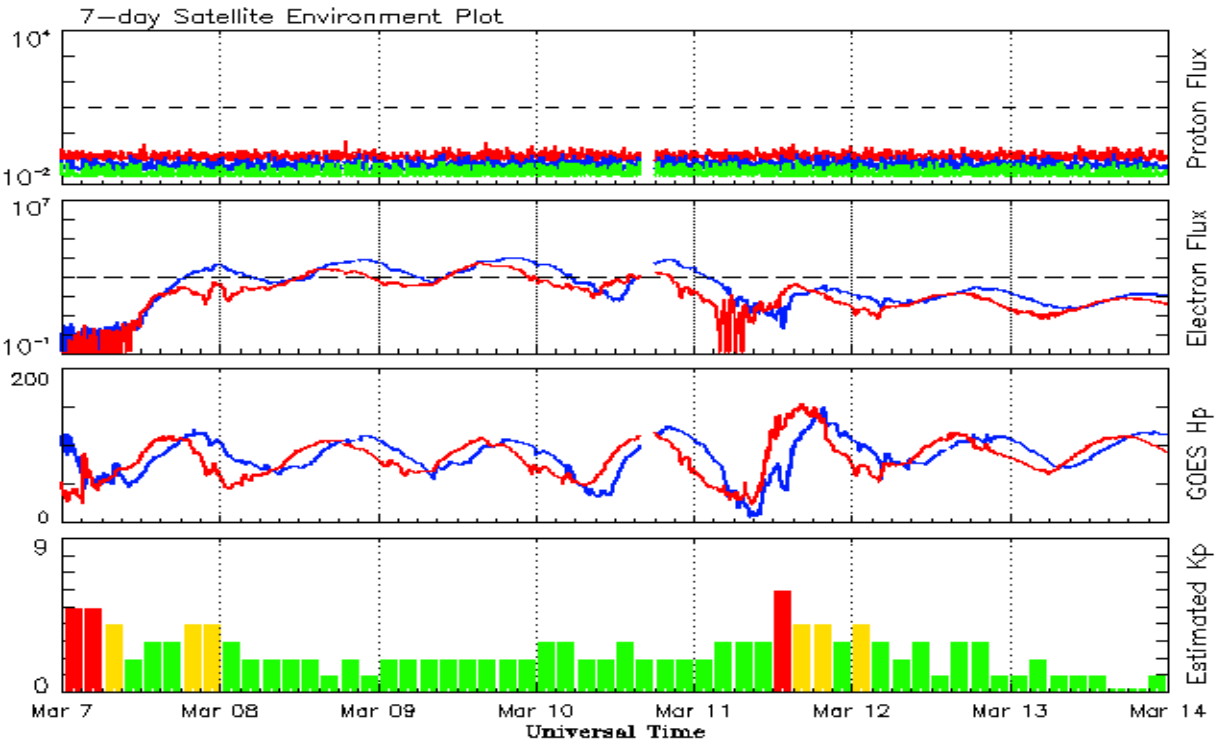
			Region 2521												
12 Mar	N19E18	28	70	4	Cao	9	B				1				
13 Mar	N20E04	29	80	5	Dao	7	B				1				
								0	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 29

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
				2014					
March	141.1	91.9	0.65	123.2	80.8	149.9	140.8	6	7.2
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	45.6	120.1	123.3	9	12.7
June	77.3	39.9	0.53	73.1	43.2	123.2	119.5	14	13.0
July	68.4	39.5	0.58	68.2	40.9	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			102.1		16	
October	59.5	37.0	0.62			104.1		15	
November	61.8	37.9	0.61			109.6		13	
December	54.1	34.6	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	

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 07 March 2016

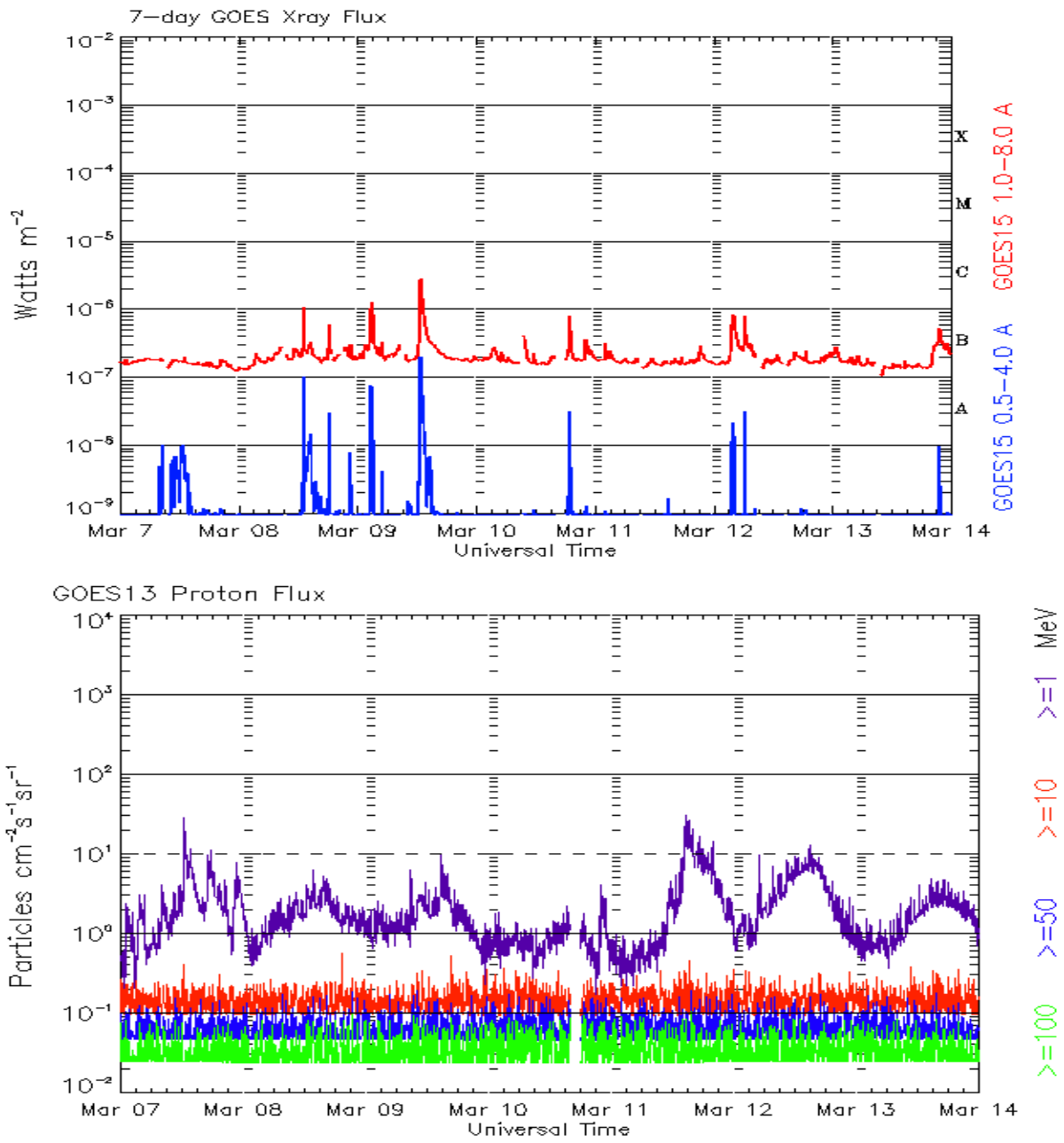
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm^2-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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 07 March 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 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