

Space Weather Highlights
20 June - 26 June 2016

SWPC PRF 2130
27 June 2016

Solar activity was very low during the entire summary period with only B-class flare activity observed. No Earth-directed CMEs occurred.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 21-22 Jun and 25-26 Jun following coronal hole high speed stream events. Normal to moderate levels were observed on the remaining days.

Geomagnetic field activity was quiet on 20-21 Jun. Mostly quiet conditions were observed early on 22 Jun but activity increased after 22/1800 UTC due to enhanced solar wind parameters and unsettled to minor storm levels were observed. Quiet to unsettled conditions with isolated active periods were observed on 23-24 Jun due to negative polarity CH HSS effects. Quiet to unsettled conditions were observed on 25-26 Jun with an isolated period of active conditions observed from 26/2100-2400 UTC due to CH HSS effects.

Space Weather Outlook
27 June - 23 July 2016

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

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 from 27 Jun to 01 Jul following CH HSS effects. Normal to moderate levels are expected on 02-03 Jul as a CIR redistributes electrons. High levels are expected to return from 04-07 Jul following a recurrent CH HSS. Moderate levels are expected from 08-21 Jul followed by moderate to high levels on 22-23 Jul following another recurrent CH HSS.

Geomagnetic field activity is expected to begin at unsettled to active levels but decrease to mostly quiet levels by midday on 27 Jun and remain quiet through 29 Jun. Quiet to unsettled conditions are expected from 30 Jun to 05 Jul with isolated active conditions possible on 03 Jul due to a recurrent negative polarity CH HSS. Quiet conditions are expected on 06 Jul. Quiet to unsettled conditions are expected from 07-12 Jul with minor storms possible on 11 Jul and active periods likely on 12 Jul due to effects from a recurrent positive polarity CH HSS. Mostly quiet conditions are expected to return from 13-18 Jul with unsettled periods possible on 14-15 Jul. Quiet to unsettled conditions are expected on 19-21 Jul due to negative polarity CH HSS effects with an isolated active period likely on 19 Jul. Quiet conditions are expected for the remainder of the period.



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
20 June	84	35	310	A8.4	0	0	0	0	0	0	0	0
21 June	80	22	200	A8.6	0	0	0	0	0	0	0	0
22 June	78	22	160	A8.0	0	0	0	0	0	0	0	0
23 June	78	0	0	A8.2	0	0	0	0	0	0	0	0
24 June	76	0	0	A8.3	0	0	0	0	0	0	0	0
25 June	77	0	0	A9.3	0	0	0	0	0	0	0	0
26 June	77	0	0	A7.7	0	0	0	1	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
	20 June	2.2e+05	1.3e+04	3.2e+03	4.6e+07	
21 June	3.1e+05	1.4e+04	3.3e+03	5.4e+07		
22 June	4.3e+05	1.3e+04	3.3e+03	4.1e+07		
23 June	3.3e+05	1.2e+04	2.9e+03	3.2e+06		
24 June	1.8e+05	1.3e+04	2.9e+03	1.5e+06		
25 June	2.7e+05	1.3e+04	3.2e+03	6.0e+07		
26 June	2.6e+05	1.3e+04	3.1e+03	6.8e+07		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	20 June	4	1-2-1-1-2-0-1-1	2	2-2-0-0-0-0-1-0	4
21 June	3	1-1-0-1-2-1-1-0	2	1-1-1-0-0-0-1-0	4	1-1-1-1-1-1-1-1
22 June	14	1-1-1-2-2-3-5-4	9	0-1-0-2-3-3-3-3	14	1-1-1-2-2-3-5-4
23 June	10	2-3-1-1-2-3-3-3	10	3-3-1-0-1-3-3-3	12	2-3-1-1-1-3-3-4
24 June	10	2-3-3-2-3-2-2-2	21	4-4-4-5-3-2-2-2	12	3-4-3-2-2-2-2-3
25 June	7	3-2-2-1-2-1-2-2	7	3-2-2-2-2-2-1-1	7	3-2-2-1-1-1-2-2
26 June	11	2-2-2-1-2-3-3-4	16	2-2-2-4-4-4-2-3	6	2-2-2-2-2-3-3-4

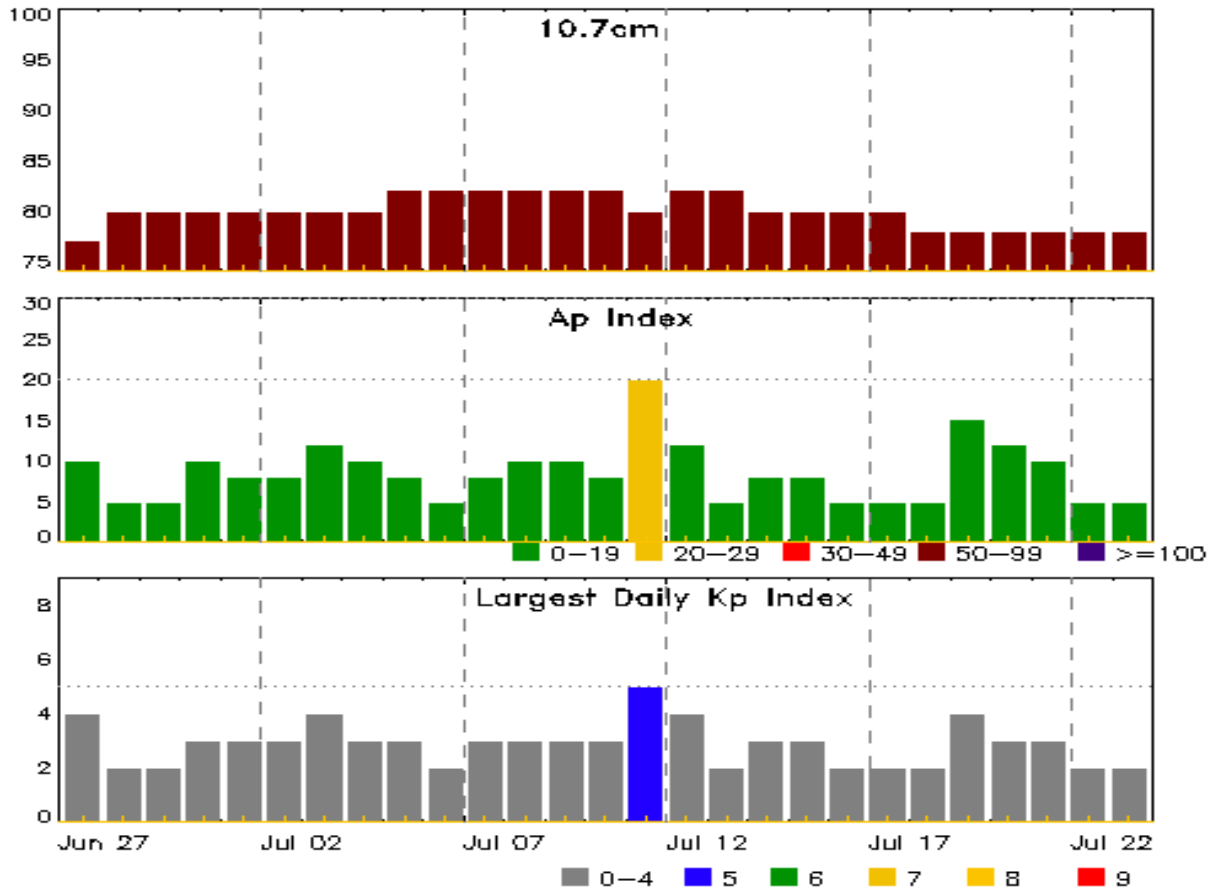


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
20 Jun 0948	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	19/1640
21 Jun 1649	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	21/1630
22 Jun 1411	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	21/1630
22 Jun 2002	WARNING: Geomagnetic K = 4	22/2001 - 23/0600
22 Jun 2014	ALERT: Geomagnetic K = 4	22/2013
22 Jun 2018	WARNING: Geomagnetic K = 5	22/2018 - 2359
22 Jun 2057	ALERT: Geomagnetic K = 5	22/2056
23 Jun 0555	EXTENDED WARNING: Geomagnetic K = 4	22/2001 - 23/1300
23 Jun 1534	WARNING: Geomagnetic K = 4	23/1534 - 1800
23 Jun 2314	WARNING: Geomagnetic K = 4	23/2330 - 24/0900
23 Jun 2352	ALERT: Geomagnetic K = 4	23/2350
25 Jun 1341	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	25/1325
26 Jun 1211	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	25/1325
26 Jun 2332	WARNING: Geomagnetic K = 4	26/2330 - 27/0600
26 Jun 2345	ALERT: Geomagnetic K = 4	26/2345



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
27 Jun	77	10	4	11 Jul	80	20	5
28	80	5	2	12	82	12	4
29	80	5	2	13	82	5	2
30	80	10	3	14	80	8	3
01 Jul	80	8	3	15	80	8	3
02	80	8	3	16	80	5	2
03	80	12	4	17	80	5	2
04	80	10	3	18	78	5	2
05	82	8	3	19	78	15	4
06	82	5	2	20	78	12	3
07	82	8	3	21	78	10	3
08	82	10	3	22	78	5	2
09	82	10	3	23	78	5	2
10	82	8	3				



Energetic Events

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

No Events Observed

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD	Rgn #	
20 Jun	0249	0300	0309	B9.6				2558
21 Jun	0438	0534	0709	B3.8				2553
24 Jun	0017	0034	0044	B3.7				2558
24 Jun	2242	2256	2321	B3.9				
25 Jun	0207	0315	0426	B4.4				
25 Jun	1101	1111	1125	B4.9				
25 Jun	1527	1544	1553	B4.4				
26 Jun	0406	0411	0417	B2.1				
26 Jun	1046	1050	1055	B1.3				
26 Jun	1557	1604	1623	B3.8	SF		N13E51	



Region Summary

Date	Location		Sunspot Characteristics				Flares																
	Lat CMD	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 2553																							
10 Jun	S06E71	226	120	6	Hsx	1	A						1										
11 Jun	S06E56	228	270	4	Hhx	1	A																
12 Jun	S06E43	228	330	3	Hhx	1	A																
13 Jun	S06E31	226	290	3	Hhx	1	A																
14 Jun	S07E18	226	290	4	Hhx	1	A																
15 Jun	S07E06	225	300	3	Hhx	1	A																
16 Jun	S07W09	225	310	4	Hhx	2	A						1										
17 Jun	S07W22	226	300	4	Hhx	1	A																
18 Jun	S07W36	227	250	4	Hhx	1	A																
19 Jun	S07W49	227	260	4	Hhx	1	A																
20 Jun	S06W63	228	250	3	Hhx	1	A																
21 Jun	S07W77	229	190	2	Hsx	1	A																
22 Jun	S06W90	228	150	2	Hsx	1	A																
								0	0	0	2	0	0	0	0	0							

Crossed West Limb.

Absolute heliographic longitude: 225

Region 2556																							
17 Jun	N05E72	132	30	1	Hsx	1	A																
18 Jun	N05E57	134	30	1	Hsx	1	A																
19 Jun	N06E43	135	30	2	Hsx	1	A																
20 Jun	N06E29	136	40	1	Hax	1	A																
21 Jun	N06E16	136	10	1	Hax	1	A																
22 Jun	N05E03	135	10	1	Hsx	1	A																
23 Jun	N05W12	137	plage																				
24 Jun	N05W27	139	plage																				
25 Jun	N05W42	141	plage																				
26 Jun	N05W57	142	plage																				
								0	0	0	0	0	0	0	0	0							

Still on Disk.

Absolute heliographic longitude: 135



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	4							
Region 2557																							
18 Jun	N10E07	184	10	1	Axx	1	A																
19 Jun	N09W07	185	10	1	Axx	1	A																
20 Jun	N09W21	186	plage																				
21 Jun	N09W35	187	plage																				
22 Jun	N09W49	187	plage																				
23 Jun	N09W63	188	plage																				
24 Jun	N09W77	189	plage																				
												0	0	0	0	0	0	0	0	0	0		

Died on Disk.

Absolute heliographic longitude: 184

Region 2558																							
19 Jun	N13W37	215	30	5	Cso	5	B	1															
20 Jun	N13W50	215	20	4	Cao	3	B																
21 Jun	N13W64	216	plage																				
22 Jun	N13W78	216	plage																				
												1	0	0	0	0	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 215

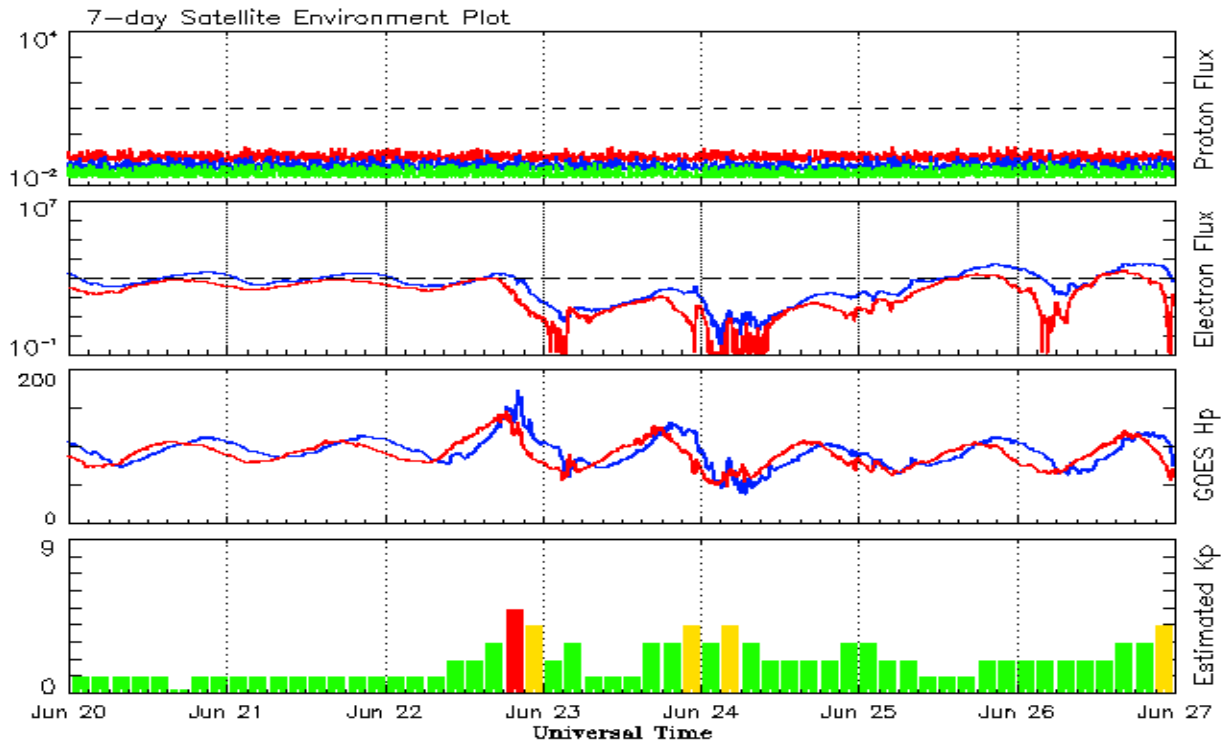


Recent Solar Indices (preliminary)
Observed monthly mean values

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									
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	61.8	38.6	104.1	107.9	15	12.5
November	61.8	37.3	0.61	59.0	36.8	109.6	105.3	13	12.5
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	
April	39.2	22.8	0.58			93.4		10	
May	48.9	31.3	0.64			93.1		12	

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 20 June 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.

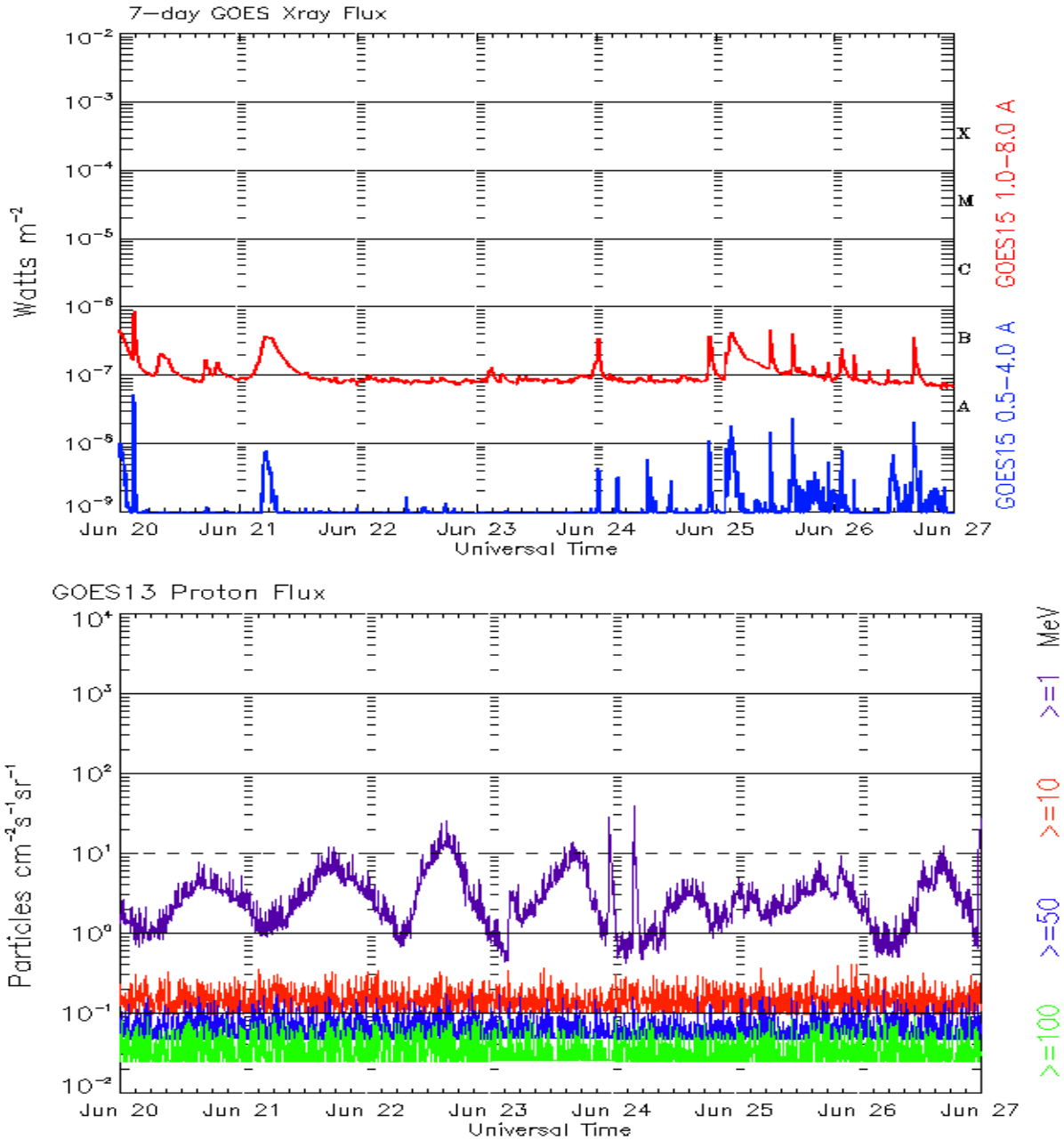
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 20 June 2016*

The x-ray plots contains five-minute averages x-ray flux (Watt/m²) 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/cm² -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
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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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