

Solar activity was at very low levels on 12 Jul, low levels on 10, 11, 13, 15 and 16 Jul and moderate (R1-Minor) levels on 14 Jul. Region 2665 (S06, L=111, class/area Ekc/710 on 09 Jul) produced a majority of the flare activity. However, new Region 2667 (N12, L=155, class/area Axx/010 on 14 Jul) produced all of the C-class activity on 13 Jul including a C8 x-ray event with a Type II radio emission (770 km/s). The largest event of the summary period was a long-duration M2/1n flare from Region 2665 observed at 14/0209 UTC. Associated with this event was a Tenflare (130 sfu) and Type IV radio emission. At 14/0125 UTC, LASCO C2 imagery detected an asymmetric halo CME that was analyzed and modelled to reveal an Earth-directed component with a likely arrival at Earth on 16 Jul.

A greater than 10 MeV at greater than or equal to 10 pfu proton event (S1-Minor) began at 14/0900 UTC, reached a maximum flux of 22 pfu at 14/2320 UTC and ended at 15/1115 UTC.

The greater than 2 MeV electron flux at geosynchronous orbit was at moderate flux levels then entire summary period. A maximum flux of 942 pfu was observed at 14/1750 UTC.

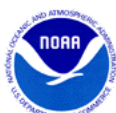
Geomagnetic field activity was at quiet to unsettled levels, with isolated active intervals, on 10-11 Jul due to waning effects from a positive polarity CH HSS. Solar wind speeds reached a peak of about 650 km/s early on 11 Jul and steadily decreased through the summary period to reach a low speed of 287 km/s at 16/0446 UTC. Quiet levels were recorded from mid-day 11 Jul through early on 16 Jul.

At 16/0515 UTC, an interplanetary shock associated with the arrival of the 14 Jul CME, was observed in DSCOVR solar wind data. Solar wind speeds sharply increased from around 320 km/s to 502 km/s. Solar wind speeds then slowly increased to a peak value of 643 km/s observed at 16/2037 UTC. Total field strength values reached 28 nT at 16/0836 UTC while the Bz component was sustained at around -23 nT for a prolonged period following the shock arrival. Solar wind density reached a peak of around 56 particles/cubic cm following the shock and the phi angle became highly variable after 16/0515 UTC. Phi angle settled into a mostly positive (away) solar sector after 16/1100 UTC. The geomagnetic field was quiet until 16/0601 UTC when a geomagnetic sudden impulse was observed (40 nT at Hartland magnetometer) indicating the arrival of the 14 Jul CME. The geomagnetic field responded with active to G1 and G2 (Minor to Moderate) geomagnetic storm levels through the remainder of 16 Jul.

Space Weather Outlook

17 July - 12 August 2017

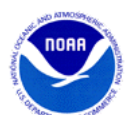
Solar activity is expected to be low with a chance for M-class flare activity (R1-R2 / Minor-Moderate) through 19 Jul when Region 2665 exits the visible disk. Very low to low levels are expected from 20-28 Jul. A chance for R1-R2 activity is possible with the return of old Region 2665 from 29 Jul - 12 Aug.



There is a chance for an S1 (Minor) solar radiation storm through 19 Jul due to potential significant flare activity from Region 2665. No proton events are expected from 20-28 Jul. A chance for S1 (Minor) solar radiation storms is possible with the return of old Region 2665 from 29 Jul - 12 Aug.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be reach high levels on 19-20 Jul due to influence from the 14 Jul CME. Normal to moderate levels are expected for the remainder of the outlook period.

Geomagnetic field activity is expected to be at G1-G2 (Minor-Moderate) geomagnetic storm levels on 17 Jul due to continued CME effects. Unsettled to active levels are expected on 21-22 Jul and again on 05-06 Aug, with G1 (Minor) geomagnetic storm levels likely on 05 Aug, due to positive polarity CH HSS influence. Quiet to unsettled levels are expected for the remainder of the outlook 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
10 July	95	32	690	B1.3	1	0	0	2	0	0	0	0
11 July	91	27	620	B1.3	1	0	0	5	0	0	0	0
12 July	90	43	590	B1.6	0	0	0	0	0	0	0	0
13 July	92	55	470	B1.4	4	0	0	4	0	0	0	0
14 July	94	58	490	B5.6	2	1	0	11	2	0	0	0
15 July	92	34	390	B1.9	5	0	0	6	0	0	0	0
16 July	87	26	350	B2.1	5	0	0	3	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
	10 July	3.0e+07	1.6e+04	3.6e+03	5.7e+06	
11 July	2.5e+07	-1.0e+00	-1.0e+00	-1.0e+00		
12 July	1.6e+07	1.5e+04	3.6e+03	2.7e+07		
13 July	1.5e+07	1.5e+04	3.6e+03	3.3e+07		
14 July	5.0e+07	7.4e+05	5.0e+03	4.4e+07		
15 July	1.0e+08	7.5e+05	4.2e+03	2.9e+07		
16 July	1.4e+08	1.2e+05	3.0e+03	3.6e+06		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	10 July	11	3-4-1-1-2-2-3-2	12	4-4-2-2-1-2-2-2	9
11 July	9	2-3-3-2-2-2-1-2	13	2-4-4-2-3-2-2-1	8	2-3-3-2-1-2-1-2
12 July	5	1-1-1-2-2-2-1-1	4	1-2-1-1-2-2-1-0	4	1-1-1-1-1-1-0-1
13 July	5	1-1-1-1-2-2-2-2	4	1-1-0-1-3-1-1-0	4	1-1-1-1-1-1-1-2
14 July	3	1-1-0-1-2-1-1-1	3	1-1-0-0-0-0-3-0	4	1-1-1-1-1-1-0-1
15 July	4	1-1-1-1-2-1-1-1	1	0-1-1-0-0-0-0-0	4	1-1-1-1-1-1-1-1
16 July	29	2-1-4-5-4-4-5-5	91	1-1-5-7-9-6-4-4	9	2-1-4-5-6-5-6-5

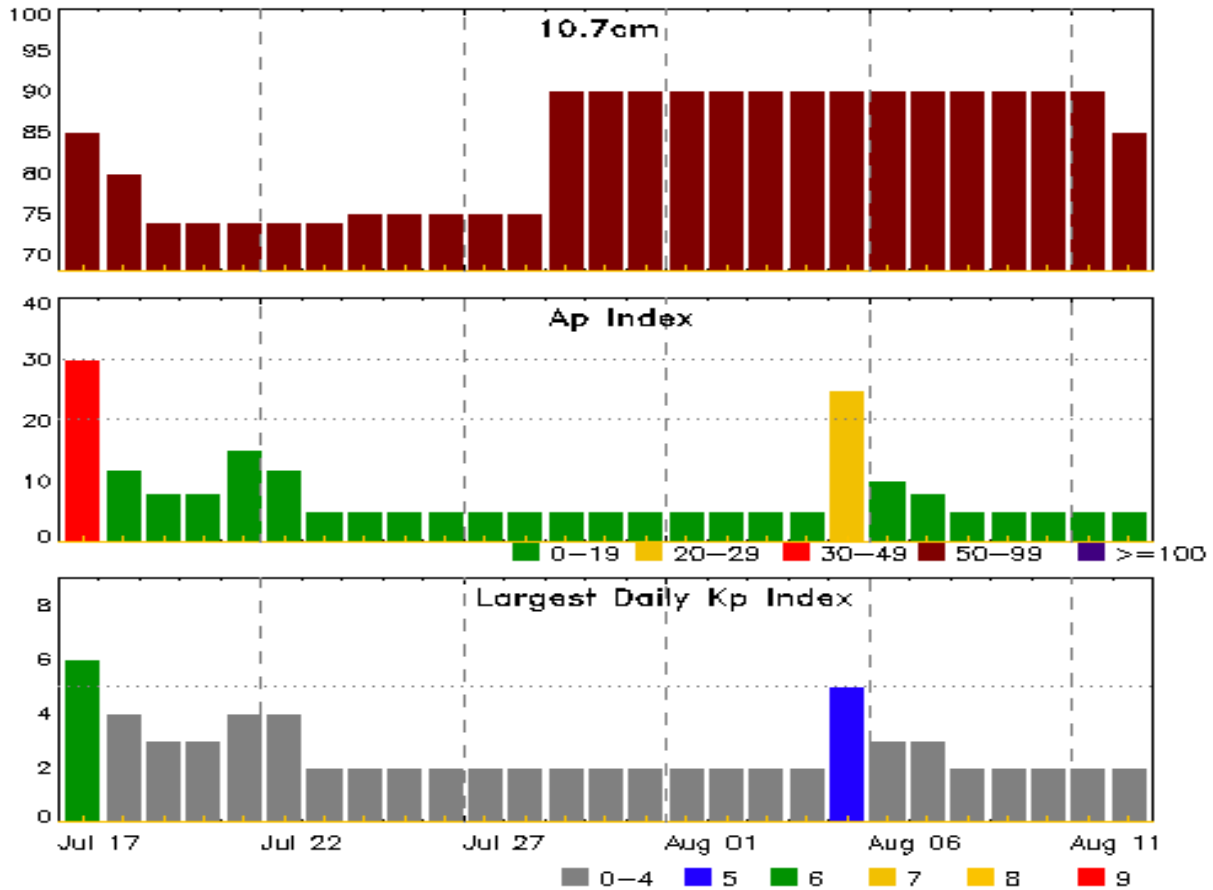


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
13 Jul 2049	ALERT: Type II Radio Emission	13/2006
14 Jul 0231	SUMMARY: 10cm Radio Burst	14/0110 - 0154
14 Jul 0235	ALERT: Type IV Radio Emission	14/0202
14 Jul 0530	WARNING: Proton 10MeV Integral Flux > 10pfu	14/0530 - 1800
14 Jul 0919	ALERT: Proton Event 10MeV Integral Flux >= 10pfu	14/0900
14 Jul 1029	WATCH: Geomagnetic Storm Category G2 predicted	
14 Jul 1755	EXTENDED WARNING: Proton 10MeV Integral Flux > 10pfu	14/0530 - 15/1200
15 Jul 1124	EXTENDED WARNING: Proton 10MeV Integral Flux > 10pfu	14/0530 - 15/2100
15 Jul 2100	SUMMARY: Proton Event 10MeV Integral Flux >= 10pfu	14/0900 - 15/1115
16 Jul 0521	WARNING: Geomagnetic K = 5	16/0520 - 2359
16 Jul 0523	WARNING: Geomagnetic K = 4	16/0520 - 17/0600
16 Jul 0524	WARNING: Geomagnetic Sudden Impulse expected	16/0530 - 0630
16 Jul 0607	ALERT: Geomagnetic K = 4	16/0604
16 Jul 0609	SUMMARY: Geomagnetic Sudden Impulse	16/0601
16 Jul 1038	WARNING: Geomagnetic K = 6	16/1040 - 1800
16 Jul 1106	ALERT: Geomagnetic K = 5	16/1105
16 Jul 1309	ALERT: Geomagnetic K = 5	16/1308
16 Jul 1455	ALERT: Geomagnetic K = 6	16/1454
16 Jul 1655	ALERT: Geomagnetic K = 5	16/1654
16 Jul 1950	WARNING: Geomagnetic K = 6	16/1950 - 17/0300
16 Jul 1958	ALERT: Geomagnetic K = 6	16/1957
16 Jul 2023	EXTENDED WARNING: Geomagnetic K = 5	16/0520 - 17/0600
16 Jul 2155	ALERT: Geomagnetic K = 5	16/2150



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
17 Jul	85	30	6	31 Jul	90	5	2
18	80	12	4	01 Aug	90	5	2
19	74	8	3	02	90	5	2
20	74	8	3	03	90	5	2
21	74	15	4	04	90	5	2
22	74	12	4	05	90	25	5
23	74	5	2	06	90	10	3
24	75	5	2	07	90	8	3
25	75	5	2	08	90	5	2
26	75	5	2	09	90	5	2
27	75	5	2	10	90	5	2
28	75	5	2	11	90	5	2
29	90	5	2	12	85	5	2
30	90	5	2				

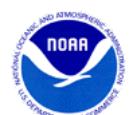


Energetic Events

Date	Time			X-ray	Optical Information			Peak		Sweep Freq		
	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux 245	Radio Flux 2695	Intensity II	Intensity IV
14 Jul	0107	0209	0324	M2.4	0.130	1N	S06W29		2665		130	1

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
	Begin	Max	End				
10 Jul	0000	0031	0038	C1.5	SF	S09E31	2665
10 Jul	0752	0755	0759	B3.8	SF	S08E13	2665
11 Jul	0109	0113	0117	B3.2			2655
11 Jul	0158	0205	0207	B4.9	SF	S08E08	2665
11 Jul	0432	0435	0439	B2.1			2665
11 Jul	1029	1029	1029		SF	S05E08	2665
11 Jul	1257	1304	1310	B8.5	SF	S06E11	2665
11 Jul	1655	1658	1703	B2.8			
11 Jul	1750	1754	1757	B2.2			
11 Jul	1823	1827	1831	B9.4	SF	S04W01	2665
11 Jul	2018	2031	2035	C1.2	SF	S05E06	2665
13 Jul	0449	0512	0541	B5.5			2665
13 Jul	1641	1644	1650	B3.4			2665
13 Jul	1738	1743	1750	B4.8	SF	S08W29	2665
13 Jul	1749	1754	1800	B6.1	SF	N11W68	2665
13 Jul	1932	1940	1949	B5.8			2667
13 Jul	2001	2005	2011	C8.4			2667
13 Jul	2044	2048	2052	B5.7	SF	N12W70	2667
13 Jul	2127	2131	2133	C2.0			2667
13 Jul	2146	2155	2158	C5.9			2667
13 Jul	2330	2340	2344	C3.0	SF	N12W71	2667
14 Jul	0012	0050	0100	C1.4			2665
14 Jul	0107	0209	0324	M2.4	1N	S06W29	2665
14 Jul	0136	0137	0139		SF	N11W73	2667
14 Jul	B0424	U0438	0648		1F	S08W28	2665
14 Jul	0655	0702	0709		SF	S08W30	2665
14 Jul	0731	0733	0735		SF	N11W76	2667
14 Jul	0816	0816	0818		SF	N08W77	2667
14 Jul	0900	0905	0915		SF	N08W77	2667
14 Jul	0904	0907	0908		SF	N12W76	2667



Flare List

Date	Time			Optical			Rgn #
	Begin	Max	End	X-ray Class	Imp/Brtns	Location Lat CMD	
14 Jul	0926	0926	0927		SF	N08W77	2667
14 Jul	1004	1004	1008		SF	N08W79	2667
14 Jul	1152	1153	1155		SF	N08W79	2667
14 Jul	1205	1205	1208		SF	N08W79	2667
14 Jul	1820	1822	1825		SF	S06W41	2665
14 Jul	1918	1925	1944	C1.4			2665
15 Jul	0020	0028	0038	C1.7	SF	S08W46	2665
15 Jul	0222	0226	0232	B2.7			2665
15 Jul	0235	0238	0242	B4.1			2665
15 Jul	0346	0355	0401	C1.0	SF	S06W29	2665
15 Jul	0406	0410	0418	B8.5			2665
15 Jul	0540	0541	0543		SF	S07W51	2665
15 Jul	0608	0608	0610		SF	S04W53	2665
15 Jul	0619	0620	0622		SF	S07W52	2665
15 Jul	0739	0743	0746	B3.4			2665
15 Jul	0901	0916	0920	B3.0			2665
15 Jul	1050	1053	1055	C1.4	SF	S07W53	2665
15 Jul	1539	1542	1544	B4.4			2665
15 Jul	1622	1634	1639	C1.1			2665
15 Jul	1926	1936	1944	C5.8			2665
16 Jul	0158	0235	0257	C3.1	SF	S06W61	2665
16 Jul	0544	0547	0549	B7.6			2665
16 Jul	0723	0726	0728	C1.1	SF	S06W64	2665
16 Jul	1025	1030	1032	B6.1			2655
16 Jul	1032	1035	1037	C1.3			2665
16 Jul	1053	1057	1059	C1.5			2665
16 Jul	1213	1217	1219	B8.7			2665
16 Jul	1233	1237	1239	B8.3			2665
16 Jul	1754	1804	1810	C1.2	SF	S04W75	2665
16 Jul	2048	2051	2059	B4.7			2665
16 Jul	2128	2132	2136	B5.5			2665
16 Jul	2232	2235	2239	B4.6			2665
16 Jul	2319	2324	2328	B5.8			2665



Region Summary

Date	Location		Sunspot Characteristics				Flares										
	Lat CMD	Helio 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 2665																	
05 Jul	S05E78	109	70	6	Hsx	1	A					2					
06 Jul	S06E64	111	140	9	Dai	6	B					3					
07 Jul	S06E52	110	310	11	Ekc	15	B	1				19	1				
08 Jul	S06E38	111	480	11	Ekc	14	B	1				23		2			
09 Jul	S06E24	111	710	11	Ekc	21	BG	4	1			16	1	1			
10 Jul	S06E11	110	690	12	Ekc	22	BG	1				2					
11 Jul	S06W03	111	620	13	Ekc	17	BG	1				5					
12 Jul	S06W17	112	570	12	Ehi	17	B										
13 Jul	S07W30	113	440	12	Ehi	26	B					2					
14 Jul	S06W43	113	460	11	Ekc	18	B	2	1			2	2				
15 Jul	S05W57	113	380	10	Dki	12	B	5				6					
16 Jul	S06W70	113	340	10	Dko	5	B	5				3					
								20	2	0		83	4	3	0	0	

Still on Disk.

Absolute heliographic longitude: 111

Region 2666

12 Jul	N13W06	101	20	4	Cro	6	B										
13 Jul	N13W20	103	30	6	Cro	9	B										
14 Jul	N12W32	102	20	7	Bxo	9	B										
15 Jul	N13W47	103	10	2	Axx	2	A										
16 Jul	N15W56	99	10	1	Axx	1	A										
								0	0	0		0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 101

Region 2667

13 Jul	N12W71	155	plage					4									
14 Jul	N12W85	155	10	1	Axx	1	A					9					
15 Jul	N12W99	155	plage														
								4	0	0		9	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 155

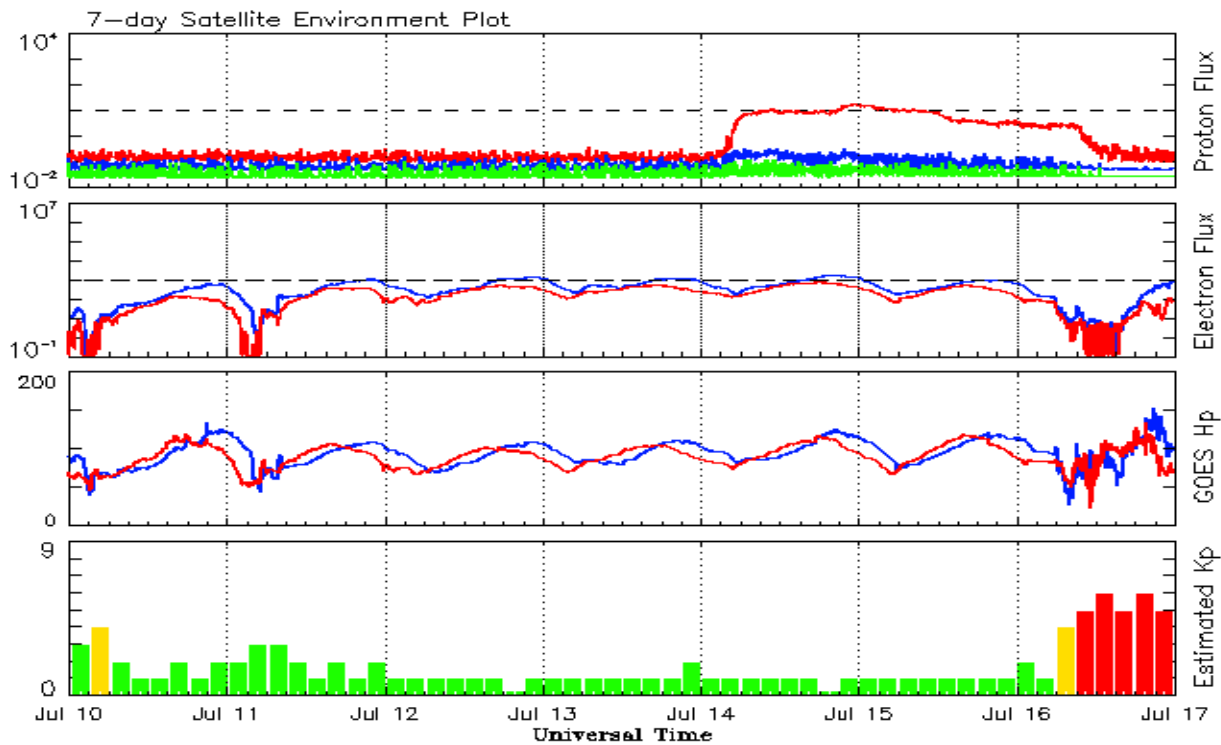


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2015									
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	39.5	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	36.7	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			77.4		10	
February	22.0	15.8	0.71			76.9		10	
March	25.4	10.6	0.42			74.6		15	
April	30.4	19.6	0.64			80.9		13	
May	18.1	11.3	0.62			73.5		9	
June	18.0	11.6	0.64			74.8		7	

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 10 July 2017*

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.

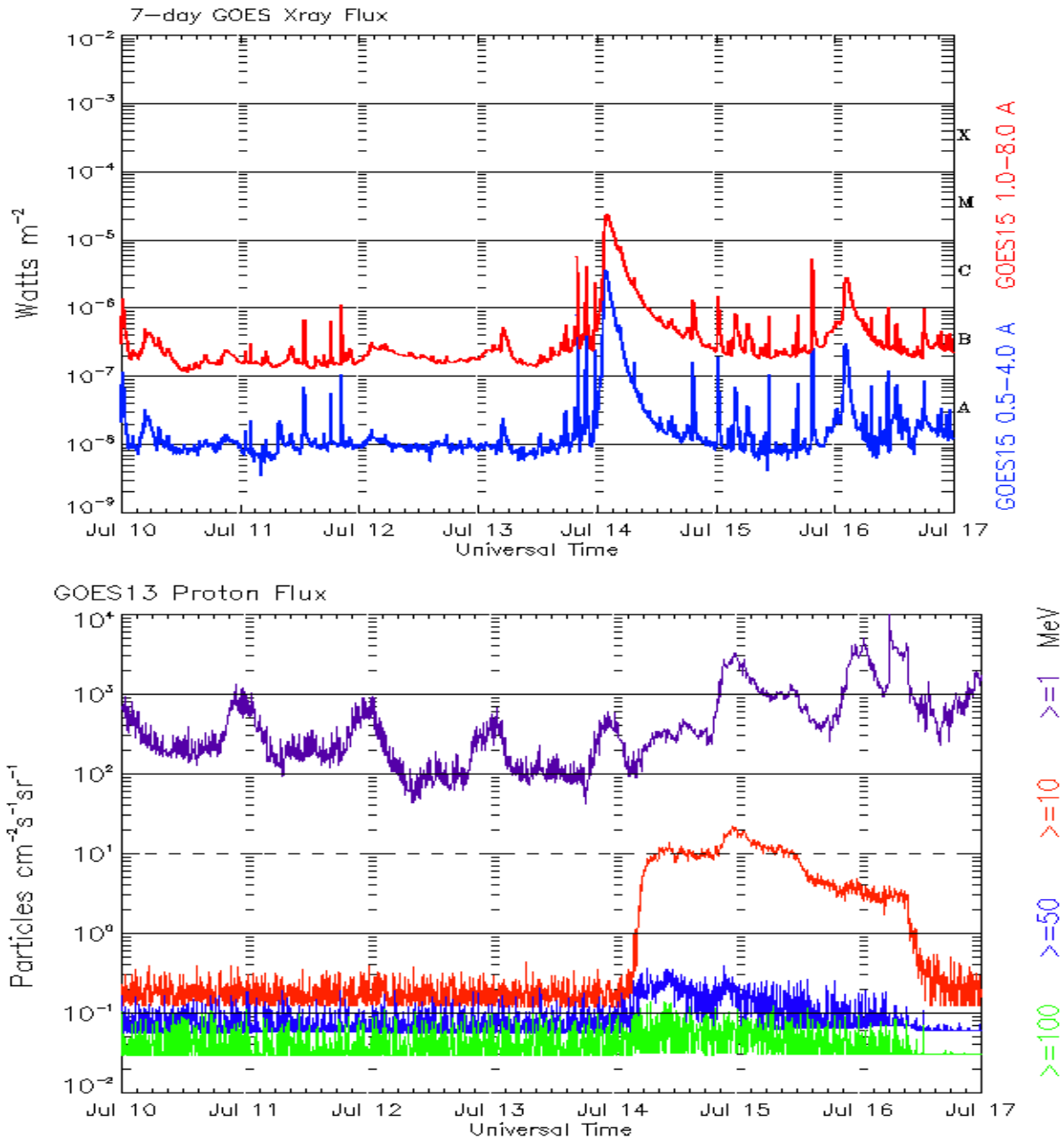
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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.

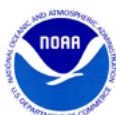




*Weekly GOES Satellite X-ray and Proton Plots
Week Beginning 10 July 2017*

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.



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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

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

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