

Space Weather Highlights
19 April – 25 April 2010

SWO PRF 1808
27 April 2010

Solar activity was at very low levels and the visible disk was spotless during the period. However, there were three CME's observed leaving the disk during the period. Two CME's on 19 April and one CME observed, around 22/0000 UTC, on the Stereo A and B spacecrafts. All three CME's appeared to be non-geoeffective.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit varied between normal background and moderate levels from 19-22 April. The remainder of the summary period was at normal background levels.

Geomagnetic field activity ranged from quiet to minor storm levels during the period. The geomagnetic field was initially at quiet levels from 19-21 April, but became unsettled late on 22 April due to the arrival of a coronal hole high-speed stream. Minor storm to active levels were observed early on 23 April due to elevated wind speeds of 468 km/s and sustained negative Bz of -8 nT, both observed at the ACE spacecraft. On 24 April, mostly quiet level were observed, with the exception of isolated active to minor storm levels observed at middle latitudes due to nighttime sub-storming. The remainder of the summary period was quiet.

Space Weather Outlook
28 April – 24 May 2010

Solar activity is expected to be at very low levels with possible isolated periods of low levels during 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 normal background levels through most of the period. However, moderate to high flux levels are possible during 05-08 May.

Geomagnetic field activity is expected to be at quiet to unsettled levels from 28-29 April due to a coronal hole high-speed stream. Quiet conditions are expected during 30 April- 03 May. Generally unsettled levels are expected for 04-05 May due to a recurrent coronal hole high-speed stream. Quiet levels are expected to prevail from 06-19 May. Generally unsettled levels are expected for 20-21 May due to a recurrent coronal hole high-speed stream. Activity is expected to return to quiet levels during the remainder of the period 22-24 May.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background	Flares								
					X-ray Flux			Optical					
					C	M	X	S	1	2	3	4	
19 April	75	0	0	A3.1	0	0	0	0	0	0	0	0	0
20 April	76	0	0	A3.0	0	0	0	0	0	0	0	0	0
21 April	76	0	0	A2.8	0	0	0	0	0	0	0	0	0
22 April	76	0	0	A3.1	0	0	0	0	0	0	0	0	0
23 April	75	0	0	A3.1	0	0	0	0	0	0	0	0	0
24 April	74	0	0	A3.5	0	0	0	0	0	0	0	0	0
25 April	75	0	0	A3.3	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	>.6 MeV	>2MeV	>4 MeV
19 April	3.0e+05	1.8e+04	7.7e+03		1.8e+07	
20 April	2.7e+05	1.8e+04	7.2e+03		1.6e+07	
21 April	2.0e+05	1.8e+04	7.4e+03		4.8e+06	
22 April	1.9e+05	1.8e+04	7.1e+03		5.0e+06	
23 April	6.7e+04	1.8e+04	7.0e+03		9.7e+05	
24 April	1.0e+05	1.5e+04	3.7e+03		1.2e+06	
25 April	2.2e+05	1.6e+04	3.9e+03		1.7e+06	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
19 April	3	1-1-1-1-1-1-0-1	6	1-3-2-3-2-0-0-0	5	1-2-2-2-1-1-1-1
20 April	4	0-1-1-1-2-1-1-2	4	0-0-1-1-3-2-1-0	5	1-1-1-1-2-1-1-2
21 April	4	0-2-2-1-2-1-1-1	7	1-2-2-3-3-2-1-0	6	1-2-2-1-2-2-1-1
22 April	4	0-1-1-1-1-1-2-2	3	1-1-1-0-0-1-2-2	6	1-1-1-0-1-2-3-3
23 April	7	4-2-2-1-1-0-1-2	9	4-3-3-2-0-0-1-2	13	5-4-2-1-1-1-2-2
24 April	8	4-4-0-0-1-1-1-0	5	2-2-1-2-3-0-0-0	8	3-4-0-1-1-1-2-1
25 April	2	1-2-0-1-0-0-0-0	1	1-1-0-0-0-0-0-0	3	1-2-0-0-1-1-0-1

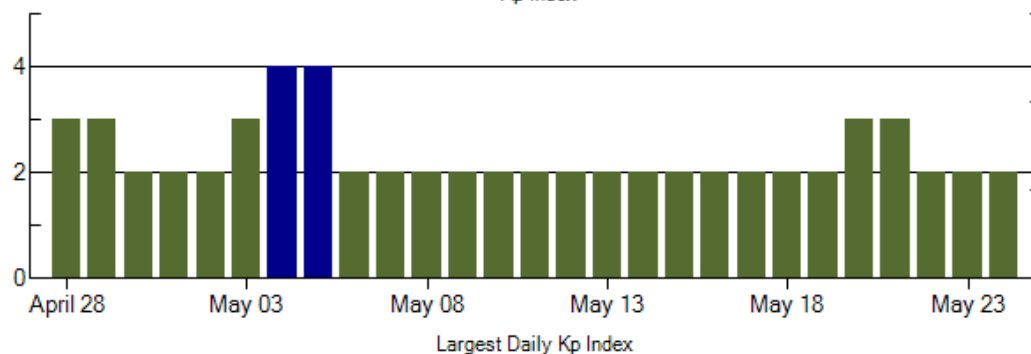
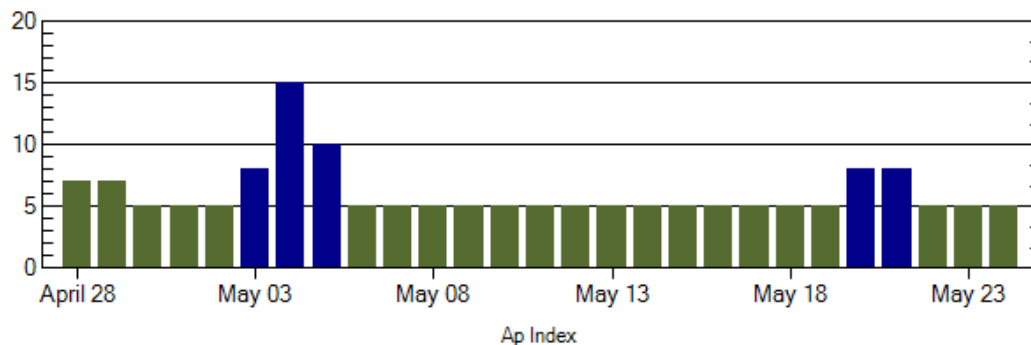
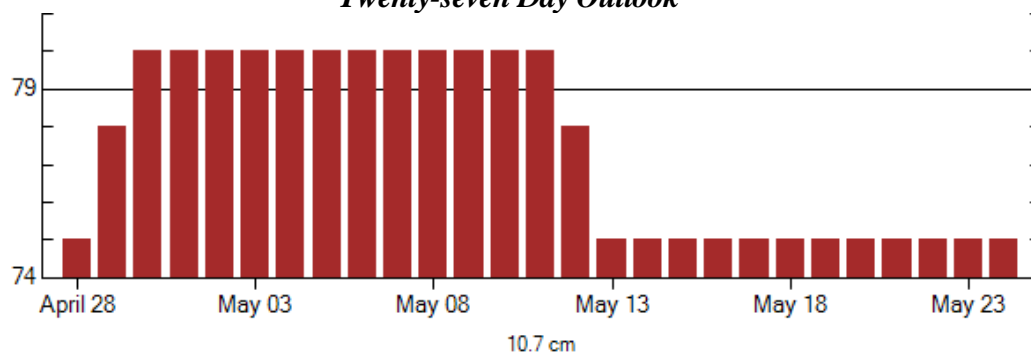


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
23 Apr 0058	WARNING: Geomagnetic K = 4	23 Apr 0058 - 0600
23 Apr 0059	ALERT: Geomagnetic K = 4	23 Apr 0058
23 Apr 0129	WARNING: Geomagnetic K = 5	23 Apr 0130 - 0300
23 Apr 0130	ALERT: Geomagnetic K = 5	23 Apr 0130
23 Apr 0203	EXTENDED WARNING: Geomagnetic K = 5	23 Apr 0130 - 0600
23 Apr 0424	CANCELLATION: Geomagnetic K = 5	
24 Apr 0300	WARNING: Geomagnetic K = 4	24 Apr 0258 - 0900
24 Apr 0302	ALERT: Geomagnetic K = 4	24 Apr 0255
24 Apr 0337	WARNING: Geomagnetic K = 5	24 Apr 0340 - 0900
24 Apr 0347	ALERT: Geomagnetic K = 5	24 Apr 0346



Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
28 Apr	75	7	3	12 May	78	5	2
29	78	7	3	13	75	5	2
30	80	5	2	14	75	5	2
01 May	80	5	2	15	75	5	2
02	80	5	2	16	75	5	2
03	80	8	3	17	75	5	2
04	80	15	4	18	75	5	2
05	80	10	4	19	75	5	2
06	80	5	2	20	75	8	3
07	80	5	2	21	75	8	3
08	80	5	2	22	75	5	2
09	80	5	2	23	75	5	2
10	80	5	2	24	75	5	2
11	80	5	2				



Energetic Events

Date	Time			X-ray		Optical Information			Peak		Sweep Freq		
	$\frac{1}{2}$			Integ		Imp/	Location	Rgn	Radio Flux		Intensity		
	Begin	Max	Max	Class	Flux	Brtns	Lat	CMD	#	245	2695	II	IV
<i>No Events Observed</i>													

Flare List

Date	Time			X-ray	Imp /	Optical		Rgn
	Begin	Max	End			Class.	Location	
							Lat CMD	
19 April	No Flares Observed							
20 April	No Flares Observed							
21 April	No Flares Observed							
22 April	No Flares Observed							
23 April	No Flares Observed							
24 April	2256	2301	2307			B1.1		
25 April	No Flares Observed							



Region Summary

Table 1. Summary of the data collected during the 2012-2013 solar cycle.															
Location			Sunspot Characteristics					Flares							
Date	(° 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	4

No Active Regions



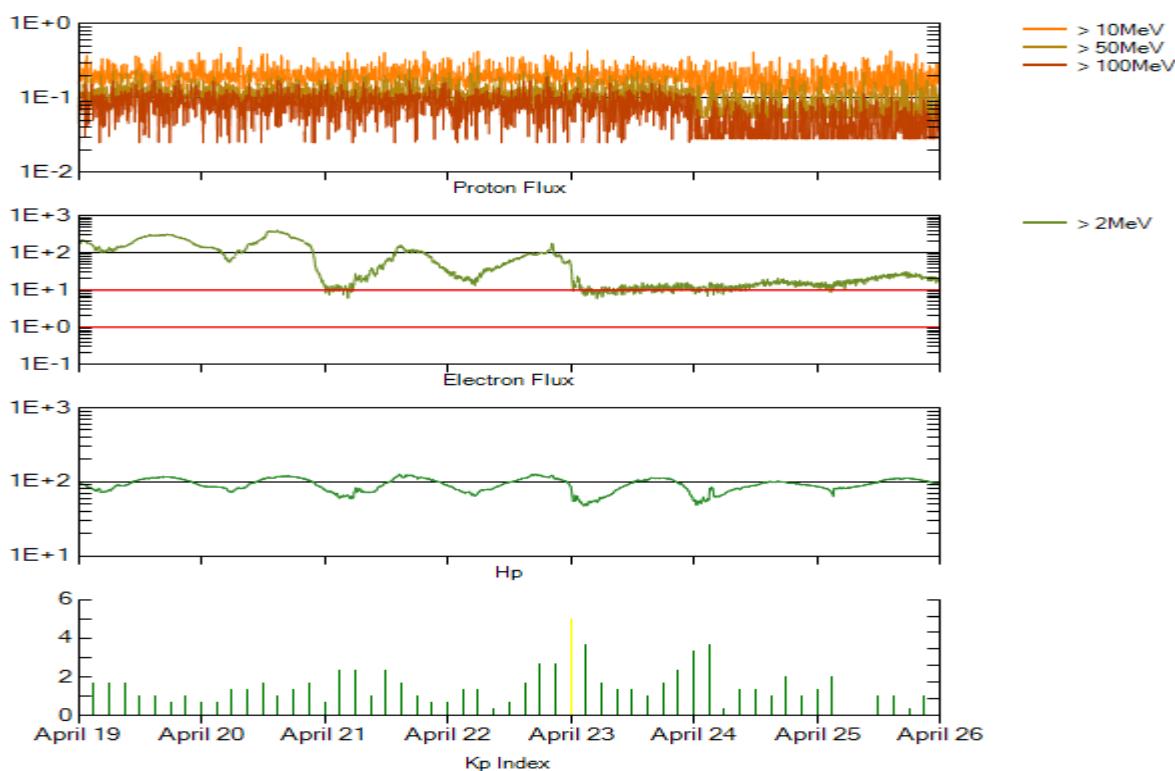
Recent Solar Indices (preliminary)
Of the observed monthly mean values

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
2008									
April	4.9	2.9	0.59	5.3	3.4	70.2	69.8	9	7.3
May	5.7	3.2	0.56	5.7	3.5	68.4	69.8	6	7.2
June	4.2	3.4	0.81	5.2	3.3	65.9	69.4	7	7.0
July	1.0	0.8	0.80	4.5	2.8	65.7	68.8	5	6.8
August	0.0	0.5	**	4.4	2.7	66.3	68.6	5	6.3
September	1.5	1.1	0.73	3.7	2.3	67.1	68.4	6	5.8
October	5.2	2.9	0.56	2.9	1.8	68.3	68.2	7	5.4
November	6.8	4.1	0.60	2.7	1.7	68.6	68.3	4	5.1
December	1.3	0.8	0.62	2.7	1.7	69.2	68.5	4	4.9
2009									
January	2.8	1.3	0.46	3.0	1.8	69.8	68.7	4	4.7
February	2.5	1.4	0.56	3.1	1.9	70.0	68.8	5	4.7
March	0.7	0.7	1.00	3.4	2.0	69.2	69.0	5	4.6
April	1.2	0.8	1.00	3.7	2.2	69.7	69.3	4	4.3
May	3.9	2.9	0.74	3.8	2.3	70.5	69.7	4	4.1
June	6.6	2.9	0.39	4.4	2.7	68.6	70.2	4	4.0
July	5.0	3.2	0.70	5.8	3.6	68.2	71.0	4	3.9
August	0.3	0.0	0.00	7.7	4.8	67.4	72.1	5	3.8
September	6.6	4.3	0.64	9.9	6.1	70.5	73.3	4	3.8
October	7.0	4.6	0.66			72.3		3	
November	7.7	4.2	0.55			73.6		3	
December	15.7	10.6	0.68			76.8		2	
2010									
January	21.3	13.1	0.62			81.1		3	
February	31.0	18.6	0.60			84.7		5	
March	24.7	15.4	0.62			83.3		4	

NOTE: Values are final except for the most recent 6 months which are considered preliminary. Cycle 23 started in May 1996 with an RI=8.0. Cycle 23 maximum was April 2000 with an RI=120.8.

** SWPC sunspot number was zero so a ratio could not be computed.





Weekly Geosynchronous Satellite Environment Summary
Week Beginning 19 April 2010

GOES-13 replaced GOES-11 as primary proton and electron satellite and primary magnetometer satellite on 14 April 2010.

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²–sec–sr) as measured by GOES-13 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

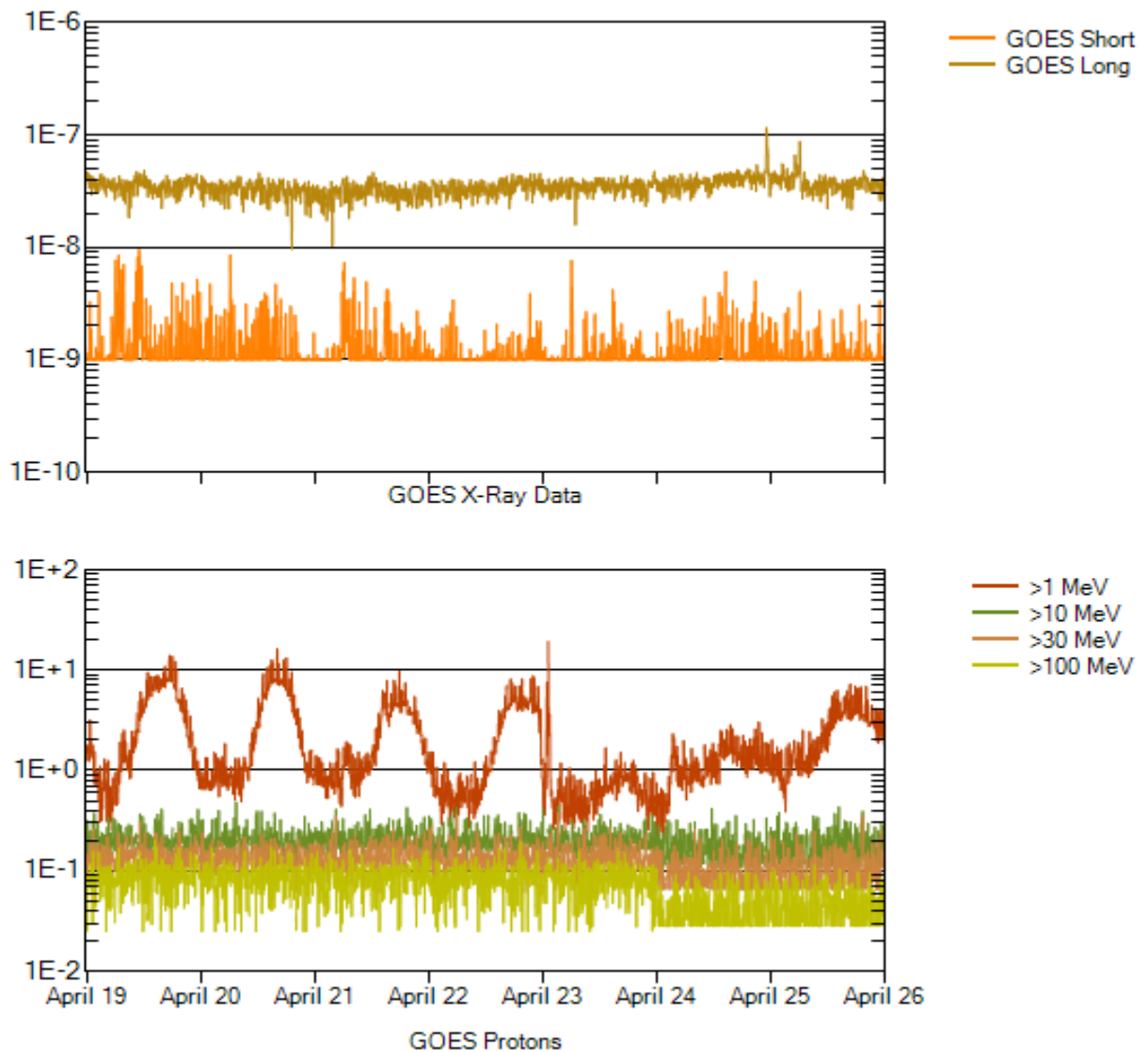
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²–sec–sr) with energies greater than 2 MeV at GOES-13.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as measured by GOES-13. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth’s rotation axis.

Kp plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meantook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) and the US Geological Survey. These may differ from the final Kp values derived from a more extensive network of magnetometers.

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

The x-ray plot contains five-minute averaged x-ray flux (Watts/m^2) as measured by GOES 14 (W105) 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 proton flux ($\text{protons/cm}^2\text{-sec-sr}$) as measured by GOES-13 for each of the energy thresholds: >1 , >10 , >30 and >100 MeV. P10 event threshold is 10 pfu ($\text{protons/cm}^2\text{-sec-sr}$) at greater than 10 MeV. (GOES-13 replaced GOES-11 as primary for protons on 14 April 2010).

