Space Weather Highlights **SEC PRF 1683**
26 November – 02 December 2007 **04 December 2007**

Solar activity was very low. Region 977 (S05, L = 290, class/area Bxo/020 on 02 December) produced several subflares during 01 - 02 December. Region 977 emerged on 01 December and gradually developed during the remainder of the period, but remained simply structured.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels throughout the period.

The geomagnetic field was quiet to unsettled during 26 - 27 November. Activity decreased to quiet levels for the rest of the period. ACE solar wind measurements indicated a gradual decrease in velocities during 26 - 30 November as a recurrent coronal hole high-speed stream subsided. Peak solar wind velocity was 655 km/sec at 26/0517 UTC. Velocities decreased to as low as 310 km/sec by the end of the period. Minor IMF variations occurred during the period with Bt in the 01 to 06 nT range and Bz in the +5 to -4 nT range.

Space Weather Outlook
05 December – 31 December 2007

Solar activity is expected to be very low.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels during 19 - 31 December.

The geomagnetic field is expected to be at mostly quiet levels during 05 - 16 December. Activity is expected to increase to unsettled to active levels during 17 - 19 December due to recurrent coronal hole effects. Minor storm levels are also expected on 17 December. Activity is expected to decrease to quiet to unsettled levels during 20 - 23 December as coronal hole effects subside. Activity is expected to decrease to quiet levels for the balance of the period.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
26 November	72	11	10	<A1.0	0	0	0	0	0	0	0	0
27 November	71	0	0	<A1.0	0	0	0	0	0	0	0	0
28 November	71	0	0	<A1.0	0	0	0	0	0	0	0	0
29 November	71	0	0	<A1.0	0	0	0	0	0	0	0	0
30 November	71	0	0	<A1.0	0	0	0	0	0	0	0	0
01 December	72	13	30	<A1.0	0	0	0	1	0	0	0	0
02 December	73	26	40	<A1.0	0	0	0	11	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm^2-day-sr) >1 MeV	>10 MeV	>100 MeV	Electron Fluence (electrons/cm^2-day-sr) >.6 MeV	>2MeV	>4 MeV
26 November	7.9E+5	1.8E+4	4.1E+3		2.7E+8	
27 November	8.2E+5	1.8E+4	4.3E+3		2.8E+8	
28 November	5.7E+5	1.8E+4	4.4E+3		2.5E+8	
29 November	6.6E+5	1.8E+4	4.2E+3		2.2E+8	
30 November	1.3E+6	1.8E+4	4.5E+3		1.9E+8	
01 December	1.1E+6	1.9E+4	4.5E+3		9.3E+7	
02 December	1.2E+6	1.9E+4	4.4E+3		8.8E+7	

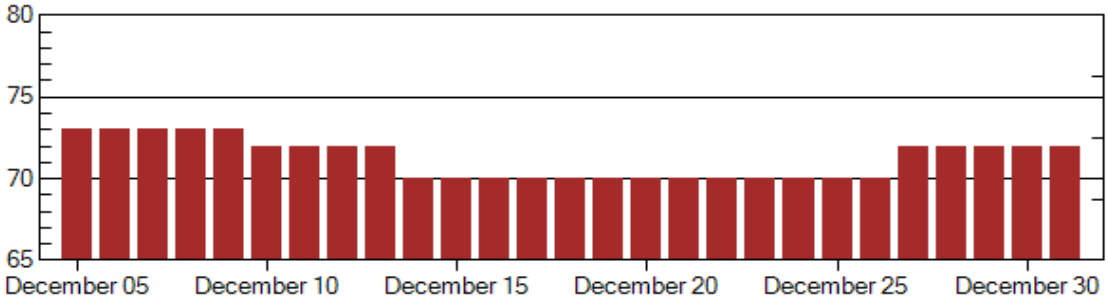
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
26 November	6	2-2-2-2-1-1-1-2	8	2-2-2-4-2-1-1-1	8	3-3-2-2-1-1-1-2
27 November	5	1-3-1-1-1-1-1-1	6	1-2-2-3-2-1-1-0	4	1-2-1-1-1-0-1-2
28 November	3	2-0-0-1-1-2-0-0	5	1-0-1-2-3-3-0-0	3	2-0-0-1-1-2-0-1
29 November	2	0-0-1-1-0-1-1-0	4	0-0-1-1-3-2-1-0	3	0-0-1-0-1-1-1-1
30 November	1	0-0-0-0-1-0-1-1	3	0-0-0-3-1-0-1-0	2	0-0-0-1-1-1-1-1
01 December	2	2-0-1-1-0-0-0-0	3	1-0-2-3-0-0-0-0	2	2-0-1-1-0-0-0-0
02 December	2	0-1-1-0-0-1-0-1	0	0-0-0-0-0-0-0-0	2	0-1-0-0-0-0-0-1

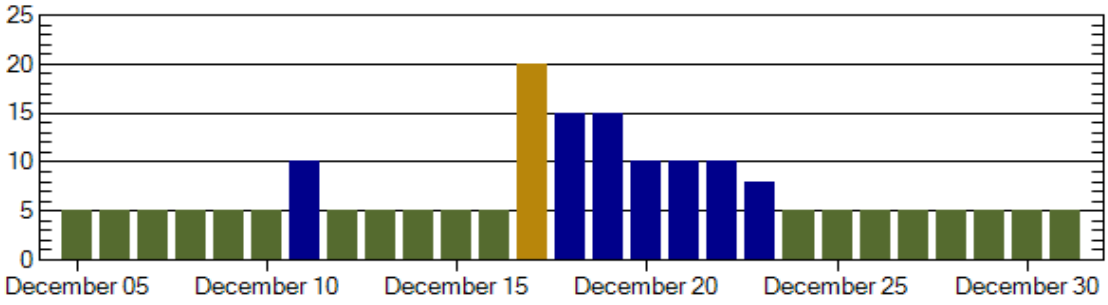
Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
26 Nov 0631	ALERT: Electron 2MeV Integral Flux >1000pfu	26 Nov 0600
27 Nov 0501	ALERT: Electron 2MeV Integral Flux >1000pfu	27 Nov 0500
28 Nov 0504	ALERT: Electron 2MeV Integral Flux >1000pfu	28 Nov 0500
29 Nov 0506	ALERT: Electron 2MeV Integral Flux >1000pfu	29 Nov 0500
30 Nov 0516	ALERT: Electron 2MeV Integral Flux >1000pfu	30 Nov 0505
01 Dec 0952	ALERT: Electron 2MeV Integral Flux >1000pfu	01 Dec 0930
02 Dec 1031	ALERT: Electron 2MeV Integral Flux >1000pfu	02 Dec 1010

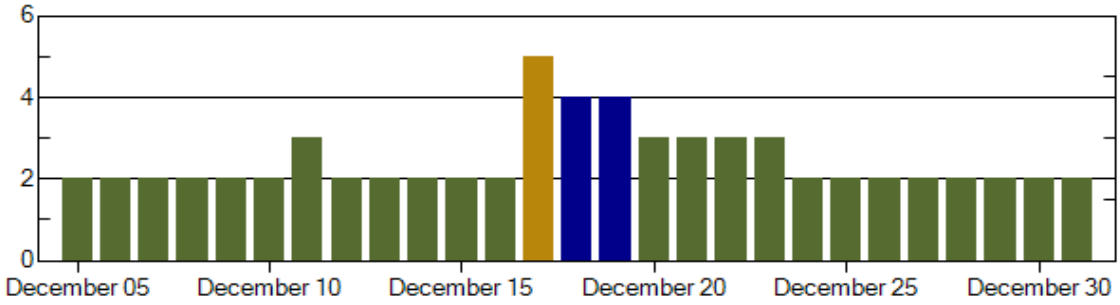
Twenty-seven Day Outlook



10.7 cm



Ap Index



Largest Daily Kp Index

Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
05 Dec	73	5	2	19 Dec	70	15	4
06	73	5	2	20	70	10	3
07	73	5	2	21	70	10	3
08	73	5	2	22	70	10	3
09	73	5	2	23	70	8	3
10	72	5	2	24	70	5	2
11	72	10	3	25	70	5	2
12	72	5	2	26	70	5	2
13	72	5	2	27	72	5	2
14	70	5	2	28	72	5	2
15	70	5	2	29	72	5	2
16	79	5	2	30	72	5	2
17	70	20	5	31	72	5	2
18	70	15	4				

Energetc Events

Date	Time Begin	Time Max	Time ½ Max	X-ray Class	X-ray Integ Flux	Optical Information Imp/ Brtns	Optical Information Location Lat CMD	Optical Information Rgn #	Peak Radio Flux 245	Peak Radio Flux 2695	Sweep Freq Intensity II	Sweep Freq Intensity IV
No Events Observed												

Flare List

Date	Time Begin	Time Max	Time End	Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
26 November	No Flares Observed						
27 November	No Flares Observed						
28 November	No Flares Observed						
29 November	No Flares Observed						
30 November	No Flares Observed						
01 December	2311	0003	0205		Sf	S06E65	977
02 December	0205	0205	0210		Sf	S06E64	977
	0212	0217	0225		Sf	S06E65	977
	0226	0228	0231		Sf	S06E64	977
	0237	0238	0243		Sf	S06E64	977
	0300	0300	0304		Sf	S06E64	977
	0320	0323	0325		Sf	S06E64	977
	0330	0338	0341		Sf	S06E64	977
	0350	0352	0355		Sf	S06E64	977
	0403	0408	0411		Sf	S06E63	977
	1959	2005	2017	B7.0	Sf	S07E66	977
	2256	2256	2300		Sf	S07E65	977

Region Summary

Date	Location (° Lat ° CMD)	Location Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Sunspot Characteristics Extent (helio)	Sunspot Characteristics Spot Class	Sunspot Characteristics Spot Count	Sunspot Characteristics Mag Class	Flares X-ray C	Flares X-ray M	Flares X-ray X	Flares Optical S	Flares Optical 1	Flares Optical 2
			Region 975										
24 Nov	N02W15	103	0020	02	Bxo	005	B						
25 Nov	N02W27	102	0010	03	Bxo	002	B						
26 Nov	N03W38	100	0010	01	Axx	001	A						
27 Nov	N03W50	100											
28 Nov	N03W63	100											
29 Nov	N03W76	100											
30 Nov	N03W89	100											
								0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 103

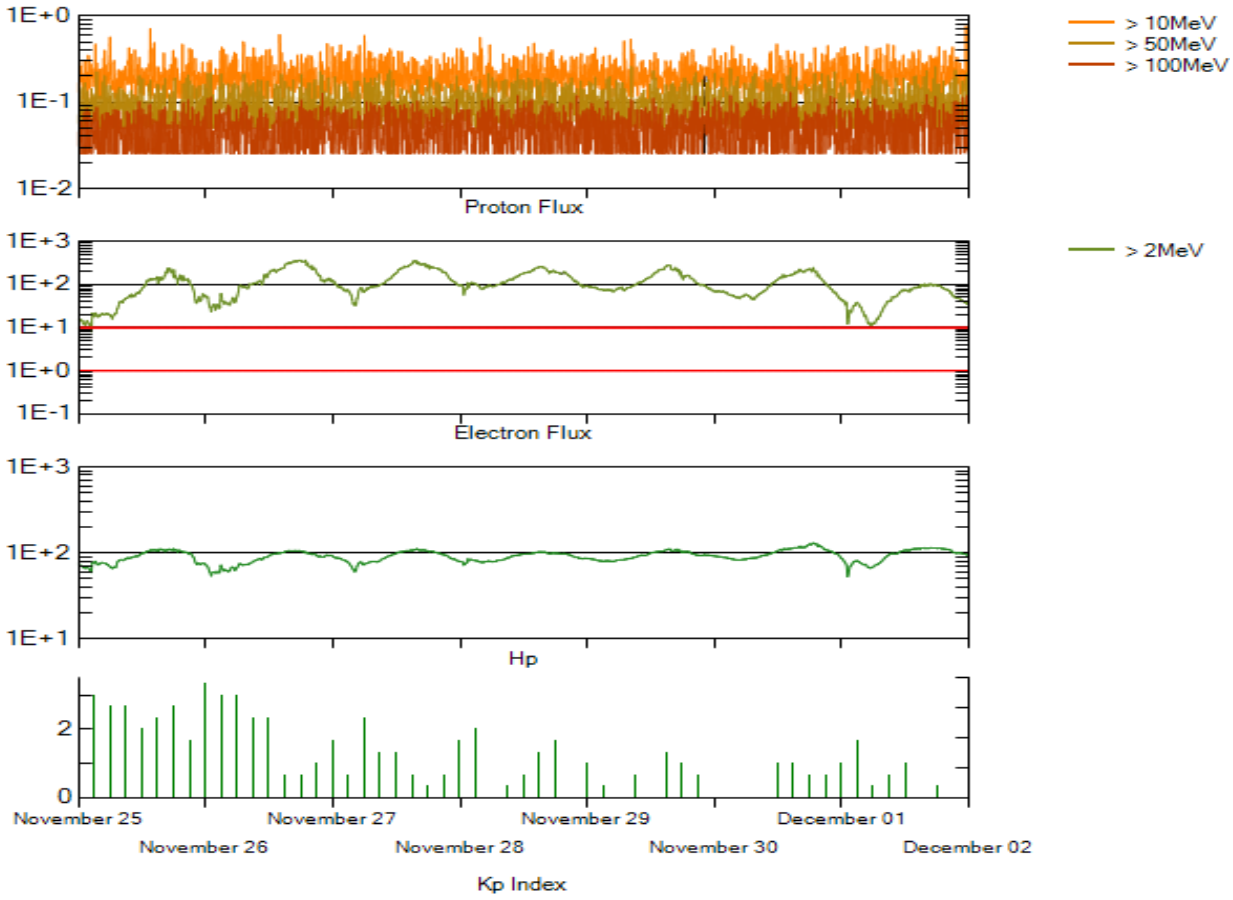
Region Summary-Continued

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2
	Region 976												
01 Dec	S08E27	329	0030	03	Bxo	003	B						
02 Dec	S09E10	333	0010	02	Bxo	002	B						
								0	0	0	0	0	0
Still on Disk.													
Absolute heliographic longitude: 333													
	Region 977												
02 Dec	S05E53	290	0030	04	Bxo	004	B				11		
								0	0	0	11	0	0
Still on Disk.													
Absolute heliographic longitude: 290													

Recent Solar Indices (preliminary)
Of the 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
				2005					
November	32.2	18.0	0.56	42.1	24.9	86.3	86.7	8	11.1
December	62.6	41.2	0.66	40.1	23.0	90.8	85.4	7	10.4
				2006					
January	28.0	15.4	0.55	37.2	20.8	83.8	84.0	6	9.9
February	5.3	4.7	0.89	33.4	18.7	76.6	82.6	6	9.2
March	21.3	10.8	0.51	31.0	17.4	75.5	81.6	8	8.4
April	55.2	30.2	0.55	30.6	17.1	89.0	80.9	11	7.9
May	39.6	22.2	0.56	30.7	17.3	81.0	80.8	8	7.9
June	37.7	13.9	0.37	28.9	16.3	80.1	80.6	9	8.3
July	22.6	12.2	0.54	27.2	15.3	75.8	80.3	7	8.7
August	22.8	12.9	0.57	27.6	15.6	79.0	80.3	9	8.7
September	25.2	14.5	0.58	27.7	15.6	77.8	80.2	8	8.7
October	15.7	10.4	0.66	25.2	14.2	74.3	79.4	8	8.6
November	31.5	21.5	0.68	22.3	12.7	86.4	78.5	9	8.5
December	22.2	13.6	0.61	20.7	12.1	84.3	77.9	15	8.5
				2007					
January	26.6	16.9	0.64	19.7	12.0	83.5	77.5	6	8.4
February	17.2	10.6	0.62	18.9	11.6	77.8	76.9	6	8.4
March	9.7	4.8	0.49	17.5	10.8	72.3	76.0	8	8.4
April	6.9	3.7	0.54	16.0	9.9	72.4	75.2	9	8.5
May	19.4	11.7	0.60			74.5		9	
June	20.0	12.0	0.60			73.7		7	
July	15.6	10.0	0.64			71.6		8	
August	9.9	6.2	0.63			69.2		7	
September	4.8	2.4	0.50			67.1		8	
October	1.3	0.9	0.70			65.5		9	

NOTE: All smoothed values after September 2002 and monthly values after March 2003 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 23, RI= 120.8, occurred April 2000.
*After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.



Weekly Geosynchronous Satellite Environment Summary
Week Beginning 26 November 2007

Protons plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec –sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

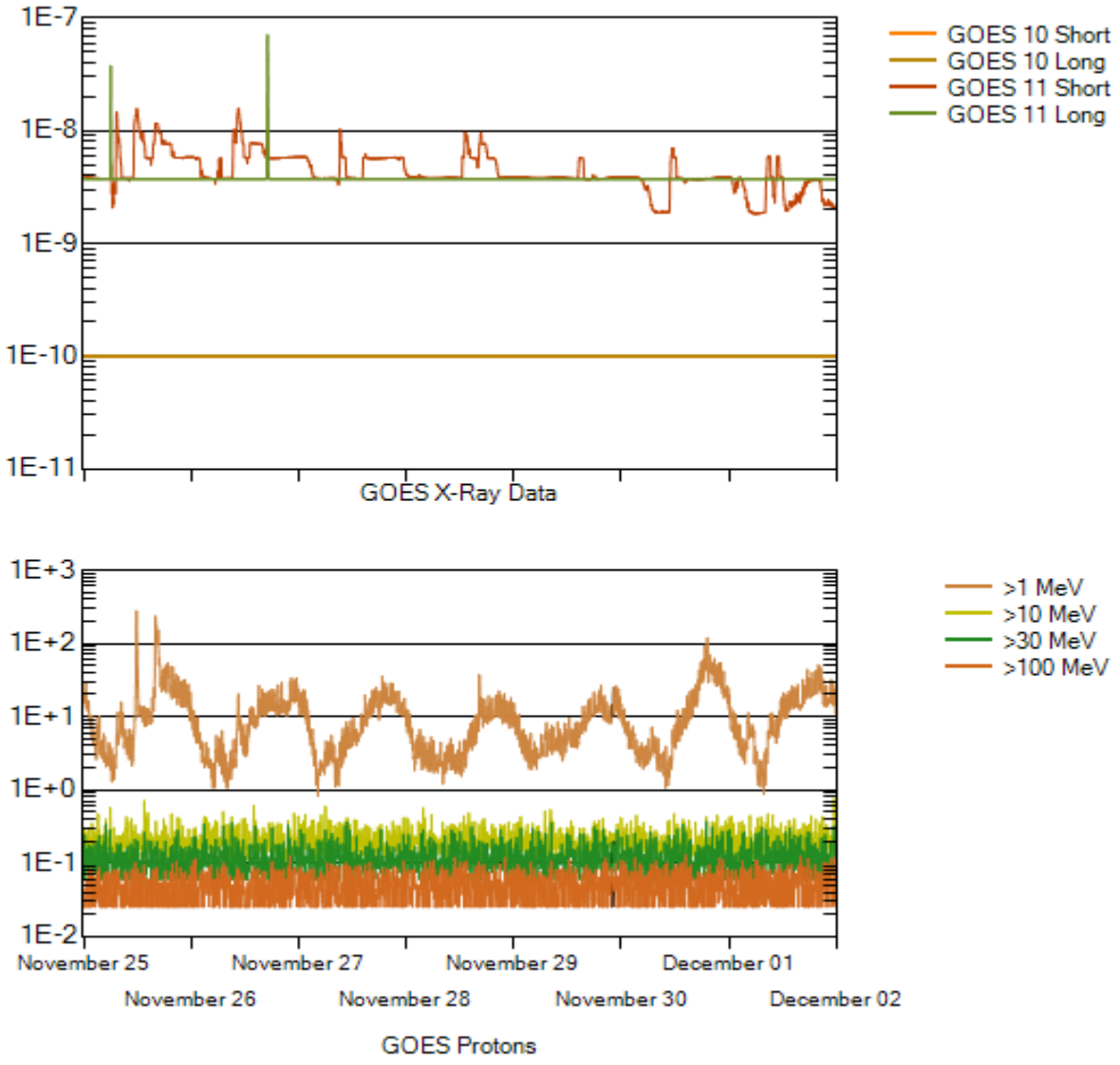
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm^2 –sec –sr) with energies greater than 2 MeV at GOES-12 (W075).

Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H 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 Meanook, 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 SEC 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

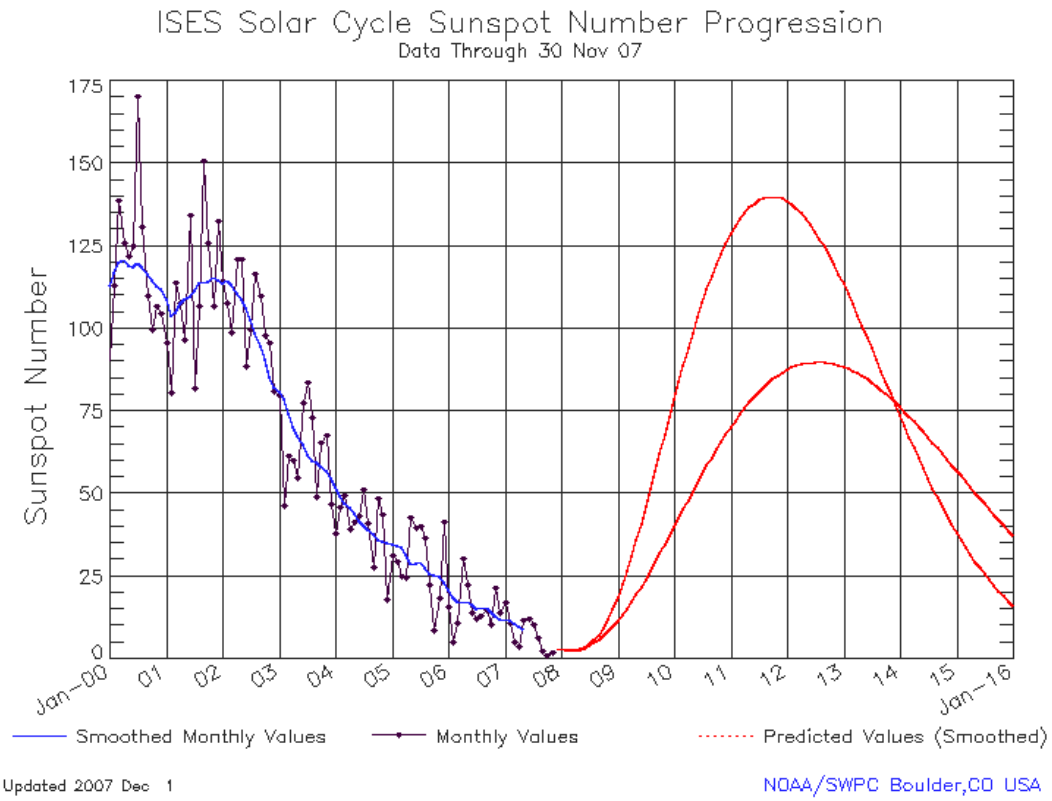
measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five-minute averaged x-ray flux (watts/m$^{2)}$ as measured by GOES 10 (W060) and GOES 11 (W135) in two wavelength bands, .05 -. 4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

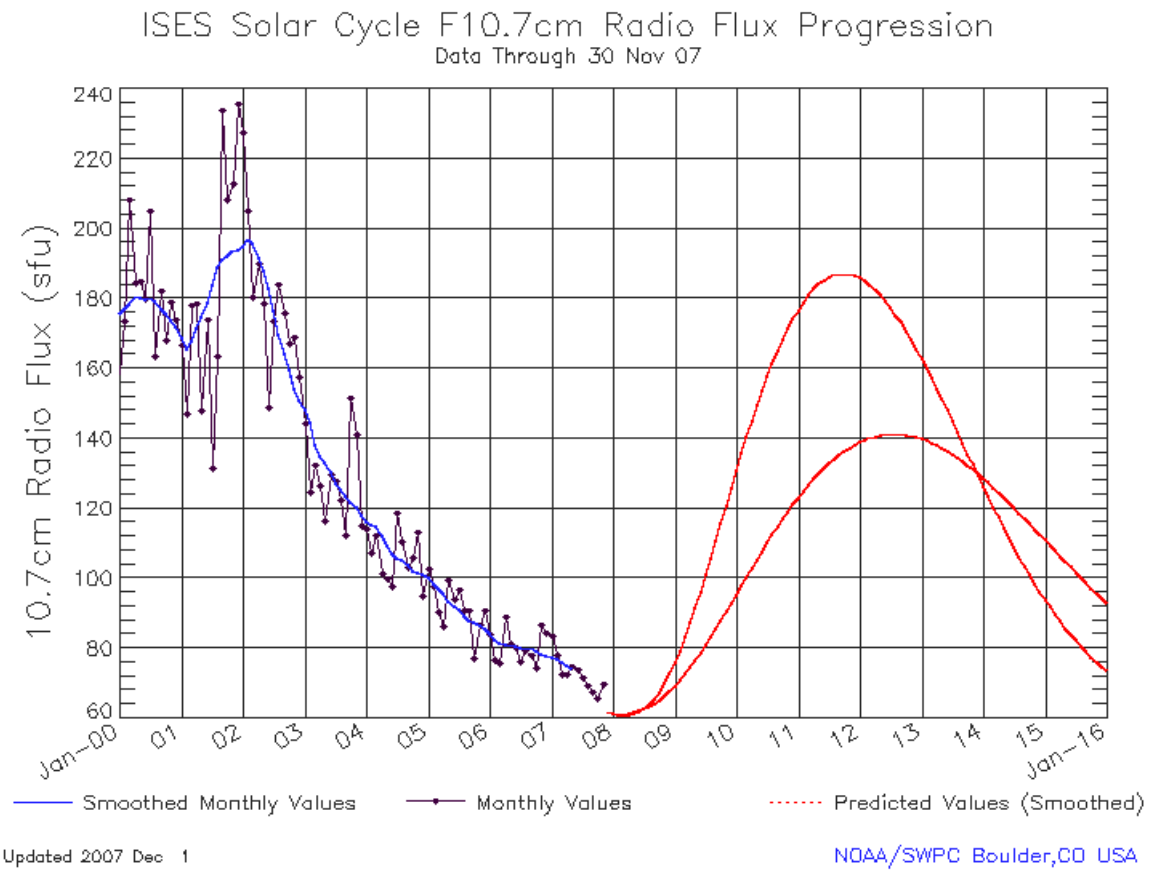
Proton plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec-sr) as measured by GOES-11 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm^2-sec-sr) at greater than 10 MeV.



SEC Prediction of Smoothed Sunspot Number

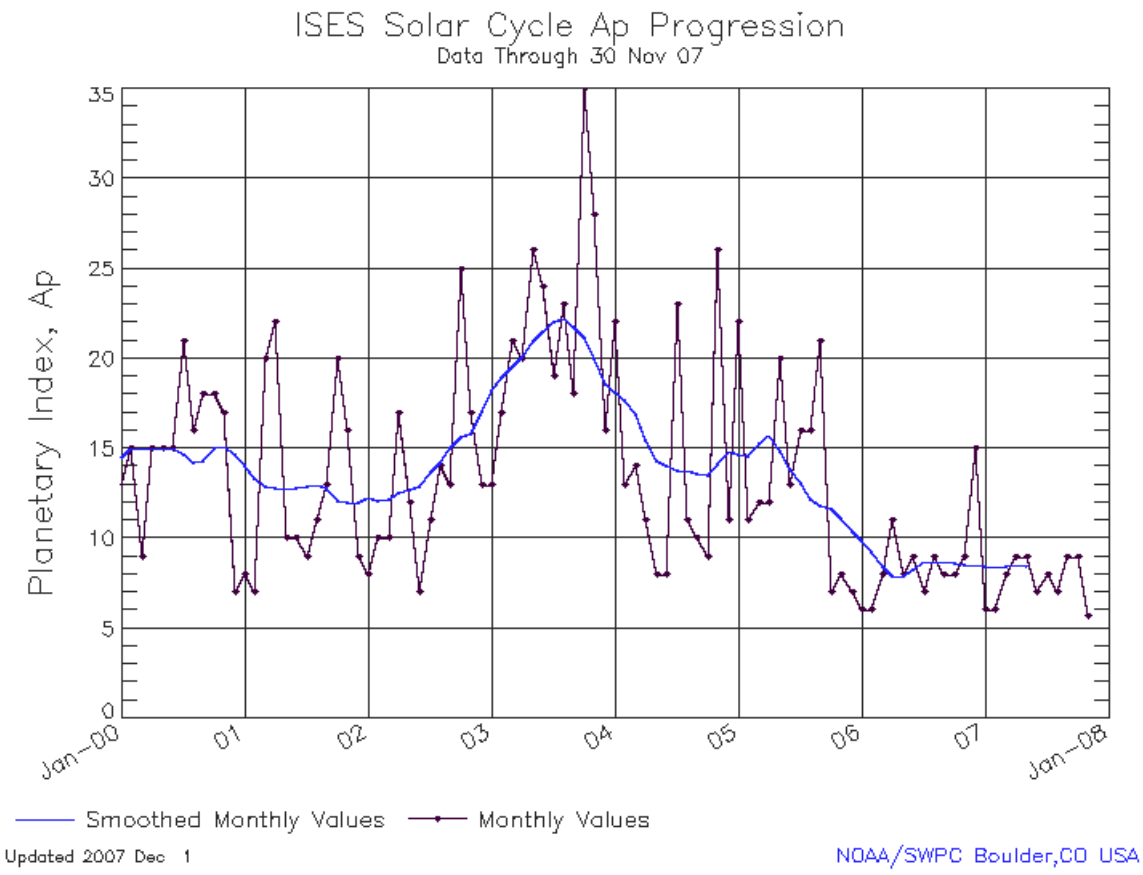
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo
2006	21	19	17	17	17	16	15	16	16	14	13	12
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2007	12	12	11	10	9	**7/7**	**6/6**	**6/5**	**5/5**	**5/5**	**5/5**	**4/4**
	(***)	(***)	(***)	(***)	(***)	(1)	(3)	(5)	(7)	(8)	(9)	(10)
2008	**3/3**	**3/3**	**3/3**	**4/3**	**4/4**	**3/4**	**4/4**	**6/5**	**7/6**	**10/7**	**12/8**	**15/10**
	(11)	(12)	(13)	(14)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2009	**19/12**	**23/13**	**27/15**	**31/17**	**36/20**	**41/22**	**46/24**	**52/27**	**57/29**	**62/32**	**68/35**	**73/37**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2010	**79/40**	**84/43**	**89/45**	**94/48**	**99/51**	**103/53**	**108/56**	**112/59**	**116/61**	**119/63**	**123/66**	**126/68**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2011	**129/70**	**131/72**	**133/74**	**135/76**	**137/78**	**138/79**	**139/81**	**140/82**	**140/84**	**140/85**	**140/86**	**139/87**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2012	**139/88**	**138/88**	**136/89**	**135/89**	**133/90**	**131/90**	**129/90**	**127/90**	**125/90**	**122/90**	**119/89**	**116/89**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2013	**114/89**	**110/88**	**107/87**	**104/86**	**101/86**	**97/85**	**94/84**	**91/83**	**87/81**	**84/80**	**80/79**	**77/78**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2014	**74/76**	**70/75**	**67/73**	**64/72**	**61/70**	**58/69**	**55/67**	**52/65**	**49/64**	**46/62**	**44/60**	**41/59**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2015	**38/57**	**36/55**	**34/54**	**32/52**	**30/50**	**28/49**	**26/47**	**24/45**	**22/44**	**21/42**	**19/40**	**18/39**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)

Note: *Hi is for the larger solar cycle prediction, Lo is for the smaller solar cycle prediction*



SEC Prediction of Smoothed F10.7cm Radio Flux

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo	Hi/Lo
2006	84	83	82	81	81	81	80	80	80	79	79	78
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2007	78	77	76	75	75	**73/67**	**71/65**	**69/63**	**68/62**	**67/61**	**66/60**	**65/60**
	(***)	(***)	(***)	(***)	(***)	(1)	(3)	(5)	(7)	(9)	(11)	(13)
2008	**64/60**	**63/60**	**63/60**	**63/60**	**63/60**	**62/62**	**63/63**	**64/63**	**65/64**	**67/65**	**70/66**	**73/68**
	(15)	(17)	(19)	(21)	(22)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2009	**76/69**	**79/71**	**83/73**	**87/75**	**92/77**	**96/79**	**101/81**	**106/83**	**111/86**	**116/88**	**121/90**	**126/93**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2010	**131/95**	**136/98**	**140/100**	**145/103**	**149/105**	**154/108**	**158/110**	**161/112**	**165/115**	**168/117**	**171/119**	**174/121**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2011	**178/123**	**179/125**	**181/127**	**183/128**	**184/130**	**185/132**	**186/133**	**187/134**	**187/135**	**187/136**	**187/137**	**187/138**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2012	**186/139**	**185/140**	**184/140**	**183/141**	**181/141**	**179/141**	**177/141**	**175/141**	**173/141**	**171/141**	**168/141**	**167/140**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2013	**163/140**	**160/139**	**157/139**	**154/138**	**151/137**	**148/136**	**145/136**	**142/135**	**139/134**	**136/132**	**133/131**	**130/130**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2014	**128/128**	**125/125**	**123/123**	**121/121**	**119/119**	**117/117**	**115/115**	**112/112**	**110/110**	**108/108**	**106/106**	**104/104**
	(24)	(25)	(26)	(27)	(27)	(28)	(29)	(29)	(30)	(30)	(31)	(31)
2015	**103/103**	**101/101**	**99/99**	**97/97**	**95/95**	**94/94**	**92/92**	**90/90**	**89/89**	**87/87**	**86/86**	**85/85**
	(32)	(32)	(32)	(32)	(33)	(33)	(33)	(33)	(33)	(33)	(33)	(33)

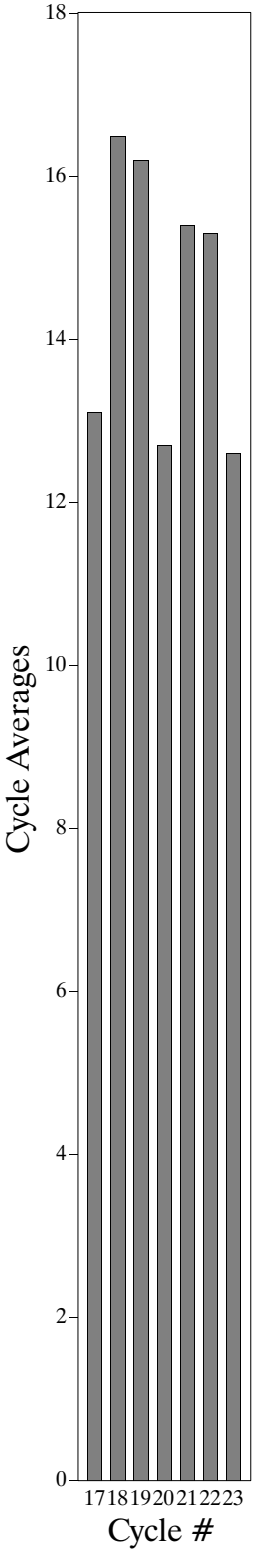

ISES Solar Cycle Ap Progression
Data Through 30 Nov 07
Planetary Index, Ap
35
30
25
20
15
10
5
0
Jan-00
01
02
03
04
05
06
07
Jan-08
Smoothed Monthly Values
Monthly Values
Updated 2007 Dec 1
NOAA/SWPC Boulder,CO USA

Space Environment Center

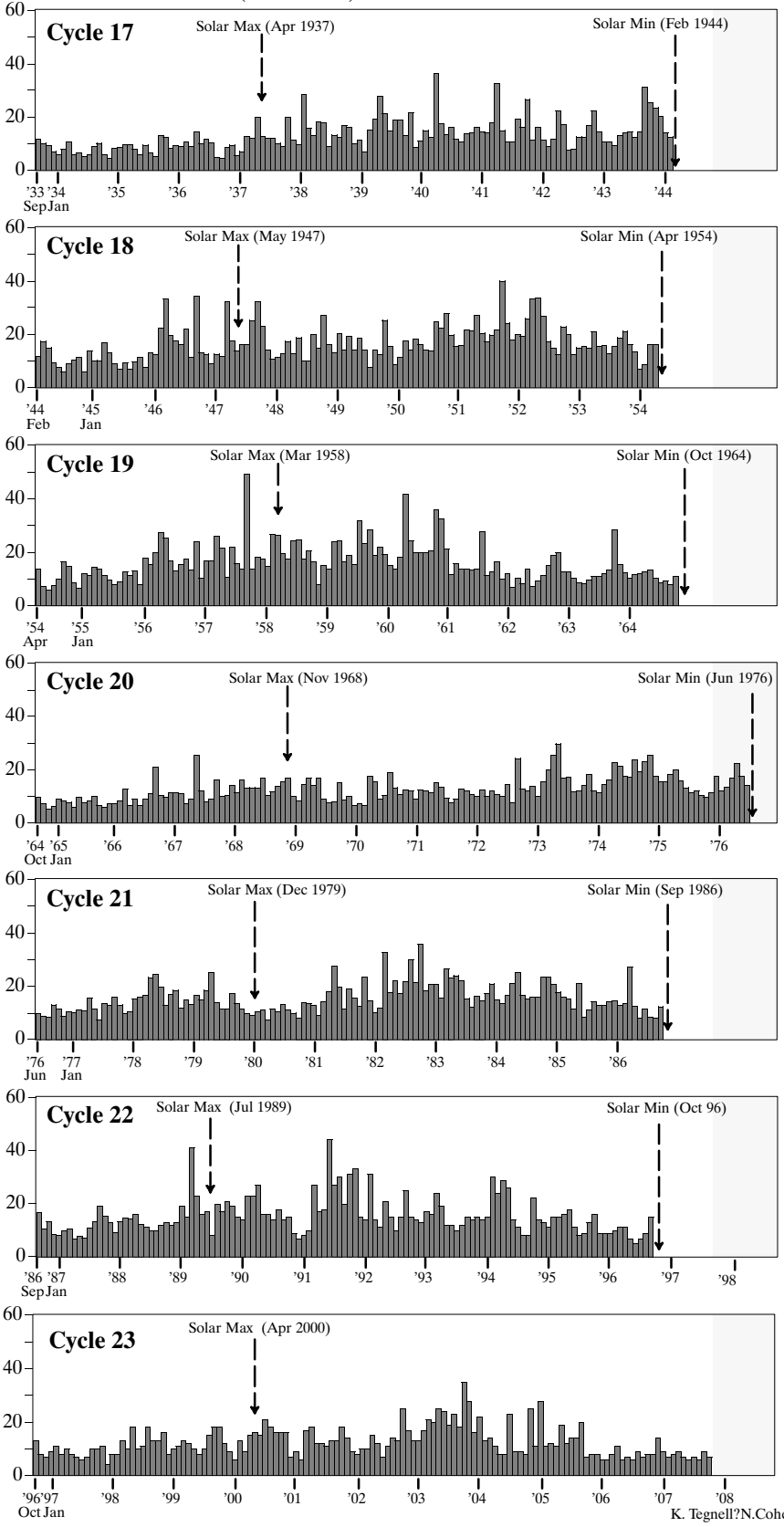
Geomagnetic Activity (Ap)

October 2007
(Month 133)

Comparison of Cycles at current month in cycle



Monthly Averages



K. Tegnell?N.Cohen