Space Weather Highlights **SWPC PRF 2364**
14 December - 20 December 2020 **21 December 2020**

Solar activity was at very low to low levels. Low levels were observed on 14 Dec when Region 2792 (S22, L=103, class/area Bxo/010 on 15 Dec) produced a C4/Sf at 14/1437 UTC. Associated with this event was a Type II radio sweep with an estimated shock velocity of 606 km/s. 15-20 Dec saw solar activity at very low levels. No Earth-directed CMEs were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels throughout the period.

Geomagnetic field activity was at quiet levels throughout the period. The solar wind environment was at nominal levels with wind speeds between 348-416 km/s, total field ranged between 2-5 nT and the Bz component varied between +/-5 nT. The phi angle was in a predominately positive orientation throughout the period.

Space Weather Outlook
21 December - 16 January 2021

Solar activity is expected to be at very low levels throughout the period with a slight chance for low levels from 21-31 Dec and 01 Jan and again on 14-16 Jan due to the flare potential from Region 2794 (S18, L=347, class/area Hsx/120 on 20 Dec).

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels on 21 Dec, 30-31 Dec and 01-16 Jan. High levels are anticipated on 23-29 Dec due to CH HSS effects.

Geomagnetic field activity is expected to be at unsettled to active levels on 21-26 Dec and 05-06 Jan due to CH HSS influence. G1 (Minor) geomagnetic storms are likely on 23 Dec. Mostly quiet conditions are expected to prevail throughout 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	4
14 December	83	25	20	A6.8	1	0	0	1	0	0	0	0
15 December	83	25	30	A6.6	0	0	0	2	0	0	0	0
16 December	82	12	30	A4.9	0	0	0	0	0	0	0	0
17 December	82	12	10	A4.0	0	0	0	0	0	0	0	0
18 December	80	0	0	A3.3	0	0	0	0	0	0	0	0
19 December	82	0	0	A5.7	0	0	0	0	0	0	0	0
20 December	84	11	120	A6.9	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	>2MeV
14 December	4.9e+05	4.5e+04	5.7e+06
15 December	4.1e+05	4.4e+04	5.0e+06
16 December	6.2e+05	4.5e+04	4.4e+06
17 December	5.2e+05	4.5e+04	2.9e+06
18 December	9.2e+05	4.4e+04	2.8e+06
19 December	1.4e+06	4.4e+04	1.5e+06
20 December	4.7e+05	4.4e+04	1.3e+06

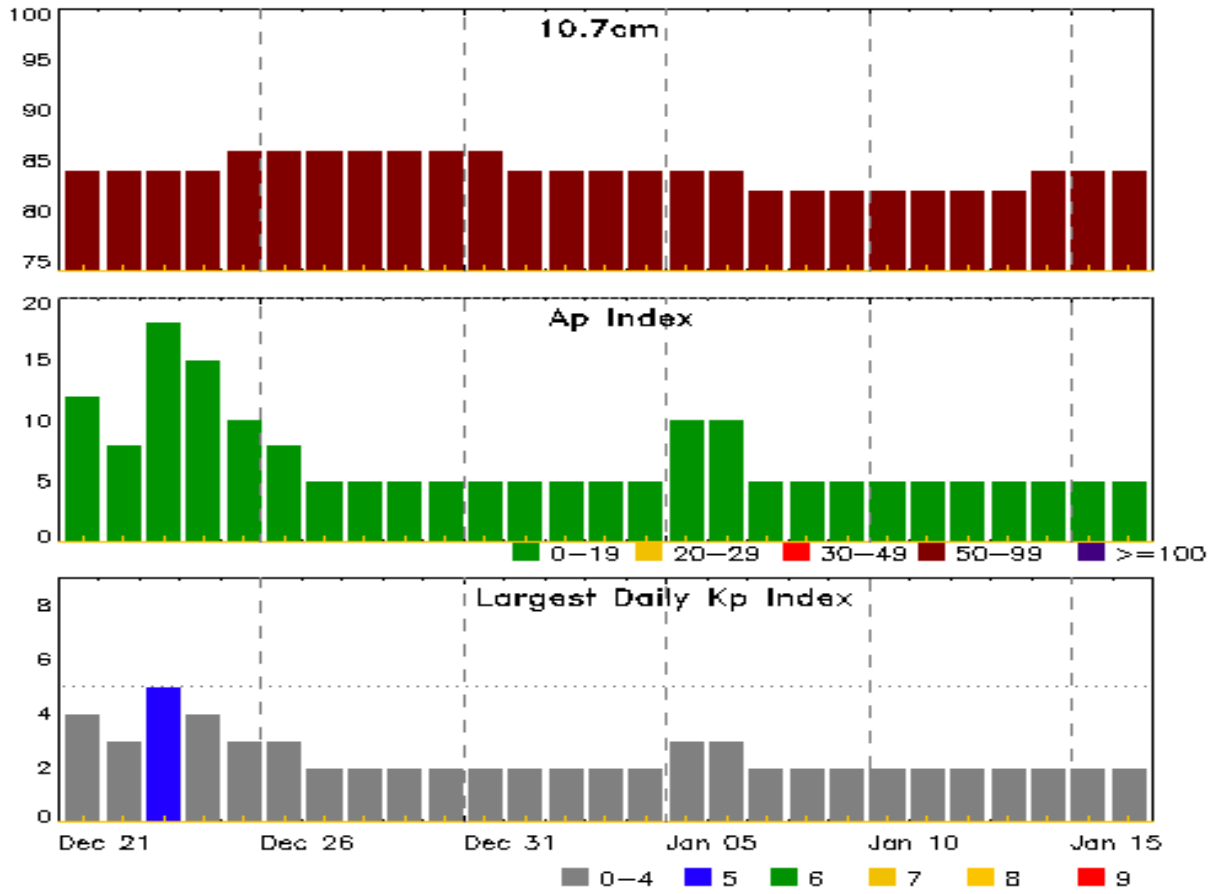
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
14 December	2	0-0-0-0-1-2-1-1	1	0-0-0-1-1-0-1-0	3	0-0-0-1-0-1-2-1
15 December	2	1-0-1-0-1-1-0-0	0	0-0-1-0-0-0-0-0	3	2-0-1-0-0-0-1-1
16 December	3	2-1-0-0-1-2-1-1	0	0-0-0-1-0-0-0-0	3	1-1-0-0-0-1-1-1
17 December	2	0-0-1-0-1-1-1-0	0	0-0-0-0-0-0-0-0	2	1-1-0-0-0-0-0-1
18 December	2	0-0-0-0-2-2-1-0	1	0-0-0-1-0-1-0-0	3	0-0-1-1-1-1-1-0
19 December	4	0-0-1-2-2-2-2-0	6	0-0-2-2-4-1-1-0	5	1-0-1-2-2-1-1-1
20 December	4	1-1-2-1-2-1-1-1	2	0-0-2-1-2-0-0-0	4	1-1-2-1-1-1-0-1

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
14 Dec 1541	ALERT: Type II Radio Emission	14/1437
20 Dec 2104	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
21 Dec	84	12	4	04 Jan	84	5	2
22	84	8	3	05	84	10	3
23	84	18	5	06	84	10	3
24	84	15	4	07	82	5	2
25	86	10	3	08	82	5	2
26	86	8	3	09	82	5	2
27	86	5	2	10	82	5	2
28	86	5	2	11	82	5	2
29	86	5	2	12	82	5	2
30	86	5	2	13	82	5	2
31	86	5	2	14	84	5	2
01 Jan	84	5	2	15	84	5	2
02	84	5	2	16	84	5	2
03	84	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 #
14 Dec	0212	0220	0226	B1.3			2792
14 Dec	0555	0559	0604	B1.4			2793
14 Dec	0646	0657	0703	B1.1			2792
14 Dec	1340	1349	1359	B1.4			2792
14 Dec	1409	1437	1456	C4.0	SF	S22E48	2792
14 Dec	1817	1824	1832	B2.2			2793
14 Dec	2008	2016	2038	B2.4			2793
14 Dec	2041	2044	2056	B3.5			2793
14 Dec	2226	2233	2237	B2.0			2793
14 Dec	2313	2321	2330	B1.7			2793
15 Dec	0032	0042	0048	B1.7			2793
15 Dec	0059	0110	0120	B5.6			2793
15 Dec	0419	0425	0435	B2.5			
15 Dec	0531	0537	0547	B1.3			
15 Dec	0550	0556	0605	B1.7	SF	S16E61	2793
15 Dec	0756	0759	0803	B1.9			
15 Dec	1705	1714	1721	B1.2			
15 Dec	2137	2145	2150	B3.2	SF	S16E51	2793
15 Dec	2156	2207	2217	B1.4			
16 Dec	1329	1339	1346	B1.8			
18 Dec	1723	1730	1736	B2.0			2793
20 Dec	0549	0556	0600	B1.1			2793

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 2791												
05 Dec	S16E45	218	20	5	Bxo	5	B								
06 Dec	S16E30	220	20	5	Bxo	4	B								
07 Dec	S15E15	221	10	2	Axx	2	A								
08 Dec	S15E01	222	plage												
09 Dec	S15W13	223	plage								1				
10 Dec	S15W27	224	plage												
11 Dec	S15W41	225	plage								2				
12 Dec	S15W55	225	plage								1				
13 Dec	S15W69	226	plage												
14 Dec	S15W83	227	plage												
								0	0	0	4	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 222

			Region 2792												
12 Dec	S23E67	103	10	2	Bxo	3	B								
13 Dec	S22E52	105	10	1	Bxo	4	B								
14 Dec	S22E39	105	10	4	Bxo	3	B	1			1				
15 Dec	S22E26	103	10	6	Bxo	2	B								
16 Dec	S22E12	106	plage												
17 Dec	S22W02	107	plage												
18 Dec	S22W15	106	plage												
19 Dec	S22W29	107	plage												
20 Dec	S22W43	108	plage												
								1	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 107

			Region 2793												
14 Dec	S16E60	84	10	1	Axx	2	A								
15 Dec	S15E49	81	20	3	Cro	3	B				2				
16 Dec	S15E35	82	30	4	Cro	2	B								
17 Dec	S15E22	81	10	2	Bxo	2	B								
18 Dec	S15E08	83	plage												
19 Dec	S15W06	84	plage												
20 Dec	S15W20	85	plage												
								0	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 84

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 2794													
20 Dec	S17E78	347	120	2	Hsx	1	A	0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 347

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.

https://www.swpc.noaa.gov/products/weekly-highlights-and-27-day-forecast -- Current
ftp://ftp.swpc.noaa.gov/pub/warehouse -- Online archive from 1997
https://www.ngdc.noaa.gov/stp/satellite/goes-r.html -- NCEI GOES data textarchive
https://www.swpc.noaa.gov/products/solar-cycle-progression -- Solar Cycle Progression web site
https://www.swpc.noaa.gov/content/contact-us -- Contact and Copyright information
https://www.swpc.noaa.gov/sites/default/files/images/u2/Usr_guide.pdf -- User Guide