Space Weather Highlights **SWPC PRF 2418**
27 December - 02 January 2022 **03 January 2022**

Solar activity was at very low to moderate levels. Moderate levels were observed on 28 Dec due to an M1 flare at 0401 UTC and an M1/Sf at 1611 UTC from Region 2918 (N19, L=211, Class/area Dki/280 on 25 Dec). Region 2918 also produced another M1 flare at 0730 UTC on 01 Jan as it was rotating off the NW limb. The largest region on the disk was Region 2916 (S15, L=189, class/area Ekc/480 on 27 Dec) and was responsible for 2 M-class flares on 21 Dec, but only managed 1 C-class flare this reporting period. No Earth-directed CMEs were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit only reached high levels on 27 Dec with a peak flux of 3,210 pfu observed at 27/1325 UTC. The rest of the period, the electron flux was at normal to moderate levels.

Geomagnetic field activity ranged from quiet to active levels. The period began with a weak positive polarity coronal hole high speed stream (CH HSS) that began after 27/0833 UTC. Total field reached a maximum of 15 nT at 27/1357 UTC followed by a maximum solar wind speed of 538 km/s at 28/1224 UTC. The geomagnetic field responded with quiet to active levels on 27 Dec followed by quiet to unsettled levels on 28 Dec. On 29 Dec, a late enhancement in total field reaching 21 nT at 30/0036 UTC was followed by a brief increase in solar wind speed to 515 km/s. The geomagnetic response was quiet to unsettled on 29-30 Dec. Solar wind conditions began to wane on 31 Dec with only quiet levels observed. On 01-02 Dec another positive polarity CH HSS was observed beginning at approximately 01/0115 UTC. Total field increased to around 10 nT while the solar wind increased to near 530 km/s by 01/0900 UTC. Solar wind speed remained enhanced through the rest of the period. The geomagnetic field responded with quiet to active levels on 01 Jan followed by quiet to unsettled levels on 02 Jan.

Space Weather Outlook
03 January - 29 January 2022

Solar activity is expected to be at very low to low levels through 15 Jan. There is a slight chance for M-class flares (R1-R2, Minor-Moderate) on 16-29 Jan with the return of old Regions 2916 and 2918.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 19-23 Jan due to recurrent CH HSS influence.

Geomagnetic field activity is expected to reach unsettled levels on 03, 11-12, 15-18, 23-26, and 28-29 Jan and reach active levels on 16 Jan due to recurrent CH HSS activity.

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
27 December	124	85	740	B4.7	8	0	0	1	0	0	0	0
28 December	121	107	860	B5.2	6	2	0	8	0	0	0	0
29 December	111	79	670	B3.0	1	0	0	1	0	0	0	0
30 December	102	77	1050	B2.4	0	0	0	3	0	0	0	0
31 December	102	53	480	B2.6	5	0	0	2	0	0	0	0
01 January	94	52	440	B2.4	1	1	0	1	0	0	0	0
02 January	89	25	340	B1.4	1	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
27 December	1.3e+06	4.4e+04	5.1e+07
28 December	5.6e+04	4.4e+04	5.9e+06
29 December	1.3e+05	4.4e+04	1.8e+07
30 December	1.3e+05	4.5e+04	3.7e+06
31 December	3.5e+05	4.5e+04	6.5e+06
01 January	8.5e+04	4.4e+04	4.0e+06
02 January	7.3e+04	4.4e+04	5.5e+06

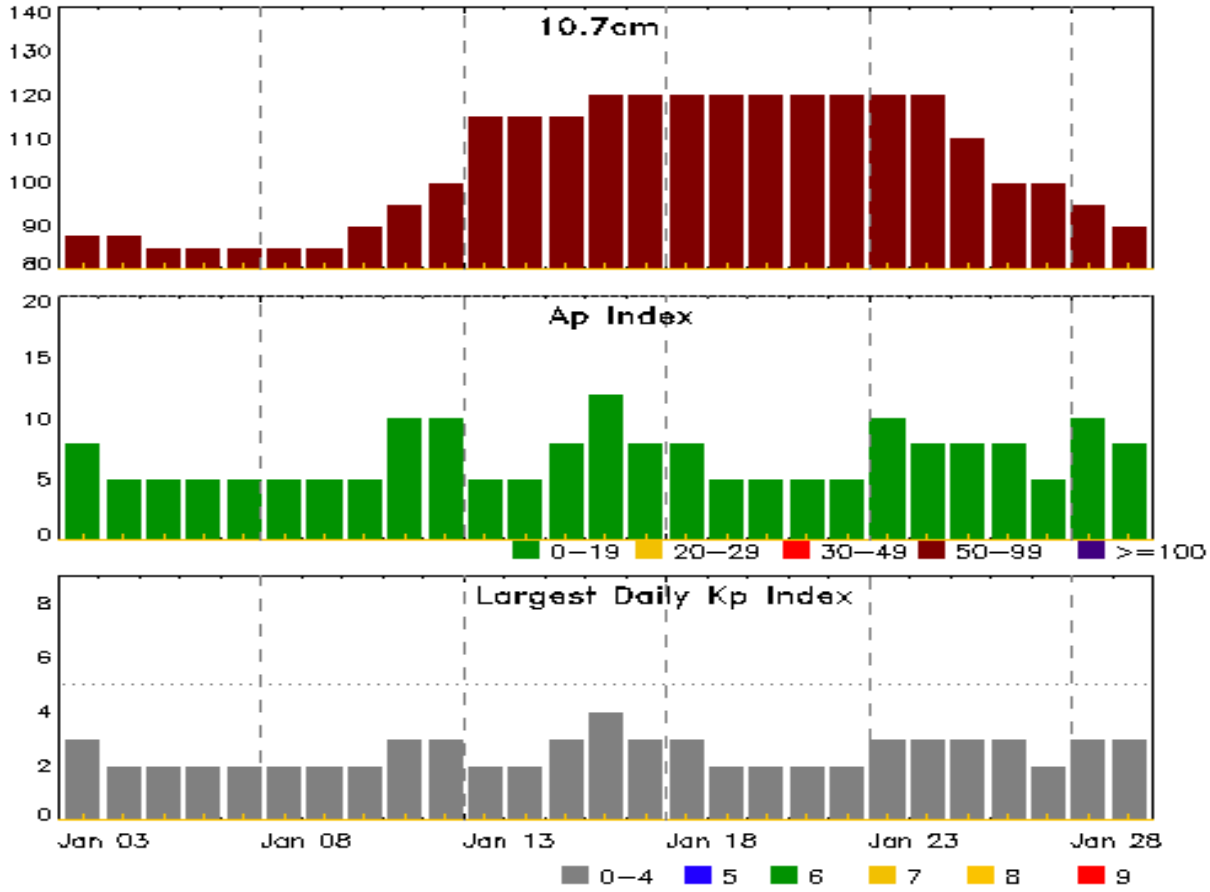
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
27 December	8	1-1-2-2-3-3-2-1	14	0-0-2-3-6-2-1-1	10	2-1-2-2-4-3-2-1
28 December	6	1-2-3-2-1-2-1-1	18	0-4-5-4-4-3-1-0	9	2-3-3-2-1-3-2-1
29 December	5	1-2-0-1-2-2-2-2	8	0-2-1-4-3-2-1-1	7	1-2-1-2-2-2-2-3
30 December	7	3-1-1-3-2-1-1-1	10	1-0-0-5-3-2-1-1	8	3-2-1-3-2-1-2-1
31 December	2	0-0-1-1-1-1-1-1	5	0-0-0-2-3-3-0-1	4	0-1-1-1-1-2-1-1
01 January	9	2-3-3-2-1-2-2-2	10	0-3-3-3-3-2-2-1	11	2-4-3-2-2-3-3-2
02 January	7	2-1-1-2-1-2-2-3	7	1-1-1-2-2-3-2-2	15	3-2-1-2-1-3-2-3

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
27 Dec 1144	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	22/1705
27 Dec 1247	WARNING: Geomagnetic K = 4	27/1248 - 2359
27 Dec 1258	ALERT: Geomagnetic K = 4	27/1257
01 Jan 0416	WARNING: Geomagnetic K = 4	01/0415 - 1500
01 Jan 0439	ALERT: Geomagnetic K = 4	01/0435
02 Jan 2228	WARNING: Geomagnetic K = 4	02/2228 - 03/0900

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
03 Jan	88	8	3	17 Jan	120	8	3
04	88	5	2	18	120	8	3
05	85	5	2	19	120	5	2
06	85	5	2	20	120	5	2
07	85	5	2	21	120	5	2
08	85	5	2	22	120	5	2
09	85	5	2	23	120	10	3
10	90	5	2	24	120	8	3
11	95	10	3	25	110	8	3
12	100	10	3	26	100	8	3
13	115	5	2	27	100	5	2
14	115	5	2	28	95	10	3
15	115	8	3	29	90	8	3
16	120	12	4				

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
28 Dec	0350	0401	0410	M1.8	0.011					2918	120		
28 Dec	1559	1611	1620	M1.6	0.011	SF	N20	W28		2918			
01 Jan	0707	0730	0742	M1.1	0.014	SF	N21	W79		2918			

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
27 Dec	0027	0034	0038	C1.0			2915
27 Dec	0216	0227	0234	C1.4			
27 Dec	0253	0304	0316	C1.2			
27 Dec	0406	0420	0433	C1.4			2917
27 Dec	0609	0617	0625	C1.0			
27 Dec	0945	0953	0959	C1.3			2917
27 Dec	B1001	U1001	1011		SF	S29W24	2917
27 Dec	1050	1054	1058	B8.3			
27 Dec	1224	1236	1256	B8.9			2920
27 Dec	1802	1810	1821	B6.6			2918
27 Dec	1937	1948	2000	C1.4			2918
27 Dec	2209	2215	2219	B6.7			
27 Dec	2318	2325	2328	B5.9			
27 Dec	2328	2335	2342	C2.2			2918
28 Dec	0025	0032	0036	C1.2			
28 Dec	0039	0047	0051	C1.3			
28 Dec	0158	U0211	A0221		SF	N31W51	2921
28 Dec	0209	U0210	A0221	C2.7	SF	N20W20	2918
28 Dec	0350	0401	0410	M1.8			2918
28 Dec	0448	0448	0449		SF	N31W54	2921
28 Dec	0511	0514	A0520		SF	S18E03	2916
28 Dec	0513	0515	A0520		SF	N31W54	2921
28 Dec	0611	0618	0623	C1.3			
28 Dec	0729	0744	0757	C7.0	SF	N20W22	2918
28 Dec	1259	1305	1310	B9.2	SF	N21W27	2918
28 Dec	1503	1514	1532	C1.0			2918
28 Dec	1559	1611	1620	M1.6	SF	N20W28	2918
28 Dec	2135	2142	2146	B5.7			2916

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
28 Dec	2237	2246	2252	B8.4			2918
29 Dec	0418	0428	0432	C4.6			2916
29 Dec	1232	1240	1257	B5.1			2916
29 Dec	2143	2149	2154	B5.5			2921
29 Dec	2312	2328	2340	B6.8	SF	N18W55	2918
30 Dec	0015	0024	0031	B7.7	SF	N31W54	2921
30 Dec	0054	0101	0103		SF	N31W54	2921
30 Dec	0530	0540	0554	B4.4			
30 Dec	0752	0810	0824	B8.3	SF	N25W25	2918
30 Dec	0951	0954	0958	B4.9			
30 Dec	1052	1058	1102	B3.9			
30 Dec	1619	1626	1631	B4.9			
30 Dec	1903	1909	1914	B4.0			
30 Dec	2018	2024	2034	B4.5			
30 Dec	2234	2237	2241	B4.2			
30 Dec	2244	2251	2259	B4.1			
31 Dec	0309	0316	0322	B4.7			
31 Dec	0444	0454	0507	C1.9			2918
31 Dec	0626	0641	0646	C4.5			2918
31 Dec	0640	0653	0707	C9.8	SF	N21W62	2918
31 Dec	1002	1005	1010	B4.6	SF	S15W34	2916
31 Dec	1107	1114	1126	B4.4			
31 Dec	1231	1237	1243	B4.5			2916
31 Dec	1558	1611	1622	B7.8			2916
31 Dec	1711	1725	1740	C1.2			
31 Dec	1932	1946	2002	C8.1			2918
31 Dec	2232	2237	2243	B6.2			2918
01 Jan	0025	0031	0042	B2.9			
01 Jan	0707	0730	0742	M1.1	SF	N21W79	2918
01 Jan	1236	1243	1249	B3.4			
01 Jan	1337	1344	1347	B5.2			2916
01 Jan	1347	1354	1359	B4.3			2918
01 Jan	1448	1501	1506	B6.8			2916
01 Jan	1611	1621	1626	B3.9			2918
01 Jan	1727	1736	1746	B4.1			2918
01 Jan	1859	1909	1915	C2.3			2918
02 Jan	0001	0012	0020	C1.0			2918
02 Jan	0337	0343	0351	B4.5			2918

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
02 Jan	0819	0828	0836	B3.5			2918
02 Jan	1002	1011	1020	B4.2			2916
02 Jan	1200	1213	1239	B3.8			2918
02 Jan	1653	1702	1716	B5.5			2918

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 2909												
15 Dec	S21E70	283	150	9	Dao	6	B								
16 Dec	S21E58	282	150	7	Dao	5	B	4			1				
17 Dec	S21E42	285	210	7	Dso	6	B	1			1				
18 Dec	S21E29	285	210	7	Dao	6	B	1							
19 Dec	S21E16	284	120	6	Cao	4	B								
20 Dec	S21E01	284	100	6	Cso	5	B	1							
21 Dec	S21W12	286	80	3	Hax	3	A	1			1				
22 Dec	S21W26	287	70	3	Hsx	3	A								
23 Dec	S21W39	287	50	2	Hax	2	A								
24 Dec	S21W53	288	20	1	Hrx	1	A								
25 Dec	S21W67	289	plage					1			1				
26 Dec	S21W81	289	plage												
								9	0	0	4	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 284

			Region 2911												
16 Dec	N19E70	270	20	5	Cro	3	B	3			2				
17 Dec	N19E54	273	80	5	Cao	4	B	6	1		5	1			
18 Dec	N20E39	275	80	4	Cao	6	B								
19 Dec	N20E25	275	50	3	Hax	3	A								
20 Dec	N20E14	273	20	1	Hrx	2	A								
21 Dec	N20E02	272	20	1	Hrx	1	A								
22 Dec	N20W12	273	10	1	Axx	1	A								
23 Dec	N20W25	273	10	1	Axx	1	A								
24 Dec	N20W39	274	plage												
25 Dec	N20W53	275	plage												
26 Dec	N20W67	275	plage												
27 Dec	N20W81	276	plage												
								9	1	0	7	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 272

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 2912													
19 Dec	S12E64	236	40	1	Hsx	1	A								
20 Dec	S12E52	235	30	1	Hsx	1	A								
21 Dec	S12E39	235	30	1	Hsx	1	A								
22 Dec	S12E27	234	20	1	Hrx	1	A								
23 Dec	S12E13	235	10	1	Hrx	1	A								
24 Dec	S12W00	235	20	1	Hrx	1	A								
25 Dec	S13W14	236	20	1	Hrx	1	A								
26 Dec	S13W27	235	10	1	Axx	1	A								
27 Dec	S13W41	236	plage												
28 Dec	S13W55	237	plage												
29 Dec	S13W69	238	plage												
30 Dec	S13W83	239	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 235

		Region 2913													
20 Dec	S28E32	255	10	1	Axx	1	A								
21 Dec	S28E19	255	10	1	Axx	1	A								
22 Dec	S28E05	256	plage												
23 Dec	S25W09	257	plage												
24 Dec	S25W23	258	plage												
25 Dec	S25W37	259	plage												
26 Dec	S25W51	259	plage												
27 Dec	S25W65	260	plage												
28 Dec	S25W79	261	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 256

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 2914												
21 Dec	S17E23	251	10	2	Bxo	2	B								
22 Dec	S17E09	252	plage												
23 Dec	S17W05	253	plage												
24 Dec	S17W19	254	plage												
25 Dec	S17W33	255	plage												
26 Dec	S17W47	255	plage												
27 Dec	S17W61	256	plage												
28 Dec	S17W75	257	plage												
29 Dec	S17W89	258	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 253

			Region 2915												
21 Dec	N16E36	238	30	4	Dso	3	B								
22 Dec	N16E22	239	30	5	Dro	3	B								
23 Dec	N17E10	238	30	6	Cro	2	B								
24 Dec	N16W03	238	20	7	Cro	3	B								
25 Dec	N16W16	238	10	1	Axx	1	A								
26 Dec	N16W30	238	plage												
27 Dec	N16W44	239	plage					1							
28 Dec	N16W58	240	plage												
29 Dec	N16W72	241	plage												
30 Dec	N16W86	242	plage												
								1	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 238

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 2916												
21 Dec	S18E82	192	100	2	Hsx	1	A	1	2						
22 Dec	S17E69	192	240	9	Dso	3	B								
23 Dec	S16E55	193	190	7	Dso	7	B	1							
24 Dec	S18E42	193	400	7	Dhi	17	B								
25 Dec	S18E28	194	450	11	Ekc	21	BGD	1							
26 Dec	S18E14	194	430	12	Ekc	17	B				1				
27 Dec	S15E06	189	480	13	Ekc	21	B								
28 Dec	S15W08	190	480	13	Eki	18	B				1				
29 Dec	S17W22	191	420	12	Eac	14	B	1							
30 Dec	S16W36	192	640	12	Esi	14	BG								
31 Dec	S16W49	192	420	11	Ehi	8	BG				1				
01 Jan	S18W61	190	390	11	Ehi	4	BG								
02 Jan	S18W74	190	320	11	Eho	3	B								
								4	2	0	3	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 189

			Region 2917												
22 Dec	S27E30	231	10	2	Bxo	2	B								
23 Dec	S27E18	230	30	4	Cro	7	B	1			1				
24 Dec	S27E05	230	50	6	Cro	9	B	1				1			
25 Dec	S28W06	228	20	7	Cro	5	B	2			1				
26 Dec	S28W20	228	plage												
27 Dec	S28W34	229	plage					2			1				
28 Dec	S28W48	230	10	5	Axx	1	A								
29 Dec	S26W62	231	10	1	Axx	1	A								
30 Dec	S27W76	232	10	1	Axx	1	A								
31 Dec	S27W90	233	plage												
								6	0	0	3	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 230

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 2918												
22 Dec	N20E52	209	20	6	Cro	4	B	1			1				
23 Dec	N20E38	210	80	7	Dao	6	B								
24 Dec	N19E24	211	140	9	Dai	15	B				1				
25 Dec	N19E11	211	280	9	Dki	17	B	7			4				
26 Dec	N19W03	211	260	10	Dki	17	B	2							
27 Dec	N21W12	207	180	13	Dai	15	B	2							
28 Dec	N21W26	208	180	13	Eai	15	BG	3	2		4				
29 Dec	N19W40	209	40	11	Cso	10	B								
30 Dec	N22W54	210	60	10	Bxi	9	B				1				
31 Dec	N22W67	210	20	8	Bxo	2	B	4			1				
01 Jan	N22W81	210	10	3	Bxo	2	B	1	1		1				
								20	3	0	13	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 211

			Region 2919												
25 Dec	S11E59	163	20	1	Hsx	1	A								
26 Dec	S11E45	163	20	1	Hrx	1	A								
27 Dec	S11E40	155	10	1	Hrx	1	A								
28 Dec	S11E26	156	10	1	Hrx	1	A								
29 Dec	S11E12	157	20	1	Hrx	1	A								
30 Dec	S11W01	157	40	3	Hrx	1	A								
31 Dec	S12W15	158	10	1	Hrx	1	A								
01 Jan	S13W28	157	plage												
02 Jan	S13W42	158	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 157

			Region 2920												
26 Dec	S17W31	239	30	4	Cro	9	B	1							
27 Dec	S16W43	238	70	4	Cao	8	B								
28 Dec	S16W57	239	70	4	Bxo	8	B								
29 Dec	S17W70	239	plage												
30 Dec	S17W84	240	plage												
								1	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 239

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 2921												
28 Dec	N30W64	246	110	6	Dao	4	B				3				
29 Dec	N29W78	247	180	7	Dso	3	B								
30 Dec	N30W92	248	300	4	Dso	2	B				2				
								0	0	0	5	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 246

			Region 2922												
31 Dec	S17E24	119	30	3	Cso	2	B								
01 Jan	S17E11	118	20	2	Bxo	3	B								
02 Jan	S17W02	118	20	2	Bxo	2	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 118

			Region 2923												
01 Jan	S30W63	192	20	5	Bxo	3	B								
02 Jan	S31W74	190	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 192

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

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