Space Weather Highlights
11 April - 17 April 2022

SWPC PRF 2433
18 April 2022

Solar activity reached very high levels during the period. Very low to low levels were observed on 11-14 April. Activity increased to moderate levels on 15 April due to a pair of M1 flares R1 (Minor), at 15/1031 UTC and 1359 UTC respectively, from Region 2993 (N21, L=111, class/area Dho/400 on 17 Apr. Moderate levels were observed on 16 Apr with another M1 flare (R1-Minor) at 16/1456 UTC from Region 2993. Activity increased to very high levels on 17 Apr with an X1 (R3-Strong) flare from Region 2994 (N13, L=106, class/area Eho/350 on 17 Apr) at 17/0334 UTC. Associated with this event was a Type II radio Sweep with an estimated shock velocity of 614 km/s. In addition, a Tenflare of 130 sfu was observed. Region 2993 also contributed two M1 flares (R1-Minor). Region 2992 (S31, L=248, class/area Dao/110 on 17 Apr) produced M-class activity as well on the 17th. The first was an M1/Sf at 17/2002 UTC and an M4/Sf at 17/2234 UTC. Associated with this event was a Type II radio Sweep with a shock velocity of 837 km/s.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was was at high levels on 11-13 Apr and 16-17 Apr with a peak flux of 2,310 pfu oberved at 17/1705 UTC. Normal to moderate levels were observed on 14-15 Apr.

Geomagnetic field activity ranged from quiet to moderate storm levels (G2-Moderate). Quiet to active levels were observed on 11 April due to negative polarity CH HSS influence. Quiet to active levels were observed on 12-13 April due to influence from the 07 Apr CME. Unsettled to minor to major storm levels were observed on 14-15 Apr. Minor to major (G1-G2, Minor-Moderate) geomagnetic storm levels were observed on 14 Apr and minor (G1-Minor) storm levels were observed on 15 Apr, all due to influences from the 11 Apr CME. The highlight period finished with quiet to unsettled levels under effects from a positive polarity CH HSS.

Space Weather Outlook
18 April - 14 May 2022

Solar activity is expected to be at moderate to high levels (R1-R2, Minor-Moderate), with a slight chance for very high levels (R3, Strong), on 18-30 Apr and 11-14 May due to the flare potential from Regions 2993 and 2994. Very low to low activity is expected from 01-10 May.

A slight chance for proton events are expected at geosynchronous orbit is possible on 18-30 Apr and 11-14 May due to the potential from Regions 2993 and 2994.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 18-20, 30 Apr, 01-02, 07-09 and 14 May. Normal to moderate levels are expected for the remainder of the outlook period.

Geomagnetic field activity is expected to reach unsettled to active levels on 18-20, 23, 29-30

Apr, 01, 06-08 and 13-14 May, all due to recurrent CH HSS effects. Mostly quiet conditions are anticipated 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	4
11 April	99	24	20	B2.3	1	0	0	1	0	0	0	0
12 April	96	23	20	B2.7	8	0	0	0	0	0	0	0
13 April	99	37	60	B1.7	0	0	0	0	0	0	0	0
14 April	103	37	120	B5.0	1	0	0	0	0	0	0	0
15 April	110	35	160	C1.3	2	2	0	0	0	0	0	0
16 April	122	78	730	C1.6	9	1	0	0	0	0	0	0
17 April	135	74	970	C1.4	10	4	1	8	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
11 April	1.1e+05	4.1e+04	2.2e+07
12 April	3.0e+05	4.2e+04	3.8e+07
13 April	9.2e+04	4.0e+04	3.8e+07
14 April	9.0e+05	4.0e+04	5.2e+06
15 April	2.3e+05	3.9e+04	2.1e+07
16 April	6.2e+04	3.9e+04	4.0e+07
17 April	6.7e+04	4.0e+04	5.4e+07

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
11 April	13	4-3-3-3-3-2-2-1	15	3-3-4-5-2-1-1-1	13	4-4-3-3-2-2-2-1
12 April	10	2-1-1-2-3-3-3-3	18	1-1-1-3-5-5-3-2	12	2-1-1-2-3-4-3-3
13 April	9	2-3-4-1-2-1-1-2	12	3-3-4-4-2-0-0-1	9	3-3-4-2-1-0-0-2
14 April	22	3-3-4-3-4-5-3-3	56	2-3-6-5-5-7-6-4	38	3-3-4-5-4-6-5-4
15 April	14	3-4-3-3-3-2-2-2	26	5-3-2-4-5-5-2-2	21	5-4-3-4-3-3-2-2
16 April	7	2-1-1-2-3-2-2-2	12	2-1-1-3-5-2-2-1	8	2-2-2-1-3-2-2-3
17 April	9	2-3-2-3-2-2-2-2	11	2-3-1-4-2-3-2-1	15	3-3-2-3-2-3-2-2

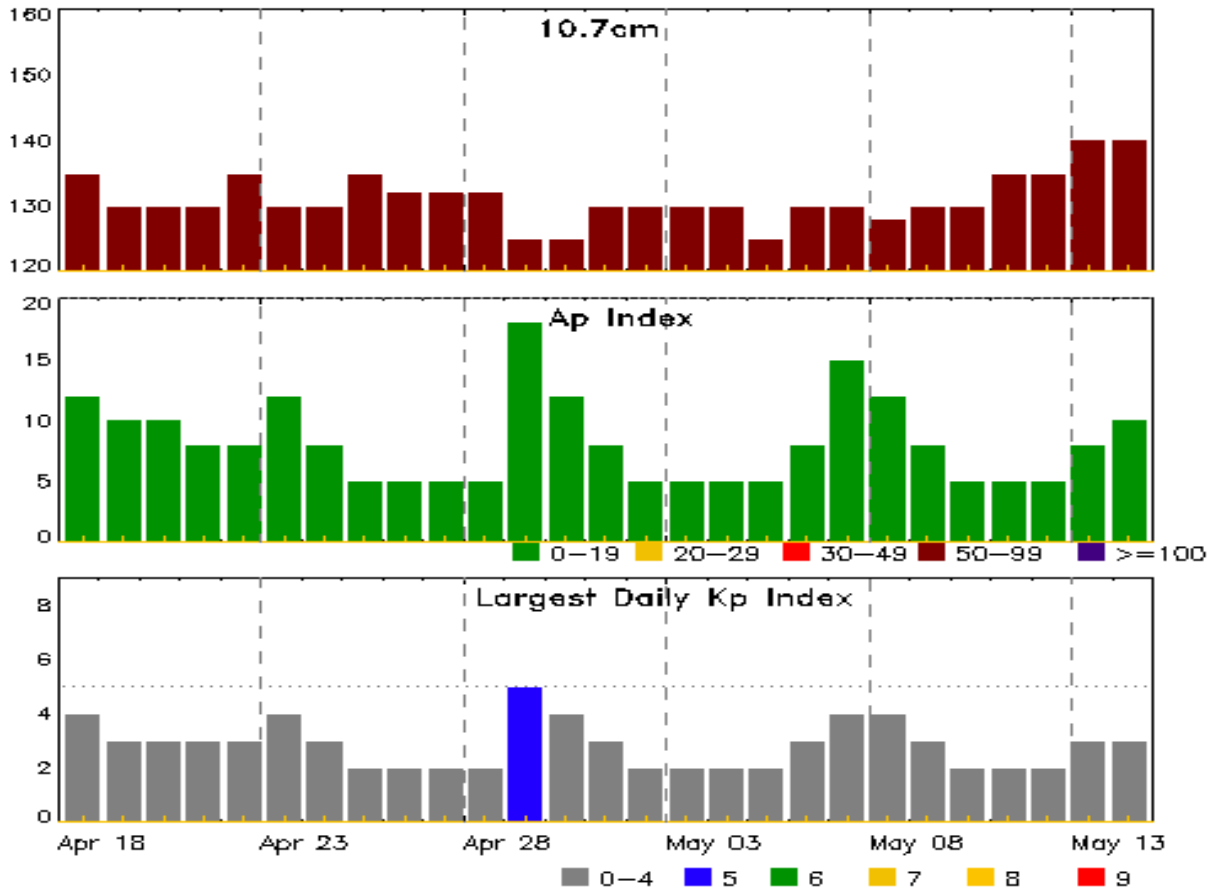
Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
11 Apr 0243	ALERT: Geomagnetic K = 4	11/0231
11 Apr 2153	WATCH: Geomagnetic Storm Category G2 predicted	
12 Apr 1248	WARNING: Geomagnetic K = 4	12/1247 - 1800
12 Apr 1403	ALERT: Electron 2MeV Integral Flux >= 1000pfu	12/1345
12 Apr 1659	ALERT: Geomagnetic K = 4	12/1657
12 Apr 1708	EXTENDED WARNING: Geomagnetic K = 4	12/1247 - 13/0300
12 Apr 1826	WATCH: Geomagnetic Storm Category G2 predicted	
13 Apr 0203	EXTENDED WARNING: Geomagnetic K = 4	12/1247 - 13/0900
13 Apr 0809	EXTENDED WARNING: Geomagnetic K = 4	12/1247 - 13/1500
13 Apr 1207	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	12/1345
14 Apr 0111	WARNING: Geomagnetic K = 4	14/0110 - 0900
14 Apr 0702	ALERT: Geomagnetic K = 4	14/0654
14 Apr 0743	EXTENDED WARNING: Geomagnetic K = 4	14/0110 - 1800
14 Apr 1047	WARNING: Geomagnetic K = 5	14/1048 - 1500
14 Apr 1201	ALERT: Geomagnetic K = 5	14/1159
14 Apr 1448	EXTENDED WARNING: Geomagnetic K = 5	14/1048 - 15/0300
14 Apr 1449	EXTENDED WARNING: Geomagnetic K = 4	14/0110 - 15/0900
14 Apr 1612	ALERT: Geomagnetic K = 5	14/1610
14 Apr 1630	WARNING: Geomagnetic K = 6	14/1630 - 2359
14 Apr 1649	ALERT: Geomagnetic K = 6	14/1645
14 Apr 1937	ALERT: Geomagnetic K = 5	14/1933
15 Apr 0212	ALERT: Geomagnetic K = 5	15/0208
15 Apr 0255	EXTENDED WARNING: Geomagnetic K = 4	14/0110 - 15/1500
15 Apr 0255	EXTENDED WARNING: Geomagnetic K = 5	14/1048 - 15/1200
15 Apr 1416	EXTENDED WARNING: Geomagnetic K = 4	14/0110 - 16/0600
16 Apr 1732	ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/1715
17 Apr 0208	WARNING: Geomagnetic K = 4	17/0205 - 1500
17 Apr 0329	ALERT: X-ray Flux exceeded M5	17/0329

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
17 Apr 0411	ALERT: Type II Radio Emission	17/0328
17 Apr 0415	SUMMARY: 10cm Radio Burst	17/0328 - 0329
17 Apr 0420	SUMMARY: X-ray Event exceeded X1	17/0317 - 0351
17 Apr 1321	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/1715
17 Apr 2350	ALERT: Type II Radio Emission	17/2234

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
18 Apr	135	12	4	02 May	130	5	2
19	130	10	3	03	130	5	2
20	130	10	3	04	130	5	2
21	130	8	3	05	125	5	2
22	135	8	3	06	130	8	3
23	130	12	4	07	130	15	4
24	130	8	3	08	128	12	4
25	135	5	2	09	130	8	3
26	132	5	2	10	130	5	2
27	132	5	2	11	135	5	2
28	132	5	2	12	135	5	2
29	125	18	5	13	140	8	3
30	125	12	4	14	140	10	3
01 May	130	8	3				

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
15 Apr	1031	1101	1107	M1.2	0.015			2993				
15 Apr	1347	1359	1411	M1.9	0.025			2993				
16 Apr	1449	1456	1509	M1.0	0.009			2993				
17 Apr	0200	0211	0223	M1.8	0.018			2993				
17 Apr	0200	0211	0223	M1.9	0.019			2993				
17 Apr	0317	0334	0351	X1.1	0.140			2994				
17 Apr	1952	2002	2006	M1.5	0.005	SF	S31W70	2992	80	42		
17 Apr	2228	2234	2240	M4.4	0.017	SF	S31W73	2987	260	110	1	

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
11 Apr	0459	0521	0558	C1.6	SF	S18E11	2987
11 Apr	2222	2230	2247	B4.9			
12 Apr	0326	0333	0337	B8.7			
12 Apr	0340	0347	0351	B5.3			
12 Apr	0406	0409	0416	B4.7			
12 Apr	0417	0423	0429	B6.0			
12 Apr	0445	0456	0506	C1.1			
12 Apr	0557	0604	0608	B6.9			
12 Apr	0638	0649	0657	C3.8			
12 Apr	0757	0808	0818	C1.0			
12 Apr	0849	0855	0903	B6.7			
12 Apr	0950	1001	1016	C1.2			2983
12 Apr	1004	1008	1012	C1.2			
12 Apr	1104	1114	1127	B7.4			
12 Apr	1155	1208	1222	B9.2			
12 Apr	1423	1439	1451	B8.8			
12 Apr	1451	1505	1512	C1.1			
12 Apr	1557	1602	1606	B4.7			
12 Apr	1721	1740	1753	C1.2			2983
12 Apr	1753	1758	1802	C1.3			2983
12 Apr	2025	2032	2036	B2.8			2989
12 Apr	2121	2132	2146	B4.3			
12 Apr	2242	2251	2302	B3.9			

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
12 Apr	2302	2319	2327	B4.1			
13 Apr	0015	0035	0058	B9.8			
13 Apr	1300	1309	1344	B2.8			
14 Apr	1023	1322	1519	C1.3			
15 Apr	1031	1101	1107	M1.2			2993
15 Apr	1347	1359	1411	M1.9			2993
15 Apr	1833	1843	1902	C4.4			2994
15 Apr	2234	2246	2305	C4.4			2994
16 Apr	0239	0250	0301	C5.1			2993
16 Apr	0602	0611	0623	C3.7			2993
16 Apr	0717	0724	0731	C2.9			2993
16 Apr	0737	0748	0756	C4.2			2993
16 Apr	0847	0900	0907	C6.9			2993
16 Apr	1039	1043	1047	C2.2			2993
16 Apr	1122	1133	1158	C3.3			2993
16 Apr	1350	1357	1409	C2.6			2993
16 Apr	1418	1425	1433	C2.1			2993
16 Apr	1449	1456	1509	M1.0			2993
17 Apr	0033	0037	0042	C2.9			2993
17 Apr	0126	0136	0141	C3.1			2993
17 Apr	0141	0157	0200	C4.9			2993
17 Apr	0141	0157	0200	C5.0			2993
17 Apr	0200	0211	0223	M1.8			2993
17 Apr	0200	0211	0223	M1.9			2993
17 Apr	0317	0334	0351	X1.1			2994
17 Apr	B0741	U0742	0745		SF	S29W67	2992
17 Apr	0933	0940	0950	C3.9			2994
17 Apr	B1328	1329	1332		SF	S29W65	2992
17 Apr	1335	1336	1342		SF	S30W63	2992
17 Apr	1359	1400	1355		SF	S29W65	2992
17 Apr	1602	1608	1613	C7.7	SN	S35W57	2992
17 Apr	1740	1744	1749	C1.6			
17 Apr	1750	1804	1810	C6.2			
17 Apr	1811	1811	1812		SF	S32W68	2992
17 Apr	1952	2002	2006	M1.5	SF	S31W70	2992
17 Apr	2052	2101	2108	C2.7			
17 Apr	2113	2119	2125	C3.2			2992
17 Apr	2228	2234	2240	M4.4	SF	S31W73	2987

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 2982												
01 Apr	S19E47	337	20	1	Hrx	1	A								
02 Apr	S19E34	337	20	1	Axx	1	A								
03 Apr	S19E21	336	10	1	Axx	1	A								
04 Apr	S20E10	334	40	4	Bxo	2	B	1							
05 Apr	S22W03	334	plage												
06 Apr	S22W17	335	plage								1				
07 Apr	S22W31	336	plage												
08 Apr	S22W45	336	plage												
09 Apr	S22W59	337	plage												
10 Apr	S22W72	337	plage												
11 Apr	S22W86	338	plage												
								1	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 334

			Region 2983												
01 Apr	N23E53	331	plage												
02 Apr	N20E42	328	40	2	Hsx	2	A								
03 Apr	N23E28	329	30	2	Hrx	3	A								
04 Apr	N24E15	329	30	3	Hrx	1	A								
05 Apr	N24E04	327	20	1	Hrx	1	A								
06 Apr	N24W10	328	10	1	Axx	1	A								
07 Apr	N24W24	329	plage												
08 Apr	N21W47	337	30	3	Cro	4	B	2							
09 Apr	N21W62	340	30	1	Bxo	3	B								
10 Apr	N21W73	338	40	3	Bxo	3	B								
11 Apr	N20W83	335	10	1	Axx	1	A								
								2	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 327

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 2985													
03 Apr	S20E68	289	30	2	Hsx	3	A								
04 Apr	S20E55	289	30	1	Hax	2	A								
05 Apr	S20E42	289	50	2	Hax	2	A	1			1				
06 Apr	S20E29	289	40	2	Hrx	2	A								
07 Apr	S20E16	289	30	4	Cro	3	B	1			1				
08 Apr	S20E02	290	30	3	Cro	4	B								
09 Apr	S20W11	289	20	2	Bxo	3	B								
10 Apr	S20W23	288	plage												
11 Apr	S20W37	289	plage												
12 Apr	S20W51	290	plage												
13 Apr	S20W65	291	plage												
14 Apr	S20W79	291	plage												
								2	0	0	2	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 290

		Region 2987													
07 Apr	S30E43	262	10	1	Axx	1	A								
08 Apr	S31E35	256	plage												
09 Apr	S31E21	257	plage												
10 Apr	S31E08	257	plage												
11 Apr	S31W06	258	plage					1							
12 Apr	S31W20	259	plage												
13 Apr	S31W34	260	plage												
14 Apr	S31W48	260	plage												
15 Apr	S31W61	260	plage												
16 Apr	S31W74	260	plage												
17 Apr	S31W87	260	plage						1		1				
								1	1	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 258

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 2988												
11 Apr	N15E49	202	10	1	Bxo	3	B								
12 Apr	N16E37	202	10	1	Bxo	2	B								
13 Apr	N14E22	204	10	4	Axx	1	A								
14 Apr	N14E08	204	plage												
15 Apr	N14W05	204	plage												
16 Apr	N14W18	204	plage												
17 Apr	N14W31	204	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 204

			Region 2989												
12 Apr	N19E73	166	10		Axx	1	A								
13 Apr	N18E60	166	30	1	Bxo	3	B								
14 Apr	N18E45	167	20	1	Hrx	1	A								
15 Apr	N18E32	167	30	1	Hrx	1	A								
16 Apr	N18E19	167	20	1	Bxo	2	B								
17 Apr	N18E06	167	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 167

			Region 2990												
13 Apr	N16E47	179	20	3	Bxo	3	B								
14 Apr	N16E32	180	40	6	Dao	5	B								
15 Apr	N16E19	180	70	6	Dao	3	B								
16 Apr	N16E07	178	60	6	Dao	4	B								
17 Apr	N16W07	179	60	6	Dao	5	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 178

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 2991												
14 Apr	S24E63	149	60	2	Hsx	1	A								
15 Apr	S24E51	148	60	2	Hsx	1	A								
16 Apr	S24E39	147	60	2	Hax	1	A								
17 Apr	S24E26	146	50	2	Hax	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 146

			Region 2992												
16 Apr	S31W62	248	40	5	Cao	4	B								
17 Apr	S31W76	248	110	6	Dao	5	B	2	1		7				
								2	1	0	7	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 248

			Region 2993												
15 Apr	N22E89	111	plage						2						
16 Apr	N22E75	111	300	8	Cho	6	B	9	1						
17 Apr	N21E61	111	400	9	Dho	8	B	4	2						
								13	5	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 111

			Region 2994												
15 Apr	N14E89	111	plage					2							
16 Apr	N14E75	111	250	5	Hhx	1	A								
17 Apr	N13E66	106	350	12	Eho	5	B	1		1					
								3	0	1	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 106

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