Version 6. May 2024

Cumulative Catalog of Solar Flare Events of X-ray Class M1 - X>17.5 XXV Cycle of Solar Activity (I.2020 - VI.2031?)

V.N. Ishkov, IZMIRAN, GC RAS ishkov@izmiran.ru

DOI: https://doi.org/10.2205/ESDB-SAD-FE-03

DATE: y m d	Year, month, day of the solar flare event.
TIME (UT): to, tm, te	Time of the beginning, maximum and end of the total flare event: a flare in Hα and a burst in the soft X-ray range (1–8 A=12.5-1 keV). Accordingly, to and te are determined by the earlier start and later end in these ranges, tm is always determined from the X-ray burst. If only an X-ray burst is observed, then the end of the event is determined by the point where the intensity decreases by half from Imax to the background.
CLASS: X-ray/opt	X-ray class and optical importance of the flare event.
L ($J \cdot m^{-2}$)	Integrated flux in the standard X-ray range from the beginning of the burst through the maximum to 1/2 of the maximum intensity.
COORDINATES: lt, lg, L	The spherical heliographic coordinates of the solar flare in Hα as lt – (heliographic latitude) – the distance in degrees from the solar equator; lg – (central meridian) – the distance in angular degrees from the central meridian of the Sun; L – (Carrington longitude) – the absolute heliographic longitude of the active region where the flare event took place, in a coordinate system that rotates with the Sun (https://www.solarmonitor.org/data/).
AR	Solar active region. Clicking on the link to the corresponding page of the website: http://helio.mssl.ucl.ac.uk/helio-vo/solar_activity/arstats/arstats_page5.php?region=XXXXX.
RADIO MHz: 245, 2695	The peak value above pre-burst background of associated radio bursts at frequencies of 245 and 2695 MHz in solar flux units (sfu), (1 flux unit=10^{-22} W m^{-2} Hz^{-1}) (https://www.solarmonitor.org/data/).
RADIO SWEEP	The intensity of spectral radio bursts in a relative scale from 1 (minor) to 3 (major) in various flare events: Type II/2|0966 (km/s) – slow drift burst with intensity 2 with an estimated speed of propagation of the shock wave in the solar corona of 966 km/s; Type IV – broadband smooth continuum burst. (https://www.solarmonitor.org/data/)
CME: to/v/da/pa	Coronal mass ejection: to – first appearance in the coronagraph field of view (LASCO SDO or preliminary CACTUS data); v – linear speed (km/s); da – type: Halo and partial Halo or angular width (degrees);

	pa – principal angle, counterclockwise from North (degrees); CME on LASCO – http://cdaw.gsfc.nasa.gov/CME_list/ Preliminary CME (CACTUS) – the symbol "c" comes after CME: https://www.sidc.be/cactus/catalog.php
X-ray HARD: An/tm/Emax keV	A – space satellite (F – Fermi); n – number of hard X-ray bursts in the flare event - RHESSI analysis; tm – time of maximum intensity of the hardest X-ray burst in this flare event; Emax – maximal energetic band of the hardest X-ray in the flare event in keV: (12-25 keV) – https://hesperia.gsfc.nasa.gov/fermi/gbm/qlook/fermi_gbm_flare_list.txt (>100 MeV) – https://hesperia.gsfc.nasa.gov/fermi/lat/qlook/lat_events.txt
GOES PROTONS E>10MeV: d/tmax/Ipr/ GLE	d – day of Solar Proton Event flux maximum; tmax – time of proton (E>10 MeV) maximum; Ipr – proton flux for (E>10 MeV), given in particle flux units (1 pfu = 1 p/(cm*2 s sr). GLE – Ground Level Event registration.
n	Solar neutrons registration..
Attendant phenomena; remarks	Active dynamic phenomena, constituting the flare event: WL – white light event; SPY – spray; DSF – solar filament ejection; LPS – loop prominent system; BSL – bright surge on limb.
*	Before 'to' of flares means that all flare events marked are components of a single flare event.
*	After a burst in hard X-rays means that these flare events occurred within the time limits of this X-ray burst.
g	There are no data on CME in other catalogs..
?	Before CME means that parameters of the CME can be refinements.
?	Before hard X-ray burst means, that time of a maximum of its realization is close, but is not entered during realization flare events..
	If after a x-ray class is not Ha-flare importance, coordinates of flare were given on localization of X-ray flare.

2020-2021

D A T E	T I M E			CLASS	COORDINATES		AR	RADIO MHz		DYNAMIC EVENT	CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2			sfu		|km/s	km/s	keV	d |tmax/Ipr	/GLE	remarks
20201129	1234	1311	1341	M4.4/	.094	S23E90L252	12790?	110	240	II/2|0765	1326/2077/360/159	F /1240/12-25	01|0655/6.5		
20210419	2319	2342	2359	M1.1/	.013	S24E23L261	12816			*II/2|1202 IV/2	0024/0427/107/095				
20210507	1843	1904	1919	M3.9/1N	.045	N17E78L335	12822	160	24	II/3|0816	1924/0754/114/067	F /1858/12-25			
20210523	1100	1108	1114	2N/M1.1	.005	N20E05L100	12824	230	85		1148/0384/138/273	F /1103/12-25			
20210703	0704	0722	0727	M2.7/SF	.012	N23W78L100	12838	340			0736/0426/067/261				
20210703	1418	1434	1447	X1.5/SN	.046	N23W82L100	12838	120		II/1|0357	1448/0455/069/254	F /1426/12-25			
20210703	1655	1703	1714	M1.2/SF	.006	N24W82L100	12838					F /1706/12-25			
20210704	0501	0509	0515	M1.5/BSL	.007	N22W90L100	12838				0600/0211/061/253	F /0503/12-25			
20210828	0539	0623	0936	M4.7/1N	.054	S27W01L002	12860	340	60	II/1|0276 IV/1	0636/0174/205/177	F2/0553/12-25			
20210923	0427	0442	0527	1N/M2.8	.018	S27E21L353	12871	120		II/2|0966 IV/1	0548/0264/022/188	F /0436/12-25			
20210923	1523	1539	1608	M1.8/1N	.012	S29E16L353	12871				1612/0435/058/182	F /1529/12-25			
20211009	0619	0638	>0722	M1.6/2B	.015	N17E09L180	12882	3700	430	II/3|0934	0712/0712/360/265		09|2000/01		
20211026	0240	0247	0353	M1.3/BSL	.006	N14E88L212	12891					F /0244/12-25			
20211026	1542	1557	1602	M1.0/BSL	.005	N13E89L212	12891								
20211028	0730	0745	0822	M1.4/1N	.005	S30E03L274	12887				0936/0309/010/278				
20211028	1019	1037	>1111	M2.2/1F	.013	S30W02L274	12887				1036/0558/010/274	F /1024/12-25			
20211028	1517	1548	1641	X1.0/2N	.091	S26W05L274	12887	4300		II/3|1457 IV/2	1548/1519/360/309	F2/1601/>100	29|0250/29	/GLE	
20211029	0222	0253	0306	M1.5/1N	.014	N16E54L212	12891				0312/0434/008/341				
20211101	0057	0145	0300	M1.5/1F	.032	S29W45L274	12887	160	210	II/1|0626 IV/2	0200/0753/201/231	F /0124/12-25			
20211102	0120	0301	0521	M1.7/1F	.075	S26W69L274	12887	190	110		0248/1473/360/028	F2/0212/12-25			
20211109	1547	1702	1737	M2.0/	.057	N19W89L212	12891				1648/1350/176/321	F /1633/12-25	09|1900/02.26		
20211217	0039	0051	0134	M1.2/1F	.005	N19E11L270	12911					F2/0112/12-25			
20211220	1112	1136	1155	M1.8/1N	.030	S20W01L295	12908			II/2|0350	1224/0359/314/155	F /1129/12-25			
20211221	0743	0750	0757	M1.1/	.006	S17E89L192	12916								
20211221	1131	1144	1149	M1.4/	.005	S17E89L192	12916				1436/0105/111/284	F /1146/12-25			
20211222	0654	0706	0738	M1.3/1N	.011	S21W25L295	12908			II/2|0881		F /0701/12-25			
20211228	0350	0401	0410	M1.8/	.011	N20W20L209	12918					F /0738/12-25			
20211228	1559	1611	1620	M1.6/SF	.011	N19W26L209	12918					F /1610/12-25			

2022

D A T E	T I M E			CLASS	COORDINATES		AR	RADIO MHz		DYNAMIC EVENT	CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2			sfu		|km/s	km/s	keV	d |tmax/Ipr	/GLE	remarks
20220101	0707	0730	0742	M1.1/SF	.014	N20W76L209	12918					F /0738/12-25			
20220114	0147	0203	0214	M1.8/	.014	N31E86L251	12932				0243/0555/033/072	F /0155/12-25			
20220118	1701	1744	1817	M1.5/SF	.034	N08W55L322	12929	110	150	II/1|0143 IV/1	1748/1014/153/286	F /1832/>100			
20220120	0541	0601	0620	M5.5/1F	.043	N08W76L322	12929	10000	350	II/2|0329 IV/1	0612/1431/211/279	F /0526/>100	20|1015/22.7		
20220129	2232	2332	0032	M1.1/SF		N18E06L113	12936				2336/0530/360/058	F2/2231/12-25			
20220212	0825	0844	0857	M1.4/SN	.016	S17W82L037	12939			II/2|0642 IV/1	0912/0280/102/265	F /0844/12-25			
20220214	1702	1736	1751	M1.0/SF	.017	N26W62L344	12941					F /1733/12-25			
20220215	1754	1815	1831	M1.3/SF		N26W81L344	12941				1836/0181/034/299	F /1802/12-25			
20220302	1731	1747	1810	M2.0/1B	.011	N15E29L034	12958	440		II/3|0690	1812/0266/128/066	F /1734/12-25			
20220311	2213	2232	2238	M2.2/SF		S27W63L010	12964				0012/0506/112/238	F /2225/12-25			
20220314	0829	0840	0845	M2.0/	.007	N23E03L265	12965				1124/0093/118/173?	F /0841/12-25			
20220315	1233	1239	1259	M1.4/SN	.002	N23W10L265	12965					F /1236/12-25			
20220315	2239	2246	0020	M1.5		N23W17L265	12965					F /2246/12-25			
20220325	0502	0526	0637	M1.5/1F	.026	S18E37L088	12974	100		II/2|0959 IV/2	0548/0495/360/097	F2/0541/12-25			

D A T E y m d	T I M E to	 tm	 te	CLASS X-ray/opt	 L J*m-2	COORDINATES lt lg L	AR	RADIO MHz 245 sfu	 2695	DYNAMIC EVENT RADIO SWEEP |km/s	 to	CME / v /da /pa km/s	X-ray HARD An / tm /Emax keV	GOES PROTONS E>10MeV d |tmax/Ipr	 n /GLE	Attendant phenomena; remarks
20220328	1058	1129	1145	M4.0/1N	.044	N14W04L087	12975	3900		II/3|1259	IV/2	1200/0702/360/127	F /1118/12-25	28|1325/18.7		
20220328	1732	1741	1747	M1.0	.001	N13W08L085	12975	120					F /1710/12-25			
20220328	1908	1923	1940	M1.0	.017	N14W07L085	12975					2024/0905/360/299	F /1854/12-25			
20220328	2049	2059	2109	M1.1	.011	N13W10L085	12975	350					F /2023/12-25			
20220329	0057	0111	0611	2N/M2.2	.025	N12W12L085	12975	170					F /0102/12-25			
20220329	0148	0158	0203	2N/M1.1	.001	N13W11L085	12975	180	19							
20220329	?0917	0938	0955	M1.0	.016	N13W19L085	12975						F /0923/12-25			
20220329	2143	2152	2157	M1.6		N15W24L085	12975						F /2148/12-25			
20220330	1721	1737	1746	X1.3	.096	N13W31L085	12975	130000	540	II/3|1424	IV/1	1800/0641/360/298	F /1724/12-25	31|0630/10.6		
20220331	1817	1835	1934	M9.6/1B	.076	N12W47L085	12975	450	700	II/2|0772	IV/2	1912/0489/360/261	F2/1823/12-25			
20220402	0239	0256	0307	M2.9	.023	N13W68L085	12975									
20220402	1256	1444	1511	M3.9/1N	.140	N12W68L066	12976			II/2|0956		1336/1433/360/263	F3/1316/12-25	02|1600/32		
20220402	1734	1744	1751	M4.3/1N	.021	N13W78L085	12975	41	110				F /1738/12-25			
20220415	1031	1149	1229	M2.2/	.015	N14E88L105	12994					1205/0796/212/089	Fgap 08-18.04			
20220415	1347	1359	1411	M1.9/	.025	N14E88L105	12994									
20220416	1449	1456	1509	M1.0/	.009	N19E87L111	12993									
20220417	0200	0211	0223	M1.9/	.019	N20E83L111	12993									
20220417	0317	0334	0351	X1.1/	.140	N12E88L105	12994	3400	130	II/2|0724		0348/0895/209/089				
20220417	1952	2002	2020	M1.5/SF	.005	S29W70L248	12992	80	42							
20220417	2228	2234	2240	M4.4/	.017	S30W72L248	12992	260	110							
20220418	0737	0748	0805	M1.3/SF	.006	S30W78L248	12992									
20220418	1004	1027	1049	M1.1	.020	N21E64L105	12993									
20220418	1712	1724	1731	M1.9/SF	.009	S29W84L248	12992									
20220419	0443	0450	0459	M1.0	.007	N22E47L111	12993	29	150				F /0446/12-25			
20220419	2039	2049	2058	M3.7	.023	S29W87L248	12992						F /2041/12-25			
20220419	2109	2113	2155	M1.6/SN	.007	N16E48L105	12994									
20220420	*0107	0114	0120	M1.2	.006	S32W86L248	12992						F /0111/12-25*			
20220420	*0120	0144	0219	M7.2/1N	.064	S33W86L248	12992	200				0200/0542/055/242	F /0111/12-25*			
20220420	0341	0357	0404	X2.2/SF	.100	S34W86L248	12992	2600	510	II/3|1630		0412/1001/139/256	F /0413/12-25			
20220420	1224	1252	1302	M1.9/SF	.019	S34W86L248	12992	130				1236/0342/056/237	F /1229/12-25			
20220421	0147	0159	0246	M9.6/1N	.046	N22E23L111	12993	3000	370	II/2|1132	IV/1	0224/0357/090/026	F /0245/12-25			
20220422	0452	0514	0528	M1.1	.001	N19E10L105	12994									
20220422	1316	1330	1351	M3.4/2B	.010	N21E00L111	12993	210		II/1|0381		1624/0255/101/206?	F2/1223/12-25			
20220425	0110	0156	0156	M1.0/SF		N26W24L111	12993						F /0134/12-25*			
20220425	0118	0201	0239	M1.2/SF	.039	N17E04L076	12995					0200/0172/021/102?	F /0134/12-25*			
20220425	0352	0402	0410	M1.1/SF	.005	N21W34L111	12993	190	42			0424/0197/049/099	F /0358/12-25			
20220429	0715	0730	0756	M1.2/1F	.012	N26W39L067	12996	840	230			0736/1292/245/310	F /0719/12-25	29|2145/4.2		
20220429	1801	1810	1900	M1.3/SF	.010	N15W86L105	12994									DSF
20220430	0446	0501	0507	M2.6	.012	N14W88L105	12994	100				0548/0223/091/263				
20220430	0525	0534	0540	M1.4	.010	N16W88L105	12994	33	65				F /0526/12-25			
20220430	0948	0958	1005	M4.8	.025	N16W88L105	12994	130		II/1|0545		1012/0382/156/261	F /1003/12-25			
20220430	1337	1347	1352	X1.1	.047	N16W88L105	12994	41000		II/2|1071		1400/0498/187/250				
20220430	1942	1947	1954	M1.9	.008	N16W88L105	12994	11000		II/2|2683		2000/0648/209/264	F /1945/12-25			
20220503	0734	0753	0801	M1.3	.001	S30E88L238	13006	130				0812/0252/040/111	F /0752/12-25			
20220503	1309	1325	1331	X1.1	.044	S30E88L238	13006					1436/0102/016/159	F /1320/12-25			
20220504	0008	0019	0025	M5.3	.022	S30E87L238	13006				IV/1		F /0015/12-25			
20220504	0813	0859	1036	1B/M5.7	.040	S16W09L323	13004	590	32				F /0818/12-25			
20220504	<1615	1632	1733	1N/M1.1	.010	S16W11L323	13004	190					F /1618/12-25			
20220504	*1940	1948	2055	M1.5/1F	.015	S16W13L323	13004						F /1942/12-25			
20220504	*2009	2027	2036	M1.6/1F	.021	S16W13L323	13004						F /2025/12-25			
20220505	1308	1316	1322	M2.2/SN	.009	S15W24L323	13004	280					F /1313/12-25			

D A T E		T I M E		CLASS		COORDINATES	AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to	/ v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2			sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20220505	1402	1410	1416	M2.7/SF	.007	S30W04L238	13006	100				1748/0870/044/282?				
20220510	1350	1355	1430	X1.5/1B	.031	S30W04L238	13006	100		II/3|0718	IV/1	1436/0415/159/123	F2/1330/12-25			
20220511	1624	1658	1707	1N/M1.6	.013	S24E41L179	13007						F /1641/12-25			
20220511	*1808	1858	2050	M2.7/SF	.042	S17W89L323	13004	82	82	II/2|1345		1836/1100/194/228	F2/1856/12-25	12|2330/5		
20220511	*1927	1931	1935	M2.2	.012	S17W89L323	13004						F2/1856/12-25			
20220512	2004	2019	2027	M1.3	.009	N14E88L123	13011					2024/0719/091/064	F /2019/12-25			
20220514	2358	0008	0017	M2.2		N13E89L084	13017						F /2359/12-25			
20220516	1310	1327	1359	M2.4/SF	.031	N13E78L084	13017					1348/0224/065/078	F /1329/12-25			
20220518	2156	2202	2208	M1.1		N22E23L101	13014									
20220519	0632	0719	0757	M5.6/2B,1F	.054	N18E26L084	13017						F /0632/12-25			
20220519	0909	1009	1040	1N/M1.5	.011	N21E15L102	13014					1048/0355/038/135	F /1006/12-25			
20220519	1505	1513	1534	M1.1/SF	.008	N21E13L102	13014									
20220520	0735	0745	0841	M3.0/1B	.008	N20E03L106	13014		210				F /0742/12-25			DSF
20220525	1809	1824	1903	M1.3/1N	.018	S19W41L076	13016	82	160	II/3|1638	IV/2	1836/1134/360/215	F /1812/12-25			
20220610	1011	1104	>1114	M1.2/SF	.034	N17E89L114	13030						F /1012/12-25			
20220613	0258	0407	0512	M3.4	.180	N15E45L106	13032		670	II/2|0325	IV/1	0312/1150/360/098	F2/0301/12-25			
20220616	0347	0353	0357	M1.6	.003	S28W14L129	13031					0400/0405/038/185?	F /0351/12-25			
20220708	2007	2028	2149	M2.5	.079	N20E40L136	13053					2036/1223/360/077	F2/2102/12-25			
20220714	0422	0431	0447	M1.2/SF	.008	N15E81L049	13058					0412/0215/182/047	F /0427/12-25			
20220714	2142	2148	2153	M2.8		N15E69L017	13058					2212/0517/024/067	F /2143/12-25			
20220716	0616	0629	0651	M1.1/1N	.007	N18E19L059	13057									
20220716	1533	1544	1620	M1.4/1B	.005	S16W54L121	13055	250				1724/0539/102/185				
20220815	1427	1436	1600	1N/M1.0	.005	S22E00L033	13078	1700				1524/0450/125/164	F /1435/12-25			
20220815	1640	1654	1726	M2.7/1N	.001	S22W00L033	13078	220					F /1646/12-25			
20220815	1723	1735	1809	1F/M9.0	.005	S11W46L078	13079									
20220815	2147	2153	2158	M1.1		S22W03L033	13078						F /2152/12-25			
20220816	0752	0758	0805	M5.0	.022	S22W11L033	13078	1900	130				F /0814/12-25			
20220816	2110	2121	2128	M1.8		S22W15L033	13078						F /2111/12-25			
20220817	*1326	1345	1533	M2.0/1N	.008	S21W25L033	13078	320								
20220817	*1428	1452	1510	M1.0	.018	S26W25L033	13078	24000					F /1428/12-25			
20220818	*1000	1009	1321	1N/M1.3	.004	S23W38L033	13078	1100			IV/1		F2/1000/12-25			
20220818	*1037	1055	1113	1N/M1.5	.024	S27W37L033	13078	290		II/1|0749		1100/1327/360/174	F /1103/12-25			
20220818	1401	1413	1426	M1.3/1F	.005	S23W37L033	13078						F /1408/12-25			
20220819	0414	0444	0545	M1.6/SN	.036	S27W48L033	13078	880	150	II/2|0694	IV/1	0449/0996/104/227	F3/0425/12-25			
20220825	1939	1951	2002	M1.8	.015	S22E63L298	13088						F /1926/12-25			
20220825	2321	2327	2332	M1.0/1N	.007	S20E61L194	13089									
20220826	1041	1055	1105	M2.1/1N	.016	S22E52L194	13089						F /1044/12-25			
20220826	1208	1214	1221	M7.2/1B	.031	S22E51L194	13089						F /1214/12-25			
20220826	1224	1231	1238	M5.3	.040	S22E53L194	13089									
20220827	0152	0240	0305	M4.8/SF	.130	S19W58L298	13088	340	130	II/1|	IV/1	0224/1284/360/225	F /0230/12-25	27|1220/27.5		
20220827	1129	1138	1143	M1.2/SN	.006	S28W66L298	13088									
20220827	1513	1525	1530	M1.1/SF	.008	S28W71L298	13088						F2/1514/12-25			
20220827	1545	1558	1621	M1.8	.027	S27W73L298	13088						F /1546/12-25			
20220828	0047	0134	0138	M1.4	.028	S27W85L298	13088						F /0053/12-25			
20220828	1548	1619	1646	M6.7/SF	.140	S28W80L298	13088	100		II/1|		1612/1232/360/243			
20220828	1820	1832	1850	M4.6	.063	S26W86L298	13088						F /1809/12-25			
20220829	0324	0338	0347	M3.3/SF	.028	S23W80L298	13088						F /0340/12-25			
20220829	1048	1108	1112	M8.6	.030	S26W86L298	13088						F /1050/12-25			
20220829	1446	1456	1508	M2.5	.024	S28W86L298	13088					1524/0818/009/218	F /1446/12-25			
20220829	1845	1857	1908	M4.7	.044	S26W86L298	13088					1924/1088/020/221	F /1946/12-25			
20220830	*0125	0140	0158	M1.7		S24W86L298	13088									

DATE	TIME			CLASS		COORDINATES		AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg	L		245	2695	RADIO SWEEP		to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2				sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20220830	*0158	0213	0224	M1.5	.023	S26W86L298	13088						0312/0114/026/299	F4/0159/12-25	30|0210/0.88		
20220830	1804	1929	2123	M2.1	.190	S25W86L298	13088						1812/1247/360/268	F2/1918/12-25			
20220905	1758	1805	1814	M1.0	.007	S26W86L194	13089							F /1801/12-25			
20220912	2337	2344	2348	M1.7/SF		N19W41L049	13098							F /2342/12-25			
20220914	0941	1019	1056	M1.1/SF	.027	N22W58L049	13098						0936/0637/020/293	F2/1014/12-25			
20220916	0944	0949	0956	M7.9	.030	N18W81L049	13098							F /0947/12-25			
20220916	1549	1559	1612	M6.2/SN	.057	N18W81L049	13098							F /1549/12-25			
20220917	1242	1339	1353	M1.9	.031	N22W87L049	13098						1325/0313/074/304	F2/1254/12-25			
20220917	2032	2041	2052	M2.6	.021	N18W87L049	13098							F /2033/12-25			
20220920	1113	1122	1145	M1.0/1N	.009	S25W17L302	13102		3000				1136/0286/111/301				
20220921	0651	0702	0717	M1.0	.010	S25E73L196	13107							F /0657/12-25			
20220923	1748	1810	1841	M1.7/SF	.040	N16E84L158	13110		150	130	II/2|2453	IV/1	1812/1776/189/102	F /1800/12-25			
20220930	0346	0401	0651	M1.1	.007	N25E87L062	13112						0500/0569/040/271	F /0350/12-25			
20220930	1611	1622	1633	M2.9	.022	N20E87L062	13112							F /1612/12-25			
20220930	1730	1734	1745	M1.3	.009	N24E87L062	13112		730					F /1731/12-25			
20221001	1958	2010	2044	M5.8/1B	.030	N17W35L158	13110		220				2024/1122/069/297	F /2022/12-25			
20221002	0208	0221	0239	M8.7/1N	.036	N17W39L158	13110		910	190		IV/1	0236/1222/153/287	F /0243/12-25			
20221002	1352	1405	1423	M1.2/SF	.017	N23E71L062	13112						1505/0334/066/297	F2/1409/12-25			
20221002	1534	1545	1554	M1.0/SF	.008	N22E69L062	13112							F /1537/12-25			
20221002	1953	2025	2034	X1.0	.086	N17W49L158	13110		1400	560	II/2|1157		2036/1086/360/312	F /2033/>100			
20221003	0219	0223	0311	M2.6/SF	.040	N23E63L062	13112			170			0236/0611/239/143	F /0230/12-25			
20221003	0938	1011	1027	M4.2	.072	N18W58L158	13110		310	110			0948/1059/081/309	F2/0939/12-25			
20221003	1103	1111	1119	M1.5	.011	N18W59L158	13110							F /1045/12-25			
20221003	1520	1530	1548	M1.6/1N	.013	N23E56L052	13112						1524/0577/010/060	F /1525/12-25			
20221003	1957	2028	2053	M1.2		N17W64L158	13110						2036/0964/057/310	F /1958/12-25			
20221003	2111	2122	2131	M1.7		N17W64L158	13110							F /2131/12-25			
20221004	1240	1315	1351	SN/M1.6	.039	N17W75L158	13110		2200			IV/2	1325/1089/067/314	F /1323/12-25			
20221007	<1253	1444	1532	1F/M1.0	.036	N28E09L044	13116						1512/0616/026/067	F /1420/12-25			
20221010	<0000	0047	0114	1F/M1.0	.011	N24W23L044	13116							F /0007/12-25			
20221010	1605	1628	1653	M2.4/SF	.039	N24W33L062	13112						1624/1213/009/276	F /1603/12-25			
20221011	0836	0842	0854	M3.9/SB	.009	N24W35L044	13116		5500	140	II/2|0967		0912/0252/088/286	F /0847/12-25			
20221011	1047	1052	1057	M1.5	.005	N23W45L044	13116		29000		II/2|0237		1124/0246/086/286	F /1049/12-25			
20221012	2354	0019	0037	M1.5/SF		N24W65L062	13112			93			0312/0156/067/295	F /0022/12-25			
20221014	0920	0944	0959	M1.3	.012	N20W88L062	13112						1000/0223/093/313	F2/0941/12-25			
20221106	2359	0011	0016	M5.2/	.005	N16E69L321	13141				II/2|0927		0048/0422/084/125				
20221111	0700	0714	0720	M1.2/1F	.006	N14W03L321	13141		7900			IV/1	0912/0190/137/282	F /0708/12-25			
20221111	1127	1140	1146	M1.2/SN	.005	N12W11L321	13141		7200			IV/1	1136/0385/016/269	F /1133/12-25			
20221112	0009	0018	0028	M1.1/SF	.005	N14W20L321	13141							F /0013/12-25			
20221115	0242	0251	0307	M1.0/1N,SF	.003	N22W64L330	13140						0500/0286/027/287	F2/0249/12-25			
20221119	1242	1256	1311	M1.8	.017	N20W50L254	13150		410		II/2|1118	IV/1	1326/0422/165/325	F2/1253/12-25			
20221201	0704	0721	0736	M1.0/1N	.011	N28W34L009	13152						0748/0813/115/359	F /0712/12-25			
20221203	1736	1741	1745	M1.2/SN	.003	N18E83L290	13157		200		II/2|		1800/0307/088/109				
20221214	0730	0740	0747	M2.4/1N	.017	S21W39L278	13165							F /0738/12-25			
20221214	0824	0831	0837	M1.1/1F	.008	S16W89L319	13153		110		II/2|		0836/0452/093/268	F /0814/12-25			
20221214	0833	0935	1037	1F/M1.3	.009	S21W40L278	13165							F /0921/12-25			
20221214	*1145	1217	1259	M1.1	.015	S21W42L278	13165							F /1223/12-25			
20221214	*1224	1231	1238	M4.1	.020	S20W42L278	13165							F2/1256/12-25			
20221214	*1243	1247	1257	M1.4		S21W41L278	13165										
20221214	1431	1442	1449	M6.3/2B	.031	S20W49L278	13165		100					F /1435/12-25			
20221214	1454	1459	1504	M3.2	.018	S20W43L278	13165										
20221214	1703	1712	1723	M2.2	.016	S20W46L278	13165							F /1706/12-25			

D A T E	T I M E			CLASS		COORDINATES	AR	RADIO MHz		DYNAMIC EVENT	CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2			sfu		|km/s	km/s	keV	d |tmax/Ipr /GLE		remarks
20221214	*2031	2050	2052	M1.3		S21W46L278	13165				?2036/0372/070/140	F /2035/12-25			
20221214	*2052	2102	2158	M2.2	.011	S22W45L278	13165								
20221214	2133	2139	2145	M1.3/SF	.005	S22E16L213	13163	260							
20221214	*2145	2153	2157	M1.9	.012	S20W49L278	13165					F /2148/12-25			
20221214	*2157	2206	2217	M4.5	.043	S21W48L278	13165					F /2148/12-25			
20221215	0124	0137	0149	M1.6/SF	.016	S21W48L278	13165				0248/0145/062/266	F /0118/12-25			
20221215	0655	0707	0722	M2.3	.024	S21W51L278	13165					F /0718/12-15			
20221215	0754	0758	0802	M1.0	.004	S20W48L278	13165	100				F /0718/12-25			
20221215	*0955	1016	1035	M1.5		S20W56L278	13165					F /1029/12-25			
20221215	*1023	1030	1037	M1.6	.013	S21W55L278	13165	110				F /1029/12-25			
20221215	1558	1610	1619	M1.0	.011	N20E89L042	13169				1612/1072/141/113	F /1600/12-25			
20221215	*1635	1644	1647	M1.1	.007	S21W59L278	13165				1824/0187/029/283	F /1600/12-25			
20221215	*1647	1656	1720	M2.0	.027	S21E05L278	13165					F /1649/12-25			
20221215	2220	2240	2257	M5.7	.082	S21W62L278	13165		34			F /2232/12-25			
20221216	0130	0201	0230	M3.5	.081	S21W64L278	13165					F /0133/12-15			
20221216	0442	0459	0520	M1.2		N19E89L042	13169				0512/1220/106/117	F /0449/12-25			
20221216	0536	0548	0602	M1.3		S21W66L278	13165					F /0529/12-25			
20221216	0617	0642	0654	M1.2/1F	.014	S20W65L278	13165				0624/0238/036/287				
20221216	0726	0738	0747	M1.6	.014	S20W68L278	13165					F /0716/12-25			
20221216	0855	0905	0911	M1.5/SF	.009	S19W68L278	13165	730				F /0900/12-25			
20221216	0933	0943	0950	M1.1/SF	.011	S20W71L278	13165								
20221216	1002	1019	1034	M4.0	.043	S20W68L278	13165					F /1015/12-25			
20221216	1424	1440	1504	M2.4	.037	S20W71L278	13165					F /1501/12-25			
20221216	1534	1540	1545	M1.2	.007	S20W70L278	13165					F /1546/12-25			
20221217	1940	1953	2001	M1.0/1N	.008	N19E72L118	13169				2000/1215/062/125	F /2002/12-25			
20221220	1359	1406	1414	M1.1/SF	.008	N22E48L118	13169					F /1407/12-25			
20221227	0046	0054	0100	M2.0	.012	N18E63L008	13176				0224/0321/113/138	F /0022/12-25			
20221227	0753	0815	1236	2N/M1.1	.022	N19E60L008	13176				0812/0662/018/101	F3/0808/12-25			
20221227	1609	1634	1709	1B/M1.2	.007	N20W49L118	13169					F /1621/12-25			
20221229	0632	0727	0808	M1.2	.044	N17E88L309	13180					F2 0738/12-25			
20221229	1811	1833	1843	M2.4	.023	N20E88L042	13179				1812/0269/035/241	F /1826/12-25			
20221230	1524	1528	1533	M1.4/1B	.004	N20E09L008	13176								
20221230	1926	1938	1947	M3.7/2N	.023	N20E07L008	13176					F /1948/12-25			

2023

D A T E	T I M E			CLASS		COORDINATES	AR	RADIO MHz		DYNAMIC EVENT	CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2			sfu		|km/s	km/s	keV	d |tmax/Ipr /GLE		remarks
20230106	0043	0052	0151	X1.2/2B	.062	S18E68L226	13182	420				F /0052/12-25			
20230107	0040	0052	0102	M1.6/SF	.012	S18E56L226	13182					F /0044/12-25			
20230108	0839	0854	0906	M1.2	.014	S14E90L179	13184					F2/0843/12-25			
20230108	0915	0948	1014	M1.4	.039	S16E90L179	13184					F2/1013/12-25			
20230108	1451	1507	1521	M1.4	.018	S14E90L179	13184					F /1454/12-25			
20230108	1902	1911	1919	M1.0/SF	.011	S15E86L179	13184								
20230109	0051	0102	0119	M1.1/SF	.016	S16E82L181	13184					F /0049/12-15			
20230109	0845	0901	0916	M2.1/1N	.024	S16W26L281	13181					F /0848/12-15			
20230109	1315	1322	1331	M1.0	.006	S16W26L281	13181					F /1318/12-25			
20230109	1837	1850	1931	X1.9/3B	.097	S14E72L179	13184	230			1912/0873/036/087				
20230110	0000	0016	0121	SN/M5.1	.022	N24E79L168	13186				0024/0972/041/094	F /0010/12-25			

D A T E		T I M E		CLASS	COORDINATES	AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L lt lg L		245	2695	RADIO SWEEP	to	/ v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
				J*m-2			sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20230110	0208	0216	0224	M1.0/SF	.007 S12E68L179	13184						F /0213/12-25			
20230110	0233	0241	0331	M2.6/2N	.025 S18W33L281	13181						F /0234/12-25			
20230110	1059	1108	1112	M1.1	.005 S13E63L179	13184						F /1103/12-25			
20230110	1717	1728	1734	M1.3	.009 N22E66L168	13186						F /1724/12-25			
20230110	1744	1748	1752	M1.2	.004 S13E59L179	13184						F /1746/12-25			
20230110	2239	2247	2317	X1.0/2B	.028 N25E66L168	13186	120	320		IV/2	2312/0807/021/096	F /2243/12-25			
20230111	0039	0059	0155	M2.4/1F	.023 N25E66L168	13186	100			IV/2		F /0120/12-25			
20230111	0111	0121	0201	M5.6/1B	.021 S13E75L179	13184	24000	290	II/1|0625		0126/1083/089/072	F /0146/12-25			
20230111	0526	0601	0634	M1.3/SF	.031 S14W53L281	13181						F /0607/12-25			
20230111	0825	0833	0837	M3.1/SN	.006 N22E66L168	13186					0836/1047/144/047	F /0831/12-25			
20230112	*0553	0618	0633	M1.1	.014 N22E47L168	13186						F /0557/12-25			
20230112	*0633	0646	0702	M1.5	.024 N23E49L168	13186									
20230112	1108	1128	1146	M1.2/SF	.022 S14W69L281	13181						F /1111/12-25			
20230112	1439	1457	1510	M1.0	.014 S17W10L226	13182						F /1444/12-25			
20230112	1903	1913	1924	M1.0	.011 S17W14L226	13182						F /1847/12-25			
20230113	0249	0259	0326	1N/M1.4	.007 N27E41L168	13186	400					F /0239/12-25			
20230113	1005	1015	1019	M3.9/SN	.013 S19W84L281	13181	1300		II/2|0381						
20230114	0129	0209	0230	M1.3/SF	.043 N18E75L118	13192						F2/0043/12-25			
20230114	2006	2021	2028	M3.5	.030 S17W42L226	13182		100				F /1957/12-25			
20230114	2037	2100	2119	M4.6/	.090 S15W43L226	13182					2136/0335/202/241	F /2120/12-25			
20230115	0258	0308	0408	M6.0/SF	.140 N13E56L123	13191	720		II/1|0223		0348/0809/127/123	F /0340/15-25			
20230115	1416	1431	1511	M4.8/2B	.060 S15E54L120	13190						F /1446/15-25			
20230117	2316	2329	2344	M1.8	.019 S17E24L120	13190	130					F /2351/12-25			
20230118	1021	1035	1053	M1.8	.019 S16E20L120	13190						F /1057/12-25			
20230119	0400	0403	0409	M1.1/SF	.004 N11E43L084	13196									
20230119	1006	1012	1019	M1.7	.009 N11E40L084	13196	100								
20230119	1025	1027	1045	M1.0/SF	.012 N11E40L084	13196						?F /1100/12-25			
20230122	1212	1226	1234	M1.1	.012 S24W50L132	13194						F /1152/15-25			
20230122	1649	1702	1740	M1.6/1B	.012 S24W52L132	13194									
20230125	0937	1011	1049	M4.6/SF	.150 S12W78L120	13190					1012/0354/141/248	F /0923/12-25			
20230125	1642	1701	1722	M1.3/SF	.019 N16W77L118	13192						F /1718/12-25			
20230125	2223	2235	2244	M2.0	.014 N14W88L118	13192						F /2228/12-25			
20230126	1253	1306	1326	M2.8	.021 N18W87L118	13192						F /1257/12-25			
20230207	1333	1353	1422	M1.0	.022 S14E88L121	13220					1436/0391/083/127	F /1334/12-25			
20230207	2001	2007	2014	M1.5/1N	.008 N30E05L226	13213		57				F /2002/12-25			
20230207	*2246	2258	2305	M3.8	.012 N28E02L226	13213									
20230207	*2305	2307	2309	M6.3	.012 N30E03L226	13213	120				0024/0568/011/041	F /0215/12-25			
20230208	0245	0253	0257	M2.0	.007 N30E01L226	13213									
20230208	1528	1603	1626	M1.6/2N	.037 N31W05L226	13213	470					F2/1543/12-25			
20230208	1956	2012	2046	M1.5/1N	.037 S09E72L139	13217					2036/0500/018/101	F /2028/12-25			
20230208	2103	2113	2148	M1.7/1F	.011 N30W10L226	13213									
20230209	0245	0310	0328	M3.0	.041 S02E70L139	13217	230					F /0250/12-25			
20230209	0711	0717	0721	M1.1/SF	.004 S02E70L139	13217	530								
20230209	0849	0907	0924	M2.8	.038 S12E85L139	13217	220		II/1|	IV/1	0924/0622/107/106	F /0932/12-25		
20230209	1430	1456	1527	M1.5/1N	.012 N30W18L226	13213						F4/1449/15-25			
20230209	1510	1525	1552	M1.4/SN	.015 S09E69L139	13217						F /1529/12-15			
20230209	1818	1842	1902	M1.8	.037 N31W18L226	13213					1836/0262/029/231	F2/0250/12-25			
20230210	0245	0345	0403	M3.7/2N	.046 N29W25L226	13213	370	110	II/2|	IV/1	0347/0308/047/158	F2/0250/12-25		
20230210	0802	0805	0809	M1.4/SN	.004 N31W27L226	13213					0924/0324/116/209	F /0803/12-25			
20230210	1435	1455	1512	M1.1/SF	.018 N34W29L226	13213	870					F /1516/12-25			
20230210	1529	1600	1613	M1.6/SF	.033 N14W62L226	13213						F /1552/12-25			

DATE	TIME			CLASS	COORDINATES		AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to	/ v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2			sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20230210	2234	2241	2248	M1.2/1N	.008	S18E63L121	13220	410								
20230211	0759	0808	0815	M2.2/1N	.017	N07W69L252	13208						F /0752/12-25			
20230211	1042	1058	1129	M1.0/1N	.008	S18E58L121	13220					1112/1498/360/022	F /1047/15-25			
20230211	1129	1134	1141	M1.4	.009	N29W70L249	13222									
20230211	1205	1209	1215	M1.5	.009	S09E41L139	13217									
20230211	1218	1223	1228	M1.1	.007	S10E40L139	13217						F /1220/12-25			
20230211	1228	1240	1249	M1.5/SF	.017	N06W71L251	13208									
20230211	1540	1548	1618	X1.1/2B	.046	S10E39L139	13217						F /1544/12-25			
20230211	1711	1723	1731	M1.4/SF	.011	N07W74L251	13208						F2/1715/12-25			
20230212	0835	0848	0859	M3.1/1B	.014	S10E29L139	13217	200					F /0847/12-25			
20230212	0911	0927	0937	M1.4	.018	S09E31L139	13217	100								
20230212	1323	1334	1344	M1.2	.010	N28W85L249	13222						F /1343/12-25			
20230212	1533	1538	1601	M1.0/SN	.013	S09E26L139	13217	1400				1538/0416/045/132	F /1535/12-25			
20230213	0504	0518	0543	M1.0	.017	N10E46L113	13226						F /0513/12-25			
20230213	1549	1556	1614	M1.4	.009	N10E40L113	13226									
20230214	0157	0203	0220	M1.8/1N	.006	N10E34L113	13226					0336/0357/126/090	F /1058/12-25			
20230214	1159	1212	1246	M2.6	.047	N29W85L226	13213						F2/1206/12-25			
20230215	0433	0447	0507	M1.1	.017	N30W85L226	13213						F /0444/12-25			
20230215	0516	0523	0530	M2.0	.014	N27W86L226	13213					0624/0071/033/206	F /0516/12-25			
20230215	0642	0705	0728	M1.3	.018	N27W86L226	13213						F /0642/12-25			
20230215	2105	2114	2118	M1.0	.004	N30W85L226	13213	600					F /2109/12-25			
20230216	0019	0032	0043	M1.1	.009	N25E86L035	13229						F /0022/12-25			
20230217	1938	2016	2050	X2.2	.510	N25E67L035	13229	320	550	II/3|		2012/1315/360/045	F /2000/12-25			
20230220	1447	1458	1503	M4.4/SF	.016	N26E75L343	13234					1524/0339/063/065	F /1454/12-25			
20230221	1105	1123	1131	M4.7	.038	N14W70L113	13226						F2/1124/12-25			
20230221	1957	2017	2030	M5.0	.053	N26E64L343	13234	30	32	II/2|		2048/0413/069/069	F /2000/12-25			
20230222	0451	0512	0540	M1.4	.029	N26E59L343	13234		120				F /0455/12-25			
20230222	1336	1350	1358	M2.6	.017	N26E53L343	13234					1348/0450/100/054				
20230223	0611	0614	0618	M1.5	.004	N20E20L007	13235	5300				0648/0400/024/047	F /0612/12-15			
20230223	0832	0848	0909	M1.0	.009	N26E43L343	13234									
20230224	1711	1715	1720	M1.1	.004	N20E01L007	13235						F /1713/12-25			
20230224	2003	2030	2129	M3.7	.100	N29W24L035	13229				IV/2	2036/1336/360/351	F /2010/12-25	24/2335/3		
20230225	1534	1540	1546	M1.0	.004	S24W00L356	13236						F /1537/12-25			
20230225	1840	1944	2100	M6.4/3N	.200	N24W45L035	13229			II/2|3133		1924/1170/360/284	F2/1948/12-25	26/0440/58		
20230228	1735	1750	1756	M8.6	.057	N27W29L343	13234		140			1824/0325/070/319	F /1739/12-25			
20230301	0056	0107	0118	M1.0/SF	.008	S15E69L241	13240					0137/0199/049/105				
20230302	2105	2116	2125	M3.8	.030	N21W64L343	13234					2136/0244/096/293				
20230303	1008	1112	>1229	M3.3/1F	.047	N21W66L343	13234					1124/0517/057/210	F /1033/12-25			
20230303	1742	1752	1825	X2.1/1B	.091	N22W80L343	13234	360	710	II/1|1247	IV/1	1812/0709/360/271	F2/1749/12-25			
20230304	0706	0710	0721	M1.0/SN	.003	N17W39L306	13243	370				0724/1178/084/266	F2/0709/12-25			
20230304	1334	1342	>1356	M1.2/1F	.007	N08E41L216	13242						F /1336/12-25			
20230304	1519	1557	1626	M5.2	.140	N19W87L343	13234			II/2|0815	IV/2	1536/0933/360/263	F /1504/12-25			
20230305	0240	0252	0303	M1.3/SF	.010	N09W01L260	13238					0248/0550/014/321	F /0246/12-25			
20230305	1624	1641	1659	M1.1/SF	.009	N10W12L260	13238						F /1629/12-25			
20230305	1653	1701	1711	M1.0	.011	N14E37L216	13242									
20230305	2129	2136	2141	M5.0	.021	N18W60L306	13243		91				F /2130/12-25			
20230306	0208	0228	0336	M5.8/2N	.044	N18W63L306	13243		480		IV/1	0312/0873/360/276	F2/0214/12-25			
20230306	0857	0912	0937	M1.3	.021	N24W86L343	13234						F2/0902/12-25			
20230306	1724	1750	1810	M1.0	.021	N14E24L216	13242						F /1747/12-25			
20230308	0953	1012	1046	M1.2	.026	N09W07L216	13242					1148/0296/013/256	F /0958/12-25			
20230308	2235	2244	2252	M1.3/1N	.007	S23E13L196	13245	110					F /2239/12-25			

DATE			TIME		CLASS	COORDINATES		AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y	m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to	/ v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
						J*m-2			sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20230317	1504	1507	1511	M1.1/SN	.003	S22W66L160	13247										
20230320	0119	0148	0226	M1.2	.042	S21E57L009	13256						0227/0386/062/079	F3/0103/12-25			
20230329	0218	0233	0240	X1.2	.058	S21W59L009	13256	140	50								
20230329	1347	1407	1415	M1.2/1F	.010	S21W67L009	13256						1400/1008/015/211	F2/2342/12-25			
20230329	2335	2347	0015	M1.1/1N	.008	S20W72L009	13256										
20230330	0724	0737	0746	M5.4/1F	.026	S22W77L009	13256	590	120	II/2|0279	IV/2	0748/0487/224/238	F /0745/12-25	30|1016/0.61			
20230406	0536	0553	0611	M3.0	.030	S21E87L009	13272		100					F2/0613/12-25			
20230408	0138	0146	0150	M2.9/1N	.010	S18E61L009	13272										
20230410	0414	0520	0731	M2.8/1N	.018	S21E87L052	13276							F /0514/12-25			
20230411	0951	1016	1039	M1.3/1N	.010	S19E17L009	13272						0648/0297/053/116	F/ 1007/12-25			
20230414	1610	1618	1625	M1.1	.006	N10E56L022	13282										
20230414	2318	2327	>0036	M1.5/1N	.005	N11E54L022	13282							F /2325/12-25			
20230421	1744	1812	2001	M1.8/2N	.039	S23W10L001	13283	110		II/3|0580	IV/2	1812/1284/360/180	F /1810/12-25				
20230427	1104	1114	1123	M1.8/SN	.009	S22W05L265	13288							F /1112/12-25			
20230430	1956	2028	2052	M2.4/1F	.038	N14E81L141	13293						2024/0924/157/066	F2/2012/12-25			
20230501	0055	0121	0129	M1.1	.012	S24W42L269	13288										
20230501	1302	1309	1313	M7.1	.012	S24W45L269	13288	1300	150				1412/0445/027/198	F /0925/12-25			
20230503	0913	0927	0935	M4.2/1B	.021	S24W83L269	13288						0924/0494/034/215				
20230503	1003	1014	1019	M3.1	.015	N12E42L141	13293										
20230503	1036	1045	1049	M7.2	.024	N12E42L141	13293							F2/1037/12-25			
20230503	1224	1235	1241	M1.7	.009	N12E41L141	13293										
20230503	1335	1350	1420	M2.2/1B	.008	N14E43L141	13293							F /1345/12-25			
20230504	0805	0844	>0947	M3.9/SB	.080	N14E32L124	13296	22000	350	II/2|0717	IV/2	0848/0810/360/067	F3/0845/12-25				
20230505	0730	0801	0833	M2.1	.060	N15E29L124	13296	5300	550	II/2|0997	IV/2	0800/0770/360/027	F /0717/12-25				
20230505	1518	1531	1615	M1.2/1N	.006	N15E29L124	13296	340				1548/0652/122/011	F /1536/12-25				
20230507	*2140	2234	2258	M1.5	.026	N16W06L124	13296	300			IV/2		F2/2220/12-25				
20230507	*2253	2323	2346	M1.6	.064	N15W05L124	13296	3000				2312/1075/360/274		08|1240/38			
20230508	2011	2025	2033	M2.3/2B	.016	N13W18L124	13296	1300				2236/0217/099/249	?F /2040/12-25				
20230509	0339	0354	0423	1N/M6.5	.044	N12W13L124	13296	740	360	II/2|0774		0424/0415/076/284	F /0347/12-25				
20230509	0555	0613	0640	M1.2	.013	N13W24L124	13296	1100	210		IV/2	0424/0416/076/269	F /0612/12-25				
20230509	1000	1020	1043	M1.4	.016	N13W30L124	13296						F /1006/12-25				
20230509	1820	1858	1924	M4.2/1B	.100	N15W31L124	13296	3200	1300	II/2|1892	IV/3	1900/1209/360/297	F /1843/12-25	09|2335/83			
20230509	2032	2052	2104	M5.0/1N	.055	N14W35L124	13296	200	180				F /2033/12-25				
20230510	1319	1421	1556	1B/M2.2	.018	N13W51L141	13293					1505/0441/092/290	F /1418/12-25				
20230511	0847	0901	>0948	M2.1/1N	.018	S06W41L127	13294	5000	100	II/2|0419		0924/0365/191/233	F /0906/12-25				
20230511	1813	1829	1902	M1.8/1N	.014	S05W44L127	13294	330	180	II/2|0356		1848/0424/092/245	F /1820/12-25				
20230516	1631	1643	1651	M9.6	.054	S23E89L285	13310					1700/0234/151/126					
20230518	0613	0626	0638	M1.0	.009	N17E88L272	13311						F /0621/12-25				
20230518	0648	0655	0702	M1.2	.007	N18E88L272	13311										
20230518	*1132	1147	1200	M2.2	.014	N18E88L272	13311						F /1150/12-25				
20230518	*1200	1213	1222	M1.9	.024	N20E88L272	13311						F /1212/12-25				
20230518	1239	1249	1256	M1.6	.016	N18E84L272	13311										
20230518	1732	1751	1801	M1.1	.012	N18E82L272	13311										
20230518	*2012	2023	2051	M3.8	.012	N17E77L272	13311						F /2017/12-25				
20230518	*2051	2105	2116	M4.5	.057	N18E81L272	13311					2112/0520/020/036	F /2121/12-25				
20230519	0041	0048	0054	M5.3/1N	.025	N18E74L272	13311						F /0042/12-25				
20230519	0305	0312	0323	M1.6/SN	.014	N19E72L272	13311					0324/0086/088/023					
20230519	0449	0500	0510	M2.5/1N	.018	N19E72L272	13311										
20230519	1945	2006	2014	M2.3/SF	.020	N16E61L272	13311						F /1948/12-25				
20230519	2014	2026	2038	M2.7	.034	N17E60L272	13311										
20230520	0649	0702	0712	M1.0/SF	.011	N19E72L272	13311						F /0652/12-25				

D A T E		T I M E		CLASS	COORDINATES	AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L lt lg L		245	2695	RADIO SWEEP		to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
				J*m-2			sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20230520	0716	0732	0736	M6.4/1N	.033 N19E72L272	13311	140				0748/0199/043/146	F /0714/12-25			
20230520	0918	0927	0932	M1.1	.008 S27E66L262	13312					0948/0223/064/144				
20230520	1048	1054	1110	M1.6	.017 N17E57L272	13311					1224/0234/035/152				
20230520	1225	1235	1240	M8.9	.030 N17E56L272	13311					1400/0196/027/153				
20230520	1454	1500	1504	M5.6	.018 N17E55L272	13311		60				F /1454/12-25			
20230520	1857	1903	1907	M1.1	.006 N18E53L272	13311					2012/0193/054/144				
20230520	2252	2306	2321	M5.1/1F	.050 N19E49L272	13311	170					F /2258/12-25			
20230521	0218	0223	0233	M1.4/SN	.009 N20E47L272	13311						F /0219/12-25			
20230521	1549	1604	1618	M2.6/SN	.026 N17E40L272	13311						F /1555/12-25			
20230522	1330	1337	1343	M1.9/SF	.008 N18E24L272	13311			II/		1409/0249/087/13				
20230523	1207	1213	1217	M3.0/SN	.007 N17E11L272	13311						F /1217/12-25			
20230524	0951	0958	1002	M1.0/SN	.003 N18E00L272	13311									
20230524	1704	1721	1748	M1.8/1F	.031 N18W03L272	13311	140					F2/1708/12-25			
20230524	1753	1800	1818	M1.0/SF	.013 S17E38L234	13315									
20230525	1437	1446	1509	M1.1/1N	.007 S26W04L262	13312	100				1524/0404/106/214				
20230526	2248	2303	2326	M1.4	.004 S19E07L234	13315						F /2237/12-25			
20230528	1021	1055	1036	M1.0/1N	.012 S15W12L234	13315									
20230530	0754	0810	0819	M1.2/SF	.001 N00E00L285	13310						F /0800/12-25			
20230530	1015	1022	1029	M1.3	.006 S22W89L285	13310	210								
20230530	1336	1338	1400	M1.4/1B	.003 S20W41L234	13315					1424/0216/071/320	F /1342/12-25			
20230531	0424	0438	0444	M1.3	.009 S07E89L104	13323						F /0430/12-25			
20230531	1223	1226	1230	M1.0	.002 S17W20L200	13319									
20230531	2147	2208	2214	M1.1/SF	.001 S06E89L104	13323						F /2152/12-25			
20230531	2214	2252	2312	M4.2	.100 S06E82L104	13323						F /2258/12-25			
20230602	0232	0241	0245	M1.5	.004 N16E02L159	13324						F /0239/12-25			
20230607	1118	1146	1159	M4.7	.059 S15E36L053	13327	100				1236/0164/053/097	F /1145/12-25			
20230609	1648	1711	1734	M2.5	.030 S21E48L017	13331					1724/0651/199/093	F /1659/12-25			
20230616	0521	0530	0541	M1.0	.001 N17E69L263	13337					0548/0892/086/052	F /0534/12-25			
20230616	1020	1038	1102	M1.1	.170 N13E65L266	13338					1100/0904/060/077	F /1025/12-25			
20230616	1952	1959	2007	M1.0	.005 S24W46L017	13331									
20230618	0025	0031	0040	M1.3	.007 S21E26L279	13336						F /0028/12-25			
20230618	1325	1420	1517	M2.5/2N	.048 S23E22L279	13336			II/1|0440		1400/0832/084/131	F /1351/12-25			
20230619	0337	0350	0358	M1.4	.110 S12E89L207	13341			II/2|0355		0424/0271/069/065				
20230619	1206	1214	1218	M1.1/SF	.005 S13E79L207	13341	190		II/2|0954		1248/0198/062/069	F /1208/12-25			
20230620	*1109	1113	1117	M1.1	.009 S21W67L342	13342					1124/0376/066/236	F /1052/12-25			
20230620	*1117	1125	1135	M1.8	.009 S21W68L342	13342					1124/0376/066/236	F /1118/12-25			
20230620	1544	1548	1633	M1.1	.002 S20W71L342	13342						F /1544/12-25			
20230620	1642	1709	1735	X1.1	.140 S17E73L207	13341	200	480	II/2|1027	IV/1	1712/1113/360/101	F2/1652/12-25			
20230621	1231	1244	1254	M1.1/1N	.010 S13E58L207	13341						F /1237/12-25			
20230621	1531	1538	1543	M1.0/SF	.004 N19W05L263	13337			II/1|0556		1624/0371/069/295				
20230622	1057	1121	1136	M1.1/1N	.017 S12E44L207	13341						F /1122/12-25			
20230622	2329	2344	0007	M4.9	.045 S21E41L207	13341	39	140	II/2|	IV/1		F /0003/12-25		
20230624	1211	1217	1224	M1.1/SN	.006 N21W42L263	13337	310				1236/0688/119/289				
20230626	1608	1634	1622	M1.6/1N	.012 N23W38L233	13340									
20230627	1453	1514	1639	M1.3/2B	.004 N23W49L233	13340						F3/1510/12-25			
20230628	0826	0844	0859	M1.9/2N	.020 N22W60L233	13340						F /0841/12-25			
20230629	1400	1415	1502	M3.8/2B	.022 N17W13L170	13351									
20230701	2207	2223	2231	M1.1/SN	.009 S20E55L070	13359	410				2312/0233/033/096	F /2213/12-25			
20230702	0229	0235	0240	M2.1	.007 S22E55L070	13359	42000		II/3|0379		0312/0284/054/094	?F /0250/12-25			
20230702	2254	2314	2358	X1.1	.260 N16W60L166	13354		200				F /2316/12-25			
20230703	0629	0653	0738	M1.4/1N	.007 S15E40L072	13358									

DATE	TIME			CLASS	COORDINATES	AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L lt lg L		245	2695	RADIO SWEEP	to	/ v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
				J*m-2			sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20230704	1220	1235	1316	M1.5/SF	.021 N16W89L166	13354						F /1224/12-25			
20230705	1836	1858	1925	M1.0	.001 N17W89L166	13354						F /1839/12-25			
20230706	1032	1049	1116	M1.1	.016 N15W89L166	13354									
20230707	0617	0629	0638	M4.0/2B	.023 S21W13L070	13359	830	190				F /0624/12-25			
20230710	0329	0355	0412	M2.3/2N	.040 S13W49L052	13366	180	23	II/1|1062		0400/1160/360/204	F /0353/12-25			
20230710	2206	2218	2229	M1.4/1N	.013 S12W59L072	13358	59	120				F /2208/12-25			
20230711	1419	1435	1445	M2.0	.018 N25E88L276	13372					1512/0201/064/045	F /1444/12-25			
20230711	1602	1612	1635	M1.1	.020 N24E88L276	13372					1636/0502/360/010	F /1619/12-25			
20230711	1751	1808	1816	M6.8/SF	.052 S19W57L050	13368						F /1755/12-25			
20230711	1920	1929	1939	M1.0/SF	.011 N24E87L276	13372					1924/0826/360/144	F /1929/12-25			
20230711	2204	2215	2224	M5.8	.032 N25E88L276	13372	140	65	IV/2			F /2239/12-25			
20230711	2334	2337	2345	M1.2	S19W59L050	13368									
20230712	0021	0031	0040	M1.4/SF	.013 N11W24L052	13366						F2/0025/12-25			
20230712	0431	0445	0458	M1.3	.003 N24E88L276	13372	100					F /0459/12-25			
20230712	0510	0514	0523	M1.3	.003 N25W48L038	13361						F /0510/12-25			
20230712	0849	0855	0900	M6.9/1N	.025 N24E77L276	13372						F /0840/12-25			
20230713	1855	1920	1936	M2.1/1N	.032 N24E57L276	13372						F /1902/12-25			
20230714	0922	0936	0949	M1.0/SF	S19W24L344	13363	210				1004/0421/103/209	F /0924/12-25			
20230715	0721	0741	0810	M2.9/2B	.037 S25W40L344	13363	3600	570			0737/0836/167/220	F /0728/12-25			
20230715	0942	0953	1018	M1.0/1N	.004 N21E42L276	13372	1500		II/2|0662			F2/0949/12-25			
20230715	1005	1010	1014	M2.2	.005 N21E41L276	13372	1100		II/2|0335		?1032/0887/081/061				
20230716	0816	0826	0854	M1.0	.001 N21E30L276	13372	550								
20230716	1457	1512	1508	M1.7	.001 N21E26L276	13372	6900	170		IV/2		F /1507/12-25			
20230716	1736	1746	1817	M4.0/2B	.001 S24W59L276	13363	38	130			1753/1239/182/220	F /1738/12-25			
20230717	2241	2254	2306	M2.7	.028 S25W81L344	13363	100				2254/2075/131/225	F2/2246/12-25			
20230717	2337	0006	0023	M5.7	.150 S26W87L344	13363	340	190			2336/1385/360/223	F /0021/12-25	18|0115/620		
20230718	0645	0656	0702	M1.5	.010 N11E89L175?	13379?					0724/0428/010/036	F /0650/12-25			
20230718	*1932	1948	2000	M1.3	.020 N27E35L229	13376						F /1922/12-25*			
20230718	*2000	2005	2011	M1.4	.007 N26E35L229	13376					2012/1272/360/031	F /1922/12-25*			
20230718	2016	2017	2022	M2.1/SF	.001 N20W12L272	13372									
20230718	2016	2027	2035	M2.1	.021 S21W87L344	13363					2048/0467/056/257				
20230719	1049	1057	1102	M1.4/SF	.007 S20W88L344	13363									
20230719	1704	1725	1743	M3.8	.052 S18W88L344	13363			II/1|0429		1736/0716/179/262	F /1732/12-25			
20230722	0312	0355	0415	M3.1/2N	.043 N23W54L276	13372					0400/0549/144/248	F /0322/12-25			
20230722	0412	0424	0515	M1.0/1F	.007 N06W29L245	13373						F /0412/12-25			
20230725	0136	0203	0222	M1.5/2N	.029 N25W51L229	13376	180				0212/0325/070/292	F /0147/12-25			
20230725	2108	2116	2124	M1.6/SF	.010 N19W61L229	13376						F /2108/12-25			
20230726	0421	0428	0433	M1.2	.008 N21W65L229	13376									
20230726	1017	1037	1048	M4.6	.040 N21W70L229	13376					1100/0444/041/280	F /1024/12-25			
20230726	1505	1613	1650	1B/M2.0	.013 N20W76L229	13376						F /1552/12-25*			
20230727	0944	0951	0958	M1.9/SF	.013 N21W85L229	13376						F /0935/12-25			
20230727	2204	2234	2305	M1.7/SF	.051 S21E68L092	13388						F /2205/12-25			
20230728	1539	1616	1658	M4.1	.056 N27W87L229	13376			II/2|		1600/1896/360/314	F /1542/12-25	29|0920/154		
20230729	1611	1624	1637	M1.4/1N	.014 S11W09L125	13380		100							
20230730	*0801	0814	0846	M1.8/1F	.014 S18E57L052	13390	110	120							
20230730	0818	0806	0922	*M1.9/SF	.009 S18E59L052	13390	370								
20230731	0842	0909	>0941	M1.7/2F	.021 S20E44L052	13390						F /1542/12-25			
20230801	0138	0158	0246	M1.0/SF	.012 S09W40L125	13380						F /0143/12-25*			
20230801	0158	0203	0207	SF/M1.3	.007 S09W41L125	13380						F /0143/12-25*			
20230801	0427	0504	1034	*M2.2/1N	.006 S09W41L125	13380						F /0143/12-25			
20230801	0530	0537	0543	*1N/M1.3	.009 S09W42L125	13380						F /0526/12-25			

DATE	TIME			CLASS	COORDINATES		AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to	/ v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2			sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20230801	0628	0657	0719	*1N/M1.3	.074	S09W43L125	13380	110					F /0630/12-25			
20230801	0903	0909	0916	*1N/M1.3	.009	S08W42L125	13380									
20230801	1402	1409	1434	M1.4/1N	.012	S08W45L125	13380						F /1420/12-25			
20230801	2139	2158	2151	M1.0	.008	S10W52L125	13380									
20230802	0803	0812	0938	M1.3/1F	.011	S10W58L125	13380	710		II/2|0286 IV/2	0912/0572/360/256		F3/0803/12-25			
20230802	1040	1054	1057	M1.2/1F	.003	S10W60L125	13380						F /1059/12-25			
20230802	*1446	1452	1659	M1.7/SF	.005	S10W62L125	13380						F /1452/12-25			
20230802	*1612	1622	1626	SF/M1.3	.005	S10W63L125	13380									
20230802	1909	1914	1921	M1.1	.008	S11W65L125	13380						F /1924/12-25			
20230803	1147	1155	>1201	M2.0/SF	.006	S11W74L125	13380									
20230804	0338	0424	0623	M1.9/1N	.079	N11W52L095	13386	810	140		0417/1029/360/293		F /0407/12-25			
20230805	0616	0722	0810	M1.6/SF	.110	N07W69L095	13386			II/2|0572	0700/1000/360/246		F /0703/12-25	05|1745/18.5		
20230805	0923	0952	0936	M2.1	.027	S08W88L125	13380						F /0924/12-25			
20230805	2145	2221	2244	X1.6	.300	N11W77L095	13386	460		II/1|0772	2212/1647/360/299		F3/2207/12-25	08|0115/47		
20230806	1820	1840	1911	M5.5/SN	.060	N08W89L095	13386	630			1848/1182/236/251		F /1843/12-25			
20230807	0429	0441	0451	M2.4	.019	N10W89L095	13386				?0500/0509/080/252		/12-25			
20230807	1525	1611	>1632	*M1.0/SF	.032	N16W81L068	13387				1639/0602/094/254		F /1606/12-25			
20230807	1530	1627	1636	*M1.0/SF	.032	N15W79L095	13386				1639/0602/094/254					
20230807	1937	1951	>2123	M1.4/2N	.011	N19W75L068	13387						F2/1939/12-25			
20230807	2030	2046	2118	X1.5	.280	N12W88L095	13386	1600		II/2|		2048/1851/360/290		F /2051/12-25		
20230808	0909	0931	0941	M3.6/1N	.025	N18W84L068	13387									
20230822	2235	2304	2338	M1.1/SF	.002	N10W30L188	13405	300			2322/0528/098/236		F /2242/12-25			
20230825	0056	0109	0144	M1.5/1N	.001	S12E50L081	13415						F /2242/12-25			
20230826	2205	2250	2342	M1.1	.044	S05E89L001	13417				2236/0666/254/100		F /2231/12-25			
20230901	0220	0352	0447	M1.2	.067	N16W64L094	13413	190		II/2|0743 IV/2	0324/1339/301/336		F /0338/12-25	01|0610/25.8		
20230902	0633	0712	0734	M3.4/SF	.075	N06W89L094	13413	230			0712/1176/156/260		F /0638/12-25			
20230903	0014	0033	0023	M1.1	.009	N11W88L094	13413				0036/0575/088/287		F /0015/12-25			
20230903	0809	0836	0856	M6.0	.064	N12W88L094	13413				0912/1349/249/301		F /0809/12-25			
20230905	0803	0812	0840	M2.0/1N	.016	N14W02L343	13421						F /0806/12-25			
20230905	1933	1945	2007	M1.2/1N	.011	N15W10L343	13421			II/2|1314						
20230905	2321	2339	0007	M1.0/1F	.009	N15W11L343	13421						F /2326/12-25			
20230907	1858	1909	1952	M2.1/1B	.022	N22E56L247	13425	8000		II/2|1238	1924/0634/124/073					
20230911	0108	0128	0213	M1.4/1F	.029	N09E65L204	13429	100		II/2|0547	0148/0545/166/071					
20230911	0358	0407	0427	M1.1/SN	.009	S05E58L203	13431									
20230911	1438	1449	1459	M1.1/SN	.009	S06E52L203	13431									
20230912	0418	0426	0516	M1.9/1B	.007	N22E02L247	13425									
20230912	0647	0707	0757	M2.6/2N	.001	N16W32L281	13423		170							
20230914	0640	0745	0839	M1.4	.065	N10E15L204	13429				0724/0804/360/304					
20230914	1923	1931	1958	M1.9/SN	.011	N10E09L204	13429		460							
20230914	2117	2126	2141	M2.5/SN	.013	N10E07L204	13429									
20230915	2219	2234	2229	M1.7	.006	N10W07L204	13429									
20230916	0038	0050	0111	M2.9/1N	.015	N10W08L204	13429									
20230916	0528	0538	0638	M3.4/1B	.032	N10W11L204	13429									
20230919	0345	0355	0404	M1.1/SF	.007	N07E53L116	13435	140			0424/0473/100/123					
20230919	0923	0938	0944	M1.8	.001	N07E51L116	13435				1000/0418/125/130					
20230919	2001	2014	2021	M4.0	.024	N07E45L116	13435	1300			2035/0483/114/136		F /12-25			
20230920	1411	1419	1425	M8.2	.036	N07E35L116	13435			II/2|1054	1506/0199/048/027					
20230921	1242	1254	1302	M8.7	.001	N07E22L116	13435				1336/0347/067/027		F /12-25			
20230922	0203	0430	0656	M1.2	.002	N13E18L116	13435	2400			0224/0983/109/038		F2/12-25			
20230922	1553	1623	1640	M1.4	.004	N29W36L145	13443	2900					F2/12-25			
20230922	1706	1720	1715	M1.5	.010	N29W38L145	13443	1300								

DATE	TIME			CLASS	COORDINATES	AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L lt lg L		245	2695	RADIO SWEEP	km/s	to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
				J*m-2			sfu				km/s	keV	d |tmax/Ipr /GLE		remarks
20230922	2225	2300	2319	M1.9	.025 N28W40L145	13443						F /2256/12-25			
20230924	0259	0328	0416	1N/M4.4	.039 S13E21L073	13445	120					F /0324/12-25	24| /0.4		
20230924	1451	1500	1505	M1.0	.005 N27W57L145	13443	360		II/1	0755	1524/0614/090/208				
20230928	0858	0907	0911	M1.2/SF	.004 S19E66L334	13450					?0927/0455/048/127				
20230930	1616	1635	1649	M1.2	.018 N11E66L299	13451					1645/0374/063/084	F /1620/12-25			
20231001	0110	0132	0143	M2.5	.028 N10E61L300	13452						F /0121/12-25			
20231002	1235	1246	1258	M1.9/1N	.015 N20E65L274	13455						F /1246/12-25			
20231007	1757	1806	1810	M1.7/SB	.005 S10E39L233	13460	920		II/1			F /1829/12-25			
20231010	0155	0209	0222	M1.6/SF	.018 N12W63L299	13451						F /0204/12-25			
20231010	1208	1217	1229	M2.3/SF	.020 N09W69L300	13452						F /1214/12-25			
20231012	0450	0458	0505	M1.1	.008 N17W88L299	13451						F2/0454/12-25			
20231026	2247	2324	2340	M1.4	.005 N20E88L337	13472			II/2		2314/1238/360/086				DSF
20231101	0607	0626	0643	M1.1	.001 S11E88L205	13480						F /0619/12-25			
20231101	1137	1226	1243	M1.4	.039 S09E88L205	13480	23000				1248/0583/047/111	F /1247/12-25			
20231102	1218	1222	1226	M1.6/SB	.003 S18W30L327	13474									
20231102	1908	1921	1940	M1.0	.007 S09E88L205	13480									
20231105	1134	1143	1147	M1.8/1N	.005 S09E52L205	13480						F /1143/12-25			
20231105	1424	1432	1436	M1.6	.004 S09E51L205	13480		140				F /1432/12-25			
20231111	1701	1729	1745	M1.2/SF	.002 S18W58L230	13477						F /1728/12-25			
20231114	2258	2305	2309	M1.1/SN	.003 S20W75L205	13485						F /2305/12-25			
20231118	0537	0542	0550	M1.2	.006 N23E89L344	13490									
20231118	1634	1644	1654	M1.1	.009 N16E89L344	13490									
20231118	2226	2234	2240	M1.0	.008 N14E89L344	13490						F /2230/12-25			
20231120	0854	0903	0912	M1.2	.007 N19E76L344	13490						F /0907/12-25			
20231123	0259	0338	0405	M1.4/EPL	.003 S20E55L330	13494	110				0312/0982/172/045	F /0322/12-25			
20231123	1425	1437	1442	M1.0	.006 N20E16L344	13490	2500					F /1432/12-25			
20231124	0917	0933	0943	M1.1/1F	.011 S16W02L003	13499						F2/0942/12-25			
20231128	1907	1932	1935	*M3.4	.014 S15W02L302	13500	6500	720	II/2			F /1943/12-25			
20231128	1935	1950	2009	*M9.8	.016 S16W00L302	13500			II/1		2012/0741/360/285	F /1958/12-25			
20231201	0412	0439	0456	M1.1	.027 N12W73L342	13502						F /0431/12-25			
20231201	2055	2120	2137	M1.0	.031 S18W39L302	13500					2124/0217/032/309	F /2102/12-25			
20231205	0639	0644	0648	M1.6/1F	.005 N18E78L142	13513	800					F /0643/12-25			
20231205	2059	2110	2117	M1.0.1N	.006 N20E70L142	13513									
20231205	2117	2120	2125	M1.4	.006 N20E72L142	13513						F /2121/12-25			
20231206	0530	0541	0601	M2.1/2N	.014 N18E66L142	13513						F /0540/12-25			
20231206	2126	2144	2155	M2.3/1B	.020 N20E55L142	13513									
20231208	2257	2307	2314	M5.4/1B	.027 S20W48L213	13511						F /2155/12-25			
20231209	0928	0955	1006	M1.5/SF	.013 S20W55L213	13511		240			0936/0234/078/253				
20231209	1303	1319	1337	M1.0	.015 S21W54L213	13511									
20231210	0342	0353	0358	M2.3/SF	.009 S20W66L213	13511						F /0352/12-25			
20231210	2237	2243	2248	M1.4	.005 S21W77L213	13511						F /2244/12-25			
20231214	0711	0744	0801	M5.8/SF	.066 N04W41L131	13514	100					F /0742/12-25			
20231214	1329	1348	1408	M2.3	.032 N04W50L131	13514					?1326/0395/099/333	F /1347/12-25			
20231214	1647	1702	1836	X2.8/1B	.190 N04W53L131	13514			II/2	1218	IV/2 1712/0948/360/291	F2/1702/12-25	15|0015/13.9		
20231215	0703	0715	0723	M6.3/1N	.066 N03W61L131	13514	250	1200			IV/2 0748/1018/235/260	F /0712/12-25			
20231215	0723	0734	0824	1N/M6.9	.078 N03W61L131	13514	320								
20231217	2008	2017	2021	M1.1	.004 N09W89L131	13514						F /2016/12-25			
20231221	0519	0538	0549	M4.2/1N	.043 S12W61L067	13519	750				0600/0577/143/286	F /0536/12-25			
20231221	2342	0004	0022	M3.3/1N	.044 S10W72L067	13519						F /2358/12-25			
20231224	1109	1118	1124	M2.9/1N	.015 S20W27L343	13529	2300					F /1112/12-25			
20231224	1637	1649	1709	M2.6/1F	.017 S17W33L343	13529						F /1647/12-25			

D A T E		T I M E		CLASS	COORDINATES	AR	RADIO MHz		DYNAMIC EVENT	CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L lt lg L		245	2695	RADIO SWEEP	to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2		sfu		|km/s	km/s	keV	d |tmax/Ipr /GLE		remarks
20231224	1921	1951	2016	M1.1	.025 S20E89L224?	13534?					F /1932/12-25			
20231231	1844	1912	1940	M1.0	.026 N04E73L152	13536					F /1903/12-25			
20231231	2135	2155	2317	X5.0/3B	.550 N04E73L152	13536	1500	3100	IV/2	2200/2852/360/112	F2/2156/>100			
2024														
20240101	0833	0854	0904	M2.3/1N	.025 N04E70L152	13536								
20240101	1154	1225	1235	M4.7	.044 N04E69L152	13536					F2/1220/12-25			
20240102	1802	1830	1856	M1.1	.025 N05E58L152	13536	130				F /1836/12-25			
20240104	*0108	0116	0122	M1.1/2N	.003 N02E38L152	13536					F /0113/12-25			
20240104	*0122	0155	0213	2N/M3.9	.069 N04E38L152	13536					F /0153/12-25			
20240110	1239	1255	1305	M1.4	.016 S20E88L100	13538					F /1259/12-25			
20240110	2318	2328	2335	M1.9/SF	.018 N22W77L177	13538	130				F /2328/12-25			
20240111	1244	1251	1255	M1.3	.006 N19W88L177	13538					F /1251/12-25			
20240111	1749	1752	1759	M1.5	.007 N09W54L139	13539					F /1751/12-25			
20240111	1908	1923	1949	M1.2	.022 N18W88L177	13538	390				F /1911/12-25			
20240112	0255	0258	0302	M1.0/SN	.003 N18E19L064	13547					F /0258/12-55			
20240122	0609	0622	0636	M1.5/1N	.002 N29E27L287	13559		110		0648/0481/036/049c				
20240122	1843	1947	2029	1F/M2.0	.010 S15W30L287	13559					F /1946/12-25			
20240122	1928	1932	1936	M1.2	.009 S16W28L325	13561								
20240122	2114	2121	2132	M3.4	.021 S17W29L325	13561					F /2121/12-25			
20240122	2136	2143	2158	M1.6	.019 S17W29L325	13561	330			2148/0229/012/247c				
20240122	2219	2222	2226	M2.1	.006 S17W30L325	13561				2224/0343/058/230c				
20240123	0309	0331	0338	M5.1	.041 N29E18L287	13559	440	140		0348/0880/042/014c	F /0330/12-25			
20240123	0752	0811	0818	M2.4	.006 S17W36L325	13561					F /0805/12-25			
20240123	0818	0822	0826	M2.3/1F	.010 S19W37L325	13561								
20240123	*1240	1258	1303	M1.0	.006 S17W37L325	13561					F /1256/12-25			
20240123	*1303	1308	1313	M1.0	.006 N30E13L287	13559					F /1256/12-25			
20240123	1445	1459	1505	M1.3	.013 S18W41L325	13561								
20240123	1636	1640	1647	M4.3	.019 S17W39L325	13561								
20240123	*1819	1828	1846	M1.0	.009 S17W43L325	13561								
20240123	*1835	1844	1849	M1.1	.009 S16W43L325	13561								
20240123	1957	2001	2005	M1.0	.001 S17W42L325	13561								
20240124	0021	0038	0043	M1.0	.011 S18W42L325	13561					F /0035/12-25			
20240124	0131	0140	0153	M2.6/SF	.025 S16W48L325	13561		100		0136/0222/050/220c	F /0137/12-25			
20240124	0518	0543	0600	M1.4	.025 S16W51L325	13561					F /0529/12-25			
20240124	2044	2058	2111	M1.3	.012 S17W58L325	13561				?2136/0250/032/233c				
20240129	0129	0140	0158	M1.2/SF	.011 N30W62L287	13559	430			0148/0985/060/285c	F /0154/12-25			
20240129	0354	0438	0456	M6.8/SF	.190 N28W86L287	13559		2700	II/2|512	0436/0606/360/144c	F /0416/12-25	29/0615/137		
20240202	0252	0301	0305	M1.1	.004 S18E60L104	13571	310		II/3|144	0324/0641/046/134c	F /0301/12-25			
20240204	1140	1153	1208	M1.4/SF	.015 S15E86L055	13576					F /1148/12-25			
20240204	1622	1638	1646	M1.5	.015 S15E79L055	13576					F /1643/12-25			
20240204	1705	1712	1719	M1.3	.002 S15E77L055	13576								
20240204	1816	1829	1843	M1.1	.012 S36W46L178	13575					F /1826/12-25			
20240204	2052	2057	2101	M1.2	.004 S20E83L055	13576		96			F /2056/12-25			
20240204	2220	2228	2234	M2.1	.015 S14E86L055	13576								
20240204	2234	2237	2242	M2.7	.012 S15E73L055	13576								
20240204	2245	2248	2302	M1.8?	S09E89L043	13576					F /2302/12-25			
20240205	0413	0428	0447	*M2.1	.002 S16E74L178	13576								
20240205	0436	0438	0456	*M1.4	.002 S15E71L178	13576								
20240205	0610	0622	0626	M1.4	.006 S20E77L055	13576								

DATE	TIME			CLASS	COORDINATES		AR	RADIO MHz		DYNAMIC EVENT		CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L		245	2695	RADIO SWEEP	to	/ v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2			sfu		|km/s		km/s	keV	d |tmax/Ipr /GLE		remarks
20240206	0215	0228	0237	M2.2	.006	S39W62L178	13575					0236/1041/108/203c				
20240206	0237	0312	0332	M4.2	.013	S40W63L178	13575	3300	480	II/1|0431	IV/2		F /0310/12-25			
20240206	1838	1849	1907	M1.3	.019	S36W72L178	13575	110					F /1847/12-25			
20240207	0304	0331	0349	M5.1/SF	.014	S40W78L178	13575	970	390			0324/1077/056/227c	F /0319/12-25			
20240207	1741	1805	1835	M1.3	.030	S15E38L055	13576						F /1829/12-25			
20240208	1241	1312	1337	M3.4	.075	S18E28L055	13576					?1325/0453/028/231c	F /1320/12-25			
20240208	1411	1418	1425	M1.2	.009	S15W83L169	13564						F /1417/12-25			
20240208	1517	1523	1527	M1.8/1F	.009	S15E25L055	13576									
20240208	1856	1902	1906	M1.3/1F	.004	S15E20L055	13576						F /1902/12-25			
20240208	2316	2355	0036	M3.9	.008	S35W85L178	13575					2348/1041/048/233c	F3/2337/12-25			
20240209	0036	0041	0045	M3.1/1N	.003	S16E17L055	13576		100				F /0041/12-25			
20240209	1253	1314	1332	X3.3	.430	S37W85L178	13575		1000		IV/2	1325/1017/138/234c	F2/1313/>100	09/1530/187		
20240209	1754	1800	1807	M1.2	.007	S14E07L055	13576	130	57			1812/0258/008/285c	F /1759/12-25			
20240210	0042	0051	0100	M1.5/SF	.011	S14E05L055	13576						F2/0048/12-25			
20240210	0304	0354	0411	M3.4	.096	S15E88L335	13584		250			0424/0801/360/144c	F /0350/12-25			
20240210	2256	2307	2314	M9.0	.045	S12W12L055	13576	190	360	II/3|2170	IV/3	2336/0600/098/326c	F /2305/12-25			
20240211	2235	2245	2250	M1.0	.005	N10E88L282	13586						F /2240/12-25			
20240212	0323	0348	0353	M6.5/2B	.028	S17W26L055	13576	1000					F /0344/12-25			
20240212	1250	1308	1321	M1.1	.014	S16W28L055	13576						F /1304/12-25			
20240212	1531	1548	1603	M1.4/1F	.020	S12W34L055	13576					1545/0703/218/268c	F /1542/12-25			
20240212	2035	2117	2151	M2.7	.093	N28E86L282	13586					2148/0822/162/102c	F /2056/12-25			
20240212	2200	2204	2303	M1.6		S14W36L055	13576					2224/0600/008/161c	F /2203/12-25			
20240214	0302	0310	0323	M1.0	.009	N07W26L034	13582						F /0307/12-25			
20240214	0726	0735	0742	M1.0/SF	.006	S17W57L055	13576						F /0733/12-25			
20240215	1650	1707	1725	M1.8	.021	S13W79L055	13576						F /1704/12-25			
20240216	0239	0251	0257	M1.5	.008	S13W88L055	13576					0248/0452/078/348c				
20240216	0642	0653	0658	X2.5/1N	.084	S16W80L055	13576		420	II/3|	IV/2		F /0653/>100			
20240216	2157	2209	2216	M3.0	.016	S14W88L055	13576						F /2215/12-25			
20240221	2252	2307	2314	X1.8	.099	N17E39L224	13590						F /2305/12-25			
20240221	2358	0014	0031	M1.5	.026	S35E85L224						0024/0976/062/138c	F /0006/12-25			
20240222	0617	0632	0640	X1.7/2B	.088	N16E35L224	13590		99				F /0633/12-25			
20240222	2029	2046	2103	M4.8/2B	.053	N18E29L224	13590						F /2042/12-25			
20240222	2208	2234	2243	X6.3	.450	N17E27L224	13590	390	240			2236/0265/008/087c	F /2234/12-25			
20240223	1312	1328	1354	M1.0	.019	N16E19L224	13590					1348/0188/006/038c	F /1321/12-25			
20240223	1541	1553	1606	M1.4/1N	.018	N18E18L224	13590					1624/0133/006/044c	F /1545/12-25			
20240223	1726	1747	1807	M2.6/1N	.039	N18E18L224	13590						F /1545/12-25			
20240224	0621	0634	0644	M4.5	.033	N18E08L224	13590						F /0631/12-25			
20240224	1032	1057	1113	*M2.2	.027	N15E08L224	13590						F /1116/12-25			
20240224	1103	1118	1125	*M3.6	.038	N18E05L224	13590						F /1116/12-15			
20240224	1154	1159	1220	M1.0	.005	N16E10L124	13590									
20240225	1647	1722	1740	M2.0/1N	.046	N14W07L124	13590					1700/0315/062/100c	F /1708/12-25			
20240228	1637	1819	1930	M1.3	.160	N19W58L124	13590	3590				1724/0532/096/299c	F2/1744/12-25			
20240308	2118	2126	2131	M1.3/SF	.004	S14W15L066	13599	19	49				F2/2126/12-25			
20240310	1200	1213	1220	M7.4	.035	S13W38L066	13599			II/3|0714		?1248/0288/052/287c	F /1212/12-25			
20240314	0552	0604	0611	M1.0/SF	.005	S11W82L066	13599						F /0602/12-25			
20240316	1622	1635	1644	M3.5	.025	S14E88L215	13615						F /1629/12-25			
20240316	2127	2155	2211	M1.1	.021	S15E88L215	13615									
20240318	0321	0332	0345	M2.7	.002	N22W86L215	13612						F /0328/12-25			
20240318	0406	0414	0424	M1.0	.009	N15E70L215	13614									
20240318	1902	1919	1928	M6.7	.049	S11E70L215	13615						F /1917/12-25			
20240319	0224	0229	0238	M1.4	.007	S13E68L215	13615									

DATE	T I M E			CLASS	COORDINATES	AR	RADIO MHz		DYNAMIC EVENT	CME	X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L lt lg L		245	2695	RADIO SWEEP	to / v /da /pa	An / tm /Emax	E>10MeV	n	phenomena;
				J*m-2			sfu		|km/s	km/s	keV	d |tmax/Ipr /GLE		remarks
20240319	2317	2327	2332	M2.1/SN	.009 S15E56L215	13615				0248/0320/092/193c	F /2326/12-25			
20240320	0723	0736	0815	M7.4/3B	.055 S10E48L215	13615		100			F /0733/12-25			
20240320	2246	2255	2300	M1.9	.003 S15E43L215	13615		100			F /2256/12-25			
20240322	2018	2032	2049	M4.3/2B	.042 S14E18L215	13615								
20240322	2120	2122	2125	M1.1/SN	.004 S14E18L215	13615					F3/2121/12-25			
20240323	0058	0133	0316	X1.1/2F	.350 S14E15L215	13614	350	240	II/2/0791	0136/0942/360/144c	F2/0134/12-25			
20240323	0647	0655	0659	M1.1/SF	.006 S13E04L215	13615					F /0655/12-25			
20240323	0701	0709	0728	M2.5	.036 S14E11L215	13615					F /0704/12-25			
20240323	0726	0738	0747	M3.1	.035 S14E10L215	13615								
20240323	1122	1129	1136	M1.0/SF	.008 S15E10L215	13615								
20240323	1236	1247	1256	M1.3/1B	.011 S15E09L215	13615					F /0704/12-25			
20240323	1304	1311	1320	M1.1	.003 S11W01L215	13615					F /1315/12-25			
20240323	1331	1337	1344	M1.9	.005 S14E00L215	13615					F /1336/12-25			
20240323	1351	1402	1415	M5.3	.064 S14W00L215	13615					F /1425/12-25			
20240323	1449	1453	1458	M1.5	.007 S14W00L215	13615								
20240323	1501	1513	1517	M3.8	.013 S14E01L215	13615					F /1509/12-25			
20240323	1622	1651	1707	M2.8	.056 S13E02L215	13615					F /1645/12-25			
20240323	2330	2349	0007	M2.5	.030 S11W01L215	13615					F /2346/12-25			
20240324	0051	0104	0112	M1.0/2N	.002 S14E00L215	13615								
20240324	0112	0125	0130	M1.5	.006 S14W00L215	13615					F2/0120/12-25			
20240324	0143	0154	0157	M2.1/2N	.008 S14W00L215	13615					F /0154/12-25			
20240324	0157	0205	0209	M2.3	.007 S14E01L215	13615								
20240324	0209	0218	0234	M2.7	.033 S13E02L215	13615								
20240324	0559	0606	0610	M2.2/1B	.002 S14W04L215	13615					F /0606/12-25			
20240324	0736	0751	0807	M1.3/2N	.021 S14E00L215	13615					F /0808/12-25			
20240324	1210	1218	1222	M1.1/1N	.004 S14W01L215	13615								
20240324	1227	1234	1239	M1.0/SF	.007 S14W02L215	13615					F /1229/12-25			
20240324	1300	1313	1331	M1.3	.002 S13W02L215	13615					F2/1312/12-25			
20240325	0637	0644	0648	M4.4/SB	.008 S13W02L215	13615					F /0644/12-25			
20240326	0028	0036	0040	M1.8/SN	.001 S13W36L215	13615								
20240326	1011	1017	1024	M1.0	.005 S13W25L215	13615								
20240326	1036	1043	1052	M1.3	.009 S11W34L215	13615					F /1042/12-25			
20240326	1255	1330	1341	M1.9	.038 S14W31L215	13615					F /1326/12-25			
20240326	1341	1346	1350	M1.7	.009 N18W75L252	13621								
20240326	2143	2158	2207	M1.6	.014 S11W41L215	13615					F /2153/12-25			
20240327	0137	0144	0152	M1.1/1F	.001 S13W37L215	13615								
20240327	0633	0641	0650	M1.1/1N	.001 S11W48L215	13615								
20240328	0616	0629	0636	M7.0	.037 s14W51L215	13615								
20240328	1540	1556	1603	M6.1/1N	.032 S13W58L252	13615				1548/0265/010/228c	F /1603/12-25			
20240328	1921	1931	1938	M1.1/1F	.010 S13W59L215	13615	490				F /1927/12-25			
20240328	2029	2056	2101	X1.1/3B	.130 S14W61L215	13615					F /2054/12-25			
20240329	0217	0230	0242	M3.2/SF	.034 S15W63L215	13615	750				F /0226/12-25			
20240329	1919	1934	1956	M1.2/SF	.023 S12W78L215	13615					F /1929/12-25			
20240330	2101	2115	2216	M9.4	.270 S12W88L215	13515					F /2150/12-25			
20240330	2248	2253	2307	M4.5	S14W88L215	13615								
20240401	0113	0132	0149	M3.9/SF	.062 N10W64L175	13625								
20240401	0138	0230	0142	M3.4	.005 S18W88L215	13615	5							
20240411	*1652	1706	1711	M5.4	.022 S13E88L230	13637		5500	IV/1	1700/1302/113/032c	F /1658/12-25			
20240413	0458	0502	0506	M2.4/SF	.004 S10E80L230	13637		1500		0512/0606/026/082c				
20240414	0224	0232	0236	M4.3/1F	.010 S11E67L230	13637				0236/0892/016/105c	F /1229/12-25			
20240415	0106	0118	0126	M1.7/SF	.011 N28E61L220	13639								

D A T E		T I M E		CLASS		COORDINATES		AR	RADIO MHz		DYNAMIC EVENT	CME		X-ray HARD	GOES PROTONS		Attendant
y m d	to	tm	te	X-ray/opt	L	lt lg L			245	2695	RADIO SWEEP	to / v	/da /pa	An / tm /Emax	E>10MeV	n	phenomena;
					J*m-2				sfu		|km/s	km/s		keV	d |tmax/Ipr /GLE		remarks
20240415	0715	0732	0738	M1.0/1F	.013	N30E57L220	13639										
20240415	0838	0842	0847	M2.3/1B	.009	N27W29L313	13634		13000	100							
20240415	0921	0932	0942	M1.2/SF	.010	N29E60L220	13639							F /0946/12-25			
20240415	1343	1352	1458	M1.1/1F	.005	N28E56L220	13639							F /1418/12-25			
20240415	1401	1404	1406	M1.4/SN	.005	N26W33L313	13634										
20240415	1408	1417	1427	M2.2	.021	N29E55L220	13639							F /1418/12-25			
20240415	1925	1932	1939	M4.0/1N	.018	N28E56L220	13639							F /1929/12-25			
20240416	1749	1802	1814	M1.1/2N	.014	S10E36L222	13645							F /1749/12-25			
20240417	2155	2208	2217	M1.6/2N	.012	S07E22L213	13643					2236/0248/032/143		F /2201/12-25			
20240418	0232	0248	0253	M2.2/SF	.014	S11E27L213	13643							F /0238/12-25			
20240418	0717	0737	0809	M1.3/SF	.029	S12E23L213	13643							F /0720/12-25			
20240418	1922	2016	2021	M1.6/SF	.010	S12E17L218	13647							F /1948/12-25			
20240419	0440	0453	0503	M2.1/SF	.017	N20W58L218	13635										
20240419	1253	1306	1322	M1.0	.013	S17W00L228	13647		210					F /1312/12-25			
20240421	1239	1259	1316	M1.0/1F	.025	S06W25L222	13645		190					F /1338/12-25			
20240421	1507	1514	1520	M2.2/SF	.010	N22E19L180	13646			120		1526/0593/054/188		F /1508/12-25			
20240421	2144	2152	2157	M3.4/SN	.013	S17W37L249	13638		380	120	II/1|0278	2212/0573/068/191					