REPORT UAG-52

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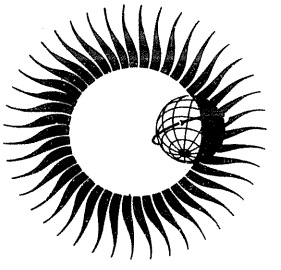
EXPERIMENTAL COMPREHENSIVE SOLAR FLARE INDICES FOR CERTAIN FLARES, 1970-1974



November 1975

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Solar-Terrestrial Physics

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EXPERIMENTAL COMPREHENSIVE SOLAR FLARE INDICES FOR CERTAIN FLARES, 1970-1974

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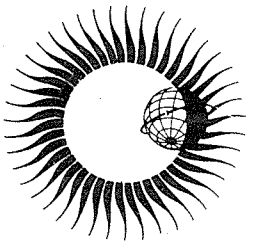

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Introduction

In July 1971 a report on *An Experimental, Comprehensive Flare Index and Its Derivation for 'Major' Flares, 1955-1969* was published by the present authors as Report UAG-14. The experimental and exploratory nature of the index was emphasized. The index apparently proved to be a useful tool for some investigators and values of the indices for subsequent years have been requested. Accordingly, the present report has been prepared.

We continue to emphasize the experimental nature of the index and report that the possible form of an improved comprehensive index has been discussed with colleagues. The imperfections of the present index are fully recognized, but a practical format for an improved type of comprehensive flare evaluation has not yet been developed. Under these circumstances, and in the interests of homogeneity, we have derived for the years 1970-74 comprehensive indices for so-called "major" flares following the same definitions and rules that were used in the preparation of the indices for 1955-1969.

The five components that comprise the "profile" of the flare are listed below. The sum of the five components gives the Comprehensive Flare Index (CFI).

1. Importance of ionizing radiation as indicated by time-associated Short Wave Fade or Sudden Ionospheric Disturbance; (Scale 1-3).

2. Importance of Hα flare; (Scale 1-3).

3. Magnitude of ∿10 cm. flux; (Characteristic of log of flux in units of $10^{-22}Wm^{-2}Hz^{-1}$).

4. Dynamic spectrum; (Type II = 1, Continuum = 2, Type IV with duration >10 minutes = 3).

5. Magnitude of ∿200 MHz flux; (Characteristic of log of flux in units of $10^{-22}Wm^{-2}\ Hz^{-1}$).

Comprehensive Flare Indices for "Major" Flares

In Report UAG-14, and again in this report, values of the Comprehensive Flare Index have been derived for a group of flares that are considered to have been well above average in either ionizing, Hα, or radio frequency radiation. Specifically the index has been determined for all flares in 1970-74 that satisfied any one of the following criteria:

Short wave fade (or Sudden Ionospheric Disturbance) importance ≥3.
Hα Flare, importance ≥3.
10 cm flux, $\geq 500 \times 10^{-22}Wm^{-2}Hz^{-1}$.
Type II burst.
Type IV radio emission, duration >10 minutes.

Each flare that satisfied at least one of the above criteria can in some sense be considered to have been a "major" flare and is so referred to in this report. The times of these "major" flares, with their respective profiles and comprehensive indices, are listed in Table I. In this table, the reported time refers to the Hα flare or subflare, when known. When no Hα event has been reported, a nominal time is given in parentheses and refers to the approximate time of the short wave fade or the radio frequency emission. Careful distinction has been made between "no flare reported" and "Hα observations not in progress." An asterisk in the Time column of Table I identifies the latter situation. Underlined times indicate exact beginning and/or end times.

In order to take care of some of the inadequacies of the index, a few additions have been introduced in the tabulated data. A double asterisk now indicates the occurrence of a Type II burst with flares for which this fact is masked in the fourth entry in the profile by the occurrence of either continuum or Type IV emission. Columns giving information on the associated X-radiation (1-8Å), when known, and certain general remarks also have been added.

For conventions of abbreviations see *Solar-Geophysical Data, (SGD)*, especially SGD, 366 (Supplement), Explanation of Data Reports, February 1975, U.S. Department of Commerce, (Boulder, Colorado 80302 U.S.A.). See also on p. 17 the Notes to both Table I and Appendix Table of "Lesser Events."

Table I

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974

Date 1970	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
Jan. 5	0415-0525	N15W45	2n	10506(S)	02010	3	s	A "Spotless" Flare
6	1405-1500	S21E30	1f	10516(S)	01010	2	vs	A "Spotless" Flare
8	(0216)	-	-	-	00010	1	vs	
18	1421-1455	S14W39	sn	10525	10010	2	0.013	X-ray Flux Units = $x10^{-4}$ ergs/cm^2/sec
28	1910-2020	S14W34	2b	10542	32300	8	0.490	
30	1500-1650	S06W33	1b	10544	11233	10**	0.097	
31	1515-1615	S22W63	2b	10542	22130	8**	0.039	
Feb. 2	2037-2054	S08W77	sn	10544	00012	3	s	
11	0704-0834	N18W06	2b	10568	22311	9	0.530	
12	0003-0127	N18W17	1n	10568	31000	4	0.130	
16	0202-0305	S13W82	2n	10567(S)	02010	3	s	A "Spotless" Flare
20	0943-1050	S18E32	2b	10584	22200	6	0.140	
20	1717-1745	S13W46	sn	10579	10130	5?	0.013	IV (DKM-SAG), called continuum by BO and CLRO.
21	1310-1325	S08E52	sn	10588	00031	4	vs	
21	1850-1915	N17E72	sn	10595	10030	4?	s	IV (DKM-SAG), called continuum by BO.
27	2318-2358	N07E69	2b	10607	32133	12**	0.170	
28	1257-1323	N07E61	sn	10607	30102	6	0.060	
Mar. 1	0250-0325	N15W30	1n	10595	11113	7	≥0.013	
1	0500-0516	N05E52	sb	10607	10233	9**	0.047	
1	0936-0946	N05E48	1b	10607	31234	13**	0.320	
1	1127-1203	N13W31	2b	10595	22233	12**	0.094	
1	1529-1537	N05E46	1n	10607	21233	11**	(0.063)	
1	1955-2129	N15W37	2b	10595	22213	10	0.220	
2	0012-0038 and 0046-0105	N06E39	1b sb	10607	21112	7	0.034	
2	1317-1450	N06E35	1n	10607	21233	11**	0.064	
3	0629-0730	N14W55	1b	10595	21213	9	≥0.026	
4	1822-1852	N14W79	1b	10595	11234	11**	0.039	
5	0407-0550	S14E73	1n	10618	31100	5	0.077	
6	(0933)	-	-	-	30201	6	0.047	
6	1319-1349	S14E60	1n	10618	31132	10	0.035	
7	0140-0330	S11E09	2b	10614(S)	22113	9	0.051	A "Spotless" Flare
8	g1425-1441	S22W90	1n	10621(S)	01031	5?	s	IV (DKM-SAG) called continuum (M & DKM) by BO, and I_s (M) by H.
17	1440-1508	N01W31	sn	10630	10132	7**	0.008	A "Spotless" Flare
18	0712-0820	S01W40	1n	10630	11112	6	0.013	
18	1656-1738	S04W45	1n	10630	11032	7**	0.006	
21	0035-0305	N19E66	2f	10641	02110	4	0.017	
23	(1700)	-	-	-	00030	3?	s	IV (DKM-SAG), not reported by BO.
23	(1758)	-	-	-	00020	2**	x	
25	1202-1430	N14E10	1b	10641	31232	11**	0.100	
25	1559-1623	N09E05	sn	10641	00011	2	s	
25	g2234-2246	N18W11	sn	10641	00030	3	s	
25	2355-2410	S17W62	1n	10633	01010	2	x	
26	g1732-1743	N08W25	sb	10641	10213	7	0.051	
26	2004-2125	N05E66	2n	10652	22232	11**	0.094	
29	0010-0200	N14W37	2b	10641	22334	14**	0.170	
31	1756-1901	S12E45	2b	10654(S)	22231	10**	0.021	A "Spotless" Flare
Apr. 6	1953-2130	S13E30	1n	10669	31230	9?	0.039	IV (DCM-CLG) is reported as (cont.- M & DKM) by BO and CLRO.
8	1944-2030	N17E56	1n	10675	2103-	6	0.051	
8	2324-2353	N16E55	sn	10675	20132	8**	0.086	
9	1846-1930	S13E50	sn	10674(S)	00010	1	s	A "Spotless" Flare

Note: See notes to Table I on page 17.

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date 1970	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
Apr. 13	0418-0436	N16W01	sb	10675	00113	5	-	
15	0413-0530	N13W85	2b	10670	32333	14**	0.230	
18	(1314)	-	-	-	00032	5**	s	Active Region 10675 is going over the West Limb.
27	(1520)	-	-	-	00030	3?	x	IV (DKM-SAG), not reported by BO.
28	1811-1844	N11W79	sb	10693	10012	4	0.004	
28	2116-2150	S09E35	sb	10709	10231	7	0.011	IV is DCM only.
May 1	1424-1550	S13E11	1n	10709	11132	8**	0.006	
4	2222-2500	N31E08	2f	10714-10722 (S)	02010	3	s	A "Spotless" Flare related to a filament between the two regions.
15	0925-1010	S09W10	1b	10740	31100	5	0.077	
15	2200-2233	S08W18	1b	10740	31000	4	>0.007	
22	0020-0130	N16E12	1n	10750	01031	5**	0.008	
22	1857-1912	N17W65	sb	10743	10011	3?	0.013	II (M&DKM - CLRO), called III G & V by H.
30	0226-0515	S08W31	2b	10760	32101	7	≥0.043	
Jun. 2	0618-0725	S08W76	2n	10760	22132	10**	>0.021	
4	(2347)	-	-	-	00012	3	vs	Active Region 10760 is beyond West Limb.
5	(1043)	-	-	-	00112	4	s	
12	2107-2230	S14W28	1n	10774	11112	6	0.015	
13	0300-0316	N18E56	sn	10789	10112	5	0.015	
13	0920-0939	N18E53	sb	10789	20212	7	0.100	
13	1227-1238	N18E51	1b	10789	21203	8	0.300	
14	0503-0615	N19E42	2b	10789	32211	9	0.510	
14	1321-1415	N20E42	2b	10789	12233	11**	0.150	
14	1415-1530	N18E35	1b	10789	21032	8	0.120	IV is DCM only. May be a continuation of preceding event.
14	1659-1840	N18E35	1b	10789	31200	6	0.500	
15	1304-1334 and 1316-1410	N18E22	1n	10789	22222	10	0.250	
		N15E08	2b	10781				
15	1610-1658	N22E28	sn	10789	10120	4**	0.008	
17	g1550-1605	N19E04	sf	10789	00030	3?	s	IV (DKM-SAG), duration 10 minutes, not reported by BO, H, or CLRO.
28	0103-0148	N19E34	1b	10808	21112	7	-	
28	1847-1855	N22W33	sn	10802	00010	1	x	
28	1945-2045	N21E22	1b	10808	31232	11**	0.330	
29	1206-1335	N20E15	1b	10808	11232	9?	0.099	IV (DKM-SAG), duration only 6 minutes, continuum (DKM) also reported.
Jul. 1	2021-2139	N18W17	1n	10808	11132	8**?	0.008	II (M) and IV (M&DKM) reported by CLRO, but not reported by H.
2	1758-1921	N19W29	1b	10808	11133	9**?	>0.009	II (M-CLRO) called "unclassified" by H, and Vb by SAG.
5	2206-2309	N11W15	1n	10813	01010	2**?	vs	II (M&DKM-CLRO), not reported by CLG.
6	2137-2230	N22W90	1b	10808	21112	7	0.086	
7	1648-1711 or	N24W90	sf	10808				
g	1652-1706 or	N08W56	sf	10813	20112	6	0.060	Three small subflares in progress at time of Type II.
	1654-1715	S09W14	sf	10815				

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1970								
Jul. 7	(1711)	-	-	-	00012	3	x	Another II, perhaps related to preceding event.
13	1715-1728	N13E87	sn	10838	10013	5	0.005	
14	g0650-0702	S15E90	sn	10837	10010	2	0.008	
19	0052-0157	N08E68	1b	10845	31121	8	0.077	
20	1109-1237	N08E55	2b	10845	32332	13	0.490	
20	g1836-1931	N07E45	sn	10845	10030	4?	s	IV (DKM-SAG), Duration 12 minutes, called "unclassified" burst by CLRO.
20	g2010-2106	N05E43	sn	10845	10131	6	0.034	IV is DCM only.
21	0437-0642	N09E45	1n	10845	21131	8	>0.021	
21	1554-1629	N17W76	sn	10830	10130	5?	0.006	IV (DKM-SAG) called continuum by H and CLRO.
22	0023-0132	N08E33	1b	10845	21332	11	0.140	
22	0204-0235	N21E75	1n	10846	11110	4	0.006	
22	1535-1603 and/or 1550-1623	N03W90 N08E18	sn sn	10831 10845	10030	4?	-	IV (DKM-SAG) called cont.(M & DKM) by CLRO.
22	1940-1950	N06E18	sb	10845	10213	7	0.009	
23	1029-1140	N10E13	1n	10845	31133	11	0.030	
23	1832-2020	N09E09	1b	10845	21333	12	0.200	
27	0717-0845	N11W38	1n	10845	31222	10	0.039	
30	0100-0140	N11E02	1n	10852	01011	3	s	
Aug. 4	(2104)*	-	-	-	0-010	1	-	No Flare Patrol at time of Type II.
10	g2330-2352	N19W26	sn	10865	10030	4	-	
11	2317-2338	N18E00	sf	10868	20232	9**	0.047	
12	2015-2128	N11E90	1b	10882	31333	13**	>0.490	A bright limb flare with loops.
12	g2106-2118	N18W14	sn	10868	10022	5**	-	
12	g2153-2210	N18W52	sn	10865	00010	1	vs	
14	1602-1700 and/or 1604-1657 and/or 1710-1820	N10E74 N16W72 N17W75	1b sn 1b	10882 10865	31233	12	0.440	
16	1542-1559	N17W90	sb	10865	10030	4?	0.043	IV (DKM-SAG) called continuum by CLRO.
19	1117-1128	N22W89	sn	10868	30232	10?	0.490	IV (DKM-SAG) reported in progress all day.
19	(1758)	-	-	-	20010	3?	x	Questionable SWF.
25	g1836-1847	N17W57	sn	10887	00010	1	x	
26	1436-1525	S07W74	sn	10890	00012	3	s	
26	(1528)	-	-	-	00010	1	x	
30	g1314-1331	N08W53	sb	10917	10112	5	0.011	
Sep. 1	g2213-2245	N20E90	sn	10922	10011	3	0.026	
4	1611-1812	N21W19	1b	10913	21120	6**	0.017	
5	0803-0931 and/or 0811-0840	N19W22 N14E05	sn sn	10913 10918	00131	5	0.008	
8	1227-1254	N13W47	1b	10918	21232	10	0.039	
9	g 2117-2131 and/or 2123-2133	N13W66 S09E40	sn sn	10918 10931	00010	1	x	
15	0444-0546	N05W40	1n	10933(S)	01010	2	vs	A "Spotless" Flare
23	1817-1847	N13E36	sn	10959	00020	2**	s	
24	1612-1720	N09W11	1f	10948	01020	3**	s	
26	0019-0041	N17W66	1n	10946	01012	4	-	

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date 1970	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
Oct. 22	g1951-2011	N21W57	sf	10993	00010	1	x	
24	1425-1500	N12W33	sn	10995	00112	4	s	
26	1235-1302	N13E45	sb	11002	30100	4	0.099	
27	(1212)	-	-	-	30100	4	≥0.013	
27	1414-1435	N11W77	sn	10995	10112	5	0.015	
27	2239-2304	N13W84	sn	10995	10110	3	0.010	
28	1232-1330	N21E21	2b	11002	32234	14**	>0.039	
30	2328-2409	N15W30	2b	11002	22200	6	>0.004	
Nov. 4	2119-2330	N23E16	1b	11018	21121	7**	>0.005	
4	2250-2302	N14W85	1b	11002	11110	4	0.030	
5	0307-0720	S13E35	3b	11019	33332	14**	0.230	A major flare in almost "Spotless" region.
6	(0649)	-	-	-	00010	1	x	
7	(0402)	-	-	-	00010	1	x	
10	1430-1455	N19W40	1n	11022(S)	01010	2	s	A "Spotless" Flare.
10	1721-1735	N15W66	sn	11030	10012	4	≥0.009	
11	(0707)	-	-	-	00212	5	s	
11	1911-1955	N18E44	sn	11029	00020	2**	-	
12	g0342-0351	N05E90	sb	11035	30213	9	s	
12	(1740)	-	-	-	00032	5	s	
15	0625-0850	N15W12	2b	11029	222-2	≥8	0.410	
15	g1315-1330	N16W11	sn	11029	20030	5	-	
15	1754-1905	N16W18	1b	11029	31100	5	≥0.170	
16	0042-0232	N16W22	2b	11029	32332	13**	>0.180	Van Allen (2-12Å): "Greatest X-ray Event since Nov. 24, 1969".
16	0921-1110	N16W27	2n	11029	322-0	≥7	0.410	
16	1210-1324	N16W27	1b	11029	31120	7**	>0.200	
16	1337-1408	N17W26	1b	11029	11130	6	0.090	
17	0732-0900	N16W38	2b	11029	322-0	≥7	0.490	
17	1147-1210	N15W41	1n	11029	21130	7**	0.051	
18	1023-1043	S12W19	sn	11032	00112	4	-	
18	(1219)	-	-	-	00020	2**	vs	
19	2246-2322	N01W19	1n	11035	21112	7	0.030	
21	1512-1606	N07W40	1b	11035	11212	7	0.051	Also IV (DCM), duration 6 minutes reported by H.
23	0007-0021	N03W53	sb	11035	00012	3	s	
24	(1502)	-	-	-	00130	4	-	
Dec. 3	(0420)	-	-	-	10113	6	-	
5	2259-2426 or	N15W46	1n	11060	11110	4	0.013	
	g2330-2352	S17W18	sn	11063				
8	0425-0452	N13E80	1b	11077	31100	5	0.300	
8	1144-1227	N16E43	sn	11073	00112	4	>0.017	
9	0800-0840	N13E70	1n	11077	21111	6	0.056	
9	1752-1814	N03E85	1b	11077	11130	6	0.017	
11	0351-0415	N04E64	1n	11077	01010	2	-	
11	1025-1054	N10E36	1b	11077	31214	11	>0.008	Also IV (M) reported by WEIS, duration only 5 minutes.
11	2205-2443	N16W01	1n	11073	11332	10**	0.080	
12	0901-0922	N10E23	1b	11077	31103	8	>0.100	IV (M) also reported by WEIS, duration only 7 minutes.
13	1831-1843	N10E04	sb	11077	10113	6	0.039	IV (DKM) also reported by SAG, duration only 6 minutes.
17	(0617)	-	-	-	00312	6	vs	

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1971								
Jan. 1	2013-2043	N13W34	sn	11097	00010	1	s	
12	(1844)	-	-	-	00030	3?	x	IV (DKM-SAG) duration 2 hours, is reported as III N (M & DKM) by H.
13	g{1223-1243 or 1237-1500}	N14E69 S15E23	sf sf	11123 11121	00032	5	vs	
14	1121-1143	S09W56	1b	11111	11213	8	0.051	
16	0804-1030	N18E65	2n	11128	22322	11	0.090	
16	(1429)	-	-	-	00130	4?	x	IV (DKM-SAG) reported as I N (DCM & M) by H.
21	1320-1353	N19W04	sn	11128	30220	7**	>0.084	
24	2308-2530	N18W49	2b	11128	22333	13**	0.490	
Feb. 5	g0524-0558 or 0533-0553	S09E13 N03W43	sn sn	11145 11137	00010	1	vs	
5	1424-1448	N10W75	sn	11140	00030	3	vs	
5	2221-2320	S09E02	2n	11145	12232	10**	0.009	
14	g0205-0225	S14E85	sf	11163	00010	1	vs	
14	2316-2400	S12E74	1n	11163	01010	2	s	
19	g1458-1516	N20W38	sn	11162	00012	3	vs	
20	0814-0925	N21W45	1n	11162	11111	5	>0.017	
22	1423-1522	S14W38	1n	11163	01011	3	s	
25	(0451)	-	-	-	00010	1	-	
27	g0454-0530	S22W87	1b	11163	01012	4	x	
								There are no "Major Solar Events" in March.
Apr. 1	1300-1430	S19W13	1n	11221	11132	8	0.005	
6	0936-1028	S19W80	1b	11221	212-1	≥6	>0.013	
7	(1612)	-	-	-	00030	3	x	
10	g1317-1345	N04E88	sn	11249	10030	4	-	
11	g1504-1532	N20W25	sf	11234	00030	3?	s	IV (M & DKM - BO), reported as cont.(DKM) by SAG.
11	g1637-1646	N03E65	sn	11249	10030	4	x	IV (DCM-H), becomes continuum at M & DKM-λ.
20	0055-0157	N21W17	1n	11256	31100	5	≥0.056	
20	0513-0615	N20W19	2b	11256	32202	9	0.490	Also IV (DCM) reported by CLG, duration only 2 minutes.
20	1919-2155	S06W49	1n	11250	21221	8**	0.030	
21	g0605-0631	N18W45	sn	11256	10010	2	0.006	
21	1115-1139	N18W48	sn	11256	20111	5	0.009	
May 3	1412-1428	N15E47	sb	11294	30213	9	0.150	
12	0131-0240	N13W70	2n	11294	22211	8	0.073	
13	1750-1815	N10W85	1n	11294	21231	9	>0.073	
14	1411-1540	N04E11	1b	11312	21232	10**	0.086	
14	(1805)	-	-	-	10130	5?	0.013	IV (DKM-BO) called continuum by CLRO and SAG.
15	g1705-1732	N03E24	sn	11313	00030	3?	-	IV (DKM-BO) called continuum by CLRO.
16	(1236)	-	-	-	00031	4	-	
26	g1525-1643	S08W18	sn	11340	00030	3	-	IV N reported by H, DCM-λ only.
Jun. 5	(2118)	-	-	-	00010	1	x	
24	g0427-0502	S10W90	sn	11377	00011	2?	x	Also IV (M), duration only 2 minutes, reported by CLG.

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1971								
Jun. 29	1230-1252	N18W15	sn	11393	20132	8	0.022	
29	1535-1610 and g1654-1700	N18W17 and N16W18	sb sf	11393	10032	6	0.009	
29	2235-2312	N18W22	sb	11393	10233	9**	-	
30	2143-2200	N17W33	sn	11393	10011	3	-	
Jul. 1	1340-1413	S13E19	1b	11402	11112	6	0.015	
19	g2105-2127	N07W10	sf	11425	00022	4**	-	
24	1758-1850	N07W77	sn	11425	10210	4	0.013	
Aug. 3	1040-1110	S08E80	1n	11457	01011	3	s	
20	(1520)	-	-	-	00032	5	x	IV (DCM-H), called IIIN and continuum by other observers, at M & DKM-λ.
Sep. 1	(1934)	-	-	-	00232	7**	s	
8	1836-1905	S13W73	sn	11496	00030	3**	s	
12	g1617-1653	S17E85	sf	11516	10030	4**	0.044	
13	2353-2412	S14E72	sb	11516	10110	3	0.013	
14	2338-2412	S14E59	sn	11516	10112	5	>0.022	
15	0320-0440	S12E53	1n	11516	21112	7	0.040	
17	1544-1610	S17E22	1b	11516	11011	4	0.018	
Oct. 3	1330-1530	N13E14	2n	11537	32232	12**	0.080	
10	0024-0115	N12W73	1n	11537	31000	4	≥0.031	
19	1302-1405	N09E31	1b	11565	31101	6	≥0.053	
Nov. 15	0605-0630	S15E59	sn	11610	00010	1	s	
18	(2254)	-	-	-	00030	3**	x	
19	g2031-2044	S12W77	sf	11615	00010	1	x	
21	g1512-1516	N14E86	sf	11621	00010	1	-	
22	1511-1600	N15E72	1b	11621	21332	11**	0.190	
23	0537-0650	S18E59	1b	11619	21322	10**	0.049	
Dec. 2	0104-0208	S15W66	1b	11619	21231	9**	0.058	
2	0229-0340	S15W68	sn	11619	10231	7?	∿0.015	IV and Cont. from previous event still in progress.
5	g1932-1945	S12E68	sf	11639	00010	1	vs	
14	(0240)	-	-	-	00132	6**	x	
14	g0557-0635	N19E33	sf	11647	00133	7	vs	
15	g1323-1500	N08W14	sn	11645	00030	3	vs	
29	2311-2325	S21W74	1n	11657	21232	10**	(0.071)	
30	(2034)*	-	-	-	1-110	≥3	-	No flare patrol.
30	(2258)*	-	-	-	1-110	≥3	0.022	No flare patrol. Active region 11657 is going over West Limb on Dec. 30th.
31	(0125)	-	-	-	10010	2	0.008	
1972								
Jan 1	(1831)	-	-	-	00010	1	vs	
3	(0402)	-	-	-	00010	1	x	
4	(1519)	-	-	-	00200	2	-	
8	(2006)	-	-	-	00030	3	x	
10	0204-0305	S11E47	1n	11687	01010	2	0.002	
10	g2212-2219	S08E30	sn	11687	00030	3**?	0.002	IV (M-CLG) is reported as cont. (M & DKM) by BO.

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1972								
Jan. 13	2125-2200	S20E82	1n	11693	21130	7**?	(0.039)	IV (M-CLG) is reported as cont. (M & DKM) by BO and cont. (M) by H.
14	0625-0652 and/or 0630-0709	S10E65 / S09W15	2n / 1n	11693 / 11687	02112	6?	0.013	Several Flare choices at time of Type II.
14	(1435)	-	-	-	00010	1	x	
14	1525-1553	S10E60	1b	11693	11110	4?	>0.044	IV (DCM-H) also reported, duration 4 minutes.
15	1809-1915	S11E70	1n	11693	21130	7**	0.022	
16	g2255-2315	S15E49	sf	11693	00010	1	s	
22	0538-0615	S16W39	2n	11693	22232	11**	0.071	
23	0319-0342	S17W51	1b	11693	11112	6	0.036	
26	0345-0358	N14E55	sn	11709	10013	5	0.009	
29	0016-0133	S10E26	1n	11708(S)	01010	2	vs	A "Spotless" Flare.
Feb. 10	2019-2045	S19E84	sn	11734	10130	5	0.004	
10	2313-2436	S17E79	1n	11734	21111	6	0.027	
13	0827-0903	S19E47	2b	11734	22213	10	0.084	
14	g1820-1855	S16E23	sn	11734	00031	4	s	
16	1729-1850	N23E04	sn	11741	00232	7	>0.005	
16	g1934-1944	N08E82	sf	11748	1013-	≥5**	>0.009	Possibly questionable flare - association.
17	1928-2000 / 2054-2110 and/or g2045-2050	S22E87 / S23E84 / S14E38	sb / sn / sn	11751 / 11751 / 11743	20231	8**	0.150	
18	2133-2150 and/or 2137-2144	S13E30 / N15E51	sb / sn	11743 / 11748	00112	4	0.006	
19	1515-1535 and/or 1516-1528	N06E33 / S09W88	1n / sn	11748 / 11729	21222	9**	0.062	
22	0029-0057	N03W02	2n	11748	22333	13**	0.093	
22	1310-1413	N07W04	1b	11748	31102	7	0.130	
23	0649-0703	S19E23	sn	11751	00110	2	vs	
23	1926-1955	N15W15	sn	11748	00120	3**	-	
23	g2135-2152	N05W28	sn	11748	00112	4	-	Also cont. (DKM) in progress.
26	1805-1834	N11W43	sb	11748	10112	5?	-	II (DKM-CLRO) is reported as IIIG by H, BO, & SAG.
27	(1842)	-	-	-	00012	3?	-	II (DKM-CLRO), not reported by H or BO.
Mar. 4	(1625)	-	-	-	00030	3	x	
5	0807-0830	S07E42	1b	11769	213-3	≥9	0.510	
5	1135-1207	S08E40	sn	11769	20213	8	0.018	
5	g 2028-2040 and 2109-2126	S08E18 / S12E21	sn / sn	11769	00030	3	vs	
6	0237-0315	S07E32	sb	11769	20232	9	0.036	
6	1045-1150	S07E26	1b	11769	31234	13**	0.160	
7	0216-0233	S11E20	1b	11769	21233	11	-	
16	(0029)	-	-	-	00010	1	-	
21	0112-0128	N08E43	sb	11787	10112	5	0.018	
21	0210-0251	N11E74	1f	11790(S)	01010	2	vs	A "Spotless" Flare.
31	(1524)	-	-	-	00010	1?	-	II (M-WEIS) is reported as IIIG(M) by H.

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1972								
Apr 9	2318-2343	S11W73	1b	11799	11031	6**	(0.022)	
28	(2250)	-	-	-	00010	1	x	
May 6	g0026-0355	S20E30	2f	11856	02030	5	vs	
8	1527-1630	S18E04	sn	11856	00130	4?	0.005	IV (M & DKM-BO), called cont. (DKM) by SAG.
16	0307-0410	S06W15	1b	11870	21232	10	0.044	
17	2234-2345	N15E33	2b	11882	22230	9**	0.071	
20	(2233)	-	-	-	00030	3	vs	
24	0705-0740	N08E87	1b	11895	31232	11**	>0.510	
24	(1620)	-	-	-	00030	3	vs	IV (DKM-BO) reported as I at M-λ by H.
24	(1906)	-	-	-	00130	4	x	
28	1305-1500	N09E30	2b	11895	32333	14**	>0.510	
Jun. 3	1402-1530	N10W53	1n	11895	21232	10**	0.013	
6	1505-1533	N10W90	1b	11895	31101	6	0.080	
8	g1319-1336	S06W30	sf	11911	00011	2	vs	
12	1318-1402	S11E53	1b	11926	31132	10**	0.190	
15	0928-1030	S11E10	1n	11926	21212	8?	0.013	During CINOF Project, the flares of June 15 were reevaluated as Importance 2
15	1247-1500	S12W02	1n	11922 and 11926	21131	8?	0.062	IV (M & DKM-BO) is reported as cont. (DKM) by SAG.
20	1916-1923	N04E85	sb	11933	10132	7**?	0.036	IV (DKM-SAG) duration 9 minutes. Reported as IIIG & V by H.
21	g0338-0348	N04E85	sn	11933	00012	3	s	
23	1723-1755	N08E39	1n	11933	21111	6	0.120	
24	0700-0750	N09E30	1b	11933	31232	11**	0.180	
25	0441-0600	N08E20	1b	11933	11132	8**	0.022	
29	(1952)	-	-	-	00030	3	-	
Jul. 11	1352-1505	S10W25	1n	11949	21130	7	0.018	IV is DCM only (H)
15	0404-0427	S09W44	sn	11959	00011	2	-	
19	(0345)	-	-	-	00011	2	x	
19	(0420)	-	-	-	00010	1	-	
22	(0134)	-	-	-	00010	1	x	
22	(0334)	-	-	-	00010	1	x	
22	0549-0630	S08W50	sn	11958	00010	1	-	
27	0632-0700 and 0632-0642	S05E19 S10W64	sn sn	11968 11971	00011	2	0.003	
Aug. 2	0316-0451 0505-0800	N13E35 N14E34	1b 2n	11976	32322	12	≥0.179	No II or IV reported in dynamic spectra.
2	1838-1859	N14E26	1b	11976	21200	5?	0.049	IV (DCM) reported by H, duration only 4 minutes.
2	1958-2355	N13E27	2b	11976	22333	13	≥0.147	
4	0620-1000	N14E08	3b	11976	33334	16	>0.456	
4	1308-1340	N13W01	sn	11976	10032	6	x	
4	(2136)	-	-	-	00010	1	x	
4	g0234-0244	N14W19	sf	11976	00110	2	s	Flare-association may be doubtful.
7	1200-1230	N13W34	1b	11976	11130	6	-	
7	1443-1700	N14W36	3b	11976	33333	15**	≥0.456	
10	2306-2314	N11W88	sn	11976	00130	4	0.009	
11	1217-1305	N12W90	1b	11976	21131	8**	0.081	
11	(1315)	-	-	-	00211	4	0.015	

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1972								
Aug. 12	(2042)	-	-	-	00030	3?	0.007	IV (M & DKM-BO) is reported as Is and cont. at M-λ by CLG.
15	1739-1812	N03E77	sb	11994	10110	3	0.021	
21	g1927-1936	S12E60	sf	12002	00010	1	vs	
24	0345-0445 and 0347-0422	S04E02 / S15E32	2n / sn	12001 / 12002	02012	5	0.005	
24	(1700)	-	-	-	00030	3	s	IV (DKM-BO), duration 11 minutes.
26	(0348)	-	-	-	00132	6**	0.008	
26	g2300-2340	N16E89	sn	12011	00132	6**	0.010	
27	g2334-2340	N14E88	sn	12011	20231	8**	0.020	
28	1640-1658	S24E89	sn	12014	10010	2	0.020	
28	g2021-2045	N14E60	sn	12011	00033	6	-	
30	0650-0721	S26E59	1n	12014	1111-	≥4	0.020	
31	2346-2415	S26E37	1n	12014	01010	2	s	Also cont. (DKM-BO) reported in progress all day.
Sep. 5	1422-1600	S25W21	1n	12014(S)	01012	4	s	Region has become "Spotless" by day of Flare.
5	1536-1636	N17W19	1n	12011	01010	2	0.004	
6	0407-0440	S07W87	1b	12012	21131	8**	-	
6	g2149-2154	S08W29	sn	12016	10132	7**	-	
10	g1237-1252	N11W62	sf	12023	00030	3?	-	IV (M & DKM-BO), called I_C(M) by H, and cont. (DKM) by SAG.
10	(1745)	-	-	-	00010	1	s	
21	2241-2345	S17E13	1n	12040	01010	2	0.004	
Oct. 1	0433-0458	N11E25	sb	12056	20112	6	0.081	
1	1645-1711	N12E16	sn	12056	20111	5	0.081	
7	2225-2340	N19W25	2n	12057	02031	6?	s	IV (M & DKM-BO), called I_S and cont. (M) by CLG.
10	(2141)	-	-	-	00010	1	vs	
21	1537-1556	S12E90	1b	12090	01010	2	0.003	
27	1957-2014	S11E22	sn	12094	00030	3?	-	IV (M & DKM-BO), called Is and cont. (M & DKM) by H&CLG.
28	1752-1911	S09E67	1n	12099(S)	01020	3**	0.005	A "Spotless" Flare.
29	g1544-2020	S10E05	sn?	12094	20230	7?	0.033	IV (M & DKM-BO), called I and cont. (M & DKM) by H and SAG.
Nov. 1	(0714)	-	-	-	00013	4	0.013	
24	1234-1320	S07W33	sn	12115	20130	6	0.016	
25	0817-0912	S06W44	1b	12115	21233	11**	0.049	
28	0358-0428	S08W81	1n	12115	01130	5**	0.011	
Dec. 5	g0602-0606	S14W19	sn	12132	00010	1	x	
8	2257-2345	N10E38	1n	12136	21233	11**	>0.029	
9	(1601)*	-	-	-	2-210	5?	0.014	Also IV (DCM & M-H), duration 8 minutes, No Flare Patrol.
10	0033-0200	N11E25	1n	12136	21131	8	0.029	
15	0522-0645	S06E47	1b	12143	21110	5	0.029	
16	0341-0445	N12W57	1b	12136	21232	10**	0.101	
30	(2240)	-	-	-	00030	3	x	IV (M), From CLG Radioheliograph, with source position beyond East Limb.

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1973								
Jan. 6	1350-1442 and 1447-1451	N13E13 N13E10	1n 1f	12164	21130	7**	0.029	
6	(2053)	-	-	-	00010	1	-	
7	(1638)*	-	-	-	00010	1	-	No Flare Patrol.
7	(1702)*	-	-	-	00010	1	vs	No Flare Patrol.
9	0447-0505	N09W53	1n	12160	01110	3	0.005	
11	0035-0127	N11W80	1b	12160	31132	10**	>0.014	
11	(1807)	-	-	-	20132	8**	>0.007	
Feb. 10	g1401-1452	S13E45	sn	12224	00011	2	0.003	
14	g2253-2302	N16W65	1f	12223	01030	4	0.009	IV (M & DKM-BO) is called cont. (M) by CLG.
16	(1905)	-	-	-	10031	5**	0.007	
18	2105-2257	S06W06	1n(S)	12228	01132	7**	0.004	Region is Spotless on day of flare.
28	1311-1345	N06E13	sn	12246	00030	3	vs	
28	2155-2245	N08W01	1b	12246	21131	8**	0.065	
Mar. 1	1115-1205	N07W08	1b	12246	21212	8	>0.084	
12	1057-1215	S18W22	1b	12261	11132	8**	0.009	
13	0858-0920	N10W48	sn	12259	10132	7	0.013	
14	1443-1521 and/or 1514-1530	S10W09 S17W52	sn sn	12263 and 12264 12261	00032	5**?	-	IV (M-BO) reported as I and cont. (DCM & M) by H.
14	2253-2306	S18W56	sn	12261	00010	1	0.008	
15	g2042-2115 g2205-2220	S13W28 S08W30	sf sn	12263	00032	5	0.004	IV (M-H) is reported as Is and cont. (DCM & M) by CLG.
15	g2247-2303	S07W31	sf	12263	00130	4	x	IV (M & DKM-BO) is reported as Is and continuum at M-λ by CLG.
20	1111-1128	N16E22	sb	12273	10112	5	0.004	
22	(0230-0318)	-	-	-	00031	4	s	Moving Type IV on CLG Radioheliograph related to eruptive prom. at East Limb.
26	g2358-2400	N15W51	1b?	12273	01030	4?	-	IV (M & DKM-BO) is a change from cont. in progress. Is and cont. (M) reported by CLG.
29	(2250)	-	-	-	00030	3**	0.004	
Apr. 1	1703-1734	N13E44	sb	12298	00111	3	0.013	Also cont. (DKM-BO) in progress all day.
1	2202-2310	N13E42	1n	12298	01011	3	0.014	
4	1129-1255	S13E70	1n	12300	11122	7**	0.009	
10	1223-1300	S07E09	sb	12306	30132	9	0.072	
10	1300-1327 and 1300-1520	S08E09 S12W20	sb 2n	12306 12300	12132	9	-	12300 and 12306 are "adjacent regions", and constitute a "zone" on the sun.
11	1838-2200	S09W10	1b	12306	21232	10**	0.209	
22	g1227-1239	N13E25	sf	12322	00030	3	s	
22	2145-2230	N13E20	sn	12322	10132	7**	0.014	
24	g1413-1449	N14W03	sn	12322	10232	8**	0.008	

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date 1973	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
Apr. 24	1917-2010	N13W06	sb	12322	10132	7**	0.027	
26	1916-2110	N12W36	sn	12322	10112	5	0.086	
26	g2300-2318	N10W33	sn	12322	00012	3	0.005	
29	0132-0211	N14W65	sn	12322	10130	5	0.014	
29	0625-0730	N12W65	1b	12322	21130	7	0.050	
29	0958-1130	N12W68	sb	12322	20232	9	~0.080	
29	2056-2308	N13W75	2b	12322	32334	15**	0.170	
May 1	0243-0251	N12W90	sb	12322	30332	11**	0.209	CLG Radioheliograph puts source $2R_\odot$ beyond NW Limb.
1	g1825-1853	S14E74	sf	12336	10110	3	0.004	
1	(2110)	-	-	-	10123	7**	-	
3	0145-0236	S14E54	sn	12336	20200	4	0.029	
3	(0444)	-	-	-	00132	6**	-	
3	0830-0915	S14E51	2b	12336	32334	15**	0.209	
5	1655-1830	S15E20	2b	12336	32230	10?	>0.375	IV is DCM only (H), duration only 9 minutes.
10	(1240)	-	-	-	00030	3	-	
13	(2234)	-	-	-	10031	5?	0.004	IV (M & DKM-BO), reported as I_S and cont. (M) by CLG.
17	1908-1927	N07E53	1n	12352	21113	8	>0.010	
18	1525-1558	N07E42	1b	12352	21113	8	>0.022	
18	g{2301-2307 and/or 0003-0038}	N08E37 / N06E29	sf / sn	12352	00032	5	0.003	IV (DKM-BO), reported as I_S and cont. at M-λ by CLG and H.
19	2233-2330	N10E19	2b	12352	22333	13**	0.209	IV (160 and 80 MHz) observed by CLG Radioheliograph.
Jun. 10	(0020)*	-	-	-	0-010	1	-	No Flare Patrol.
10	(0059)	-	-	-	00010	1	x	II also observed by CLG Radioheliograph. Source location is beyond NE Limb (Probably related to region 12387).
10	g{0829-1000 and 0857-1005}	N21E85 / N10E90	1n / 1b	12387	01011	3	vs	
16	1419-1510	N13E11	2b	12387	22112	8	0.027	
26	0038-0300	S09W27	1n	12397	11232	9**	≥0.010	CLG Radioheliograph places source of II and IV at and beyond SW Limb.
29	0145-0210	S13W48	sn	12402	00132	6	0.006	With concomitant III & V bursts on CLG Radioheliograph, source locations at SE Limb and SW Limb.
29	1512-1527	S08E74	sb	12414	10112	5	0.011	
29	g1906-1917	S08E71	sn	12414	00012	3	-	
Jul. 4	0201-0238	S08E12	1n	12414	01132	7**	0.004	IV (160 and 80 MHz) observed by CLG Radioheliograph.
7	0415-0449	S08W32	sn	12414	00010	1	s	
8	g1819-1835	S06W53	sf	12414	00010	1	-	
15	(2330)	-	-	-	00030	3**	-	
16	(0022)	-	-	-	00010	1	x	Previous IV (M & DKM) is still in progress.
18	0217-0303	N14W46	sn	12431	00032	5**	-	IV (160 and 80 MHz) observed by CLG Radioheliograph.

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1973								
Jul. 18	0217-0303	N14W46	sn	12431	00032	5**	-	IV (160 and 80 MHz) observed by CLG Radioheliograph.
26	g0000-0017	N18E88	sn	12461	00010	1	-	
27	(2027)	-	-	-	00010	1	-	
29	1312-1600	N14E45	3b	12461(S)	23231	11**	0.071	A great "Spotless" Flare.
Aug. 13	(0616)	-	-	-	00011	2	-	
21	1344-1433	N12E90	2f	12497(S)	02031	6	s	A "Spotless" Flare IV (M & DKM-BO) is reported as cont. (DKM) by SAG.
21	(1825)	-	-	-	00030	3	x	
Sep. 4	g{0036-0058 and/or 0052-0106	S17E32 / N13E27	sn / sn	12512 / 12510	00112	4	vs	
4	g1454-1510 / 1459-1518 / g1507-1518	S17W12 / N12E18 / S12E55	sn / sn / sf	12507 / 12510 / 12513	10112	5	0.013	Three widely-scattered but concomitant sub-flares at time of Type II.
5	g1828-1834	N11E04	sn	12510	10112	5	0.013	
7	1139-1345	S17W46	2b	12507	32232	12**	0.140	
8	(1720)	-	-	-	00010	1	-	
11	0654-0737	S11W55	1n	12520	01111	4	0.013	
14	(2338)	-	-	-	00030	3	x	
17	(1516)	-	-	-	00020	2**	x	
23	1747-1816	S14E32	sn	12534(S)	00011	2	s	A "Spotless" Flare.
Oct. 3	2031-2103	N18E08	sn	12543	00010	1	-	
4	1031-1220	S14W44	1n	12540	11010	3	0.004	
5	g{1928-1957 and/or 1937-2039	S15W42 / S12W59	sf / sf	12542 / 12540	00010	1	s	
6	1049-1127	S16W68	sn	12540	00010	1	s	
7	2322-2335	N14W64	sn	12543	00010	1	vs	
27	1547-1746	N18E54	2n	12590	12131	8**	0.031	
30	1440-1530	S15W34	sn	12584	00032	5	0.004	
Nov. 1	1925-2052	S17W65	sn	12584	10131	6	0.008	
3	0012-0100	S20W85	1n	12584	21233	11**	0.170	
4	(1935)	-	-	-	00030	3**	0.004	
26	1334-1400	S09E11	1n	12628	11112	6	0.018	
27	0306-0325	S07E03	sb	12628	10111	4	-	
Dec. 3	(0607)	-	-	-	00010	1	-	
22	g0300-0328	S19E03	sn	12664	00010	1?	s	IIN (M) reported by CLG, duration >4 hours.
23	(0000)	-	-	-	00010	1?	x	IIN (M) reported by CLG for >7 hours. Perhaps not flare-associated.

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date 1974	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.-X-ray Flux (t)	Some remarks (r)
Jan. 16	(0636)	-	-	-	00010	1	0.018	
17	(1931)	-	-	-	00010	1	vs	
Feb. 15	1505-1539	S12W51	sn	12749	10212	6?	0.018	Also IV (DCM) Reported by DWIN, duration 4 minutes.
20	1513-1533	S18W30	sb	12752	20132	8?	-	IV (DKM-SAG), duration 3 minutes. Reported as IIIG & V (DCM, M & DKM) by H.
Apr. 1	1605-1623	N08W90	sn	12834	00030	3	-	
13	1541-1607	S12W36	1n	12848	31000	4	0.048	
16	1620-1655	S13W55	1b	12849	31200	6	-	
17	(1433)	-	-	-	00010	1	-	
30	g1430-1456	S07E90	sf	12906	00130	4	-	
May 1	1002-1027	S11E75	2b	12906	22002	6		No NRL SOLRAD X-ray data in SGD Part II after April 1974.
3	(2330)	-	-	-	00030	3		
13	2117-2328	S13W65	2n	12906(S)	12211	7		Region 12906 is "Spotless" on day of flare.
Jun. 4	0008-0055	S14W13	1b	12972(S)	21132	9**		A "Spotless" Flare.
6	1535-1600	S15W46	1b	12972(S)	11112	6?		Also IV (DKM-SAG), duration 6 minutes. Not reported by BO.
19	g2200-2253	S12W08	sn	13002	00131	5**		A "Spotless" Flare.
23	0508-0655	S15W50	3n	13002(S)	13110	6		Region 13002 is "Spotless" on day of flare. Also cont. (DKM-MAN), duration 8 minutes.
30	g0226-0245	S11E49	sn	13043	10110	3		
30	2223-2310	S12E45	1b	13043	21222	9**		Type II also observed by CLG Radioheliograph.
Jul. 1	2205-2252	S12E30	1b	13043	11232	9?		IV (DKM-SAG), duration 14 minutes. Called cont. (DKM) by MAN.
1	2334-2437	S15E27	sn	13043	10121	5**		Two Flare Maxima, and Three Type II's.
2	g0147-0156	S14E21	sf	13043	10010	2?		Flare has ended before II occurs. Cont. (DCM, M, and DKM) in progress from previous event.
2	0606-0745	S15E22	1n	13043	21234	12		IV (DCM & M - DURN), and (M-WEIS).
2	g0809-0910	S15E20	sf	13043	00030	3		IV (DCM & M-DURN), duration 18 minutes.
2	g1348-1415	S16E16	sf	13043	10032	6**		
2	1627-1651	S13E10	sn	13043	10130	5		
2	1922-1951	S16E11	sn	13043	10030	4?		IV (DKM-SAG), duration 10 minutes. Not reported by BO.
2	2220-2403 and 2252-2356	S14E27 and S15E14	sb and 1n	13043	11132	8		IV (M & DKM-BO), duration >4 hours, called I_s and Cont. (M) by CLG.

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.-X-ray Flux (t)	Some remarks (r)
1974								
Jul. 3	0759-0928	S15E08	2b	13043	32234	14		
3	(1058)	-	-	-	00030	3		IV (DCM & M), duration 13 minutes.
3	g1220-1238	S12E04	sf	13043	00132	6		
3	g1418-1438	S17E05	sf	13043	00030	3		
4	0610-0800	S15W04	1b	13043	31333	13?		IV (DCM & M - DURN), called continuum by CLG.
4	1320-1450	S16W07	2b	13043	32333	14**		
4	1704-1724	S17W09	sn	13043	10132	7		
4	1818-1855	S17W10	1n	13043	11202	6		Ic (M & DKM) also reported by H.
4	2031-2125	S16W12	1n	13043	21232	10		
4	g2313-2346	S14W13	sf	13043	00020	2**		Cont. (M-CLG), duration 12 minutes.
5	1506-1610	S15W23	1b	13043	31232	11		
5	2120-2326	S15W26	1b	13043	31334	14**		
6	g{0537-0540 and 0549-0603	S14W01 / S17W32	sf / sf	13051 / 13043	00012	3		
6	1050-1227	S17W35	1b	13043	21234	12		
6	1817-2010	S15W40	1b	13043	31232	11		
7	(2333)*	-	-	-	0-010	1?		No Flare Partol. Cont. (DKM-BO) in progress 2312-2605 UT.
8	1540-1610	S17W64	sn	13043	30200	5		
9	0149-0215	S15W69	sb	13043	30100	4		
9	1355-1405	S17W74	sn	13043	20231	8**		
18	g{2012-2020 and 2026-2100	S11W18 / S11W21	sf / sf	13063	00030	3?		IV (M & DKM-BO), duration >5 hours, reported as cont. by SAG & CLG.
23	g2317-2343	S15E06	sn	13088	00030	3		CLG Rdioheliograph observes IV (160 - 43 MHz). Source location is in SE Quadrant.
26	0644-0730	S13E50	1n	13095 and 13101	01010	2		
26	2225-2243	S10E35	sn	13095	00112	4		
Sep. 10	2120-2340	N09E60	2b	13225	32333	14**		
12	g2021-2052	N10E32	sn	13225	00032	5		IV is DCM only (H).
13	1509-1758	S14E24	2b	13224	32232	12**		
15	(1447-1653)	-	-	-	00030	3		IV (DCM-H) No known flare.
15	g1803-1848	N11W11	sn	13225	00030	3		IV (DCM-H).
16	g1320-1545	N05W19	sf	13225	00130	4		IV (DCM-H).
18	1052-1244	N10W42	1n	13225	11132	8		
18	1528-1900	N09W44	1n	13225	11132	8		IV (DCM-H).
19	2224-2500	N08W62	2n	13225	22332	12**		
23	0021-0045	N13W90	1b	13225	01231	7		No Flare Patrol 22nd 2201-2342 UT. Type IV begins 22nd 2301 UT.
23	g1200-1206	N07W90	1n	13225	21234	12**		
24	(0403)*	-	-	-	00232	7**		No Flare Patrol.
Oct. 1	(2302)	-	-	-	00012	3		CLG Radioheliograph places source of II at East Limb.
3	2047-2145	N10E00	1f	13262	01032	6		
5	1158-1222	N08E90	sn	13280	00030	3		

COMPREHENSIVE FLARE INDEX FOR "MAJOR" FLARES†, 1970-1974 (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Max.X-ray Flux (t)	Some remarks (r)
1974								
Oct. 5	g{1508-1547 and/or 1510-1525	S20E44 / N08E90	sn / sn	13278 / 13280	00030	3		
8	g1550-1610	N07E47	sf	13280	00010	1		
11	0325-0401	N12E02	1n	13280	21232	10**		CLG Radioheliograph observes II and IV, source location in NE Quadrant.
11	1010-1050	N12W03	1b	13280	21112	7?		IV (DCM-DURN) also reported, but duration is only 1 minute.
11	1425-1548	N12W03	1b	13280	21232	10		IV (M-WEIS), duration 10 minutes.
12	1130-1215	N11W05	1n	13280	21232	10		
25	(1716)	-	-	-	00020	2**		
31	1539-1553	N16E90	sn	13324	30131	8**		
Nov. 5	1529-1550	S12W78	sn	13310	21233	11**		With Two Type II's.
6	0309-0342	S13W85	1b	13310	21231	9**		CLG Radioheliograph locates source of II and IV. 1 to 2 $R_\odot$ beyond W. Limb.
6	1345-1442	N15E13	1b	13324	11111	5?		Also IV (DCM & M-DURN), duration 7 minutes.
7	g{1500-1520 and 1523-1556	N10W06 / N14W02	sf / sn	13324	00030	3		
30	0551-0614	N03W52	sn	13343	00010	1		
Dec. 7	(1950)	-	-	-	00010	1		
22	1601-1810	N06E14	1n	13383	01131	6**		
25	1906-2030	N05W26	1b	13383	11131	7**		
27	0017-0059	N07W43	1n	13383	01110	3		

Notes: † This list of "major" flares includes all flares that satisfied any one of the five criteria stated on page 1 of this report.

abcde The successive entries in the column titled "Hα Flare Profile" refer respectively to evaluations of the ionizing radiation, the Hα flare, the ∿10 cm flux, the type of event in the dynamic spectrum, and the ∿200 MHz flux. See page 1 of this report. A dash (-) appearing in the profile set indicates "no observations" were available for that respective entry.

†† When no flare or subflare was reported the beginning time of the SID or radio frequency event is shown in parentheses.

g Flare data were taken from *Solar-Geophysical Data* instead of the "IAU Quarterly Bulletin on Solar Activity" as in all other cases.

* Hα flare patrol was not in progress.

S This letter appearing after the McMath plage number indicates a "Spotless" flare took place.

** A double asterisk following the index value indicates that a Type II burst, in addition to continuum or Type IV emission, also was reported.

? A question mark following the index value indicates a Type IV event that is questionable for either duration or conflicting reports.

t In general this column contains information on 1-8Å flux compiled from assorted data published in *Solar-Geophysical Data (SGD)* for the Naval Research Laboratory (NRL) SOLRAD X-ray data. It is expressed in units of ergs $cm^{-2}sec^{-1}$. If the flux value is enclosed in parentheses it indicates 2-12Å data (Van Allen) have been used. In this column the following conventions have been used from a subjective examination of the graphs of the 1-8Å X-ray records:

s = small, vs = very small, x = no event, - = no data.

r In the remarks column the following abbreviations have been used:

DCM, M, DKM = decimetric, metric, and dekametric events in the dynamic spectrum; BO (Boulder), CLG (Culgoora), CLRO (Clark Lake Radio Observatory), DURN (Dürnten), DWIN (Dwingeloo), H (Ft. Davis), SAG (Sagamore Hill), WEIS (Weissenau) = stations reporting dynamic spectrum events.

Comments on the Data Included in the List of "Major" Flares

Table I above provides information about the "major" flares in the second five years of solar cycle 20. Similar data for the first five years of the cycle can be found in Report UAG-14. It should be realized that changes over the years in observational range and sensitivity, as well as reporting techniques, have influenced to some extent the identification of an event as a "major" flare and the value of the derived comprehensive index. In the years 1970-74 increased reports of Type II and Type IV radio frequency emission with either subflares or at time of no known Hα flare have increased markedly the proportions of so-called "major" flares with indices of 1 to 3 (See Figure 1A).

In solar cycle 20 there were 100 flares with comprehensive indices >10, (41 in 1967-69 and 59 in 1970-74) and these flares with significant radiation generally throughout the electromagnetic spectrum comprised approximately 10% of the list of "major" flares.

The completeness or homogeneity of the data in Table I can be evaluated in part from the distribution of the "major" flares versus Universal Time (UT). (See Figure 1A). For both five-year intervals there tends to be a maximum in the second half of the Universal Day. This tendency is not marked for flares with indices >10 but increases as the indices become smaller.

The relationship between Hα flare importance and comprehensive flare index for "major" flares, 1970-74, is shown in Table II. It can be noted that only 37, or 56%, of the "major" flares with Hα importance ≥2 had comprehensive indices ≥10. It also seems of interest that more than half of the flare-events here identified as "major" corresponded in time to either subflares or to no known Hα flare. These results support current efforts of the World Data Centers and of the Solar Commission of the IAU to improve the world-wide reporting and tabulation of Hα events considered to be subflares.

The distribution of Comprehensive Indices for each year in the interval 1970-74 is shown in Table III. The small number of "major" flares in 1971 should be noted.

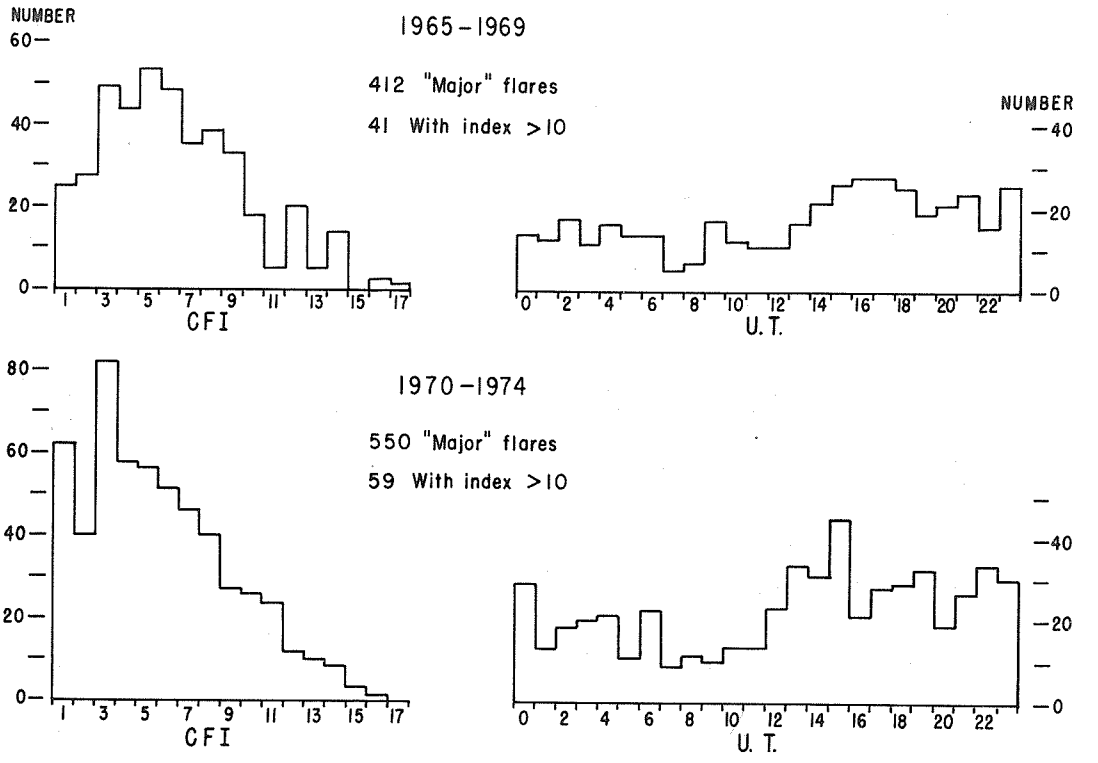

Fig. 1A. Distribution of "Major" Flares by Comprehensive Flare Index (CFI) and UT, Solar Cycle 20; 1965-69, 1970-74.

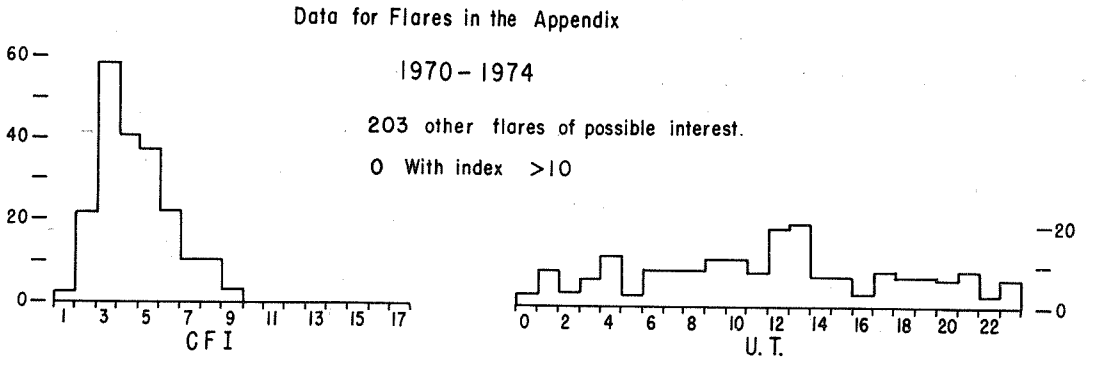

Fig. 1B. Distribution of "Lesser" Flares (see Appendix) by Comprehensive Flare Index (CFI) and UT, 1970-74.

Table II

Hα Importance of Flares in List of "Major" Flares 1970-1974

Hα Importance	Value of Comprehensive Index						Total
	1-3	4-6	7-9	10-12	13-15	>15	
			Number of Flares				
3	0	1	0	1	2	1	5
2	3	9	16	18	15	0	61
1	25	52	60	40	5	0	182
S	86	82	33	3	0	0	204
?	71	23	4	0	0	0	98
Total	185	167	113	62	22	1	550
			Percent of Flares				
3	0	1	0	2	9	100	1
2	2	5	14	29	68	0	11
1	14	31	53	64	23	0	33
S	46	49	29	5	0	0	37
?	38	14	4	0	0	0	18
Total	100	100	100	100	100	100	100

Table III

Number of "Major" Flares Distributed by Value of Comprehensive Flare Index, 1970-1974

Year	Comprehensive Flare Index																	Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1970	11	13	18	23	19	18	18	11	10	10	10	4	4	4				173
1971	9	4	16	10	7	5	5	5	5	4	2	1	1					74
1972	16	15	17	11	12	14	8	9	4	5	6	1	3	1	1	1		124
1973	19	4	16	8	13	5	9	9	4	3	3	1	1		2			97
1974	7	4	16	6	6	10	6	6	4	4	3	5	1	4				82
Total	62	40	83	58	57	52	46	40	27	26	24	12	10	9	3	1		550

Comprehensive Indices for "Lesser" Flares

In order to provide values of the Comprehensive Index for flares of potential interest but not included in the list of "major" flares, an appendix to Table I has been provided. The appendix follows the format and conventions of Table I and gives profiles and comprehensive indices for the following categories of flares:

(1) All flares of Hα importance 2 not contained in the list of "major" flares.

(2) All additional flares for which the (1-8Å) peak flux was greater than 0.040 ergs $cm^{-2}sec^{-1}$.

(3) All flares for which Type IV emission was reported but for which the duration was less than 10 minutes.

This compilation of Comprehensive Flare Indices for so-called "lesser" flares contains 203 entries, 40 of them for flares of Hα importance 2. The comprehensive indices range from 1 to 9 with highest frequencies at values 3 to 5. There were only 3 cases of an index as great as 9 (see Figure 1B). Apparently the listing of "major" flares picks up practically all instances of flares with comprehensive indices as great as 10.

Peak X-Ray Flux for "Major" Flares

The availability of X-ray data for flares in the years 1970-74 suggests that this aspect of flare emission be compared with the Comprehensive Flare Index for "major" flares during the years in question. Figure 2A shows a comparison of the comprehensive indices and the peak X-ray flux for these flares. As is to be expected, there is a general proportionality between the two values, but the scatter is great. High values of X-ray maximum do not guarantee high values of the index with its partial dependence on radio frequency flux. For flares with indices of 6, the X-ray emission ranged all the way from "no detectable event" to the highest values measured.

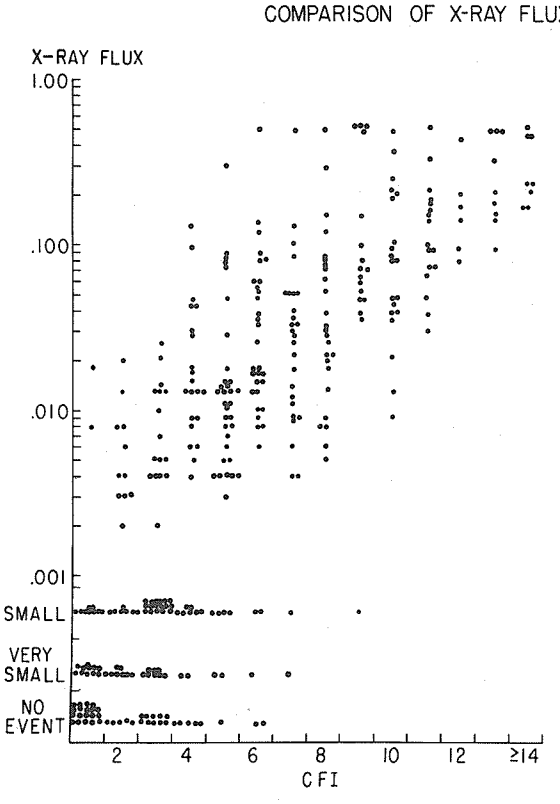

Fig. 2A. Comparison of the Comprehensive Flare Index (CFI) with the peak x-ray flux for the "major" flares of 1970-74.

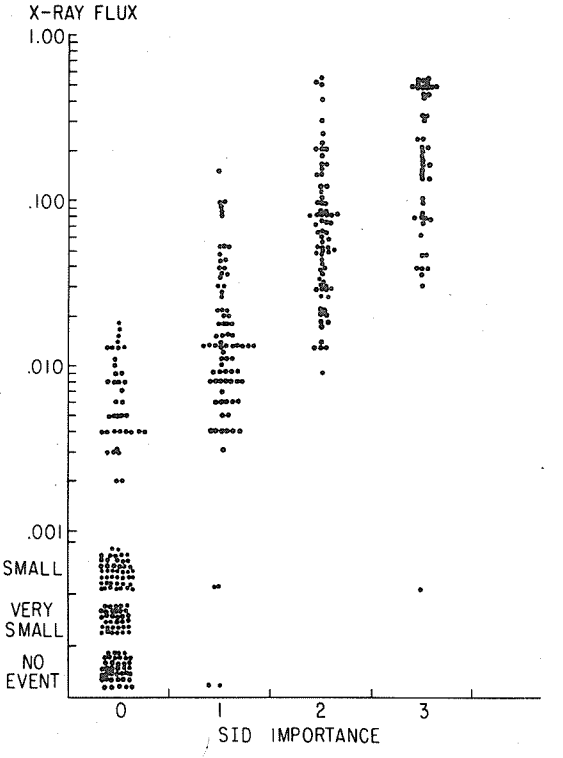

Fig. 2B. Comparison of Sudden Ionospheric Disturbances (SIDs) with the peak x-ray flux for the "major" flares of 1970-74.

In the derivation of the index, the importance of the SID has been used as a supposed measure of the ionizing or X-radiation of the flare. Figure 2B shows the extent of the proportionality between these two quantities for "major" flares in 1970-74. With a few marked exceptions, and with a wide scatter, the two values increase together. It should be remembered that the X-ray measure is the value of the peak flux without regard for the duration of the event. On the other hand, the importance of the SID is influenced by duration. This difference probably contributes to the large range in X-ray flux values associated with the respective evaluations of the SID. In spite of the scatter of the points, Figure 2B suggests that future derivations of the comprehensive index could replace the SID importance by a number reflecting the characteristic of the logarithm of the peak X-ray flux, without a serious break in the homogeneity of the indices.

Acknowledgments

The authors acknowledge with gratitude support from NOAA Contract No. 03-4-022-94 and NASA Grant NGL-23-005-275 during the years in which the work for this study was carried out.

APPENDIX OF "LESSER EVENTS"

Date 1970	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Peak Flux	Remarks (r)
Jan. 2	0510-0750	N20E54	2n	10512	02001	3	0.004	
28	0608-0650	S15W25	2n	10542	22100	5	0.090	
29	0158-0244	S21W29	2n	10542	12100	4	0.007	
Feb. 2	2143-2233	S23W89	1b	10542	21100	4	0.090	
9	0620-0700	N19E20	1n	10568	21100	4	0.140	
11	0209-0312	N19W03	sb	10568	20100	3	0.094	
11	2110-2345	N19W13	2b	10568	22100	5	0.490	
24	g1605-1710	S07W05	sf	10588	1003-	≳4?	0.005	IV (DCM-H), duration only 2 minutes.
28	1908-2050	N07E58	1b	10607	21200	5	0.094	
Mar. 1	2023-2136	N07E43	2b	10607	12000	3	-	
3	2031-2125	N15W65	2b	10595	22200	6	0.094	
12	0306-0345	S14W46	2n	10618	22101	6	0.060	
12	0633-0800	N22W29	2n	10617	12100	4	0.013	
22	2336-2415 and	N16E29	2n	10641	12100	4	0.013	
23	0018-0100	N15E32	2n					
26	1450-1513	N09W24	sn	10641	20033	8?	0.005	IV (DKM-SAG), duration 8 minutes, not reported by BO.
Apr. 6	1234-1346	S13E40	2n	10669	22100	5	0.039	
9	0400-0423	N16E52	1b	10675	21100	4	0.051	
12	1713-1845	N11W50	1b	10670	21203	8	0.077	
25	0037-0058	N05W73	1b	10684	21202	7	0.069	
May 8	0656-0805	N14E23	2b	10725	22100	5	0.064	
12	0716-0808	N16E80	1n	10743	21101	5	0.064	
15	0145-0322	S09W06	1b	10740	21000	3	0.086	
21	0137-0223	N06W68	2f	10741	02000	2?	x	An unconfirmed flare of Imp. 2.
26	1121-1144	S07E17	1b	10760	21000	3	0.230	
Jun. 7	0705-0735	N17E90	1b	10781	21200	5	0.064	
13	0658-0718	N17E53	sb	10789	20203	7	0.140	
13	1330-1410	N16E44	1n	10789	11120	5	0.100	
13	1748-1813	N18E48	sb	10789	10200	3	0.090	
13	2151-2223	N17E40	sb	10789	20202	6	0.200	
14	0004-0040	N19E43	1n	10789	21202	7	0.200	
14	0228-0320	N19W02	2n	10781	12000	3	0.050	
14	2321-2402	N19E29	1n	10789	11100	3	≳0.080	
15	0238-0315	N19E30	sb	10789	10100	2	0.130	
16	0655-0737	N18E15	sb	10789	10100	2	0.064	
17	0121-0157	N19E05	1b	10789	21100	4	0.073	
25	0712-0930	S06W26	2n	10798	02101	4	>0.013	
25	1834-1940	N10E12	2b	10801	12202	7	0.030	
Jul. 28	g1259-1318	N12W53	sn	10845	00130	4?	0.004	IV (DKM) reported by SAG., duration only 3.5 minutes.
Aug. 1	1025-1210	N06W43	2b	10851	22100	5	0.039	
13	0809-0825	N17W59	sn	10865	20100	3	0.060	
15	1140-1200	N16W88	sb	10865	20102	5	(0.034)	
15	g2345-2354	N18W86	sn	10865	10100	2	0.099	
16	g1140-1155	N17W90	1n	10865	21000	3	0.086	
18	(1152-2330)	-	-	-	00030	3?		IV (DKM-SAG) in progress all day.
18	2204-2225	N07E18	1b	10882	21200	5	0.110	
20	0424-0441 and	N15E44	sn	10888	20000	2	≳0.060	
	0426-0445	N22E23	sn	10887				

See Notes to Appendix of "Lesser Events" table on p. 17 (same as for Table I).

APPENDIX OF "LESSER EVENTS" (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Peak Flux	Remarks (r)
1970								
Aug. 20	(1126-2300)	-	-	-	00030	3?		IV (DKM-SAG) in progress all day.
21	(1219-2219)	-	-	-	00030	3?		IV (DKM-SAG) in progress all day.
27	g1349-1551	N19E88	sn	10913	10103	5	0.051	
Sep. 27	2115-2230	N15W19	2n	10959	12100	4	>0.013	
28	0418-0510	S09E24	2n	10964	12101	5	0.021	
Oct. 6	0009-0212	S10E07	2n	10971	12101	5	0.026	
23	2151-2230	N19E79	1n	11002	21102	6	0.140	
24	0450-0632	N18E75	2n	11002	121-1	≥5	>0.064	
25	1045-1145	N17E60	1n	11002	21000	3	(0.032)	
26	0240-0314	N17E49	sn	11002	100-0	≥1	0.056	
26	0406-0503	N16E51	1n	11002	111-0	≥3	0.064	
Nov. 14	1230-1328	N15W03	1n	11029	11102	5	0.056	
14	1509-1520	N17E01	sb	11029	20000	2	0.069	
14	g2018-2040	N15W08	sn	11029	10000	1	0.056	
15	0520-0613	N16W10	sn	11029	20100	3	≥0.060	
16	2142-2347	N16W33	1n	11029	21102	6	0.069	
17	0121-0158	N15W35	1b	11029	21100	4	(0.036)	
17	1755-1840	N16W45	1n	11029	21100	4	(0.057)	
17	2233-2325	N16W47	1n	11029	21102	6	(0.032)	
18	0135-0330	N15W50	2n	11029	22200	6	≥0.280	
18	0408-0432	N16W52	sn	11029	20120	5	0.110	
21	1322-1400	N05W46	1n	11035	21100	4	(0.033)	
Dec. 4	0953-1010	N21E90	2n	11073	22102	7	0.051	
12	2346-2417	N12E16	sn	11077	10203	6	(0.036)	
18	(1301-2107)	-	-	-	00030	3?		IV (DKM-SAG) all day.
19	(1219-2114)	-	-	-	00030	3?		IV (DKM-SAG).
20	(1224-2107)	-	-	-	00030	3?		IV (DKM-SAG).
22	1245-1350	N23W44	1b	11084	21000	3	0.056	
22	1517-1555	N23W43	1b	11084	21200	5	0.090	
26	0840-0845	N12W85	1n	11084	11102	5	0.070	
1971								
Jan. 11	(1218-2125)	-	-	-	00030	3?		IV (DKM-SAG), not flare associated. Coincident with M-λ emission all day on single frequency record.
14	g2032-2100	S24W77	sn	11124	20101	4	>0.077	
16	g1204-1225	S06W84	sn	11111	20001	3	0.064	
Feb. 3	1524-1635	S08E33	1b	11145	11131	7?	>0.009	IV (DKM-SAG) duration 7 minutes, not reported by BO.
6	0438-0607	N17W23	2n	11137 and (S) 11146	02000	2	x	A "Spotless" Flare at location of a filament between two regions.
11	0428-0608	N28W60	2f	11146(S)	02000	2	>0.001	A "Spotless" Flare
17	(0410)	-	-	-	20000	2	0.060	
17	g0836-0847	S16E84	sb	11165	20000	2	(0.038)	
17	1556-1622	S17E82	sn	11165	20000	2	0.073	
Apr. 8	0325-0340	S19W90	2b	11221	12000	3	0.005	Region 11221 is just beyond West Limb, on invisible hemisphere.

APPENDIX OF "LESSER EVENTS" (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Peak Flux	Remarks (r)
1971								
May 5	1211-1250	N13E17	1b	11294	21100	4	0.069	
20	0604-0745	N04W40	2n	11313	12100	4	0.021	
Jun. 29	g{1426-1442 or 1427-1439}	N11W62 / N07E30	sf / sf	11383 / 11401	00032	5?	-	IV (M-H), duration 5 minutes.
Jul. 1	0125-0155	S12E29	2b	11402	22000	4	0.190	
17	0903-0953	N05E15	1b	11425	21102	6	0.031	
24	1023-1130	N14W44	1n	11433	21100	4	0.071	
Aug. 4	0148-0228	S08E70	2n	11457	021-0	≥3	0.002	
24	(1003-2327)	-	-	-	00030	3?		IV (DKM-SAG) in progress all day. Mostly called continuum by other observers at M & DKM-λ. Not flare-associated except for continual small bright points in region 11482 (at S15W15).
30	{0303-0410 / 0412-0523}	S12W87 / S14W85	2f / 1n	11482	02000 / 21100	2 / 4	0.049	
Nov. 9	(2350)*	-	-	-	20000	2	≥0.040	No Flare Patrol.
1972								
Jan. 22	1433-1525	S14W27	1b	11693	21200	5	0.040	
Feb. 8	(0914)	-	-	-	001-1	≥2	0.093	
14	g1752-1832	N26E31	sn	11741	00030	3?	-	IV (DCM-H) of short duration, only 7 minutes.
16	1344-1408	N09E85	sn	11748	20000	2	0.040	
22	0315-0346	N08E04	1b	11748	21100	4	0.093	
22	1413-1455	N07W05	sb	11748	20200	4?	(0.017)	Large 10 cm. burst (PENN.-Flux = 610) not confirmed by OTT, BERL, ARC OR SAG. Perhaps an error?
22	1825-1937	N08W05	sn	11748	20100	3	0.058	
26	1917-2015	S16W19	1b	11751	21200	5	0.040	
Mar. 2	1812-1828	S06E76	1b	11769	21200	5	0.044	
5	1221-1308	S07E40	1n	11769	21102	6	0.053	
7	(1330-2500)	-	-	-	00030	3?		IV (DKM-BO) in progress all day. Called continuum (DKM) by SAG., and Ic (M & DKM) by H. Probably related to region 11769, CMP Mar. 8.
8	g0404-0410	S12E07	sn	11769	10232	8?	0.013	IV (DCM & M - CLG), BO only 4 minutes duration.
8	(1330-2452)	-	-	-	00030	3?		IV (M & DKM-BO) in progress all day. Called continuum (DKM) by SAG, and I (M) by H.
18	1714-1736	S19E32	sn	11784	10030	4?	0.005	IV (DCM-H), duration only 6 minutes.
22	0458-0540	S10W57	2n	11781(S)	02000	2	0.009	A "Spotless" Flare.

APPENDIX OF "LESSER EVENTS" (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Peak Flux	Remarks (r)
1972								
Apr. 20	(0950-2326)	-	-	-	00030	3?		IV (DKM-SAG) in progress all day. Reported as continuum (M & DKM) by BO, and In (M) by H, all day. Probably related to region 11827, CMP Apr. 21.
21	(0957-2328)	-	-	-	00030	3?		IV (DKM-SAG) in progress all day.
May 12	1928-1938	N21W48	sb	11857	00132	6?	0.005	IV (DKM-BO), duration only 8 minutes.
18	1405-1430	S14E25	1b	11883	21200	5	0.040	
18	1615-1648	S16E24	1b	11883	21200	5	0.040	
29	1015-1120	N08E16	1b	11895	21222	9	0.049	
Jun. 24	1911-1949	N09E23	sb	11933	20100	3	0.040	
Jul. 4	1804-1846	S11E67	sn	11949	20100	3	0.044	
Aug. 3	(0931-2600)	-	-	-	00030	3?		IV (M & DKM) reported by BO all day, called Ic (M & DKM) by H, and cont. (M) by CLG. Not flare-associated. Related to active region 11976 (CMP, Aug. 4).
4	(1205-2547)	-	-	-	00030	3?		IV (M & DKM) reported by BO, in progress all day. Called cont. (M) by CLG, and I (DCM & M) by H. Related to region 11976 at CMP.
7	g1922-2047	N12W41	sn	11976	00030	3?	x	IV (DCM-H), only 5 minutes duration.
22	1205-1340	S21E56	2b	12002	22122	9	0.021	
29	g1619-1631	N11E75	sf	12011	00030	3?	x	IV (M & DKM-BO), but duration only 0.1 minutes.
30	1955-2053	N16E39	sb	12011	10103	5	0.049	
Sep. 5	1729-1805	N17W24	1n	12011	11031	6?	0.004	IV (DKM-SAG), duration only 7 minutes.
26	0809-0841	S17W42	2f	12040	02000	2	s	
Oct. 25	0623-0635	S12E60	1n	12094	11102	5	0.049	
25	1004-1043	S13E59	1b	12094	21002	5	0.277	
26	0638-0728	S12E47	2b	12094	22201	7	0.310	
26	1325-1357	S05E43	2b	12094	12102	6	≥0.010	
30	0722-0830	S10W04	1n	12094	112-2	≥6	0.049	
31	0417-0547	S14W15	1b	12094	21100	4	0.196	
31	(1335-2327)	-	-	-	00032	5?		IV (M & DKM) reported by BO, in progress all day. Called In and cont. (M & DKM) by H and SAG. Probably not flare-associated.
1973								
Feb. 22	0802-0803	N09E90	sb	12246	200-0	≥2	0.043	
22	1500-1510	S11W58	2f	12228(S)	02000	2	-	A "Spotless" Flare.
22	2346-2413	N09E90	2n	12246	22000	4	0.094	

APPENDIX OF "LESSER EVENTS" (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Peak Flux	Remarks (r)
1973								
Mar. 12	0357-0448	S16W21	sn	12261	00031	4?	>0.002	IV (M-CLG), duration only 6 minutes.
13	g0836-0930	S07E07	sn	12263	00132	6?		IV (DCM-WEIS), duration only 4 minutes.
28	0100-0130	N04W01	sn	12280	00130	4	0.004	IV (M-CLG), duration only 9 minutes.
Apr. 8	g1733-1750	S08W04	sn	12300	00031	4?	vs	IV (DCM & M-H), duration only 4 minutes.
10	g0026-0148	S08E14	sb	12306	20102	5	0.050	
30	2247-2312	N13W89	sn	12322	20100	3	0.072	
May 1	1351-1510	S13E75	sn	12336	20102	5	≥0.043	
1	2031-2104	S15E73	sn	12336	20130	6?	0.036	IV (DCM-H), duration only 6 minutes.
2	0730-0758	S14E65	sn	12336	20100	3	0.079	
2	1148-1200	S13E62	sb	12336	20103	6	0.075	
2	2038-2135	S14E59	sb	12336	20101	4	0.050	
18	2154-2215	N09E32	sb	12352	20103	6	0.076	
20	0525-0615 and/or 0558-0617	S10W33 N08E15	sn sb	12349 12352	20222	8	0.050	
21	(1031->2400)	-	-	-	00030	3?		IV (DKM-SAG) all day. Reported as cont. (DKM) all day by BO, and Ic(M) by H. Probably related to CMP of region 12352.
Jun. 28	1842-1852 and/or g1903-1909	N11E90 S06W66	1n sf	12417 12397	21100	4	0.067	
29	1947-2008	N12E81	1n	12417	11200	4	0.053	
Jul. 16	(2330)	-	-	-	00030	3	x	IV, 160 and 80 MHz, reported from CLG radioheliograph, with source location beyond West Limb. Could the date be wrong? See similar major event on July 15.
24	0910-0950	S03W90	2f	12448(S)	020-0	2	x	Flare reported by only 1 station. A "Spotless" Flare.
Sep. 6	0912-1929	N06W90	1b	12511	21100	4	0.110	
1974 Jan 10	(1850)	-	-	-	00200	2?	-	Large 10 cm. burst (flux >500) reported by PENN. Not reported by OTT or SAG.
Feb. 20	g1330-1500	S18W30	sn	12752	00132	6?	-	IV (DCM-DWIN), duration 2 minutes. Reported as V at DKM-λ by SAG.
Apr. 13	0405-0655	S11W29	2b	12848	12200	5	0.035	
13	0749-0905	S12W31	1n	12848	21000	3	>0.130	
13	1047-1108	S12W33	1n	12848	21101	5	0.078	
13	1313-1330	S12W35	1n	12848	21000	3	>0.038	

APPENDIX OF "LESSER EVENTS" (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp.	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Peak Flux	Remarks (r)
1974								
May 1	1225-1231	S09E75	sb	12906	10133	8?		IV (DKM-SAG), duration 4 minutes. Not reported by BO.
12	2140-2238	S17W63	2n	12906	12000	3		
Jun. 21	1759-2033	S21W25	1f	13002	11200	4?		Large 2800 MHz Burst (OTT Flux = 652, called a "spike"). Not reported by BO or SAG.
30	0703-0745	S13E44	1n	13043	21131	8?		IV (DCM & M - DURN and WEIS). Duration 8 minutes
Jul. 1	1034-1047	S13E28	sb	13043	10132	7?		IV (DCM & M - DURN) duration 1 minute. Called cont. (DCM) by WEIS.
1	1556-1650	S14E28	sb	13043	20130	6?		IV (DCM & M - DURN), duration 7 minutes. Not reported by H or WEIS.
2	0943-1005	S16E19	1n	13043	21132	9?		IV (DCM & M - DURN), duration 8 minutes.
2	g1015-1029	S14E20	sn	13043	00030	3?		IV (DCM & M - DURN), duration 3 minutes
3	0300-0400	S15E08	2b	13043	22202	8		
3	(0553)	-	-	-	00030	3?		IV (M - DURN), duration 1 minute.
3	g0725-0733	S17E12	sf	13043	00032	5?		IV (DCM & M - DURN), duration 8 minutes.
3	g{1811-1821 and 1812-1847}	S10W47	sf	13030	00130	4?		IV (DCM & M - DURN), duration 1 minute.
		S14E06	sf	13043				
4	(1529)	-	-	-	00030	3?		IV (DCM - DURN), called continuum at DKM-λ by SAG. May be part of earlier event.
5	1157-1305	S15W21	sn	13043	10232	8?		IV (DCM & M - DURN), duration only 0.5 minutes.
6	g1345-1357	S15W33	sn	13043	00131	5?		IV (DCM & M - DURN), duration only 0.3 minutes.
7	1151-1345	S16W48	1n	13043	21131	8?		IV (DCM & M - DWIN), duration 2 minutes.
9	g0916-0925	S15W76	sf	13043	00030	3?		IV (DCM - DURN), duration only 0.3 minutes.
14	0935-1000	S12E90	2n	13067	02002	4		
22	g1055-1132	S14E25	sf	13088	00031	4?		IV (DCM -DWIN), duration 5 minutes. Continuum reported at DKM-λ by SAG.
31	0919-0932	S09W25	sn	13095	00130	4?		IV (DCM - DWIN), duration 4 minutes.
Sep. 11	(1420-2505)	-	-	-	00030	3?		IV (DCM - H) reported in progress all day. Not flare-associated.
14	(1246-2505)	-	-	-	00030	3?		IV (M & DKM-BO) in progress all day. Called cont. (DKM) by SAG, and Ic, drifting chains (M & DKM) by H.

APPENDIX OF "LESSER EVENTS" (continued)

Date	Time (UT) of Flare or Event††	Position	Hα Imp	McMath Plage Number	Hα Flare Profile abcde	Comp. Flare Index	1-8Å Peak Flux	Remarks (r)
1974								
Oct. 6	(1400-2425)	-	-	-	00030	3?		IV (DKM-BO) in progress all day.
7	(1306-2423)	-	-	-	00030	3?		IV (M & DKM - BO), in progress all day.
8	(1303-2425)	-	-	-	00030	3?		IV (M & DKM - BO), in progress all day. Preceded by minor sub-flare in region 13280 (at N10E45).
9	(1303-2430)	-	-	-	00030	3?		IV (M & DKM-BO), in progress all day.
10	(1314-2420)	-	-	-	00030	3?		IV (M & DKM - BO), in progress all day.
11	g0755-0818	N10E14	sn	13280	00032	5?		IV (DCM & M - DURN), duration 2 minutes.
11	0828-0845	N10E13	sn	13280	10033	7?		IV (DCM & M - DURN), duration 4 minutes.
11	1207-1253	N13W04	sn	13280	00030	3?		IV (DCM - DURN), duration only 0.2 minutes.
11	g1255-1311	N10E11	sn	13280	10132	7?		IV (DCM & M - DURN), duration 3 minutes.
11	(1304-2407)	-	-	-	00030	3?		IV (M & DKM - BO), in progress all day.
12	1310-1334	N10W04	sn	13280	00130	4?		IV (DKM - SAG), duration 8 minutes.
13	0839-1110	N12W26	1n	13280	11132	8?		IV (M - DURN), duration only 1.3 minutes.
15	0810-0900	N09W43	2n	13280	12201	6		
15	1324-1430	N08W47	1b	13280	21200	5		
16	1258-1415	N11W61	1b	13280	21100	4		
Nov. 6	g1217-1234	S13W90	sb	13310	10131	6?		IV (DCM & M - DURN), duration 0.3 minutes and 1.2 minutes.
6	(1304)	-	-	-	00031	4?		IV (DCM & M - DURN), duration 6 minutes.
17	(1216)	-	-	-	00030	3?		IV (DCM & M - DURN), duration 1.8 minutes.

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