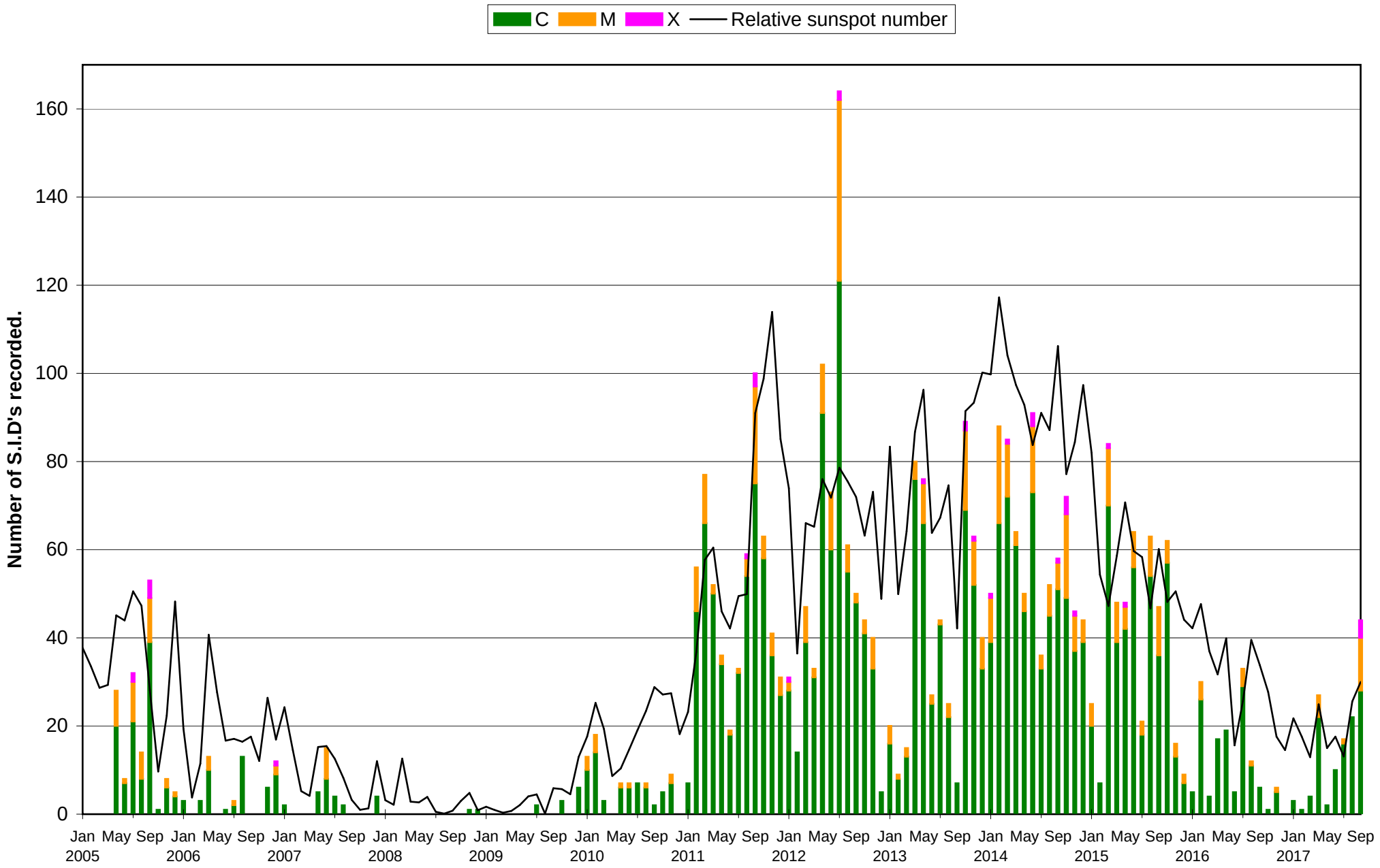
BAA Radio Astronomy Group. **2017 SEPTEMBER**

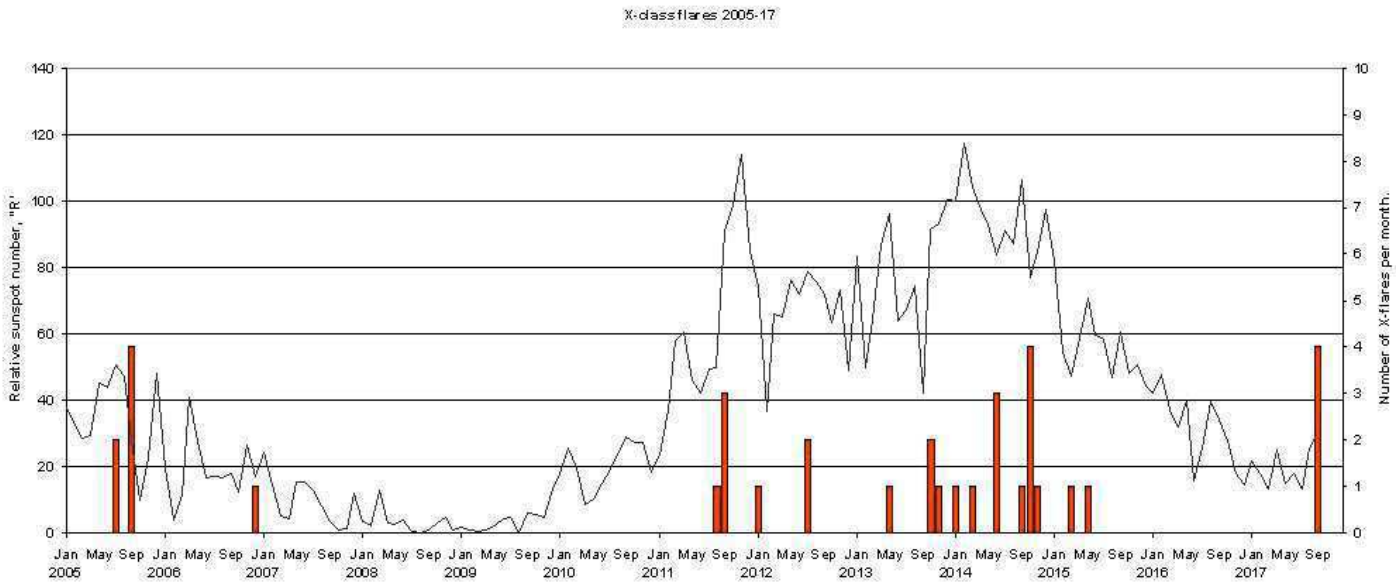
			John Cook (23.4kHz/*22.1kHz*)				Roberto Battaiola (18.3kHz)				Paul Hyde (22.1kHz)				Mark Edwards (**19.6**/24.0/*18.3kHz*)				Colin Clements (23.4kHz/*22.1kHz*)			
	X-ray class	Observers	Tuned radio frequency receiver, 0.58m frame aerial.				Modified AAVSO receiver.				Spectrum Lab / PC 1.5m frame aerial.				Spectrum Lab / PC 2m loop aerial.				AAVSO receiver, 0.76m screened loop aerial.			
DAY			START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)	
1	C2.0	5	*15:35*	*15:39*	*?*	-					15:35	15:40	16:18	2	15:35	15:38	16:09	2	15:30	15:35	16:35	2+
1	C1.2	1													17:12	17:14	17:30	1-				
2	B8.5	1													11:56	12:02	12:21	1				
2	C7.7	5	*15:32*	*15:42*	*?*	-					15:31	15:43	16:57	3	15:31	15:42	16:34	2+	15:24	15:40	16:44	2+
4	C2.9	2									08:11	08:21	08:44	2	*08:11*	*08:24*	*08:46*	*2*				
4	?	1													*08:48*	*08:53*	*?*	-				
4	*	1													*09:03*	*09:15*	*09:24*	*1*				
4	*	1													*09:40*	*10:04*	*10:30*	*2+*				
4	*	1													10:35	10:45	11:02	1+				
4	C2.4	2									11:34	11:42	?	-	11:37	11:44	?	-				
4	?	1													11:53	12:18	?	-				
4	C8.3	3									11:55	12:28	12:51	2+	12:21	12:27	?	-	11:47	12:23	12:51	2+
4	?	2													12:52	13:12	?	-	12:51	13:12	14:08	2+
4	*	3									14:13	14:16	14:29	1-	14:13	14:15	?	-	14:08	14:12	14:33	1
4	?	1													14:43	14:51	15:02	1				
4	?	3									15:12	15:19	?	-	15:12	15:17	?	-	15:06	15:14	15:22	1-
4	**M1.5**	4									15:28	15:33	16:07	2	15:28	15:34	16:08	2	15:22	15:28	16:34	2+
4	*	1													**16:07**	**16:11**	**16:38**	**1+**				
4	?	1													16:15	16:19	16:25	1-				
4	C4.1	2													16:42	16:47	17:19	2	16:34	16:44	16:51	1-
4	C6.0	1													17:22	17:36	?	-				
4	?	1													17:37	17:41	?	-				
4	**M1.0**	1													18:07	18:23	18:46	2				
4	**M1.7**	1													19:28	19:32	19:50	1				
5	**M3.8**	4	*06:39*	*06:41*	*07:04*	*1*					06:39	06:43	07:17	2	**06:37**	**06:43**	**07:01**	**1**				
5	?	1													**07:59**	**08:14**	**08:34**	**2**				
5	?	1													**09:21**	**09:25**	**09:39**	**1-**				
5	C5.4	5	*10:15*	*10:18*	*10:35*	*1*					10:14	10:22	11:01	2+	10:17	10:22	11:01	2	10:12	10:18	10:42	1+
5	*	1													11:38	11:48	11:55	1-				
5	*	2													12:02	12:03	12:08	1-	12:02	12:13	12:27	1
5	*	1													12:10	12:20	?	-				
5	C2.2	2													12:30	12:39	?	-	12:27	12:34	12:46	1
5	C6.9	4									13:28	13:37	14:56	3	13:29	13:42	15:08	3	13:23	13:37	15:01	3
5	*	1													***14:32***	***14:37***	***15:04***	***1+***				
5	C3.7	5	*16:16*	*16:20*	*16:39*	*1*					16:17	16:21	17:01	2	16:16	16:20	16:54	2	16:09	16:17	16:47	2
5	C4.6	3	*17:15*	*17:17*	*17:28*	*1-*					17:14	17:18	17:40	1+	17:14	17:19	17:36	1				
5	**M2.3**	3	*17:41*	*17:45*	*18:09*	*1+*					17:39	17:45	18:49	2+	17:40	17:47	18:37	2+				
6	C2.7	2	*07:33*	*07:38*	*?*	-					07:31	07:37	07:57	1+								
6	**X2.2**	5	*09:03*	*09:11*	*10:32*	*3*					09:00	09:12	10:41	3	08:59	09:13	?	-	08:48	09:00	10:56	3+
6	?	1													09:24	09:30	?	-				
6	?	2									11:03	11:06	11:38	2	11:01	11:10	?	-				
6	?	1													11:13	11:17	?	-				
6	**X9.3**	5	*11:55*	*12:01*	*?*	-					11:54	12:03	14:00	3+	11:53	12:01	?	-	11:49	11:52	14:24	3+
6	?	3	*14:32*	*14:44*	*14:54*	*1*					14:33	14:46	15:18	2	14:29	14:44	?	-				
6	?	2													14:57	14:59	15:18	1				
6	**M2.5**	5	*15:52*	*15:58*	*16:13*	*1*					15:53	15:58	16:29	2	15:55	15:58	16:18	1	15:48	15:53	17:39	3
6	?	1													16:29	16:39	16:52	1				
6	?	1													17:29	17:33	17:43	1-				
6	?	1													17:59	18:00	18:04	1-				
6	**M1.4**	2									19:21	19:32	20:01	2	19:19	19:31	20:01	2				
7	C8.2	3	*06:24*	*06:37*	*06:56*	*1+*					06:23	06:37	07:11	2+	***06:23***	***06:29***	***07:10***	***2+***				
7	?	3	*07:33*	*07:37*	*07:47*	*1-*					07:29	07:38	08:01	1+	**07:34**	**07:38**	**08:04**	**1+**				
7	C2.3	2									09:19	09:24	09:50	1+	09:19	09:24	09:49	1+				
7	?	1													**09:38**	**09:41**	**09:47**	**1-**				
7	**M1.4**	5	*09:53*	*09:57*	*?*	-					09:52	09:59	?	-	09:52	09:57	?	-	09:45	09:53	10:10	1
7	**M7.3**	4	*10:15*	*10:17*	*10:58*	*2*					10:14	10:19	11:37	2+	10:15	10:18	11:28	2+	10:10	10:20	11:23	2+
7	?	1													**11:37**	**11:39**	**11:43**	**1-**				
7	C3.0	2									12:08	12:17	12:55	2+	**12:11**	**12:25**	**13:18**	**2+**				
7	**X1.3**	5	*14:32*	*14:38*	*15:49*	*2+*					14:23	14:37	16:06	3	14:23	14:36	?	-	14:17	14:28	16:57	3+
7	?	1													14:50	14:51	16:25	3				
7	?	1													17:10	17:18	17:28	1-				
7	?	1													18:07	18:17	?	-				
7	C5.2	2									18:07	18:16	18:42	2	18:26	18:31	?	-				
7	C4.5	1													18:43	18:47	?	-				
7	?	1													19:16	19:23	19:38	1				
8	C6.0	3	*07:08*	*07:10*	*07:17*	*1-*					07:07	07:11	?	-	**07:08**	**07:09**	**07:16**	**1-**				
8	**M8.1**	4	07:45	07:51	09:37	3					07:43	07:49	09:16	3	07:44	07:56	08:53	2+				
8	C1.6	1													**10:48**	**10:51**	**?**	**-**				
8	C1.7	3	11:24	11:27	11:45	1					11:23	11:29	11:40	1-	**11:24**	**11:28**	**12:09**	**2**				
8	?	1													11:40	11:45	12:01	1				
8	C5.9	4	12:12	12:15	12:52	2					12:12	12:15	12:33	1	12:12	12:15	?	-				
8	C1.2	1													12:25	12:40	12:59	2				
8	?	1													***12:31***	***12:53***	***?***	**-**				
8	?	1													***13:36***	***13:42***	***13:48***	***1-***				
8	?	1													**13:58**	**14:04**	**14:29**	**1+**				
8	?	1													***14:21***	***14:23***	***?***	**-**				
8	*	1													***14:29***	***14:31***	***15:02***	***2***				
8	?	1													**14:38**	**14:43**	**15:08**	**1+**				
8	?	2	15:24	15:28	?	-									15:24	15:36	?	-				
8	**M2.9**	3	15:37	15:55	17:16	3					15:11	15:49	17:35	3+	15:40	15:50	16:44	2+				
9	C1.5	1	07:18	07:27	07:44	1+																
9	**M3.7**	4	10:54	11:05	?	-					10:54	11:09	13:32	3+	10:54	11:08	?	-				
9	?	2	11:10	11:28	12:58	3									11:22	11:28	13:11	3				
9	C1.4	1	14:43	14:48	15:06	1																
10	C2.9	3	09:07	09:22	09:59	2+									**09:08**	**09:15**	**?**	**-**				
10	?	1													**09:16**	**09:24**	**10:02**	**2+**				
10	?	1													**12:44**	**13:00**	**13:21**	**2**				
10	**X8.2**	5	15:39	16:01	?	-					15:47	16:05	17:58	3+	**15:38**	**16:05**	**18:29**	**3+**	15:39	16:04	18:14	3+
12	C3.0	2									07:28	07:32	07:54	1+	**07:26**	**07:30**	**07:37**	1-				

BAA Radio Astronomy Group. **2017 SEPTEMBER**

	Xray class		Steve Parkinson (Various)				Andrew Thomas (23.4kHz)			Phil Rourke (23.4kHz)			Jim Barber			John Elliott (18.3kHz)		
			Tuned radio frequency receiver, frame aerials.				Tuned radio frequency receiver, 0.6m frame aerial.			Spectrum Lab, 0.6m frame aerial.			Spectrum Lab, 0.6m frame aerial.			Tuned radio frequency receiver, 0.5m frame aerial.		
DAY			START	PEAK	END (UT)		START	PEAK	END (UT)	START	PEAK	END (UT)	START	PEAK	END (UT)	START	PEAK	END (UT)
1	C2.0		15:35	15:39	15:55	1												
1	C1.2																	
2	B8.5																	
2	C7.7		15:32	15:43	16:30	2+												
4	C2.9																	
4	?																	
4	*																	
4	*																	
4	*																	
4	C2.4																	
4	?																	
4	C8.3																	
4	?																	
4	*																	
4	?																	
4	?																	
4	**M1.5**		15:29	15:34	15:58	1+												
4	*																	
4	?																	
4	C4.1																	
4	C6.0																	
4	?																	
4	**M1.0**																	
4	**M1.7**																	
5	**M3.8**		06:39	06:43	07:05	1+												
5	?																	
5	?																	
5	C5.4		10:16	10:21	11:04	2+												
5	*																	
5	*																	
5	*																	
5	C2.2																	
5	C6.9		13:29	13:39	14:10	2												
5	*																	
5	C3.7		16:17	16:20	16:32	1-												
5	C4.6																	
5	**M2.3**																	
6	C2.7																	
6	**X2.2**		09:01	09:11	09:58	2+												
6	?																	
6	?																	
6	?																	
6	**X9.3**		11:54	12:02	14:30	3+												
6	?																	
6	?		14:32	14:45	15:10	2												
6	**M2.5**		15:53	15:59	16:33	2												
6	?																	
6	?																	
6	?																	
6	**M1.4**																	
7	C8.2																	
7	?																	
7	C2.3																	
7	?																	
7	**M1.4**		09:53	09:58	11:20	3												
7	**M7.3**																	
7	?																	
7	C3.0																	
7	**X1.3**		14:32	14:38	15:58	3												
7	?																	
7	?																	
7	?																	
7	C5.2																	
7	C4.5																	
7	?																	
8	C6.0																	
8	**M8.1**		07:44	07:52	09:18	3												
8	C1.6																	
8	C1.7																	
8	?																	
8	C5.9		12:12	12:14	12:46	2												
8	C1.2																	
8	?																	
8	?																	
8	?																	
8	?																	
8	*																	
8	?																	
8	?																	
8	**M2.9**																	
9	C1.5																	
9	**M3.7**		10:55	11:07	12:50	3												
9	?																	
9	C1.4																	
10	C2.9		09:05	09:26	?	-												
10	?																	
10	?																	
10	**X8.2**		15:40	?	?	-												
12	C3.0																	


VLF flare activity 2005/17.
C
M
X
Relative sunspot number
Number of S.I.D's recorded.
0
20
40
60
80
100
120
140
160
Jan 2005
May
Sep
Jan 2006
May
Sep
Jan 2007
May
Sep
Jan 2008
May
Sep
Jan 2009
May
Sep
Jan 2010
May
Sep
Jan 2011
May
Sep
Jan 2012
May
Sep
Jan 2013
May
Sep
Jan 2014
May
Sep
Jan 2015
May
Sep
Jan 2016
May
Sep
Jan 2017
May
Sep

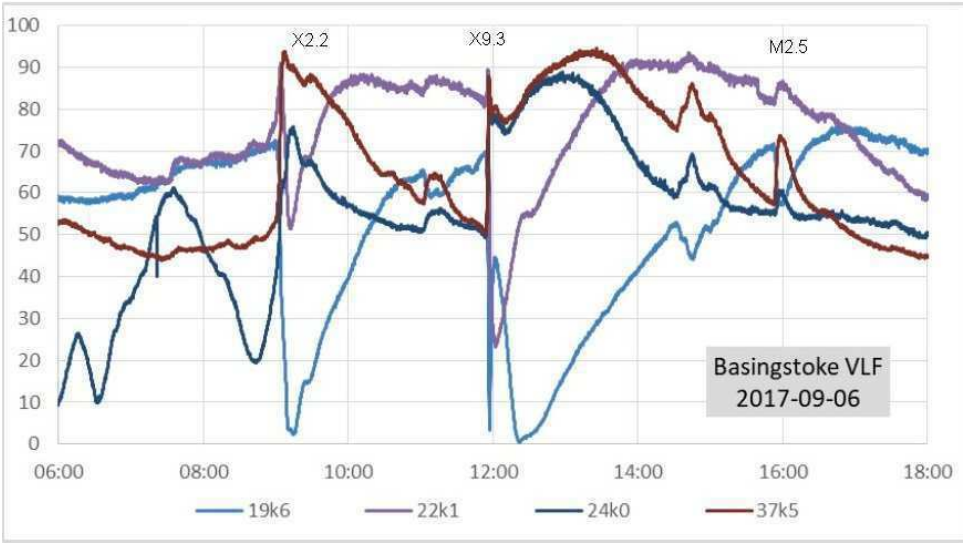
BAA Radio Astronomy Group. **2017 SEPTEMBER.**



September has been a remarkable month for X-class flare activity after a gap of over two years. This chart shows the numbers recorded as SIDs, but does not indicate their magnitudes. Just before 12:00UT on September 6th we recorded an X9.3 flare, the strongest in our record since 2005 September, when the record-breaking X17 flare occurred. Subsequent events were as follows:

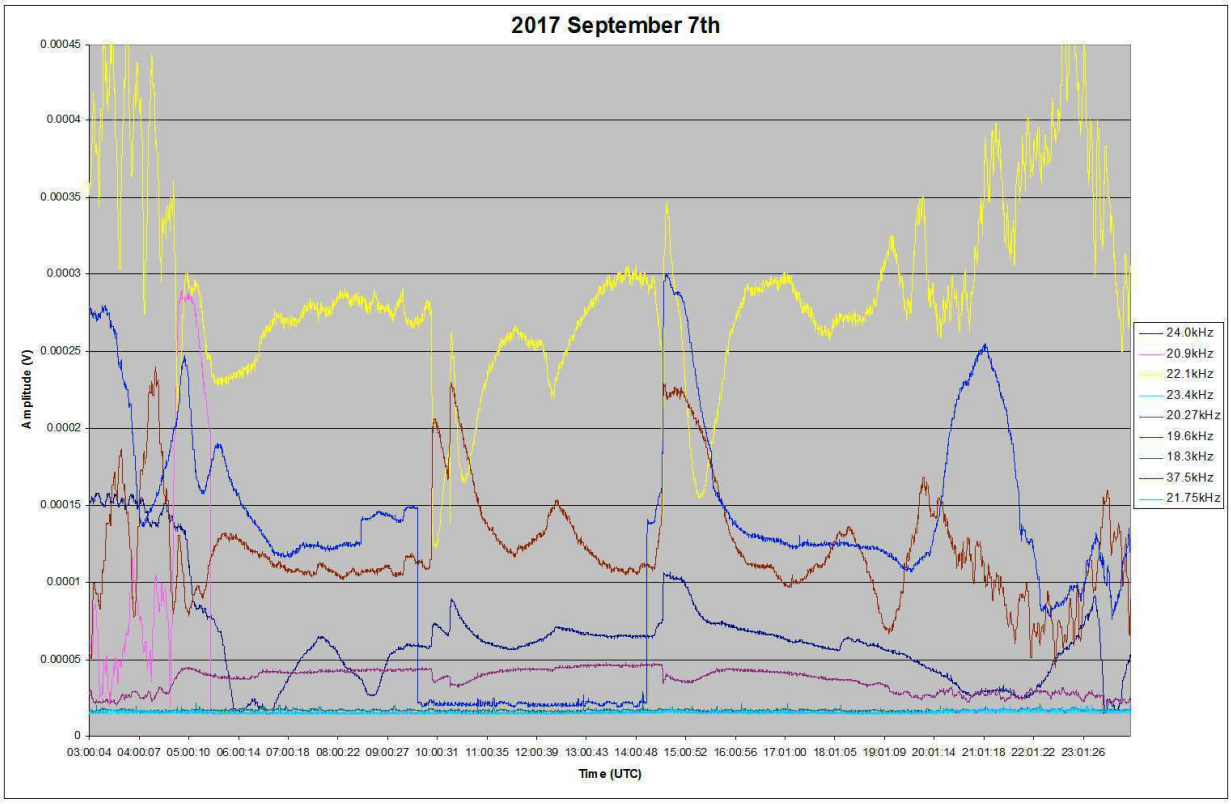
X9.3 2017 September.
X9.0 2006 December.
X8.2 2017 September.
X6.9 2011 August.
X3.6 2005 September.

The remainder were in the range X1 to X4, mostly during the higher activity period of cycle 24. The stronger flares seem to be during the decay phase of both cycles. All of this month's activity occurred in the first two weeks, with the appearance of AR12673, a notably complex active region. Some smaller sunspots followed, but were much less complex and offered only very minor activity.



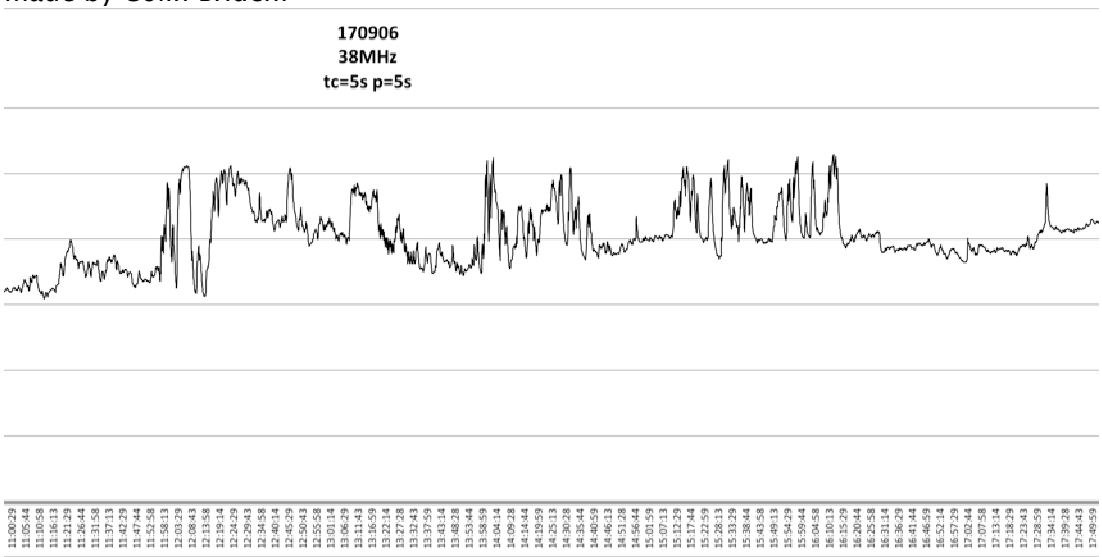
This is Paul Hyde's recording from the 6th, showing the X9.3 flare and the earlier X2.2. Both of these had multiple peaks in the X-ray flux, and so have produced complex SID patterns. The X9.3 decay lasted

through the rest of the day with several sub-peaks that are not listed in the SWPC data. One such SID shows very clearly at 14:46 on all frequencies in Paul's recording. Activity continued into the 7th, shown in the recording by Mark Edwards:



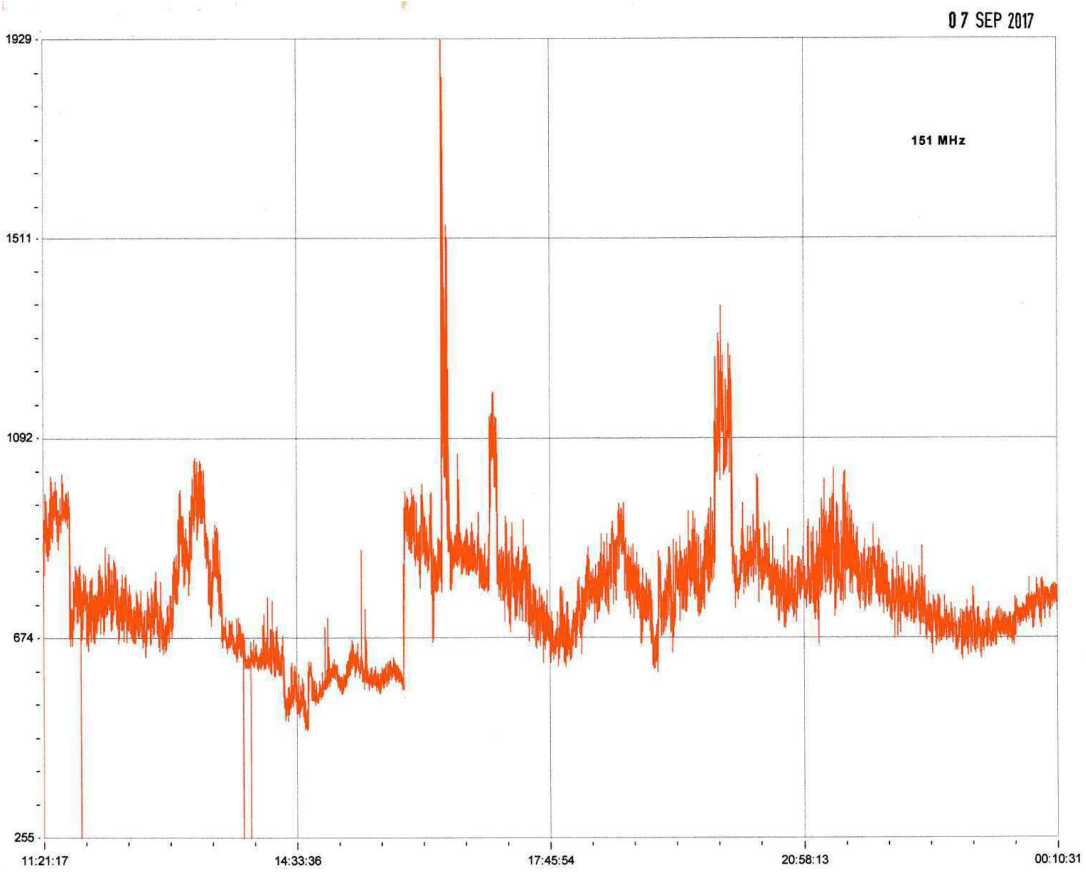
The X1.3 flare had two peaks separated by just 12 minutes, showing clearly at 37.5kHz (blue) and 19.6kHz (brown). Its decay also lasted for the rest of the day with several other peaks shown. The chart also shows that 23.4kHz was off-air at the time. Annoyingly it was off from early on the 4th to 07UT on the 8th, thus missing the best of the activity.

There was also HF/VHF noise associated with these events. This recording from the 6th at 38MHz was made by Colin Briden:

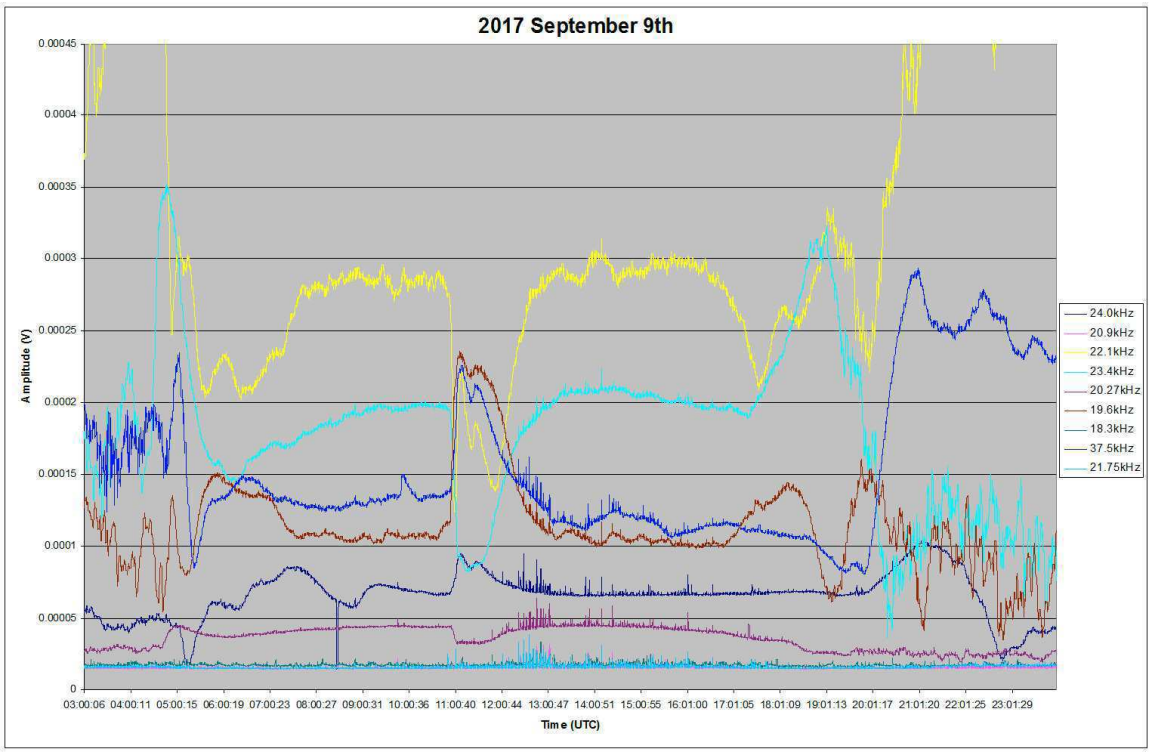


It shows a strong increase in noise starting at 11:58, co-incident with the X9.3 flare, ending at about 16:15.

Colin Clements made a recording at 151MHz on the 7th, shown on the next page:



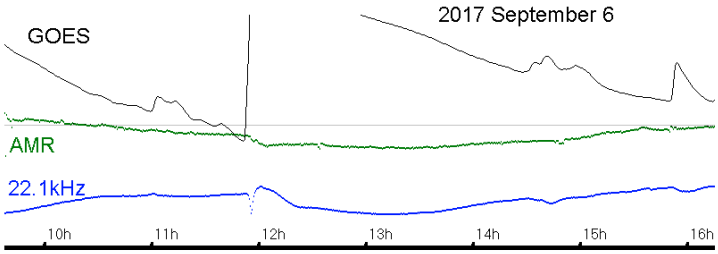
In this case, the 151MHz signal increases about an hour after the X1.3 flare was recorded.

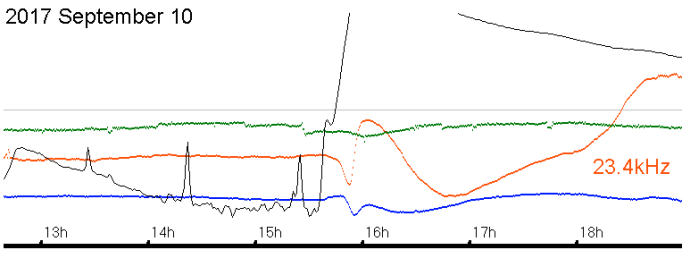


Activity continued on the 9th with an M3.7 flare just before midday, as shown in this recording by Mark Edwards. This was another multi-peaked event, showing a variety of SID shapes at different frequencies.

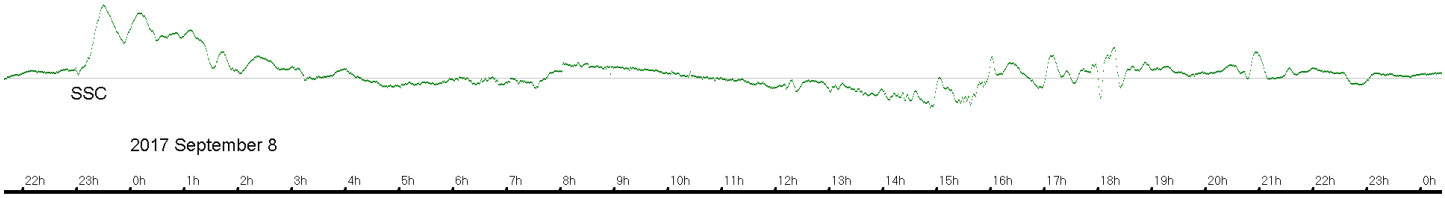
AR12673 was close to the limb of the visible disc by this stage, but still managed an X8.2 flare at 16:05UT on the 10th.

MAGNETIC OBSERVATIONS.



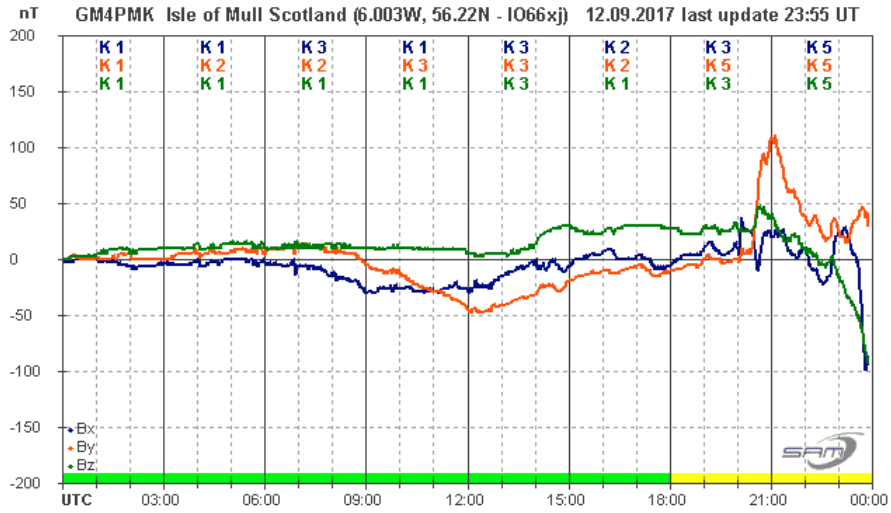


As might be expected, the two big X-class flares were accompanied by magnetic SFEs. These are shown in my own recordings, above. The magnetic disturbance is about 20nT total for the X9.3 on the 6th, and 14nT for the X8.2 on the 10th. There is a small local interference spike on the 10th at 15:30, just before the genuine SFE.

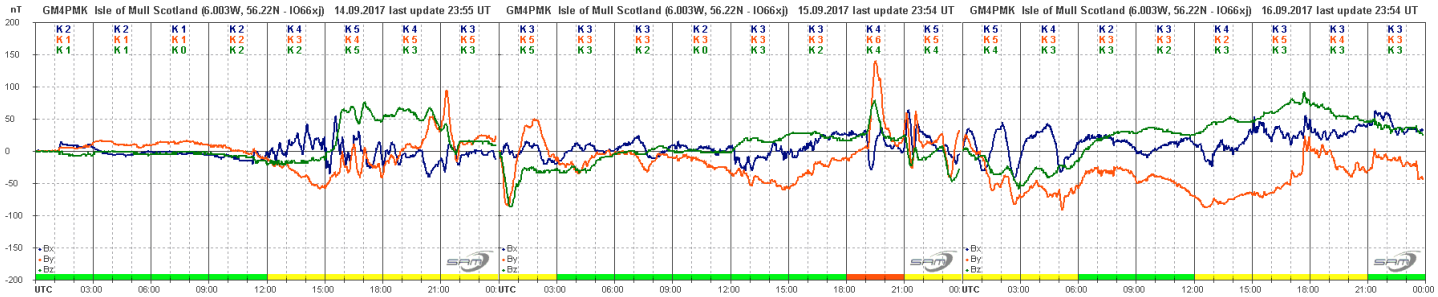


There were also a number of CMEs recorded. The first was at 23:00UT on the 7th, shown in my recording above. It was from the X9.3 flare on the 6th, giving a transit time of 35h 54m, the second fastest CME in our record. The peak disturbance on the 7th measured 200nT, with +/- 80nT measured on the 8th.

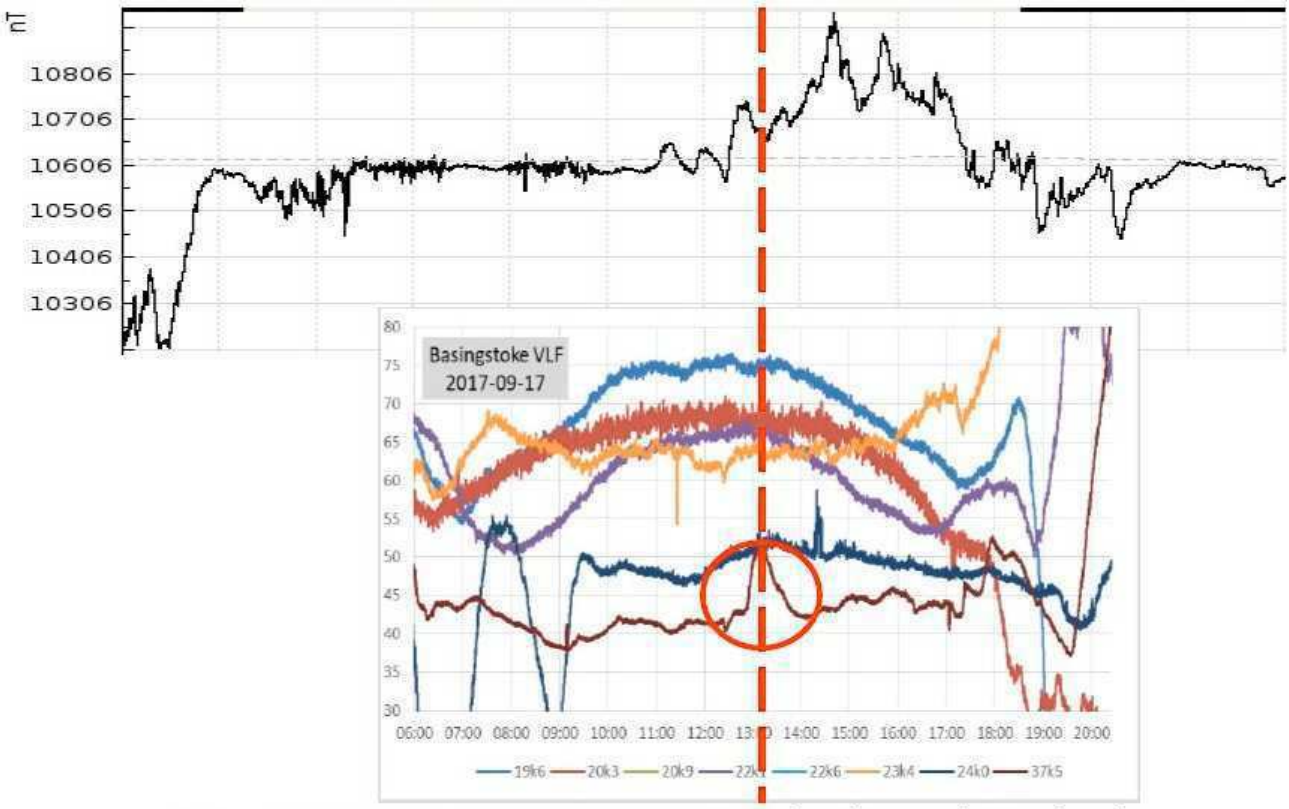
CMEs were also produced by the later large flares, but with the active region close to the limb, they were not directed towards the Earth. Disturbances were recorded however, as the CMEs combined with strong winds from active coronal holes. The X8.2 flare at 16:05 on the 10th produced a clear SSC at about 20:30 on the 12th in Roger Blackwell's magnetometer:



Using the SID peak at 16:05, this gives a transit time of 53hours 25 minutes. The disturbance from this CME was at a maximum around midnight, and settled down in the early hours of the 13th. Mark Edwards reported what appeared to be a SID at 9AM on the 13th at 22.1kHz and 19.6kHz. There was no flare activity at that time, and the magnetic disturbance was also much reduced. This is very similar to an event recorded on 2015 September 11th, illustrated in the Summary at the time. On that occasion there was a strong 150nT transient in the magnetic field that appeared to be responsible. The source of the recent event remains a mystery.



This shows activity on the 14th, 15th and 16th as recorded on the Isle of Mull by Roger Blackwell. Although AR12673 was still producing CMEs, it was facing away from us by this time. A large northern hemisphere coronal hole was producing a strong solar wind, and was responsible for this activity. It continued with some smaller disturbances over the next few days.



Kiruna magnetometer versus Grindavik VLF (37.5 kHz)
2017-09-17

Paul Hyde recorded this 37.5kHz SID possibly linked to the magnetic disturbance just after 13:00 on the 17th. Unfortunately recordings from the 14th, 15th and 16th were lost to a PC crash.

Another active period on the 27th and 28th was due to a strong coronal hole wind. Starting about 19:00 on the 27th, it had calmed a little by 07:00 on the 28th. A mild disturbance continued into the 30th.

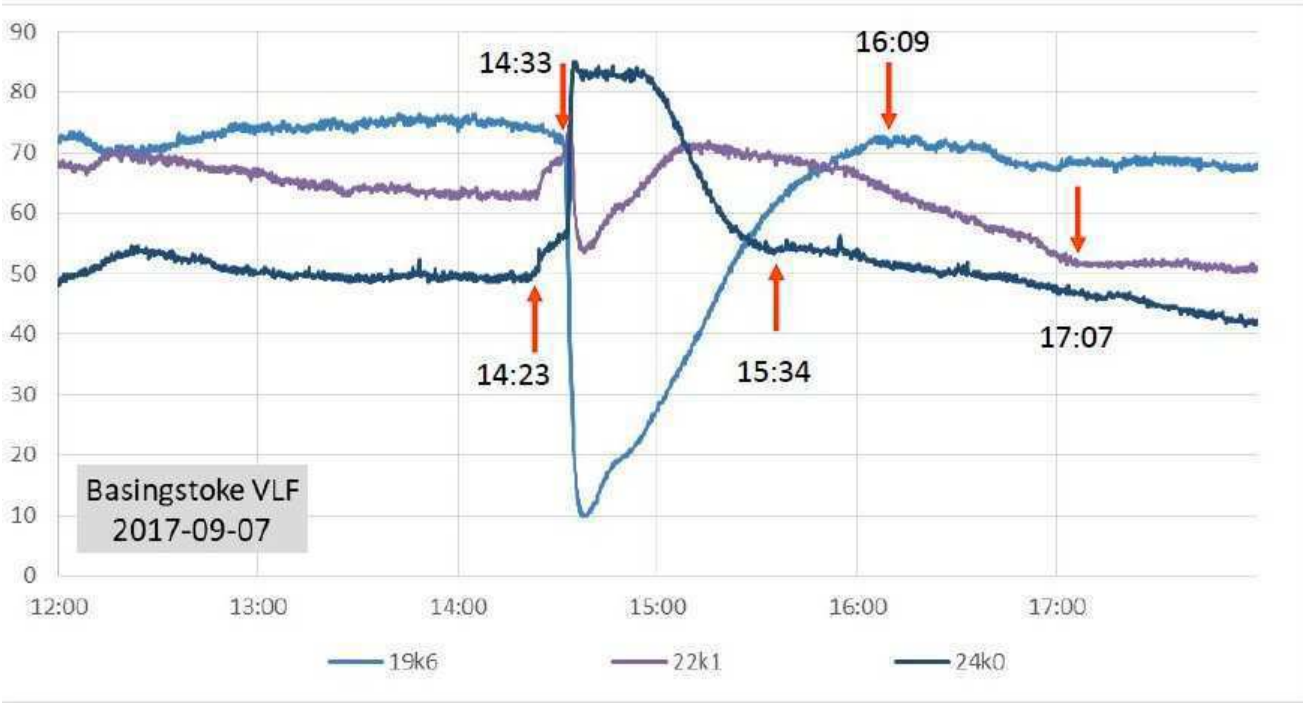
Magnetic observations received from Colin Clements, Roger Blackwell, Gonzalo Vargas and John Cook.

CME timings over the last 5 years:

1	2012 March 7	34h 41m	16	2013 May 17	63h
2	2017 September 7	35h 54m	17	2012 August 31	64h
3	2012 March 10	39h 54m	18	2014 February 25	64h 4m
4	2014 April 20	41h 56m	19	2012 November 10	66h
5	2013 March 15	47h 3m	20	2017 April 21	67h 10m
6	2012 March 5	48h 12m	21	2014 September 11	71h 17m
7	2014 September 10	49h 17m	22	2015 June 21	71h 20m
8	2012 July 12	49h 40m	23	2013 May 15	>71h
9	2014 January 7	49h 46m	24	2012 May 17	72h 48m
10	2013 May 25	52h 44m	25	2012 May 18	>84h
11	2017 September 12	53h 25m	26	2017 May 27	92h 10m
12	2015 November 4	54h 5m	27	2012 July 4	>100h
13	2014 November 7	57h 12m	28	2012 August 28	>110h
14	2012 September 27	59h 36m	29	2014 August 22	119h
15	2015 December 31	60h 24m			

SID timings.

It can sometimes be very difficult to determine precise timings for SIDs, and when several frequencies are monitored, multiple timings occur. Paul Hyde has illustrated this difficulty very nicely with the X1.3 flare on the 7th:



The peak time is consistent at all three frequencies, but there is a ten minute difference in start times shown. The largest variation is in the end time, with over an hour and half difference between 24khz (dark blue) and 22.1kHz (mauve). Each signal is 'measuring' the response of a different part of the ionosphere, and of course each observer will again monitor different parts of the ionosphere depending on their location. Where timings from multiple signals are provided, I try to be consistent in using one signal, filling in gaps with other signals when the main signal is off, or has not responded. The result is that the tables have a range of timings to any given event, with the importance rating really only applying to propagation through the part of the ionosphere being monitored. The result is that there can be a wide variation in the importance figure from one observer to another. This is only a very relative measure of the original solar flare.

BAA Radio Astronomy Group

BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).

ROTATION																											
2469 F	20	21 B	22	23	24	2153 25 C	26 CCCB	27 CC	28	29 CC	30 CC	31 CMCC	2014 August 1 CMM	2 CC	3 C	4	5 CCC	6	7	8 CCCC	9 C	10	11	12	13	14	15 CC
2470 F	16 C	17	18 C	19	20 CCCC	21 CMCC	2154 22 MCCC	23 CCCC	24 CMC	25 MM	26 C	27	28 CB	29 C	30 CCB	31 CCCC	2014 September 1 CC	2 CC	3 CCM	4 CCCC	5 CC	6 CCMC	7 CCC	8 C	9 C	10 CCX	11 CCM
2471 F	12 CCCC	13 CC	14	15	16 CC	17	2155 18 CMC	19 C	20 CC	21 CCC	22	23	24 CC	25 C	26 CCC	27 M	28 CCMM	29 C	30	2014 October 1	2 MM	3 CCC	4	5	6	7	8 C
2472 F	9 MCCC	10	11	12	13	14	2156 15	16 CCM	17 CC	18 MCCC	19 CCCC	20 MCMM	21 CCCM	22 CCXM	23 MCC	24 MCC	25 CCCX	26 XCCM	27 CCMX	28 CCM	29 MMMM	30 CCCC	31	2014 November 1 CCCC	2	3 M	4 MM
2473 F	5 MC	6 C	7 MCCX	8	9 CCM	10 CC	2157 11 C	12 C	13 C	14 CC	15 M	16 CCCM	17 C	18	19	20	21	22 C	23 C	24 C	25	26	27 CCC	28 C	29 CCCC	30 CC	1
2474 F	2014 December 2 CCC	3 CCCC	4 MCM	5 CCM	6 C	7	8	2158 9 CCCC	10	11 C	12 C	13 CCC	14 CC	15	16 CCC	17 CC	18 CCC	19 MC	20 C	21 M	22 C	23	24	25 C	26 C	27	28 C
2475 F	29 C	30	31 C	2015 January 1	2	3 M	4 M	2159 5 C	6 C	7 CC	8 C	9 C	10 C	11	12 CC	13 C	14 CM	15 CC	16	17	18	19	20	21 CCC	22	23 CC	24
2476 F	25	26	27 CC	28 C	29 MC	30 M	31	2015 February 1 C	2	3 CC	4 C	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 C
2477 F	21	22	23	24	25	26	27	28 CC	2015 March 1 C	2 CMCCM	3 CC	4 CC	5 CM	6 MCCC	7	8 C	9 CCMC	10 CCCC	11 MMCX	12 CMMM	13 C	14 CCCC	15 MCCC	16 CCMC	17	18 CCCC	19 C
2478 F	20	21	22	23 C	24	25 CC	26 CC	27 CCC	2162 28 CC	29 CCCC	30 CC	31	2015 April 1	2	3	4	5	6	7	8 M	9 CCCC	10 CCCC	11 C	12 CMCC	13 CCC	14	15 C
2479 F	16 CCCC	17 C	18 CCC	19	20	21 MMMM	22 CCMC	23 CMCC	2163 24 C	25 C	26 C	27	28	29	30	2015 May 1	2	3 C	4 CCC	5 MMMX	6 CCMC	7 CCCC	8 CC	9 CC	10 CCC	11	12 CC
2480 F	13 CCCC	14 CCCC	15	16	17 B	18	19 C	20 C	21	2164 22	23 CC	24	25	26	27	28	29	30	31	2015June 1	2 C	3	4 CC	5 CC	6	7 CC	8
2481 F	9	10 CCC	11 CMCC	12 CC	13 MCCC	14 C	15 CC	16 CC	17 CC	2165 18 CCM	19 CCCC	20 MC	21 MCCM	22 CCCM	23 C	24 C	25 M	26	27	28 C	29 CCCC	30 C	2015 July 1	2 C	3 CCCM	4	5
2482 F	6 MCCM	7 C	8	9	10 C	11	12	13	14 C	2166 15	16	17	18 C	19	20	21	22	23	24 CC	25	26 C	27	28	29	30	31	1 C
2483 F	2015 August 2	3	4	5	6 C	7 CBCC	8 CC	9 C	10	11	2167 12	13	14	15 C	16	17	18	19	20 CC	21 MCM	22 MCCM	23 CCCC	24 MCCM	25 CCCC	26 CC	27 M	28 CMCM
2484 F	29 CCC	30 CC	31	2015 September 1	2	3 C	4	5	6	2168 7	8	9	10	11	12	13	14	15	16 CC	17 CMCC	18 C	19 C	20 CCM	21	22	23 CCC	24
2485 F	25	26 C	27 CMCC	28 MCMM	29 MMCM	30 CMCM	2015 October 1 CCM	2 CCMM	3 CCCC	2169 4	5	6	7	8	9	10	11	12	13 CC	14 CC	15 CCCC	16 MCCC	17 CCCC	18	19 CCC	20 C	21 CCC
2486 F	22	23	24	25	26 C	27	28 C	29 CC	30 CCCC	31 CCCM	2015 November 1 CCCC	2 CCCC	3	4 CMM	5	6	7	8	9 M	10 CC	11	12	13	14	15	16	17
2487 F	18	19	20	21 C	22	23	24	25	26	27	2171 28	29	30	2015 December 1	2	3	4	5 C	6	7	8	9	10 C	11	12 CC	13	14
2488 F	15	16	17	18	19	20	21 M	22 C	23	24	2172 25	26	27	28 M	29 C	30	31	2016 January 1	2	3	4	5	6 C	7	8	9	10
2489 F	11	12	13	14	15 C	16	17	18	19	20	21	2173 22	23	24	25	26	27 C	28 C	29 C	30	31	2016 February 1	2 C	3 CC	4 CCC	5	6
2490 F	7 C	8	9	10 C	11	12 MC	13 CMCM	14	15 CMCC	16 CC	17 CCCC	2174 18	19 C	20	21	22	23	24 C	25 C	26	27	28	29	2016 March 1	2	3	4
2491 F	5	6	7	8 CB	9 C	10	11	12	13	14	15 CC	2175 16	17	18	19	20	21	22	23	24	25 B	26	27 BB	28	29	30	31
2492 F	2016 April 1	2	3	4	5	6 CC	7 CBCB	8 BC	9 CC	10	11 B	12 C	2176 13	14 CC	15 BC	16 C	17 BC	18	19 BB	20	21	22	23	24	25	26 BC	27
2493 F	28 CCC	29	30 C	2016 May 1 C	2 C	3	4 C	5	6	7 C	8	9	2177 10	11	12	13	14 CCCB	15 CCBC	16 C	17	18	19	20	21 BC	22 B	23	24 BBC
2494 F	25	26 CC	27 CC	28	29	30	31	2016 June 1	2	3	4	5	2178 6	7	8	9 BCC	10	11 B	12 C	13 C	14	15	16	17	18	19 C	20
2495 F	21	22	23	24	25	26	27	28	29	30	2016 July 1	2	2179 3	4	5	6	7 C	8	9 C	10	11	12	13	14	15 C	16 CCCB	17 C
2496 F	18 C	19 C	20	21 CBCB	22 CCC	23 MMCC	24 MBCM	25 C	26 BB	27	28	29	30	2180 31	2016 August 1	2	3	4	5 C	6	7 CCMC	8 CCCC	9 C	10 B	11 C	12	13
2497 F	14 C	15	16	17	18	19	20	21	22	23	24	25	26	2181 27	28	29	30	31	2016 September 1	2	3	4	5	6	7 B	8	9
2498 F	10	11	12	13	14	15	16	17	18	19	20	21 CCB	22 CCCC	2182 23	24	25	26	27	28	29	30	2016 October 1	2	3	4	5	6
2499 F	7	8	9	10	11	12 C	13	14 B	15	16 B	17	18	19	2183 20	21	22	23	24	25	26	27	28	29	30	31	2016 November 1	2
2500 F	3	4	5	6	7	8	9	10	11	12	13	14	15	16	2184 17	18	19	20	21	22	23	24	25	26	27	28 C	29 CCM
2501 F	30 CC	2016 December 1	2	3	4	5	6	7	8	9	10	11	12	13	2185 14	15	16	17	18	19	20	21	22	23	24	25	26
2502 F	27	28	29	30	31	2017 January 1	2	3	4	5	6	7	8	9	2186 10	11	12 C	13	14	15	16	17	18	19	20	21 CC	22
2503 F	23	24	25	26	27	28	29	30	31	2017 February 1	2	3	4	5	6	2187 7	8	9	10	11	12	13	14	15	16	17	18
2504 F	19	20 BB	21	22 C	23	24	25	26	27	28 B	2017 March 1	2	3	4	5	2188 6	7	8	9	10	11	12	13	14	15	16	17
2505 F	18	19	20	21	22	23	24	25	26	27 BCC	28 BC	29	30	31 C	2017 Ap 1 BB	2189 2 MMMM	3 CCCM	4 CBCC	5 CBB	6 CC	7 BC	8 C	9	10	11	12	13
2506 F	14	15	16	17	18 C	19 B	20	21 B	22	23	24	25	26	27	28	29	2190 30	2017 May 1	2	3	4	5	6	7	8	9	10
2507 F	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	2191 27 BB	28 BC	29	30	31 C	2017 June 1 CCC	2 CBC	3 CCC	4	5 C	6
2508 F	7 CB	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	2192 23	24	25	26	27	28	29	30	2107 July 1	2	3 M
2509 F	4	5	6	7 CB	8	9 CCBB	10	11 BBC	12	13 C	14 C	15 CCC	16 CCBB	17	18 C	19	2193 20	21	22	23	24	25	26	27	28	29	30
2510 F	31 B	2017 August 1	2	3	4	5	6	7	8	9	10	11	12	13	14 CC	15 CB	2194 16	17	18 BBC	19 CCCC	20 CCC	21 BC	22 CBCC	23 CCC	24 B	25 C	26
2511 F	27 C	28	29	30 BBC	31	2017 September 1 CC	2 BC	3	4 CMMM	5 MCCM	6 XXMM	7 MMXC	8 MCCM	9 CMC	10 CX	11 C	12	2195 13	14	15	16	17	18	19	20	21	22
2512 F	23	24	25	26	27	28	29	30	2017 October 1	2	3	4	5	6	7	8	9	2196 10	11	12	13	14	15	16	17	18	19