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Registered Charity No. 210769

Burlington House, Piccadilly, London, W1J 0DU

Telephone: 020 7734 4145

Fax No.: 020 7439 4629

Email: office@britastro.org

Website: www.britastro.org



Please send all reports and observations to jacook@jacook.plus.com

BAA Radio Astronomy Section.

Director Paul Hearn.

RADIO SKY NEWS

2022 OCTOBER.

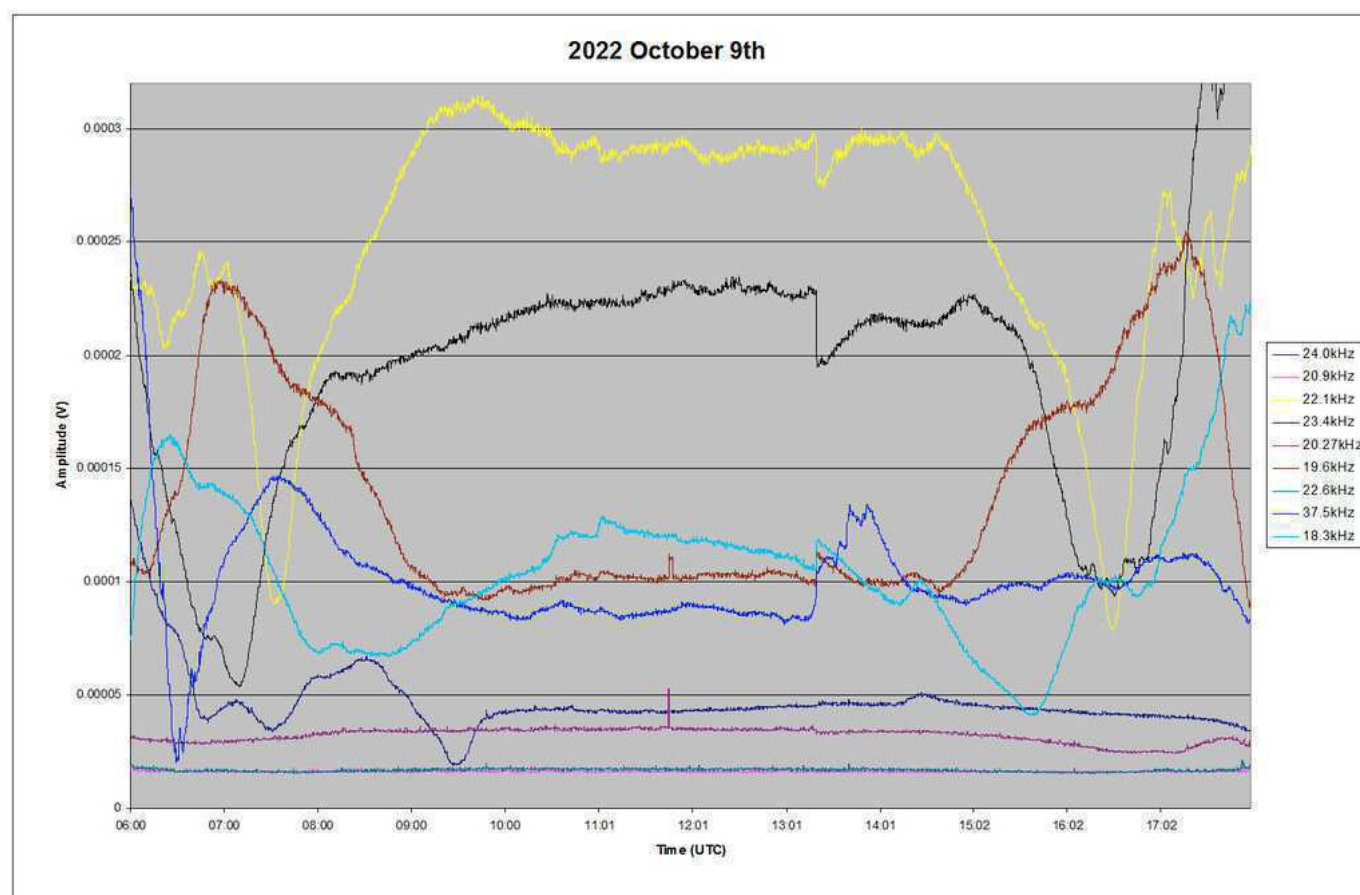
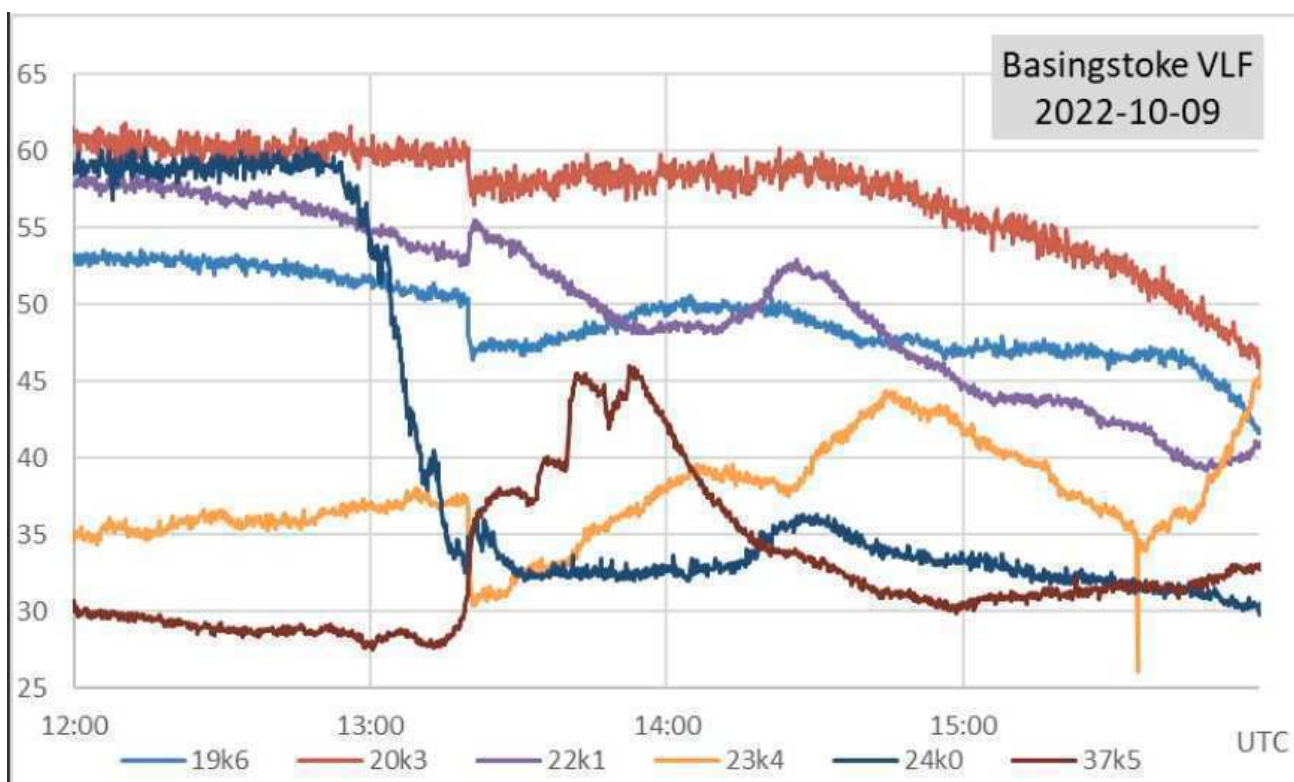
VLF SID OBSERVATIONS.

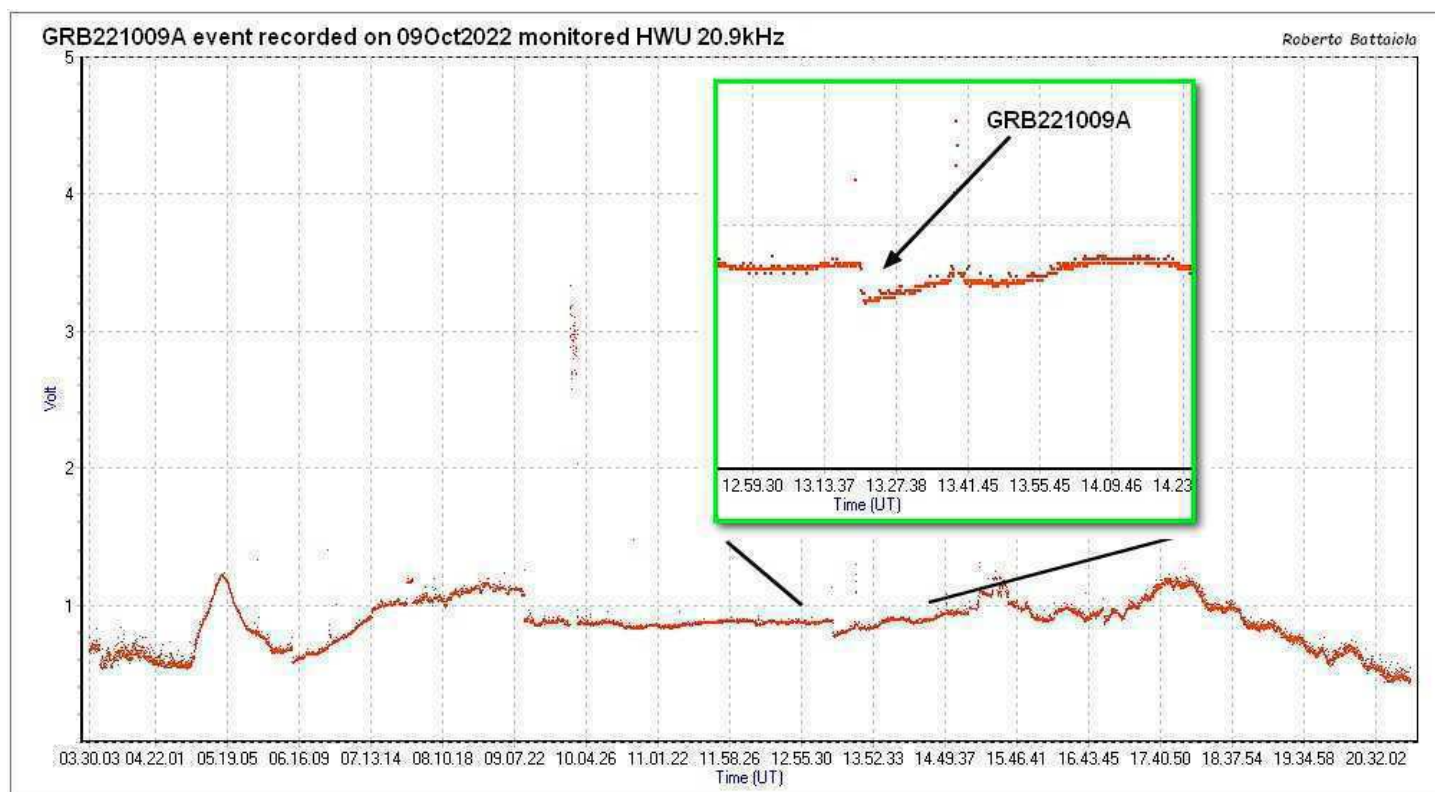
The number of SIDs recorded in October is much lower than in previous months, although many of them were from M-class flares (22% in October, 10% in September). Many of these flares overlapped so that SIDs were again often hard to separate. No X-class flares were recorded, with just a single X1.0 flare late on the 2nd appearing in the SWPC bulletin. The highlight of the month has to be the widely recorded Gamma Ray Burst (GRB) on the 9th. The Fermi and Swift Gamma ray satellites both detected an extremely strong Gamma ray burst at 13:16:59UT, while the STIX X-ray satellite recorded an X-ray signal just three minutes later. The sun was not flaring at this time, the GOES data showing a background flux at about a C1 level.



My own recording of the resulting SID compares in size to that of an ordinary C5.7 flare from last month, but has very sharp start and peak times. It looks more like a transmitter effect, but as it was also recorded on other signals then it must be from the GRB. There is a report on the qsl.net web site of a GRB detection on 2003 /03/29 using a 75kHz signal, although with a very short spike shaped SID.

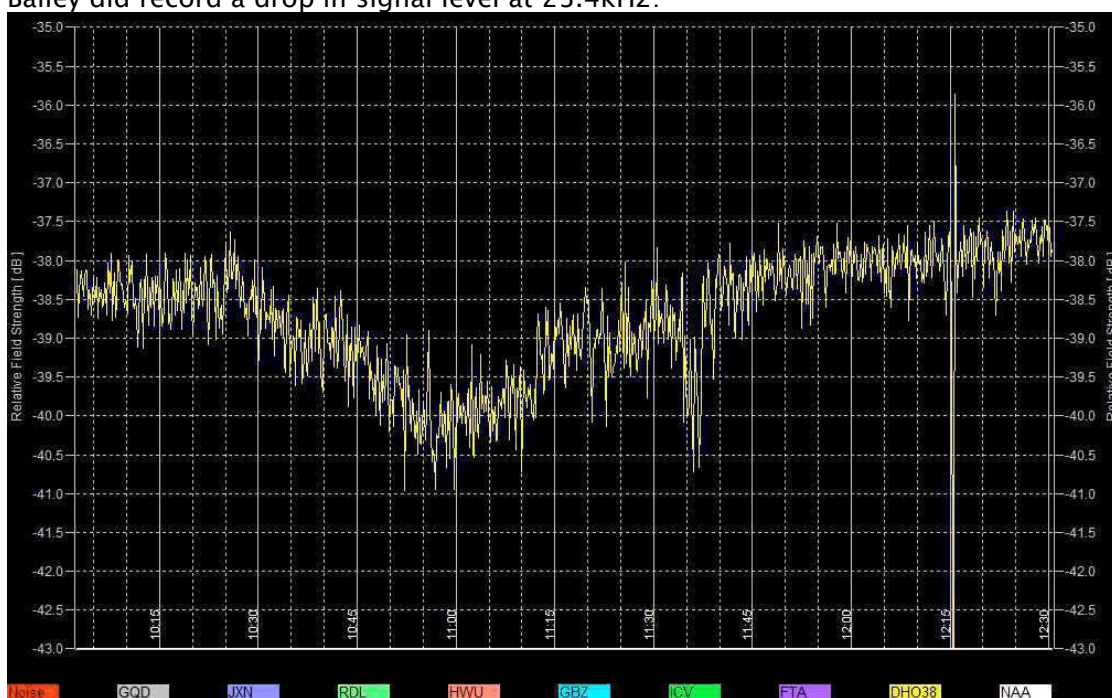
Professional analysis located the source of the GRB to be in the constellation of Sagitta. This was at about 30 degrees altitude for the European VLF paths, but only about 3 degrees altitude for the trans-Atlantic paths. Recordings by Paul Hyde, Mark Edwards and Roberto Battaiola are shown on the next pages. Notice that 24kHz has hardly responded, and that 37.5kHz shows a very different SID.





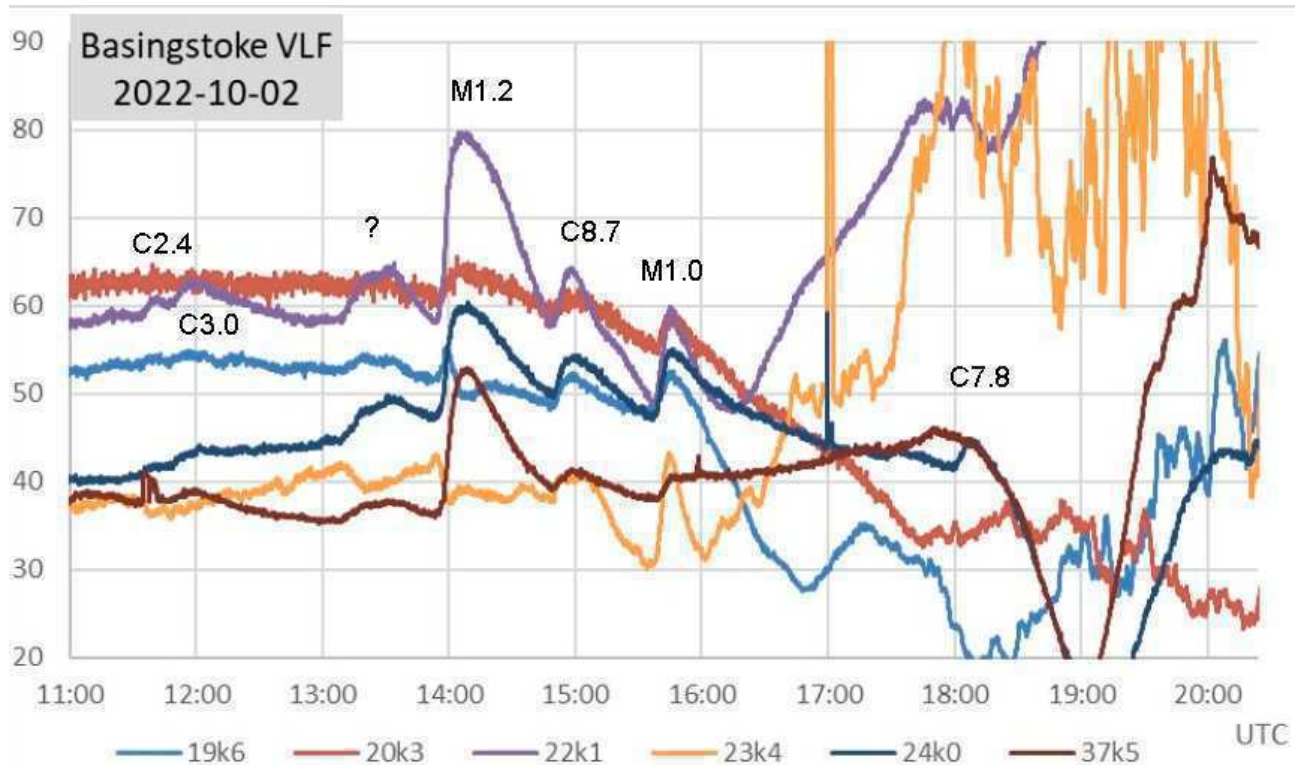
Mark Edwards provided a talk about the GRB detection for the zoom meeting on the 9th November, with a recording available from the section pages of the BAA web site. He has also provided a short paper included with this summary.

There was a small partial solar eclipse on the 25th. It only reached about 15% here in the UK, but Chris Bailey did record a drop in signal level at 23.4kHz:

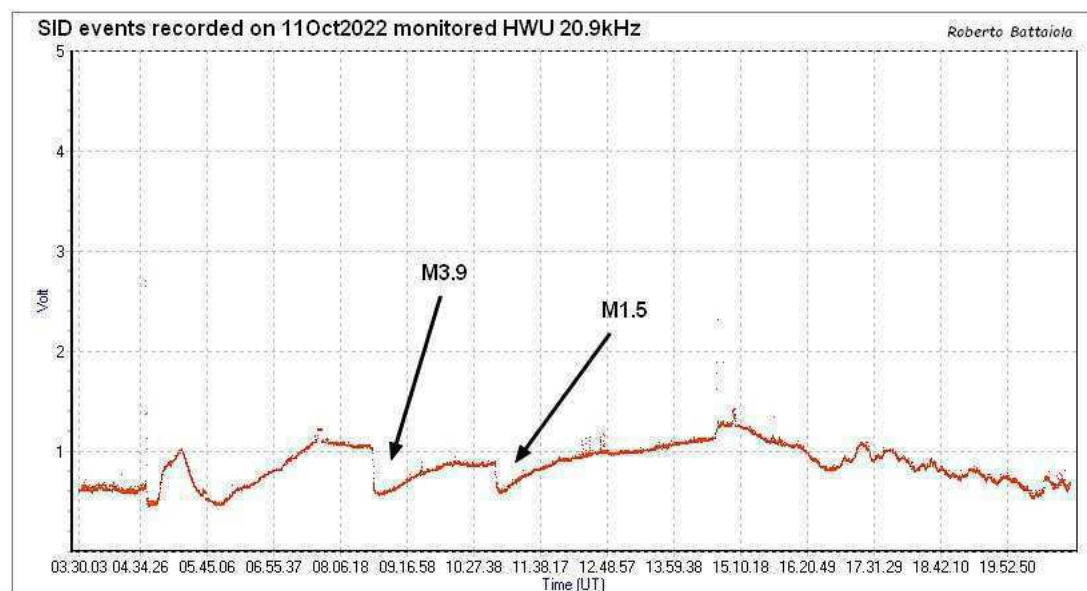


My own recording showed a small rise in 23.4kHz matching the eclipse.

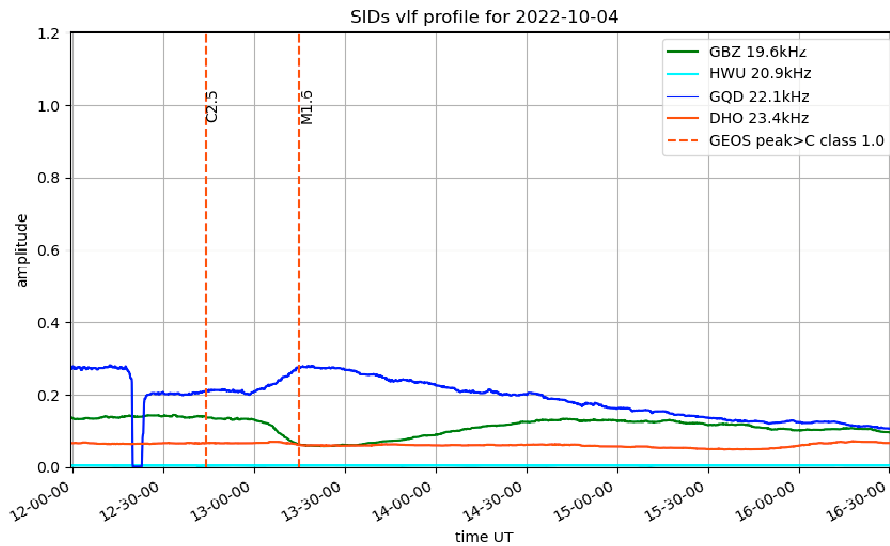
There was a good selection of stronger flares in October, the 2nd being particularly busy:



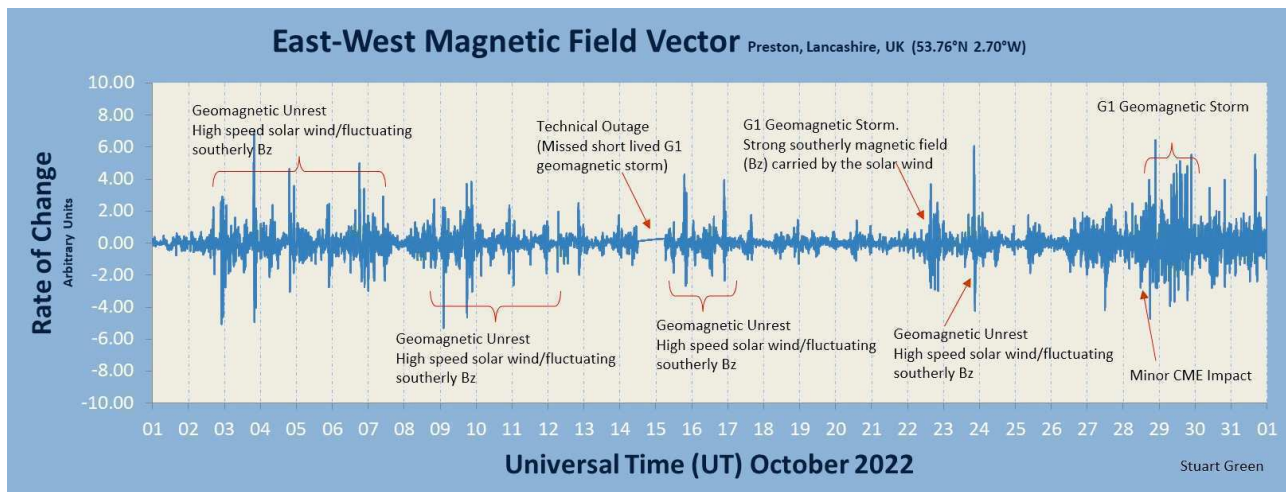
This recording by Paul Hyde shows the majority of the flares. 22.1kHz shows the three larger flares starting at 14:00 merging into one long SID, terminating as sunset takes over. 24kHz has a later sunset, and so also shows the C7.8 flare. A clear SID is also visible at 13:30, but is not classified in the SWPC lists. 23.4kHz is very difficult to interpret, being unstable all day. It also has the earliest sunset, with a very typical night-time signal after 17:30. There were two more M-flares on the 11th, shown by Roberto Battaiola:



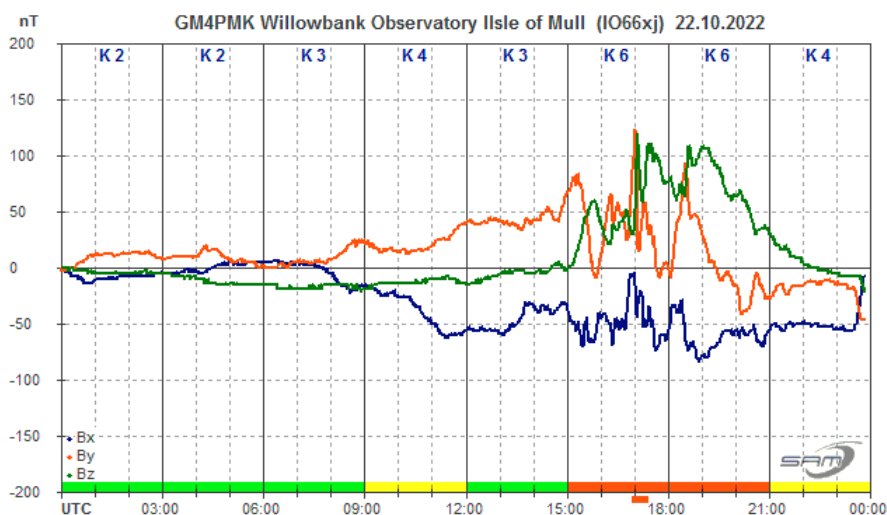
A very slow M1.6 flare was recorded in the afternoon of the 4th, shown in the recording by Mark Prescott. The rise time of the SID is about 15 minutes, with the decay lasting an hour.



MAGNETIC OBSERVATIONS.



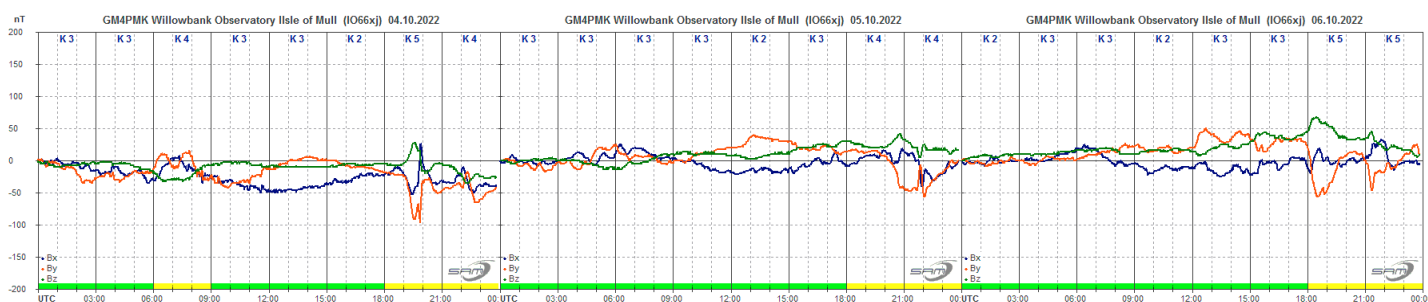
Stuart Green's monthly summary shows some moderate activity through most of October. Despite the number of M-class flares, no major CMEs were recorded. Most of the flares occurred close to the solar limb, and so CMEs were not directed towards Earth. There were some periods of very active magnetic disturbance from high speed winds, the 22nd shown here by Roger Blackwell:



Steyning Magnetometer (50.8 North, 0.3 West)



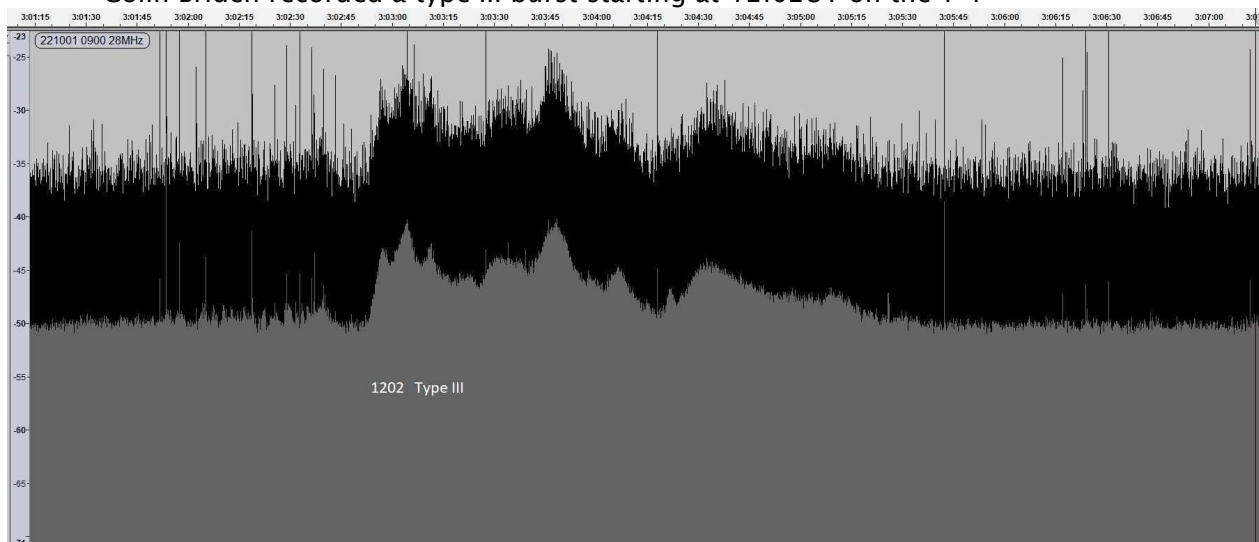
This recording from the 3rd and 4th by Nick Quinn shows a strong pulse around 20UT. It does not seem to be a CME impact, so is probably a shock in the solar wind. Recordings by Roger Blackwell show strong solar wind disturbances continuing on the 4th, 5th and 6th:



Magnetic observations received from Roger Blackwell, Colin Clements, Stuart Green, Nick Quinn and John Cook.

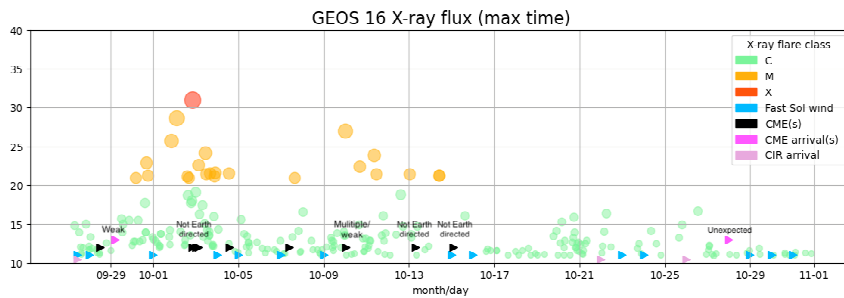
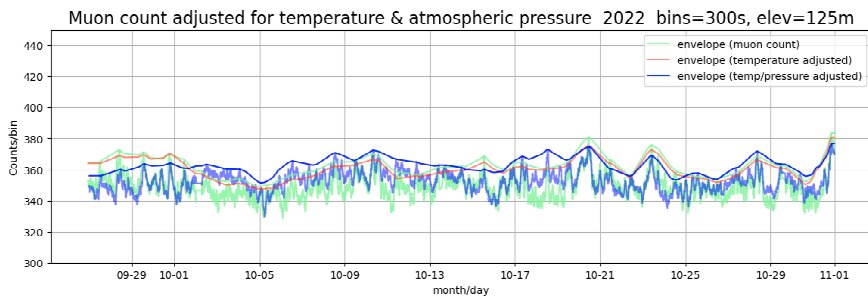
SOLAR EMISSIONS.

Colin Briden recorded a type III burst starting at 12:02UT on the 1st:

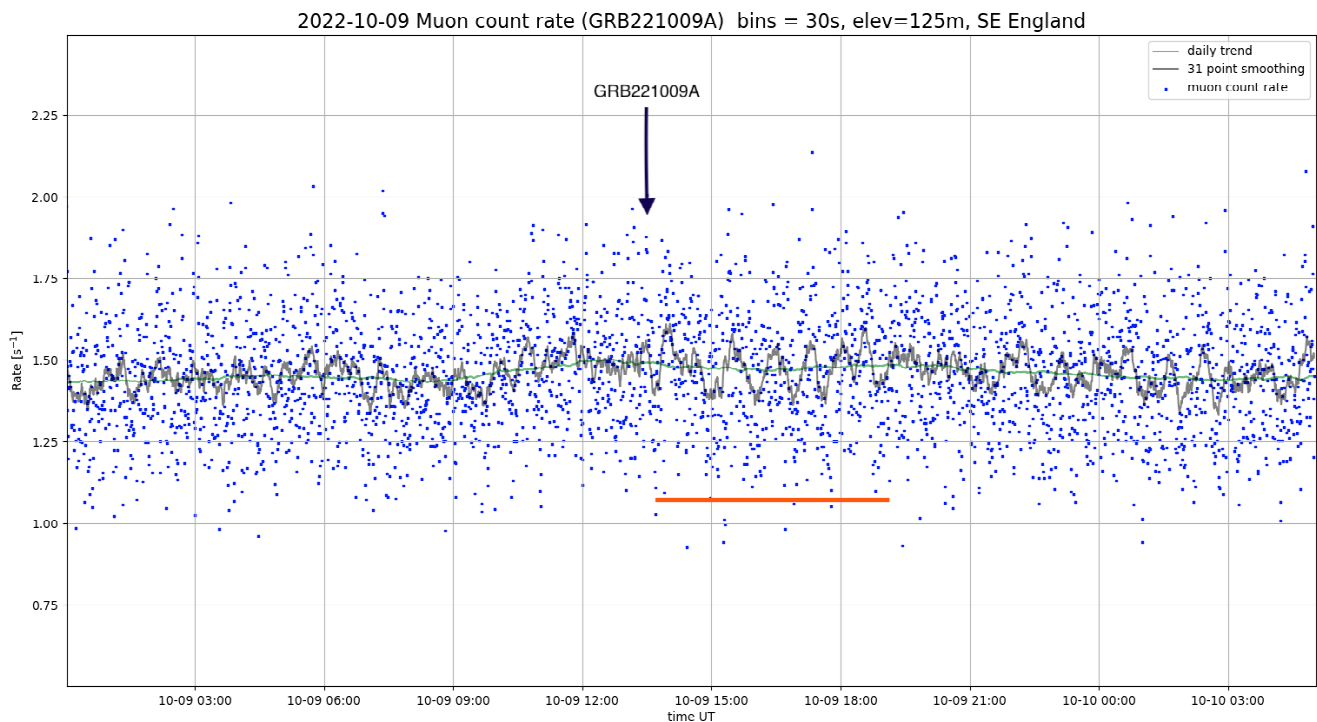


We did not record a SID at this time, but the SWPC bulletin does list a C3.5 flare starting at 11:00 with a peak at 13:00. Looking at the GOES X-ray data does show a smaller peak of about C2 at 12:00, confirming the link. It was a fairly weak burst of about 10db amplitude, lasting five minutes. The sun is now too low in the sky for Colin Clements to record VHF/UHF emissions.

MUON OBSERVATIONS.



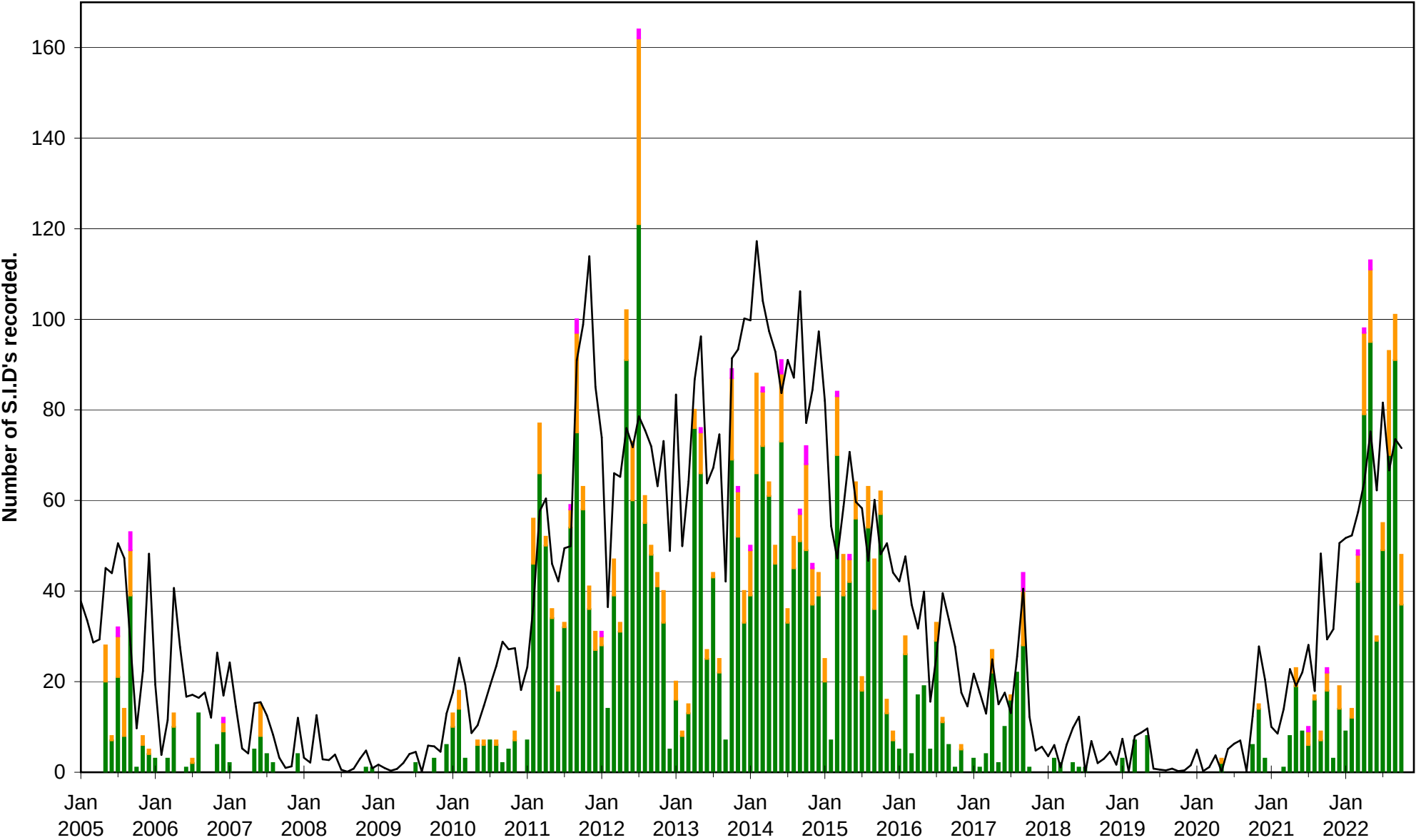
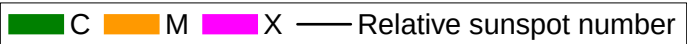
Mark Prescott's Muon counts do not show any significant features through October, although there was a small change in activity following the GRB.



Looking at the grey average trace, there does seem to be a more sinusoidal profile (marked by the red bar) compared to the periods before and afterwards. The connection with the GRB is not certain, but is interesting.

No meteor observations were received for October.

VLF flare activity 2005/22



BARTELS DIAGRAM

ROTATION	KEY:		DISTURBED.			ACTIVE		SFE	B, C, M, X = FLARE MAGNITUDE.										Synodic rotation start (carrington's).											
2543	F	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2020 February 1 2		2227 3		
2544	F	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	2228 1		
2545	F	2020 March 2 3		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	2229 28		
2546	F	29	30	31	2020 April 1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
2547	F	2230 25		26	27	28	29	30	2020 May 1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
2548	F	22	23	24	25	26	27	28	29	30	31	2020 June 1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
2549	F	2032 18		19	20	21	22	23	24	25	26	27	28	29	30	2020 July 1		2	3	4	5	6	7	8	9	10	11	12	13	14
2550	F	2033 15		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2020 August 1		2	3	4	5	6	7	8	9	10
2551	F	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2020 September 1		2	3	4	5	6	
2552	F	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	2020 October 1		2	3	
2553	F	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
2554	F	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
2555	F	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
2556	F	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
2557	F	20	21	22	23	24	25	26	27	28	29	30	31	2021 February 1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	
2558	F	16	17	18	19	20	21	22	23	24	25	26	27	28	2021 March 1		2	3	4	5	6	7	8	9	10	11	12	13	14	
2559	F	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2021 April 1		2	3	4	5	6	7	8	9	10	
2560	F	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	2021 May 1		2	3	4	5	6	7	M
2561	F	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2021 June 1		2	3	
2562	F	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
2563	F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
2564	F	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
2565	F	24	25	26	27	28	29	30	31	2021 September 1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
2566	F	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
2567	F	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2021 November 1		2	3	4	5	6	7	8	9	10	11	12	
2568	F	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	2021 December 1		2	3	4	5	6	7	8	9	
2569	F	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2022 January 1		2	3	4	5	
2570	F	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1		
2571	F	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
2572	F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
2573	F	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
2574	F	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
2575	F	21	22	23	24	25	26	27	28	29	30	31	2022 June 1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
2576	F	17	18	19	20	21	22	23	24	25	26	27	28	29	30	2022 July 1		2	3	4	5	6	7	8	9	10	11	12	13	
2577	F	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2022 August 1		2	3	4	5	6	7	8	9	
2578	F	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5		
2579	F	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2		
2580	F	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
2581	F	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		

	X-ray class	Observers	John Cook (23.4kHz/22.1kHz)	Roberto Battaiola (20.9kHz/18.3kHz)	Paul Hyde (22.1kHz/24kHz)	Mark Edwards (24.0/19.6/18.3kHz)	Colin Clements (37.5kHz/21.75kHz)
			Tuned radio frequency receiver, 0.58m frame aerial.	Modified AAVSO receiver.	Spectrum Lab / PC 1.5m frame aerial.	Spectrum Lab / PC 2m loop aerial.	Tuned Radio Frequency receivers, 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	C3.4	1				17:39 17:44 17:48 1-	
1	C4.3	1				18:03 18:07 18:16 1-	
2	C2.3	2			10:41 10:47 11:10 1+	10:43 10:47 10:59 1-	
2	C2.4	2			11:34 11:43 ? -	11:37 11:41 11:46 1-	
2	C3.0	2			11:49 12:03 12:26 2	11:53 11:58 12:20 1+	
2	?	2			13:09 13:25 ? -	13:14 13:36 13:51 2	
2	M1.2	8	13:58 14:05 ? -		13:53 14:09 ? -	13:57 14:07 ? -	13:57 14:09 14:53 2+
2	C8.7	6	14:51 14:57 15:12 1		14:49 15:02 ? -	14:50 15:00 15:34 2	14:53 15:10 15:39 2+
2	M1.0	7	15:40 15:45 15:57 1-		15:36 15:47 16:12 2	15:40 15:46 16:30 2+	15:39 15:48 16:08 1+
2	C3.6	1				17:31 17:38 17:46 1-	
2	C7.8	2			17:59 18:12 ? -	18:02 18:10 18:31 1+	
3	C7.5	4	07:20 07:22 07:39 1	07:16 07:23 07:52 2	07:18 07:27 07:41 1	07:18 07:25 07:32 1-	
3	C5.1	3	09:18 09:24 ? -		09:10 09:27 ? -	09:15 09:30 ? -	
3	M4.2	8	09:57 10:11 ? -		09:40 10:03 ? -	09:43 10:15 ? -	09:43 10:21 11:07 2+
3	?	1				10:52 10:54 ? -	
3	M1.5	7	11:06 11:10 ? -		11:03 11:13 ? -	11:05 11:15 11:39 2	11:07 11:17 12:14 2+
3	C4.3	5	12:15 12:24 12:48 2	12:13 12:23 12:33 1	12:14 12:28 12:54 2	12:16 12:26 12:41 1	
3	C2.9	2			13:14 13:22 13:43 1+	13:15 13:20 13:26 1-	
3	?	2			14:18 14:25 ? -	14:20 14:32 ? -	
3	C4.1	1			14:34 14:42 15:01 1+		
3	M1.6	9	15:27 15:30 15:55 1+	15:22 15:32 15:43 1	15:25 15:37 16:26 2+	15:27 15:34 15:52 1	12:27 15:37 16:04 3+
4	M1.6	9	13:00 13:10 14:21 2+	12:52 13:17 13:36 2	12:56 13:15 14:58 3	12:58 13:15 15:03 3	
4	?	1				15:09 15:12 15:28 1	
5	?	3			08:53 09:01 09:07 1-	08:57 09:00 09:12 1-	
5	?	1			09:53 10:02 10:22 1+		
5	?	1			10:48 11:08 11:24 2		
5	C2.2	1			11:55 12:06 12:20 1		
7	?	2	09:32 09:37 09:54 1			11:18 11:53 12:09 2+	
7	C3.4	2			12:20 12:35 13:03 2	12:24 12:38 13:19 2+	
7	M1.0	6	14:19 14:40 15:56 3	14:18 14:39 15:09 2+	14:21 14:43 15:51 3	14:24 14:42 15:44 2+	
8	C2.9	3	09:33 09:38 ? -		09:29 09:42 10:03 2	09:33 09:42 09:53 1	
8	?	1			10:22 10:29 10:49 1+		
9	C3.4	1			08:06 08:14 08:20 1-		
9	C2.0	1			09:18 09:23 09:32 1-		
9	C2.8	2			10:28 10:37 ? -	10:34 10:34 10:40 1-	
9	?	2			10:41 10:47 10:55 1-	10:42 10:43 10:48 1-	
9	C2.3	3			10:58 11:02 11:19 1	11:01 11:04 11:12 1-	
9	?	1				12:01 12:04 12:16 1-	
9	GRB	8	13:20 13:22 14:08 2+	13:17 13:18 ? -	13:19 13:20 13:54 2	13:20 13:23 13:54 2	13:33 13:37 13:40 1-
9	C3.9	3			14:16 14:29 14:51 2	14:17 14:28 14:57 2	
10	?	1				14:08 14:10 14:21 1-	
10	C4.9	5	15:41 15:46 ? -		15:41 15:52 ? -	15:41 15:50 ? -	
10	M2.4	4	16:09 16:23 ? -		16:10 16:19 17:00 2+	16:10 16:26 17:43 3	
11	M3.9	10	08:41 08:42 09:58 2+	08:34 08:42 09:16 2	08:39 08:43 09:38 2+	08:40 08:43 08:54 1-	08:42 08:45 09:20 2
11	M1.5	9	10:50 10:54 12:33 3	10:46 10:55 11:23 2	10:47 10:58 12:44 3	10:50 10:57 12:01 2+	10:51 10:54 11:12 1
11	C1.5	1				12:52 12:55 13:08 1-	
11	C3.6	2			16:32 16:46 17:31 2+	16:37 16:46 17:07 1+	
12	C8.8	7	14:17 14:18 15:00 2	14:16 14:20 14:33 1-	14:16 14:23 15:08 2+	14:18 14:25 14:48 1+	14:14 14:21 14:56 2
12	C4.7	1				16:30 16:34 16:37 1-	
13	C4.7	4	09:16 09:18 09:45 1+	09:08 09:21 09:24 1-	09:09 09:21 09:33 1	09:14 09:20 09:27 1-	
14	M1.3	8	09:30 09:44 11:12 3	09:24 09:50 10:11 2+	09:27 09:49 10:43 2+	09:30 09:49 10:56 3	
15	C6.1	9	14:16 14:31 15:28 2+	14:12 14:30 14:48 2	14:14 14:25 15:12 2+	14:16 14:32 15:55 3	14:15 14:25 14:58 2
16	C1.8	1				16:04 16:08 16:11 1-	
18	C1.9	1				14:09 14:14 14:22 1-	
20	?	1				13:29 13:31 13:37 1-	
20	?	1				13:40 13:46 13:53 1-	
20	C2.7	1				15:22 15:25 15:32 1-	
20	?	1				16:36 16:38 16:43 1-	
20	C5.9	1				16:49 16:53 17:01 1-	
22	C2.1	6	10:31 10:39 11:07 2		10:28 10:44 11:15 2+	10:31 10:38 11:32 2+	
22	B7.5	2			15:01 15:09 15:13 1-	15:02 15:11 15:18 1-	
24	C4.2	1				07:59 08:05 08:19 1	
24	C2.5	3		13:40 13:46 13:51 1-	13:39 13:45 14:01 1	13:40 13:47 14:01 1	
25	C3.3	2			15:12 15:19 15:31 1	15:15 15:22 15:42 1+	
26	C6.7	8	12:40 12:43 13:07 1+	12:38 12:46 13:16 2	12:35 12:47 13:17 2	12:39 12:47 13:20 2	12:38 12:42 13:03 1
	0	0					
	0	0					
	0	0					

BAA Radio Astronomy Section.

2022 OCTOBER.

	Xray class		Steve Parkinson (Various)				Andrew Thomas (19.6kHz/18.3kHz)				Phil Rourke (23.4kHz)				Mark Prescott (22.1kHz/19.6kHz)				John Elliot (18.3kHz)			
			Tuned radio frequency receiver, frame aerals.				Tuned radio frequency receiver, 0.6m frame aerial.				Spectrum Lab, 0.6m frame aerial.				SpetrumLab/Starbase, mini-whip aerial. Active				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	C3.4																					
1	C4.3																					
2	C2.3																					
2	C2.4																					
2	C3.0																					
2	?																					
2	M1.2		13:57	14:06	?	-	13:58	14:06	14:41	2	13:59	14:08	15:03	2+	13:58	14:11	14:51	2+				
2	C8.7		14:51	15:00	?	-									14:54	15:01	15:27	2				
2	M1.0		15:39	15:46	16:20	2					15:19	15:48	16:11	2+	15:43	15:49	16:07	1				
2	C3.6																					
2	C7.8																					
3	C7.5																					
3	C5.1																					
3	M4.2		09:40	10:10	?	-	09:43	10:13	11:04	2+	09:43	10:10	?	-	09:50	10:03	10:17	1+				
3	?																					
3	M1.5		11:06	11:14	11:40	2					?	11:13	14:05		11:09	11:19	11:39	1+				
3	C4.3		12:15	12:27	13:00	2																
3	C2.9																					
3	?																					
3	C4.1																					
3	M1.6		15:26	15:35	16:20	2+	15:25	15:33	15:45	1	15:28	15:36	?	-	15:28	15:37	16:33	2+				
4	M1.6		12:57	13:15	14:20	2+	12:57	13:14	14:25	3	12:57	13:14	14:53	3	13:01	13:16	14:21	2+	13:00	13:15	14:00	2+
4	?																					
5	?		08:54	09:03	09:24	1+																
5	?																					
5	?																					
5	C2.2																					
7	?																					
7	C3.4																					
7	M1.0										14:28	14:45	15:27	2+	14:29	14:44	15:17	2+				
8	C2.9																					
8	?																					
9	C3.4																					
9	C2.0																					
9	C2.8																					
9	?		10:59	11:04	11:25	1+																
9	C2.3																					
9	?																					
9	GRB		13:20	13:22	13:45	1	13:20	13:21	13:56	2					13:22	13:28	14:01	2				
9	C3.9														14:25	14:28	?	-				
10	?																					
10	C4.9						15:41	15:46	16:02	1	15:41	15:48	16:05	1								
10	M2.4										16:12	16:25	16:42	1+								
11	M3.9		08:40	08:46	09:50	2+	08:40	08:45	09:31	2+	08:41	08:45	09:52	2+	08:44	08:48	09:29	2	08:40	08:45	09:30	2+
11	M1.5		10:50	10:56	12:00	2+	10:50	10:54	11:58	2+	10:50	10:57	12:33	3	10:52	10:59	11:43	2+				
11	C1.5																					
11	C3.6																					
12	C8.8		14:18	14:21	14:55	2	14:17	14:21	14:39	1												
12	C4.7																					
13	C4.7																					
14	M1.3		09:30	09:51	11:00	3	09:29	09:51	10:40	2+	09:31	09:51	10:40	2+	09:32	09:52	10:50	2+				
15	C6.1		14:17	14:27	14:50	2	14:15	14:28	14:46	1+	14:16	14:29	15:02	2+	14:18	14:30	?	-				
16	C1.8																					
18	C1.9																					
20	?																					
20	?																					
20	C2.7																					
20	?																					
20	C5.9																					
22	C2.1		10:30	10:40	11:02	1+	10:13	10:38	10:59	2+									10:50	10:55	11:45	2+
22	B7.5																					
24	C4.2																					
24	C2.5																					
25	C3.3																					
26	C6.7		12:40	12:47	13:15	2	12:40	12:46	13:11	1+					12:43	12:46	13:14	1+				