

The British Astronomical Association

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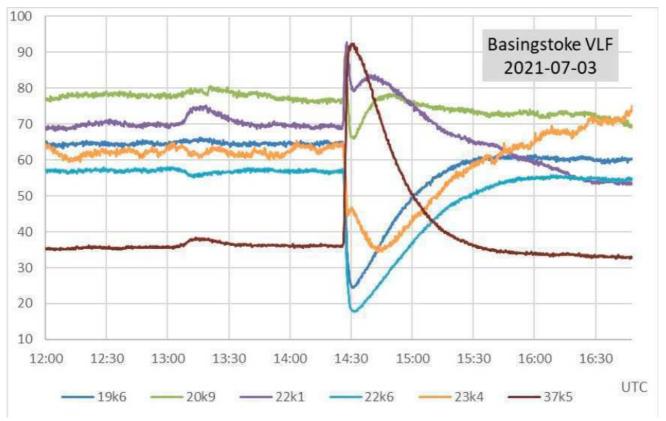


Please send all reports and observations to jacook@jacook.plus.com

BAA Radio Astronomy Section.

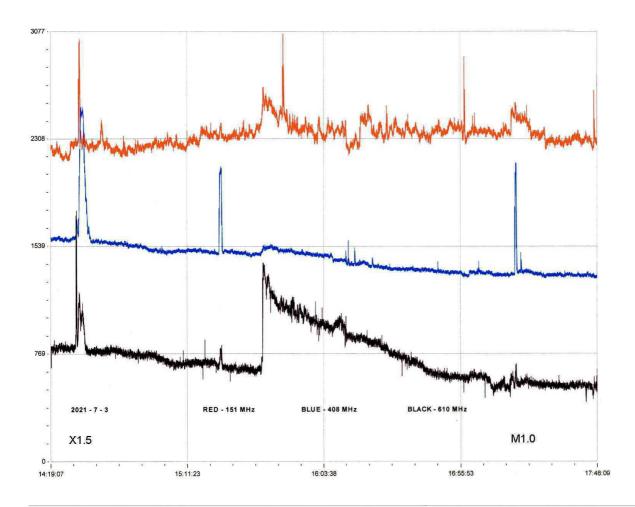
2021 JULY.

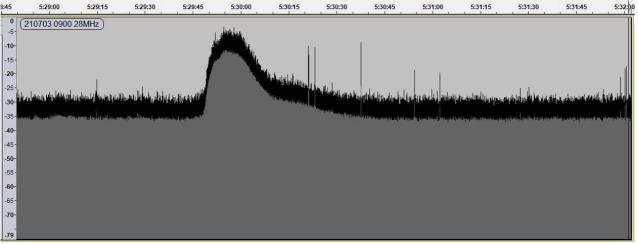
July started with a 'bang' as the first X-class flare of solar cycle 25 was recorded on the 3rd. Active region AR12838 was right on the North Western limb of the sun when the flare occurred, and was responsible for all of the activity that we recorded on the 3rd.



This recording by Paul Hyde shows a variety of SID profiles from the flare. The 37.5kHz SID is a conventional rising 'shark's fin', while the SID at 22.6kHz is inverted. The 23.4kHz signal shows a mild 'spike and wave' pattern as the phase shift between ground and sky waves moves from cancelling to adding and back again. 22.1kHz shows an inverted version of the 'spike and wave'. What is clear from them all is the very rapid rise time of the disturbance. The earlier C1.9 flare is just visible around 13:10–13:30UT.

Radio noise was also recorded at 151MHz, 408MHz and 610MHz by Colin Clements, and at 28MHz by Colin Briden as shown in the charts on the next page:

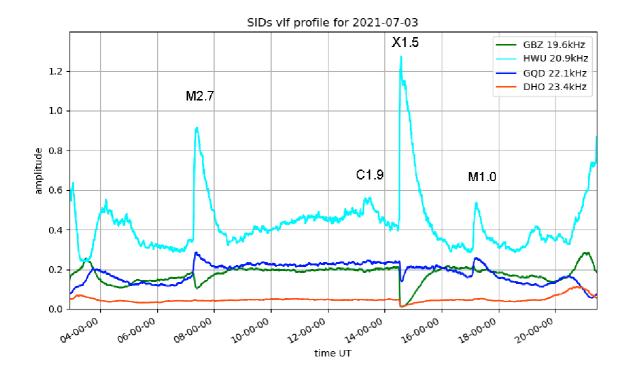




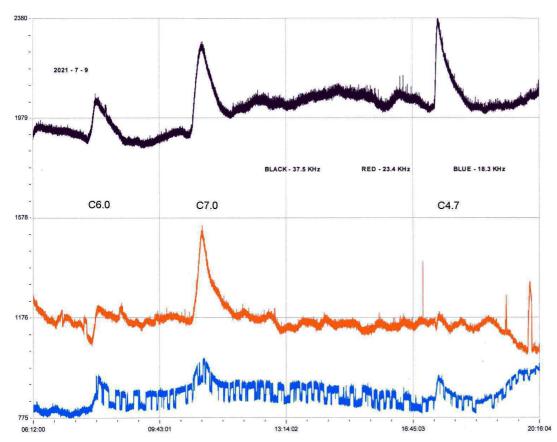
In Colin Clements' recording, 610MHz (black trace) shows a strong spike at the peak of the X1.5 flare, followed at about 15:32 by a sharp rise and long decay in signal strength. The X1.5 shows at all three frequencies, but the later M1.0 flare is only really strong at 408MHz (blue trace).

Colin Bridens' recording shows the 28MHz signal at the time of the X1.5 flare, lasting about 55 seconds before settling at its pre-flare level. The grey band is the signal average, the black band showing signal strength peaks.

The recording from Mark Prescott shows the full day's activity, starting with the M2.7 flare peaking at around 07:20UT. The C1.9 flare shows best at 20.9kHz, despite the noisy signal. The M1.0 flare is also clearly shown, although for some reason 23.4kHz has responded rather weakly to all of the events.

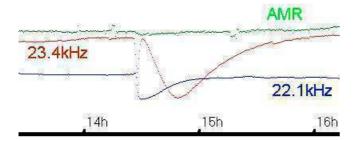


There was another M1.5 flare early on the 4th, after which the sun remained fairly quiet until the 9th when we recorded more strong C-class flares. Colin Clements' recording shows the three stronger events:

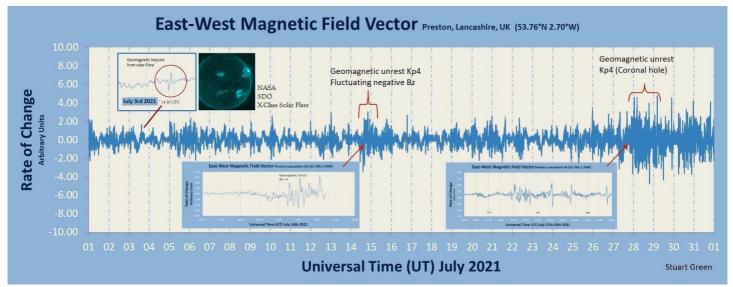


23.4kHz again shows some strange behaviour, with the C6 flare barely visible while the C7 flare produced a clear SID. The later C4.7 flare is also hidden in the noise. There is strong local interference at 18.3kHz, but the SIDs can still be seen. Colin also recorded some VHF activity with these flares. The rest of the month was much quieter with mostly B-class flares, the majority far too weak for us to record.

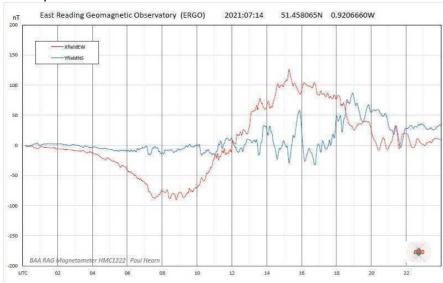
MAGNETIC OBSERVATIONS.

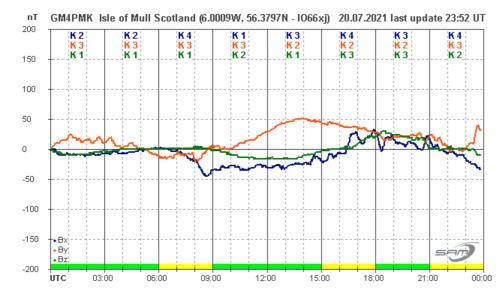


The X1.5 flare on the 3rd produced a magnetic SFE (Solar Flare Effect, or crotchet), shown in the green magnetometer trace in my recording. The SFE is quite small in amplitude (about -10nT) but the dip in the trace matches the upper peak of the 23.4kHz SID. The rectangular disturbances seen either side of the SFE are from local interference. The SFE is also indicated in the month's activity chart from Stuart Green:



There was a CME from the flare, but occurring right on the solar limb it was not Earth directed. More CMEs were seen in satellite images, but none caused any magnetic disturbances. A generally higher speed solar wind was present mid-month, creating some periods of mild disturbance. The recording by Paul Hearn shows activity on the 14th:





Mild disturbance was also seen on the 20^{th} , shown above in Roger Blackwell's recording. Towards the end of July a pair of coronal holes became effective with a stronger solar wind. This recording by Nick Quinn shows activity on the 28^{th} :





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

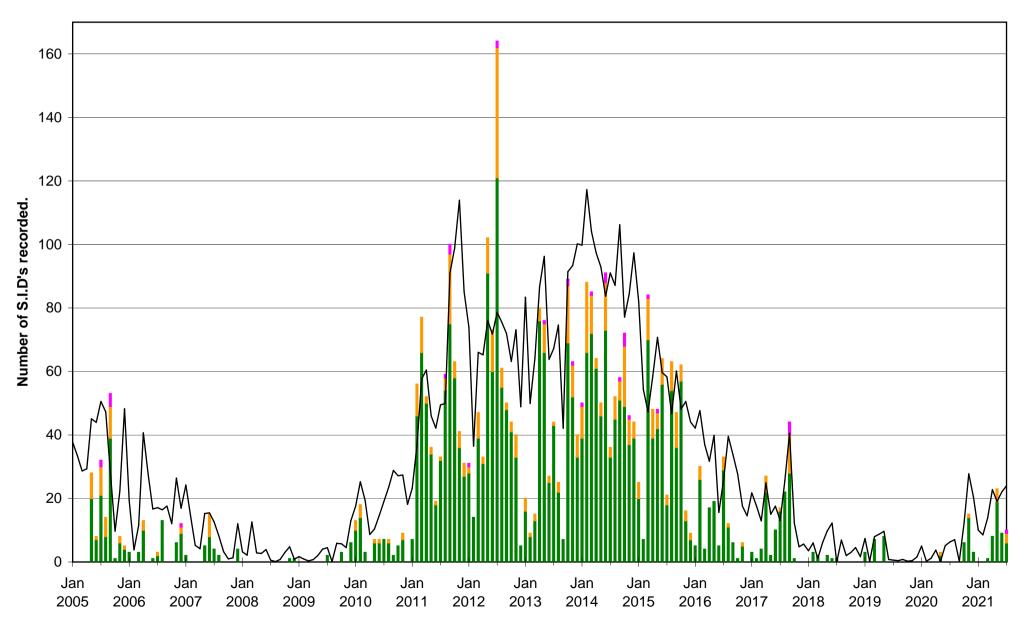
Our series of web-based meetings continues with a GNU radio training seminar on September 18th. Details of how to join the meeting can be found at www.britastro.org along with a programme of future events.

BARTELS DIAGRAM

DAA I	Naulo Astro	, 5	cction.									DAKIE	LS DIA	UKAW													
2529	26 F	27	28	29	30	31	2019 Ja 1	nuary 2	3	4	5	6 C	7	8	9	10	11	12	13	14	15	16	2213 17	18	19	20	21
2530	22 F	23	24	25	26 CB	27	28	29 C	30	31	2019 F	ebruary 2	3	4	5	6	7	8	9	10	11	12	2214 13	14	15	16	17
2531	18	19	20	21	22	23	24	25	26	27	28	2019 Ma 1	arch 2	3	4	5	6	7	8	9	10	11	12	2215 13	14	15	16
2532	17 F	18	19	20 C	21 CCC	22 CCCB	23 B	24	25	26	27	28	29	30	31	2019 Ap 1	oril 2	3	4	5	6	7	8 B	2216 9	10	11	12 B
2533	13 F	14	15	16	17	18	19	20 B	21	22	23	24	25	26	27	28	29	30	2019 Ma 1	2 2	3	4	5 BB	2217 6 CCCC	7 BCC	8	9 C
2534	10 F	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2019 Ju 1		2218 3	4	5
2535	6 F	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	2219 30	2019 Jul 1	2 2
2536	3 F	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	2220 27	28	29
2537	30 F	31	2019 Au 1	ugust 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	2221	24	25
2538	26 F	27	28	29	30	31	2019 Se	ptember 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	2222 19	20	21
2539	22 F	23	24	25	26	27	28	29	30	2019 O 1	ctober 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	2223 17	18
2540	19 F	20	21	22	23	24	25	26	27	28	29	30	31	2019 No 1	vember 2	3	4	5	6	7	8	9	10	11	12	2224 13	14
2541	15 F	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	2019 De 1	ecember 2	3	4	5	6	7	8	9	2225 10	11
2542	12 F	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2020 Ja 1	nuary 2	3	4	5	2226 6	7
2543	8 F	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2020 Fe 1	bruary 2	3
2544	4 F	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	1
2545	2020 Ma 2 F	arch 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	29 F	30	31	2020 A _l	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2547	2230 25 F 2231	26	27	28	29	30	2020 Ma 1	2	3	4	5 2020 Ji	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
2548	22 F 2032	23	24	25	26	27	28	29 MCCB	30	31	1	2	3	4 2020 Ju	5	6	7	8	9	10	11	12	13	14	15	16	17
2549	18 F	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5 2020 Au	6	7	8	9	10	11	12	13	14
2550	15 F	16 2234	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5 2020 Se	6	7	8	9	10
2551	11 F	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4 2020 Oc	5 ctober	6
2552	7 F	8 2236	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3
2553	4 F	5	6 2020 No	7 ovember	8	9	10	11	12	13	14	15	16 CC	17	18	19	20	21	22	23	24	25	26	27 C	28	29 BCCC	30
2554	31 F	1 B	2 2238	3	4 B 2020 D	5 CBCC ecember	6 CBC	7 B	8	9	10 C	11 C	12	13	14	15	16	17	18	19	20	21	CC	23	24	25	26 C
2555	27 F	28 C	29 CM 2239	30	1	2	3	4	5 2021 Ja	6 C nuary	7 C	8	9	10	11	12	13	14 C	15	16	17	18	19	20	21	22	23
2556	24 F	25	26	27 2240	28	29	30	31	1	2	3	4	5 2021 Fe	6 bruary	7	8	9	10	11	12	13	14	15	16	17	18	19
2557	20 F	21	22	23	24	25	26	27	28	29	30	31	1	2 2021 Ma	3 arch	4	5	6	7	8	9	10	11	12	13	14	15
2558	16 F	17	18	19 2242	20	21	22	23	24	25	26	27	28	1	2	3	4	5 2021 Ap		7	8	9 C	10	11	12	13	14
2559	15 F B	16	17	18 2243	19	20	21	22	23	24	25 B	26	27	28	29	30	31	1	2	3	4 2021 Ma		6	7	8	9	10
2560	11 F	12	13	14 2244	15	16	17 B	18	19	20 C	21	22 CCCC	23	24	25	26	27	28	29	30	1	2	3	4	5 2021 Ju		7 M
2561	F CC	9 CC	10	11	12 C 2245	13	14	15	16	17	18	19	20	21 C	22 CCMM		24	25	26 CCCC	27	28 C	29	30	31	1	2	3
2562	4 F 2021 July	5	6	7	8 CCC 2246	9 CCB	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25 C	26	27	28 CBC	29	CC
2563	1 F	2	3 MCXM		5 2021 Ai		7	8	9 CCB	10	11	12	13	14	15	16 C	17	18 C	19	20	21	22	23	24	25	26	27
2564	28 F	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

VLF flare activity 2005/21





	SS	SIS	John C	ook (23.	.4kHz/22.1k	(Hz)	Rob	erto Batta	aiola 21.75kH	Paul I	Hyde (22	2.1kHz/2 <i>4kH</i>	Mark Edv	ards (24	4.0/19.6/ 20.	9 kHz)	Colin Clements (23.4kHz/37.5kHz)					
	Xray cla	Observe			quency rece me aerial.	eiver,	Mod	dified AA'	VSO receiver.	Spectru	ım Lab / ae	PC 1.5m fra	Spectrun	n Lab / F	C 2m loop a	erial.	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)	
3	M2.7	8	07:13	07:19	08:20	2+	07:10	07:17	07:39	1+	07:10	07:18	08:20	2+	07:11	07:19	08:41	3	07:13	07:20	08:16	2+
3	C1.9	4	13:09	13:11	13:26	1-					13:07	13:14	13:42	2	13:09	13:14	13:58	2+	13:09	13:18	13:52	2
3	X1.5	9	14:26	14:31	16:00	3	14:24	14:28	15:04	2	14:25	14:31	16:00	3	14:26	14:32	15:20	2+	14:25	14:31	15:45	2+
3	M1.0	9	17:02	17:08	17:50	2+	16:58	17:04	17:34	2	17:01	17:08	17:59	2+	17:02	17:12	17:55	2+	17:04	17:11	17:44	2
4	M1.5	3									05:03	05:09	06:00	2+	05:09	05:13	05:42	2				
4	C1.7	1													18:10	18:14	18:28	1-				
9	C6.0	7	07:44	07:53	08:11	1+	07:35	07:54	08:04	1+	07:43	07:56	09:32	3	07:49	08:00	08:24	2	07:50	08:01	08:30	2
9	C7.0	8	10:37	10:51	11:40	2+	10:31	10:50	11:15	2	10:33	10:51	11:45	2+	10:37	10:53	11:55	2+	10:37	10:53	11:50	2+
9	B8.3	2									14:52	14:57	15:09	1-	14:54	15:01	15:12	1-				
9	C4.7	8	17:20	17:26	18:10	2+	17:16	17:24	17:50	2	17:17	17:25	18:46	3	17:20	17:20	18:30	2+	17:23	17:29	17:46	1
16	C1.7	4	08:34	08:39	08:46	1-					08:34	08:40	09:14	2	08:36	08:43	09:01	1				
18	B9.7	1													07:08	07:10	07:33	1				

	SS	Stev	e Parkin	son (Variou	s)	Andrew	(19.6kHz/22.	1kHz)	Ph	il Rourk	e (23.4kHz)		John	Wardle		Chrostopher Bailey				
	Xray class	Tuned		quency rece aerials.	iver,	Tuned radio frequency receiver, 0.6m frame aerial.				Spectrur).6m frame aerial.	Spetrum		rbase, nip aerial.	Active					
DAY		START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)	START	PEAK	END (U	Γ)	START	PEAK	END (UT)	
3	M2.7 C1.9	07:11	07:18	08:15	2+	07:12	07:19	08:32	2+											
3	X1.5	14:26	14:31	?	-	14:27	14:33	15:45	2+											
3	M1.0	17:01	17:10	18:00	2+	17:00	17:11	17:23	1											
4 4	M1.5 C1.7					05:03	05:09	05:33	1+											
9	C6.0	07:44	07:59	08:30	2+															
9	C7.0 B8.3	10:33	10:51	11:30	2+	10:32	10:52	11:52	2+											
9	C4.7	17:21	17:26	?	-	17:19	17:26	18:05	2+											
16 18	C1.7 B9.7					08:35	08:38	08:55	1											

	class	Co	olin Bride	en (45.9kHz)	An	drew Lut	ley (23.4kHz)	Pete	r Meadows	s (23.4kHz)	Jo	hn Elliott (18.3kHz)	Mark Prescott (20.9kHz)				
	Xray cla			n Lab / PC, me aerial.		Tuned ra		ency receiver, 0.6m e aerial.		radio frequ 0.6m frame	ency receiver, a aerial.		radio frequency receiver, 0.5m frame aerial.					
DAY		START	PEAK	END (UT)		START	PEAK	END (UT)	START	PEAK E	ND (UT)	START	PEAK END (UT)	START	PEAK	END (UT)		
3	M2.7 C1.9													07:15	07:24	08:12	2+	
3	X1.5 M1.0	14:27 17:01	14:31 17:10	14:45 17:34	1- 2									14:29 17:05	14:33 17:13	15:52 17:38	2+ 2	
4	M1.5	17:01	17:10	17:34	2									17:05	17:13	17:38	2	
4 9	C1.7 C6.0 C7.0													?	08:14 10:55	08:39 11:34	- 2+	
9	B8.3													10:38			Z+ 4	
9 16	C4.7 C1.7													17:23	17:30	17:47	1	
18	B9.7																	