



Founded in 1890

The British Astronomical Association

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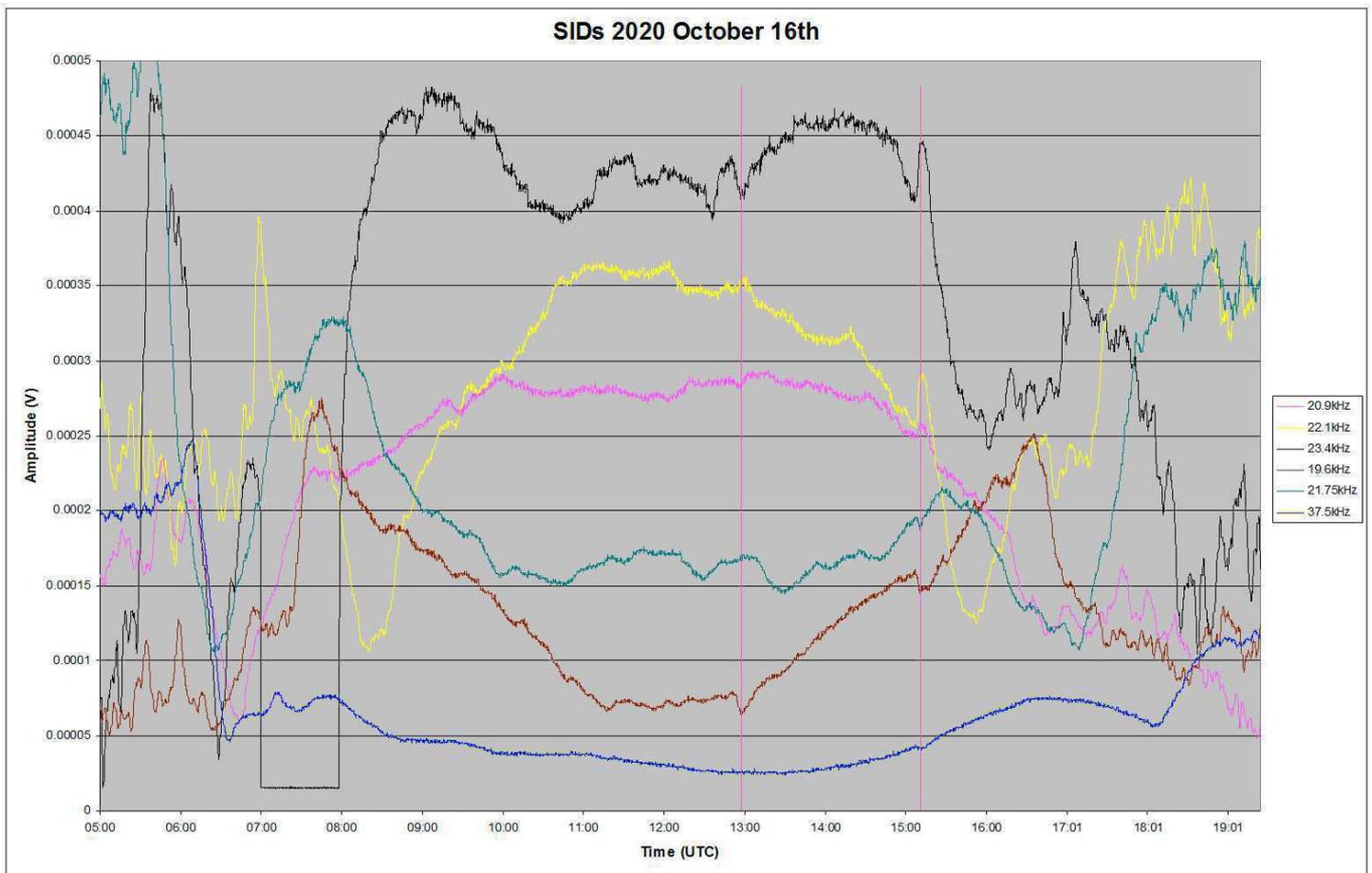


Please send all reports and observations to jacook@jacook.plus.com

BAA Radio Astronomy Section.

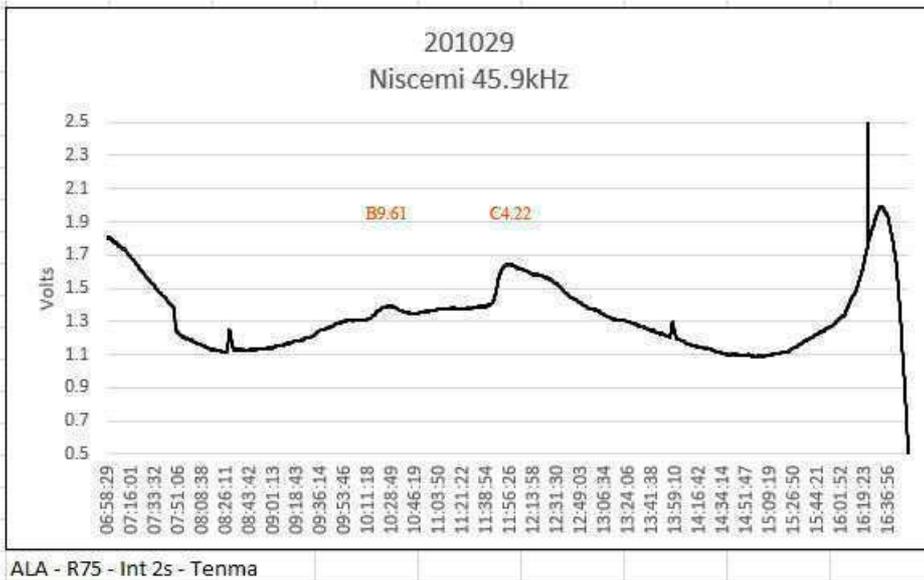
2020 OCTOBER.

Solar activity increased dramatically in October, with at least five active regions flaring in the last three weeks of the month. Along with numerous smaller B-class flares, there were two C4.3 flares, one of which was well timed for European observers and well reported as a SID. Our count of six SIDs is the highest since 11 were reported in 2019 May. Spotting these SIDs in the noisy signals typical at this time of year was tricky however.

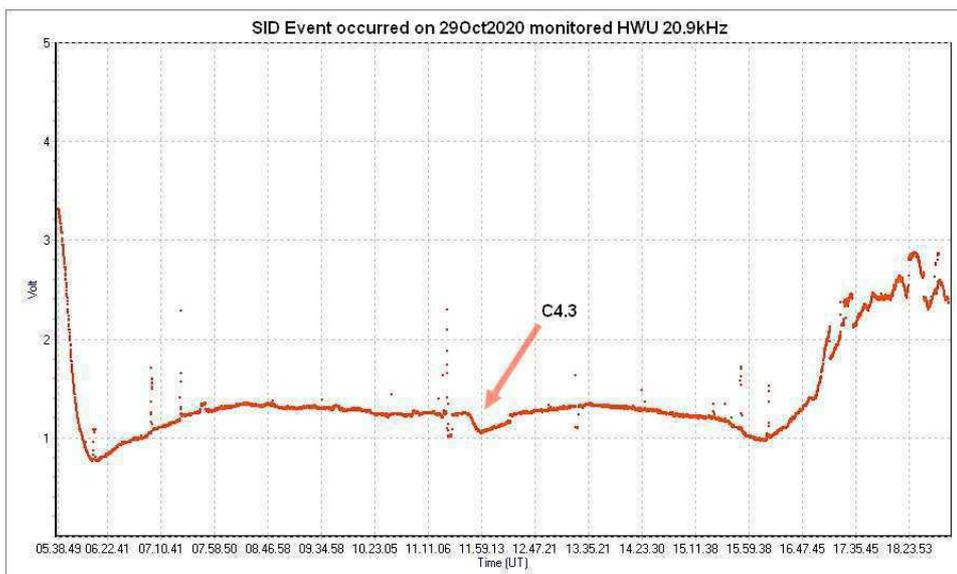


This chart by Mark Edwards shows the two SIDs recorded on the 16th, marked by the vertical lines. They show well at 19.6kHz (brown trace), but the other signals show them hiding amongst many noisy impostors. Difficult to analyse! The 37.5kHz signal is remarkably clean, but barely shows the C3.5 flare. The 21.75kHz signal from Rosnay, France is very noisy throughout the day, and again barely shows the C3.5 flare.

Smoothing of the recorded signals can help to reduce very rapid noise such as that seen at 23.4kHz in Mark's chart (black trace) but is of no help in reducing slower signal variations.



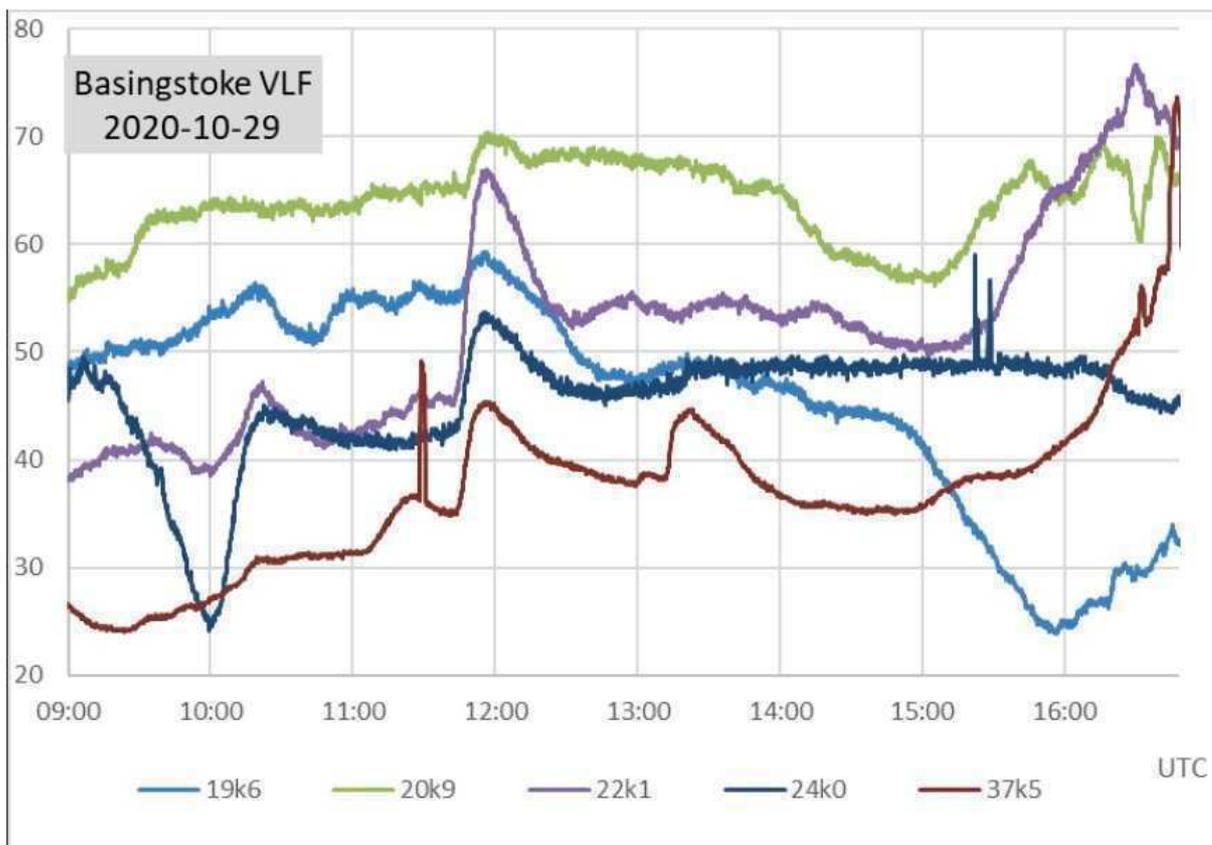
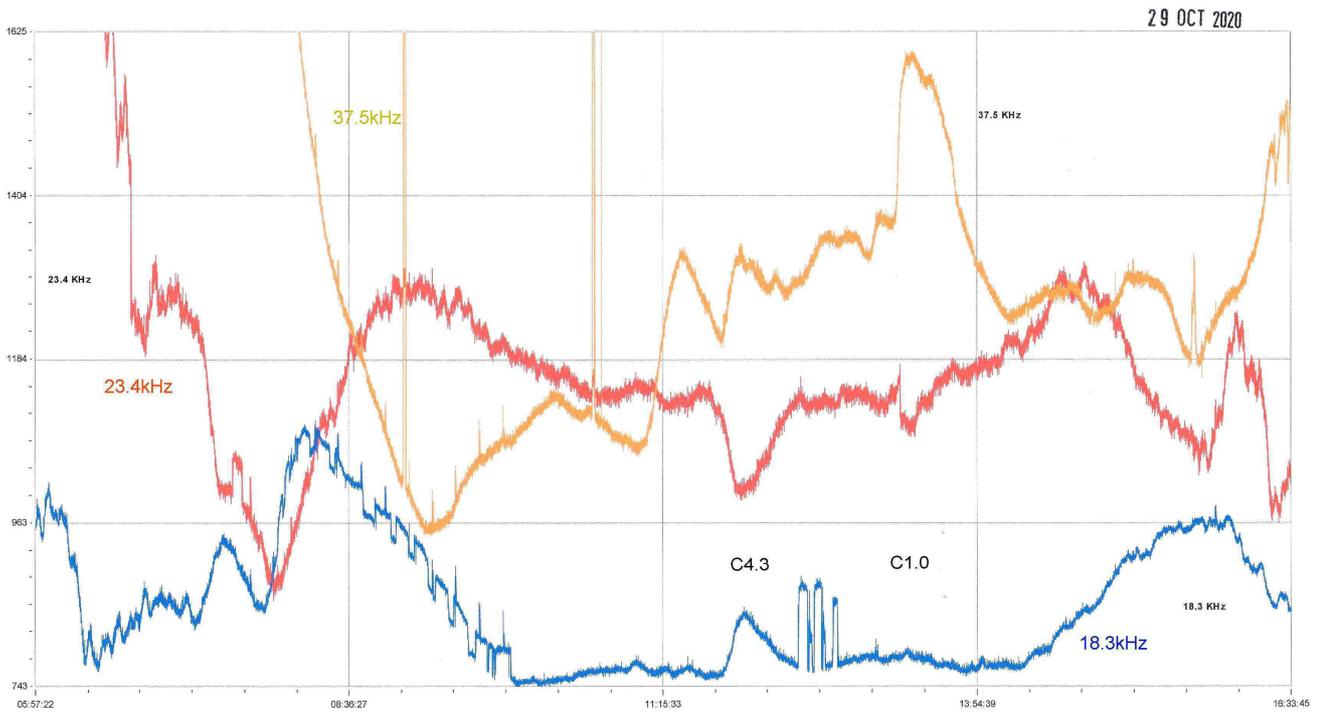
This chart shows activity on the 29th, recorded by Colin Briden at 45.9kHz. This signal is from a transmitter at Niscemi, Italy, at a much higher frequency than usual. It does however show a good SID from two flares, including the earlier B9.6 flare. Andrew is using a Wellbrook active loop aerial feeding an Icom R75 receiver. The output was fed through a two second integrator to a logging voltmeter. The result is a very clean signal.



The reverse path is monitored by Roberto Battaiola in Italy, recording the 20.9kHz signal from France. Apart from some short spiky interference, the signal is also less noisy, and shows the C4.3 flare well.

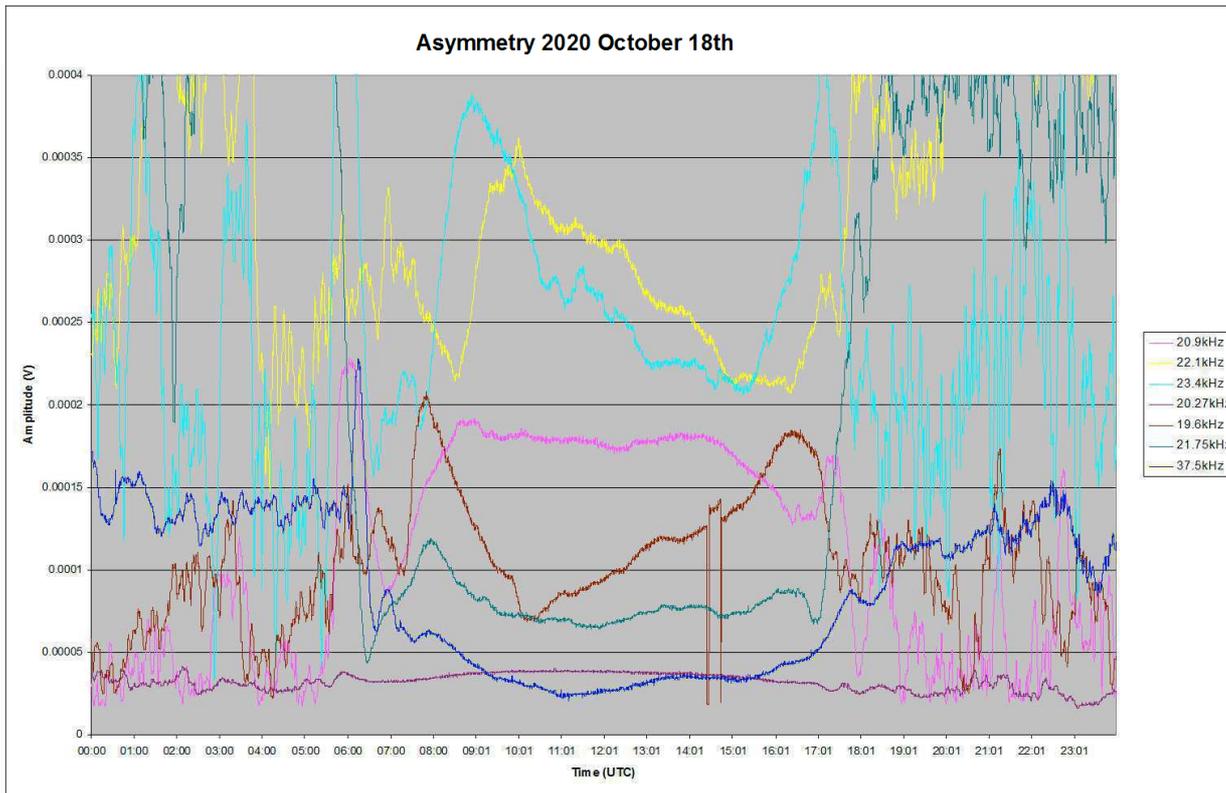
Two SIDs were recorded on the 27th, from a C1.4 flare around 09:50 – 10:00UT, and an unclassified flare at 11:20. This second flare clearly shows in the satellite X-ray data, but has not been listed as a separate event in the SWPC data.

The 29th saw further flare activity, with a clear C4.3 flare just before midday. An earlier B9.6 flare was also recorded, along with two further C-class flares in the afternoon.



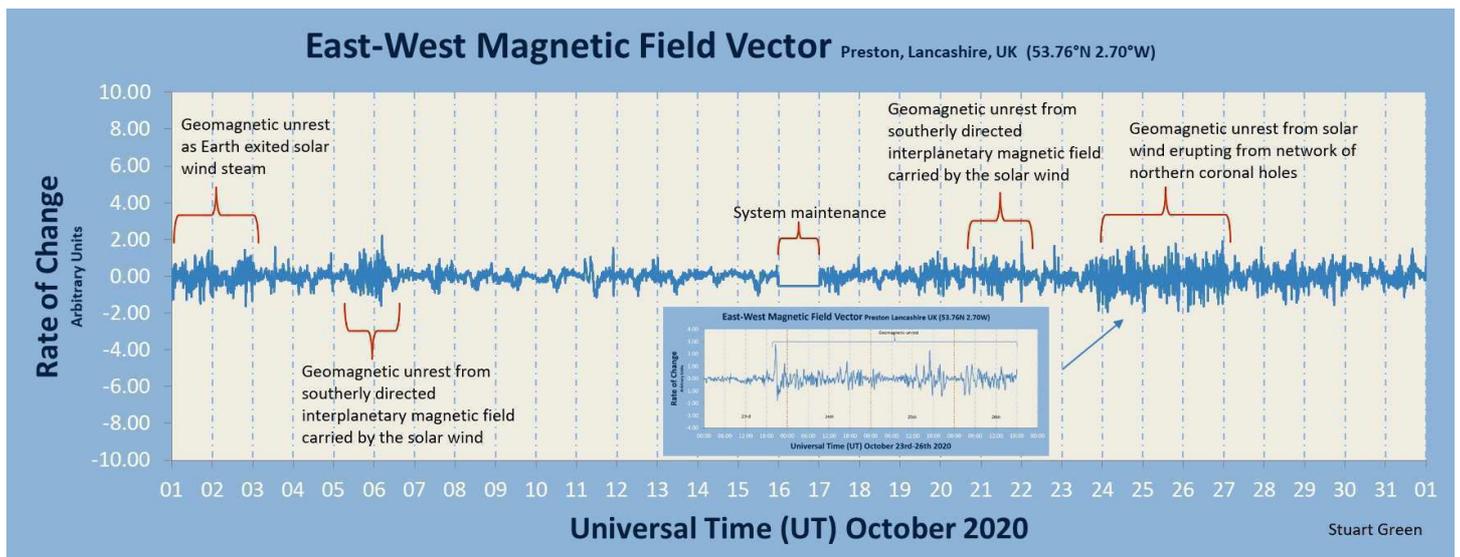
The top chart is from Colin Clements and shows two of these SIDs on some very noisy signals, very tricky to interpret. The lower chart is from Paul Hyde who was lucky to record steadier signals with much clearer SIDs. The C4.3 flare at 11:55 stands out on all five signals.

A feature occasionally seen at this time of year is very asymmetrical diurnal curves. Mark Edwards has provided the following chart from October 18th showing this behaviour:

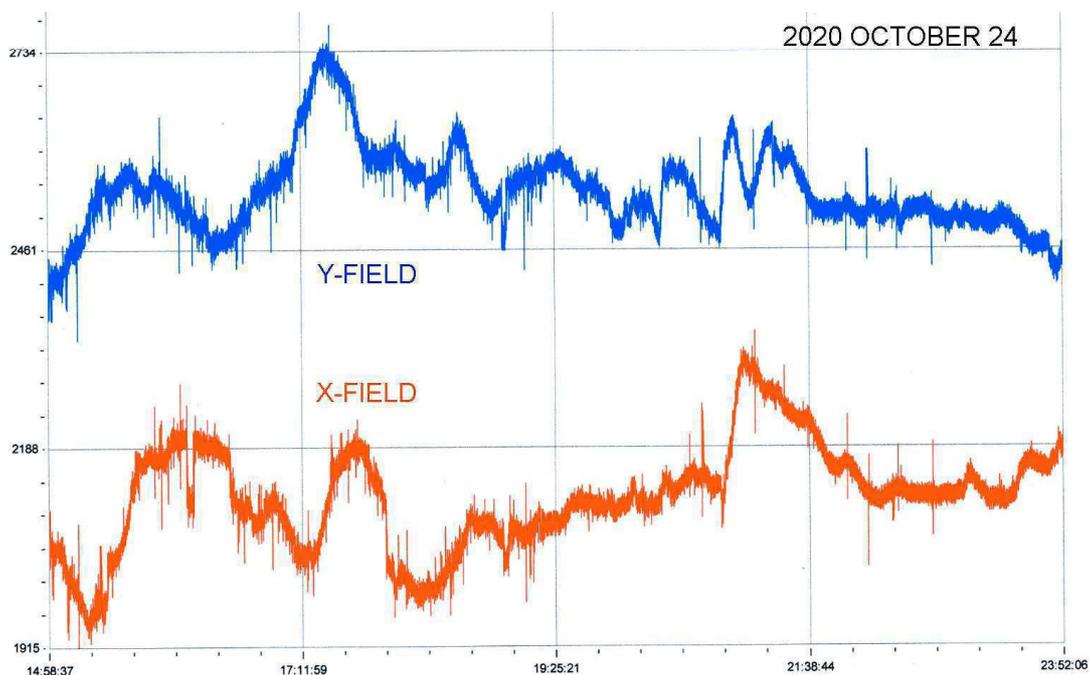
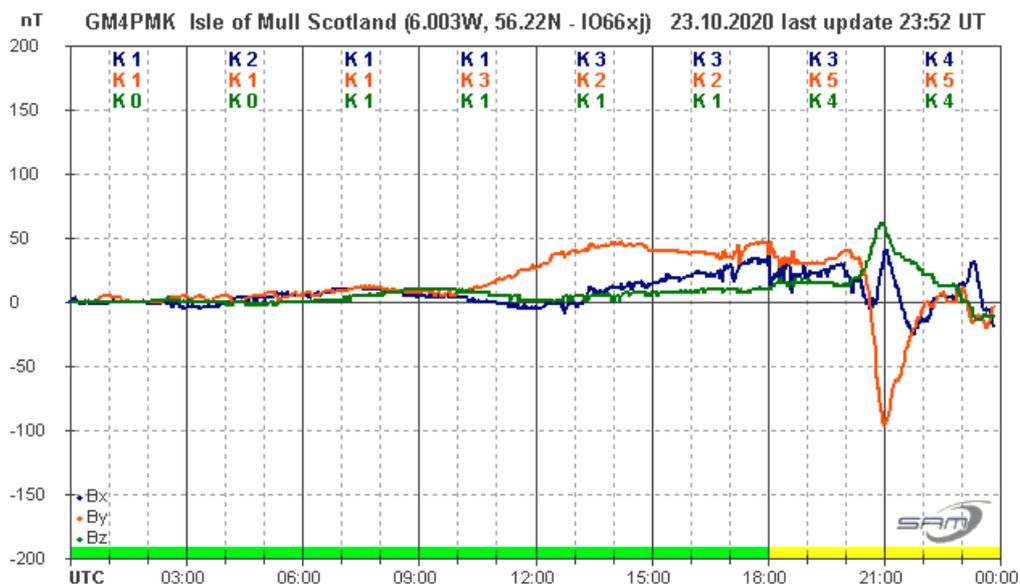


22.1kHz (yellow) and 23.4kHz (light blue) both show signal strength decreasing steadily through the day, while 19.6kHz (brown) steadily increases through the day. Anthorn and Skelton are close to each other on the Solway Firth, and are the shortest paths shown. The path at 23.4kHz is over twice as long and towards the east. The French signals paths' are a similar distance to 23.4kHz, but towards the south. Presumably this effect is due to ground wave / sky wave interference patterns.

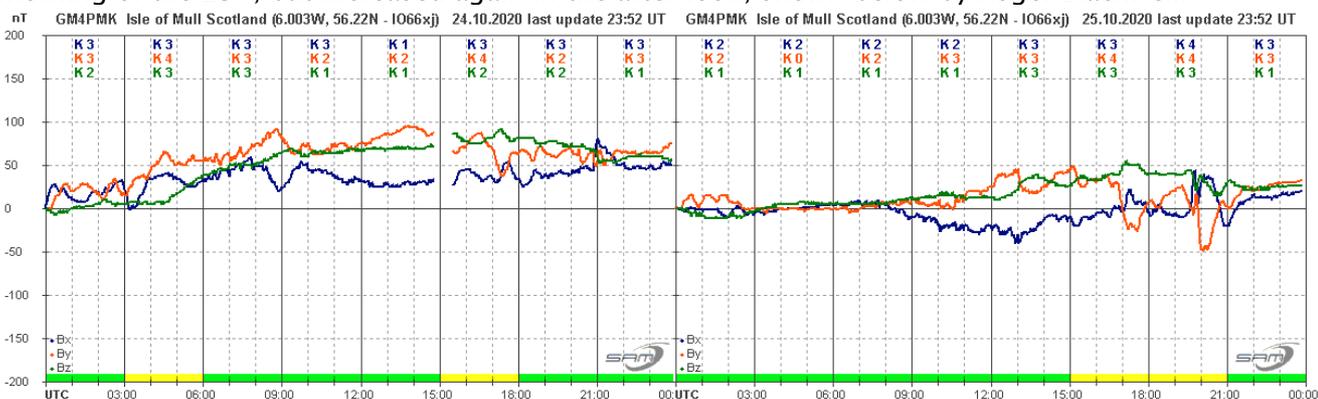
MAGNETIC OBSERVATIONS.



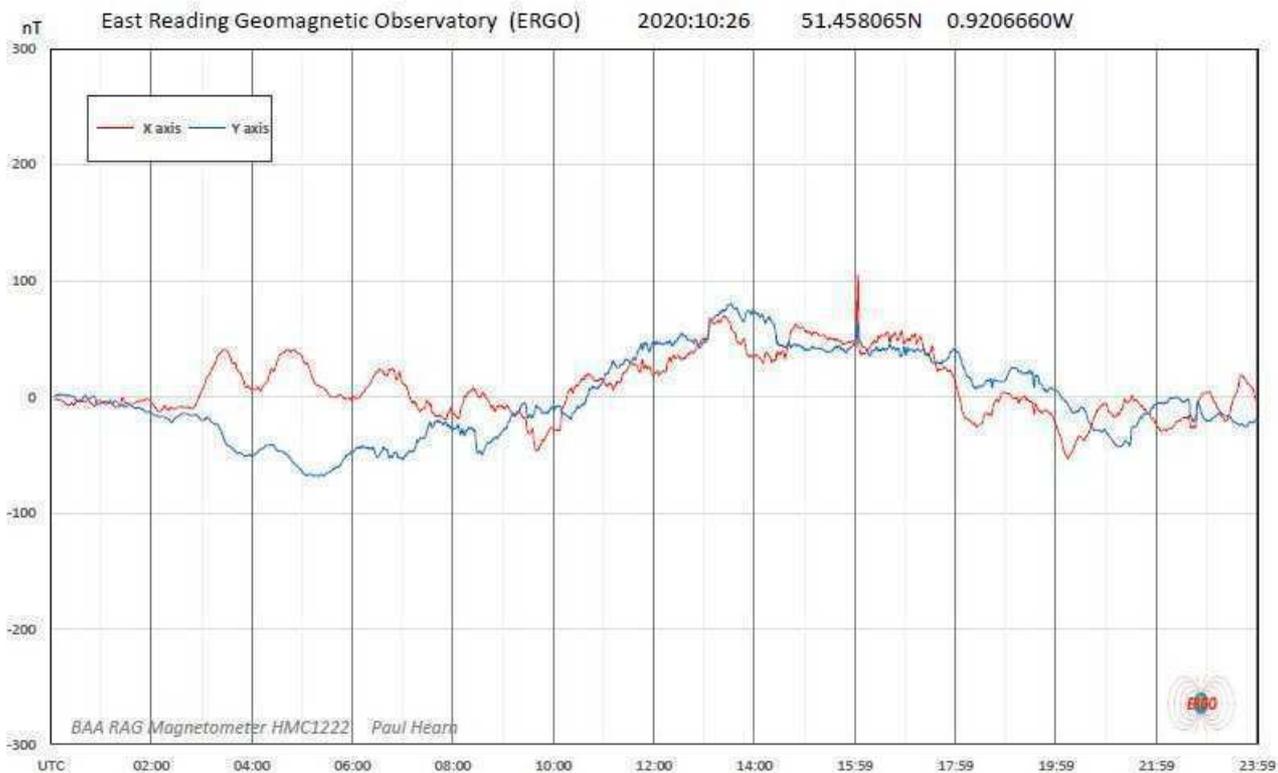
Magnetic activity in October was fairly mild compared to that recorded last month. Disturbance from the coronal hole seen at the end of September faded out over October 1st and 2nd, but was seen again on its sixth rotation starting on the 23rd.



The top chart shows activity starting in the afternoon of the 23rd, recorded by Roger Blackwell. This activity continued through the 24th, shown in the recording by Colin Clements. Activity faded a little in the morning of the 25th, but increased again in the afternoon, shown below by Roger Blackwell.

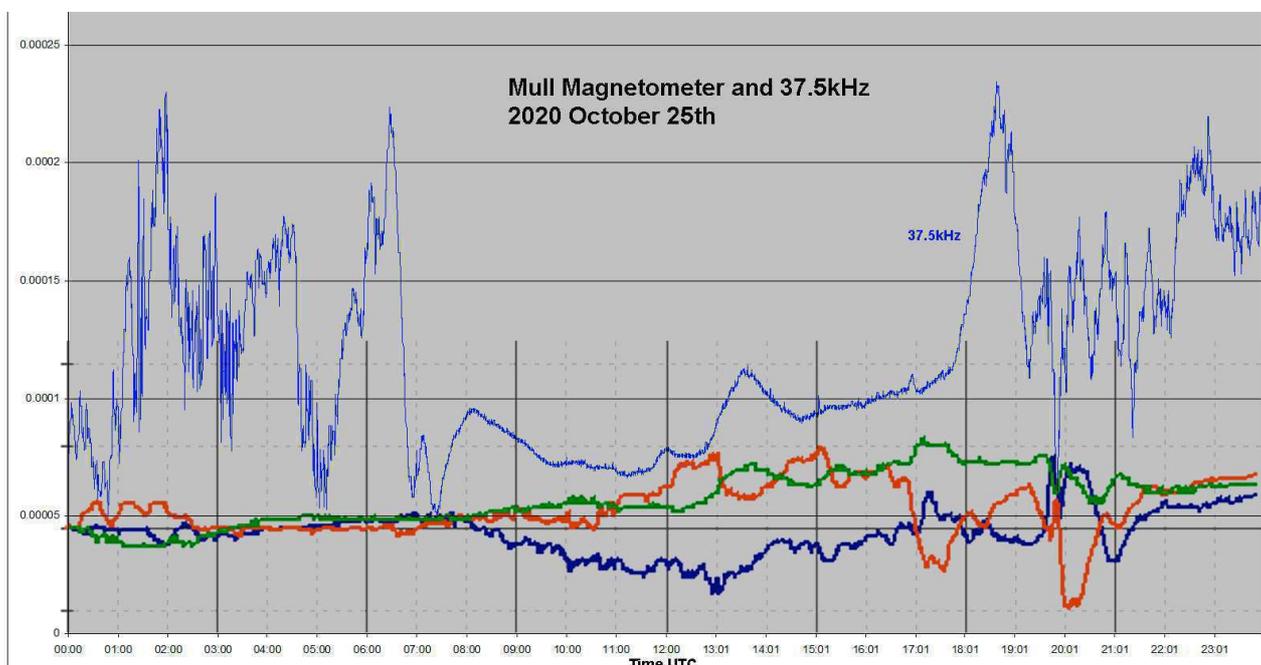


Note that the discontinuity at midnight is due to the sensor being reset.

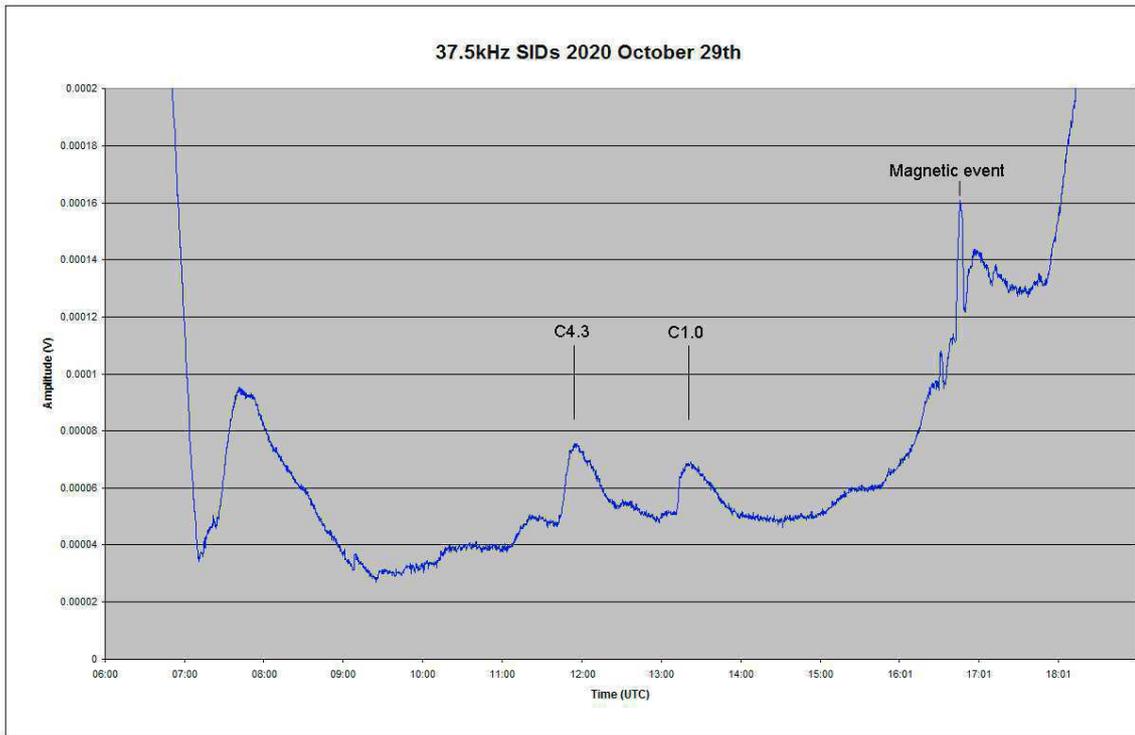


This recording by Paul Hearn shows the disturbance on the morning of the 26th, fading through the day. The spike at 16UT is from local interference.

This magnetic activity caused some disturbance at 37.5kHz on the 24th and 25th, recorded by Mark Edwards with Roger Blackwell's magnetometer overlaid:

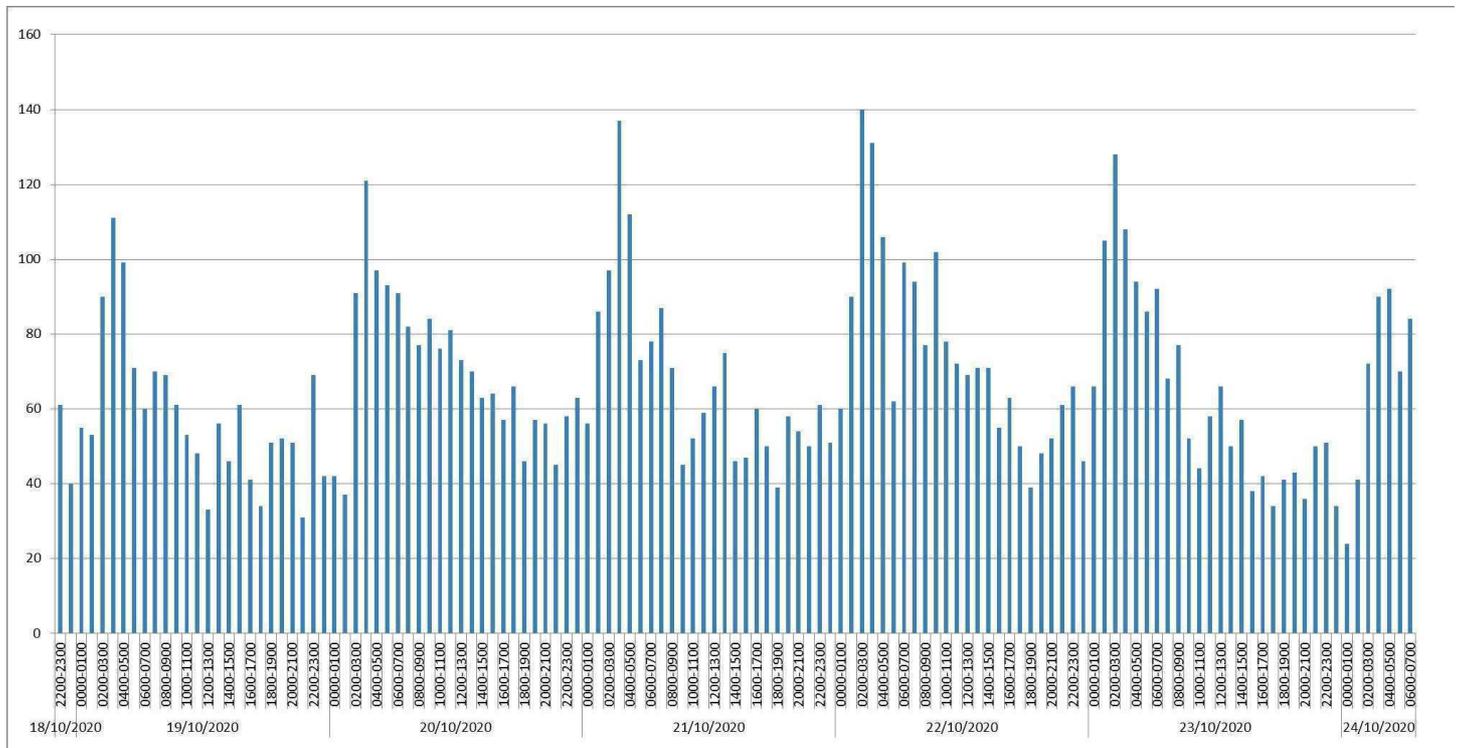


The short day length on the VLF path to Iceland has reduced the observing period, but the broad peak at 13 to 14UT and the short peak at 17:00 do seem to match well. Magnetic activity continued through to the end of the month, with a further 37.5kHz spike recorded at 17:00 on the 29th matching a short burst of increased magnetic disturbance. This is shown in Mark's recording on the next page, along with the two SIDs:

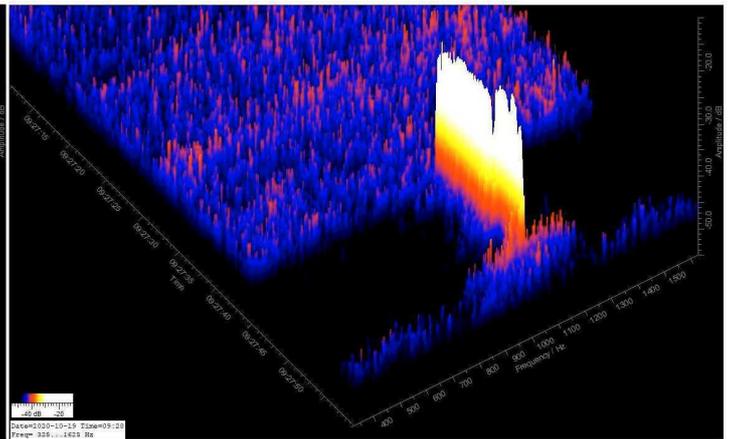
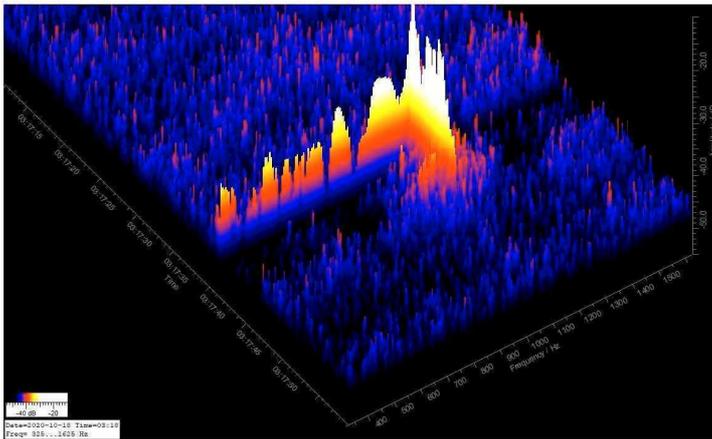


Magnetic observations received from Colin Clements, Roger Blackwell, Stuart Green, Paul Hearn, Andrew Thomas and John Cook.

ORIONID METEORS.

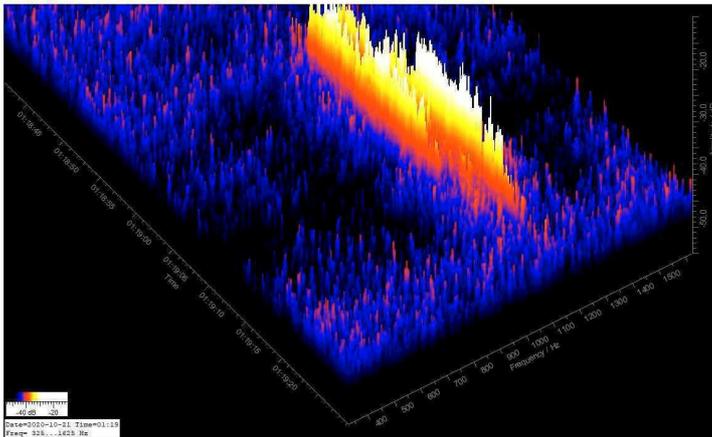


Christopher Bailey recorded the Orionid meteor shower using the GRAVES radar, his event counts shown in this 7 day graph. Peak counts can be seen in the early hours each day, decreasing through the day before rising again after midnight. Orionid activity can be seen over several days in October, as is clear from the graph. The peak on the 22nd matches the prediction in the BAA handbook.



18th 03:18

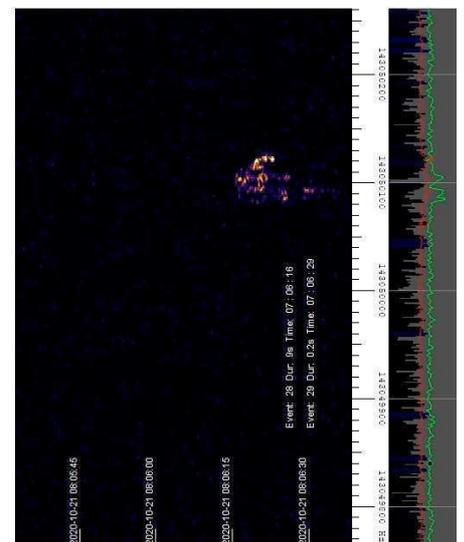
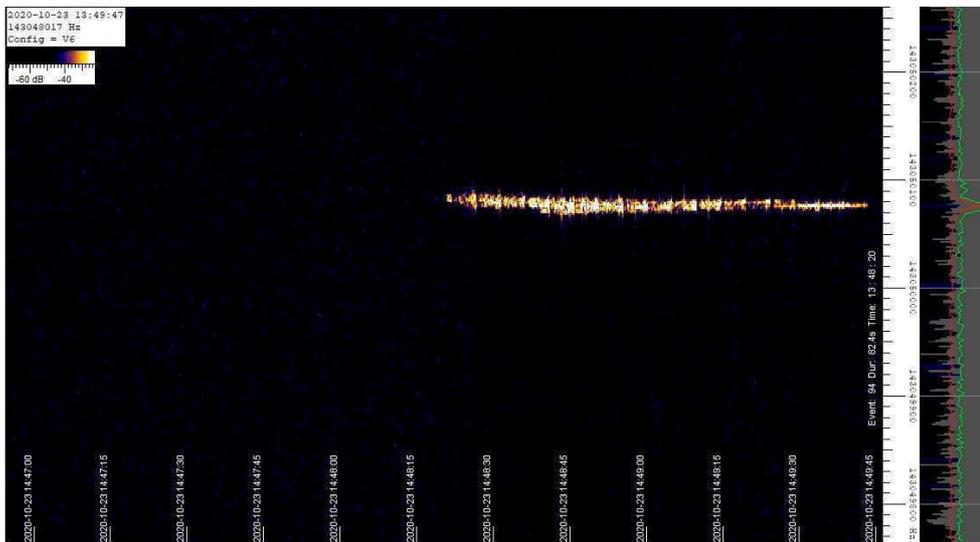
19th 09:28



21st 01:19

These are three very different meteors that Christopher recorded. In each case time is increasing from the upper left downwards, and frequency increasing to the right. Signal amplitude is colour coded vertically.

Phil Rourke also monitored the Orionids, and picked out two unusual events:



The first is from 19:49 on the 23rd, and lasts for about 82 seconds. The second is from 07:06 on the 21st, and lasts just 9 seconds. It also has a wider frequency spread.

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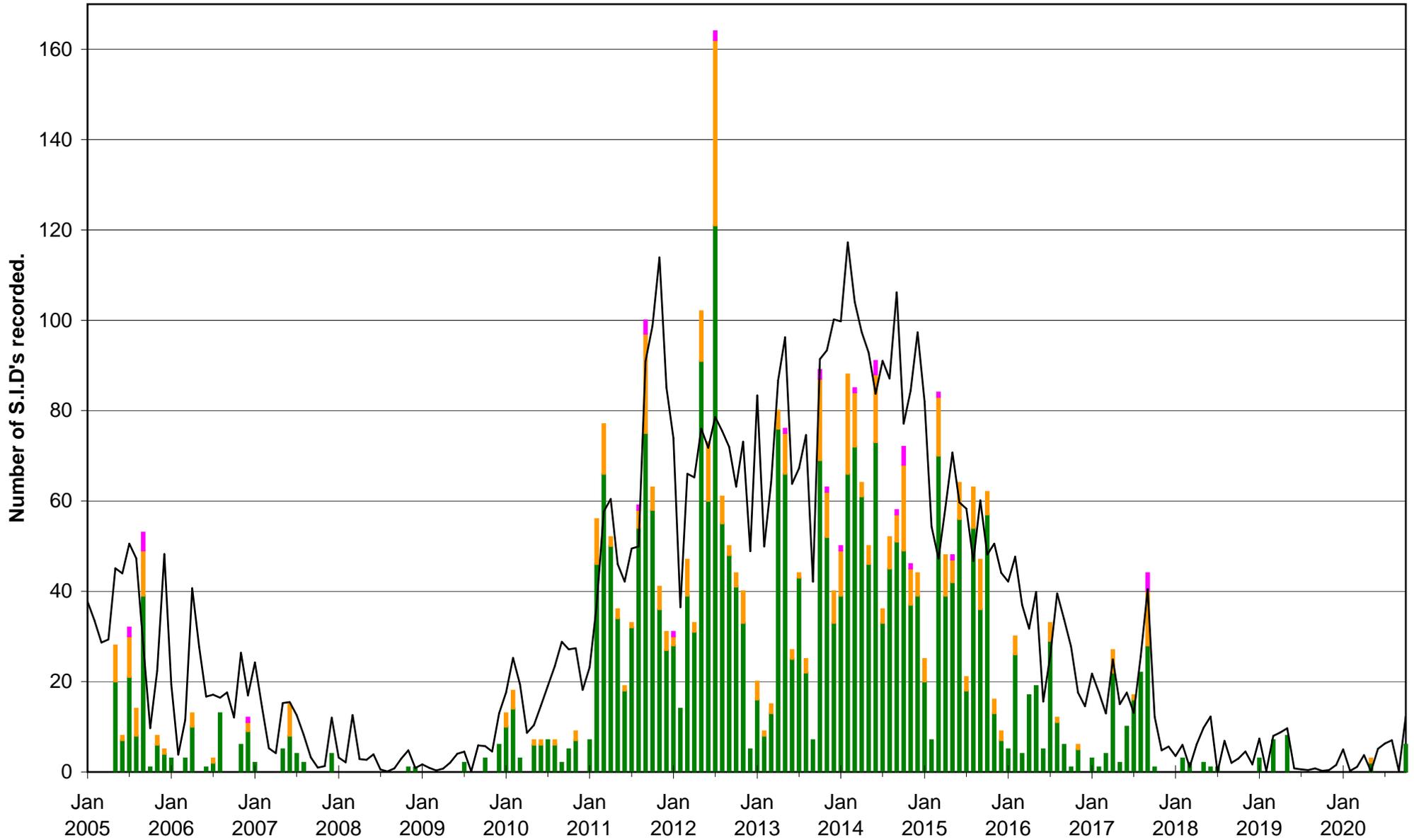
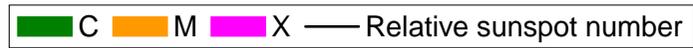
2020 OCTOBER.

DAY	Xray class	Observers	John Cook (23.4kHz/22.1kHz)	Roberto Battaiola 20.9kHz	Paul Hyde (22.1kHz/24kHz)	Mark Edwards (24.0kHz/19.6kHz)	Colin Clements (37.5kHz)
			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.
			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
16	C1.5	1				12:54 12:59 13:10 1-	
16	C3.5	4	15:09 15:12 15:17 1-	15:05 15:13 15:20 1-	15:09 15:11 15:25 1-	15:08 15:11 15:28 1	
27	C1.4	1				09:52 09:53 10:02 1-	
27	*	1				11:17 11:20 11:24 1-	
29	B9.6	2			10:13 10:23 10:48 2		
29	C4.3	8	11:46 11:53 12:34 2+	11:35 11:53 12:10 2	11:40 11:55 12:38 2+	11:45 11:55 12:29 2	11:45 11:54 12:17 1+
29	C1.0	3			13:12 13:22 14:10 2+	13:15 13:22 13:28 1-	13:00 13:21 14:10 2+
29	C1.3	1				16:03 16:08 16:14 1-	

DAY	Xray class	Observers	Steve Parkinson (Various)	Andrew Thomas (19.6kHz)	Phil Rourke (23.4kHz)	Jim Barber	John Elliott (18.3kHz)
			Tuned radio frequency receiver, frame aeriels.	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.
			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
16	C1.5						
16	C3.5						
27	C1.4						
27	*						
29	B9.6						
29	C4.3			11:44 11:54 12:23 2			
29	C1.0						
29	C1.3						

DAY	Xray class	Observers	Colin Briden (45.9kHz)	Andrew Lutley (23.4kHz)	Peter Meadows (23.4kHz)	Christopher Bailey
			ICOM R75 receiver, Wellbrook active LF loop aerial.	Tuned radio frequency receiver, 0.6m frame aerial.	Tuned radio frequency receiver, 0.6m frame aerial.	Spectrum Lab
			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
16	C1.5					
16	C3.5					
27	C1.4					
27	*					
29	B9.6		10:14 10:26 10:42 1+			
29	C4.3		11:42 11:57 12:47 2+			11:42 11:56 12:27 2
29	C1.0					
29	C1.3					

VLF flare activity 2005/20



BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).
2516	F	9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26				2200 27 28 29 30 31 2018 February 1 2 3 4
2517	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				2201 24 2018 March 1 2 3
2518	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				2202 23 24 25 C
2519	F	31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18				2203 19 20 21 22 23 24 25 26
2520	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				2204 16 B C
2521	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				2205 13 18
2522	F	20 21 22 23 24 25 26 27 28 29 30 1 2 3 4 5 6 7 8 9				2206 10 11 12 13 14 15 16
2523	F	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5				2207 6 7 8 9 10 11 12
2524	F	13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8				2208 2018 September 30 2018 October 1 2 3 4 5
2525	F	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 4 5				2209 27 28 29 30 2018 October 1 2 3 4 5
2526	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				2210 27 2018 November 23 24 25 26 27 28
2527	F	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22				2211 23 24 25 26 27 28
2528	F	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 24 25				2212 20 21 22 23 24 25
2529	F	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 20 21				2213 17 18 19 20 21
2530	F	22 23 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				2214 13 14 15 16 17
2531	F	18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16				2215 13 14 15 16
2532	F	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16				2216 9 10 11 12 B
2533	F	13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9				2217 6 7 8 9 C
2534	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				2218 1 2 3 4 5
2535	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 2				2219 30 2019 July 1 2
2536	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				2220 27 28 29
2537	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				2221 23 24 25
2538	F	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 20 21				2222 19 20 21
2539	F	22 23 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				2223 17 18
2540	F	19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14				2224 13 14
2541	F	15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11				2225 10 11
2542	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 5 6 7				2226 4 5 6 7
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 1 2 3				2227 2020 February 1 2 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 30 31 1				2228 28 29
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 28				2229 28
2546	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 24				
2547	F	2230 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 21				
2548	F	2231 22 23 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				
2549	F	2032 18 19 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				
2550	F	2033 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 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 1 2 3 4 5 6				2234 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 1 2 3				2235 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				2236 C 28 29 BCCC
2554	F	2237 2020 November 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				