The British Astronomical Association

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Founded in 1890

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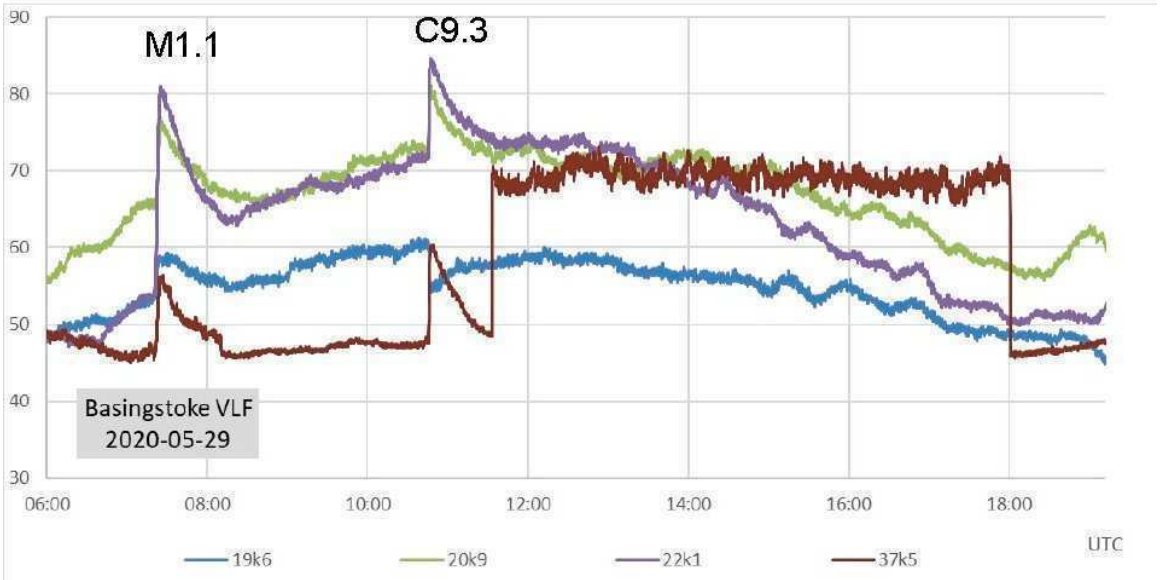
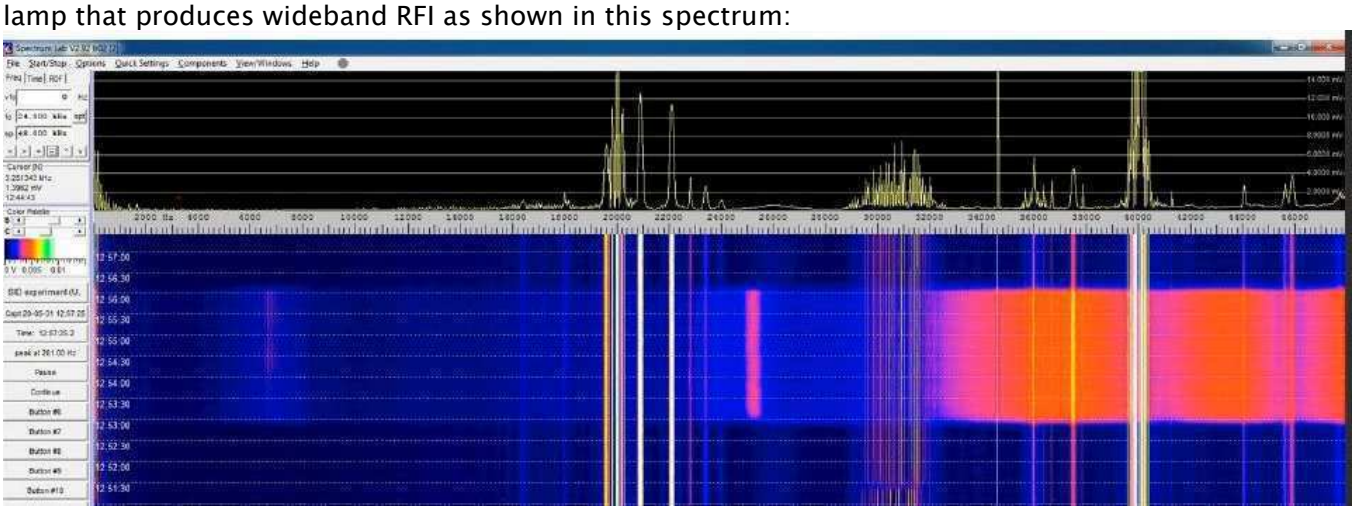
BAA Radio Astronomy Section. 2020 MAY.

As a pleasant surprise, the sun produced an M1.1 flare on May 29th, despite the visible disc being blank. Satellite images reported an active area close to the limb, just out of view, although it appears to have self-destructed in generating these flares. In addition to those that we recorded as SIDs, there were a number of smaller B-class flares before and after the M1.1 event. This is the first M-class activity since the enormous storm of 2017 September, and does appear to have been from Cycle 25.

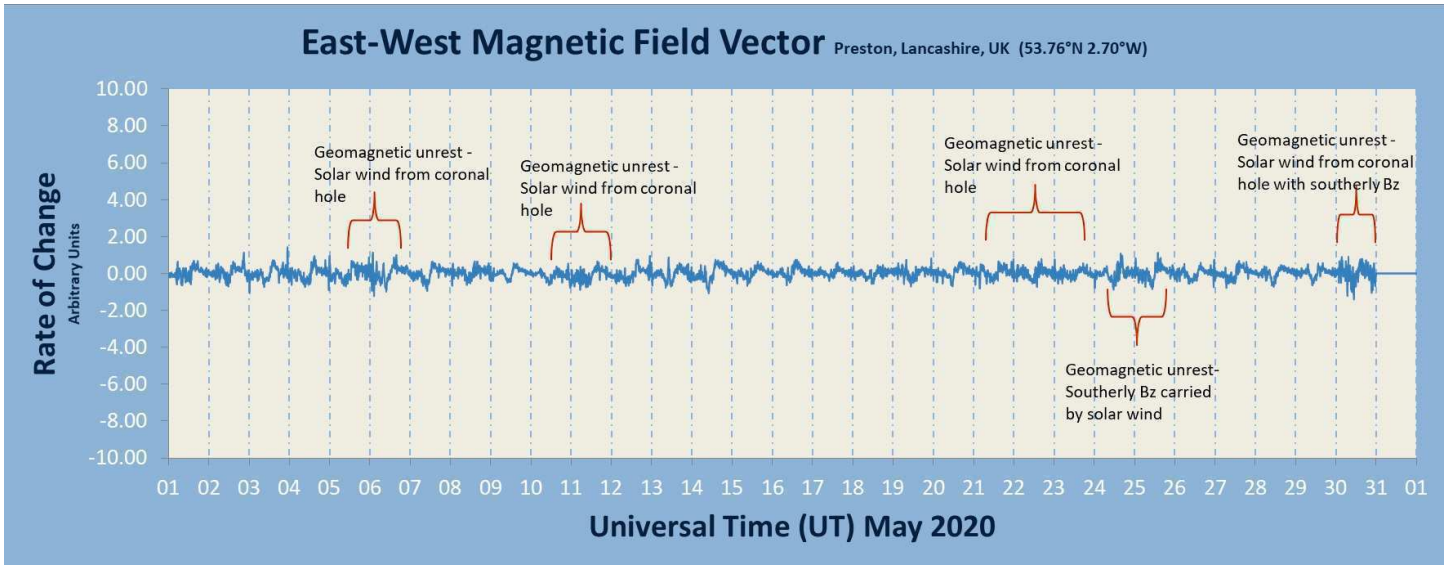


This chart by Paul Hyde shows the first two of these SIDs very clearly. It also shows some very severe interference on the 37.5kHz signal, starting just as the second SID ends. This has been traced to a new LED lamp that produces wideband RFI as shown in this spectrum:

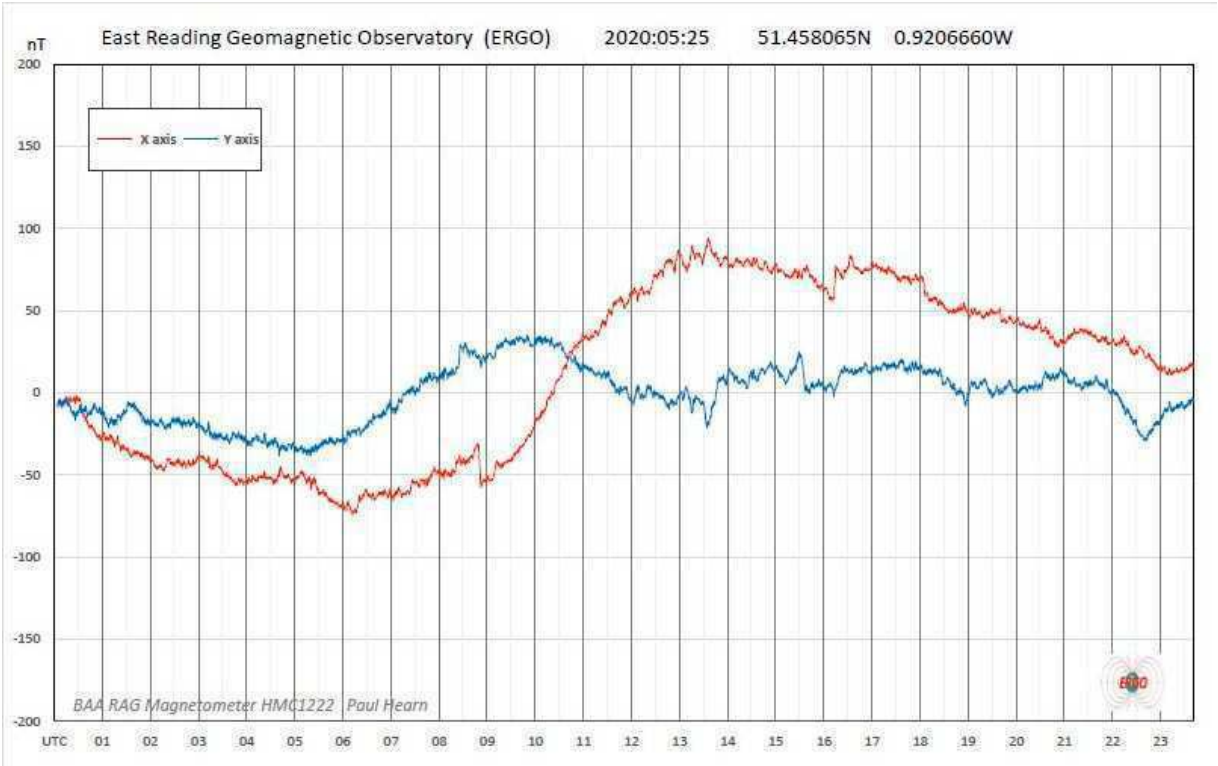


This shows the entire spectrum from 0 to 48kHz, with the lamp switched on for a three minute period. It's effects can be seen at most frequencies, becoming worse above about 30kHz. The signals near the centre of the spectrum are at 19..24kHz. Unfortunately the normal EMC rules do not extend below 150kHz, but at least the light should only be needed after sunset and so unlikely to spoil SID detection.

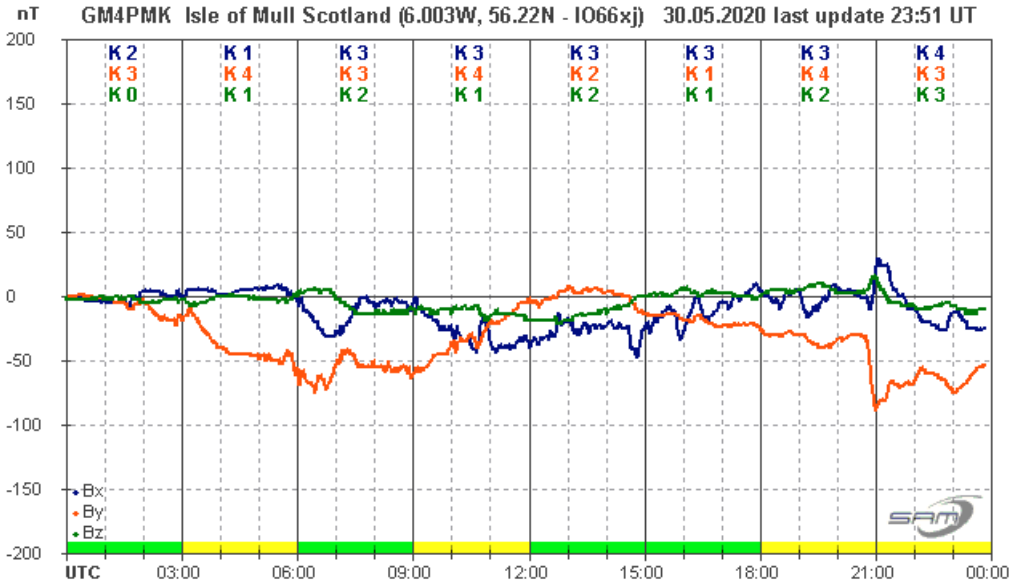
MAGNETIC OBSERVATIONS.



Stuart Green has provided a summary of the month's activity, above. This has been very mild throughout May, with just coronal hole effects recorded. Both the M1.1 and C9.3 flares did produce CMEs, but they were directed sideways, well away from Earth and so had no effect.



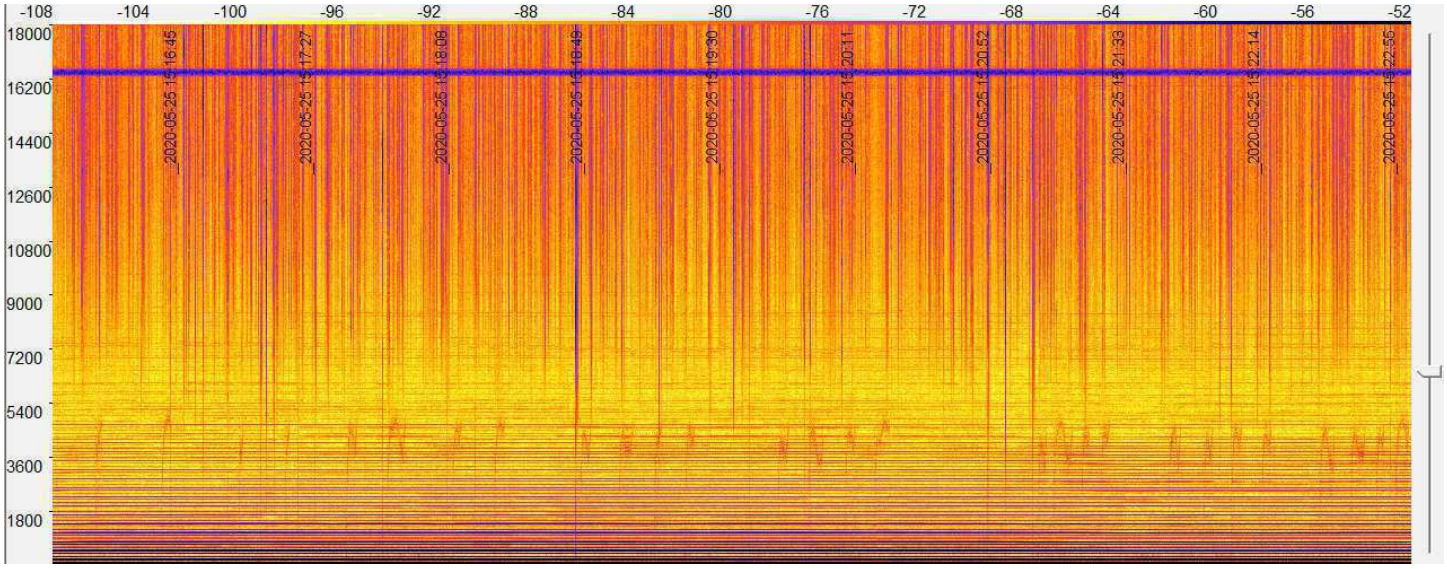
This chart by Paul Hearn shows some very rapid but small amplitude variations throughout the day on May 25th. Solar wind from several coronal holes may have combined to give this effect.



Slightly stronger disturbances were recorded on the 30th, shown in this chart from Roger Blackwell. Solar wind from a larger southern polar coronal hole appears to have been the cause. The other disturbances shown in the Bartels diagram were much weaker, <20nT over the 5th / 6th, and <50nT on the 24th.

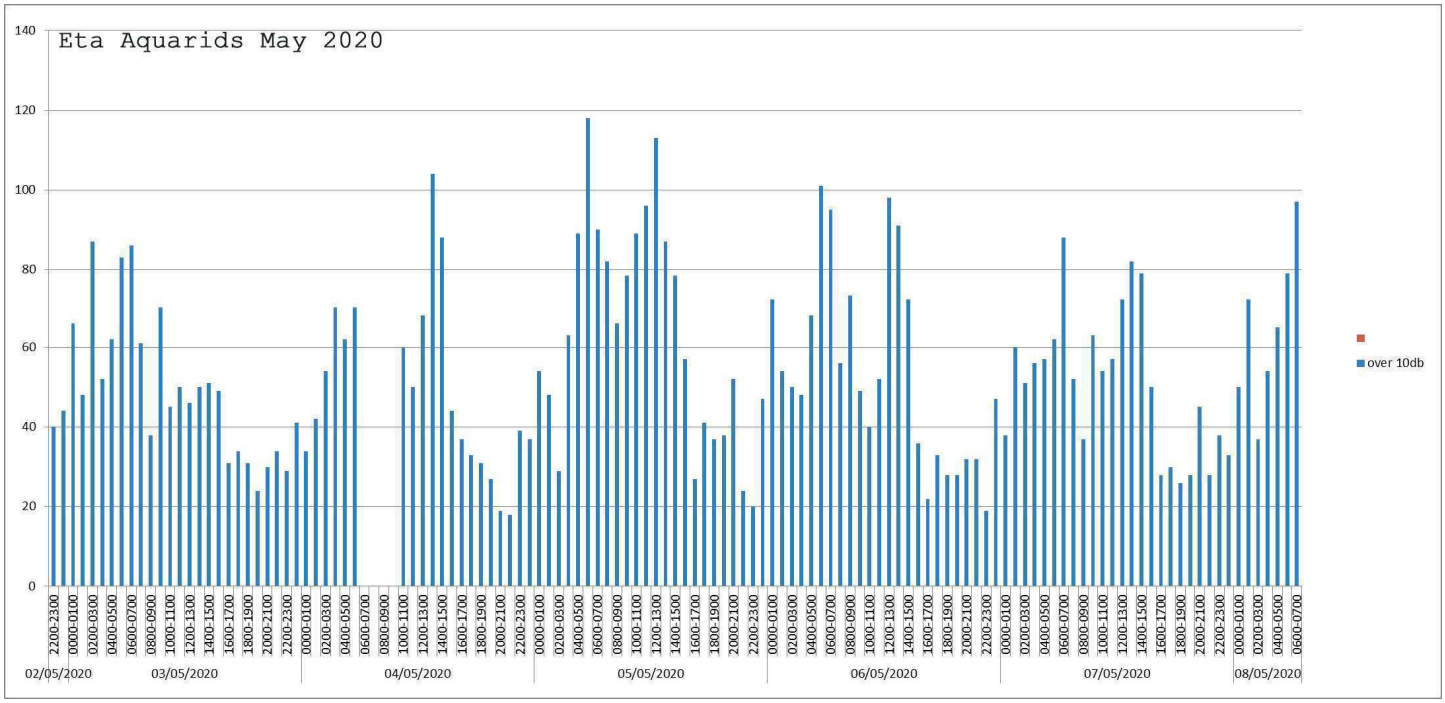
Magnetic observations received from Roger Blackwell, Colin Clements, Stuart Green, Paul Hearn and John Cook.

ATMOSPHERICS.



Colin Briden made this recording on May 25th, part of an observation from 15:14 to 16:34UT. The chart shows the period 15:16 to 15:22UT, covering 1800Hz to 18kHz. In the lower part of the chart (3600Hz to 5400Hz) can be seen a series of 'hooks', mostly in groups of four. While there is a continuous band of higher frequency impulses, there are also a few stronger bursts of wideband noise associated with the hooks. This behaviour continued through the period of observation, and appears to be most common during the local mid-afternoon. Each group of four seems to rise very slightly in frequency, behaviour that also continued through the observing period. As this unusual observation occurred during the magnetic activity seen on the 25th (following a steep dip in the Dst index), Colin is wondering whether there might be any connection. More observers would be welcome to help in this area.

ETA AQUARIDS.



Christopher Bailey has supplied this summary of meteor echoes detected during the Eta Aquarid shower over the 2nd to the 8th of May. The short gap on the 4th was due to a temporary failure in the recording equipment. A peak of just under 120 per hour were recorded around 05-06UT on the 5th, with averages of about 60 to 80 per hour over the day. There is a good diurnal curve each day as the radiant moves through the sky, with activity peaking in the early morning as the radiant is roughly due south. Counts dropped to about 20 per hour in the evening around the peak, but nearer 30 per hour on the 2nd and 7th. Only signals greater than 10dB are included in these counts.

DATA SOURCES.

I use a number of internet sources to help in analysing these reports. The space weather prediction centre weekly newsletter provides a list of flare magnitudes along with the source active area details, and can be found at ftp://ftp.swpc.noaa.gov/pub/warehouse/2020/WeeklyPDF/ . There used to be a daily text file of the GOES data at 1 or 5 minute intervals, but that seems to have been discontinued in 2019. The weekly STCE newsletter also provides in-depth details of some of the flares, together with coronal hole and CME timings. This can be found at http://www.stce.be/newsletter/newsletter.php . For a quick check of the various European VLF signals, the real-time chart at http://sidstation.loudet.org/ is also very useful.

The German website https://polarlicht-vorhersage.de/goes-archive provides a real-time chart of current GOES data, along with the facility to look at archive charts by selecting the required date and time details.

The British Geological Survey website http://geomag.bgs.ac.uk/observatories.html is useful to compare magnetic activity at various geographical locations, as well as helping to eliminate local interference effects from our own recordings.

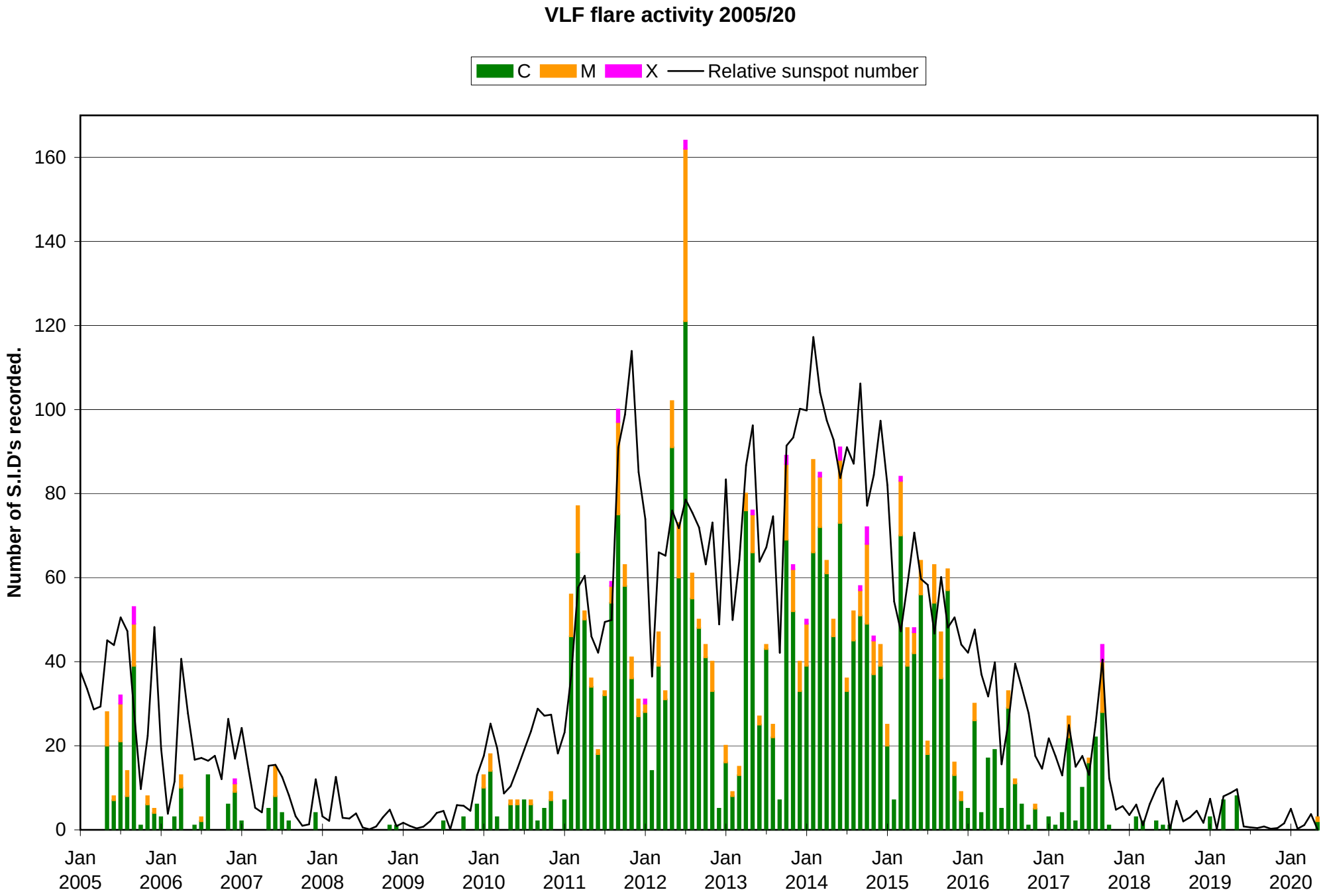
The BAA handbook is of course also vital in checking various solar and meteor details.

BAA Radio Astronomy Section. **2020 MAY.**

	Xray class	Observers	John Cook (23.4kHz/*22.1kHz*)				Roberto Battaiola				Paul Hyde (22.1kHz/*24kHz*)				Mark Edwards (24.0kHz/*22.1kHz*)				Colin Clements (23.4kHz/*18.3kHz*)			
			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)	
29	**M1.1**	5	07:21	07:24	07:50	1+					07:21	07:25	08:22	2+	07:21	07:26	07:58	2	*07:25*	*07:32*	*08:26*	*2+*
29	C9.3	5	10:45	10:48	11:28	2					10:45	10:47	11:26	2	10:45	10:47	11:35	2+	10:47	11:00	11:40	2+
29	C1.0	1													14:21	14:26	15:09	2+				
29	B8.8	1													16:47	16:54	17:02	1-				

	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)	
29	**M1.1**		07:21	07:25	08:07	2+																
29	C9.3		10:45	10:47	11:20	2																
29	C1.0																					
29	B8.8																					

	Xray class		Colin Briden (22.1kHz)				Andrew Lutley (23.4kHz)															
			Spectrum Lab / PC, 1.2m frame aerial.				Tuned radio frequency receiver, 0.6m frame aerial.															
DAY			START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)	
29	**M1.1**																					
29	C9.3																					
29	C1.0																					
29	B8.8																					


VLF flare activity 2005/20
C
M
X
Relative sunspot number
Number of S.I.D's recorded.
0
20
40
60
80
100
120
140
160
Jan 2005
Jan 2006
Jan 2007
Jan 2008
Jan 2009
Jan 2010
Jan 2011
Jan 2012
Jan 2013
Jan 2014
Jan 2015
Jan 2016
Jan 2017
Jan 2018
Jan 2019
Jan 2020

BAA Radio Astronomy Section.

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 B 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 CC 8 9 BB 10 C 11 12 13 14 15 16 17 18 19 20 21 22 23 2201 24 25 26 27 28 2018 March 1 2 C 3

2518
F 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2202 23 24 25 26 27 28 29 30 C

2519
F 31 2018 April 1 B 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 2018 May 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 2204 16 17 18 19 20 21 22 B 23 C

2521
F 24 B 25 26 27 28 BC 29 30 31 2018 June 1 2 3 4 5 6 C 7 8 9 10 11 12 2205 13 14 15 16 17 18 19

2522
F 20 21 22 23 24 25 26 27 28 29 30 2018 July 1 2 3 4 5 6 C 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 2018 August 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 2018 September 1 2 3 4 5 6 7 8

2525
F 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 2209 30 2018 October 1 2 3 4 5

2526
F 6 7 8 9 10 11 12 B 13 14 15 16 17 18 19 20 21 22 23 24 25 26 2210 27 28 29 30 31 1

2527
F 2018 November 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 2018 December 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 2212 20 21 22 23 24 25

2529
F 26 27 28 29 30 31 2019 January 1 2 3 4 5 6 C 7 8 9 10 11 12 13 14 15 16 2213 17 18 19 20 21

2530
F 22 23 24 25 26 CB 27 28 29 C 30 31 2019 February 1 2 3 4 5 6 7 8 9 10 11 12 2214 13 14 15 16 17

2531
F 18 19 20 21 22 23 24 25 26 27 28 2019 March 1 2 3 4 5 6 7 8 9 10 11 12 2215 13 14 15 16

2532
F 17 18 19 20 C 21 CCC 22 CCCB 23 B 24 25 26 27 28 29 30 31 2019 April 1 2 3 4 5 6 7 8 B 2216 9 10 11 12 B

2533
F 13 14 15 16 17 18 19 20 B 21 22 23 24 25 26 27 28 29 30 2019 May 1 2 3 4 5 BB 2217 6 CCCC 7 BCC 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 2019 June 1 2 2218 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 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 2220 27 28 29

2537
F 30 31 2019 August 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2221 23 24 25

2538
F 26 27 28 29 30 31 2019 September 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 2222 19 20 21

2539
F 22 23 24 25 26 27 28 29 30 2019 October 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 2223 17 18

2540
F 19 20 21 22 23 24 25 26 27 28 29 30 31 2019 November 1 2 3 4 5 6 7 8 9 10 11 12 2224 13 14

2541
F 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 2019 December 1 2 3 4 5 6 7 8 9 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 2020 January 1 2 3 4 5 2226 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 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 2231 22 23 24 25 26 27 28 29 MCCB 30 31 2020 June 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17