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# The British Astronomical Association

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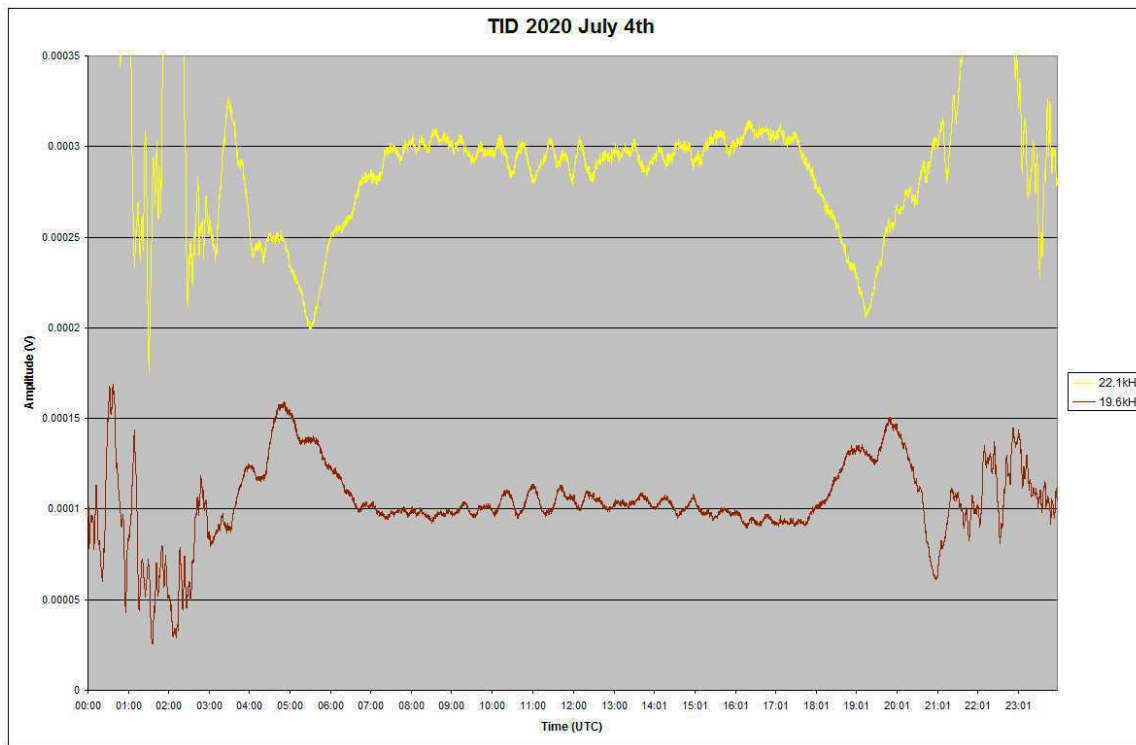


Please send all reports and observations to [jacook@jacook.plus.com](mailto:jacook@jacook.plus.com)

## BAA Radio Astronomy Section.

## 2020 JULY.

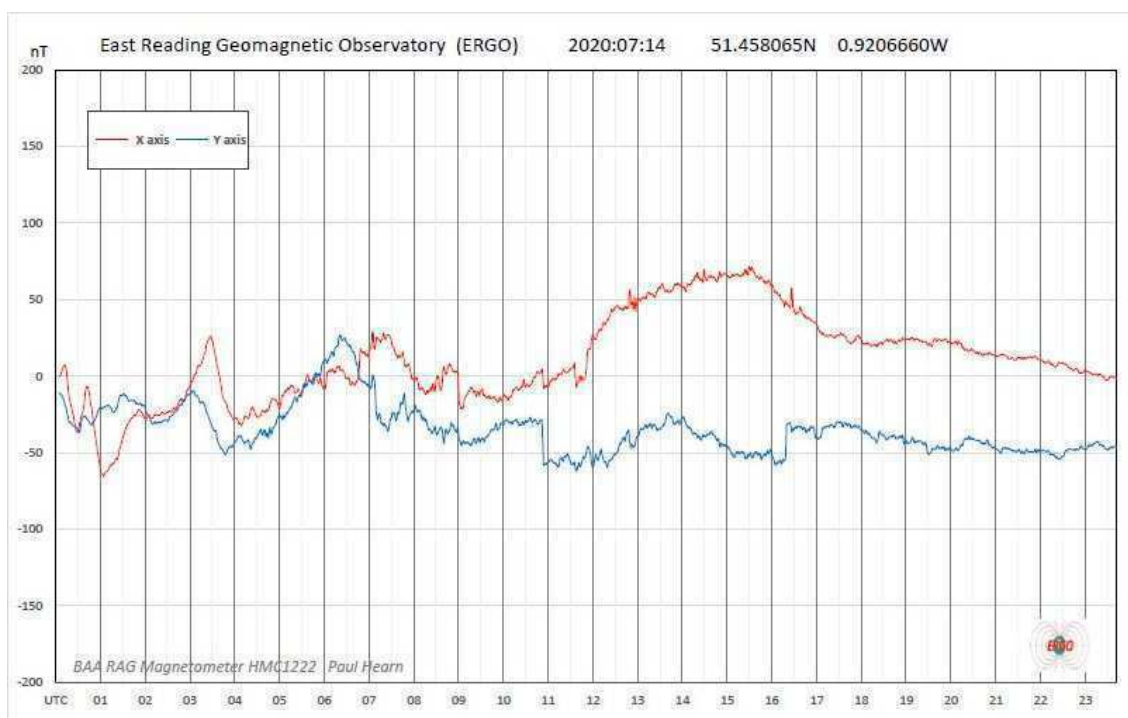
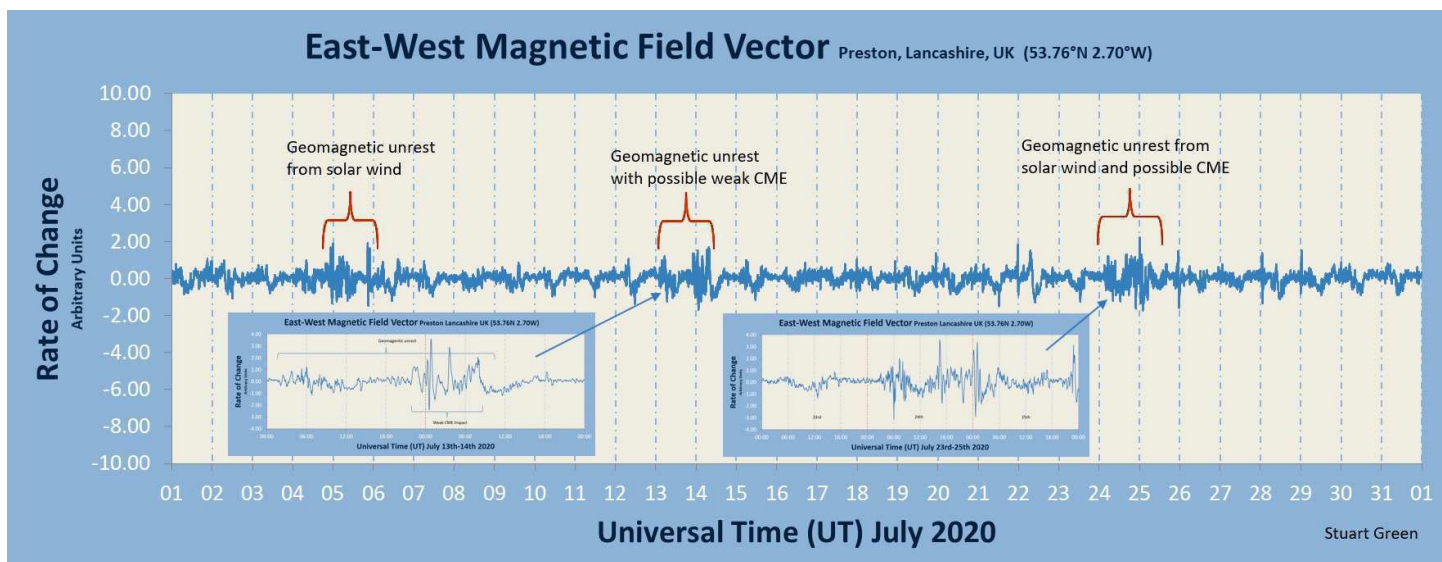
Solar activity was again very low through July, the strongest flare shown in the SWPC reports being at A4.3 on July 2<sup>nd</sup>. The sunspots that were present had a simple structure with magnetic polarity that indicated cycle 25 activity.



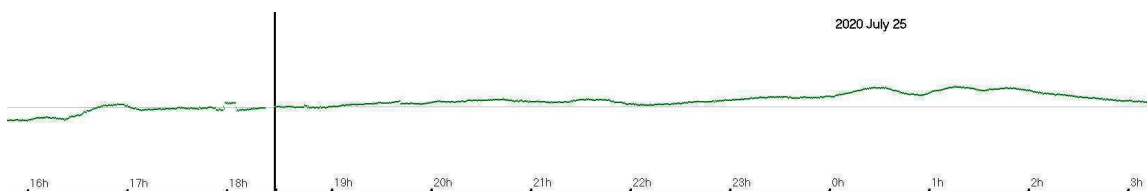
The very quiet conditions allowed some ionospheric waves to be recorded by Mark Edwards. The yellow trace is 22.1kHz, brown is 19.6kHz. Although not easy to see in the picture, both frequencies show the same frequency of oscillation, but out of phase with each other due to reflection from different parts of the same wave pattern. A similar pattern was recorded on the 8<sup>th</sup>, but just for a short period in the afternoon. The difference in path lengths between the two signals is about 25km, and the oscillation period is about 40 minutes.

## MAGNETIC OBSERVATIONS.

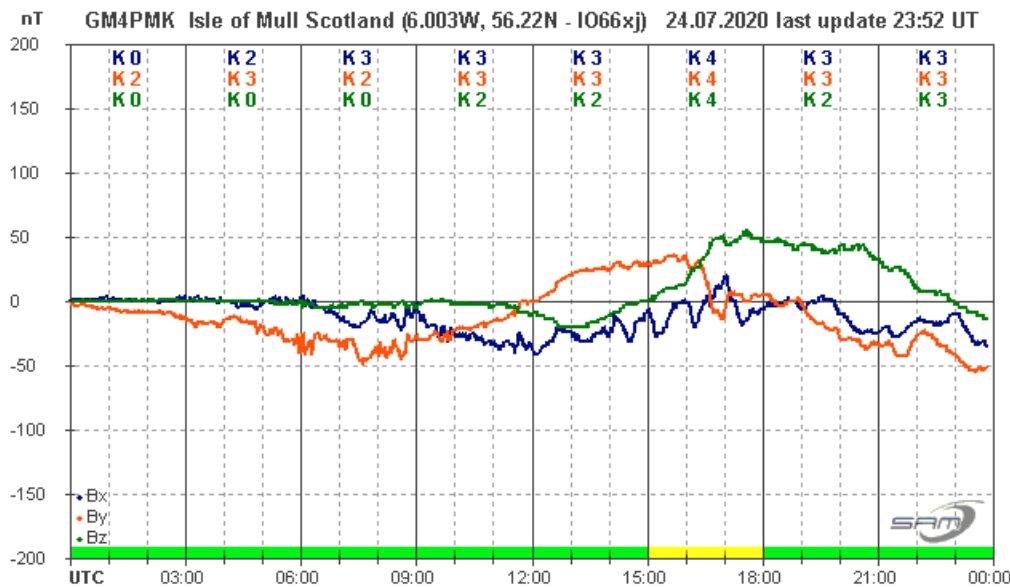
Magnetic activity has also been very low, with slow solar winds from diffuse coronal holes. There were two CMEs, both quite weak, and without a clear source. The chart below summarises activity as recorded by Stuart Green:



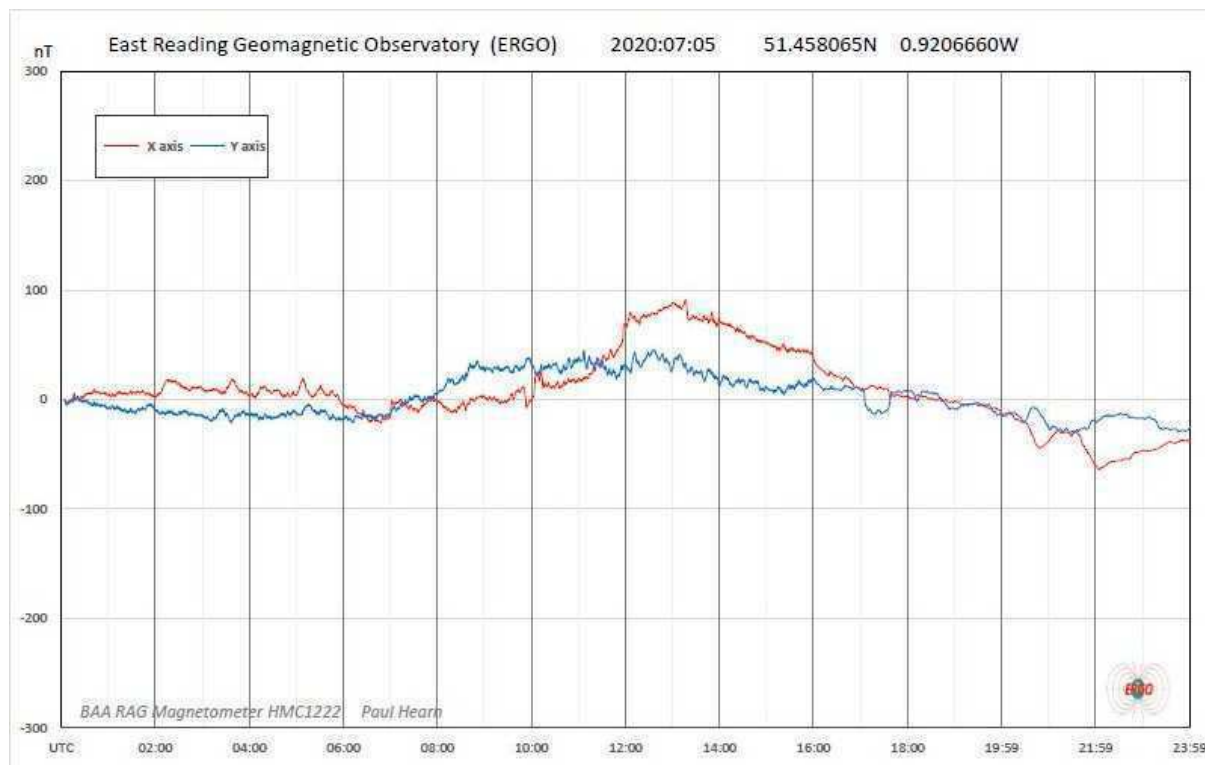
This recording by Paul Hearn shows activity on the 14<sup>th</sup>, with a disturbance evident during the morning. This was from a gentle solar wind and the first of the weak CMEs. Satellite images show the CME on the 8<sup>th</sup> and 9<sup>th</sup> giving a transit time of at least five days.



This is my own recording of the disturbance on the 24<sup>th</sup> and 25<sup>th</sup>, again from a combination of a gentle solar wind and a CME. This CME appears in satellite images from the 19<sup>th</sup>, showing a similarly long transit time. My recording earlier in the afternoon of the 24<sup>th</sup> is lost in local interference, but it can be seen in the recording by Roger Blackwell:



Fairly turbulent conditions can be seen through most of the day, although with a low amplitude of less than 50nT until mid-afternoon.



This recording from Paul Hearn shows activity on the 5<sup>th</sup>. This was due to a very gentle increase in solar wind speed, and shows well in a recording free from any local interference. The disturbance started around 18:00UT on the 4<sup>th</sup>, but had faded out by the 6<sup>th</sup>.

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

BAA Radio Astronomy Section.

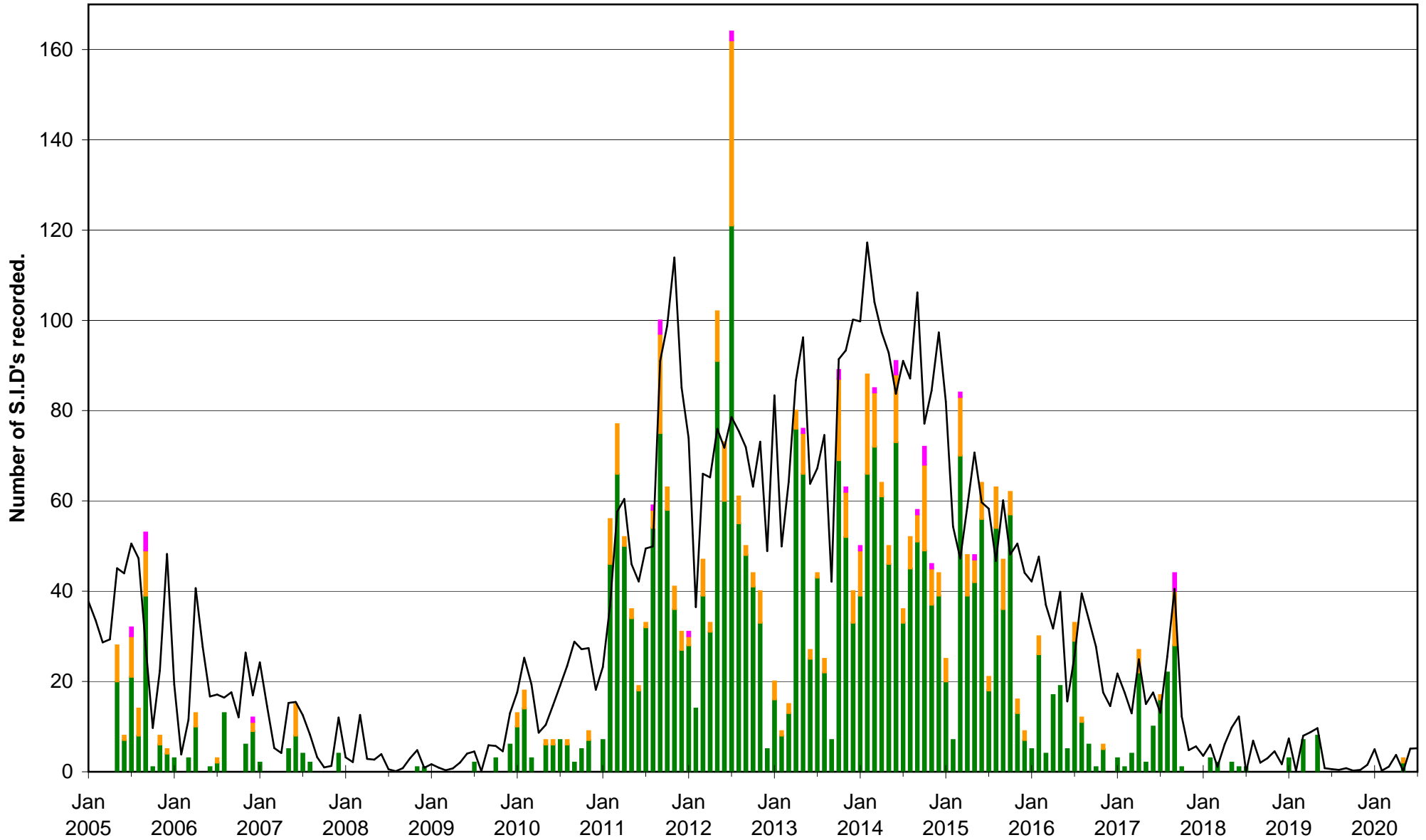
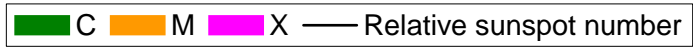
2020 JULY.

	Xray class	Observers	John Cook (23.4kHz/22.1kHz)	Roberto Battaiola 20.9kHz	Paul Hyde (22.1kHz/24kHz)	Mark Edwards (24.0kHz)	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		0	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)

	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)

	Xray class		Colin Briden (22.1kHz)	Andrew Lutley (23.4kHz)	Peter Meadows (23.4kHz)		
			Spectrum Lab / PC, 1.2m frame aerial.	Tuned radio frequency receiver, 0.6m 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)

### 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	27 28 29 30 31	2200	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	29 30 31	2201	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	
2519	F	2018 April 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	2203	
2520	F	2018 May 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		24 25 26 27 28 29 30 31	2204	
2521	F	24 25 26 27 28 29 30 31	2018 June 1 2 3 4 5 6 7 8 9 10 11 12	13 14 15 16 17 18 19	2205	
2522	F	20 21 22 23 24 25 26 27 28 29 30	2018 July 1 2 3 4 5 6 7 8 9	10 11 12 13 14 15 16	2206	
2523	F	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	2018 August 1 2 3 4 5	6 7 8 9 10 11 12	2207	
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		2209	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 31		2018 November 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2210	
2526	F	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26		2018 December 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2211	
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		2019 January 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	
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		2019 February 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	2213	
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		2019 March 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	
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		2019 April 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	2215	
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		2019 May 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	2216	
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		2019 June 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	
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		2019 July 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2	2218	
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		2019 August 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	2019 July 30 1 2
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		2019 September 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	2220	
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		2019 October 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2221	
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		2019 November 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	2222	
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		2019 December 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	2223	
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		2020 January 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	2224	
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		2020 February 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	2225	
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		2020 March 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	
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		2020 April 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
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		2020 May 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	
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		2020 June 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 29	2229	
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		2020 April 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		
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		2020 May 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		
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		2020 June 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		
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		2020 July 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		
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		2020 August 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		
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				