



Founded in 1890

# The British Astronomical Association

A company limited by guarantee

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

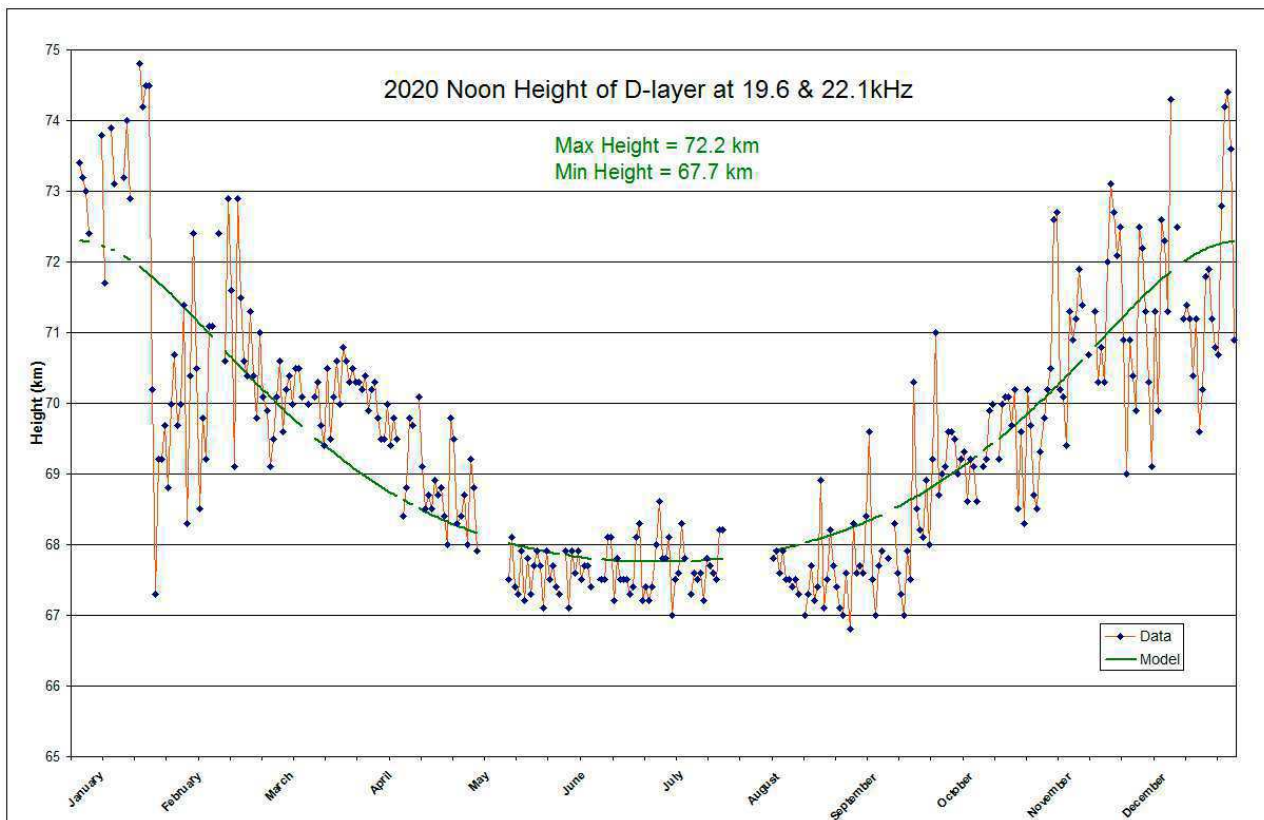


Please send all reports and observations to [jacook@jacook.plus.com](mailto:jacook@jacook.plus.com)

## BAA Radio Astronomy Section.

## 2020 DECEMBER.

Solar activity in December was much lower than last month, with just three flares recorded as SIDs. There were a number of active regions present, but they produced mostly small B-class flares that were not detected in the very noisy winter signals. The strongest flare of the month was the C7.4 on the 7<sup>th</sup>, although it was poorly timed during the sunset period for European signals.



Mark Edwards has provided his modelling of the noon-height of the D-region measured using the paths to Skelton and Anthorn. Gaps in the green trace are where one of the signals was off-air.

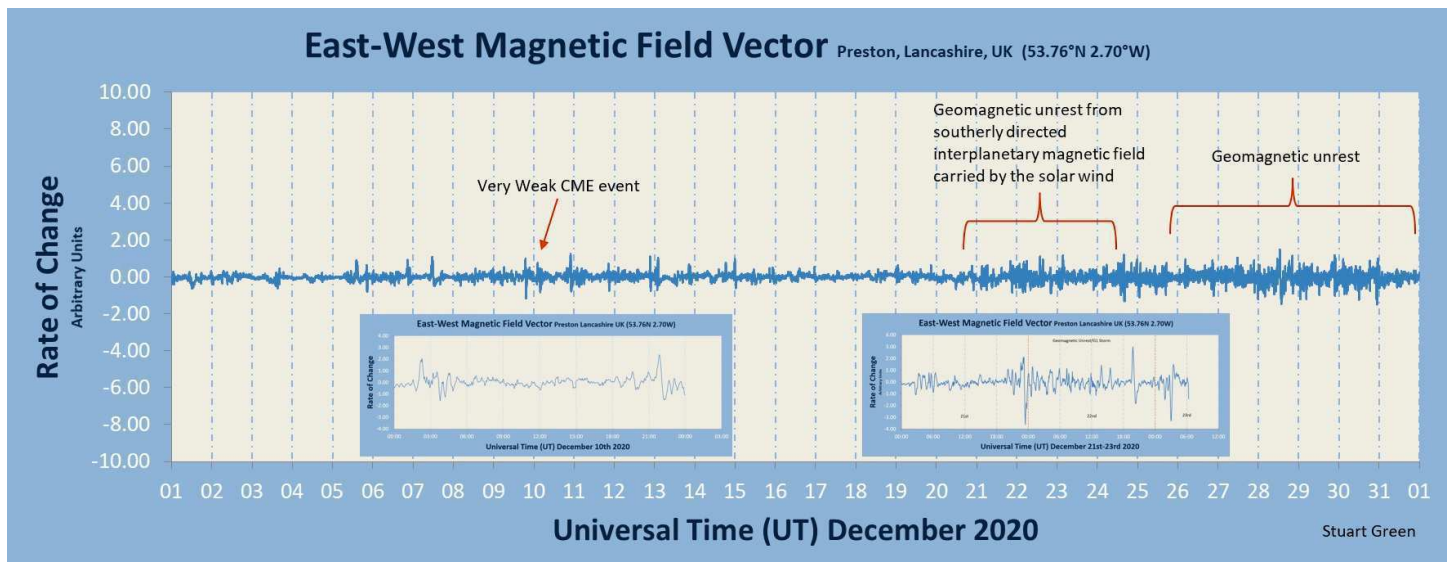
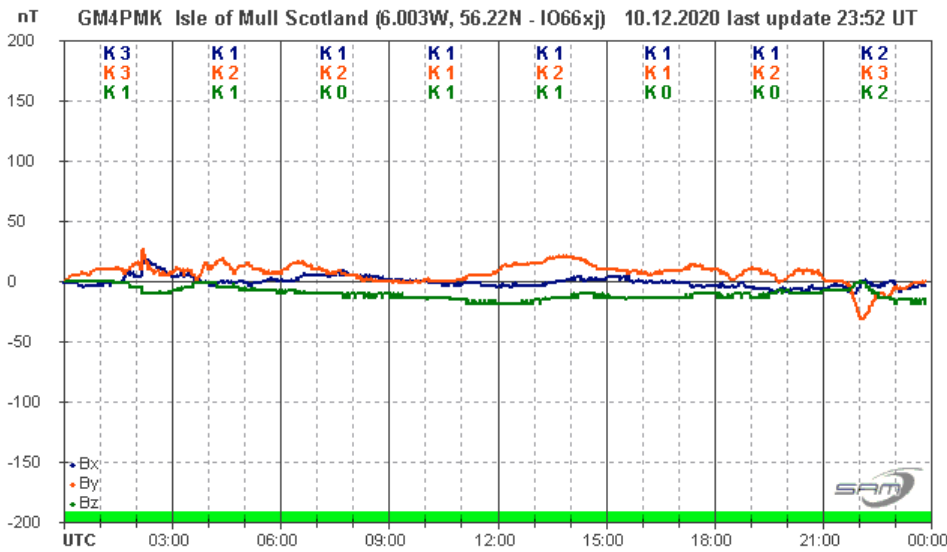
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Max	71.6	71.8	71.4	71.0	69.9	70.8	72.4	73.2	72.3	72.2km
Min	67.0	66.8	66.8	67.2	67.3	67.6	67.3	67.3	67.4	67.7km

The 2011 data represents the first year of stronger cycle 24 activity, with a short peak in 2012 and a longer peak in 2014/15. 2020 has seen the start of cycle 25 activity, but very patchy as the activity chart shows.

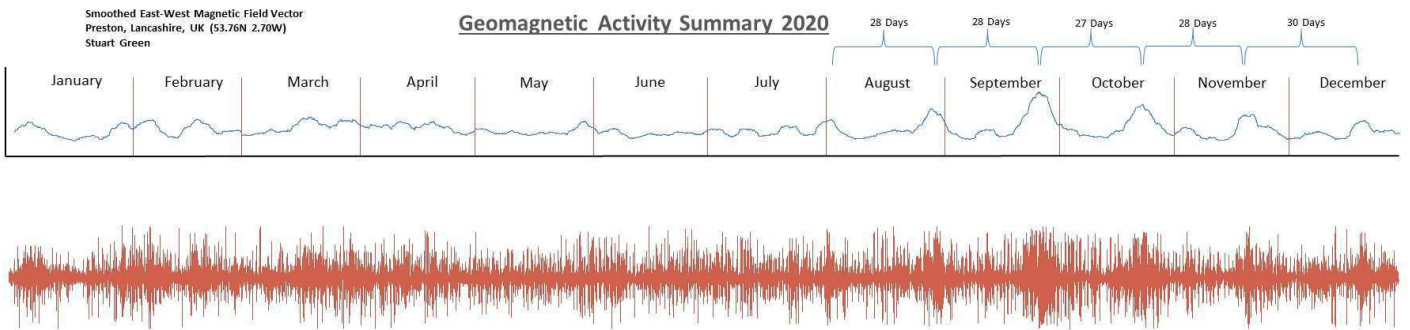
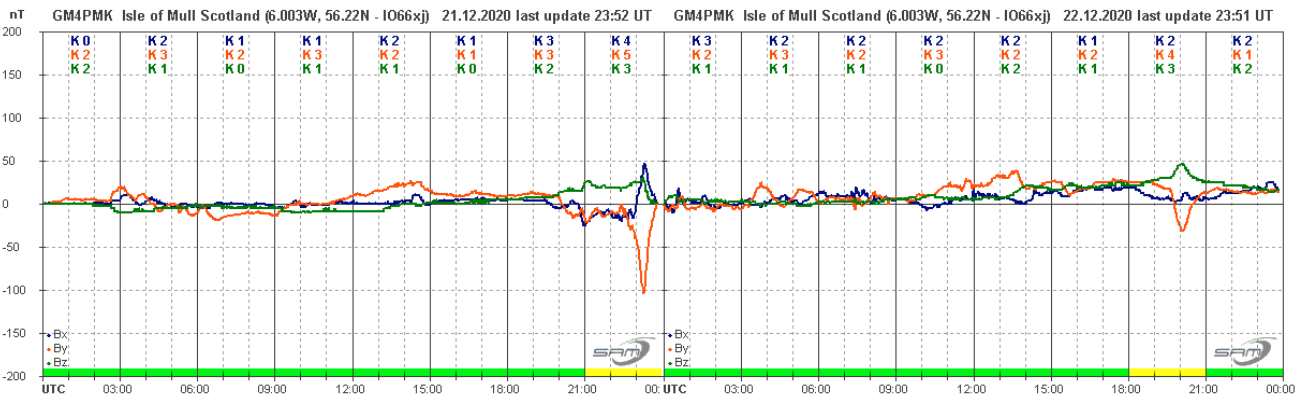
VLF interference has been a problem for some observers, with LED lights and solar panels identified as sources. Paul Hyde has recently discovered that an induction-hob cooker can also be a source of interference. I wonder has anyone else had a similar problem?

### MAGNETIC OBSERVATIONS.

The C7.4 flare recorded on the 7<sup>th</sup> produced a CME, with a magnetic signature recorded at 02:10UT on the 10<sup>th</sup> on my magnetometer. This gives a CME transit time of 57h 40m. It shows well on the chart from Roger Blackwell:



The month's summary chart from Stuart Green shows that there was very little magnetic disturbance following the initial CME impulse. The recurrent coronal hole recorded since 2020 July has faded, with only some very mild disturbance recorded on this rotation. Roger Blackwell's recordings show a sudden disturbance late in the evening of the 21<sup>st</sup> followed by a very mild disturbance until 19:30 on the 22<sup>nd</sup> and a second, smaller pulse of activity. Effects on the 23<sup>rd</sup> and 24<sup>th</sup> were also very mild.

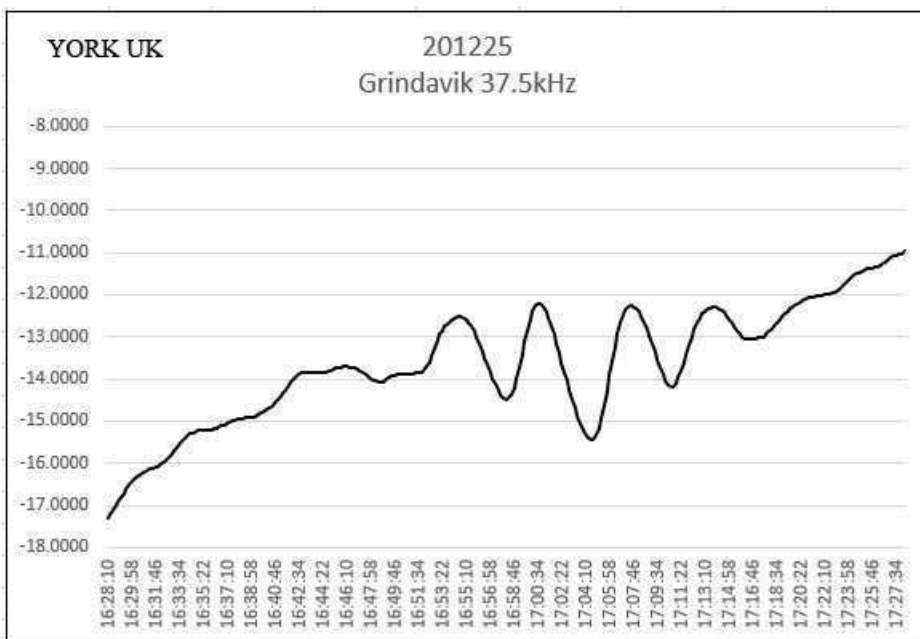
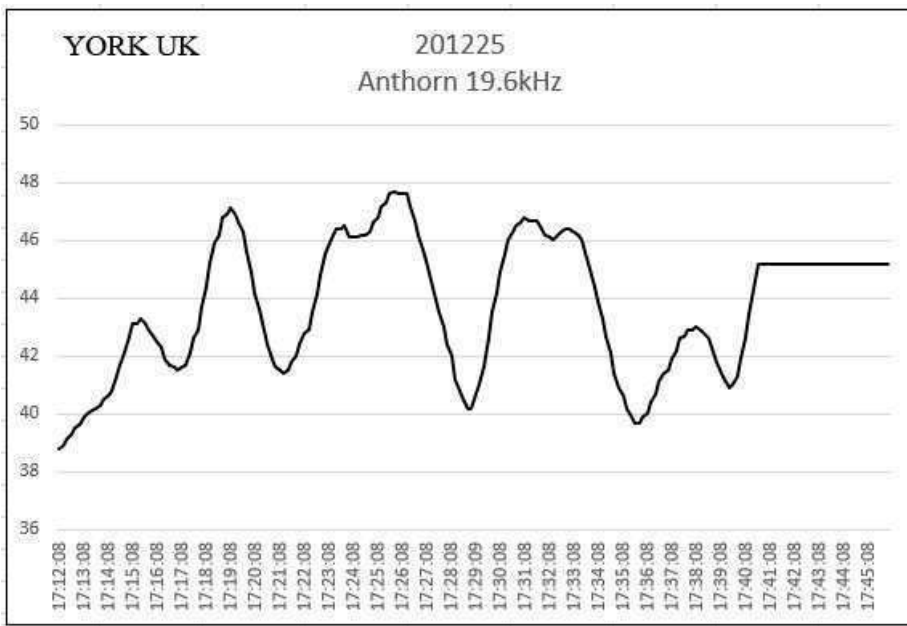


This chart from Stuart Green shows a summary of magnetic activity through 2020. Over the first six months there were random periods of activity, but a more regular 28 day pattern can be seen from the end of July. This matches well with that recurrent coronal hole. The bartels diagram uses a 27 day cycle, and so this 28 day period causes the activity to move one day to the right on each line of the chart. The 27 day period was based on sunspot activity nearer the solar equator, which has a faster rotation period than the higher latitude area of this coronal hole. The most active period at the end of September stands out well in both charts.

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	6	7	2226																											
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	3	2227																											
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 March	30	31	2228																										
2545	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	2020 April	29	30	31	2229																								
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	2230																					
2547	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	19	20	21	2020 June	22	23	24	25	26	27	28	29	30	31	2231													
2548	F	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	15	16	17	2020 July	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2232										
2549	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	12	13	14	2020 August	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2233						
2550	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	2020 September	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	2234			
2551	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	31	1	2	3	2020 October	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	2235		
2552	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	2020 November	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
2553	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	2020 December	27	28	29	30	31	2237																						
2554	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	2021 January	24	25	26	27	28	29	30	31	2238																			
2555	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	2021 February	24	25	26	27	28	29	30	31	2239																			
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	2021 March	24	25	26	27	28	29	30	31	2240																			

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

## IONOSPHERIC ACTIVITY.



These two charts recorded by Colin Briden show oscillations with a period of about 6 minutes, similar to recordings made by Mark Edwards from time to time. They appear to be due to a stable wave-pattern moving along the lower boundary of the D-region, similar in structure to gentle waves seen moving on the surface of water. They were recorded on December 25<sup>th</sup>.

BAA Radio Astronomy Section.

2020 DECEMBER.

	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			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
6	C1.6	2	13:25 13:28 13:38 1-				
7	C7.4	1					
14	C4.0	2					

	Xray class		Steve Parkinson (Various)	Andrew Thomas (23.4kHz)	Phil Rourke (23.4kHz)	John Wardle	Chrostopher Bailey
			Tuned radio frequency receiver, frame aeralis.	Tuned radio frequency receiver, 0.6m frame aerial.	Spectrum Lab, 0.6m frame aerial.	SpetrumLab/Starbase, Active mini-whip aerial.	Spectrum Lab
DAY			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
6	C1.6						
7	C7.4					16:17 16:30 16:45 1+	
14	C4.0			14:30 14:32 14:35 1-		14:40 14:44 15:27 2+	

	Xray class		Colin Briden (22.1kHz)	Andrew Lutley (23.4kHz)	Peter Meadows (23.4kHz)	John Elliott (18.3kHz)	Mark Prescott
			Spectrum Lab / PC, 1.2m frame aerial.	Tuned radio frequency receiver, 0.6m frame aerial.	Tuned radio frequency receiver, 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)
6	C1.6		13:26 13:35 13:56 1+				
7	C7.4						
14	C4.0						

### VLF flare activity 2005/20

