

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

BAA Radio Astronomy Section.

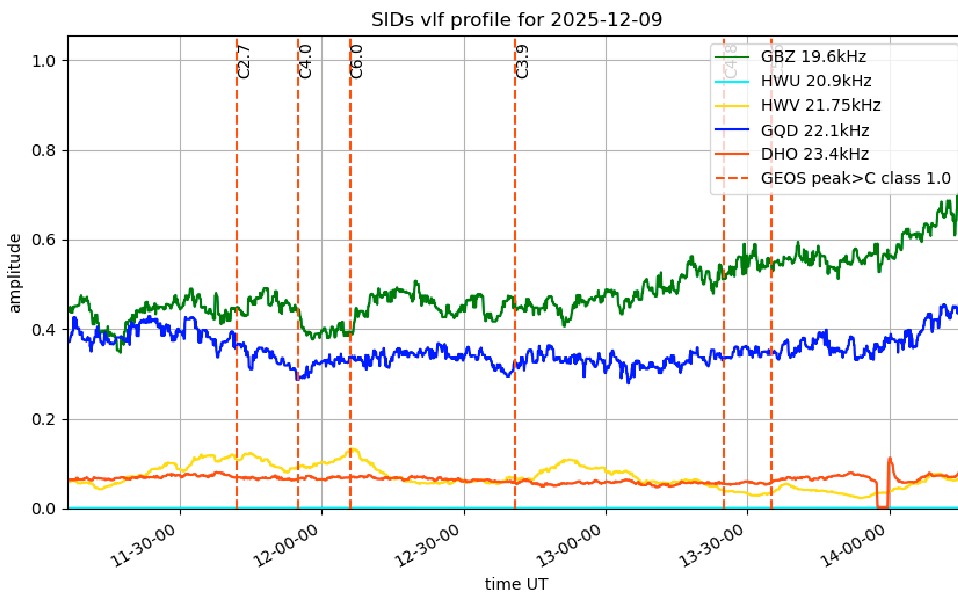
Director Paul Hearn.

RADIO SKY NEWS

2025 DECEMBER.

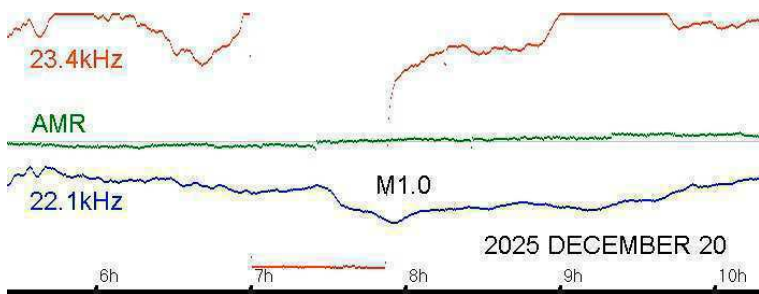
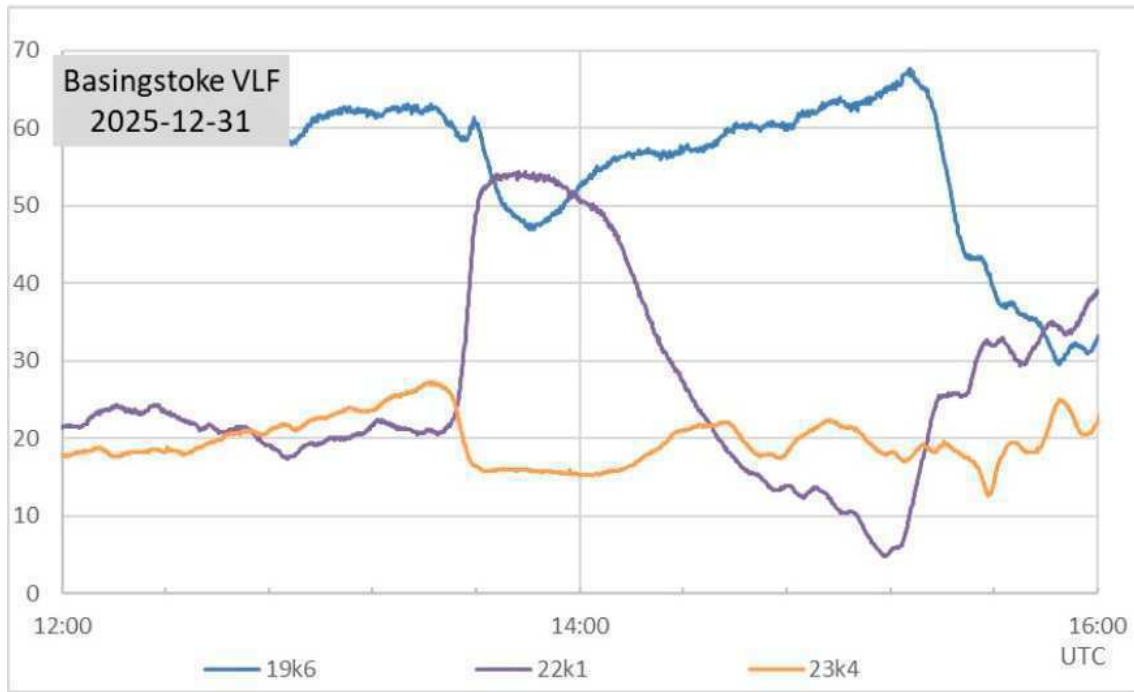
VLF SID OBSERVATIONS.

Solar flaring activity in December fell again, with just 20 recorded as SIDs. We did not record any X-flares this time, although there were some strong M-flares. In 2025 we recorded a total of 755 SIDs, compared with 2080 in 2024. The GOES satellite lists show two X-flares that were timed too early in the morning for European observers. There are plenty of smaller C-flares listed, but the low altitude of the sun makes them very difficult to record. Mark Prescott's recording from the 9th shows several C-flares hidden in the noise, particularly on the two British signals:

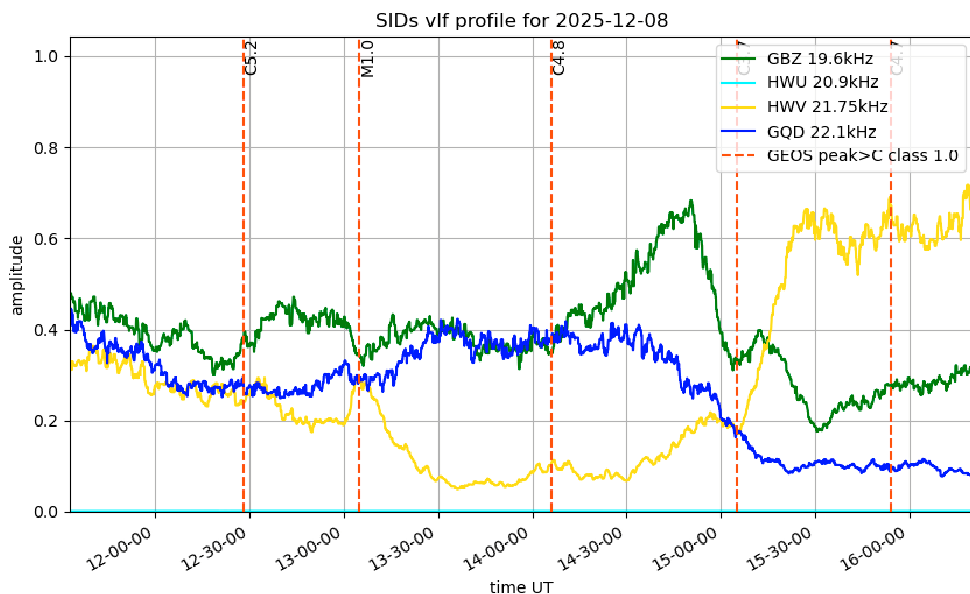


The C6.0 flare at 12:03UT would be expected to produce a strong SID during the summer months, but is lost in the noise on both 19.6kHz and 22.1kHz in December. There is a small SID visible on the French signal at 21.75kHz. 23.4kHz has remained very quiet, although my own recordings do show plenty of noise.

The strongest flare recorded was the M7.1 at 13:37UT on the 31st, recorded by all observers. Paul Hyde's recording shows a strong response on all three signals, 23.4kHz with a small spike and wave SID. The very early December sunset effects begin shortly after the end of the SID.

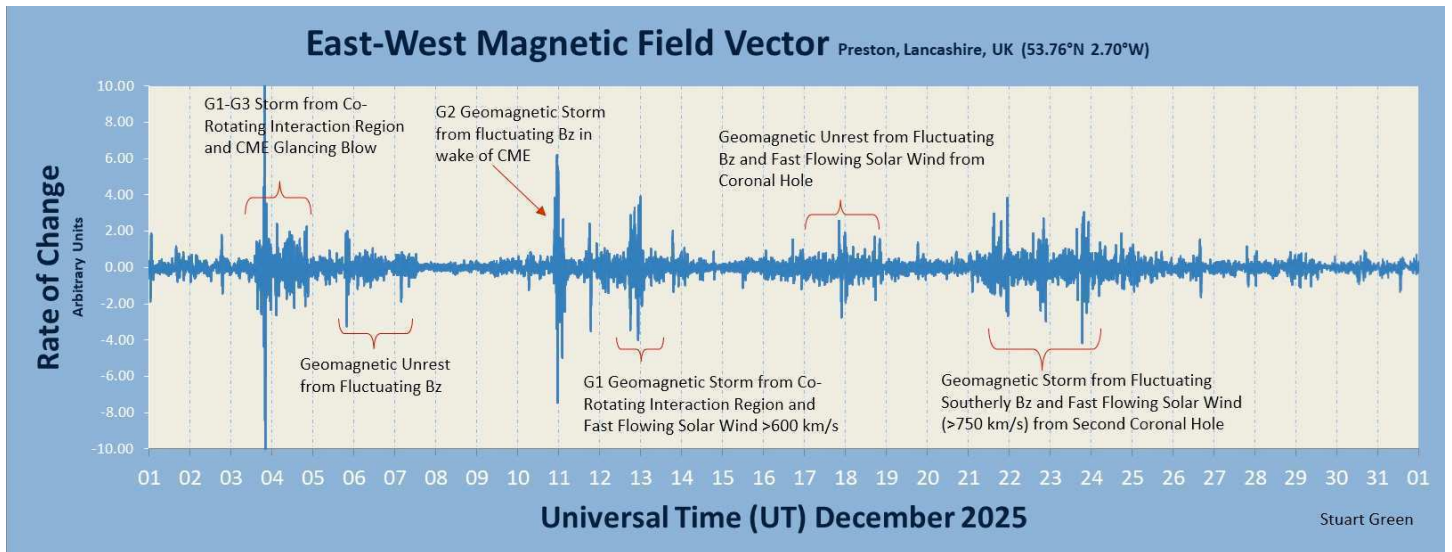


The M1.0 flare at 07:55UT on the 20th was quite early in the morning, but my recording does show a small dip at 22.1 kHz. 23.4kHz was off-air at the time.



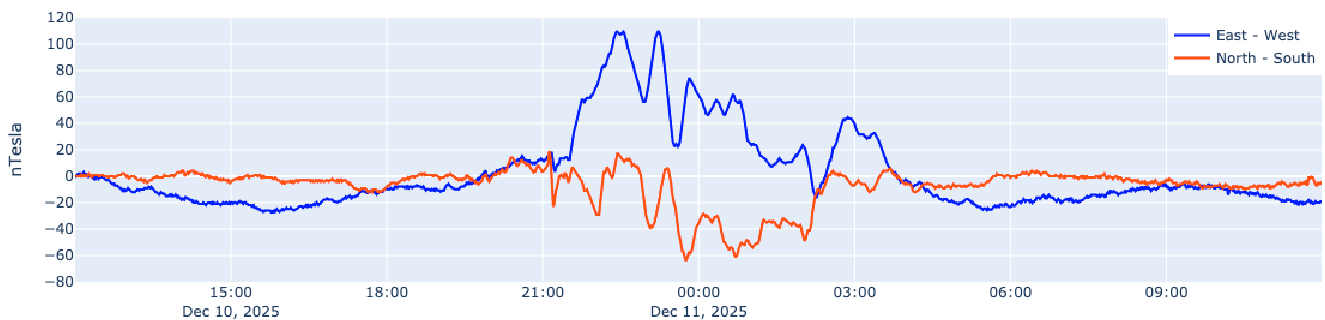
Mark Prescott's recording from the 8th shows a small response to the M1.0 flare at 13:05UT, 21.75kHz with the clearest SID. 19.6kHz has a mirror SID, while 22.1kHz appears to have about 15 minutes at minimum amplitude. General noise is again dominant right through the day.

MAGNETIC OBSERVATIONS.

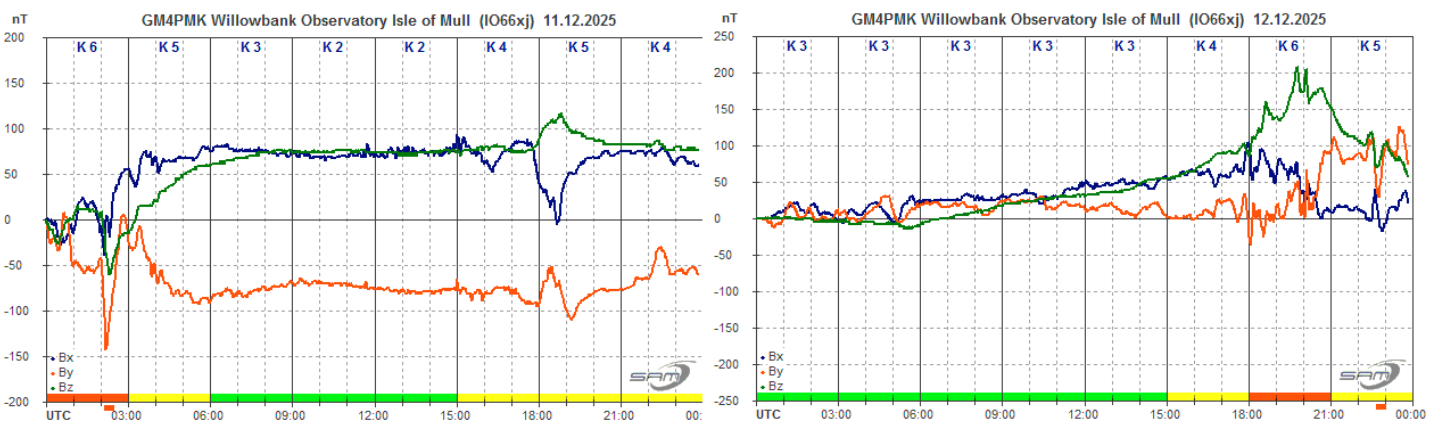


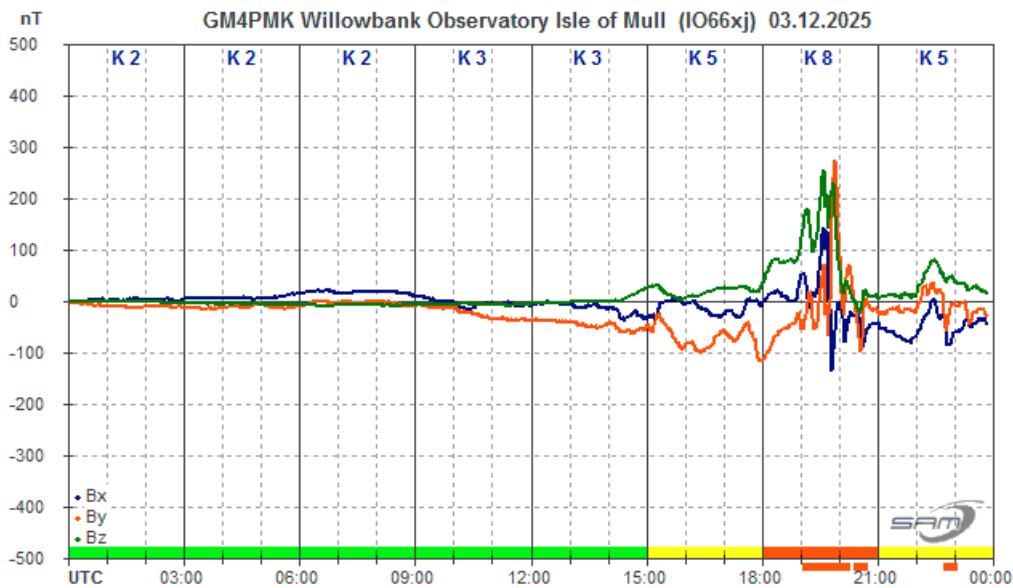
Stuart Green's summary of magnetic activity in December shows several periods of disturbance, a mixture of strong solar winds and CMEs. Coronal holes are becoming more evident as the solar cycle decays.

Steinyng Magnetometer (50.8 North, 0.3 West)



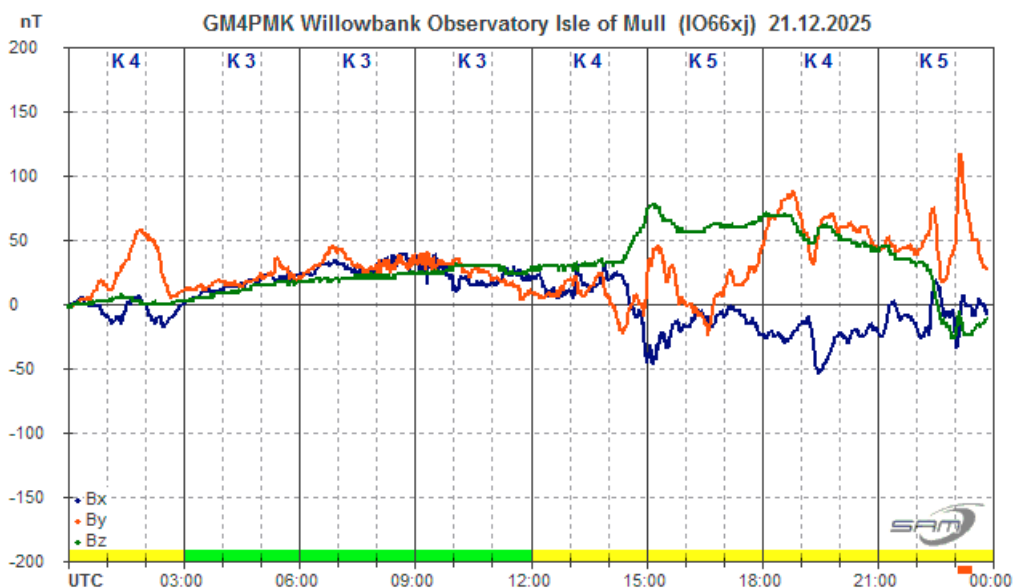
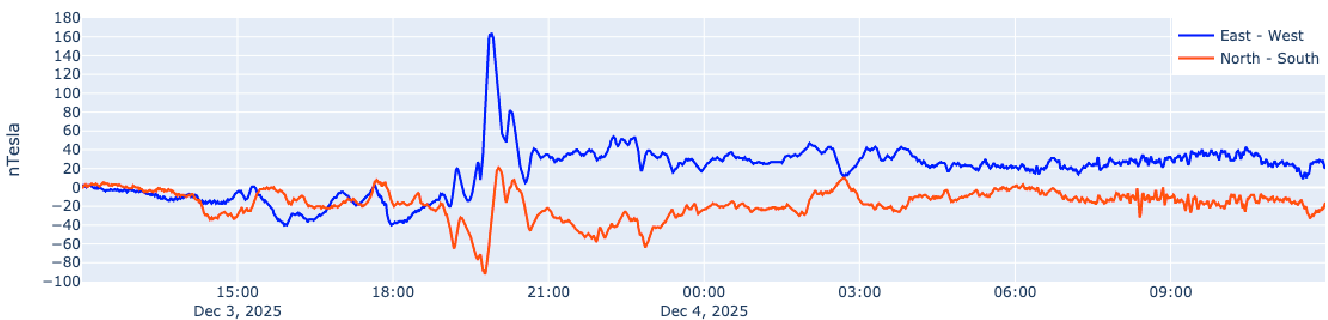
Nick Quinn's recording shows a strong disturbance overnight on the 10th–11th, with what appears to be an Impact just after 21:00UT. There were a number of CMEs recorded in the satellite data over the previous few days, reported as being not Earth-directed. There was also a turbulent solar wind present, continuing over the next few days, shown in Roger Blackwell's recording. Note the change of scale between the two charts.





Similar conditions were present on the 3rd with a strong coronal hole wind stream and several CMEs, producing a strong disturbance in the evening of the 3rd. This was much stronger, +300/-120nT shown in Roger Blackwell's recording. This continued into the 4th, although with less amplitude and more rapid turbulence as seen in Nick Quinn's recording:

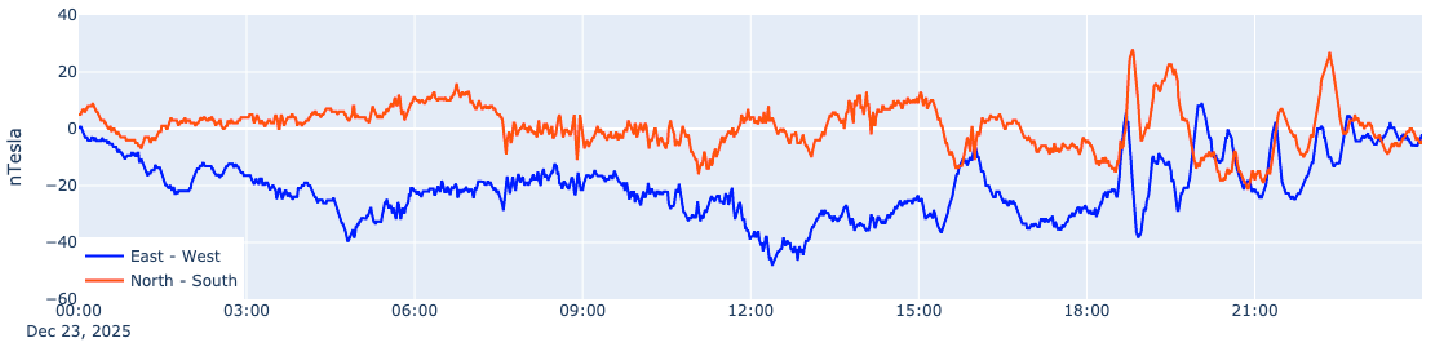
Steyning Magnetometer (50.8 North, 0.3 West)



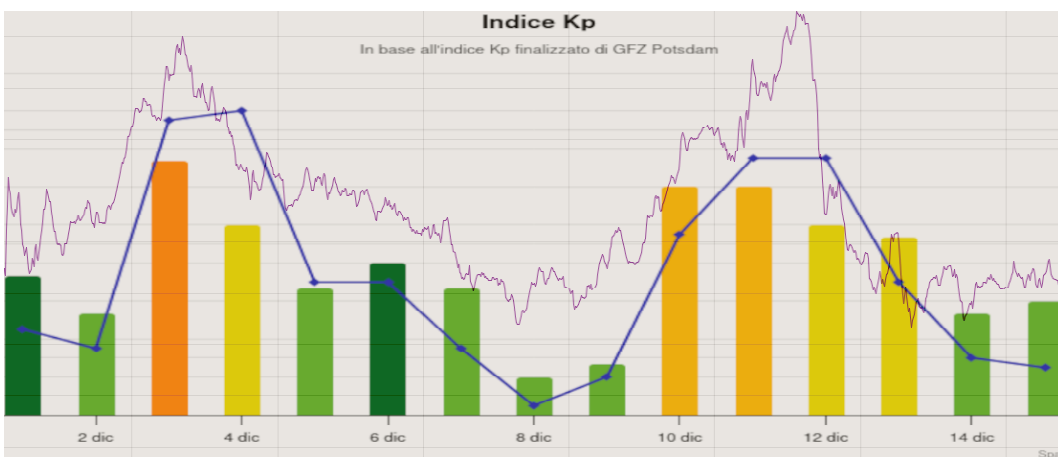
Roger Blackwell's recording from the 21st shows more coronal hole high speed solar wind turbulence.

This lasted for several days, Nick Quinn's recording showing more disturbance on the 23rd:

Steysning Magnetometer (50.8 North, 0.3 West)



The disturbance faded out on the 25th, with just a few periods of mild activity.



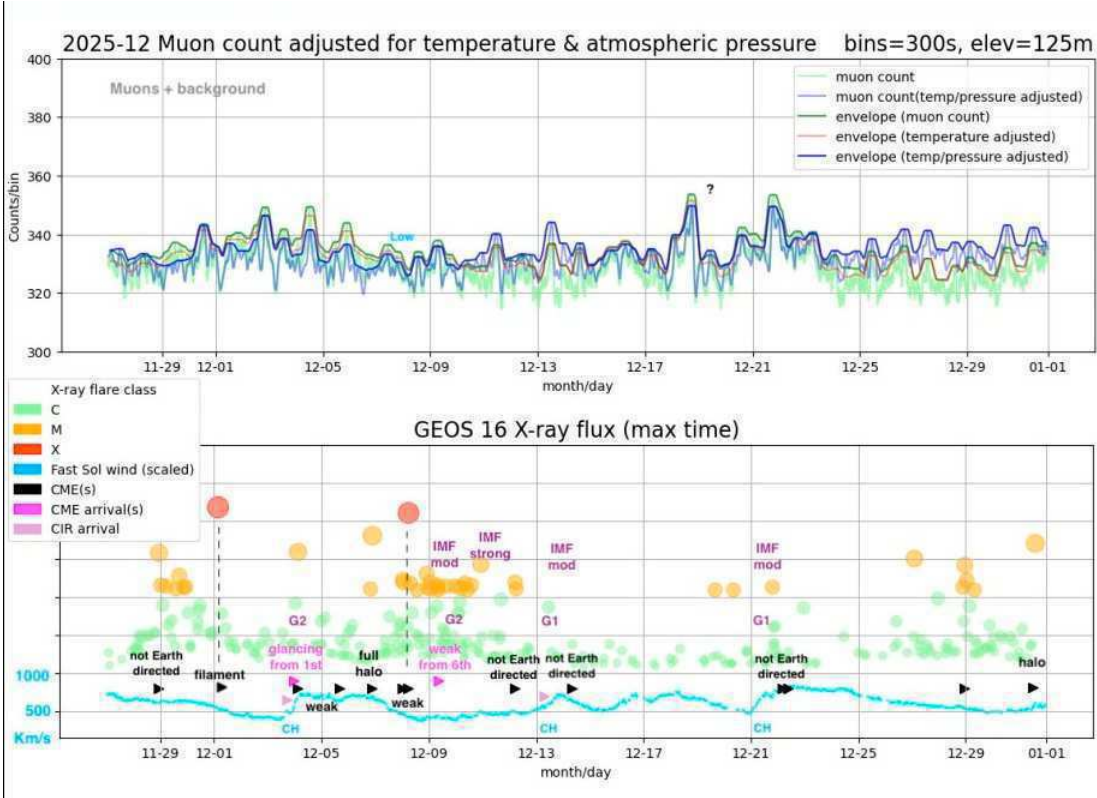
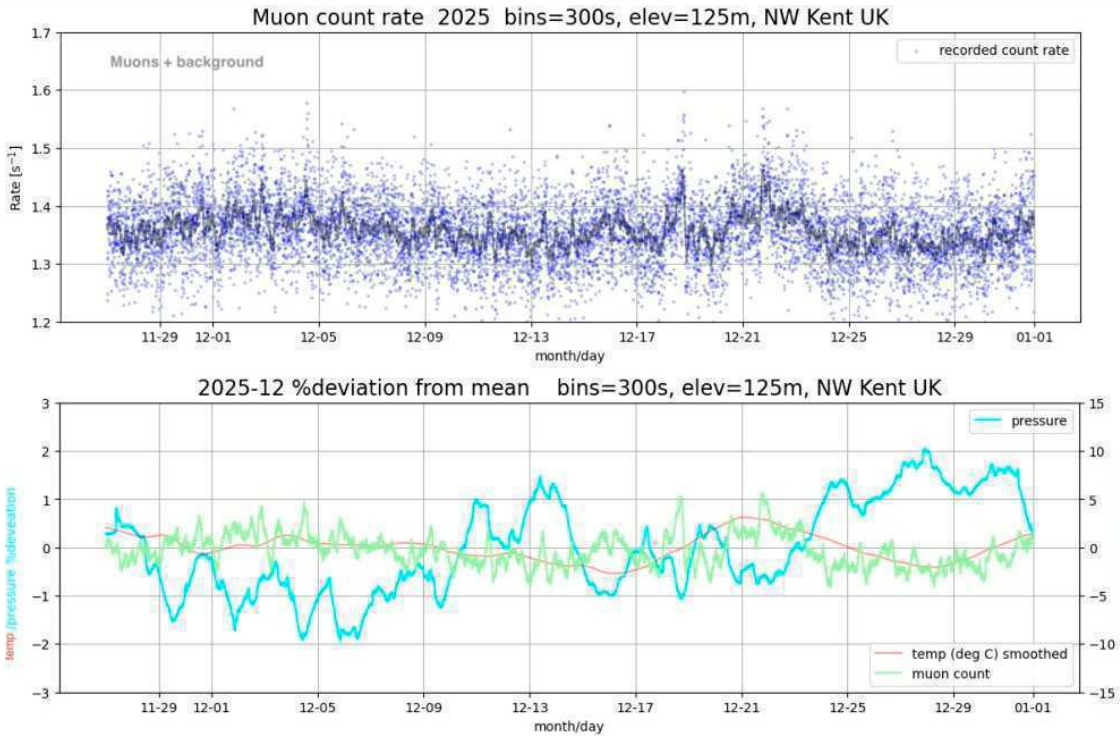
Thomas Mazzi has provided charts of the GPS errors during December. The top chart covers the full month, showing just a single peak exceeding a 1.4m error. The lower chart covers the first two weeks, and includes the Kp magnetic index showing how the GPS error peaks match the magnetic activity. Thomas uses his 'Share My Sky' project to create this data.

Magnetic observations received from Roger Blackwell, Stuart Green, Thomas Mazzi, Nick Quinn and John Cook.

SOLAR EMISSIONS

No observations of solar emissions have been received.

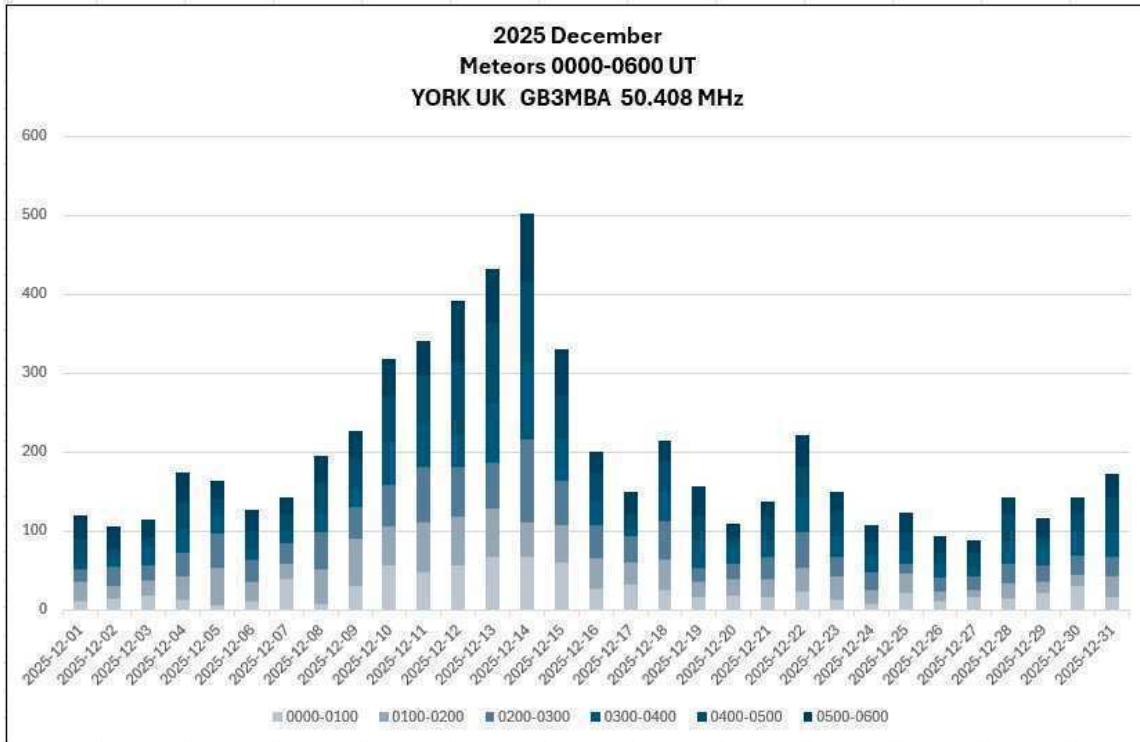
MUONS.



Mark Prescott's Muon charts show a small increase in flux over the first few days, probably due to the near-miss CMEs. There is a gentle fall through mid-month, with a strong peak on the 18th. This is probably due to the coronal hole fast solar wind seen in our magnetic data. The following peak on the 22nd also matches the magnetic disturbances from the turbulent solar wind.

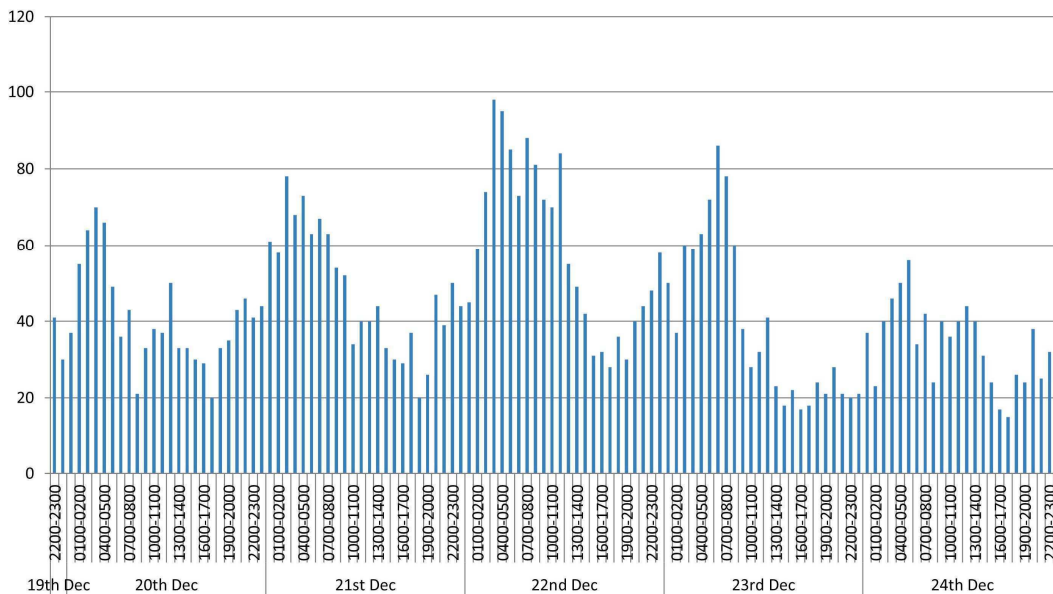
METEORS.

The Geminid and Ursid meteors reached their maximum in December. Colin Briden's recording shows a gentle increase in Geminid counts over a week, peaking on the 14th. There is a smaller peak on the 22nd, corresponding to the Ursid maximum. Geminids gave the highest counts, 500 being recorded over 6 hours on the 14th. The Ursids were much weaker, just over 200 being recorded in 6 hours.

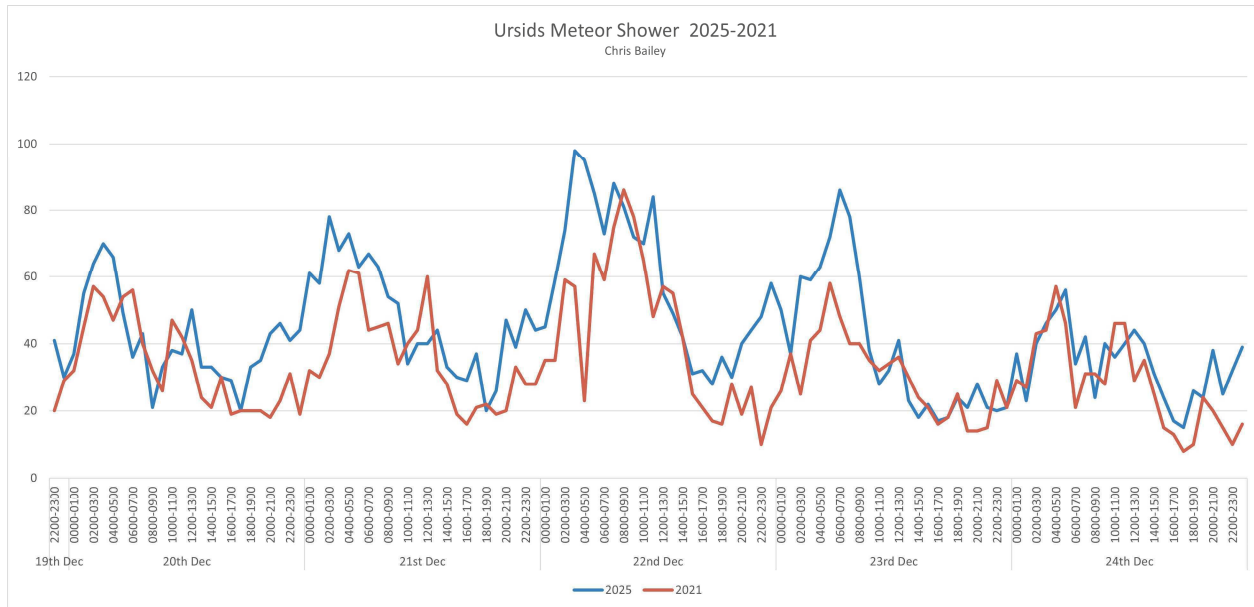


Ursids Meteor Shower December 2025

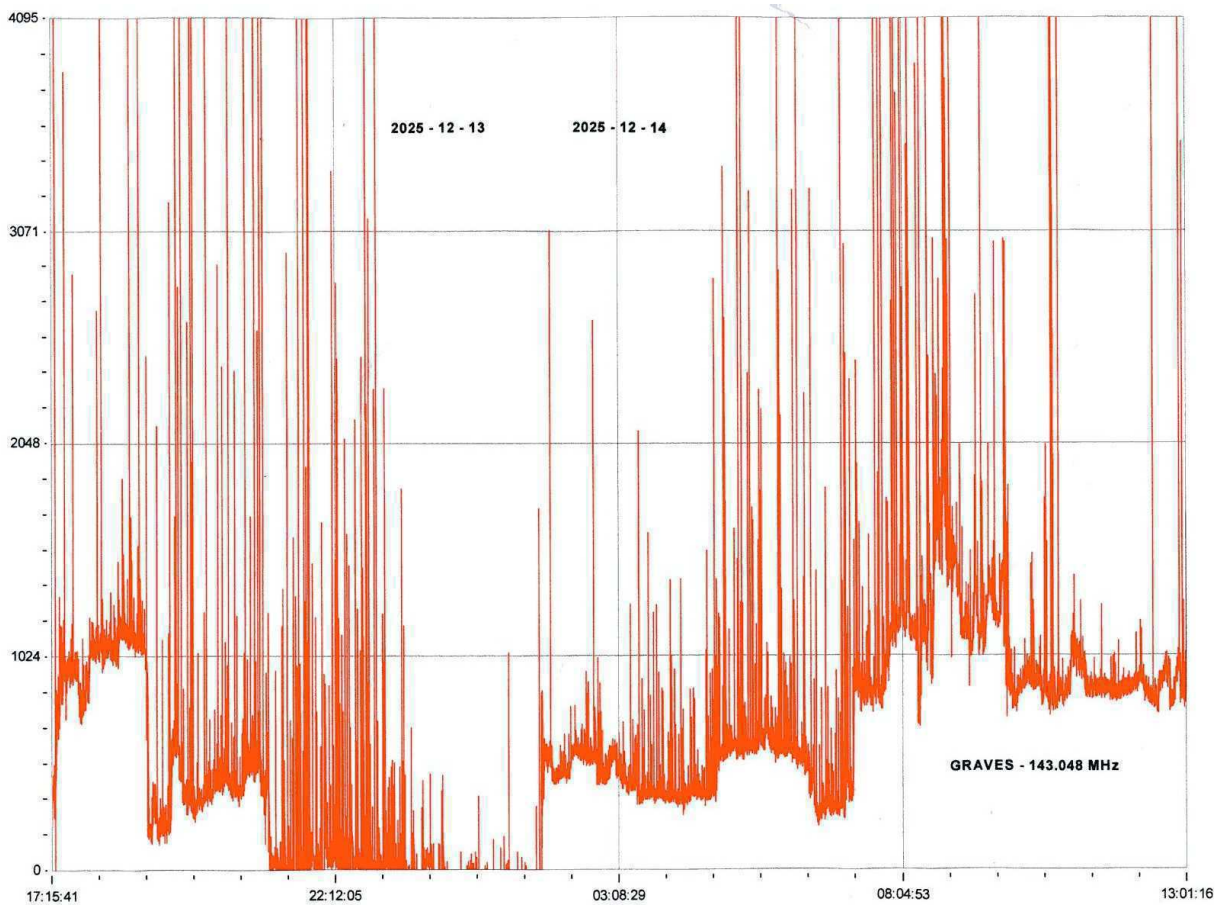
Chris Bailey



Chris Bailey's recording of the Ursids shows a similar peak in the morning of the 22nd, with smaller peaks on the 20th, 21st and 23rd. Chris has also compared Ursid activity over recent years:



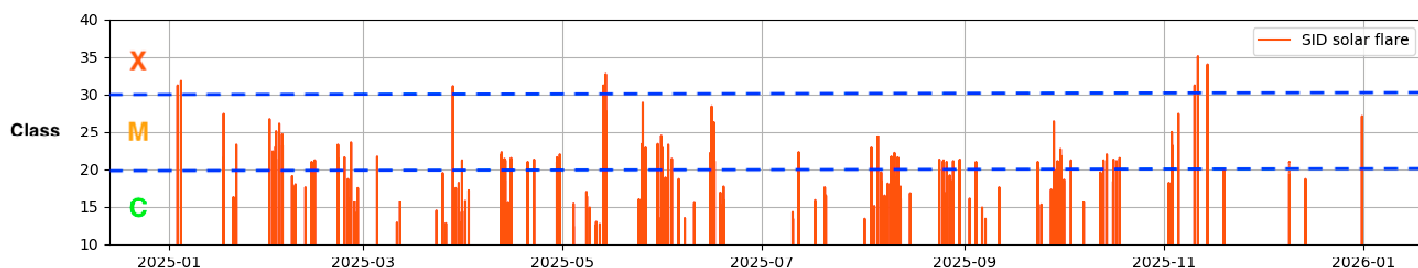
Activity this year looks to be slightly weaker than 2021, but otherwise very similar.



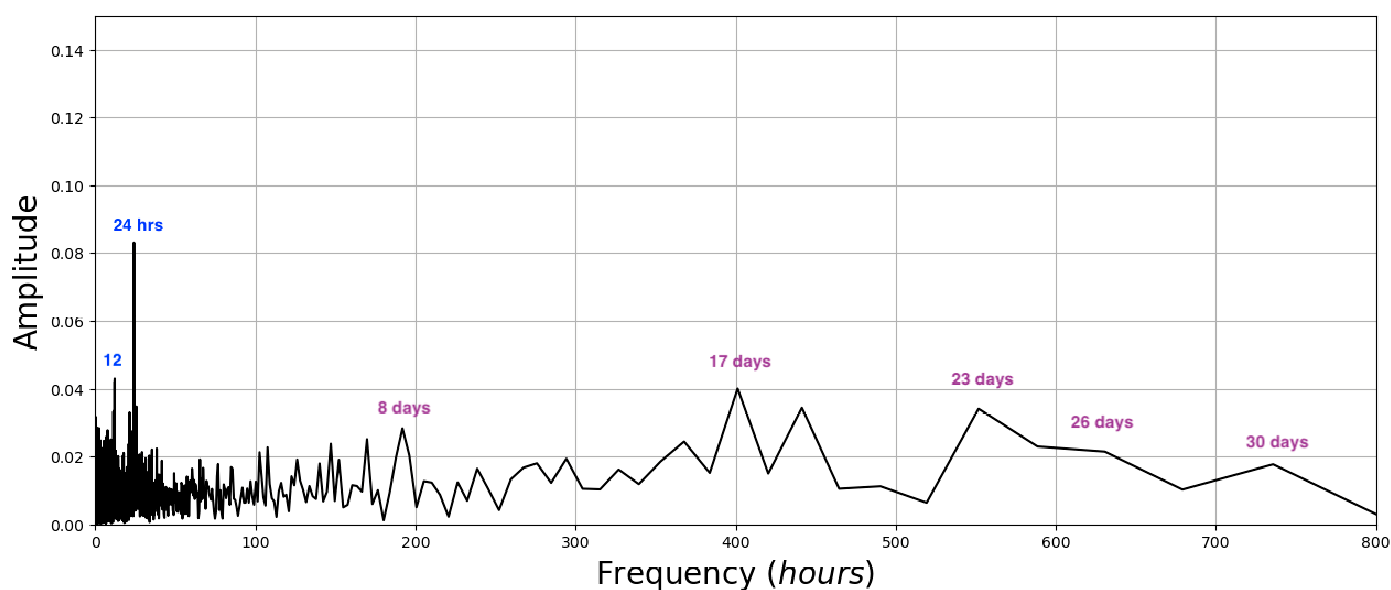
Colin Clements' recording covers the evening of the 13th and morning of the 14th. Two strong peaks are separated by a 2 hour break just after midnight. Different parts of the sky are being monitored, as Colin is using the GRAVES 143MHz signal in France.

SOLAR ACTIVITY STATISTICS.

2025 VLF SID 19.6 kHz Recorded Solar Flares (Westerham, Kent UK)



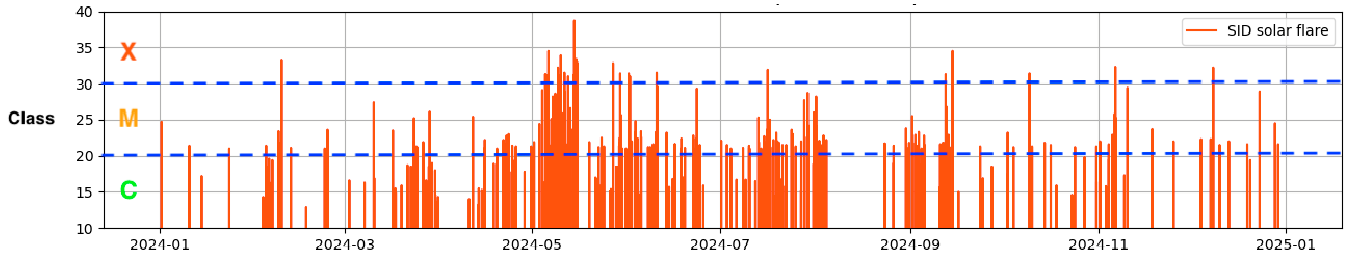
Fourier spectrum



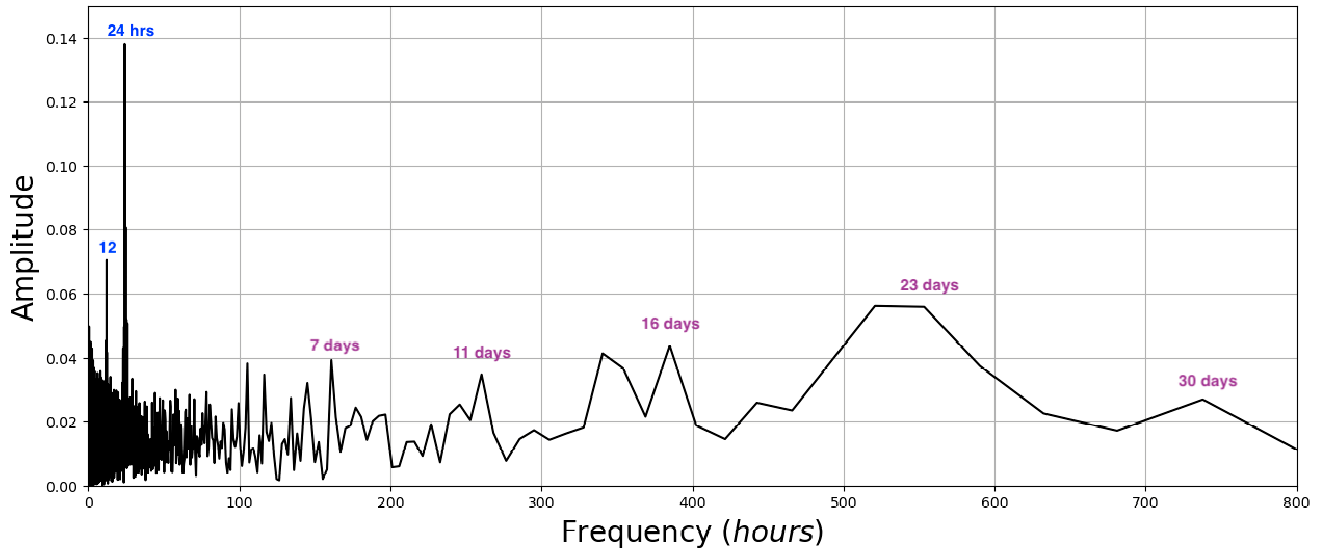
Mark Prescott has run some statistics on the Sun's flaring activity in 2025. The Fourier spectrum is very interesting, showing a variety of peaks. Solar rotation is not an easy thing to measure, as different latitude regions rotate with different periods (around 27 to 30 days). During the sunspot cycle the active regions tend to migrate to lower latitudes, so their periods will also change. The strong 12 and 24 hour peaks in the spectrum match the semi-diurnal and diurnal periods, and so are Earth related rather than solar. The 23, 26 and 30 day peaks are probably related to the solar rotation, active areas often surviving through the far side of the Sun, reappearing again on the next rotation. The remaining peaks from 8 to 18 days perhaps relate more to the less predictable repeat flaring of active areas that do not last for a full rotation. Peter Meadows has written a paper for the BAA journal investigating this differential rotation, I do not know which issue will include the paper, but look forward to reading it.

Mark has also done the same analysis for the 2024 data, chart shown on the next page. Overall activity was of course much greater, but the Fourier transform shows a similar shape. The short periods are still present, with a new peak at 11 days. The peak at 23 days is much wider, perhaps indicating the wider latitude coverage as the cycle peak starts to decay. All of this data was taken using the 19.6kHz signal from Skelton.

2024 VLF SID 19.6 kHz Recorded Solar Flares (Westerham, Kent UK)



Fourier spectrum



BAA Radio Astronomy Section.

2025 DECEMBER.

	Xray class	Observers	John Cook (23.4kHz/22.1kHz)	Roberto Battaiola (20.3kHz)	Paul Hyde (22.1kHz/24kHz)	Mark Edwards (24.0/19.6kHz)	Colin Clements (23.4kHz/21.75kHz)
			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)
1	C6.0	1		09:47 10:09 11:13 3			
3	C5.4	1		12:41 12:52 13:01 1			
7	C7.5	2		11:53 12:02 12:34 2	11:59 12:05 12:11 1-		
8	M1.0	2	12:59 13:01 13:15 1-				
9	C6.0	1					
9	C5.6	1	13:28 13:29 13:34 1-				
9	M1.5	2		15:07 15:14 15:21 1-		15:10 15:16 15:33 1	
10	M1.0	1	09:50 09:56 10:08 1-				
10	C4.1	1	10:26 10:29 10:32 1-				
10	M1.6	3			13:40 13:45 14:08 1+	13:39 13:46 ? -	
10	?	1				13:58 14:01 14:08 1-	
11	C4.5	1				15:19 15:26 15:38 1	
11	C9.7	1				15:44 15:48 16:00 1-	
12	C2.8	1				14:43 14:47 14:58 1-	
13	C8.7	1					
13	?	1			11:24 11:37 11:52 1+		
19	M1.0	2	15:21 15:58 16:04 2			15:42 15:49 15:55 1-	
20	M1.0	1	07:48 07:55 08:06 1-				
26	C6.9	1	09:12 09:16 09:22 1-				
29	C4.3	1	08:15 08:18 08:24 1-				
29	C3.8	1	09:46 09:48 09:52 1-				
31	M7.1	7	13:29 13:50 14:55 3	13:20 13:36 14:49 3	13:29 13:37 15:04 3	13:32 13:50 14:23 2+	

BAA Radio Astronomy Section.

2025 DECEMBER.

DAY	Xray class	Steve Parkinson (Various)	Andrew Thomas (18.3kHz)	Phil Rourke (23.4kHz)	Mark Prescott (19.6kHz/21.75kHz)	John Elliott (18.3kHz)
		Tuned radio frequency receiver, frame aerials.	Tuned radio frequency receiver, 0.6m frame aerial.	Spectrum Lab, 0.6m frame aerial.	SpectrumLab/Starbase, Active mini-whip 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)
1	C6.0					
3	C5.4					
7	C7.5					
8	M1.0				13:02 13:06 13:14 1-	
9	C6.0				12:03 12:07 ? -	
9	C5.6					
9	M1.5					
10	M1.0					
10	C4.1					
10	M1.6					13:37 13:45 14:10 2
10	?					
11	C4.5					
11	C9.7					
12	C2.8					
13	C8.7				10:52 10:54 ? -	
13	?					
19	M1.0					
20	M1.0					
26	C6.9					
29	C4.3					
29	C3.8					
31	M7.1	13:31 13:50 14:40 2+			13:34 13:50 14:19 2	13:30 13:50 14:28 2+

VLF flare activity 2005/25

C M X — Relative sunspot number

