



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

**BAA Radio Astronomy Section.**

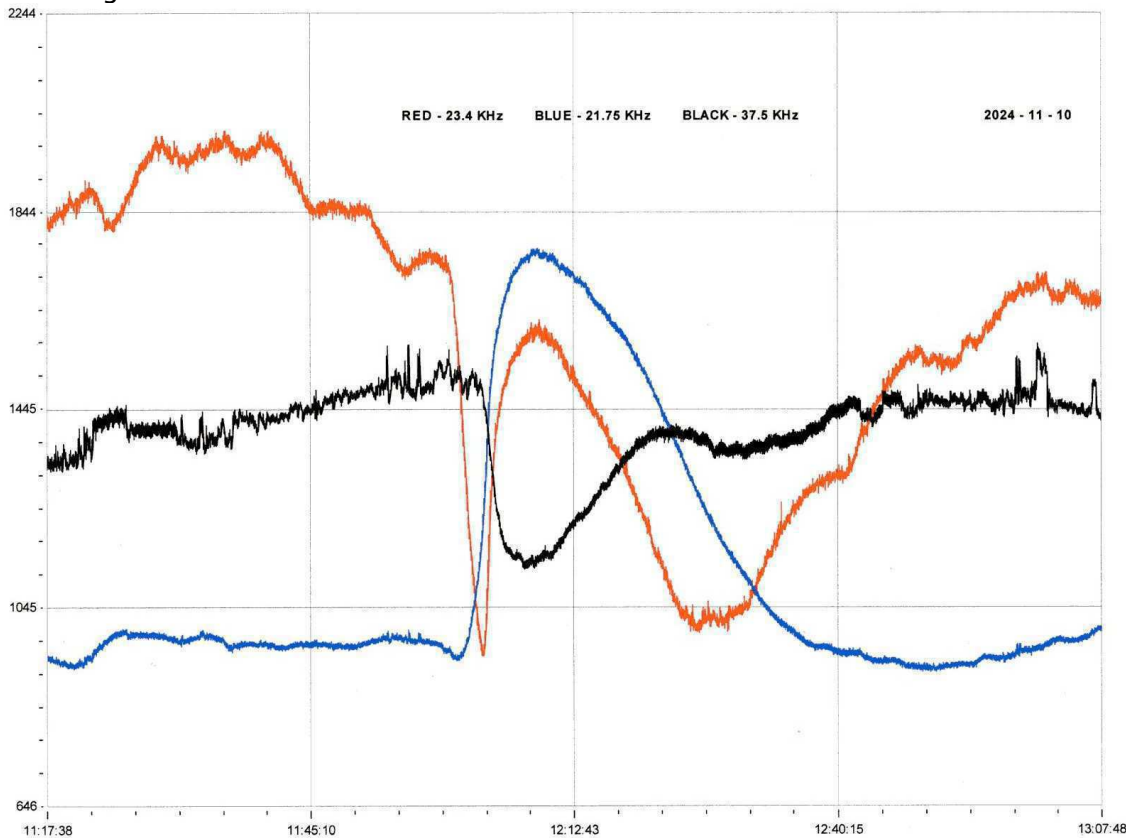
Director Paul Hearn.

## RADIO SKY NEWS

## 2024 NOVEMBER.

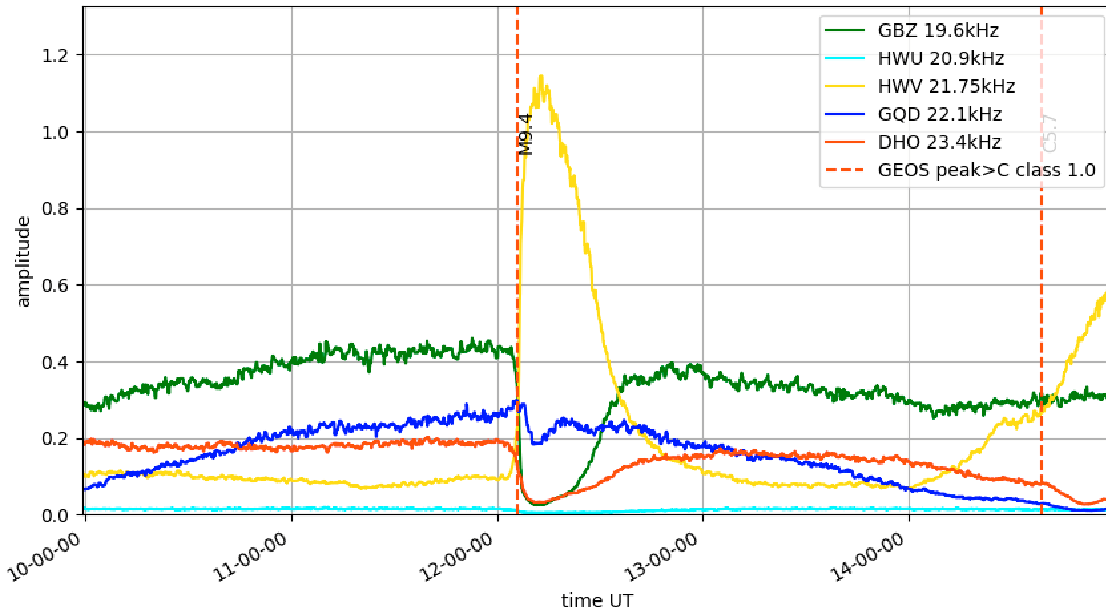
### VLF SID OBSERVATIONS.

Solar flare activity has been slowly decreasing over the last three months, a total of 83 classified flares being recorded as SIDs in November. In October there were 91. The strength of the flares has however increased slightly, with 51% C-class and 48% M-class. In October it was 66% C-class and 33% M-class. We did only record a single X-flare, compared with three in October. Some of our signals have been very disturbed due to the low solar altitude, so this has perhaps biased our detection ability to the stronger events. There are also plenty of flares that have overlapped to produce double peaked SIDs on some signals, and single SIDs on other signals.

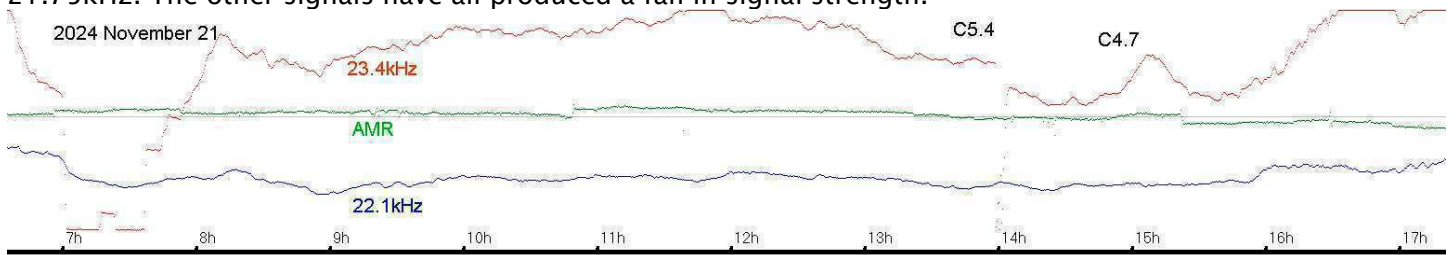


This recording by Colin Clements shows the M9.4 flare peaking just after midday on the 10<sup>th</sup>. Just shy of X-category, these three signals very clearly show the different SID shapes. 21.75kHz (blue) has a rising signal, while 37.5kHz (black) is inverted. 23.4kHz (red) has a 'spike and wave' shape, its true peak clearly aligned with the other two shapes.

SIDs vlf profile for 2024-11-10

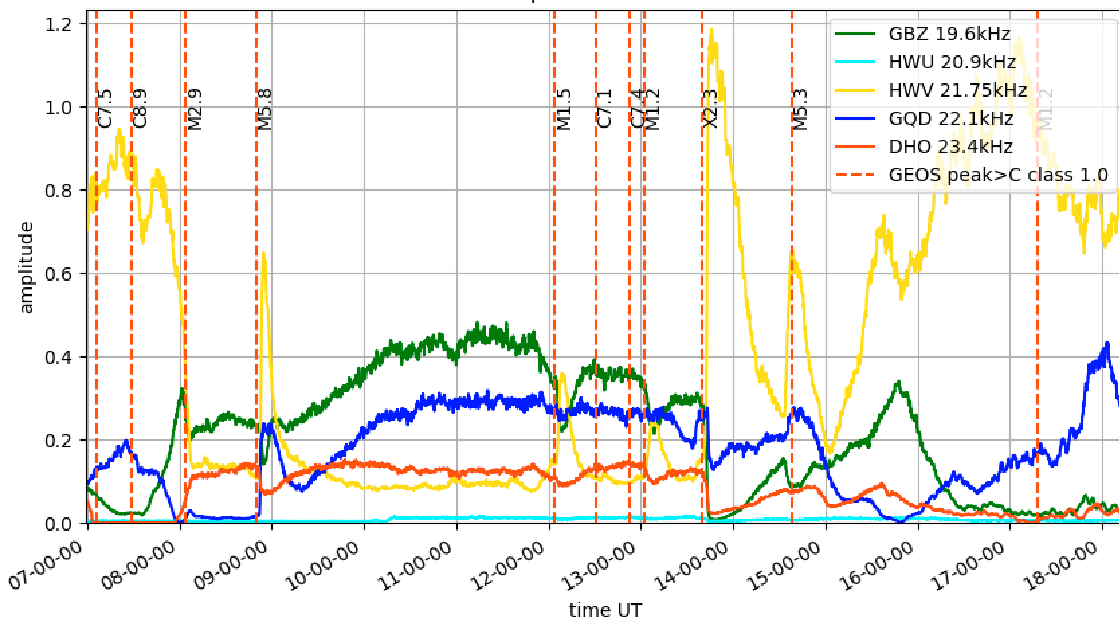


This recording by Mark Prescott includes some more signals, a very strong response recorded at 21.75kHz. The other signals have all produced a fall in signal strength.

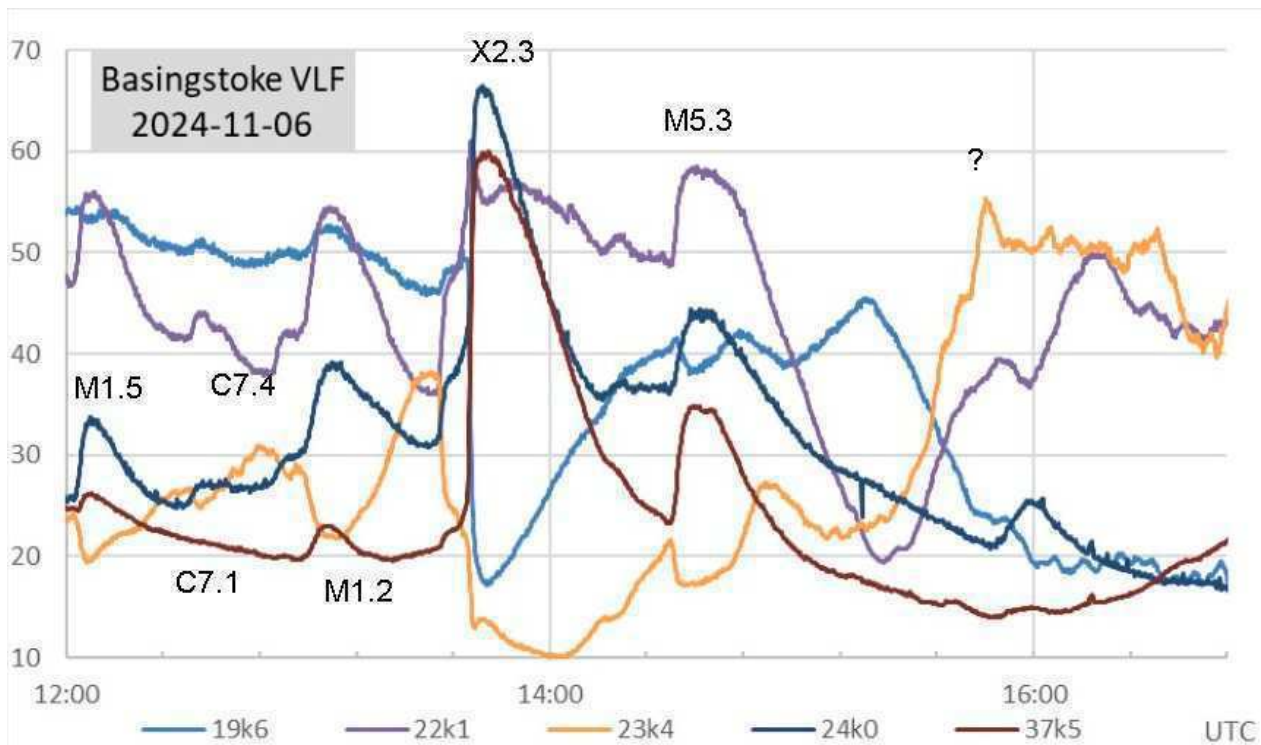


Not all days were as clear as the 10<sup>th</sup>. My recording shows the 21<sup>st</sup>, with a very noisy 23.4kHz. The two C-class flares have been completely hidden by the general ionospheric instability. I have marked their rough positions. It also shows the very early sunset, starting around 15:30UT.

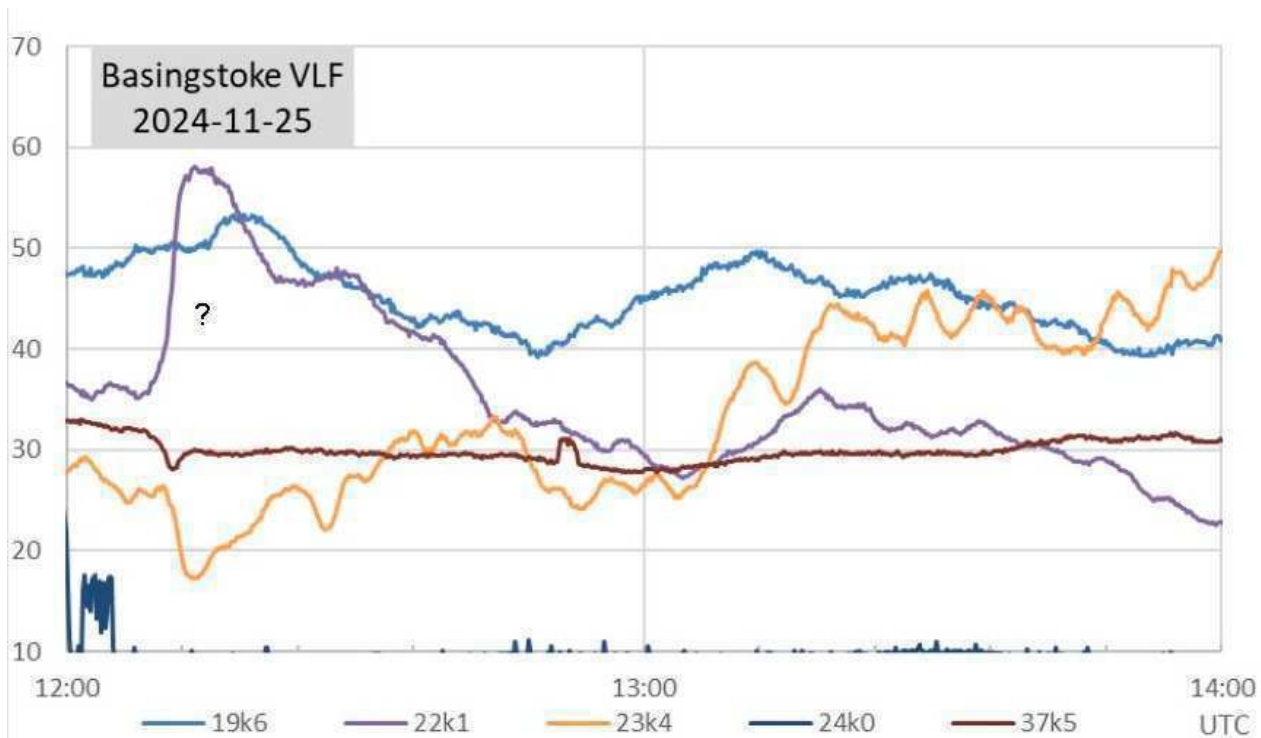
SIDs vlf profile for 2024-11-06



The 6<sup>th</sup> was the busiest day in November, including the X2.3, shown in Mark Prescott's recording. The strongest of the flares are clearly recorded as SIDs, but the strong C7.1 and C7.4 flares are well hidden.

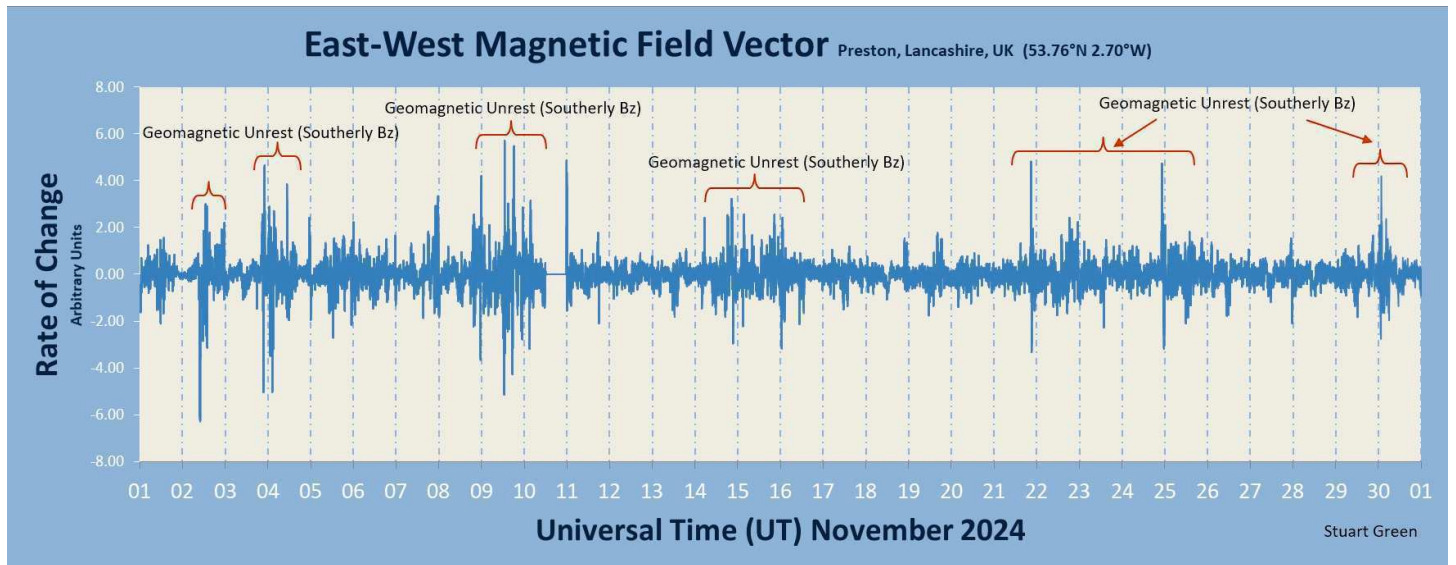


Paul Hyde's recording shows just the afternoon period, but again shows a very weak response to the C7.1 and C7.4 flares. The X2.3 flare is interesting as all of the signals appear to have a double-peaked SID, an effect not seen in other recordings. The 'spike and wave' SID at 23.4kHz has a very strange shape, tricky to analyse without guidance from the other signals. This was the only X-flare in the GOES satellite data for November, so we were lucky that it was so well timed.



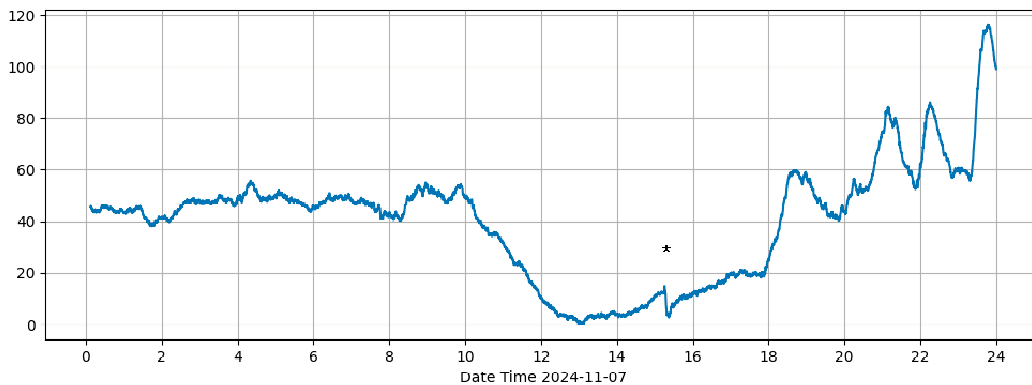
Activity decreased towards the end of the month, Paul Hyde's recording from the 25<sup>th</sup> showing just a single unclassified SID during the afternoon. This event was recorded by nine observers, and so is not local interference. There was an M9.4 flare early in the morning followed by a C5.4 flare at 10:48UT, but they were not widely recorded.

## MAGNETIC OBSERVATIONS.

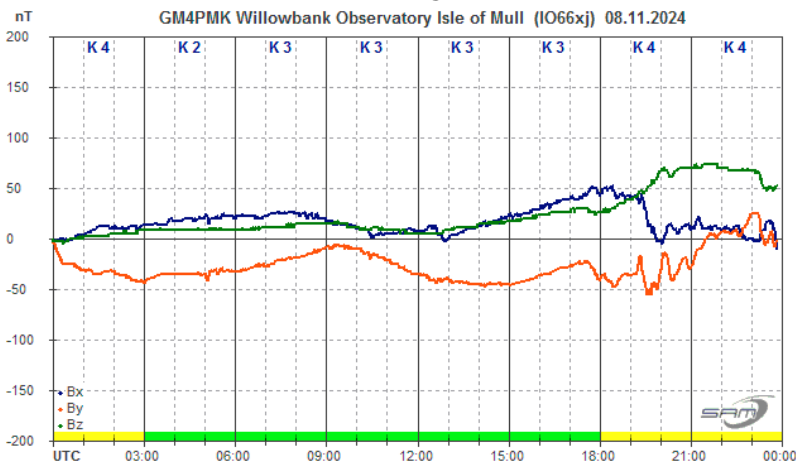


Stuart Green's summary of the month's activity shows some disturbance through most of the period. The Bartels chart also shows long periods of disturbance. Most of the activity was fairly mild, and appears to be from the solar wind rather than CMEs. We did record one potential CME impact, shown in Callum Potter's chart from the 7<sup>th</sup>:

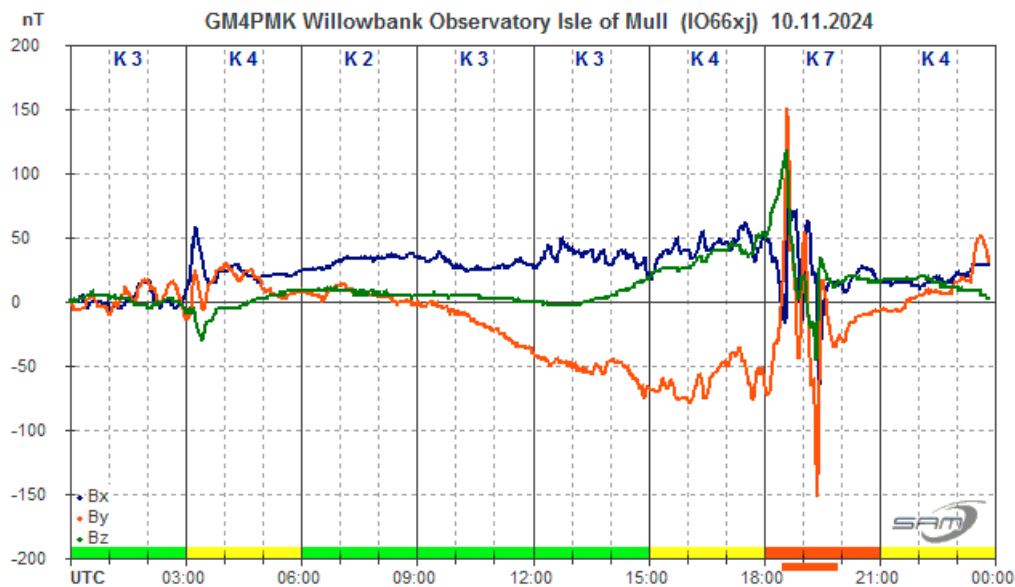
Wasbister Magnetometer (59.17N,3.06W)



The impact is at about 15:15UT, marked '\*'. The STCE bulletin suggests that a CME from the 4<sup>th</sup> was the cause. There were lots of strong flares early in the month, some with CMEs directed away from Earth, so the exact source is not known. The resulting activity was very mild, shown in Roger Blackwell's recording from the 8<sup>th</sup>:



The most active period was the evening of the 10<sup>th</sup>. This appears to be due to a turbulent solar wind, possibly assisted by small CME effects.

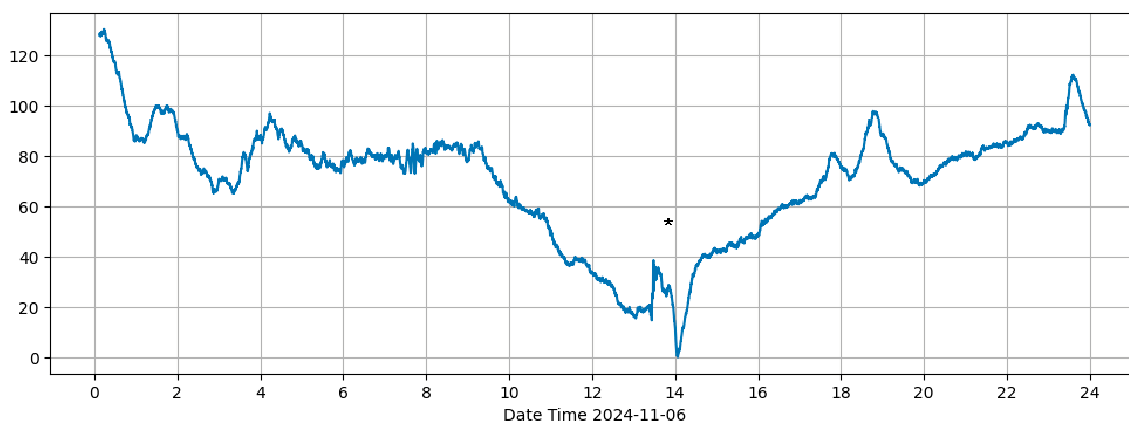


Roger Blackwell's chart shows the short active period from 18UT to 20UT, with a smaller disturbance earlier in the morning. Nick Quinn's recording also includes some activity on the previous day.

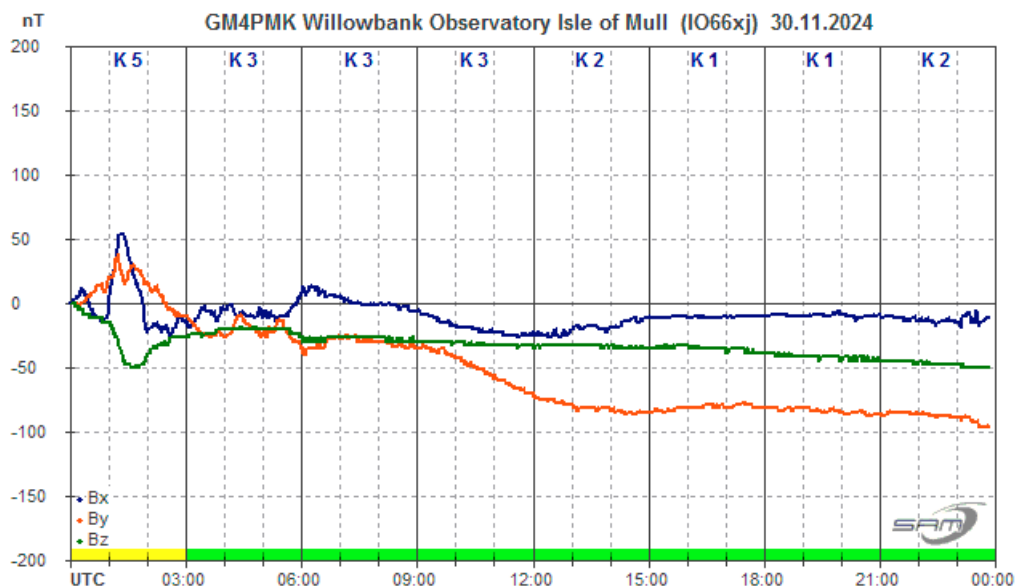
Steying Magnetometer (50.8 North, 0.3 West)



Wasbister Magnetometer (59.17N,3.06W)

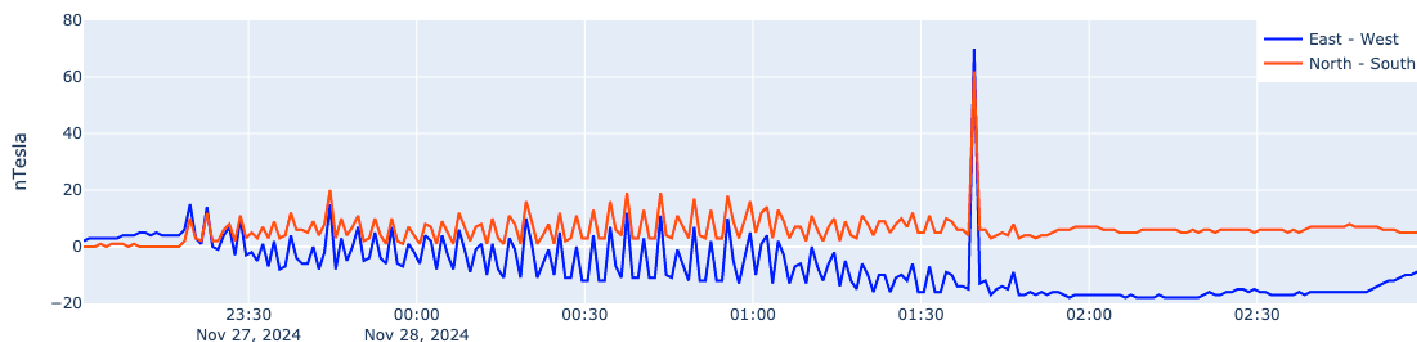


The X2.3 flare at 13:43 on the 6<sup>th</sup> has produced a Solar Flare Effect (SFE), where the sudden increase in ionisation of the D-region causes a strong electrical current to flow, thus rapidly altering the local magnetic field. Callum Potter has recorded this, marked '\*' on his chart.



Magnetic disturbance remained very mild for the rest of the month, Roger Blackwell's recording from the 30<sup>th</sup> showing some weak effects from the solar wind.

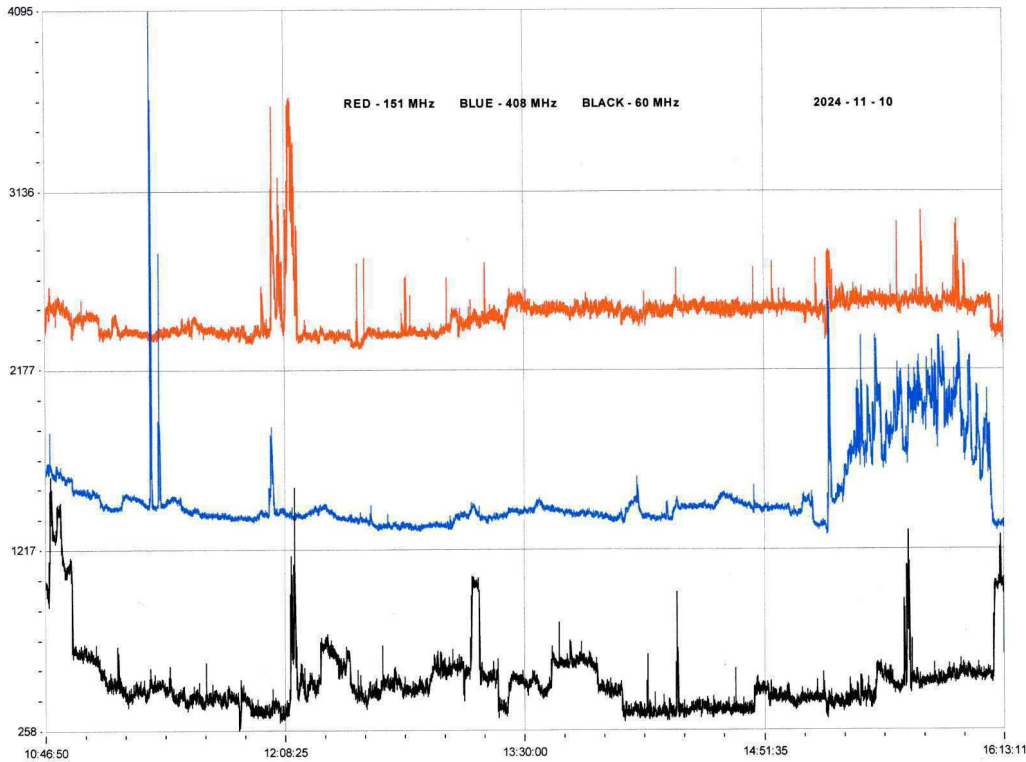
Steynning Magnetometer (50.8 North, 0.3 West)



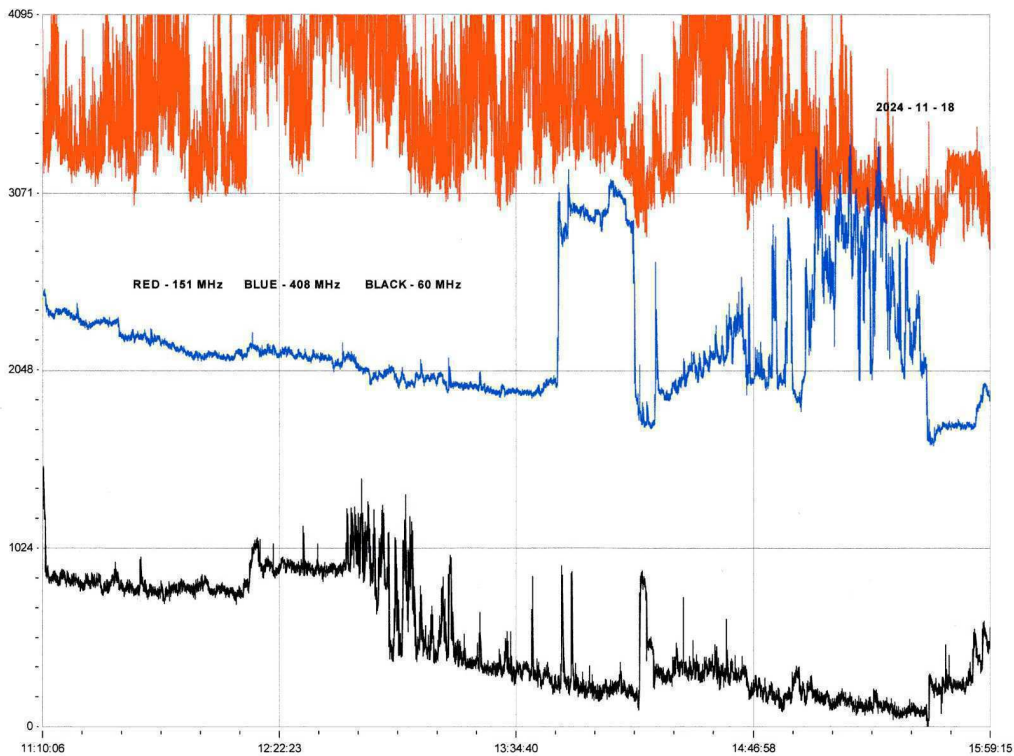
This recording from the 27<sup>th</sup> – 28<sup>th</sup> by Nick Quinn is rather a mystery. At first it looks very much like the example of PC2 waves shown in the October report, except that these waves have a period of about 3 minutes compared to 8 seconds for the PC2 waves. The sharp spike at the end of the cycle is also very different. None of our other observers have recorded anything similar, and so it must be some sort of local interference. The source however is unknown. A similar, but weaker, example was recorded on the 18<sup>th</sup> – 19<sup>th</sup>. Nick has eliminated household appliances as the cause by noting when they are used. All of the local interference that I have seen usually shows with sharp edges rather than a smooth cyclical pattern. I have seen the effects of local seismic disturbance of the sensor, but that would not be expected to last for over two hours. I have found references to minor seismic events in the north of England over this period, but nothing near the south coast. All suggestions welcome!

Magnetic observations received from Roger Blackwell, Callum Potter, Nick Quinn and John Cook.

## SOLAR EMISSIONS

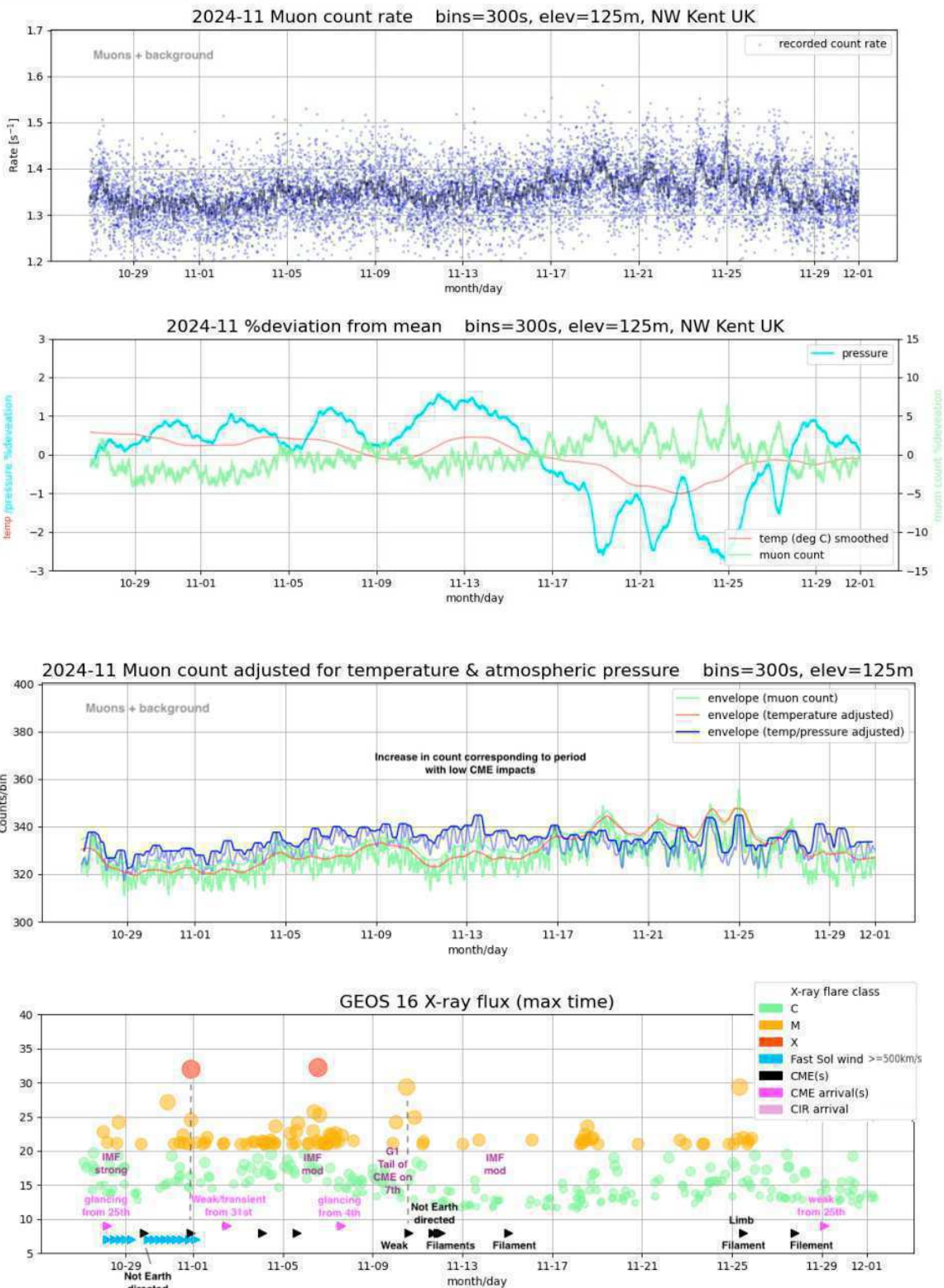


We recorded just a single SID on November 10<sup>th</sup>, from an M9.4 flare peaking at about 12:06–12:08UT. Colin Clements recorded a strong noise pulse on all three of his frequencies that match this flare very well. The 408MHz (blue) signal later in the day matches a smaller flare that we did not record as a SID.



We recorded five M-class flares during the morning of the 18<sup>th</sup>, which may well have caused the 151MHz (red) noise in Colin's recording. 60MHz (black) has a shorter burst of noise that could be from the M3.7 flare, while 408MHz shows more noise later in the afternoon. A C4.3 flare later in the afternoon may well be related, although precise relationships are not clear. A very confusing pattern of activity.

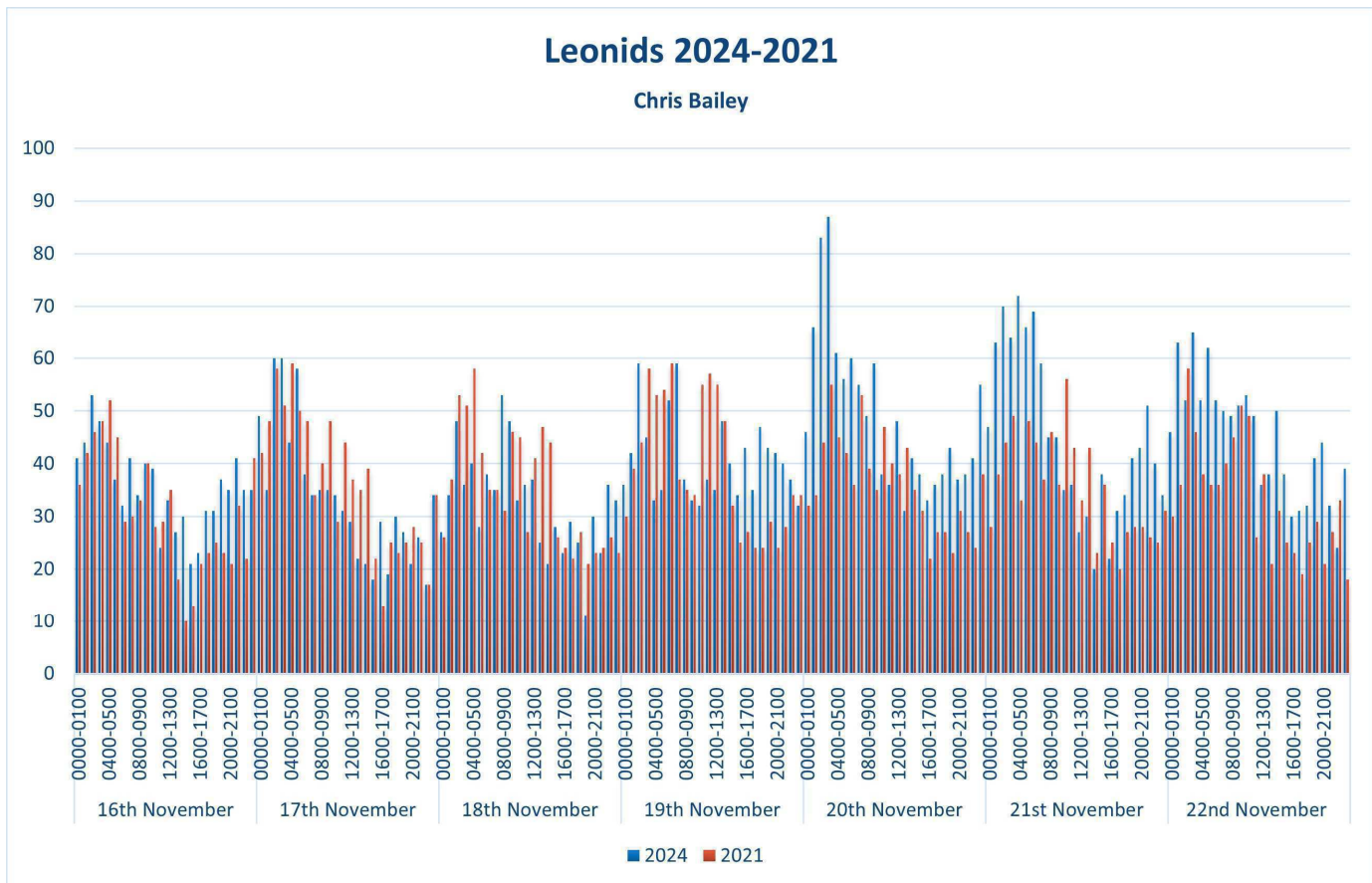
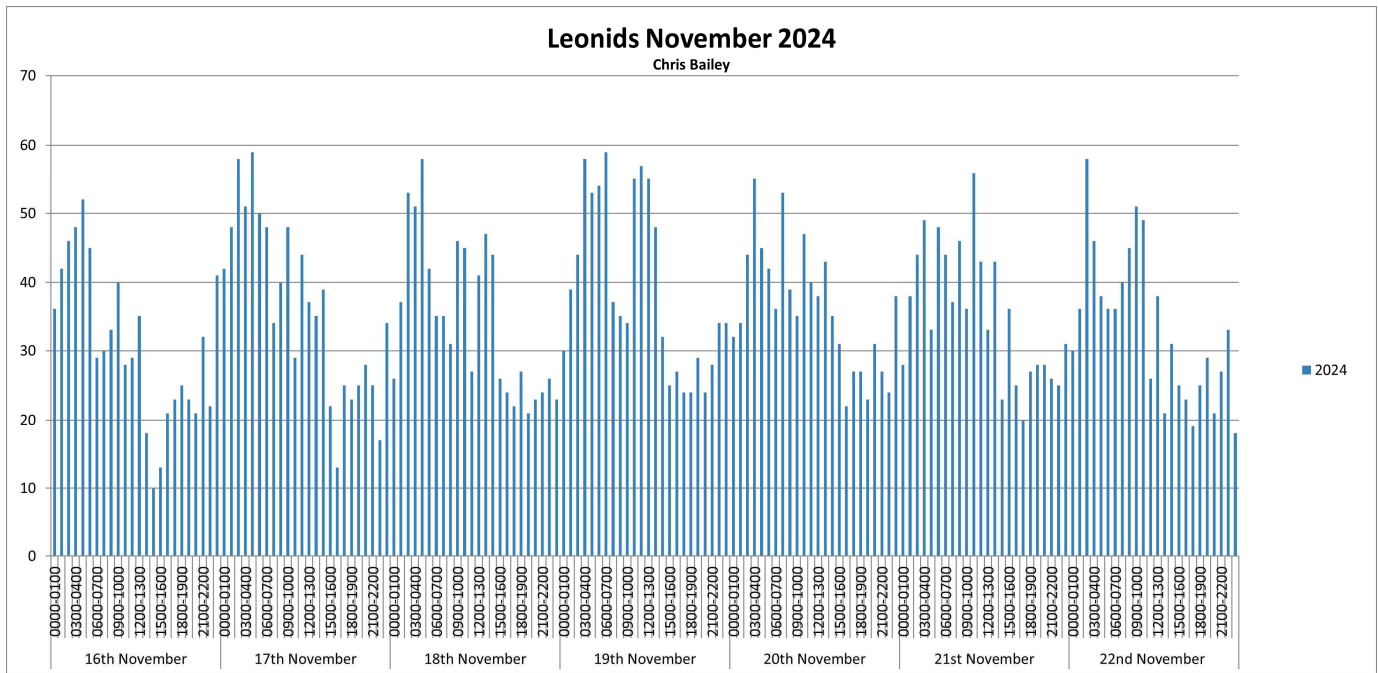
# MUONS



The Muon charts recorded by Mark Prescott show the dramatic drop in atmospheric pressure at the end of November as much as they show the Muon count. The raw data in the top chart shows the rise in Muon count with the low pressure, although the cause of the peaks on the 23<sup>rd</sup> and 24<sup>th</sup> is not clear. Higher solar activity earlier in the month has pushed up the counts, reaching a maximum by the 13<sup>th</sup>.

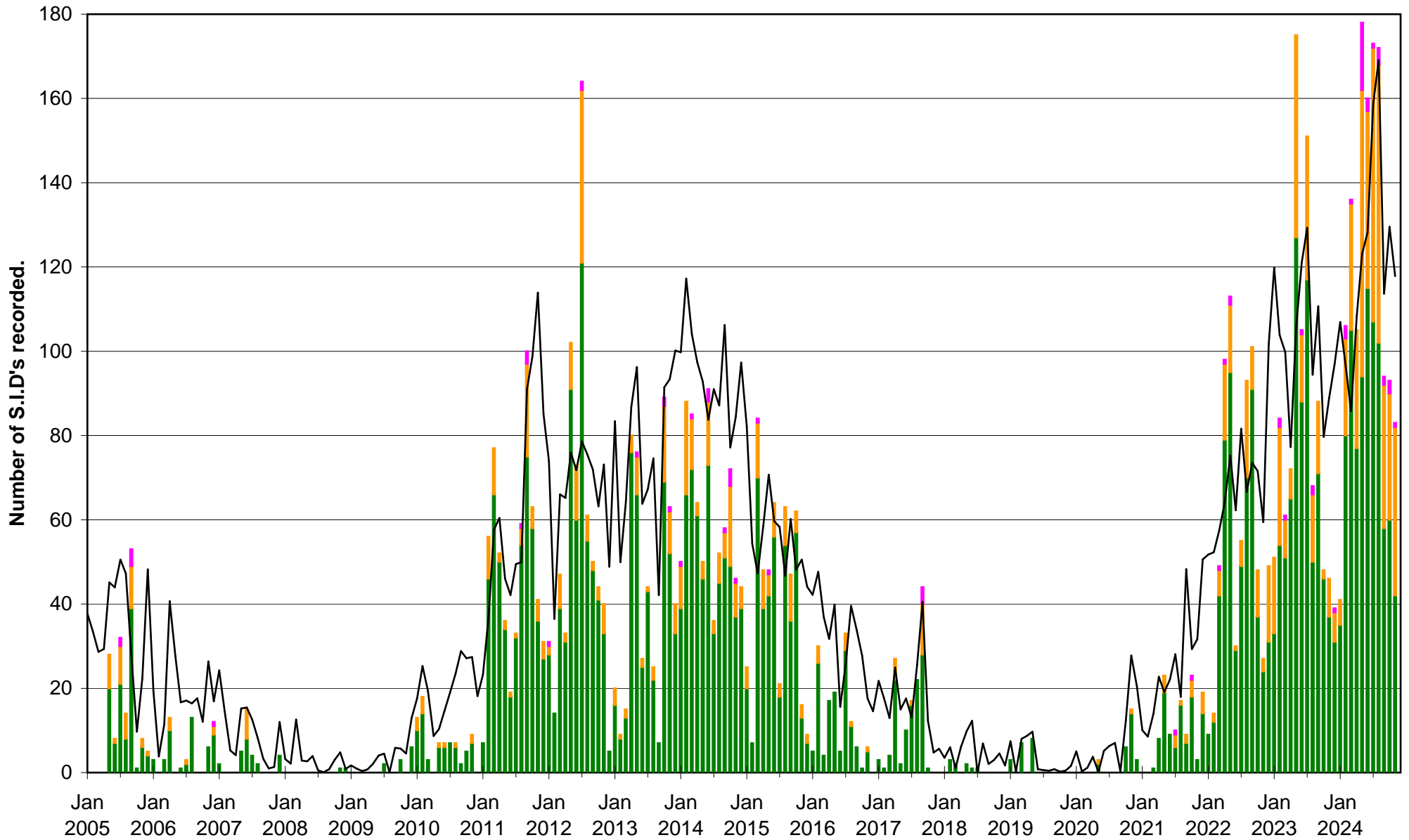
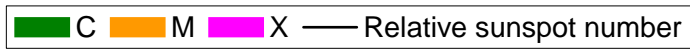


# METEORS



Chris Bailey recorded the annual Leonid meteor shower, comparing it with his data from 2021. Counts seem to be fairly consistent from the 16<sup>th</sup> to 22<sup>nd</sup>, with a small peak on the 20<sup>th</sup>. Each day shows a peak early in the morning, as expected, with lower counts during the afternoon.

### VLF flare activity 2005/24



BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).
2570	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	2253			
2571	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	2254			
2572	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	2255			
2573	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 22 23	2256			
2574	24 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	2258			
2575	21 22 23 24 25 26 27	28 29 30 31	2259			
2576	17 18 19 20 21 22 23 24	25 26 27 28 29 30	2260			
2577	14 15 16 17 18 19 20 21	22 23 24 25 26 27 28 29 30 31	2261			
2578	10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31		2262			
2579	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		2263			
2580	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		2264			
2581	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	2265			
2582	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 22	2267			
2583	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	2268			
2584	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	2269			
2585	15 16 17 18 19 20 21 22 23 24 25 26 27 28	1 2 3 4 5 6 7 8 9 10 11 12 13	2270			
2586	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	2271			
2587	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 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	2272			
2588	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 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	2273			
2589	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		2274			
2590	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	2275			
2591	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 22	2277			
2592	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	2278			
2593	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	2279			
2594	16 17 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	2280			
2595	13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 2 3 4 5 6 7 8 9	2281			
2596	10 11 12 13 14 15 16 17 18 19 20 21	22 23 24 25 26 27 28 29 30 31	2282			
2597	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	2283			
2598	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		2284			
2599	29	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	2285			
2600	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 22	2286			
2601	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	2287			
2602	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	2288			
2603	16 17 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	2289			
2604	13 14 15 16 17 18 19 20 21 22 23 24 25 26	27 28 29 30 31	2290			
2605	9 10 11 12 13 14 15 16 17 18 19 20 21 22	23 24 25 26 27 28 29 30 31	2291			
2606	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		2292			
2607	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		2293			
2608	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	2294			
2609	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	2295			



