

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

BAA Radio Astronomy Section.

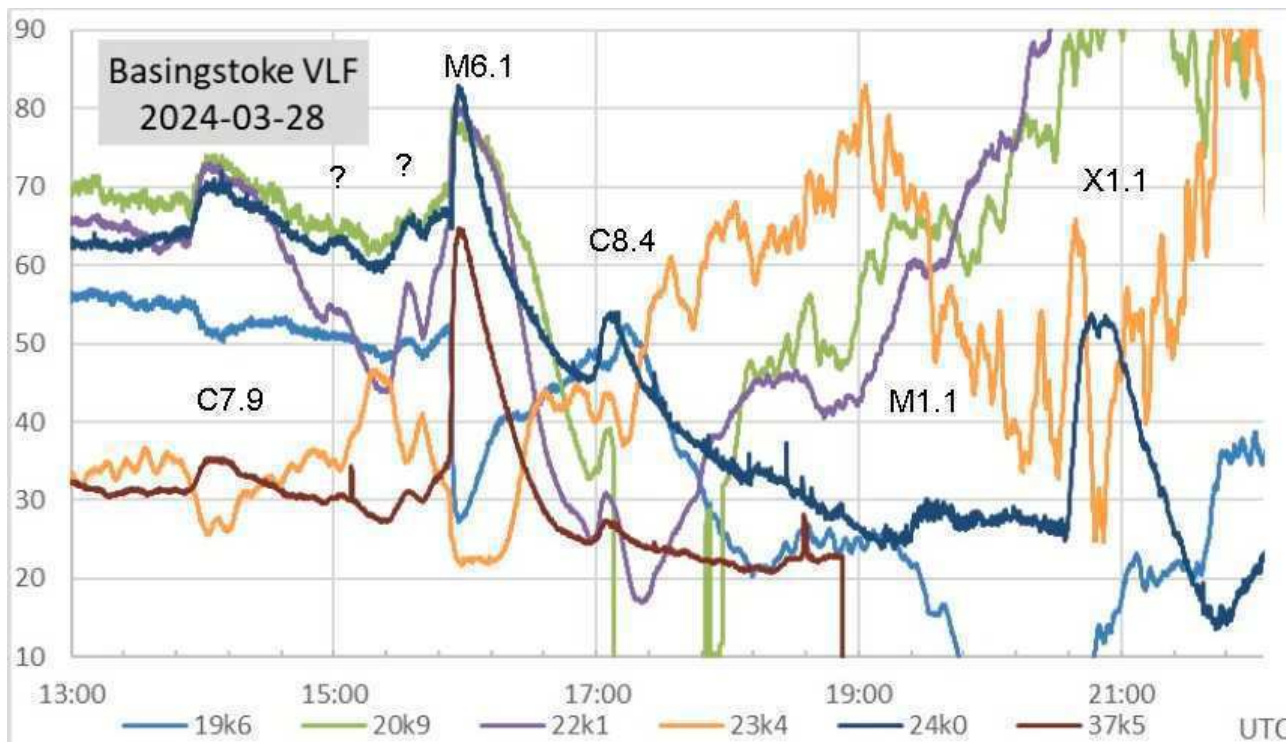
Director Paul Hearn.

RADIO SKY NEWS

2024 MARCH.

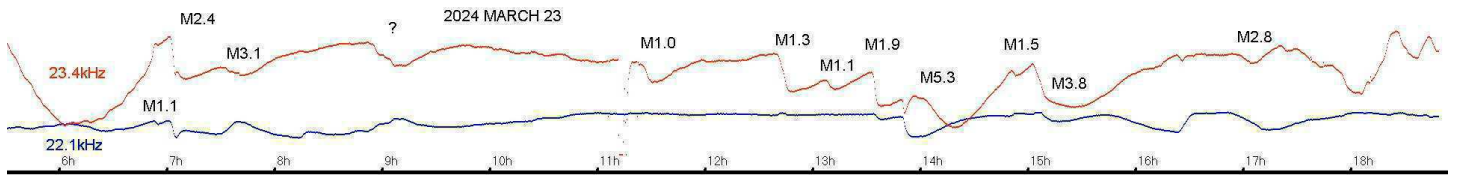
VLF SID OBSERVATIONS.

Solar activity in March started quietly, but increased dramatically from the 23rd. as AR13615 approached the centre of the visible disc. This was a very large and complex sunspot group, and produced a barrage of M-class flares. We recorded 11 M-flares on the 23rd, 5 on the 24th, 4 on the 26th, and 3 on the 28th. Observers monitoring 24kHz were also lucky to catch the X1.1 flare between 20:30 and 21:30UT.

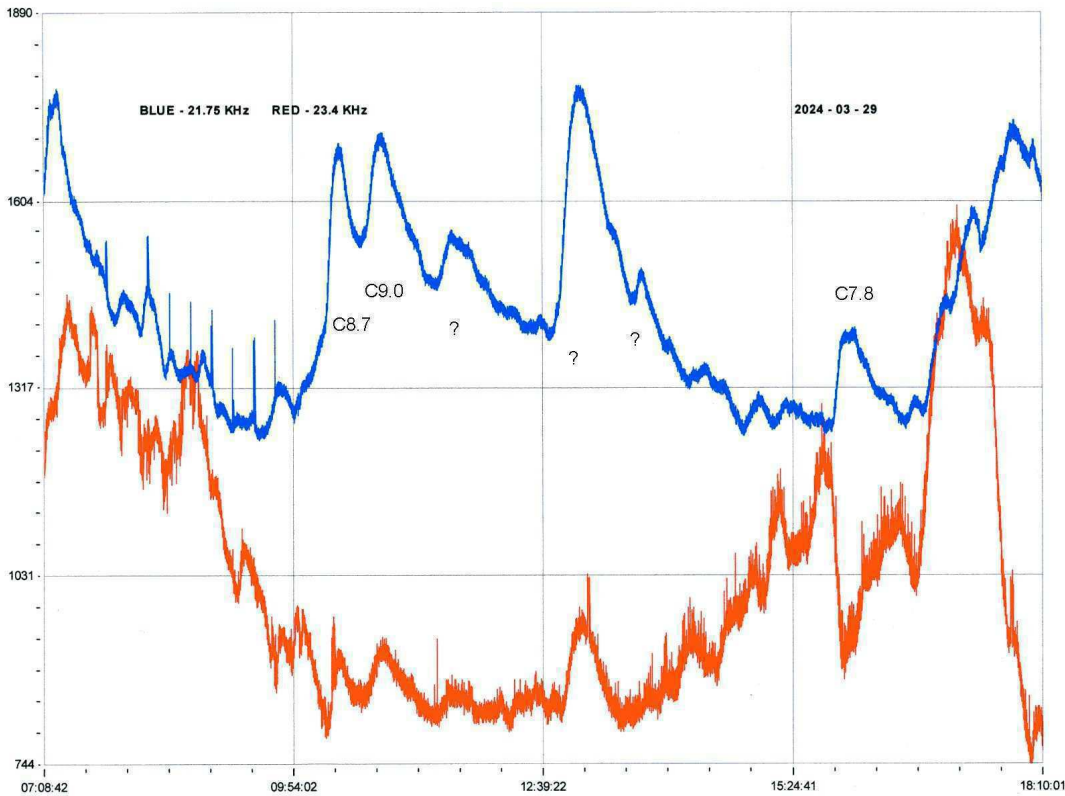


Paul Hyde's recording shows this well, while the European signals are well into night conditions. 37.5kHz had been switched off earlier, presumably due to the continuing volcanic activity. The chart also shows some of the other activity in the afternoon of the 28th, 23.4kHz being particularly chaotic and difficult to analyse. There were a number of flares unclassified in the SWPC bulletin, marked with a ?.

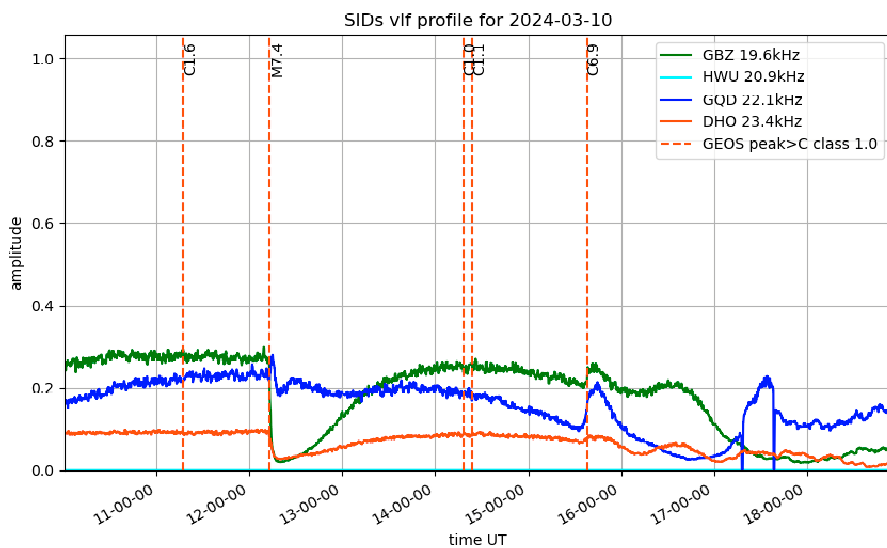
The large number of flares has made it very hard to separate individual events, particularly on the 23rd. We all have different paths to the transmitters, and so our timings for individual flares vary according to how they appear to overlap. This overlapping problem is clear in my own recording:



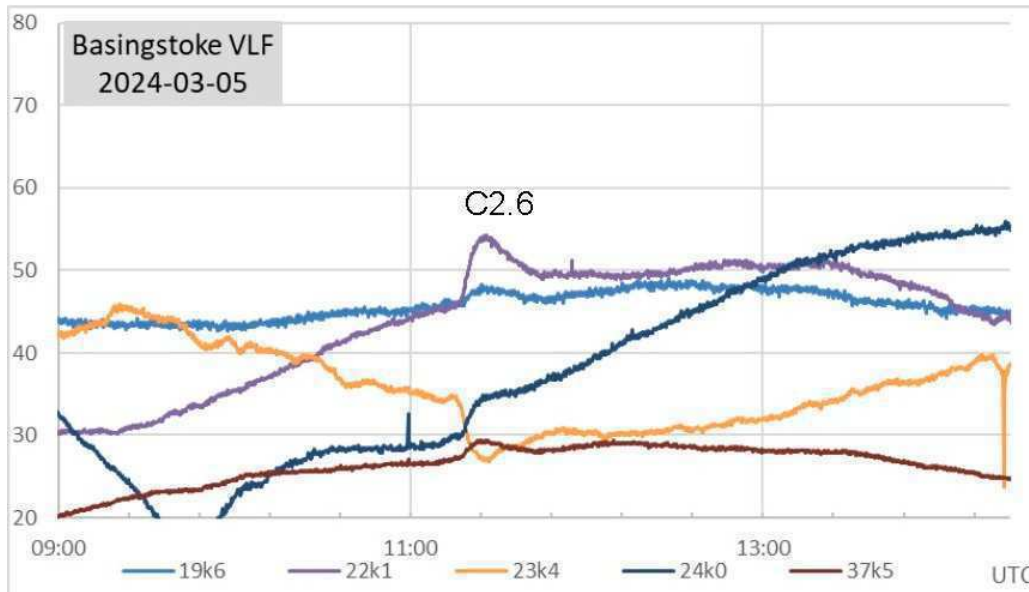
Luckily the usual 7–8AM break in 23.4kHz was not present on the 23rd, but 22.1kHz has remained fairly undisturbed by some of these events.



This recording by Colin Clements shows the strong C-class flares on March 29th. The C9.3 and C9.9 flares later in the evening are not shown. The unclassified events have produced very clear SIDs. AR13615 by this time was getting closer to the solar limb, and so the flares were not so directly aimed at the Earth.

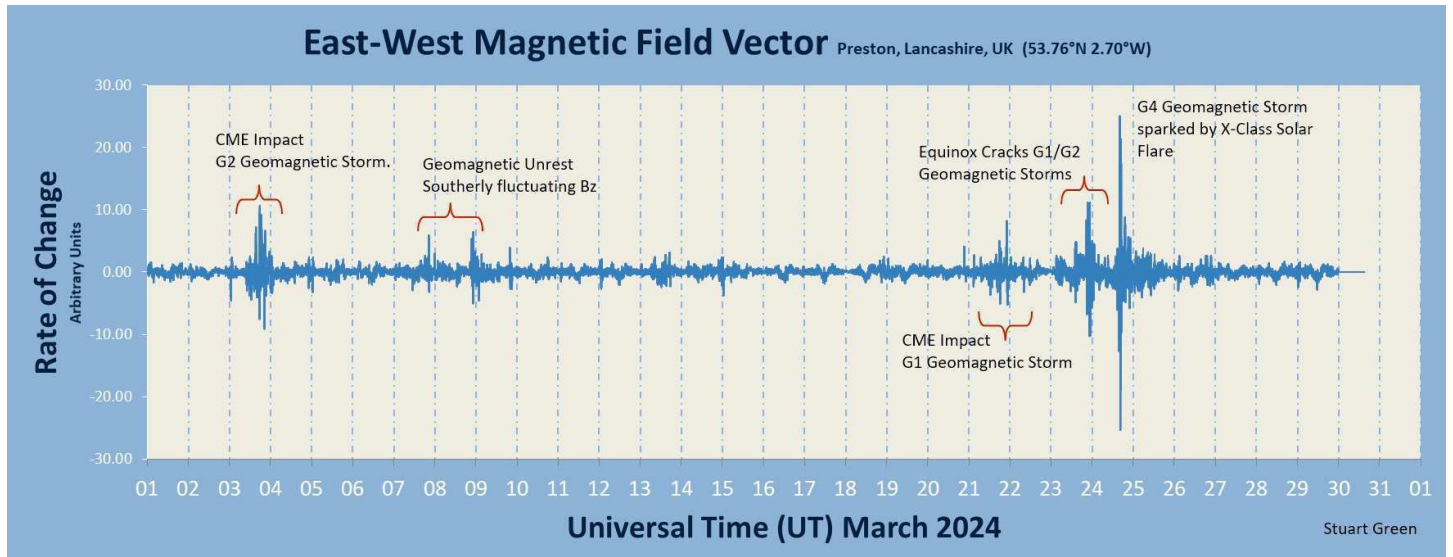


Mark Prescott's recording from the 10th shows a slightly less active period, although there is an M7.4 flare, well isolated from other activity. The C1.0 and C1.1 flares have not produced SIDs, but the later C6.9 is very clear.



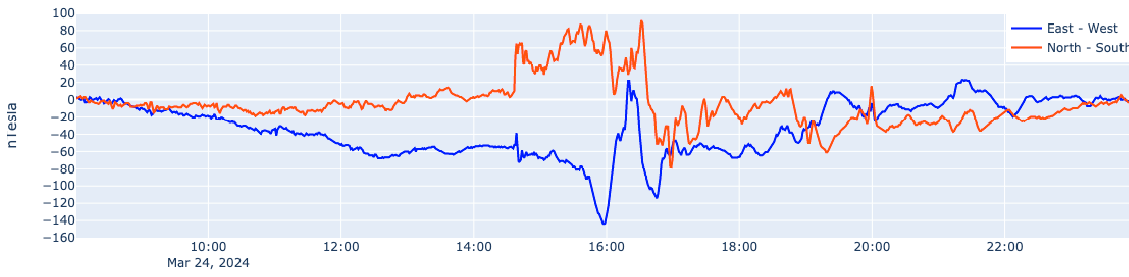
Background activity early in March was much lower, allowing weaker flares to produce clear SIDs. Paul Hyde recorded this C2.6 flare on the 5th with very stable signals.

MAGNETIC OBSERVATIONS.

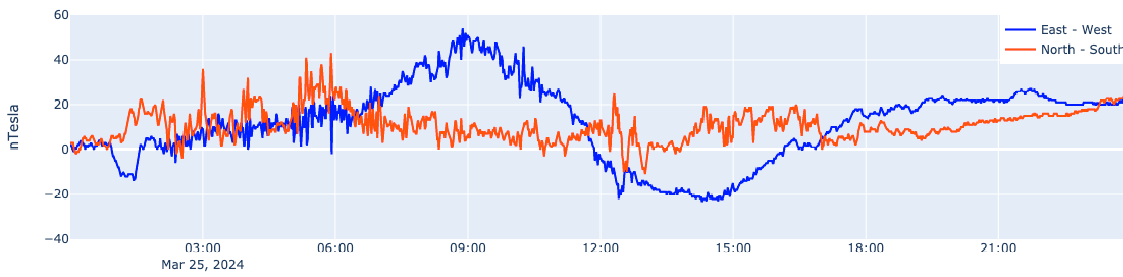


Stuart Green's summary of the Month's magnetic activity also shows a quiet start to March, with the most active period matching the barrage of M-flares in the last week. The large spike on the 24th is from a CME that produced a very active magnetic storm. Satellite data recorded by STCE shows that the CME was from an X1.1 flare at 01:30UT in the morning of the 23rd. It was from AR13615, but badly timed for us to record as a SID. We did record the CME arrival at 14:40 on the 24th, well shown in these charts by Nick Quinn:

Steyning Magnetometer (50.8 North, 0.3 West)



Steyning Magnetometer (50.8 North, 0.3 West)

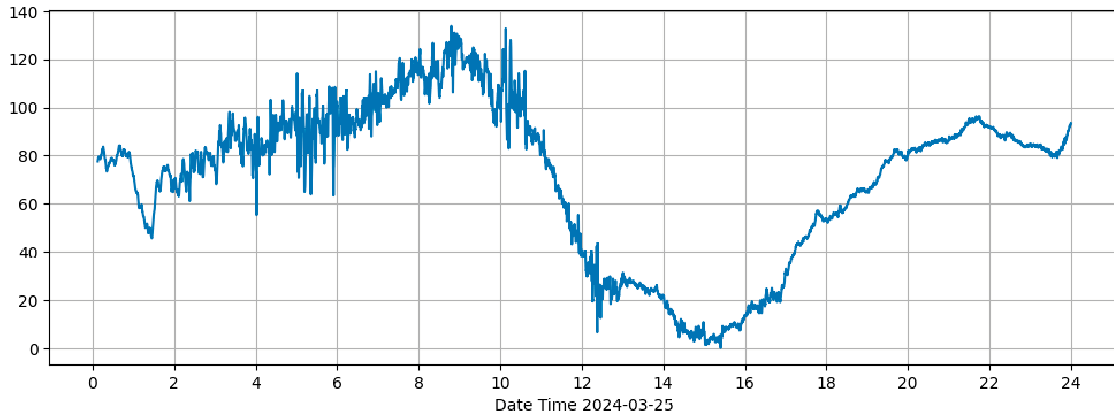


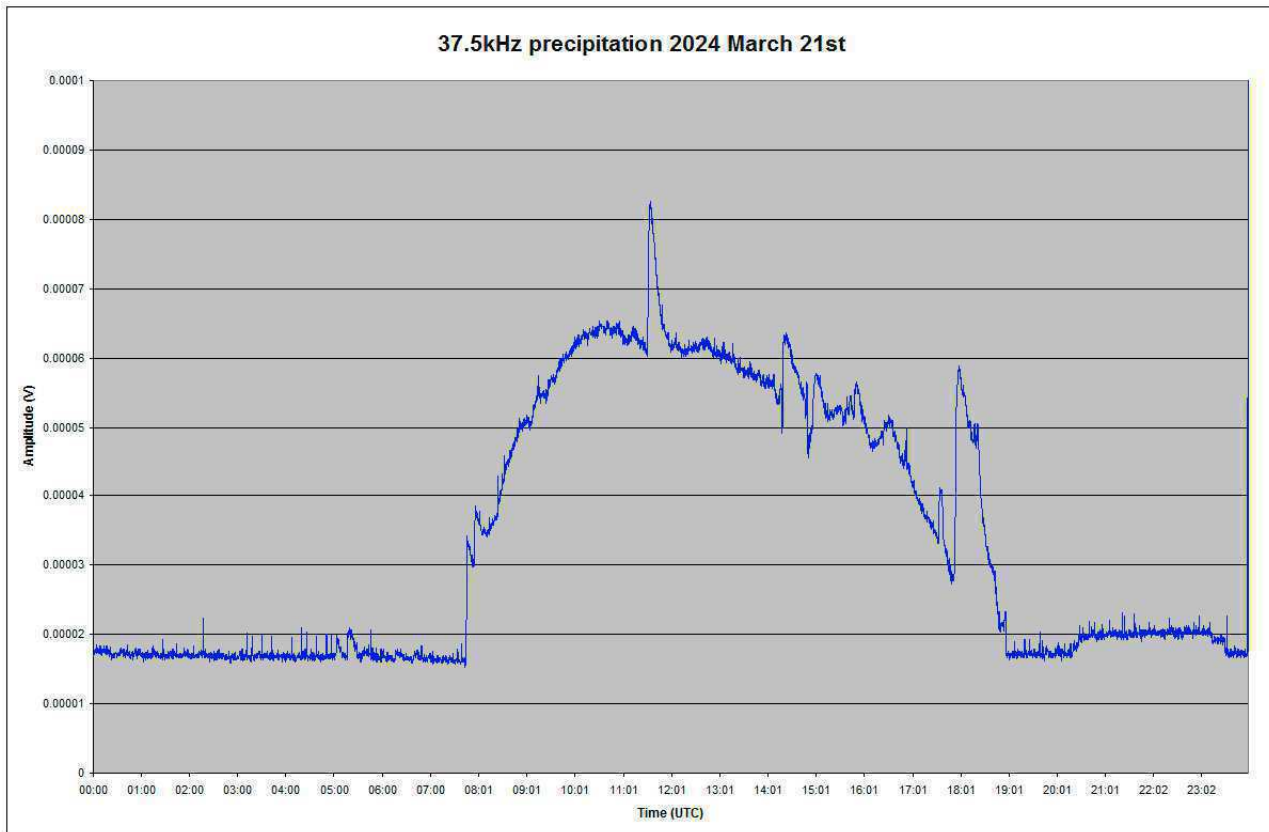
The CME sudden impact follows a very stable period, and is followed by ± 100 nT disturbance. This appears to fade away over the next six hours, but is then followed by over 12 hours of very turbulent activity on the 25th. Recordings by Callum Potter in Orkney show very similar behaviour:

Wasbister Magnetometer (59.17N,3.06W)

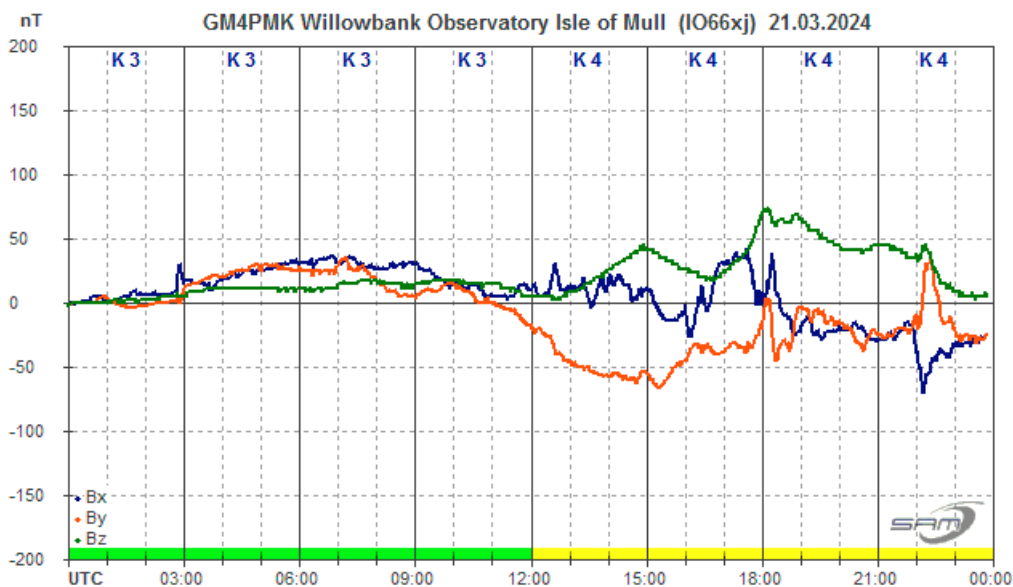


Wasbister Magnetometer (59.17N,3.06W)

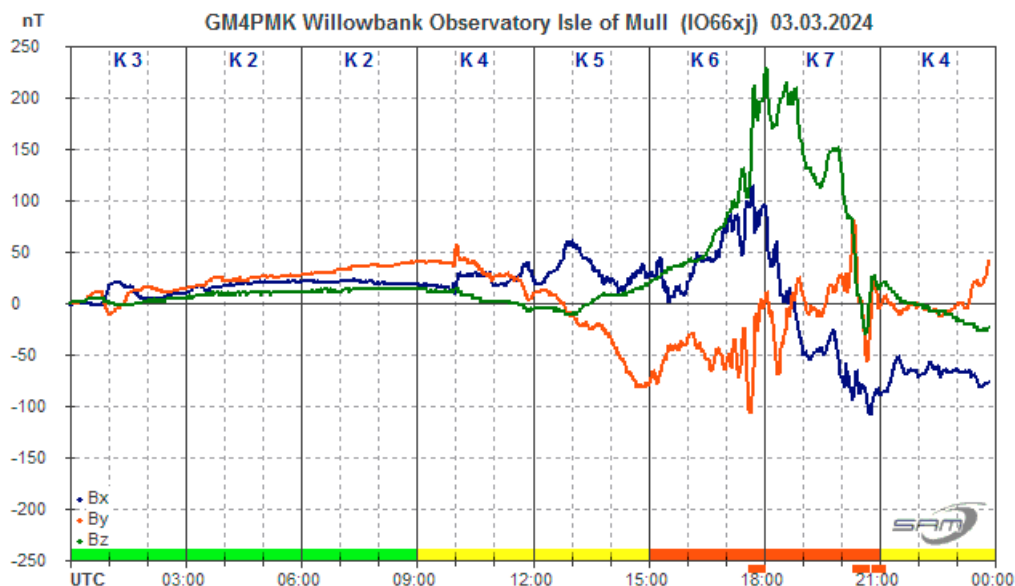




37.5kHz Grindavik has been on and off with the volcanic activity, one of its brief on periods catching magnetic activity on the 21st. Mark Edwards' recording shows the C8.7 flare around 11:30, with a response to the magnetic activity after 14:00. Roger Blackwell's recording from the 21st shows a possible CME impact around 03UT, with disturbance during the rest of the day:



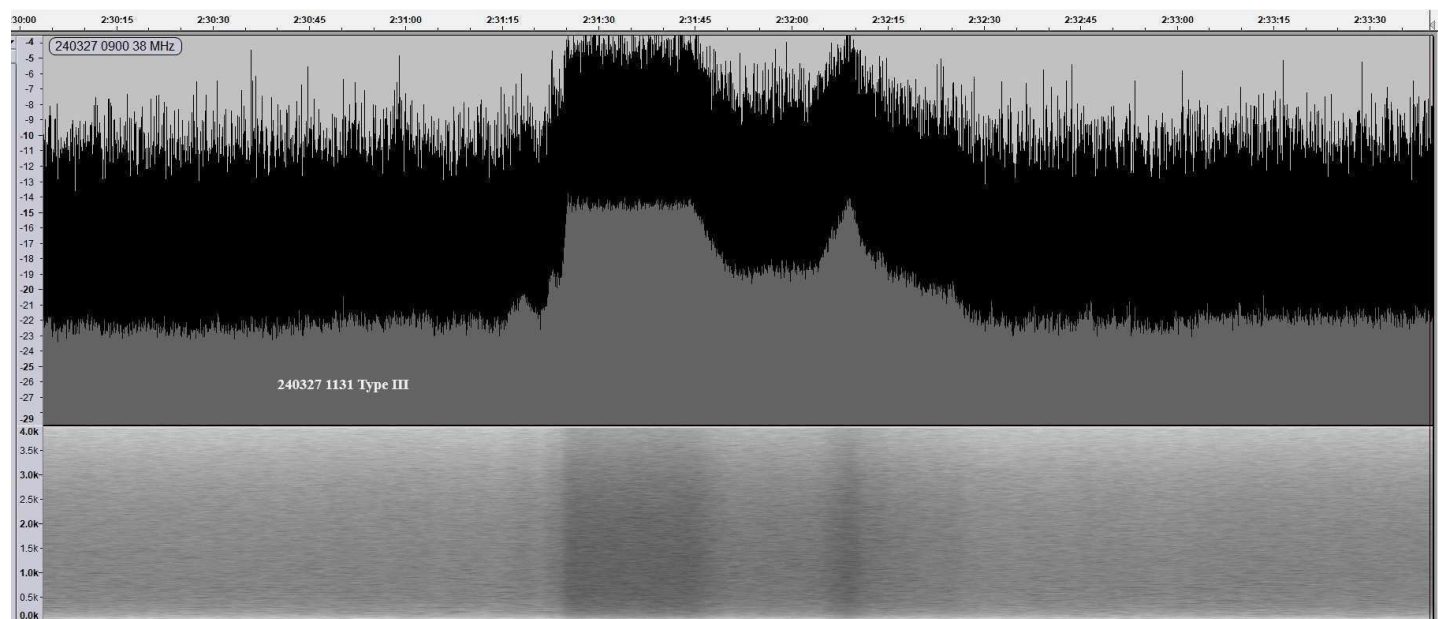
Callum Potter's recording also shows this feature. The mild disturbance continued into the 22nd and 23rd. The Sun–Earth alignment during the equinox periods allows good access for the solar magnetic field into our polar regions, also providing good aurora viewing opportunities.



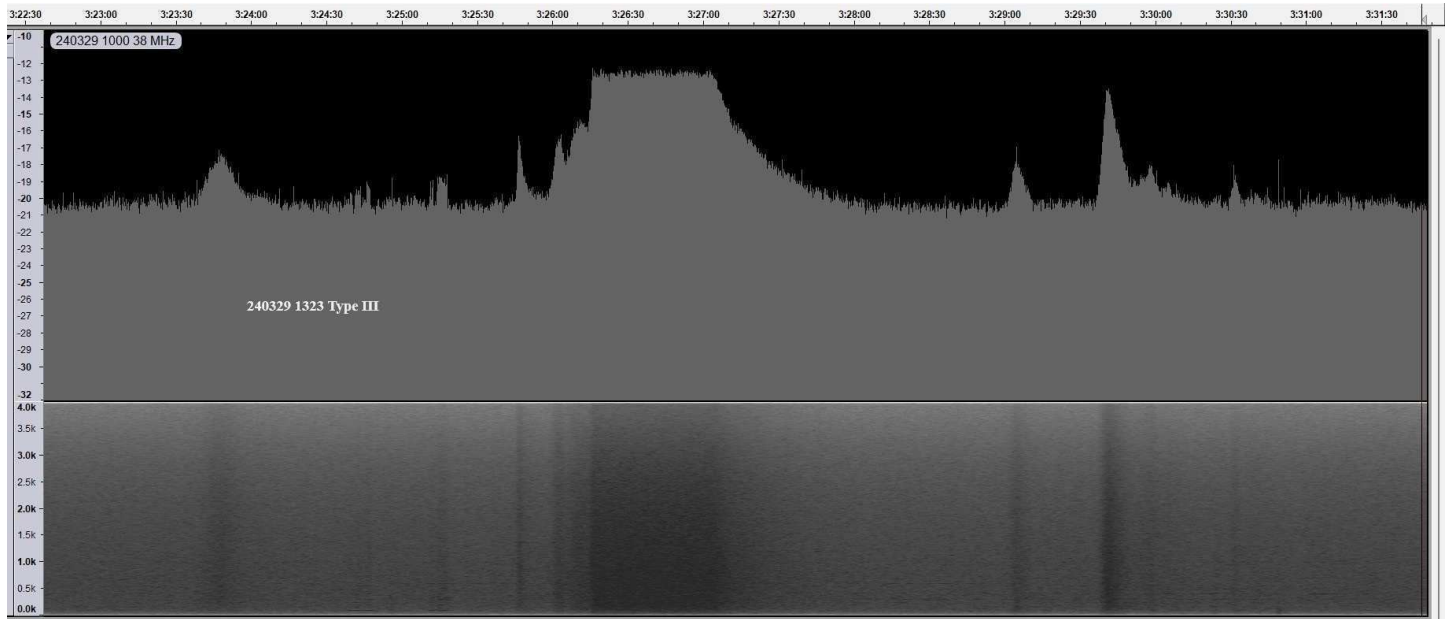
Roger Blackwell's recording from the 3rd shows another CME arrival. The impact can be seen at 10UT, STCE data linking it to a flare on February 28th. It was therefore a very slow CME, but the magnitude of the disturbance is again very high with some rapid turbulence. It did not last long, fading out just after midnight.

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

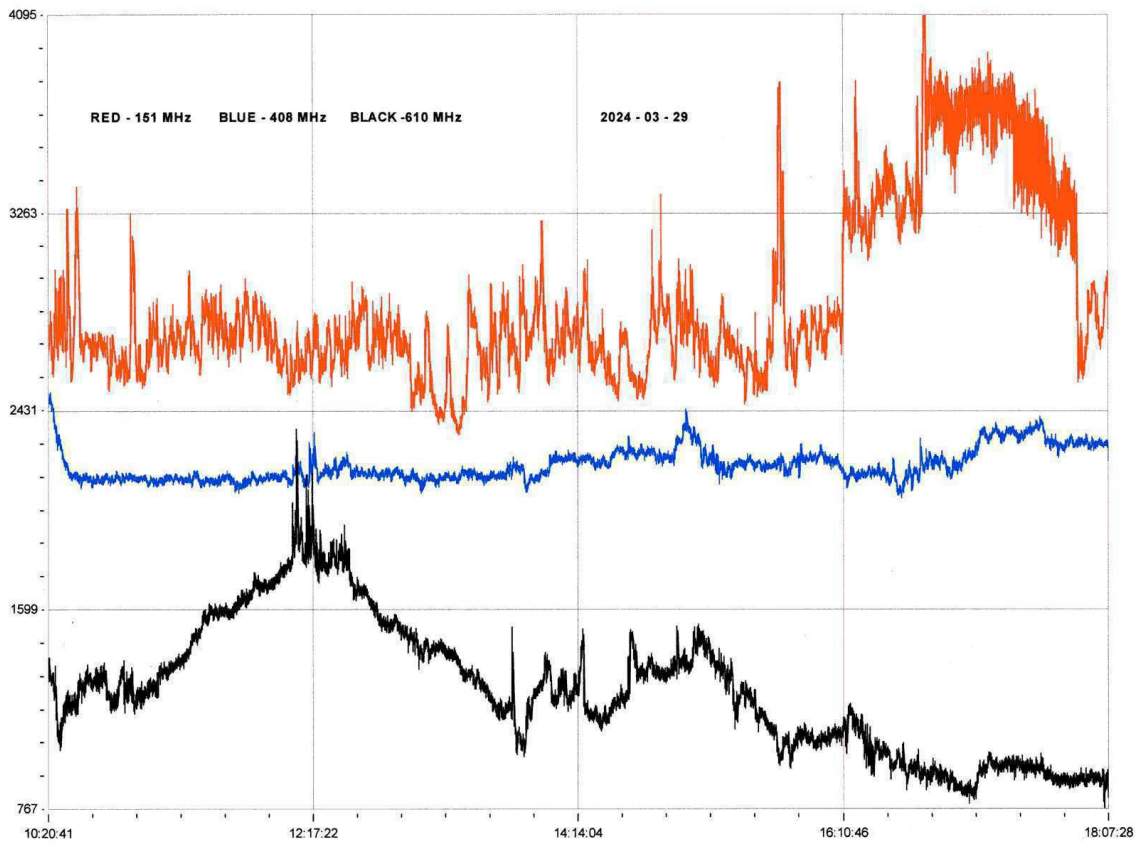
SOLAR EMISSIONS



Colin Briden has made recordings of type III 38MHz solar emissions on the 27th and 29th March. The timings of both of them match some of the unclassified flares that we recorded. They each have amplitudes of just under 10dB. Colin notes that they also have elements of a type V emission with a very clean spectrum.

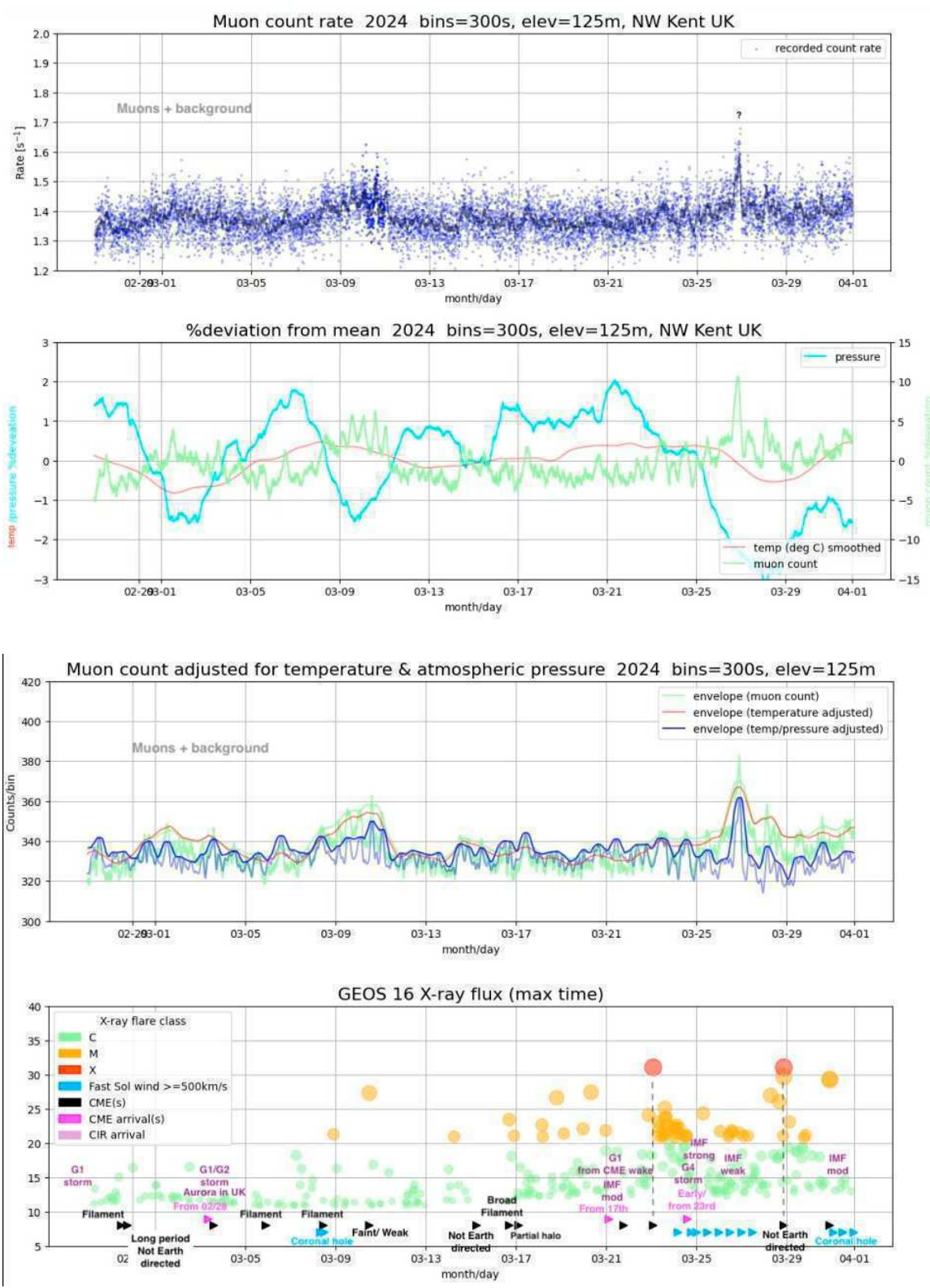


Colin Clements also made VHF recordings on the 29th:



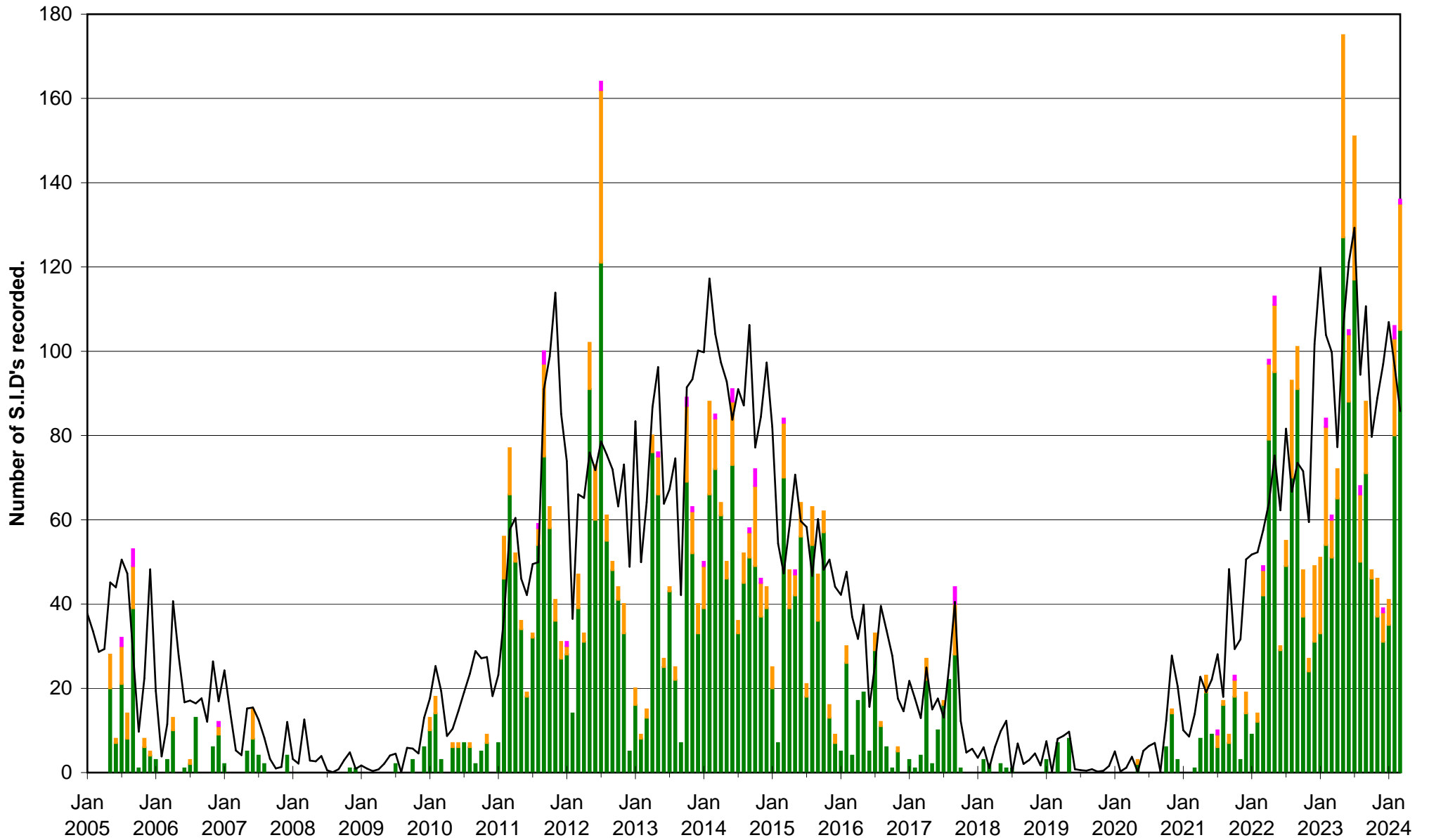
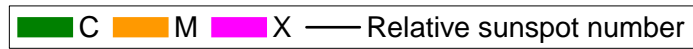
610MHz (black) shows a strong signal around 10:30 to 14:00, covering much of that unclassified activity. 151MHz (red) shows some activity over this period, but also has a strong signal after 16:10, covering the C7.8 and C9.3 flares. 408MHz has remained flat throughout the day. VHF emissions were also recorded on the 10th, 18th, 19th, 23rd, 24th and 26th, although difficult to link with specific flares. Some 610MHz activity on the 23rd probably relates to the run of M-flares in the afternoon.

MUONS



Mark Prescott's muon charts show a mild increase in flux around the 9th and 10th, with a much larger increase between the 25th and 29th. The precise cause of these is not clear, although they do occur shortly after some stronger flare and magnetic activity. The equinox alignment of the magnetic fields may well allow increased precipitation following these events, so increasing the measured flux. They both also match periods of low atmospheric pressure, adding to the effect. The lower chart is corrected for temperature and pressure variations, but that has only slightly reduced the peaks.

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	12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31			
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2572	2022 March 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	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27			
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2595	2024 February 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	1 2 3 4 5 6 7 8 9			
2596	2024 March 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	22 23 24 25 26 27 28 29 30 31 1 2 3 4 5			
2597	2024 April 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 1	18 19 20 21 22 23 24 25 26 27 28 29 30 31 1			
2598	2024 May 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 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 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			
2599	2024 June 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 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 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			
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