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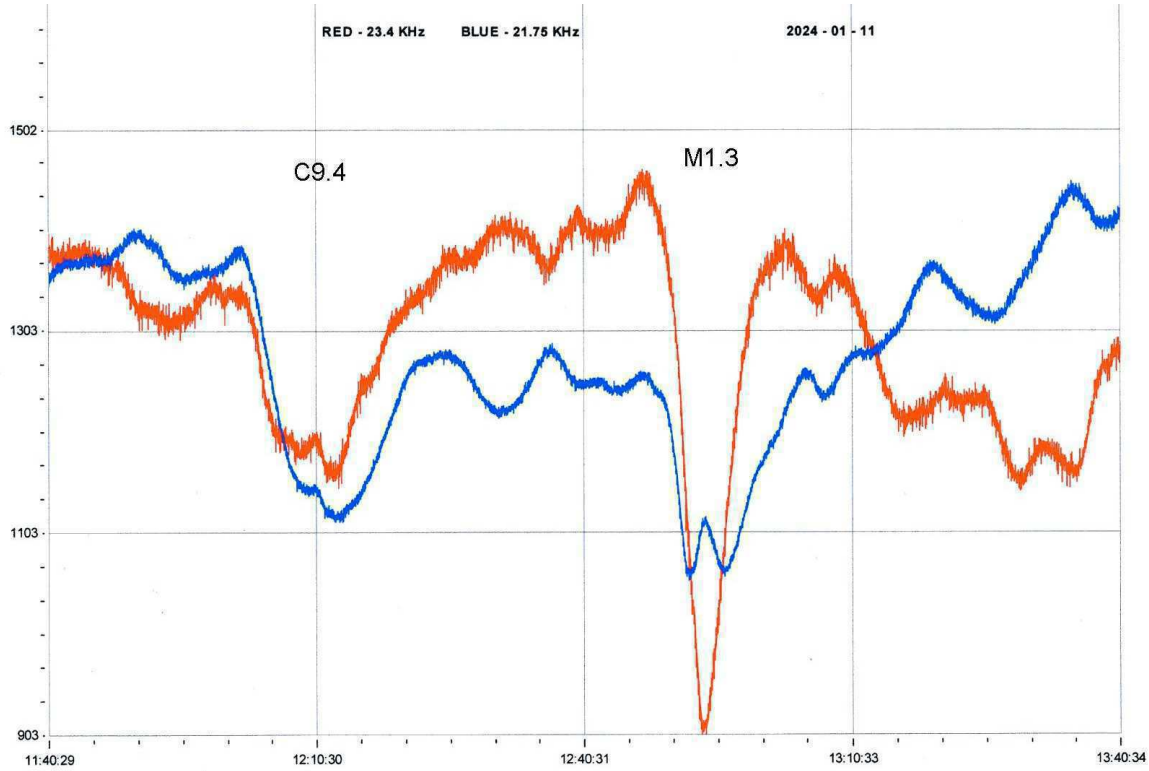
BAA Radio Astronomy Section. Director Paul Hearn.

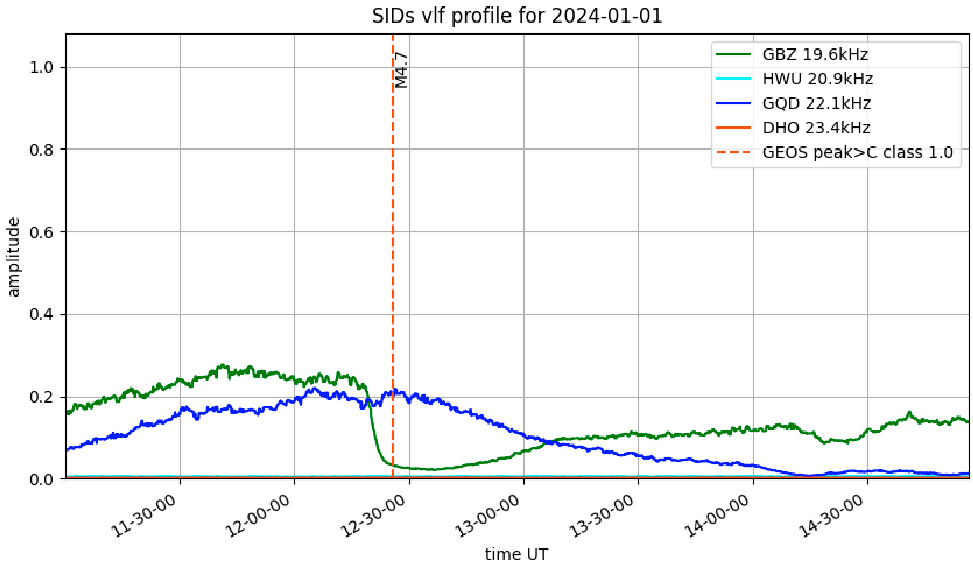
RADIO SKY NEWS 2024 JANUARY.

VLF SID OBSERVATIONS.

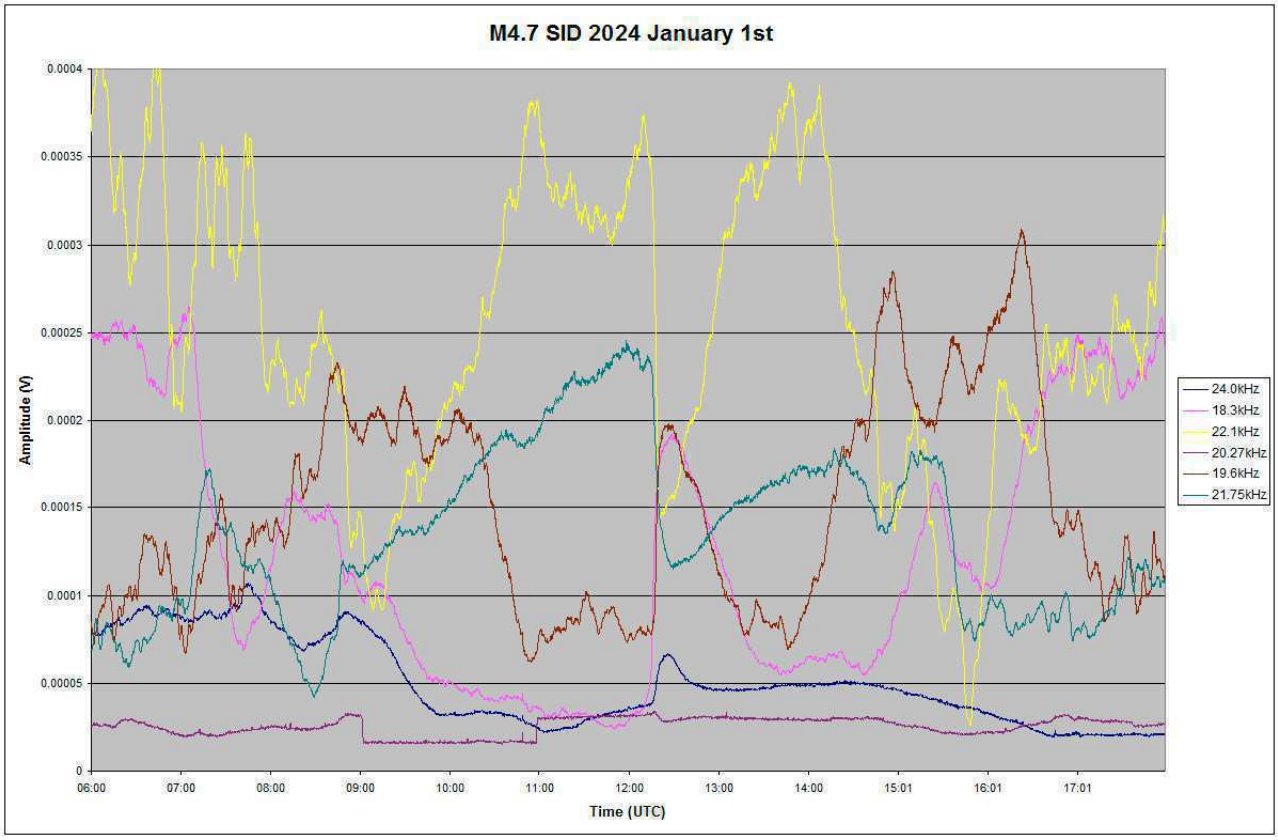
Solar flare activity has been at similar levels to the last few months, although the flare magnitudes have been much higher. Many of the weaker flares have not produced SIDs due to the low altitude of the sun and ionosphere instability. We did record a C2.8 flare on the 28th, although it has been a puzzle to analyse. The SWPC bulletin gives a start time of 11:49, maximum at 11:57, ending at 12:54UT. Our SID recordings are fairly consistent with a start around 12:40 and a peak between 12:44 and 12:50UT. These are over several frequencies, and so do seem to be genuine SID timings.



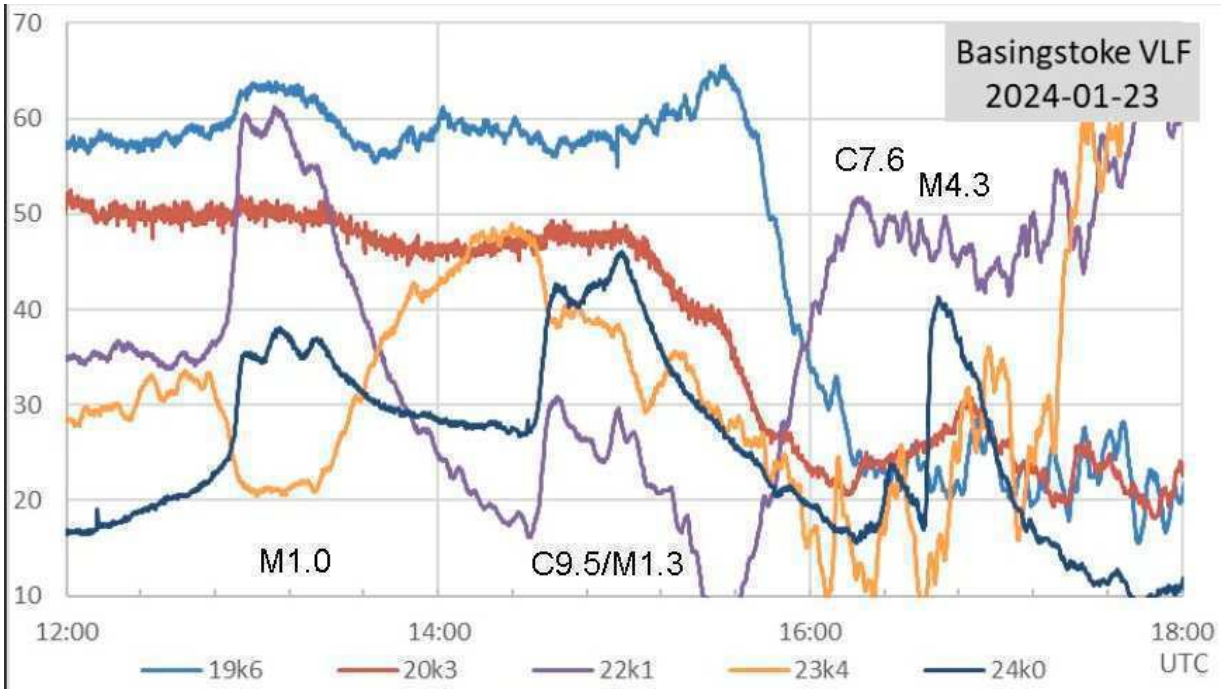
This recording by Colin Clements shows two of the stronger flares on the 11th. The M1.3 flare has produced a clean negative going SID at 23.4kHz, with a spike and wave type SID at 21.75kHz. The slightly smaller C9.4 flare appears to have produced spike and waves on both signals, although this could be from two peaks in the flare. Paul Hyde's recording showed a similar response. Most spike and wave SIDs have a much 'sharper' spike compared to the more symmetrical shape seen here. The background shows some gentle instability, not unexpected at this time of year.



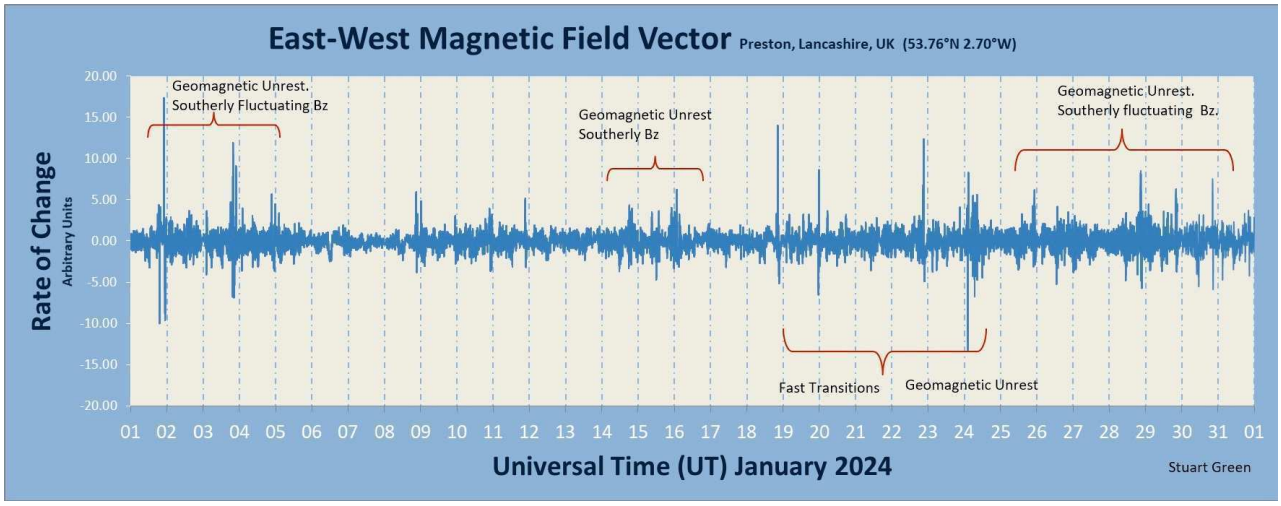
The M4.7 flare on the 1st was the strongest that we recorded in January. This recording by Mark Prescott shows a slow recovery after the peak on both signals. The start of the SID at 19.6kHz is very obvious, but barely visible at 22.1kHz. The recording by Mark Edwards shows a similar slow recovery at 21.75kHz (green trace), although other signals are much faster.



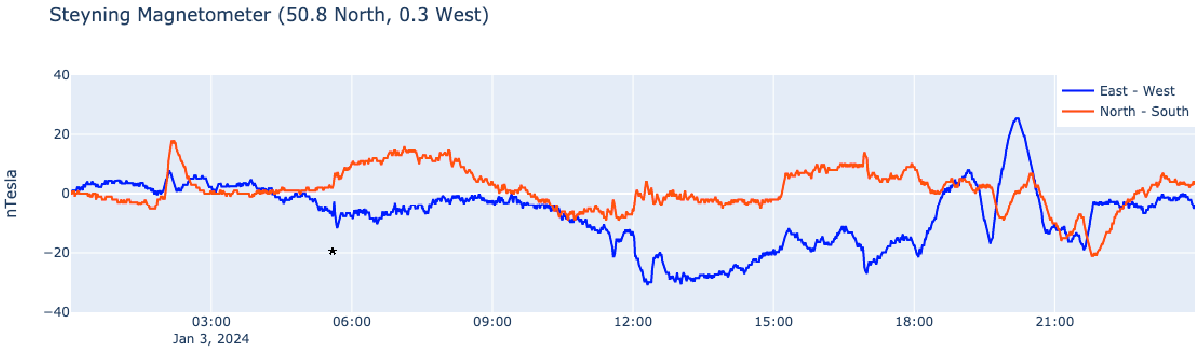
January 23rd was the most active day, with nine individual peaks identified. Many of these have merged together to give multiple-peaked SIDs. The recording by Paul Hyde on the next page shows the details. I have attempted to label them based on the SWPC X-ray satellite data. 24kHz (dark blue) shows the two later SIDs, while the European signals have gone into sunset.



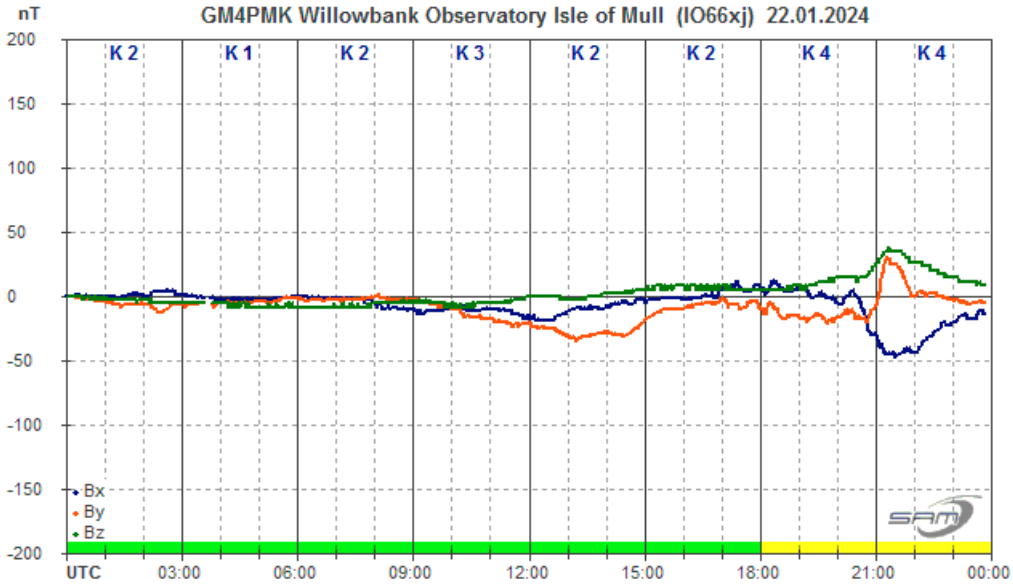
MAGNETIC OBSERVATIONS.

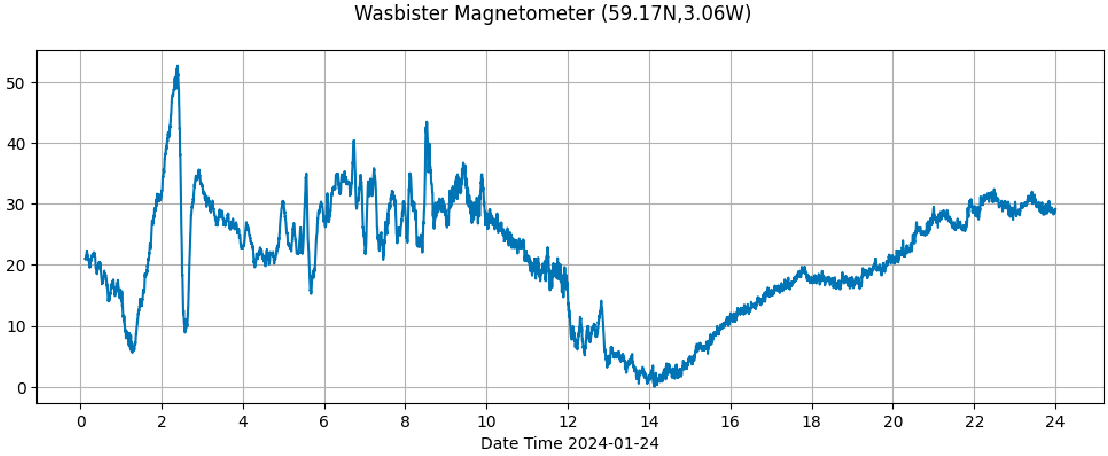


Stuart Green's monthly summary of magnetic activity shows a fairly quiet period, with some mild disturbance from solar wind. The STCE bulletin does mention that a pair of CME's from the end of December were recorded on January 3rd, with impacts at 04:50 and 14:25UT.

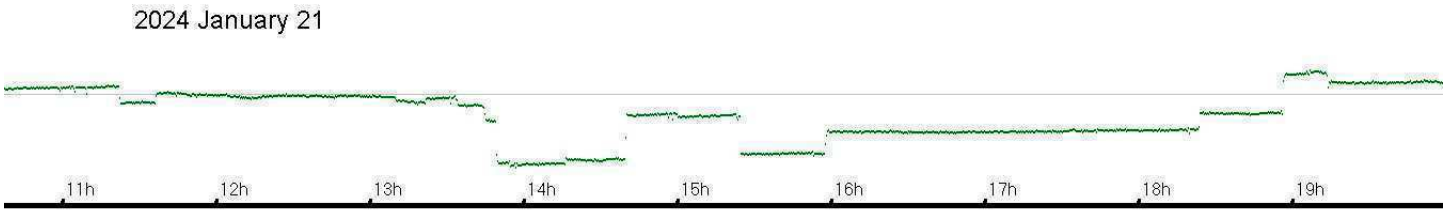


The first impact is marked '*' on this recording by Nick Quinn, rather later than reported, the second being much less clear. Recordings by Callum Potter also show the earlier impact but not the later one.





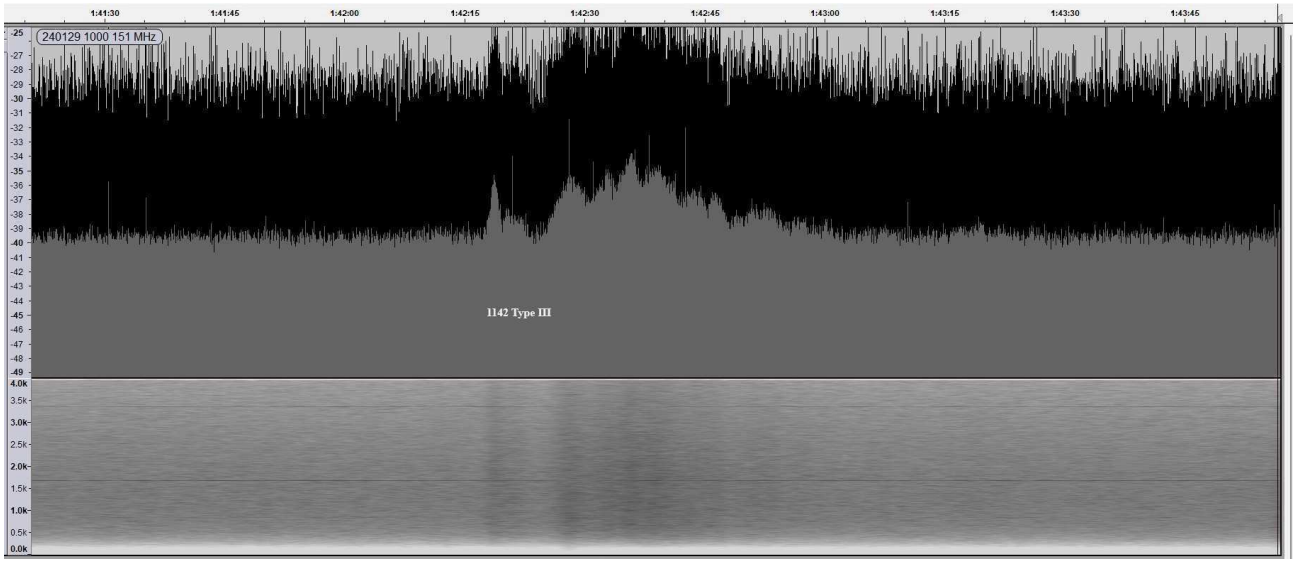
There was a very mild disturbance through the last week of January, starting in the evening of the 22nd. Roger Blackwell's recording (top) shows less than +/-50nT, fading out after midnight. The lower chart from Callum Potter shows the disturbance continuing in the morning of the 24th, again very mild.



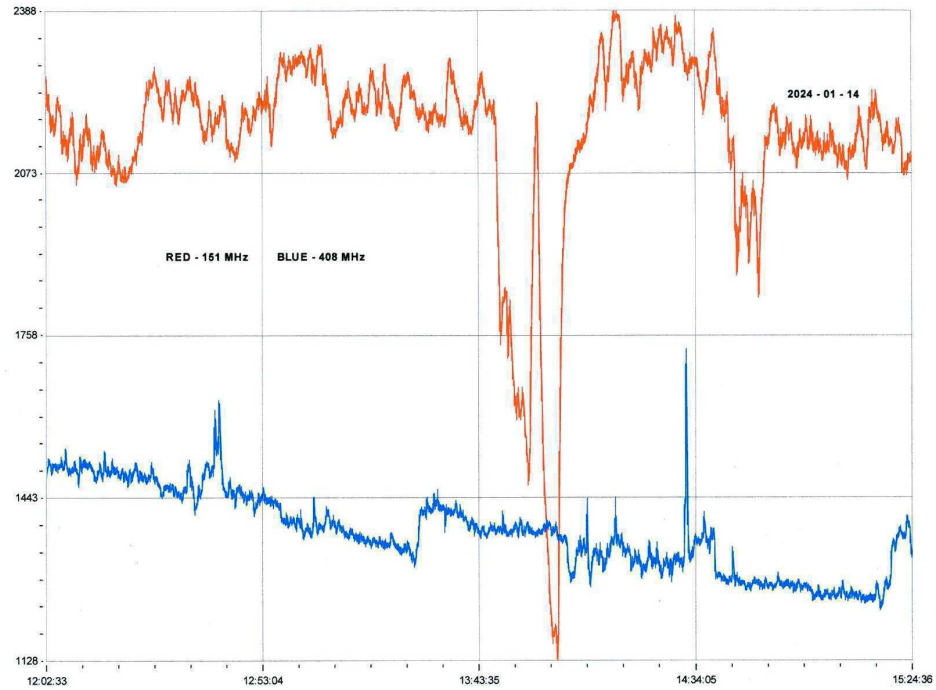
I have included my own recording from January 21st to show just how bad local magnetic interference can be. The grey line is the average though the day, the sensor recording +40 / -130nT, greater than the genuine activity recorded through the month. I have no idea what caused the problem, and just assume that it was from large vehicles in the road outside.

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

SOLAR EMISSIONS.



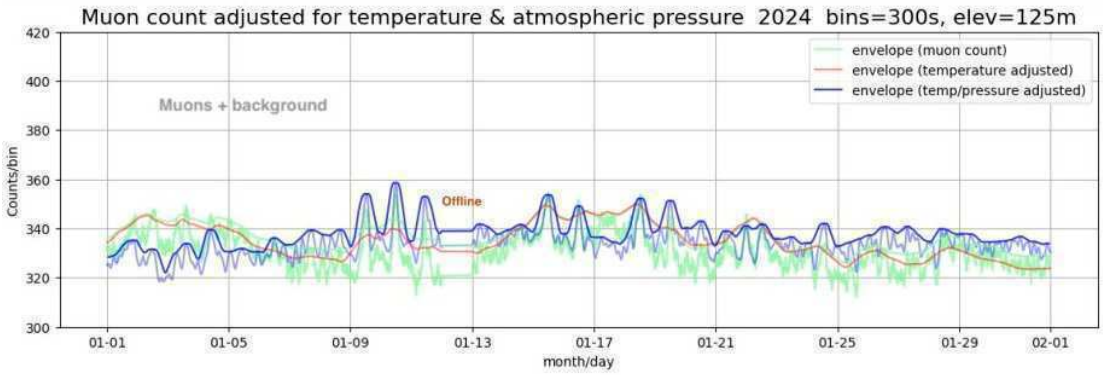
Colin Briden made this recording of a type III emission at 151MHz on the 29th. Timed at 11:42UT it lasted just under a minute with a peak amplitude 6dB above the noise floor. This matches the timing of a C2.8 flare listed in the SWPC bulletin, but not recorded as a SID. The very low winter altitude of the sun is probably responsible for the weak signal. Colin Clements recorded some unusual 151MHz behaviour on the 14th:

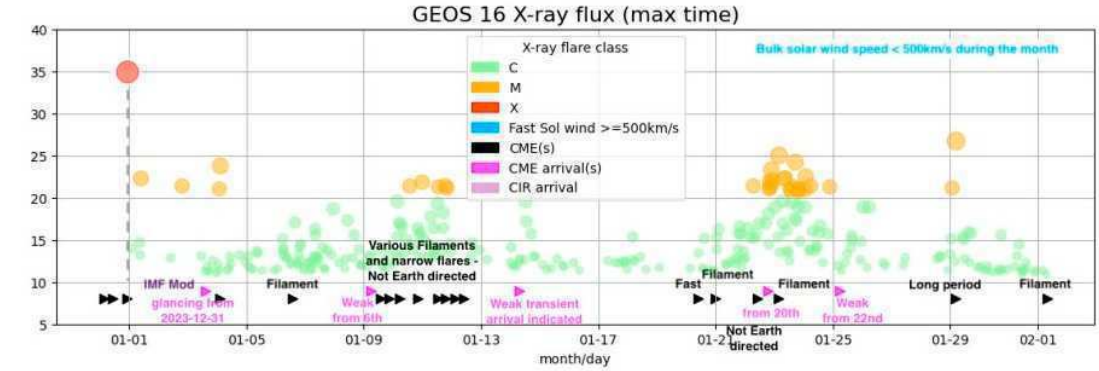


The sharp dip in 151MHz (red) occurs shortly after the C7.2 flare, with a rise at 408MHz over the same period. There may well also be some effects from the low sun causing the deep 151MHz dip.

MUONS.

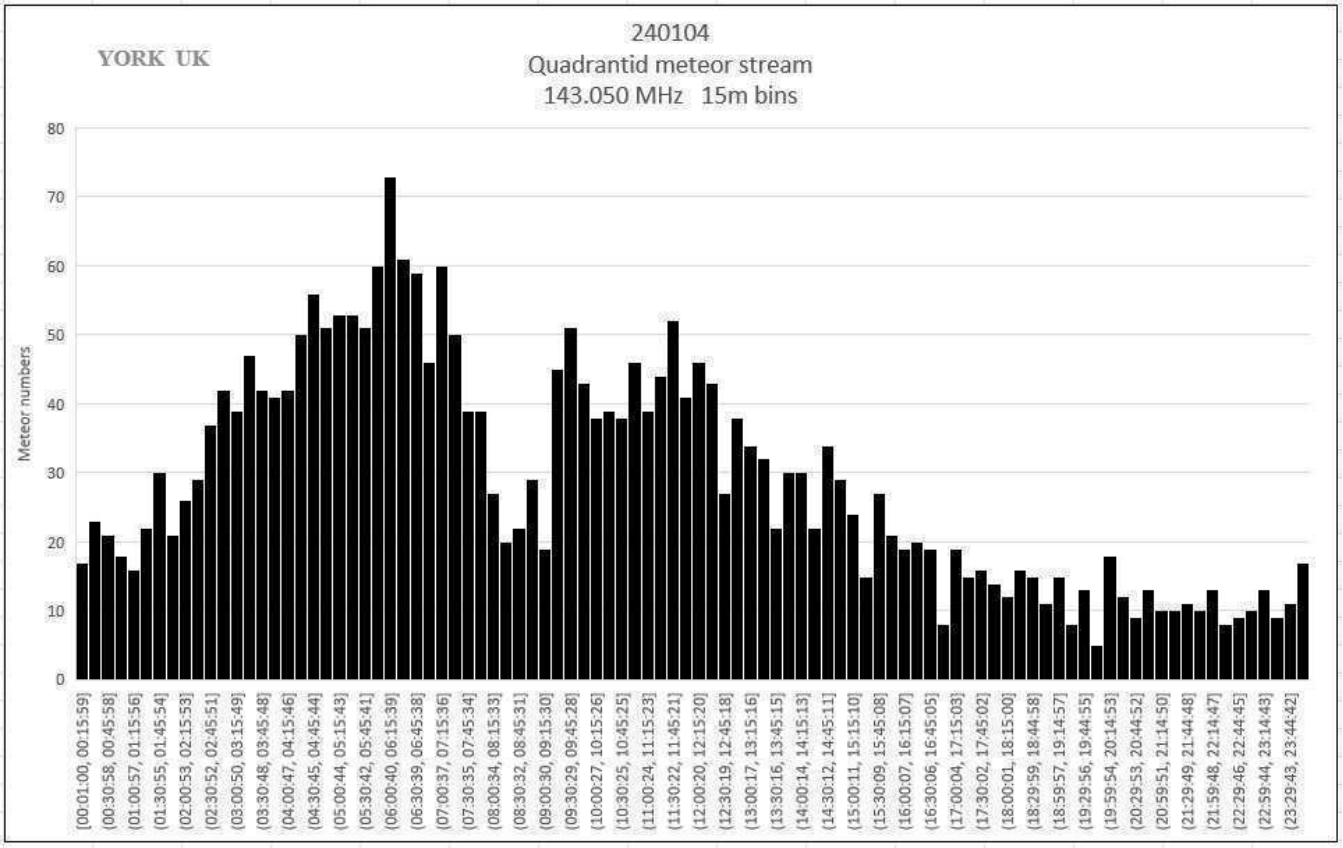
Mark Prescott's recording of Muons shows increased levels during mid-month. These match similar behaviour in the Oulu cosmic-ray monitor.





The connection is not clear, but does seem to indicate a rise in counts as the solar wind speed drops.

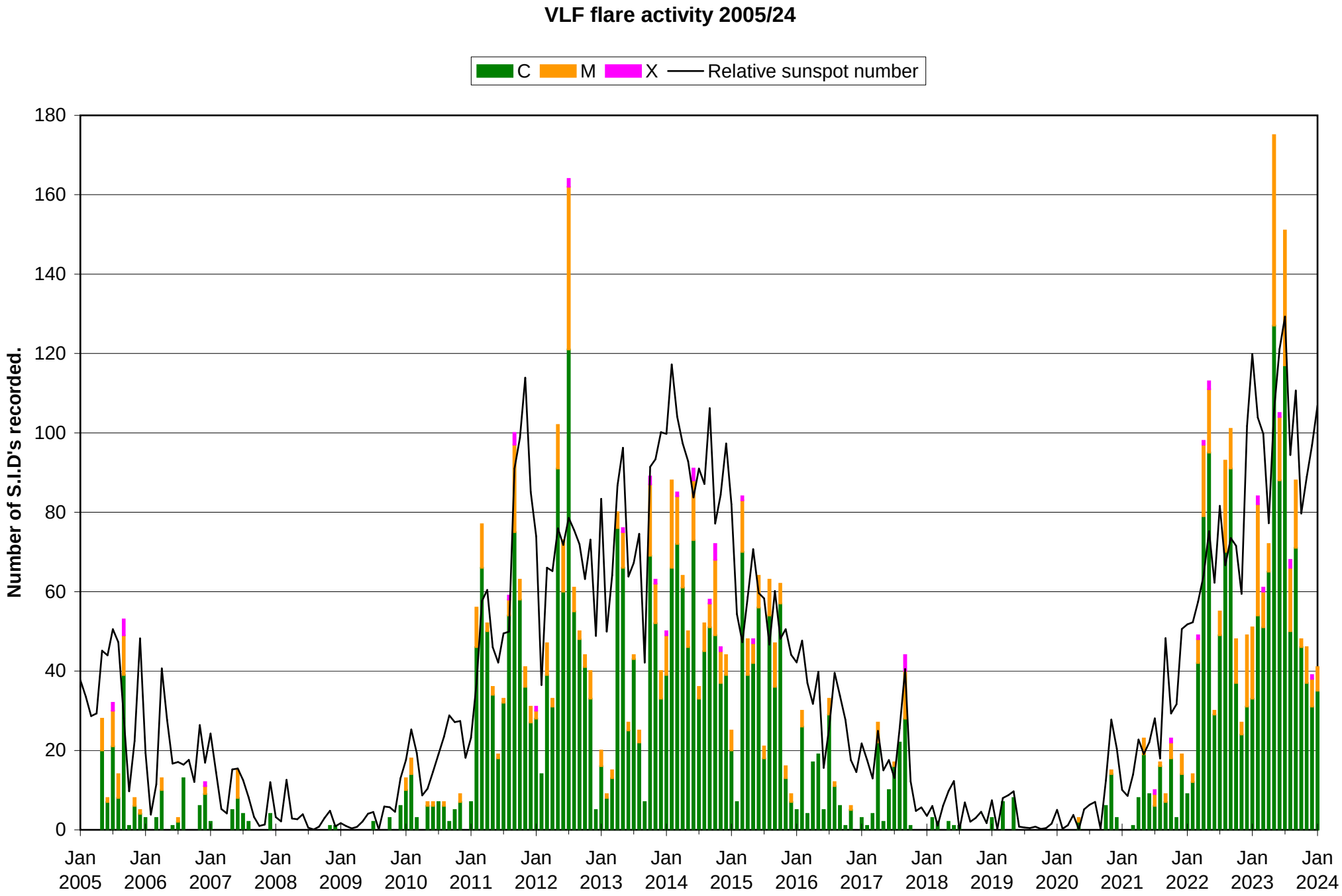
QUADRANTIDS.



Colin Briden made recordings of the Quadrantid meteor shower using the GRAVES 143MHz signal. There is a clear peak in activity around 05:30 to 07:00UT, followed by a dip and secondary peak between 09:00 and mid-day on January 4th. The decay after this peak lasts through the afternoon, much slower than the rise in activity. The gap between the peaks matches the time when the shower radiant azimuth is in the same direction as the GRAVES aerial, so reducing its effectiveness. Unfortunately I have not received any other reports of Quadrantid activity.

Colin also reported some quite dramatic consequences of the severe storms in January. A trampoline from a neighbour's garden was launched over the fence and a garden shed, landing on his 38MHz aerial system. The aerial was wrecked, but has now been re-built, and the offending trampoline returned to its owner. I am glad that all of my own aerials are safely indoors.

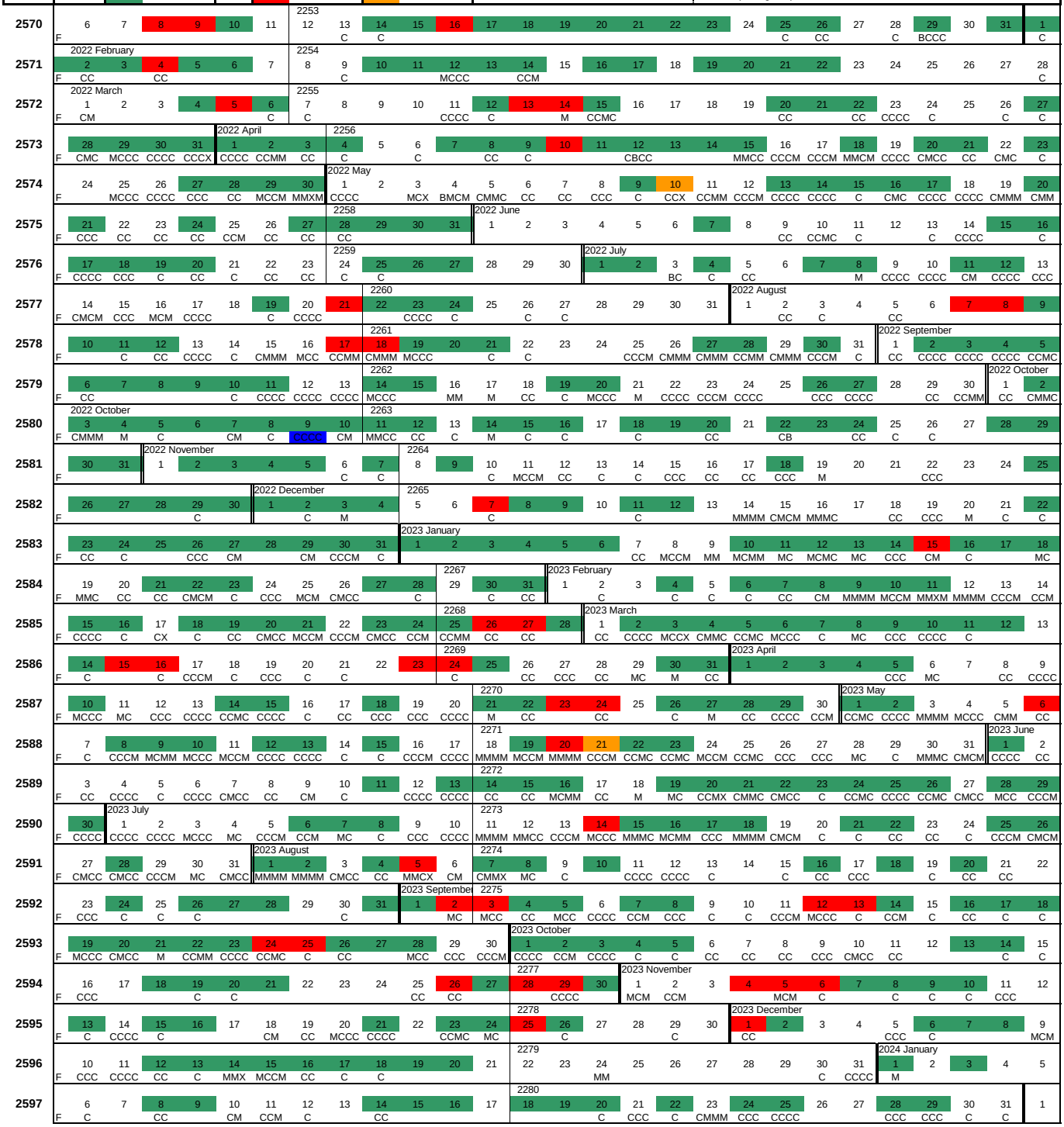
Finally a reminder that the Radio Astronomy Section's programme of zoom meetings can be found on the BAA web site. Follow the link to the Radio Astronomy Section where there is another link to the programme list.


VLF flare activity 2005/24
C
M
X
Relative sunspot number
Number of S.I.D's recorded.
180
160
140
120
100
80
60
40
20
0
Jan 2005
Jan 2006
Jan 2007
Jan 2008
Jan 2009
Jan 2010
Jan 2011
Jan 2012
Jan 2013
Jan 2014
Jan 2015
Jan 2016
Jan 2017
Jan 2018
Jan 2019
Jan 2020
Jan 2021
Jan 2022
Jan 2023
Jan 2024

BAA Radio Astronomy Section.

BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).



BAA Radio Astronomy Section. **2024 JANUARY.**

	Xray class	Observers	John Cook (23.4kHz/*22.1kHz*) Tuned radio frequency receiver, 0.58m frame aerial.				Roberto Battaiola 20.3kHz Modified AAVSO receiver.				Paul Hyde (22.1kHz/*24kHz*) Spectrum Lab / PC 1.5m frame aerial.				Mark Edwards (24.0/*18.2*/**22.1k**) Spectrum Lab / PC 2m loop aerial.				Colin Clements (23.4kHz) 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	**M4.7**	7	*12:17*	*12:26*	*?*	-					12:13	12:23	13:21	2+	12:16	12:26	13:13	2+				
6	C7.1	2									15:31	15:36	15:41	1-	15:34	15:35	15:45	1-				
8	C7.3	1													*09:49*	*09:52*	*10:00*	1-				
8	C5.7	1													15:48	15:53	16:06	1-				
10	C5.2	1													*10:05*	*10:08*	*10:29*	1				
10	**M1.4**	6	*12:45*	*12:51*	*13:09*	1					12:43	12:53	13:18	2	*12:45*	*12:55*	*13:31*	2+				
11	C4.2	3	11:31	11:35	11:45	1-									*11:30*	*11:36*	*11:45*	1-				
11	C9.4	6	12:01	12:09	12:28	1+					11:59	12:10	12:33	2	12:04	12:12	12:20	1-	12:01	12:12	12:31	1+
11	**M1.3**	7	12:48	12:52	13:02	1-					12:45	12:51	13:03	1-	12:48	12:52	13:03	1-	12:47	12:53	13:03	1-
11	?	1													*13:04*	*13:05*	*13:09*	1-				
11	?	1													13:45	13:48	14:14	1+				
12	C5.9	3	10:05	10:08	10:16	1-					10:04	10:06	10:18	1-	*10:04*	*10:08*	*10:26*	1				
14	?	1													*11:48*	*11:59*	*?*	-				
14	C9.6	4													*12:05*	*12:09*	*12:33*	1+	12:08	12:14	12:17	1-
14	C7.2	6	*13:05*	*13:08*	*13:17*	1-					13:02	13:08	13:18	1-	13:05	13:10	13:21	1-	12:58	13:08	13:24	1+
20	C5.2	1													14:30	14:36	14:52	1				
21	C2.5	2									11:34	11:37	11:53	1	**11:34**	**11:38**	**11:44**	1-				
21	C2.2	1													15:25	15:26	15:32	1-				
21	C2.9	1													16:20	16:23	16:32	1-				
22	C7.0	4	11:15	11:22	11:41	1+					11:15	11:26	12:02	2+	*11:11*	*11:27*	*?*	-				
22	?	2									12:10	12:20	12:44	2	*12:04*	*12:21*	*12:43*	2				
23	C6.2	1	09:13	09:26	09:41	1+																
23	C3.7	1	10:06	10:09	10:13	1-																
23	C3.6	2	11:05	11:08	11:18	1-									*11:02*	*11:09*	*11:19*	*1-*				
23	C2.6	1	11:57	12:00	12:15	1-																
23	?	1													12:55	12:58	?	-				
23	**M1.0**	7	12:44	12:59	13:47	2+					12:49	12:58	13:54	2+	13:06	13:09	?	-	12:53	13:12	13:50	2+
23	?	2													13:19	13:23	13:37	1-				
23	C9.5	2									14:31	14:38	15:22	2+	14:32	14:39	?	-				
23	?	1													**14:46**	**14:51**	**?**	**-**				
23	**M1.3**	1													14:42	15:00	15:48	2+				
23	C7.6	1													16:22	16:28	?	-				
23	**M4.3**	1													16:38	16:43	17:15	2				
24	C5.9	6	12:17	12:22	12:33	1-					12:12	12:23	?	-	12:16	12:25	12:35	1				
24	C6.8	5	12:48	12:59	13:17	1+					12:45	12:55	13:40	2+	12:48	13:02	13:16	1+				
24	?	1													15:20	15:26	?	-				
24	?	1													15:30	15:32	?	-				
24	?	1													15:40	15:42	?	-				
24	C2.4	1													15:52	15:55	16:10	1-				
25	?	1													*10:29*	*10:35*	*?*	-				
25	C3.4	1													*10:42*	*10:56*	*?*	-				
25	?	1													*11:00*	*11:01*	*11:10*	*1-*				
25	C4.2	2	14:03	14:07	14:17	1-									14:02	14:06	14:18	1-				
25	C5.1	2	14:58	15:04	15:12	1-									14:59	15:09	?	-				
25	C5.5	1													15:17	15:22	15:30	1-				
28	?	1													11:25	11:27	11:31	1-				
28	C2.8	7	12:40	12:45	12:53	1-					12:38	12:45	13:01	1	12:42	12:48	12:54	1-				
28	C3.2	2									15:22	15:30	15:46	1	15:23	15:29	15:39	1-				
28	C3.0	1													15:58	16:02	16:17	1				
29	C5.4	5	10:16	10:17	10:22	1-					10:12	10:19	10:26	1-	*10:15*	*10:18*	*10:25*	*1-*				
29	C5.1	5	10:35	10:38	10:45	1-					10:34	10:36	10:42	1-	***10:36***	***10:38***	***10:44***	***1-***				
29	C6.0	4	14:54	14:57	15:04	1-					14:49	14:54	15:10	1	14:55	14:57	15:07	1-				
30	C5.7	2									17:34	17:39	17:49	1-	17:36	17:41	17:49	1-				
31	C2.3	2													13:44	13:47	13:54	1-				

BAA Radio Astronomy Section. **2024 JANUARY.**

	Xray class		Steve Parkinson (Various) Tuned radio frequency receiver, frame aerials.				Andrew Thomas (18.3kHz/*19.6kHz*) Tuned radio frequency receiver, 0.6m frame aerial.				Phil Rourke (23.4kHz) Spectrum Lab, 0.6m frame aerial.				Mark Prescott (22.1kHz/*19.6kHz*) SpectrumLab/Starbase, Active mini-whip aerial.				John Elliott (19.6kHz) 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)	
1	**M4.7**		12:14	12:17	12:35	1	12:15	12:31	13:24	2+					*12:19*	*12:34*	*13:10*	*2+*	12:15	12:30	13:20	###
6	C7.1																					
8	C7.3																					
8	C5.7																					
10	C5.2																					
10	**M1.4**		12:44	12:53	13:13	1+	12:44	12:52	13:07	1					12:48	12:55	13:45	2+				
11	C4.2						11:28	11:35	11:44	1-												
11	C9.4		12:01	12:07	12:25	1	11:59	12:08	12:27	1+												
11	**M1.3**		12:48	12:52	13:02	1-	12:46	12:52	13:04	1-					12:52	12:57	13:15	1				
11	?																					
11	?																					
12	C5.9																					
14	?																					
14	C9.6						11:48	11:57	12:12	1					11:45	12:11	12:58	2+				
14	C7.2						13:04	13:10	13:24	1					13:07	13:13	13:24	1-				
20	C5.2																					
21	C2.5																					
21	C2.2																					
21	C2.9																					
22	C7.0														11:20	11:27	?	-				
22	?																					
23	C6.2																					
23	C3.7																					
23	C3.6																					
23	C2.6																					
23	?																					
23	**M1.0**		12:52	12:58	13:50	2+	*12:47*	*13:05*	*13:45*	*2+*					*12:58*	*13:02*	*?*	-				
23	?														*?*	*13:13*	*13:30*	-				
23	C9.5																					
23	?																					
23	**M1.3**																					
23	C7.6																					
23	**M4.3**																					
24	C5.9		12:16	12:23	12:35	1	12:16	12:24	12:42	1+					12:19	12:28	12:47	1+				
24	C6.8		12:47	13:00	13:16	1+									12:49	13:04	13:19	1+				
24	?																					
24	?																					
24	?																					
24	C2.4																					
25	?																					
25	C3.4																					
25	?																					
25	C4.2																					
25	C5.1																					
25	C5.5																					
28	?																					
28	C2.8		12:41	12:45	12:55	1-	12:37	12:45	13:01	1	12:38	12:44	13:01	1	12:44	12:50	13:02	1-				
28	C3.2																					
28	C3.0																					
29	C5.4		10:15	10:18	10:23	1-					10:16	10:18	10:28	1-								
29	C5.1		10:37	10:38	10:44	1-					10:36	10:39	10:46	1-								
29	C6.0														14:56	15:01	15:09	1-				
30	C5.7																					
31	C2.3		13:40	13:47	13:52	1-																