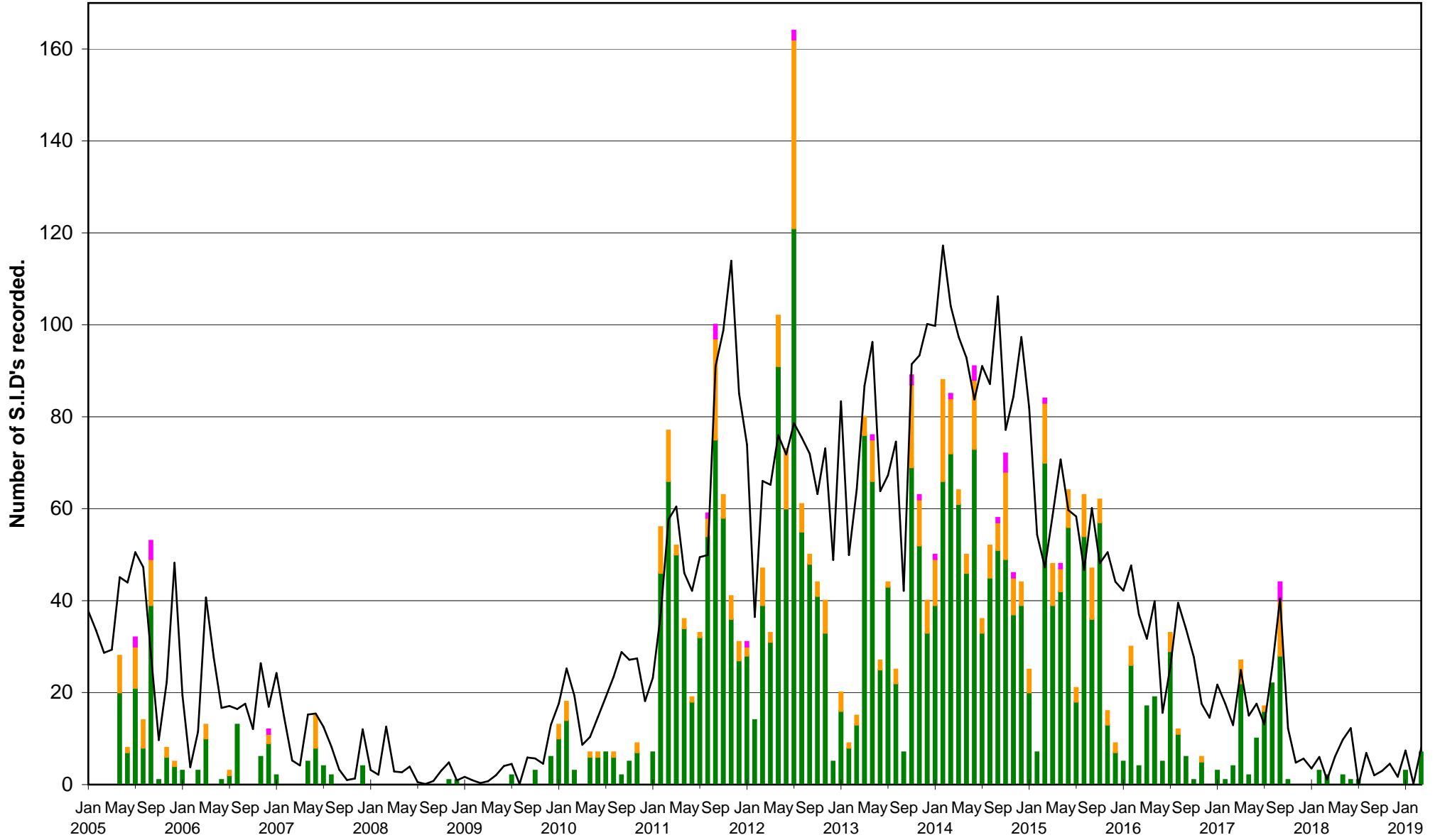
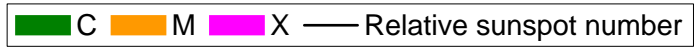


DAY	Xray class	Observers	John Cook (23.4kHz/22.1kHz)	Roberto Battaola (20.9kHz)	Paul Hyde (22.1kHz/24kHz)	Mark Edwards (19.6/24.0kHz)	Colin Clements (23.4kHz/18.3kHz)
			Tuned radio frequency receiver, 0.58m frame aerial.	Modified AAVSO receiver.	Spectrum Lab / PC 1.5m frame aerial.	Spectrum Lab / PC 2m loop aerial.	Tuned Radio Frequency receivers, 0.76m screened loop aerial.
			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
20	C4.8	7	11:07 11:12 11:22 1-	11:10 11:45 11:20 1-	11:05 11:17 12:20 2+	11:07 11:18 12:04 2+	11:04 11:11 12:02 2+
21	C1.5	4	14:42 14:44 14:55 1-		14:42 14:46 15:30 2+	14:43 14:46 15:04 1	
21	C1.2	3			16:00 16:02 16:20 1	16:01 16:03 16:12 1-	
21	C2.6	2			17:18 17:23 17:55 2	17:15 17:25 17:44 1+	
22	C2.6	2			08:00 08:02 ? -	08:00 08:02 08:15 1-	
22	C1.3	3			08:17 08:20 08:33 1-	08:17 08:18 08:24 1-	
22	C1.0	2			10:16 10:21 10:41 1	10:17 10:19 10:33 1-	
22	B8.5	2			12:39 12:40 12:48 1-	12:37 12:42 ? -	
22	B7.0	1				12:47 12:52 ? -	
22	?	1				12:55 12:59 13:09 1-	
22	B4.9	2			13:51 13:54 14:05 1-	13:52 13:53 14:02 1-	
22	B5.3	1				14:18 14:20 14:25 1-	
23	B5.7	2			12:43 12:50 13:16 2	12:47 12:50 12:58 1-	

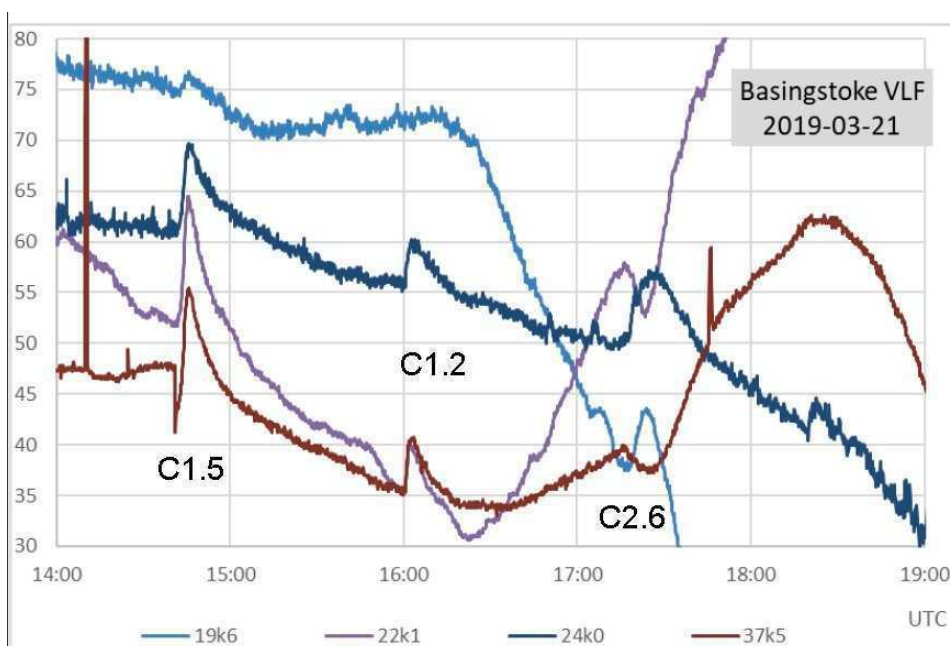
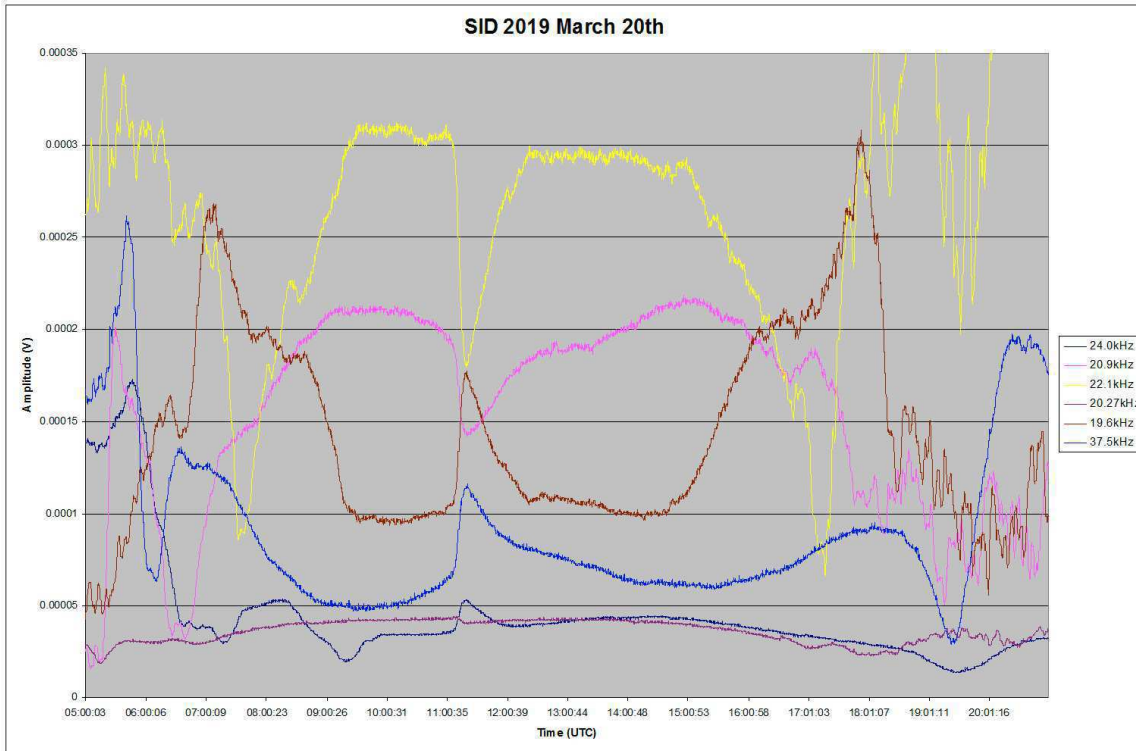
DAY	Xray class	Observers	Steve Parkinson (Various)	Andrew Thomas (19.6kHz)	Phil Rourke (23.4kHz)	Jim Barber	John Elliott (18.3kHz)
			Tuned radio frequency receiver, frame aeral.	Tuned radio frequency receiver, 0.6m frame aerial.	Spectrum Lab, 0.6m frame aerial.	Spectrum Lab, 0.6m frame aerial.	Tuned 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)
20	C4.8		11:06 11:18 12:22 2+	11:05 11:22 12:25 2+			
21	C1.5		14:41 14:46 15:00 1				
21	C1.2		16:00 16:02 16:12 1-				
21	C2.6						
22	C1.3						
22	C1.0		10:17 10:23 10:35 1-				
22	B8.5						
22	B7.0						
22	?						
22	B4.9						
22	B5.3						
23	B5.7						

DAY	Xray class	Observers	Colin Briden (22.1kHz)				
			Spectrum Lab / PC, 1.2m frame aerial.				
			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
20	C4.8						
21	C1.5						
21	C1.2						
21	C2.6						
22	C1.3						
22	C1.0						
22	B8.5						
22	B7.0						
22	?						
22	B4.9						
22	B5.3						
23	B5.7						

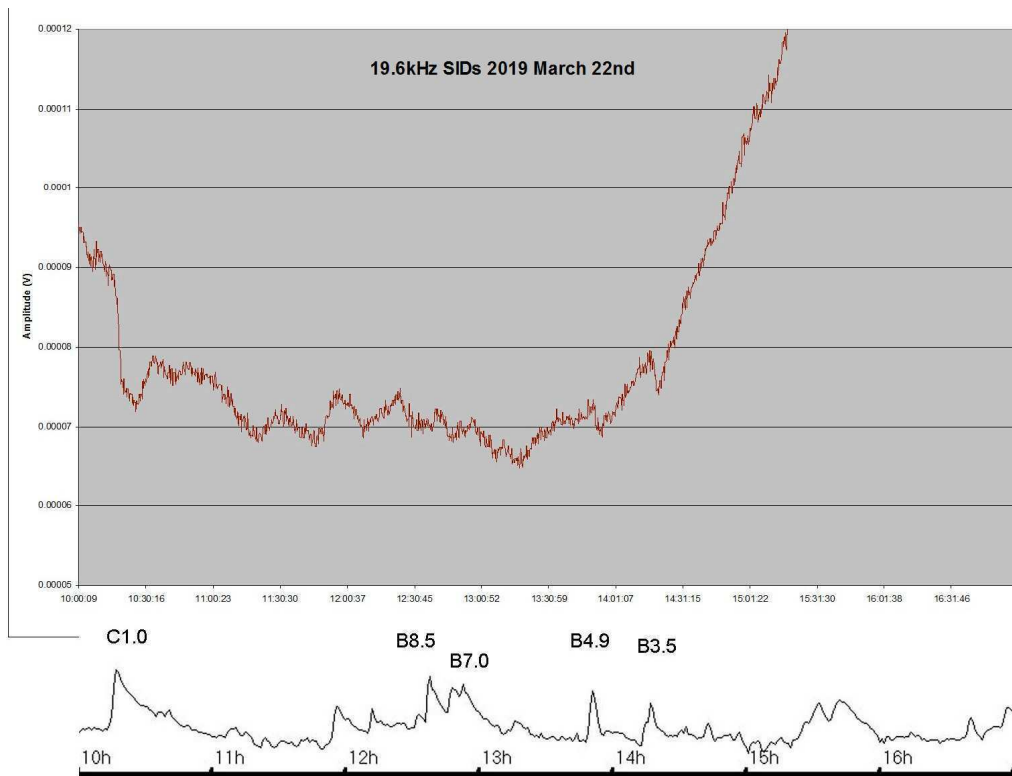
VLF flare activity 2005/19.



There were two periods of sunspot activity in March, the first starting on the 8th when AR12734 produced a C1.3 flare at 03:20UT. This of course was too early in the morning for us to record as a SID, but with the very low background X-ray flux at the time it was a 1000x increase in X-rays. The remaining activity from this group was much weaker, and lasted only a few days. On the 20th, the background X-ray flux jumped 100x to B1 levels as AR12736 appeared. This was a much more active sunspot group, and produced all of the activity seen in the tables. It only lasted for six days until the active region rotated out of view and the background dropped back to its quiescent level again. The strongest flare of the month was the C4.8 peaking at 11:18UT on the 20th, shown in this recording by Mark Edwards:



This recording by Paul Hyde shows the three smaller C-class flares on the 21st.

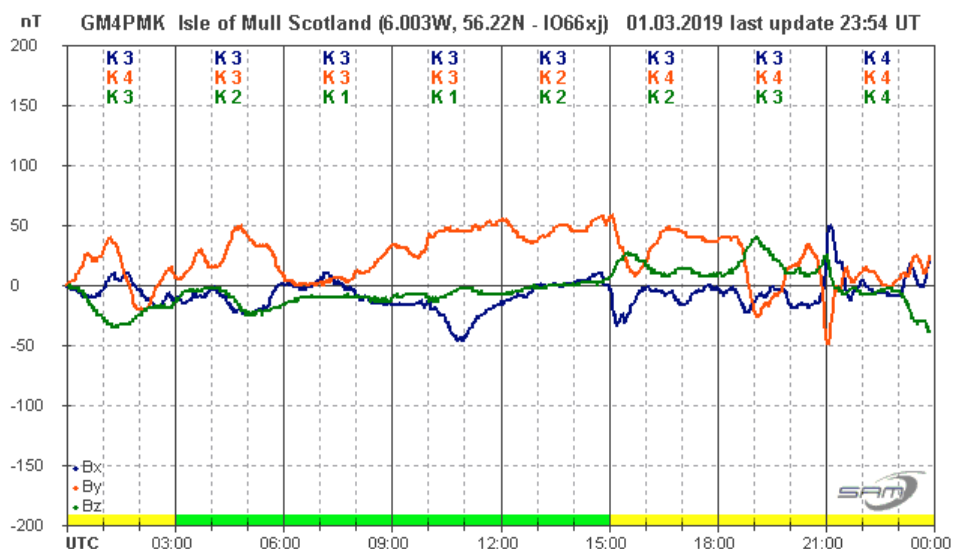


Flares on the 22nd were dropping in strength, and quite difficult to separate from the background noise. Mark's recording at 19.6kHz is the best that we have, so I have added the GOES data to help. This is a northerly path, and so sunset is hiding the later flares. AR12736 continued with B-class flares until the 25th, after which the background X-ray flux again fell back below the A1 level.

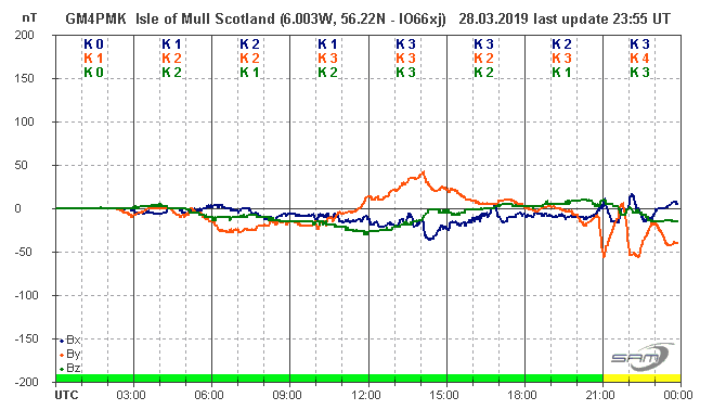
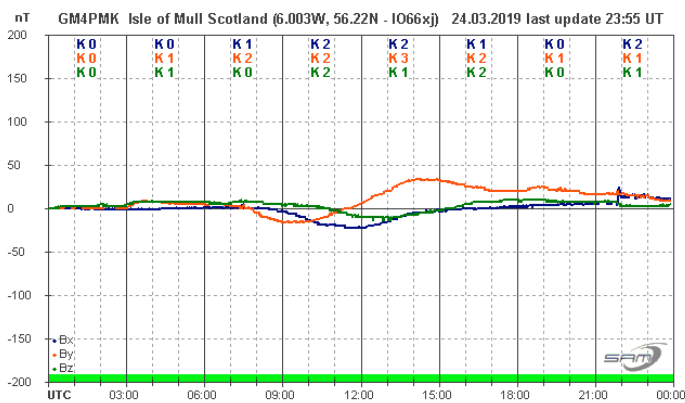
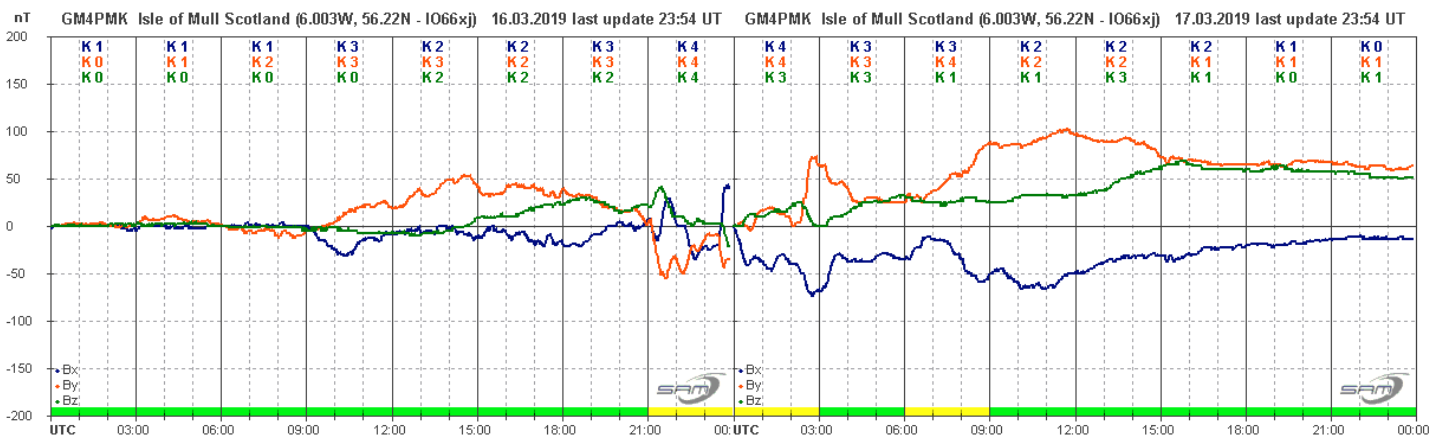
The 23.4kHz signal remains very unreliable, being off for most of the month. Apart from a few days mid-month and at the end of the month, it was more active at night than during the day.

MAGNETIC OBSERVATIONS.

The active period seen at the end of February continued into March the 1st and 2nd, although much weaker. This is the recording from the 1st by Roger Blackwell:



Satellite images show that there was a minor CME near the solar limb early on March 12th, resulting in a very minor magnetic disturbance on the 16th and 17th. Roger's recordings show the effects in the evening of the 16th, fading quickly in the morning of the 17th. Note that the sensor is reset to zero at midnight, and so the traces are discontinuous between the two days:



The left-hand recording (above) from Roger Blackwell shows a magnetic shock arrival shortly before 22:00 UT on March 24th, most noticeable in the blue (Bx) trace. Satellite images show that this was the result of a very slow CME produced by the C4.8 flare on the 20th. This gives a transit time of about 104 hours based on our timing of the flare. There were no significant disturbances recorded following the shock.

The right-hand recording shows activity on the 28th from the recurrent coronal hole seen at the beginning of the month. This coronal hole has been present for at least six months now, but its effects are getting much weaker. The disturbance on the 28th only lasted about an hour into the morning of the 29th, with a further hour of disturbance around 17:30 to 18:30 UT. The last two days of the month remained very quiet.

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

BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).
2493	F	28 CCC 29 C	2016 May 1 C 2 C 3 C 4 C	5 6 7 8 9	2177 10 11 12 13 14 CCBC 15 CCBC 16 C	17 18 19 20 21 BC 22 B 23 BBC 24
2494	F	25 CC 26 CC	2016 June 27 CC 28 CC 29 CC 30 CC 31	1 2 3 4 5 6 7 8 9	2178 10 11 12 13 14 15 16 17 18 19 20	
2495	F	21 22	2016 July 23 24 25 26 27	28 29 30 1 2 3 4 5 6 7 8 9	2179 10 11 12 13 14 15 16 17	
2496	F	18 C 19 C 20 C	2016 August 21 CBCB 22 CCC 23 MMCC 24 MBCM 25 C 26 BB 27 28 29 30	2180 31 1 2 3 4 5 6 7 8 9 10 11 12 13		
2497	F	14 C 15 C 16 C	17 18 19 20 21 22 23 24 25 26	2181 27 28 29 30 31	2016 September 1 2 3 4 5 6 7 8 9	
2498	F	10 11 12 13 14	15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	2182 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	2016 October 1 2 3 4 5 6 7 8 9	
2499	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	2183 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	2016 November 1 2	
2500	F	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	2184 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	2017 December 1 2 3 4 5 6 7 8 9 10 11 12 13	
2501	F	30 CC 31	1 2 3 4 5 6 7 8 9 10 11 12 13	2185 14 15 16 17 18 19 20 21 22 23 24 25 26		
2502	F	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	2186 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22		
2503	F	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	2187 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18		
2504	F	19 BB 20 C 21 C 22 C 23 C 24 C	25 26 27 28 29 30 31	2188 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
2505	F	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	2189 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	2017 April 1 2 3 4 5 6 7 8 9 10 11 12 13	
2506	F	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	2190 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	2017 May 1 2 3 4 5 6 7 8 9 10	
2507	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 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	2191 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	2017 June 1 2 3 4 5 6	
2508	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 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	2192 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	2107 July 1 2 3	
2509	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 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	2193 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		
2510	F	31 B 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	2194 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		
2511	F	27 C 28 B 29 B 30 B 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	2195 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		
2512	F	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	2196 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		
2513	F	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	2197 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		
2514	F	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 31	2198 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		
2515	F	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	2199 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	2018 January 1 2 3 4 5 6 7 8	
2516	F	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	2200 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	2018 February 1 2 3 4	
2517	F	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	2201 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	2018 March 1 2 3	
2518	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	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	2202 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		
2519	F	31 B 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	2203 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		
2520	F	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	2204 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		
2521	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 20 21 22 23 24 25 26 27 28 29 30 31	2205 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		
2522	F	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 31	2206 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		
2523	F	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	2207 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		
2524	F	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	2208 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	2018 September 1 2 3 4 5 6 7 8	
2525	F	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	2209 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	2018 October 1 2 3 4 5	
2526	F	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	2210 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		
2527	F	2018 November 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	2211 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		
2528	F	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 31	2212 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		
2529	F	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	2213 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		
2530	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 22 23 24 25 26 27 28 29 30 31	2214 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		
2531	F	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	2215 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	2019 March 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
2532	F	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	2216 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	2019 April 1 2 3 4 5 6 7 8	