

BAA Radio Astronomy Group.

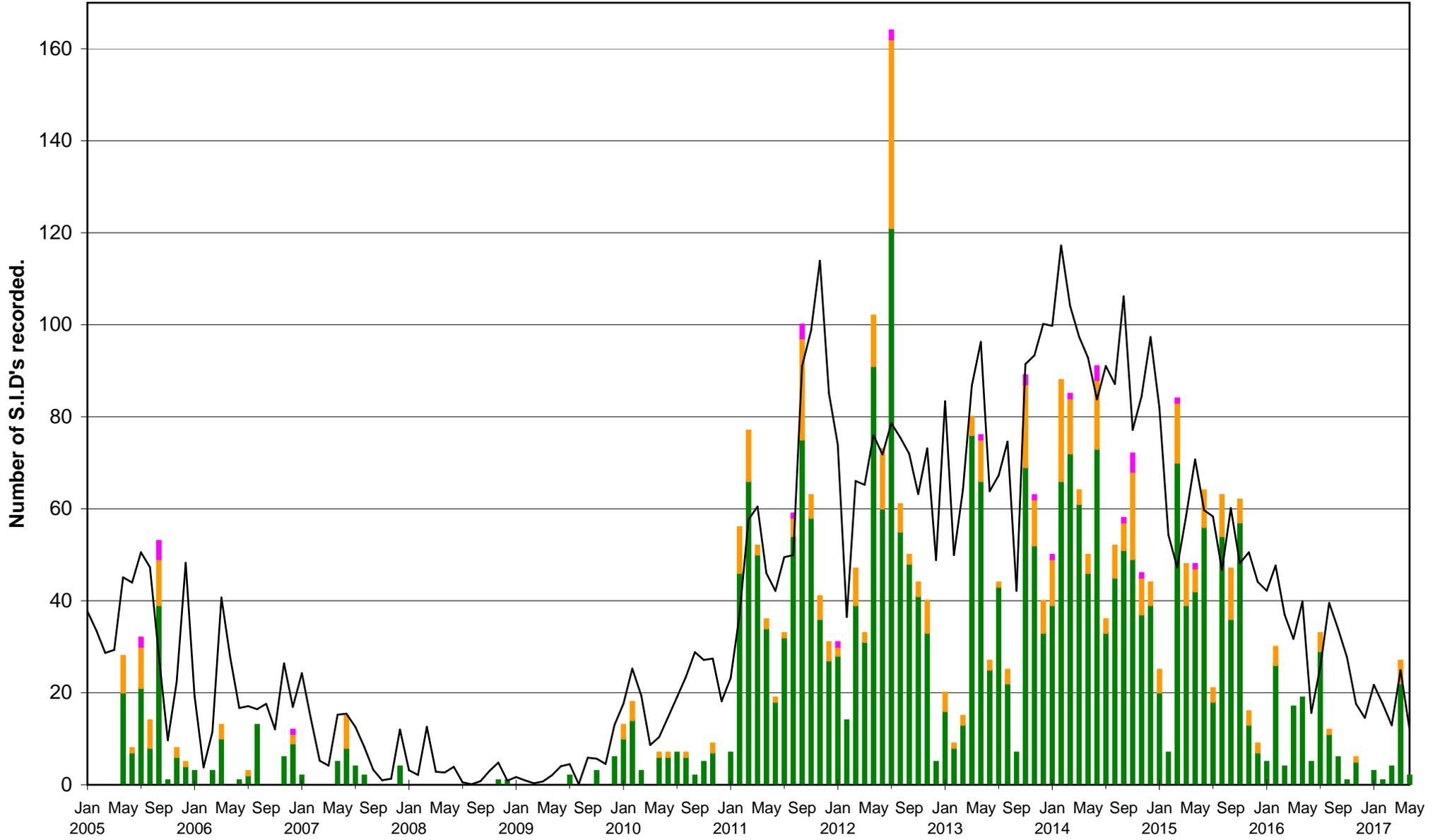
2017 MAY

	Xray class	Observers	John Cook (23.4kHz/22.1kHz)	Roberto Battaiola (21.75kHz)	Paul Hyde (22.1kHz/24kHz)	Mark Edwards (20.9/24.0/18.3kHz)	Colin Clements (23.4kHz/22.1kHz)
			Tuned radio frequency receiver, 0.58m frame aerial.	Modified AAVSO receiver.	Spectrum Lab / PC 1.5m frame aerial.	Spectrum Lab / PC 2m loop aerial.	AAVSO receiver, 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)
27	B3.1	1					
27	B9.2	2				18:03 18:26 18:40 2	
28	B8.0	1			10:49 10:54 11:01 1-		
28	C3.3	2			19:27 19:30 20:17 2+	19:26 19:31 20:03 2	
31	C1.3	1				18:47 18:50 19:00 1-	

	Xray class		Steve Parkinson (Various)	Andrew Thomas (23.4kHz)	Phil Rourke (23.4kHz)	Jim Barber	John Elliott (18.3kHz)
			Tuned radio frequency receiver, frame aerials.	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.
DAY			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
27	B3.1			10:42 10:51 11:08 1+			
27	B9.2			18:36 18:37 ? -			
28	B8.0						
28	C3.3						
31	C1.3						

VLF flare activity 2005/17.

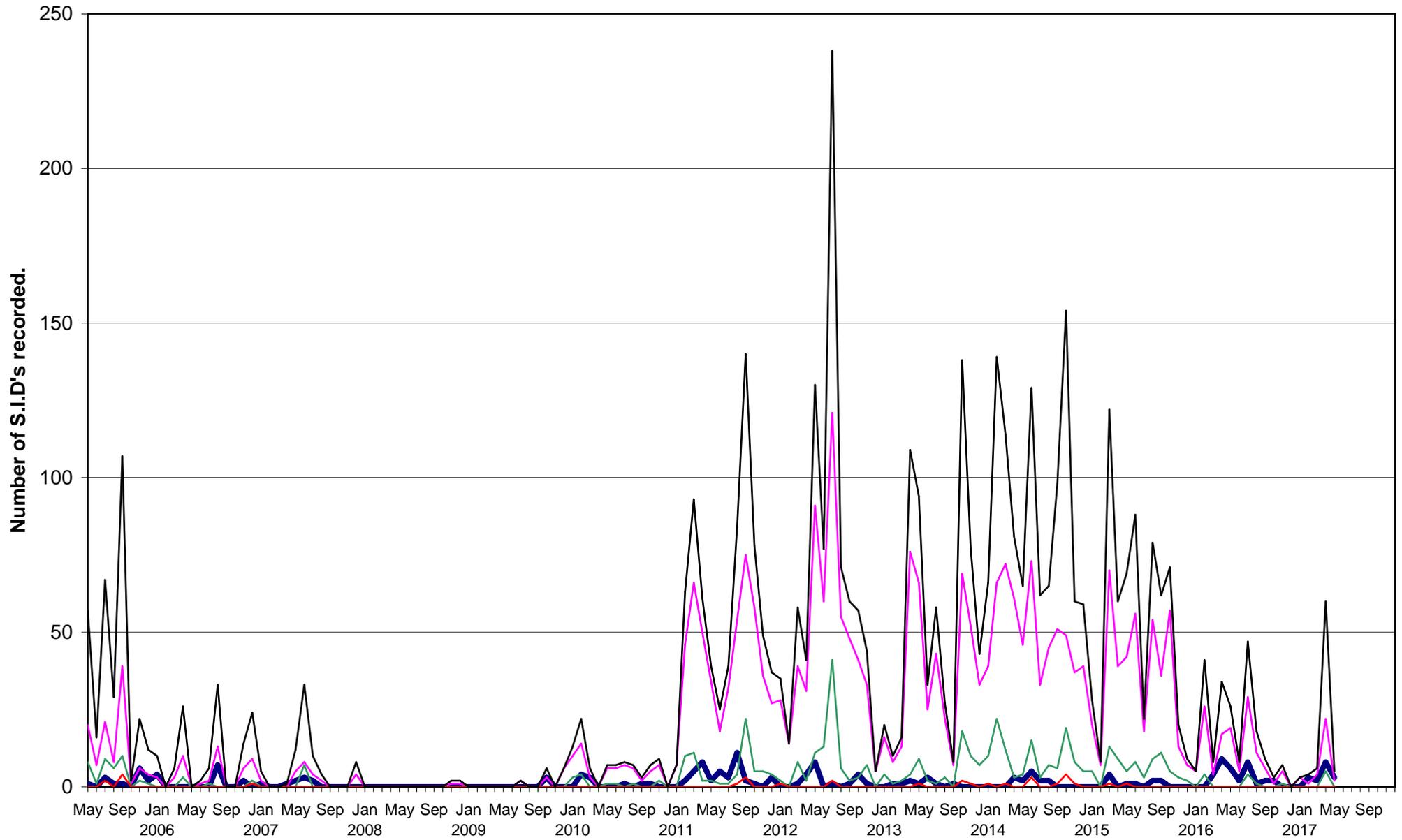
C M X — Relative sunspot number





Total flare count 2005/17.

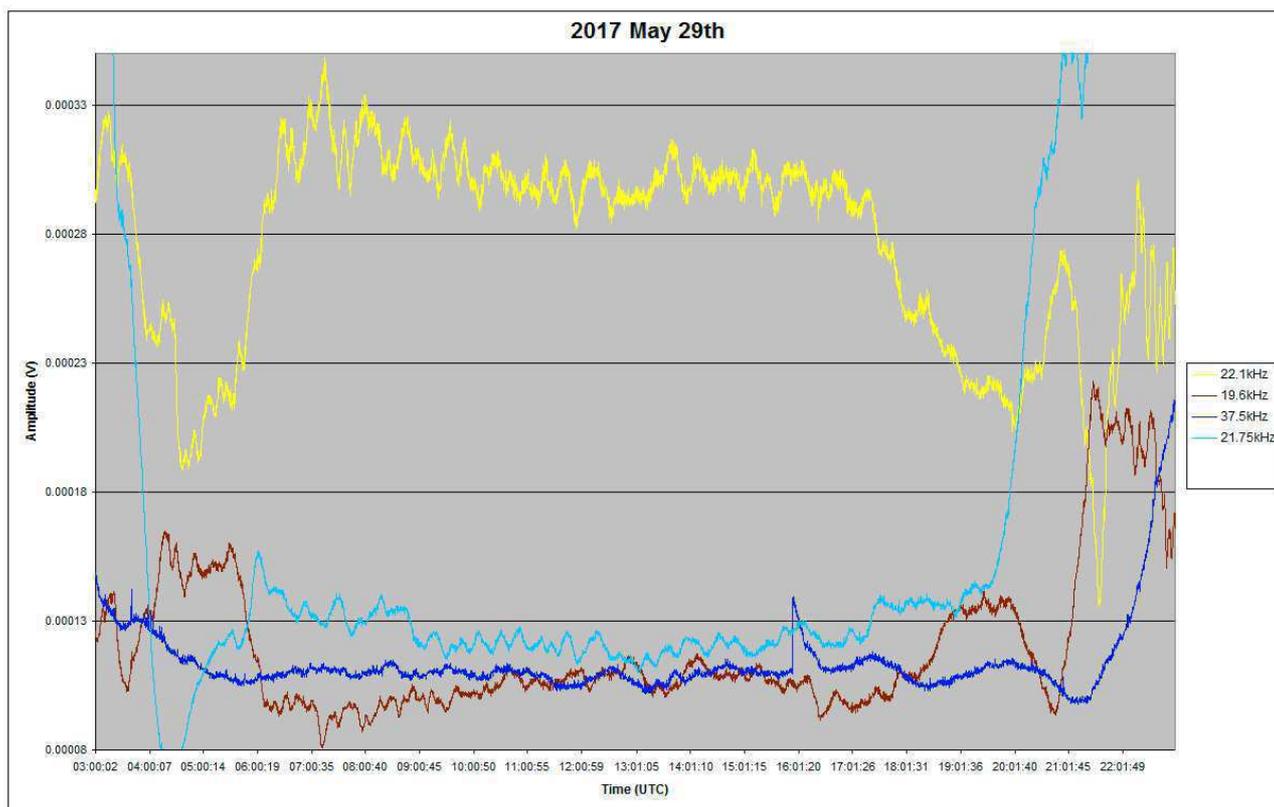
— B — C — M — X — Totals



The background X-ray flux fell from the end of April, reaching A4 by May 8th. It remained very low for the next two weeks, only rising to B1 by May 23rd. There were a few very small flares over the next few days before the B9.2 flare at 18:26UT on the 27th. This was from AR12659, a fairly small active region that was approaching the Western limb of the sun. This region also produced the strongest flare of the month at C3.3 on the 28th. The C3.1 flare on the 31st was from AR12661, just appearing at the sun's eastern limb.

The activity chart does not include B-class flares, on the basis that although they can be quite frequent, we do not always detect them when the sun is actively producing stronger flares. At times of weaker activity we detect more of them, and at a lower level. For that reason, I have included a second chart showing the total counts each month. SIDs from B-class flares are in blue. They were well recorded in 2011 at the start of cycle 24, falling in numbers through the years of peak activity, and increasing again in 2016. During 2008/9, the years of solar minimum, there were very few flares of any magnitude listed in the GOES data.

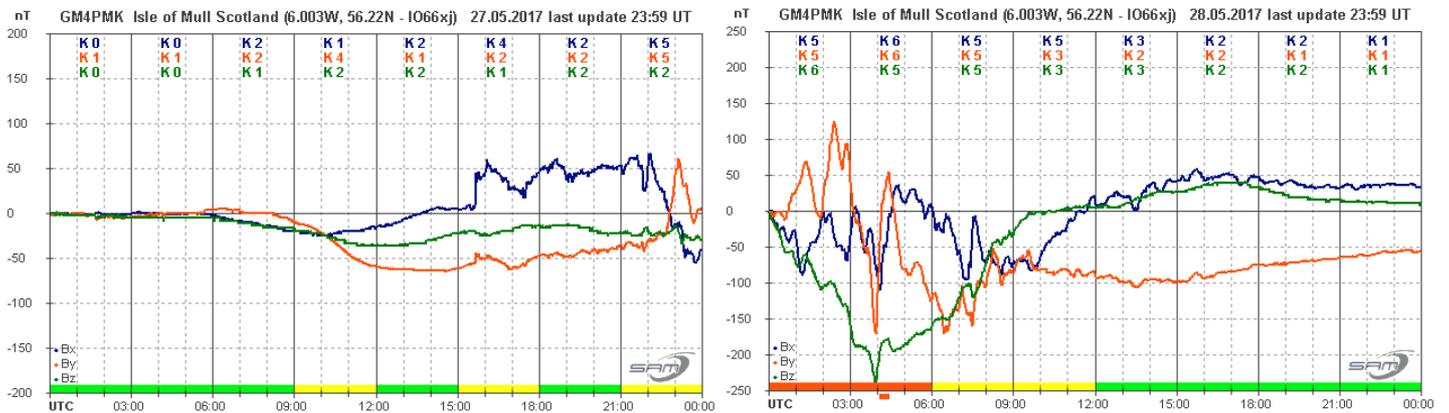
There were several periods of ionospheric instability in May. My own recordings show oscillations on both 23.4kHz and 22.1kHz throughout the second half of the month, most noticeable on the 27th and 28th. Mark Edwards recorded strong oscillations on the 29th:



The northerly path at 22.1kHz (yellow) is particularly unstable, while the southerly path at 21.75kHz (light blue) is also disturbed. Colin Clements recorded oscillations at both 22.1kHz and 23.4kHz on the 1st, 15th, 17th, 22nd and 26th, with just 22.1kHz affected on the 25th. He also detected increased noise levels at 151MHz and 327MHz on the 17th. He uses a Bi-quad aerial at 151Mhz, and a double Bi-quad at 327MHz, with gains of roughly 13 or 14dB. These have a fairly wide beamwidth, suitable for an un-driven system.

MAGNETIC OBSERVATIONS

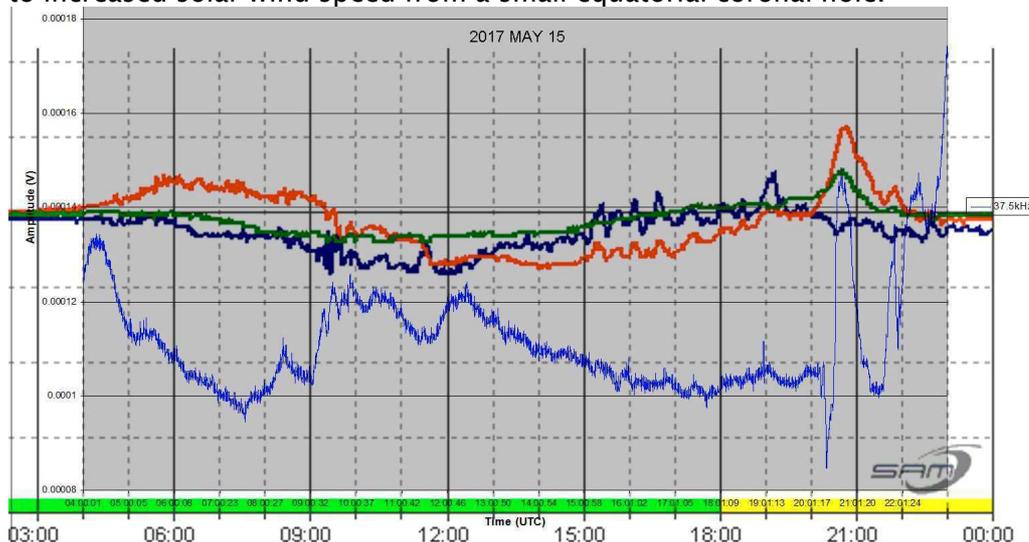
By far the most dramatic magnetic disturbance in May was recorded on the 27th and 28th:



This recording is by Roger Blackwell on the Isle of Mull. Note that the vertical scale is different for the two days, and that the magnetometer is automatically reset to 0 at midnight. The cause of the disturbance was a CME associated with the C3.3 flare on the 23rd. The arrival shock is clearly visible in the Bx signal (blue trace) at about 15:30 on the 27th. The resulting storm lasted until midday on the 28th. From our measurements, the CME transit time was about 92 hours and 10 minutes. Space weather reports suggest that despite being just four weeks before the summer solstice, aurora were seen in California as well as parts of the UK.

On the following day, Marks Edwards noted another transient in the 37.5kHz signal from Iceland that matched a small magnetic glitch at the same time, 15:55UT. This can be seen in Mark's VLF chart on the previous page (dark blue trace).

Some minor geomagnetic activity was present on the 15th, and from the 18th to the 20th. This was due to increased solar wind speed from a small equatorial coronal hole.



In this chart Mark Edwards has overlaid the Mull magnetometer signals onto his 37.5kHz recording. Once again there appears to be a link visible after 20:00UT with strong disturbance to the VLF signal from the large change in magnetic field. There is also some VLF disturbance after 09UT together with the rapid magnetic changes.

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

BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).
2465	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				2149
2466	F	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				2150
2467	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				2151
2468	F	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				2152
2469	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				2153
2470	F	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				2154
2471	F	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				2155
2472	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				2156
2473	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 1				2157
2474	F	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				2158
2475	F	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				2159
2476	F	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				2160
2477	F	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				2161
2478	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				2162
2479	F	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				2163
2480	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				2164
2481	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				2165
2482	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				2166
2483	F	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				2167
2484	F	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				2168
2485	F	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				2169
2486	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				2170
2487	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				2171
2488	F	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				2172
2489	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				2173
2490	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				2174
2491	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				2175
2492	F	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				2176
2493	F	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				2177
2494	F	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				2178
2495	F	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				2179
2496	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				2180
2497	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				2181
2498	F	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				2182
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 1 2				2183
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				2184
2501	F	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				2185
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
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
2504	F	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				2188
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				2189
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				2190
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				2191