

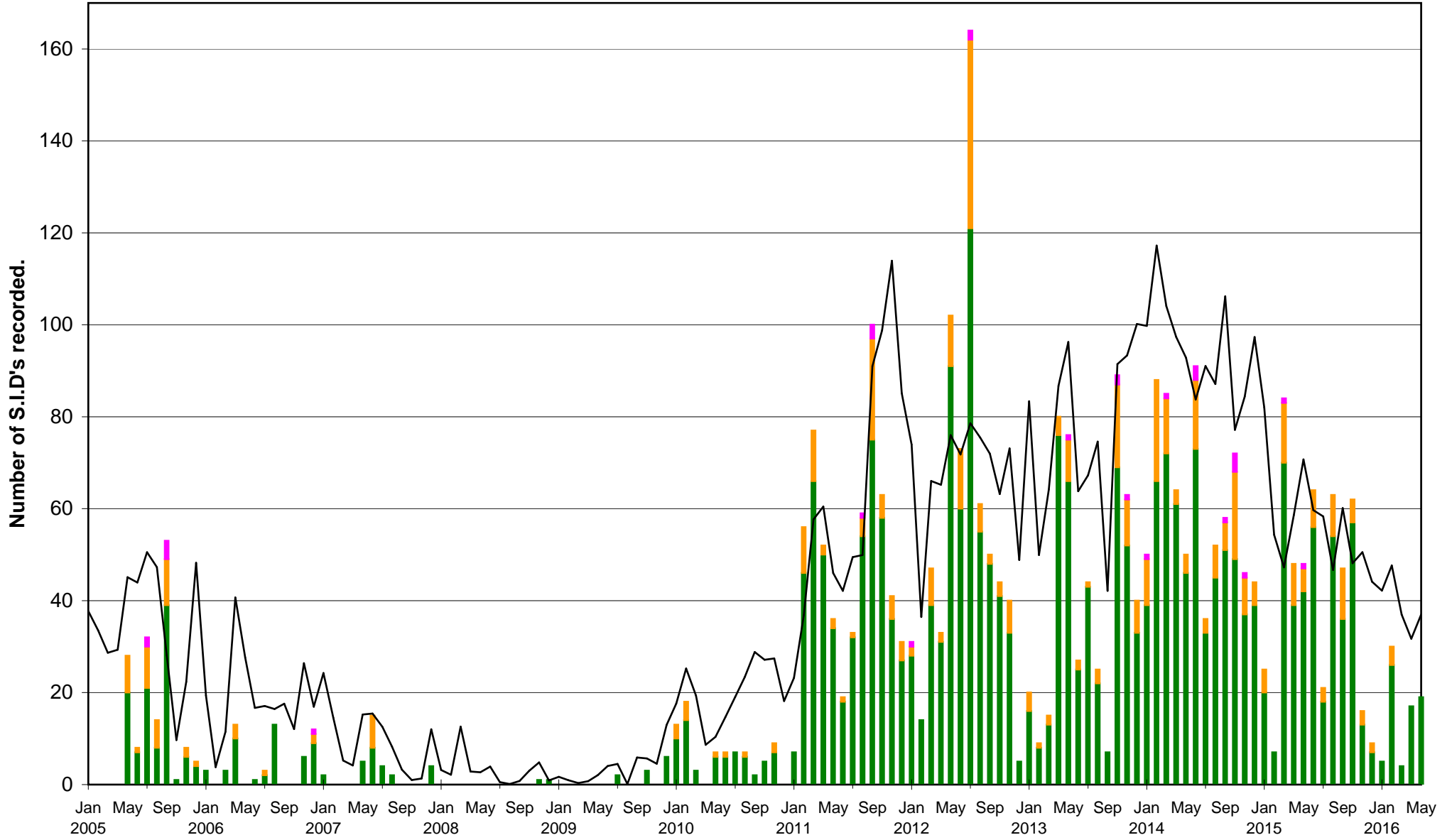
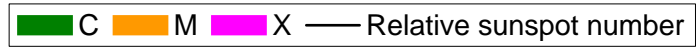
BAA Radio Astronomy Group.

2016 MAY

DAY	Xray class	Observers	John Cook (23.4kHz/22.1kHz)	Roberto Battaiola (20.9kHz)	Paul Hyde (22.1kHz)	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.
			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
1	C2.4	3	09:18 09:23 09:54 2			09:19 09:24 09:47 1+	
2	C3.5	3	08:36 08:42 09:12 2			08:37 08:45 09:22 2	
4	C1.3	1				13:46 13:54 14:10 1	
7	C1.9	1				17:10 17:18 17:30 1	
14	C2.5	4	09:29 09:32 09:54 1			09:30 09:33 10:03 2	09:26 09:33 10:12 2+
14	C7.4	4	11:33 11:36 12:14 2			11:32 11:36 12:19 2+	11:28 11:35 12:05 2
14	C4.8	4	15:18 15:22 15:52 2			15:18 15:22 15:50 1+	15:16 15:21 16:05 2+
14	B8.4	1				17:39 17:43 17:47 1-	
15	C2.9	5	08:21 08:25 08:39 1-		08:21 08:29 09:06 2	08:22 08:27 08:49 1+	08:17 08:24 08:50 2
15	C1.3	3			09:50 09:54 09:59 1-	09:50 09:53 10:06 1-	
15	C1.2	2			11:54 12:02 12:20 1+	11:59 12:03 12:13 1-	
15	C1.1	2			13:59 14:05 14:09 1-	14:00 14:04 14:24 1	
15	B6.1	1			14:47 14:51 14:56 1-		
15	C3.2	2	16:01 16:03 16:08 1-			15:38 16:03 16:47 2+	
15	?	1				16:48 16:50 17:12 1	
16	C1.8	3			15:24 15:30 16:36 2+	<b>15:23 15:31 15:41 1-</b>	
21	B7.3	1				10:58 11:04 11:18 1	
21	C1.0	3			13:59 14:03 14:18 1	13:59 14:03 14:37 2	
22	B5.9	1				09:21 09:22 09:33 1-	
24	B5.3	1				08:23 08:25 08:28 1-	
24	B9.6	3			08:32 08:42 09:18 2+	08:33 08:36 08:52 1	
24	C1.3	4	10:19 10:21 10:27 1-		10:19 10:23 10:59 2	10:19 10:23 10:41 1	
26	C1.1	1				13:35 13:40 ? -	
26	C1.0	1				13:47 13:54 14:20 2	
30	C1.4	4	07:35 07:42 07:50 1-		07:35 07:42 08:16 2	<b>07:35 07:42 07:45 1-</b>	
30	C1.0	3			13:21 13:28 13:37 1-	13:22 13:27 13:38 1-	

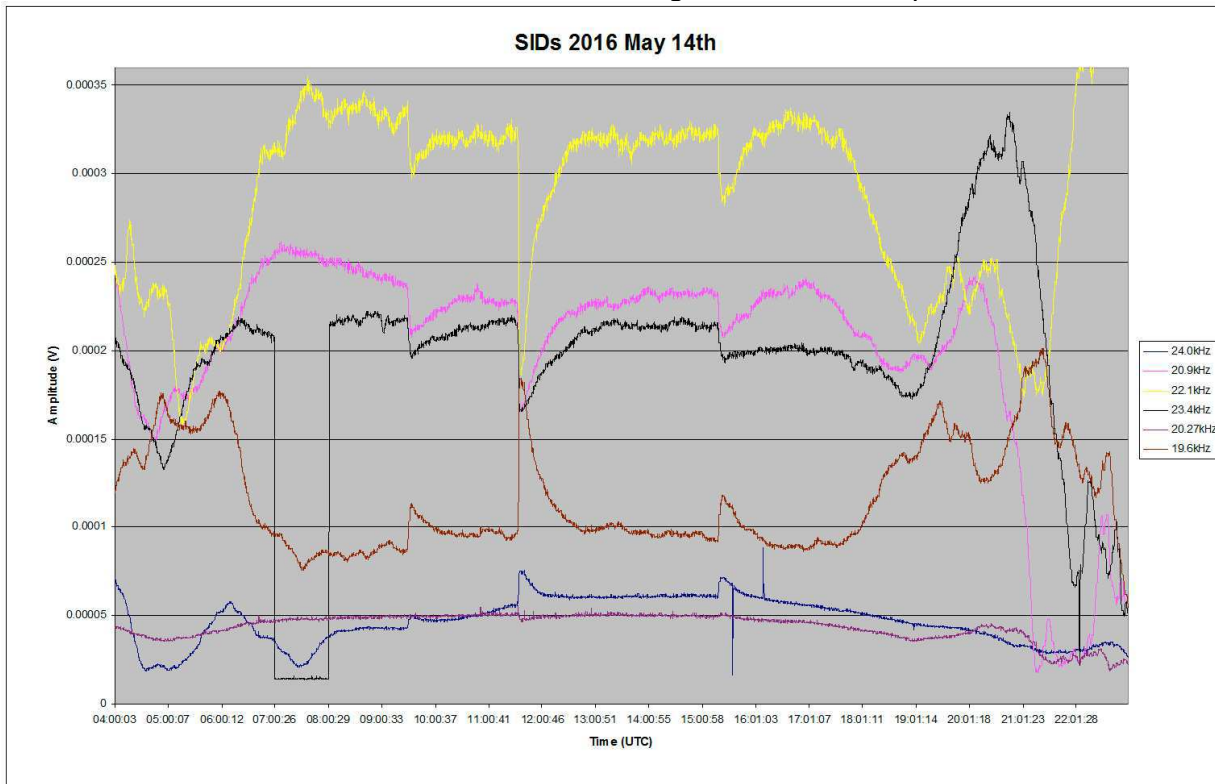


### VLF flare activity 2005/16.

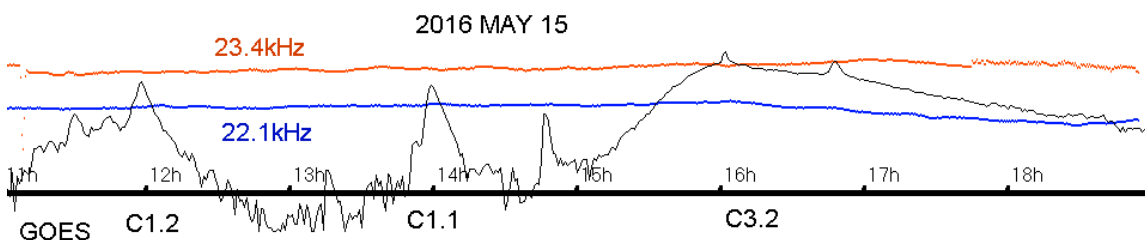


The activity chart shows a small increase in the number of flares recorded as SIDs compared to last month, although this is perhaps misleading. The chart does not include SIDs from minor B-class flares as these are fairly common but not always detected against the background noise. April also included a large number of multiple-peaked flares compared to just one in May.

The month started quietly with just four SIDs in the first two weeks. The 14<sup>th</sup> included the strongest flare of the month, at C7.4. Mark Edwards' recording shows the activity well:

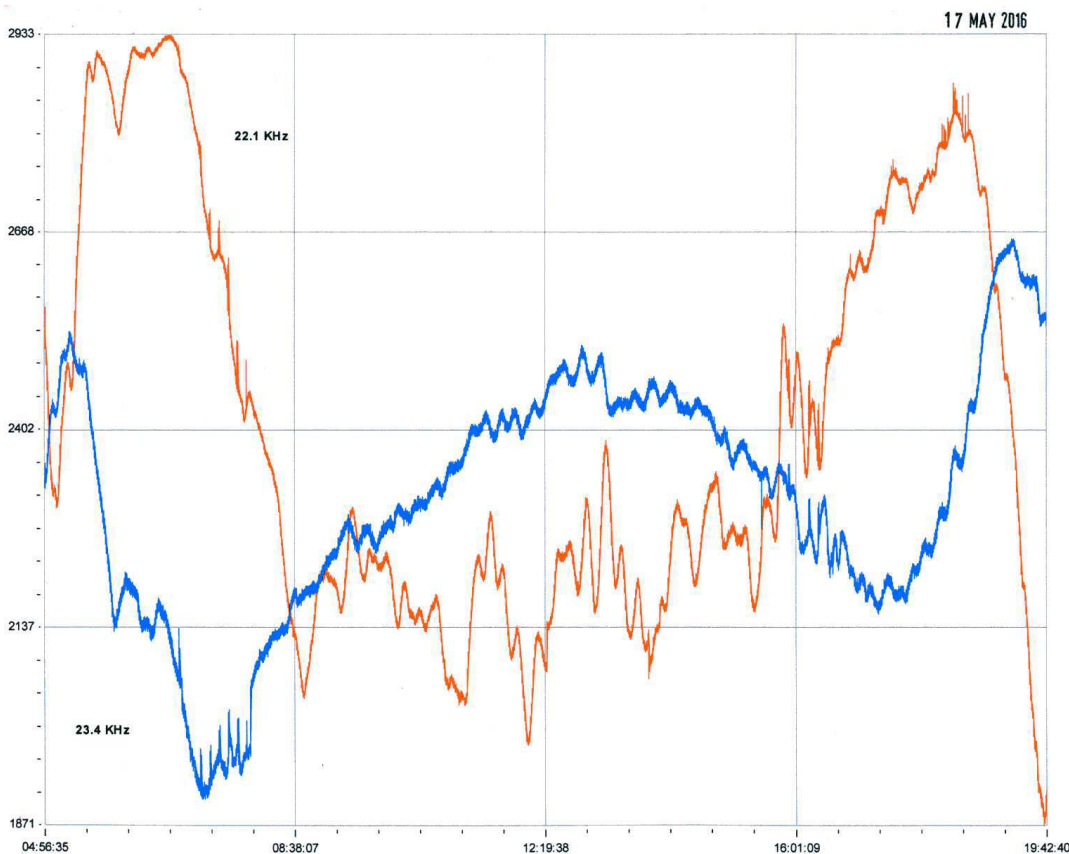
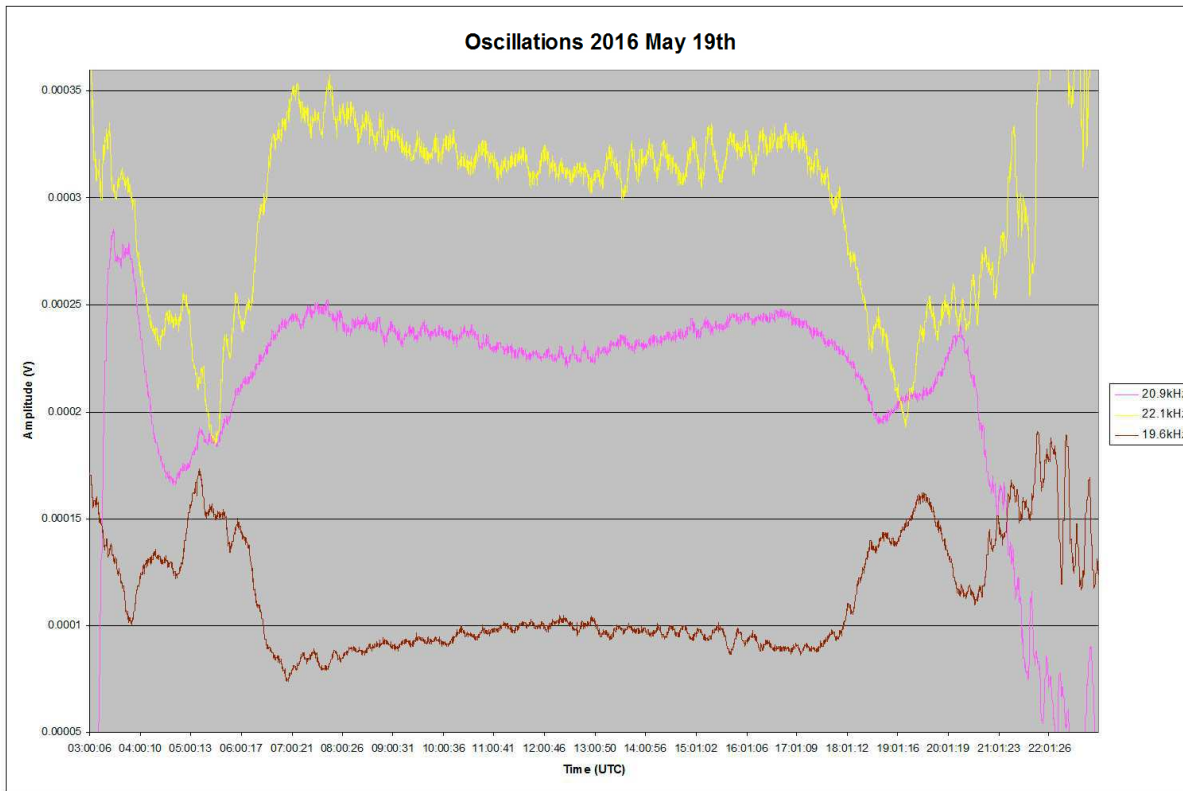


There were a total of seven SIDs recorded on the 15<sup>th</sup>, including a very long C3.2 flare in the afternoon. I have added the GOES X-ray flux to my own recording:



There were at least two active regions flaring at the time, so the result is complex. The SWPC lists the C3.2 flare peaking at 16:03UT, ending at 17:33UT, but does not identify the peak at 16:50. I have recorded a very small SID for the first peak at 23.4kHz (red), but nothing for any of the others.

The sun was very quiet again after the 15<sup>th</sup>, with just a few small flares recorded. There was however some substantial noise and oscillations recorded, particularly over the 17<sup>th</sup> to 20<sup>th</sup>. Mark Edwards noted that the oscillation that he recorded was much slower than we often see, with a 15 minute period. His recording from the 19<sup>th</sup> is shown below:



This chart from Colin Clements shows oscillations with a period of about 17 minutes on the 17<sup>th</sup>, most noticeable on the short path at 22.1kHz. The smaller disturbance on the longer path at 23.4kHz appears to have a similar period. Very similar recordings were made in May last year, with the suggestion that they may have been related to depressions crossing the country at the time. Again this year we experienced depressions moving through the country, so the connection does seem quite strong.

Colin notes more random noise present from the 4<sup>th</sup> to the 12<sup>th</sup>, again most noticeable on the short path at 22.1kHz. With less X-ray and UV input from the sun, the ionosphere electron density was much lower than usual, leaving the lower boundary of the D-region more susceptible to local weather influences.

## MAGNETIC OBSERVATIONS.

There was a single Earth-directed CME in May, associated with the C1.3 flare seen at 13:54 on the 4<sup>th</sup>. The solar wind speed was already raised due to coronal hole effects, so the mild CME added to the existing disturbance. A small SSC was recorded at about 01:10UT on the 8<sup>th</sup>, giving a transit time of 80h 16m. My own chart shows the SSC:



Colin Clements' recording, above, shows the disturbance lasting all day on the 8<sup>th</sup>, becoming quite active in the last two hours. This continued through the following morning, with some minor disturbances ending around midnight on the 9<sup>th</sup>.

Coronal holes were responsible for the rest of the activity shown in the Bartels diagram. A very small coronal hole close to the solar equator caused a disturbance in the first three days of May, while a second slightly larger hole resulted in some weak activity later in the month.

