

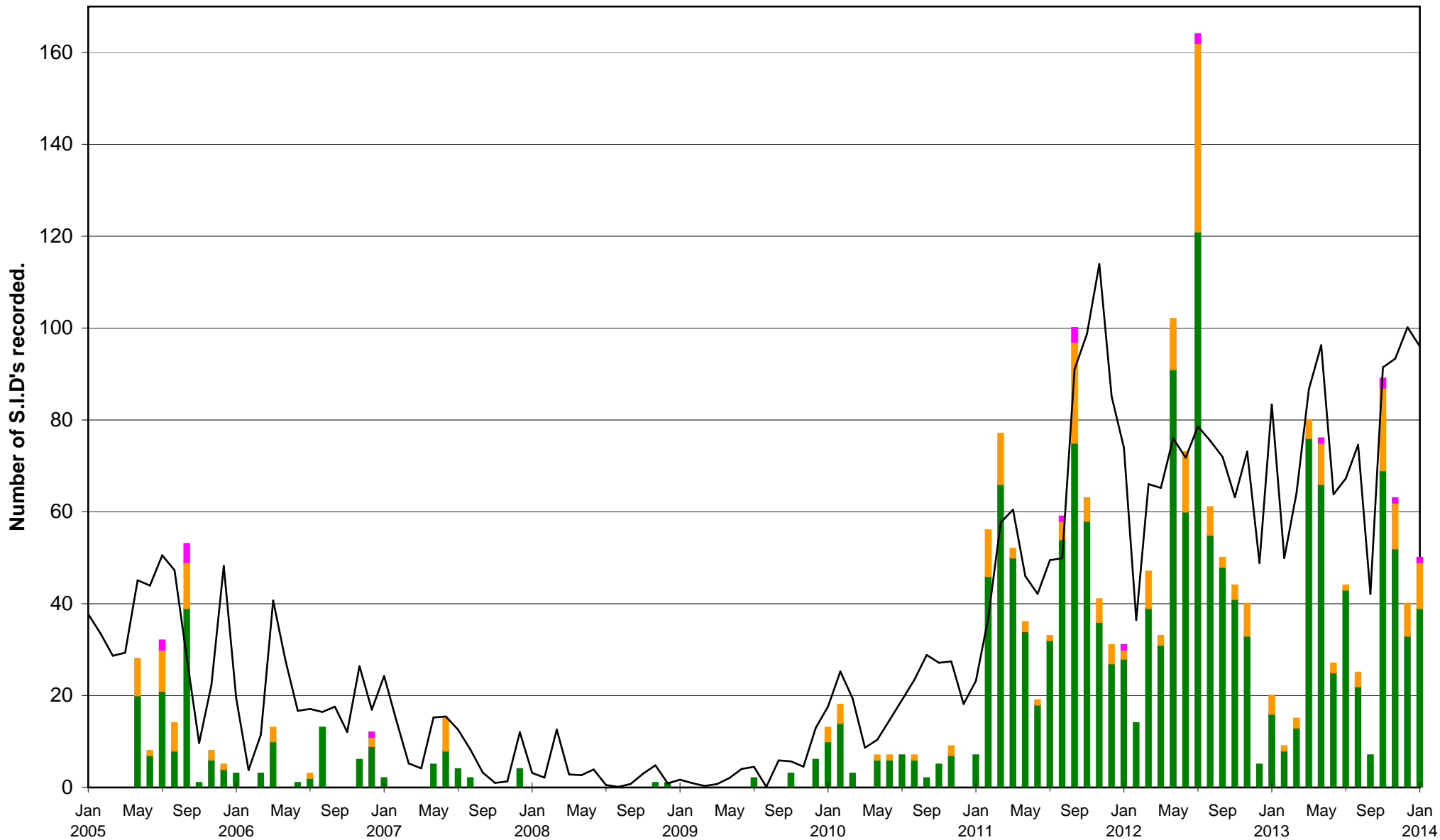
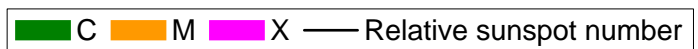
BAA Radio Astronomy Group.

2014 JANUARY

DAY	Xray class	Observers	John Cook (23.4kHz/22.1kHz)	Roberto Battaiola (21.75kHz)	Paul Hyde (22.1kHz)	Bob Middlefell (22.1kHz)	Mark Edwards (20.9/24.0/21.75kHz)
			Tuned radio frequency receiver, 0.58m frame aerial.	Modified AAVSO receiver.	Tuned radio frequency receiver, 0.96m frame aerial.	Tuned radio frequency receiver, 0.5m frame aerial.	Spectrum Lab / PC 2m loop aerial.
			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)
1	C6.5	3					
2	?	3	11:26 11:35 ? -		11:28 11:36 12:08 2		15:43 15:48 16:14 1+
2	?	3					11:28 11:36 ? -
2	C9.5	6	12:24 12:28 12:42 1-		12:24 12:28 12:39 1-		11:39 11:44 11:58 1
2	?	1					12:24 12:27 12:40 1-
3	C3.3	1					14:03 14:08 14:18 1-
3	C5.9	4	10:40 10:43 ? -				10:41 10:43 10:51 1-
3	M1.0	7	12:45 12:49 12:55 1-		12:44 12:49 13:22 2		12:45 12:52 13:08 1
3	C6.9	2					15:25 15:35 15:51 1+
4	C5.6	1		06:33 06:46 06:52 1			
4	C2.9	1					
4	M1.3	7	10:20 10:27 10:50 1+	10:22 10:29 10:50 1+	10:19 10:28 10:51 1+		10:19 10:28 10:57 2
4	C9.4	2					15:38 15:42 15:56 1-
5	C6.6	3		15:11 15:17 15:23 1-			15:14 15:20 15:40 1+
6	C2.6	1					
7	C2.3	1		08:06 08:09 08:16 1-			
7	M7.2	7	10:11 10:19 11:32 2+	10:11 10:18 10:55 2	10:11 10:21 11:27 2+		10:11 10:21 11:18 2+
7	C2.6	4	11:48 11:54 12:07 1		11:48 11:55 12:09 1		11:47 11:54 12:13 1+
7	X1.2	2					18:10 18:25 19:12 2+
8	C1.9	2					
8	C6.1	6	11:59 12:06 12:27 1+		12:00 12:09 12:30 1+		12:01 12:08 12:21 1
8	C2.4	3	12:58 12:59 13:01 1-				12:58 13:00 13:04 1-
8	C3.4	1					16:53 16:56 16:58 1-
11	C4.4	1		08:32 08:35 08:39 1-			
11	C2.1	3	10:21 10:26 10:31 1-				
11	C6.5	7	13:02 13:09 13:28 1+	13:02 13:10 13:24 1			13:03 13:11 13:28 1
13	C1.1	1					
13	C1.1	2					15:05 15:09 15:12 1-
14	C3.2	1					16:02 16:05 16:11 1-
16	C2.8	2					15:18 15:31 16:12 2+
17	C2.2	1		08:27 08:29 08:38 1-			
17	C6.0	5	09:19 09:22 09:34 1-	09:14 09:20 09:51 2	09:19 09:24 09:32 1-		
17	C7.2	7	14:01 14:04 14:15 1-	13:56 14:14 14:32 2	13:59 14:04 14:21 1		
17	C8.9	1					
18	C4.8	8	10:38 10:41 10:48 1-	10:34 10:39 10:55 1	10:38 10:41 10:52 1-		10:37 10:42 10:48 1-
18	C6.0	7	12:03 12:05 12:22 1		12:03 12:06 12:15 1-		12:04 12:05 12:15 1-
26	C6.1	7	10:10 10:13 10:20 1-	10:08 10:14 10:36 1+	10:10 10:13 10:19 1-		10:10 10:14 10:25 1-
27	C2.6	2					11:11 11:13 11:22 1-
27	?	1					11:55 11:57 12:00 1-
27	?	1					13:25 13:28 13:30 1-
28	M3.6	2		07:24 07:33 07:44 1			07:22 07:32 07:52 1+
28	M1.4	6	11:37 11:40 12:00 1		11:37 11:39 12:00 1		
28	C8.3	5	12:21 12:26 12:37 1-		12:21 12:26 ? -		
28	M1.3	6	12:40 12:47 13:10 1+		12:41 12:46 13:09 1+		
28	?	1	14:28 14:31 14:37 1-				
28	?	2	14:40 14:43 14:49 1-				
28	M3.5	4	15:25 15:27 15:45 1		15:25 15:28 15:39 1-		
29	C2.2	1					08:46 08:57 09:11 1
29	?	1					11:23 11:27 11:42 1
29	C2.4	2			11:59 12:02 12:08 1-		11:59 12:02 12:10 1-
29	C7.0	7	14:32 14:43 15:22 2+		14:34 14:45 ? -		14:36 14:56 16:23 3
30	M1.1	2		07:53 08:07 08:41 2+			08:07 08:13 08:28 1
30	C3.4	2		09:56 10:03 10:18 1			09:58 10:05 10:09 1-
30	C4.1	2					10:56 11:16 11:33 2
30	?	1					12:28 12:30 12:42 1-
30	?	1					13:09 13:11 13:25 1-
30	C1.4	1					13:34 13:36 13:45 1-
30	?	1					14:34 14:40 ? -
30	?	1					14:46 14:52 15:08 1
30	M6.6	5		15:50 16:07 16:33 2	15:54 16:07 ? -		15:51 16:06 17:40 3
31	C2.4	2					10:47 10:52 11:06 1
31	?	1					13:41 13:51 ? -
31	?	1					14:35 14:42 15:11 2
31	M1.1	5		15:33 15:41 16:00 1+	15:37 15:42 15:57 1		15:34 15:44 ? -
31	?	1					16:33 16:38 ? -
31	?	1					16:52 16:54 17:08 1-

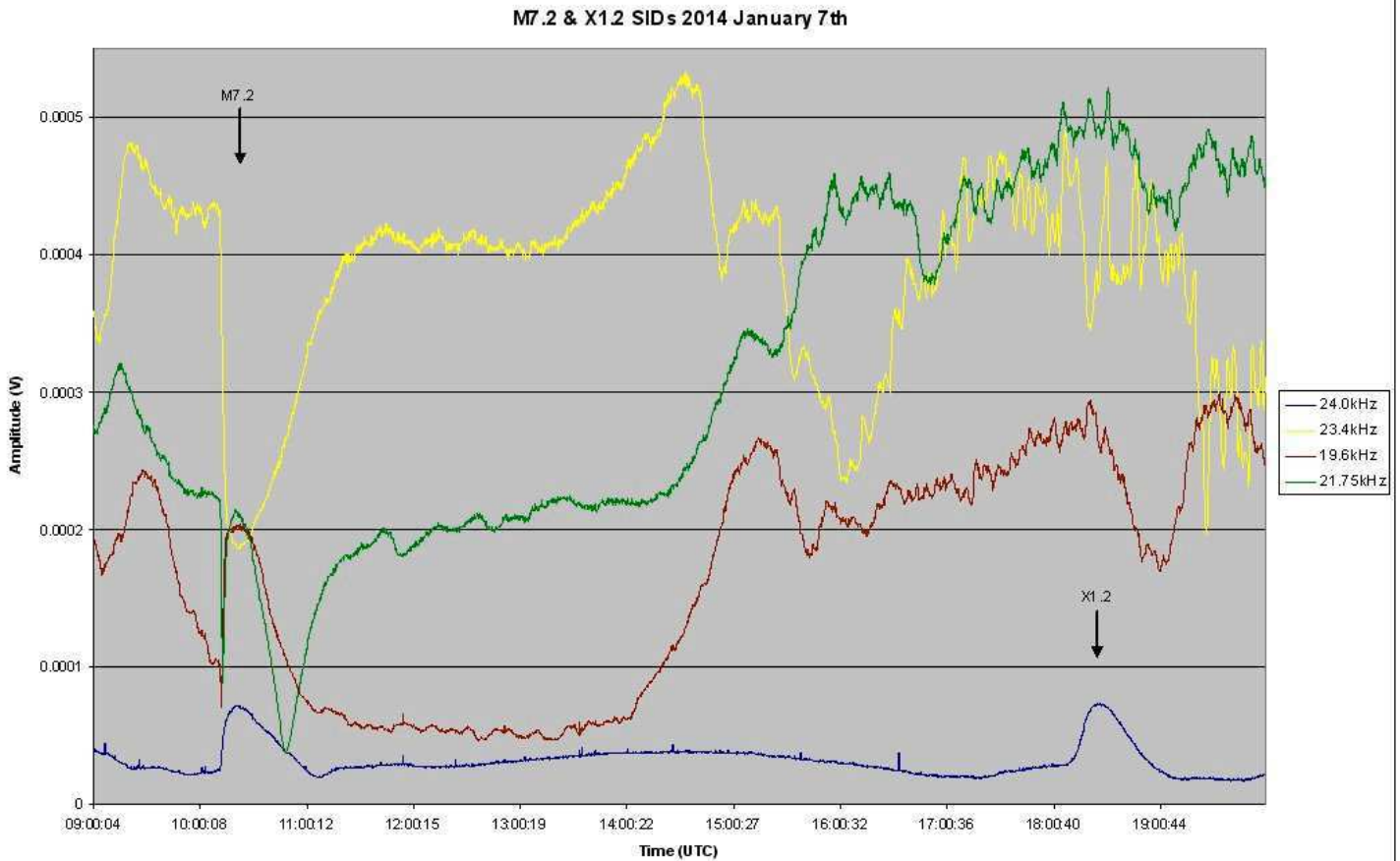


**VLF flare activity 2005/14.**

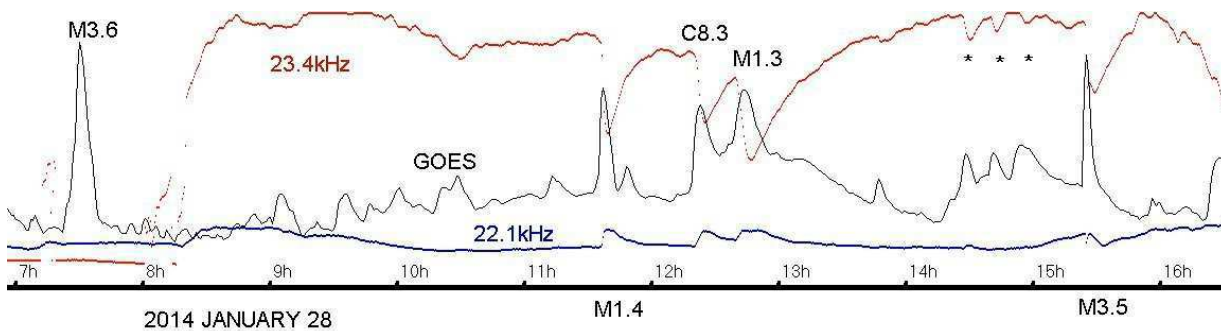


Activity in January is up on December, with an X-class flare recorded as a SID. Many of the SIDs recorded were from more energetic flares, indicating more substantial solar activity compared to recent months.

The X1.2 flare peaked at around 18:30UT on the 7<sup>th</sup>. Although this was too late for the European signals, it was caught at 24kHz on the trans-Atlantic path.

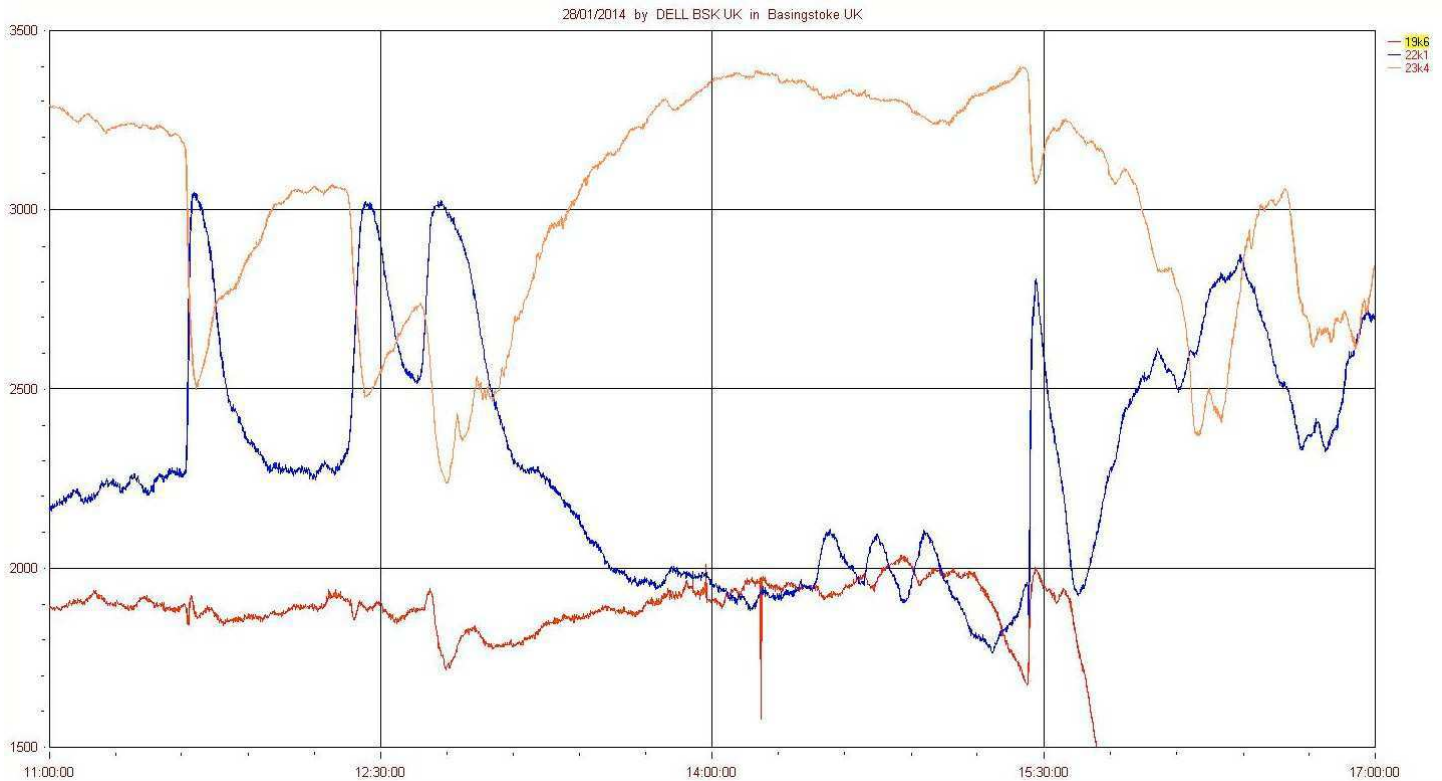


This chart from Mark Edwards shows both the X1.2 and an earlier M7.2 flare. A much smaller C2.6 flare is also recorded just before 12UT at 21.75kHz (green trace).

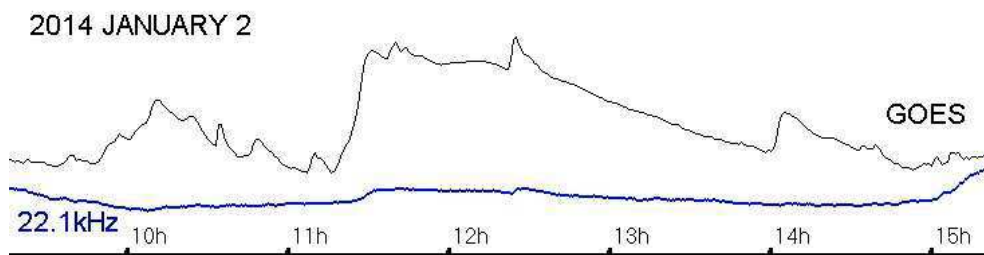


A series of well defined SIDs were recorded on the 28<sup>th</sup>, mostly from rapid M-class flares. The 15:28 M3.5 flare did not appear in the SWPC flare list at first, but it does appear in the weekly bulletin published on February 3<sup>rd</sup>. It is often the case that peaks seen in the GOES X-ray flux, and producing ionospheric disturbances, are not shown in these lists. I have added the GOES data to my own recording, above, showing

three clear SIDs, marked ‘\*’, with matching X-ray peaks that are not listed by the SWPC. These are sometimes simply fine detail in a larger flare that is listed, although that does not seem to be the case for those illustrated here. Paul Hyde has also recorded these three extra SIDs in his chart, they show particularly well at 22.1kHz (blue trace):

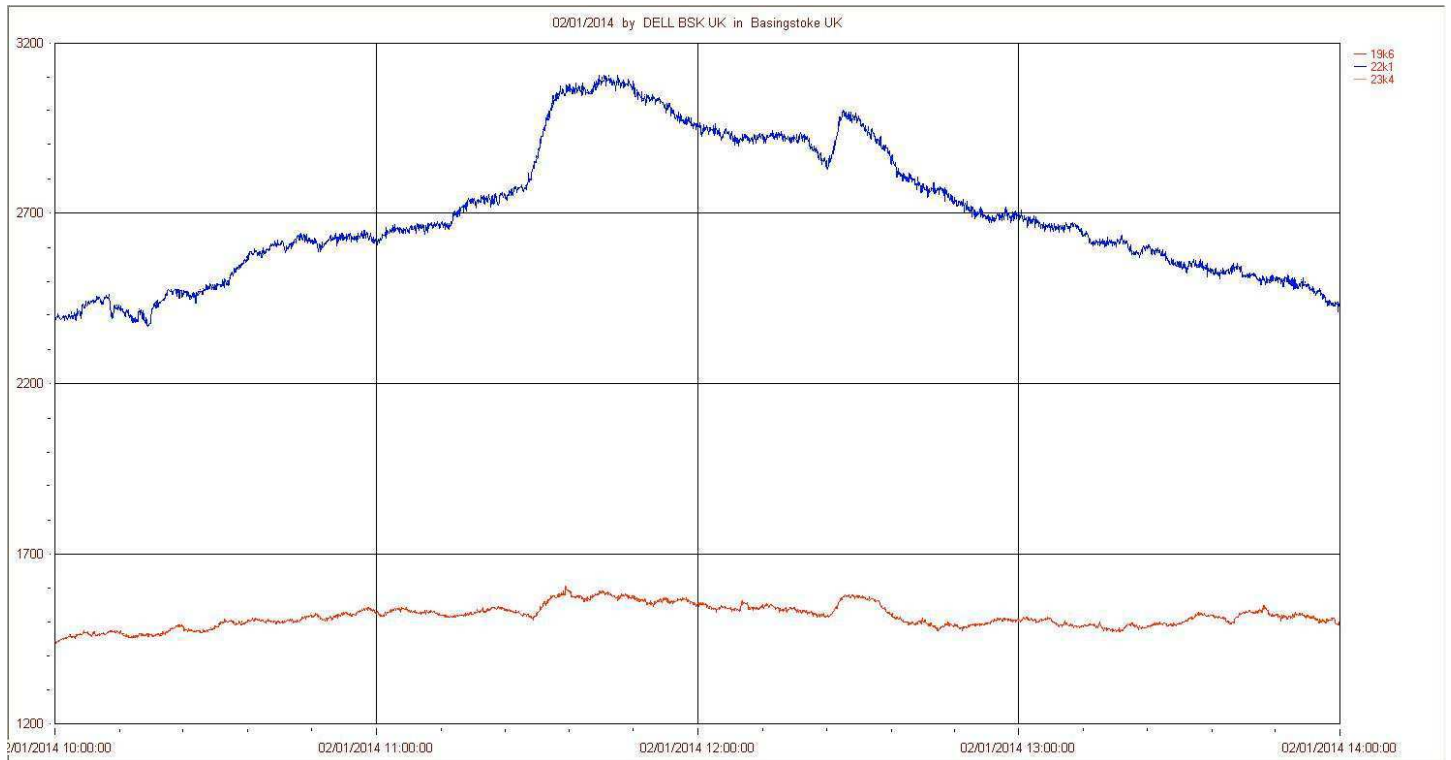


Similar unmatched SIDs were recorded on the 30<sup>th</sup> and 31<sup>st</sup> January. Two unlisted X-ray peaks on the 2<sup>nd</sup> appear to be part of a single complex flare. Active region AR1944 was a growing complex spot group close to the eastern limb of the Sun when it produced a C9.5 flare listed at 12:26UT.



The flare clearly starts around 11:20, and has some minor peaks (11:32, 11:40, 11:44, 11:50) before the strongest peak at 12:26. The decay lasts until nearly 15:00, with a further substantial peak at 14:08. The SIDs are not easy to see at 22.1kHz on my chart, above. The 23.4kHz signal was still switched off at this time.

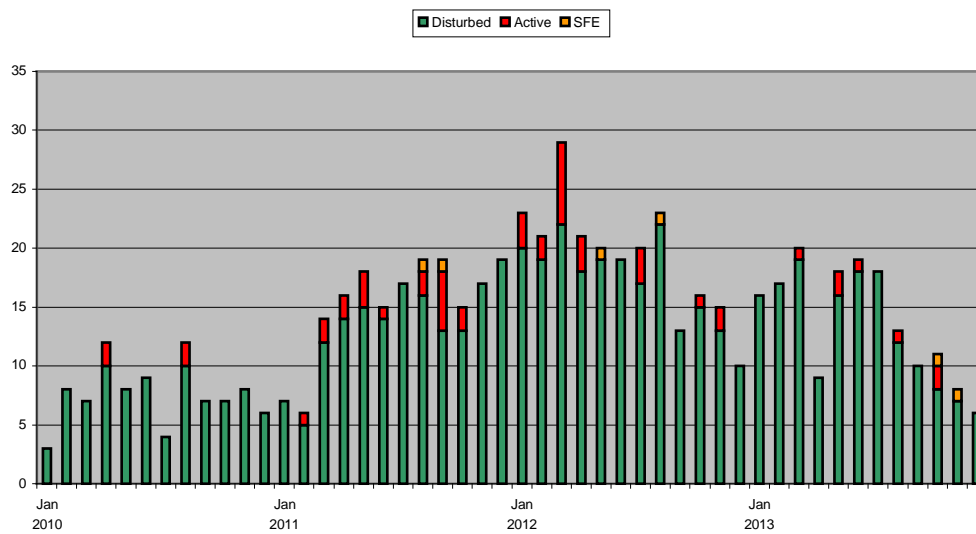
The Chart recorded by Paul Hyde (top of the next page) shows the detail more clearly. The blue trace is 22.1kHz, and clearly shows the initial peak at 11:36 as well as a hint of the smaller peaks before 12:00. The main peak appears as a separate SID at 12:28. The final peak after 14UT is not included. At 19.6kHz the smaller peaks have not recorded, but SIDs at 11:36 and 12:28 are present.



### MAGNETIC OBSERVATIONS.

Much of the magnetic disturbance shown in the Bartels diagram is from Coronal Hole effects, and of fairly low amplitude. As might be expected, the X1.2 Flare on the 7<sup>th</sup> did produce a CME, although its effects on the Earth's magnetic field appear to have been quite small. I measured the CME arrival at 20:11UT on the 9<sup>th</sup>, with a maximum 40nT disturbance lasting just an hour. Using Mark's SID peak timing of 18:25UT on the 7<sup>th</sup> gives a transit time of 49h 46m.

Monthly Magnetic Activity.



The chart above shows the number of active and disturbed days per month over the last four years, together with SFE's. The last five months show a distinct drop in general activity, while the last year has seen far fewer active periods compared to 2011 and 2012. Magnetic observations from Colin Clements and John Cook.

