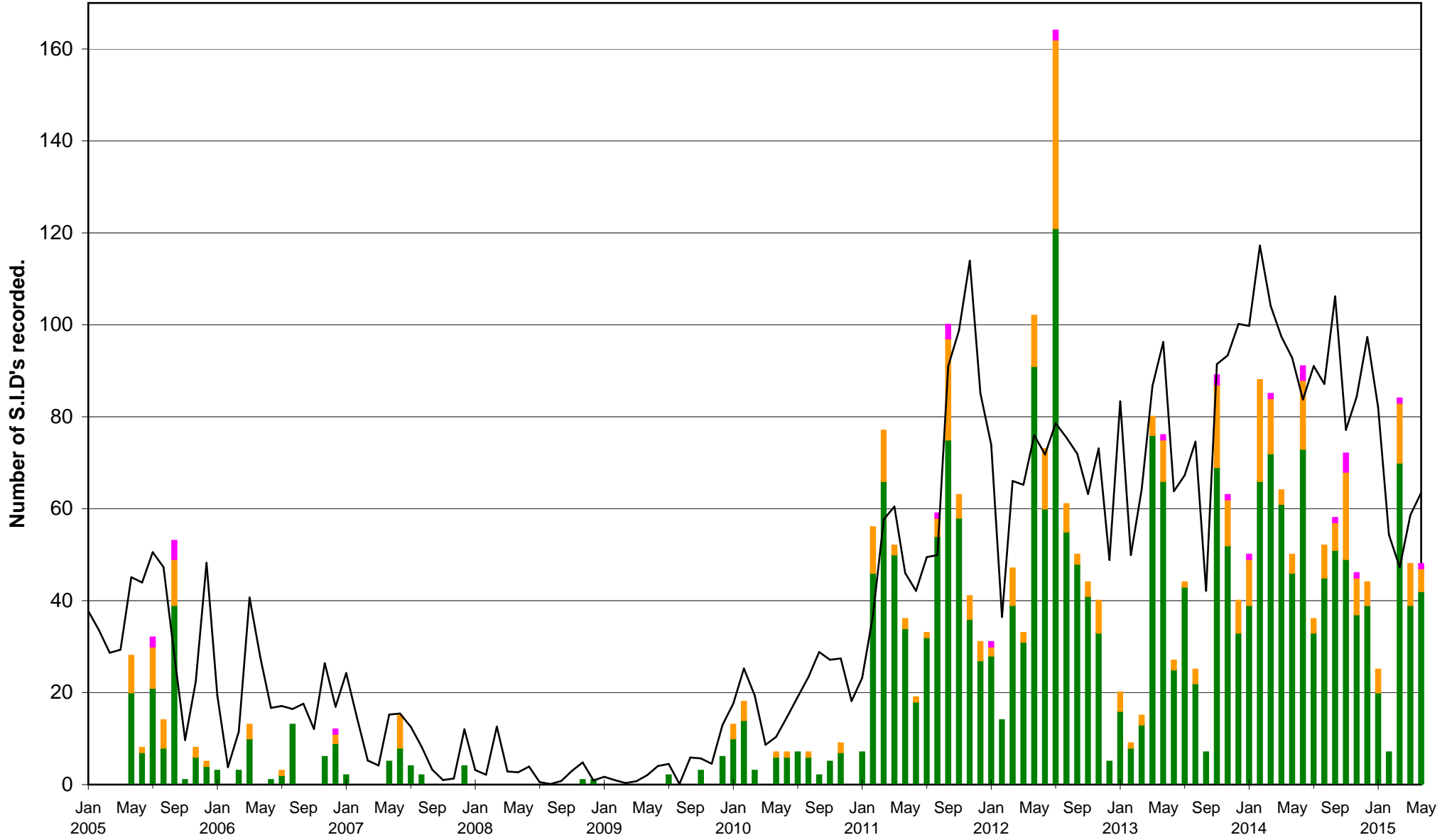


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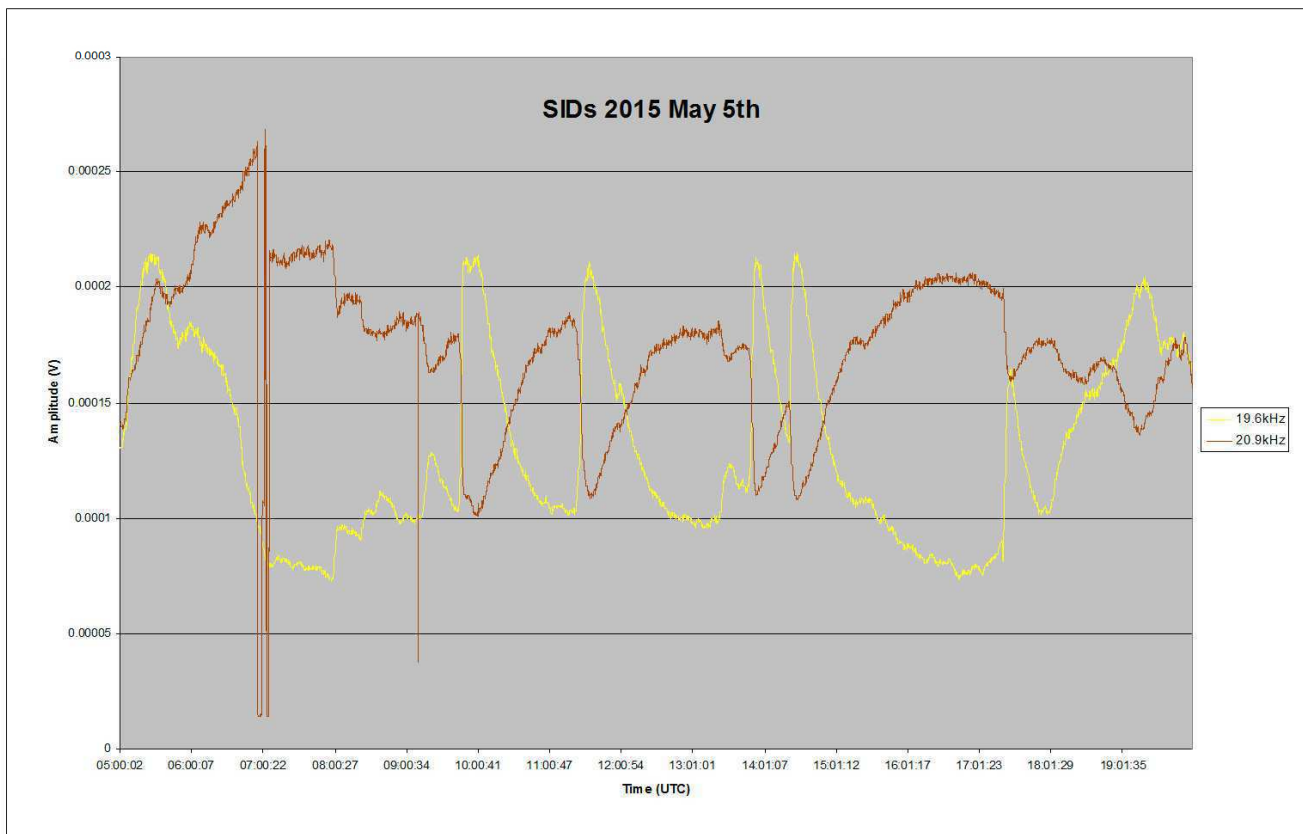
2015 MAY

DAY	Xray class	Observers	John Cook (23.4kHz/22.1kHz)				Roberto Battaiola (20.3kHz)				Paul Hyde (22.1/23.4kHz)				Bob Middlefell (22.1kHz)				Mark Edwards (19.6/24.0/23.4kHz)			
			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)	
3	C1.8	4	09:29	09:35	09:50	1					09:28	09:35	10:06	2					09:32	09:35	09:51	1
4	C1.4	3	08:39	08:44	09:10	1+													08:41	08:52	09:07	1+
4	C2.0	6	10:26	10:32	11:18	2+					10:25	10:32	11:05	2					10:25	10:33	10:52	1+
4	C5.1	5									17:01	17:08	17:41	2					17:01	17:10	17:19	1-
5	C2.6	2	06:57	07:07	?	-					06:58	07:14	07:46	2+								
5	C4.3	5	07:59	08:02	08:12	1-					07:59	08:03	?	-					07:59	08:06	?	-
5	C3.7	5	08:21	08:27	08:55	2					08:21	08:26	?	-					08:22	08:26	?	-
5	?	1																	08:33	08:41	?	-
5	*	2																	08:58	08:59	09:11	1-
5	C3.7	5	09:14	09:19	?	-					08:58	08:59	09:08	1-					09:13	09:20	09:40	1+
5	M1.9	8	09:44	09:48	10:46	2+	09:39	09:49	10:09	1+	09:13	09:21	?	-	09:44	09:49	11:19	3	09:44	09:50	?	-
5	?	1																	09:54	09:58	10:37	2
5	C6.6	8	11:22	11:32	12:28	2+	11:19	11:26	11:42	1	11:21	11:34	12:55	3					11:22	11:34	?	-
5	C3.6	1																	11:57	12:01	12:32	2
5	?	1																	13:25	13:29	13:37	1-
5	?	1																	13:40	13:42	?	-
5	M1.2	7	13:49	13:53	?	-					13:48	13:54	?	-					13:49	13:54	?	-
5	M1.3	8	14:21	14:24	15:14	2+	14:22	14:26	14:39	1-	14:21	14:27	14:54	2					14:21	14:28	14:54	2
5	*	2																	15:16	15:29	?	-
5	?	1																	15:39	15:40	15:49	1-
5	C1.5	2									16:32	16:37	16:54	1					16:34	16:37	16:59	1
5	M2.6	6	17:21	17:25	18:28	2+					17:20	17:27	18:26	2+					17:20	17:27	17:57	2
5	X2.7	1																	22:08	22:16	22:47	2
6	C3.4	3	11:07	11:13	11:30	1					06:38	06:43	?	-					06:39	06:41	06:52	1-
6	C2.4	1									06:53	06:57	07:06	1-								
6	?	1																	10:12	10:15	?	-
6	?	1																	10:21	10:29	10:42	1
6	C3.4	4									11:07	11:16	11:40	2					11:06	11:18	11:30	1
6	M1.9	8	11:47	11:50	12:41	2+	11:46	11:49	11:59	1-	11:48	11:51	12:37	2+					11:48	11:51	12:31	2
6	*	1																	12:47	12:49	13:17	1+
6	C1.5	1																	16:12	16:13	16:18	1-
6	*	2									16:17	16:23	16:55	2					16:26	16:30	16:36	1-
6	C2.0	2									17:16	17:21	17:39	1					17:16	17:20	17:40	1
6	?	1																	17:55	17:57	18:07	1-
7	C1.6	1																	06:24	06:34	06:38	1-
7	C4.3	5	09:58	10:03	10:59	2+					09:56	10:04	10:41	2					09:57	10:06	?	-
7	?	1																	09:58	10:14	10:52	2+
7	*	1																	12:25	12:28	12:36	1-
7	C1.8	5	15:24	15:30	15:47	1					15:24	15:32	16:02	2					15:25	15:32	15:51	1+
7	C2.8	5	16:52	16:57	17:15	1					16:52	16:57	17:34	2					16:52	16:59	17:23	1+
7	?	1																	17:48	17:53	17:56	1-
7	C5.0	1																	19:53	19:59	20:22	1+
8	C4.1	6	09:39	09:41	10:03	1	09:38	09:40	10:00	1	09:39	09:42	10:05	1+					09:39	09:42	10:05	1+
8	C1.4	1																	14:59	15:02	15:10	1-
8	*	1																	15:49	15:51	15:58	1-
9	C3.0	4	08:02	08:12	08:45	2	08:01	08:16	08:41	2	08:03	08:15	09:00	2+					08:05	08:18	08:43	2
9	C1.6	1																	13:54	14:02	14:28	2
10	C1.9	1																				
10	C2.2	6	12:47	12:57	13:30	2	12:46	13:02	13:35	2+	12:47	13:06	13:34	2+					12:48	13:03	13:33	2
10	C2.4	3	17:06	17:12	17:27	1					17:06	17:13	17:35	1+					17:08	17:13	17:35	1+
12	C1.7	4	10:43	10:46	11:02	1					10:43	10:46	11:05	1					10:44	10:49	10:58	1-
12	C3.0	5	11:48	11:52	12:25	2					11:48	11:53	12:24	2					11:48	11:55	12:25	2
12	*	1																	13:41	13:44	13:47	1-
13	C3.5	1					06:01	06:02	06:07	1-												
13	C2.3	6	09:43	09:47	10:50	2+	09:41	09:52	10:18	2	09:43	09:49	10:27	2					09:43	09:55	10:27	2
13	C3.2	6	11:06	11:13	11:45	2	11:05	11:13	11:36	1+	11:06	11:13	12:01	2+					11:07	11:12	11:41	2
13	?	1																	15:35	15:42	?	-
13	?	1																	15:51	15:58	16:15	1
13	C9.2	1																	18:12	18:27	19:13	2+
13	?	1																	18:24	18:29	18:52	1+
14	C2.5	4	07:30	07:32	07:49	1					07:30	07:34	07:59	1+					07:29	07:39	07:51	1
14	C2.8	4	14:01	14:07	14:34	2					14:00	14:05	14:34	2					14:01	14:13	14:50	2+
14	C2.1	1																	16:20	16:34	17:00	2
14	C4.8	5	17:48	17:53	18:10	1	17:48	17:53	18:03	1-	17:49	17:54	18:17	1+					17:48	17:54	18:31	2
17	B9.1	1																	16:02	16:04	16:09	1-
19	C2.3	4	11:58	12:02	12:25	1+					11:58	12:01	12:24	1+					11:58	12:02	12:26	1+
20	C1.6	1									08:06	08:14	08:45	2								
23	C1.1	1									07:21	07:24	07:34	1-								
23	C2.3	2									17:39	17:41	18:03	1					17:33	17:42	17:58	1

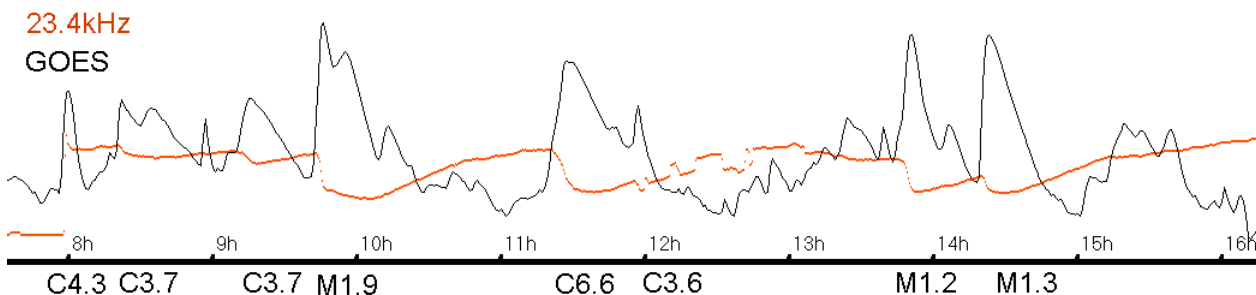
VLF flare activity 2005/15.



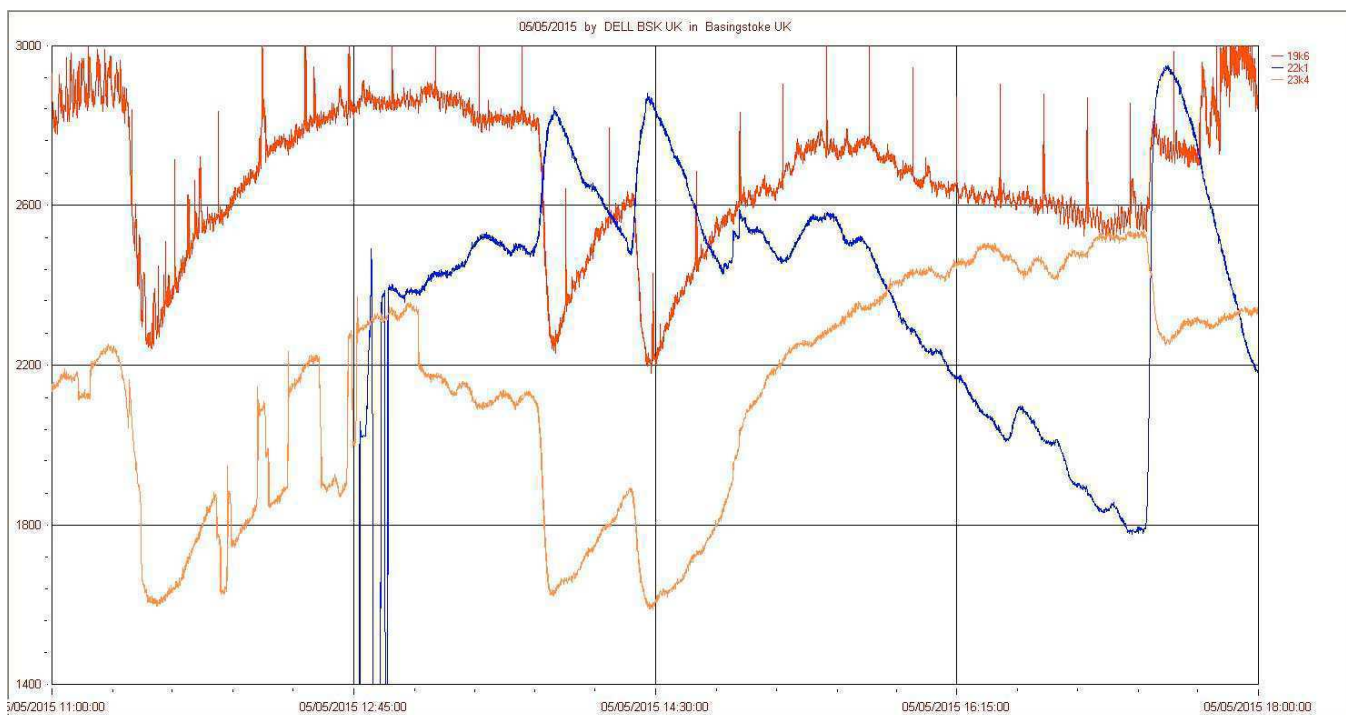
SID activity in May was at a similar level to that in April, although compressed into just over one week. There was a single X-class flare in the GOES record, rather late on May 5th, but recorded on the trans-Atlantic path at 24kHz. Activity dropped to very low levels after mid month, with just the occasional flare present. The background X-ray flux level fell below B2 on the 25th, remaining there for the rest of the month. Peak activity was on the 5th and 6th, with a succession of M and strong C-class flares that produced multiple SIDs, often merging into each other such that end-times could not be measured. Just two active regions were responsible, AR 12335 and AR12339. These were both very large and complex regions, AR12339 exceeding 15 degrees longitude span.



This recording by Mark Edwards shows some of the activity on the 5th. Yellow is 19.6kHz, Brown is 20.9kHz. These signals produce a nice matching set of opposite polarity SIDs.

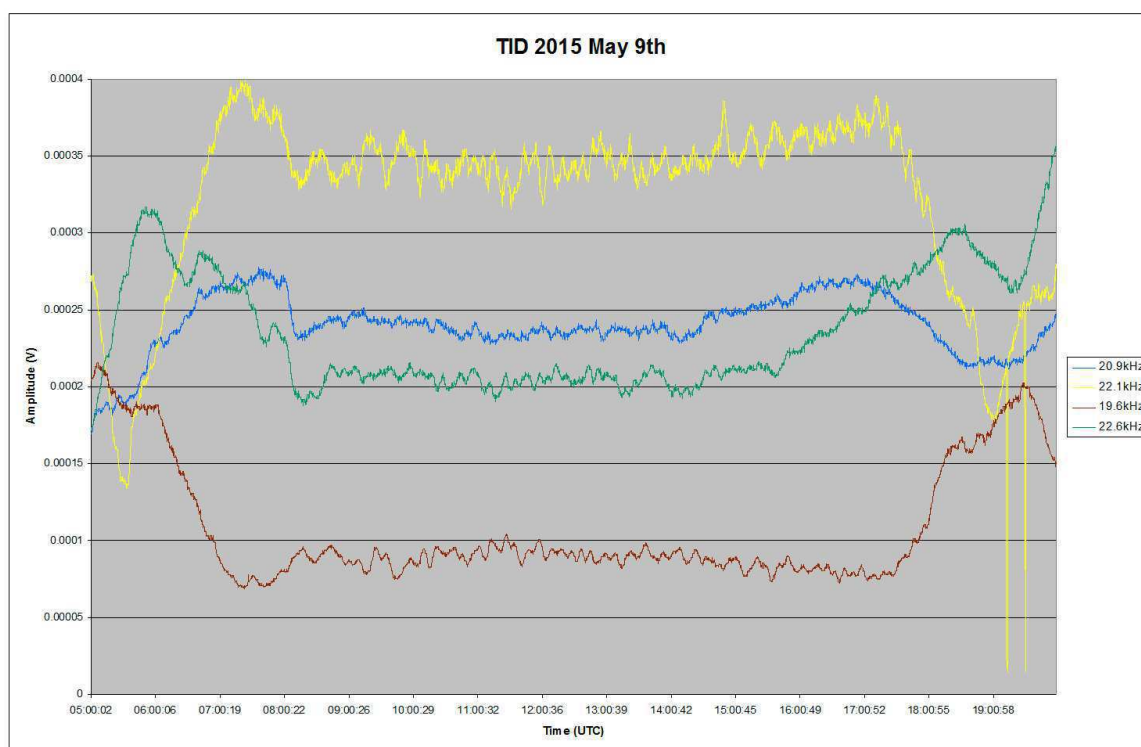


I have added the GOES X-ray data to my own recording, above. As can be seen there are many X-ray peaks between those classified in the SWPC reports. Some of these have produced SIDs, and are listed in the tables. Those marked '*' are shown by the SWPC but without a flare classification. Those marked '?' are not in the SWPC lists and were therefore not correlated with optically visible flares.



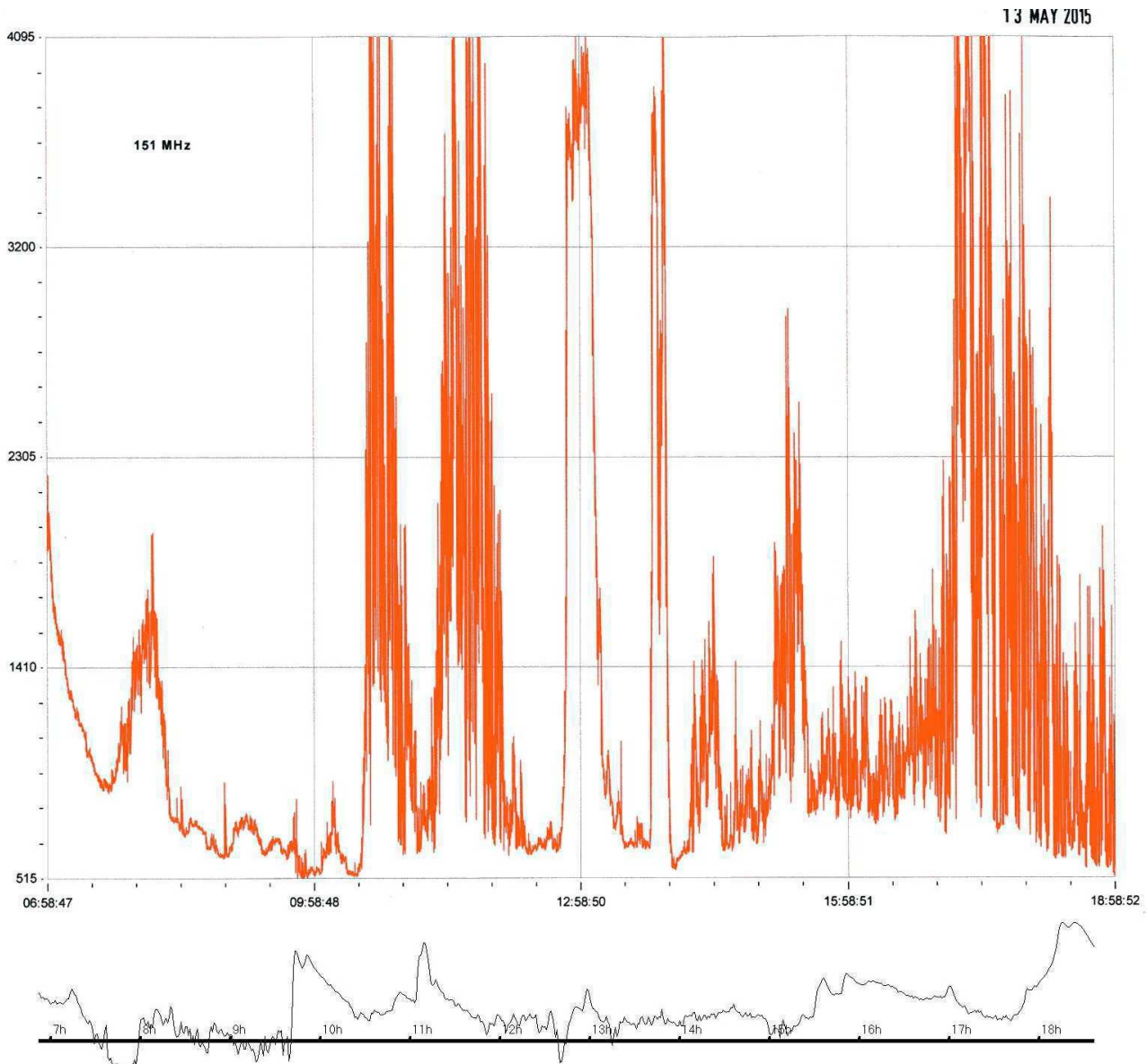
This recording by Paul Hyde also shows May 5th. 22.1kHz (blue) suffered a major drop in signal level around 10UT, recovering just before 13UT. Some disruptive changes in 23.4kHz (yellow) can also be seen for an hour before 22.1kHz returned to normal. Colin Clements noted strong 151MHz noise throughout the day and particularly just after the M1.9 and C6.6 flares.

Although there were plenty of SIDs recorded on the 6th, they were generally from much weaker flares, the most energetic being the M1.9 peaking at 11:50.



This chart by Mark Edwards shows some strong oscillations on the 9th. They are very strong on the 22.1kHz (yellow) and 19.6kHz (brown) signals. They have very similar paths to the north, while 20.9kHz (blue)

and 22.6kHz (green) show reduced oscillations on southerly paths into France. They may possibly be related to a depression crossing the UK at the time.



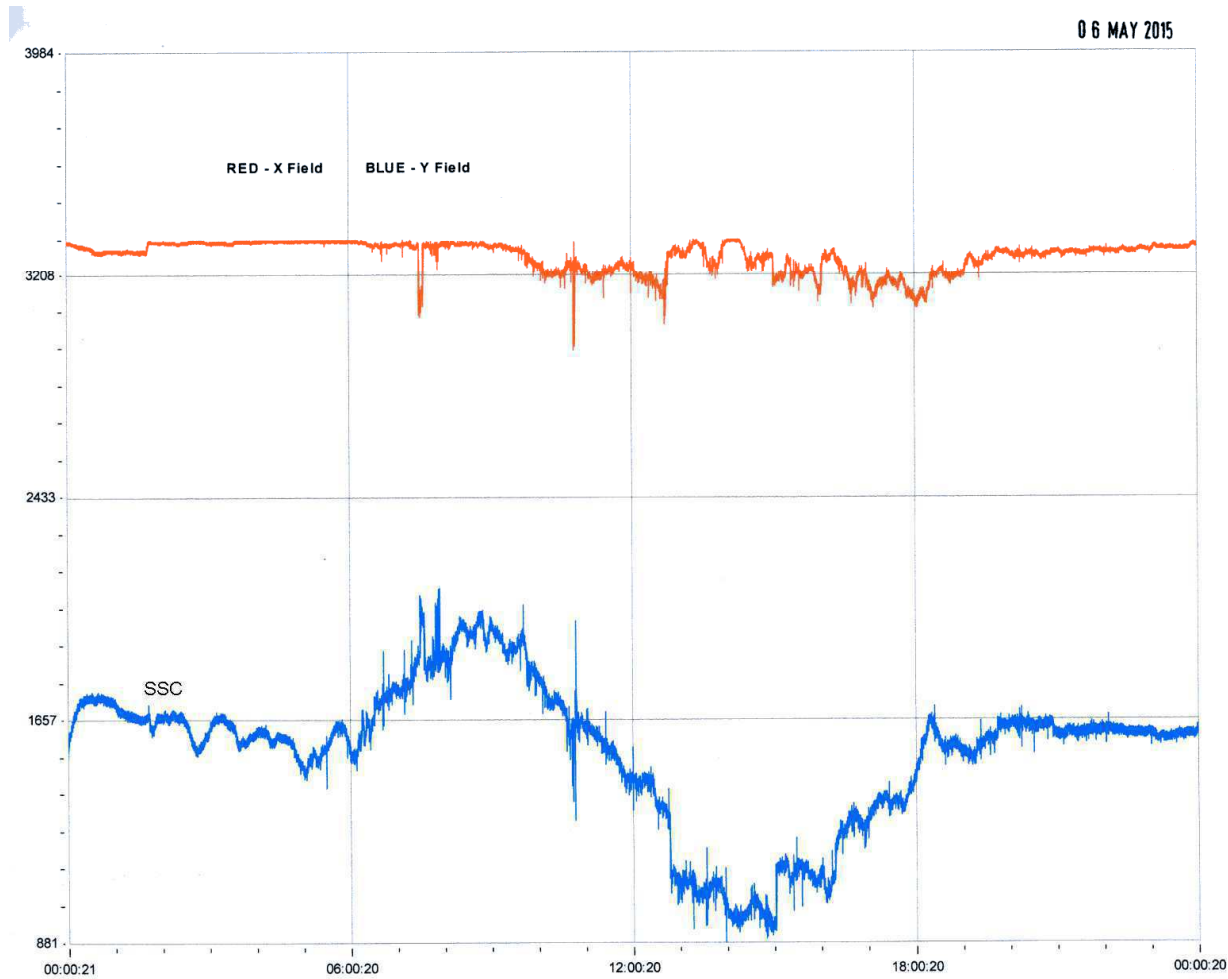
Flare activity was also quite high on the 13th, and Colin Clements recorded significant 151MHz noise throughout the day, shown in red above. GOES X-ray data is in black. AR12339 was again responsible for the morning flares, AR12345 producing the larger C9.2 evening flare. I counted 9 active regions present on the 13th, the highest for the month. Many of these were large and complex, and so the 151MHz noise represents the combined activity from all of these active regions

Over the following week the number of active regions decayed rapidly, as did the X-ray activity. By the end of the month just a few B3 to B5 flares are shown by the SWPC, including several days with no recorded flare activity.

The internal PC clock is not always a very good time keeper, and there are a number of methods used to keep it accurate. Paul Hyde uses 'Dimension 4' software for this purpose, but noted some very strange behaviour on May 5th. Starting just after 5AM it made a total of 16 corrections each of -56 seconds, and then just before 10AM it added over 13 minutes back to leave a resultant 2s correction. Luckily the programme

keeps a log of its activity and so it could be sorted out. This has never been seen before with the software. I wonder whether other observers have had a similar experience?

MAGNETIC OBSERVATIONS.



Colin Clements recorded a well defined SSC at 01:42UT on May 6th, shown above. This was from a CME associated with a large filament eruption on May 2nd. There was no SID recorded from the filament eruption. The subsequent disturbance lasted right through the day, although it was fairly mild in nature. There were several very long filaments visible on the sun at the time, satellite images identifying an 18 degree long filament at 45 degrees south as the culprit. The ejected plasma cloud is believed to have merged with another plasma cloud to produce the SSC.

A slightly stronger (± 40 nT) disturbance was recorded on May 13th from a recurrent Coronal Hole High Speed Stream. The Bartels diagram shows activity from this CHSS in March and April, with a particularly active period on April 16th/17th. This was illustrated in last month's summary.

There were no SFEs recorded in May, the remainder of the activity being mostly very mild, and from Coronal Hole effects. As cycle 24 begins to fade, more coronal holes will begin to open, and remain stable over multiple rotations.

Magnetic observations received from Colin Clements, John Cook, Gonzalo Vargas and Roger Blackwell. Observations to Jacook@jacook.plus.com.

BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).
2440	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			2012 June
2441	F	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			2012 July
2442	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 20 21 22 23 24 25 26 27 28 29			2012 August
2443	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			2012 September
2444	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			2012 October
2445	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 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29			2012 November
2446	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			2012 December
2447	F	2131 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				
2448	F	2132 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				2013 January
2449	F	2133 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				2013 February
2450	F	2134 22 23 24 25 26 27 28 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20				2013 March
2451	F	2135 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				2013 April
2452	F	2136 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				2013 May
2453	F	2137 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				2013 June
2454	F	2138 10 11 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				2013 July
2455	F	2139 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				2013 August
2456	F	2140 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				
2457	F	2141 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				2013 September
2458	F	2142 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				2013 October
2459	F	2143 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				2013 November
2460	F	2144 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				2013 December
2461	F	2145 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				2014 January
2462	F	2146 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				2014 February
2463	F	2147 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 1 2 3 4 5 6				2014 March
2464	F	2148 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				2014 April
2465	F	2149 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				
2466	F	2150 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				2014 May
2467	F	2151 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				2014 June
2468	F	2152 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				2014 July
2469	F	2153 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				2014 August
2470	F	2154 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				2014 September
2471	F	2155 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				2014 October
2472	F	2156 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				2014 November
2473	F	2157 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				
2474	F	2158 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				2014 December
2475	F	2159 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				2015 January
2476	F	2160 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				2015 February
2477	F	2161 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				2015 March
2478	F	2162 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				2015 April
2479	F	2163 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				2015 May
2480	F	2164 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				2015 June