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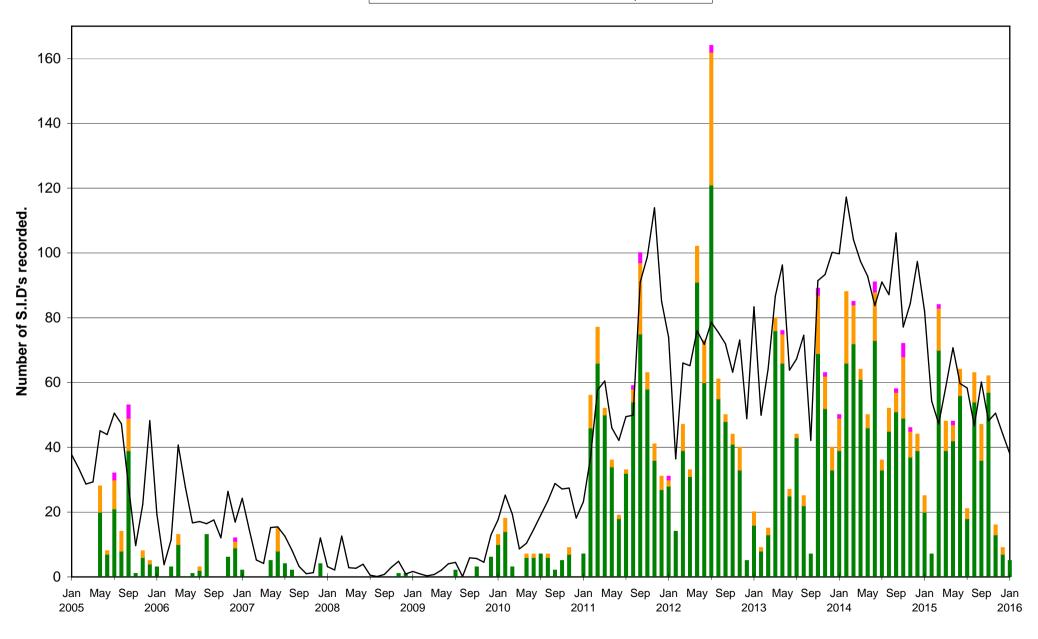
2016 JANUARY

	SS	ers	John Co	ook (23.4	4kHz/22 <i>.1kl</i>	Hz)	Robe	rto Batta	aiola (20.9kHz)	Paul	Hyde (2	22.1/23.4kl	Hz)	Mark Edv	vards (2	0.9 /24.0/18	.3kHz)	Colin Cl	ements (23.4kHz/22.1	1kHz)	
	Xray class	Observe			luency recei ne aerial.	ver,	Mod	ified AA	VSO receiver.			quency rec ime aerial.		Spectrum	n Lab / F	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)		
6 15	C1.8 C1.7	2 1	11:36	11:38	11:47	1-								11:36 15:21	11:39 15:26	11:49 15:31	1- 1-					
27	C1.0	3								13:29	13:31	13:58	1+	13:29	13:32	13:36	1-	13:19	13:28	13:30	1-	
28	C9.6	7	11:55	12:02	12:23	1+				11:55	12:03	12:33	2	11:57	12:03	12:25	1+	11:56	12:01	12:16	1	
29	C3.5	1	08:13	08:17	08:28	1-																

		Stev	e Parkins	son (Variou	us)	John	Wardle	(19.6/23.4kH	z)	Ph	il Rourk	e (23.4kHz)		Jim B	Barber	John Elliott (18.3kHz)					
		Tuned radio frequency receiver, frame aerials.				PC sou).7m frame a	erial.	Spectrur	m Lab, 0	.6m frame aerial.	Spectrur	m 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)			
6 15 27 28 29	C1.8 C1.7 C1.0 C9.6 C3.5	11:56	12:02	12:21	1	11:56	12:03	12:20	1							12:00	12:10	12:30	1+		

VLF flare activity 2005/16.

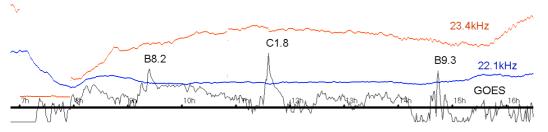
C M X — Relative sunspot number



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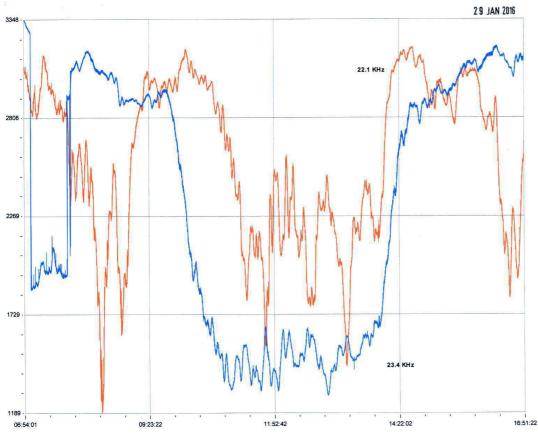
2016 JANUARY.

The decline in solar activity at the end of 2015 has continued into the new year, with just five flares recorded as SIDs. None were of M- or X-class, although the GOES data does show a single M2.3 flare at 00:11UT on the 1st. From then until the 12th there were a total of just 23 flares, mostly of B-class. A single C1.8 flare was well timed near midday on the 6th, but general ionospheric instability made the SID very difficult to record.

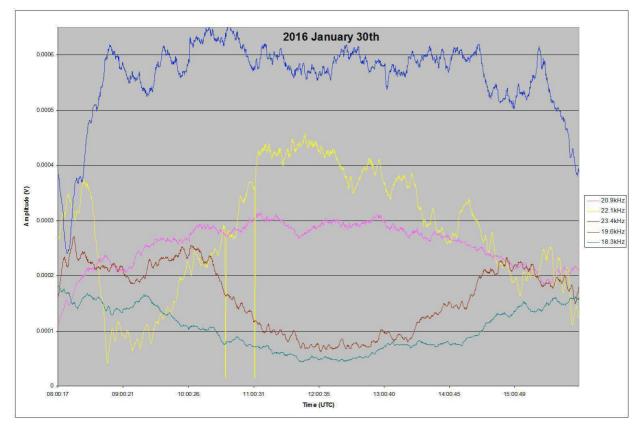


I have added the GOES X-ray flux to my own recording, above, to show just how insignificant this SID was.

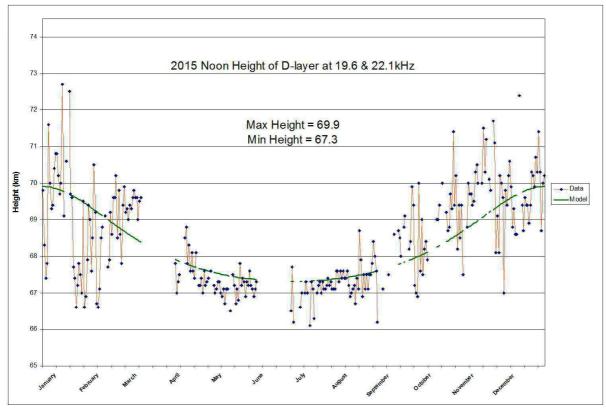
Noise from ionospheric instability has been a major feature through January. Colin Clements reported that it seemed to increase in magnitude through the month, an effect that I also noticed along with a general increase in signal level at 23.4kHz. On several occasions my receiver was saturated during the day, with much lower signal levels at night. Colin's recording from the 29th is shown below:



22.1kHz is in red, and shows some very strong disturbances from about 11 to 14:00UT. Mark Edwards also noted these oscillations on the 29th, and particularly on the 30th shown on the next page:



Much of the UK was battered by strong storms at the end of January, and some of this ionospheric instability may well be linked to these weather systems. Modelling the D-region height, Mark noted a significant rise from 69.4km on the 29th to 71.2km on the 30th. Mark has also produced his usual chart of D-region height in 2015, based on observations at 19.6kHz and 22.1kHz:

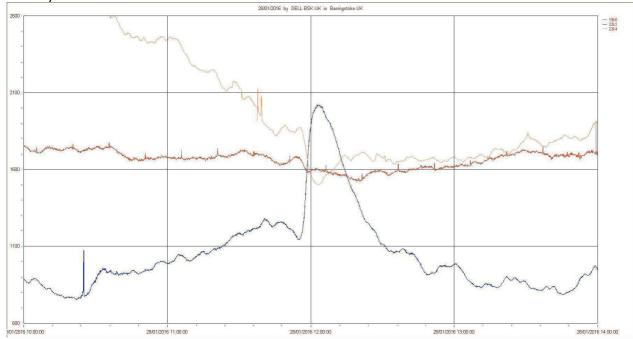


Red is the actual data, green is the model output. Note the large variations in actual height through the winter months compared to summer.

It is also interesting to see how the maximum and minimum heights have changed over the last five years:

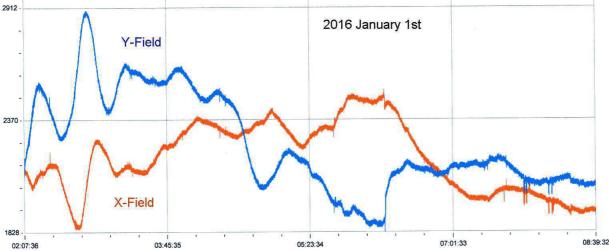
	Maximum	Minimum	Range
2011	71.6km	67.0km	4.6km
2012	71.8km	66.8km	5.0km
2013	71.4km	66.8km	4.6km
2014	71.0km	67.2km	3.8km
2015	69.9km	67.3km	2.6km

The C9.6 flare on the 28th produced the best recorded SID of the month, well shown in the chart by Paul Hyde:



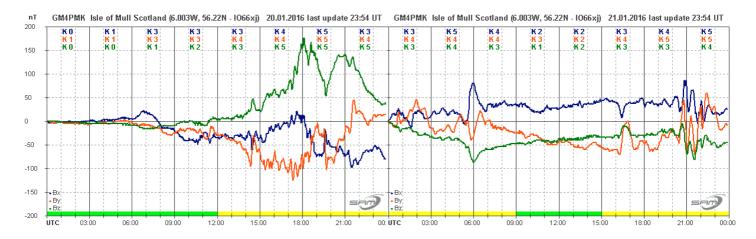
The blue trace (22.1kHz) shows a very strong SID, with a rather smaller SID at 23.4kHz (yellow). Strangely, it has hardly recorded any SID at 19.6kHz (red), despite the very similar path to that at 22.1kHz.

MAGNETIC OBSERVATIONS.



In the December summary I noted a strong magnetic disturbance on December 31st. This continued on January 1st, lasting until about 10:00UT. Colin Clements recorded a part of this activity:

The only strong CME in January originated with a filament eruption in the solar southern hemisphere on the 14th. ACE satellite data shows a magnetic shock at 20:56 on the 18th, but I have no SSC recorded for this event. There followed a very mild magnetic disturbance on the 19th, but its real effect was not seen until the 20th and 21st. CHHSS effects added to the CME in the afternoon of the 21st, increasing the strength of the disturbance. I have combined two of Roger Blackwell's charts to show the activity. Note that the magnetometer is reset at local midnight, producing a discontinuity.



There was a very mild disturbance overnight on the 6th/7th of January, measuring about 28nT on my single-axis magnetometer. This was from a recurrent coronal hole high speed stream. CHHSS effects were also responsible for a longer period of disturbance from the 10th to 13th, measuring about 50nT maximum.

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

BAA Radio Astronomy Group

BARTELS DIAGRAM

DAA I	Radio Astro	noniy (noup				_					BAKT	els dia	AGKAM													
ROTATION	KEY:	2138	DISTU	RBED.			ACTIVE			SFE			B, C, M,	X = FLA	RE MAG	NITUDE	i.	Sj	nodic ro/ (carrin)	otation sta gton's).	art	2013 Ju	h				
2454	10 F BC	2130	12	13	14	15	16	17	18	19 CC	20 CCC	21 CC	22 C	23 M	24 CCCC	25 B	26 C	27 CBC	28 C	29	30 CCCC	2013-30 1 CC	2 CC	3 MCCC	4 CCCC	5 CCCC 2013 Au	6
2455	7 F CB	8	9 C	10 C	11 CC	12 C	13 C	14 C	15 CC	16 C	17 C	18 CC	19	20	21 CC	22	23	24	25	26	27 C	28 CCCC	29 C	30	31	1	2
2456	3 F	2140 4	5	6	7	8	9	10	11 CCC	12 M	13 CCCC	14 CCC	15 CC	16 CC	17 CMM	18 C	19 C	20 C	21 CC	22 C	23	24	25	26	27	28	29
2457	30 F	31 C	2013 Se 1 C	ptembe 2	r 3 BC	4 C	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 CCCC	21	22	23	24	25
2458	26 F	27	2142 28	29	30	2013 O 1	ctober 2	3	4	5	6 C	7 C	8	9 C	10 CCCC	11 MCCC	12 CCC	13 C	14 C	15 CMCC	16 CCC	17 CCM	18 CCCC	19 CCC	20 CC	21	22 CCCM
2459	23 F CCCC	24 CMMC	2143 25 XMXM	26 MMMM	27 CCMC	28 MMMM	29 CCCC	30 C	31 MCC	2013 N 1 C	ovembe 2 CCC	r 3 C	4 CCC	5 MCCM	6 CCCM	7 CCMC	8 M	9 CC	10 CCC	11 CMC	12 CC	13 CCCM	14 CCC	15 C	16 MCC	17 CCC	18 CCC
2460	19 F X	20 CC	2144 21 M	22 C	23 CCM	24 CC	25	26	27	28	29	30	2013 D 1 C	ecember 2 C	3	4	5 C	6 C	7	8 C	9 CCC	10	11 CC	12 C	13	14 CC	15 CC
2461	16 F C	17	18	2145 19 C	20 CMCC	21 C	22 MMMM	23 M	24	25 C	26	27 CC	28 CC	29 MCCC	30 C	31 C	2014 Ja 1 C	nuary 2 C	3 CCMC	4 CCMC	5 C	6 C	7 CMCX	8 CCCC	9	10	11 CCC
2462	12 F	13 CC	14 C	2146 15	16 C	17 CCCC	18 CC	19	20	21	22	23	24	25	26 C	27 C	28 MMMM	29 CCC	30 MCC	31 CM	2014 Fe 1 CCCC	ebruary 2 MMMM	3 CCCC	4 MCCM	5 CCCM	6 CCC	7 CCMC
2463	8 F CCC	9 M	10 CC	11 CM	2147 12 CM	13 MCCM	14 CMMM	15	16 MCC	17 CCC	18 CC	19 C	20 M	21 CC	22 C	23 CC	24 MMC	25 C	26 CCM	27 CCCC	28 CCC	2014 Ma 1 MC	arch 2 CCC	3 CCCM	4 CCCC	5 C	6
2464	7 F	8	9 CCMM	10 CCCM	2148 11 CMCC	12	13 CCM	14 C	15 CCC	16 CC	17 CCC	18 C	19 CCCC	20 CC	21 C	22 MCC	23 CC	24 CC	25	26 CC	27	28 CM	29 CCCX	30 M	31 MC	2014 Ap 1	2 CCM
2465	3 F CC	4 CCC	5 CCC	6	2149 7 CC	8	9	10 C	11 CCC	12 C	13 C	14 CCCC	15 CCCC	16 CCCM	17 CC	18 CM	19 CCCC	20 CCCC	21 C	22 CCCC	23 CCCC	24 C	25 CC	26 C	27	28 BC	29 B
2466	30 F B	2014 M 1	2	3 CCCC	4 CCCC	2150 5 C	6 MCC	7 CMC	8 M	9 CCCC	10 CCC	11 CCCC	12	13 C	14 CCC	15 C	16 CCC	17	18	19	20 B	21 C	22 C	23	24 M	25 C	26 CCC
2467	27 F C	28	29	30	31 B	2014 Ju 1 C	2 M	3 CCM	4	5	6	7 CC	8 CC	9 CCC	10 CCXX	11 MMXC	12 MMMM	13 MCCC	14 CCM	15 CMCC	16 CCCC	17 CBCC	18 CC	19 C	20 CC	21 C	22 B
2468	23 F	24 BBB	25	26	27	2152 28 CCCC	29	30 CC	2014 Ju 1 CCCM	ly 2 C	3	4 C	5	6 CC	7 CC	8 CM	9 C	10 CC	11	12 CCC	13 CCCC	14	15	16	17	18	19
2469	20 F	21 B	22	23	24	2153 25 C		27 CC	28	29 CC	30 CC	31 CMCC	2014 Au 1 CMM		3 C	4	5 CCC	6	7	8 CCCC	9 C	10	11	12	13	14	15 CC
2470	16 F C	17	18 C	19	20 CCCC	21 CMCC	2154 22 MCCC	23 CCCC	24 CMC	25 MM	26 C	27	28 CB	29 C	30 CCB	31 CCCC	2014 Se 1 CC	eptember 2 CC	3 CCM	4 CCCC	5 CC	6 CCMC	7 CCC	8 C	9 C	10 CCX	11 CCM
2471	12 F CCCC	13 CC	14	15	16 CC	17	2155 18 CMC	19 C	20 CC	21 CCC	22	23	24 CC	25 C	26 CCC	27 M	28 CCMM	29 C	30	2014 Oc 1	tober 2 MM	3 CCC	4	5	6	7	8 C
2472	9 F MCCC	10	11	12	13	14	2156 15	16 CCM	17 CC	18 MCCC	19 CCCC	20 MCMM	21 CCCM	22 CCXM	23 MCC	24 MCC	25 CCCX	26 XCCM	27 CCMX	28 CCM	29 MMMM	30 CCCC	31	2014 N 1 CCCC	ovember 2	3 M	4 MM
2473	5 F MC	6 C	7 MCCX	8	9 CCM	10 CC	2157 11 C	12 C	13 C	14 CC	15 M	16 CCCM	17 C	18	19	20	21	22 C	23 C	24 C	25	26	27 CCC	28 C	29 CCCC	30 CC	1
2474	2014 De 2 F CCC	3 CCCC	4 MCM	5 CCM	6 C	7	8	2158 9 CCCCC	10	11 C	12 C	13 CCC	14 CC	15	16 CCC	17 CC	18 CCC	19 MC	20 C	21 M	22 C	23	24	25 C	26 C	27	28 C
2475	29 F C	30	31 C	2015 Ja 1	anuary 2	3 M	4 M	2159 5 C	6 C	7 CC	8 C	9 C	10 C	11	12 CC	13 C	14 CM	15 CC	16	17	18	19	20	21 CCC	22	23 CC	24
2476	25 F	26	27 CC	28 C	29 MC	30 M	31	2015 Fe 1 C	bruary 2	3 CC	4 C	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 C
2477	21 F	22	23	24	25	26	27	28 CC	2015 Ma 1 C	arch 2 CMCCN	3 1 CC	4 CC	5 CM	6 MCCC	7	8 C	9 CCMC	10 CCCC	11 MMCX	12 CMMM	13 C	14 CCCC	15 MCCC	16 CCMC	17	18 CCCC	19 C
2478	20 F	21	22	23 C	24	25 CC	26 CC	27 CCC	2162 28 CC	29 CCCC	30 CC	31	2015 Aj 1	pril 2	3	4	5	6	7	8 M	9 CCCC	10 CCCC	11 C	12 CMCC	13 CCC	14	15 C
2479	F CCCC	17 C	18 CCC	19	20	21 MMMM	22 CCMC	23 CMCC	2163 24 C	25 C	26 C	27	28	29	30	2015 M 1	ay 2	3 C	4 CCC	5 MMMX	6 CCMC	7 CCCC	8 CC	9 CC	10 CCC	11	12 CC
2480	13 F CCCC	14 CCCC	15	16	17 B	18	19 C	20 C	21	2164 22	23 CC	24	25	26	27	28	29	30	31	2015Jur 1	e 2 C	3	4 CC	5 CC	6	7 CC	8
2481	9 F	10 CCC	11 CMCC	12 CC	13 MCCC	14 C	15 CC	16 CC	17 CC	2165 18 CCM		20 MC	21 MCCM	22 CCCM	23 C	24 C	25 M	26	27	28 C	29 CCCC	30 C	2015 Ju 1		3 CCCM	4	5
2482	F MCCM	7 C	8	9	10 C	11	12	13	14 C	2166 15		17	18 C	19	20	21	22	23	24 CC	25	26 C	27	28	29	30	31	1 C
2483	2015 Au 2 F		4	5	6 C	7 CBCC	8 CC	9 C	10	11	2167 12	, 13	14	15 C	16	17	18	19	20 CC	21 MCM	22	23 CCCC	24 MCCM	25 CCCC	26 CC	27 M	28 CMCM
2484	29 F CCC	30 CC	31	2015 Se 1	eptembe 2		4	5	6	2168 7	8	9	10	11	12	13	14	15	16 CC	17 CMCC	18 C	19 C	20 CCM	21	22	23 CCC	24
2485	25 F	26 C	27 CMCC	28 MCMM	29 MMCM	30	2015 Oc 1 CCM	tober 2 CCMM	3 CCCC	2169 4	5	6	7	8	9	10	11	12	13 CC	14 CC	15	16 MCCC	17	18	19 CCC	20 C	21 CCC
2486	22 F	23	24	25	26 C	27	28 C	29 CC	30 CCCC	31 CCCM	1	ovember 2 CCCC	3	4 CMM	5	6	7	8	9 M	10 CC	11	12	13	14	15	16	17
2487	- 18 F	19	20	21 C	22	23	24	25	26	27	2171 28		30		ecember 2	3	4	5 C	6	7	8	9	10 C	11	12 CC	13	14
2488	15 F	16	17	18	19	20	21 M	22 C	23	24	2172 25	26	27	28 M	29 C	30	31	2016 Ja 1	nuary 2	3	4	5	6 C	7	8	9	10
2489	11 F	12	13	14	15 C	16	17	18	19	20	21	2173 22	23	24	25	26	27 C	28 C	29 C	30	31	2016 Fe 1		3	4	5	6
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