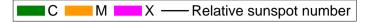
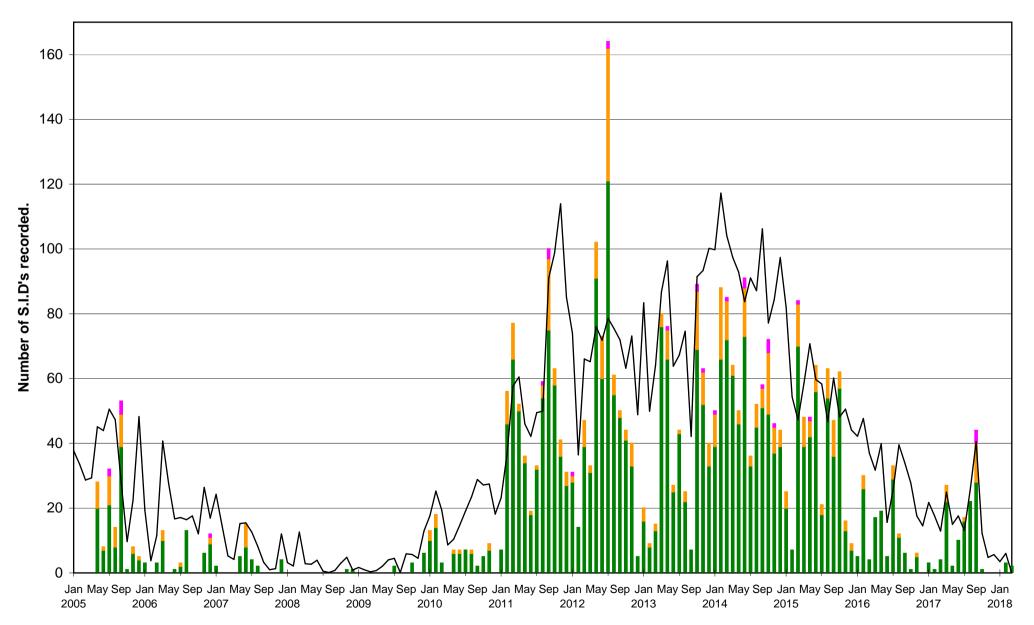
# **2018 MARCH**

	class	ers	John Cook (23.4kHz/22.1kHz)	Roberto Battaiola (18.3kHz)	Paul Hyde (22.1kHz/24kHz)	Mark Edwards (24.0kHz)	Colin Clements (23.4kHz/22.1kHz)				
	Xray cla	Observers	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)				
2 30	C1.9 C4.6	4 6	11:03 11:08 11:19 1- 08:02 08:06 08:21 1	08:00 08:07 08:17 1-	11:03 11:09 11:27 1 08:00 08:06 08:20 1	11:04 11:08 11:20 1- 08:01 08:05 08:19 1-					
	S		Steve Parkinson (Various)	Andrew Thomas (23.4kHz)	Phil Rourke (23.4kHz)	Jim Barber	John Elliott (18.3kHz)				
	Xray class		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 2 30	C1.9 C4.6		START PEAK END (UT)  11:03 11:09 11:22 1  08:00 08:05 08:32 1+	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)				
	SS		Colin Briden (22.1kHz)								
	Xray class		Spectrum Lab / PC, 1.2m frame aerial.								
DAY			START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)	START PEAK END (UT)				
2 30	C1.9 C4.6		08:03 08:09 08:18 1-								

# VLF flare activity 2005/18.

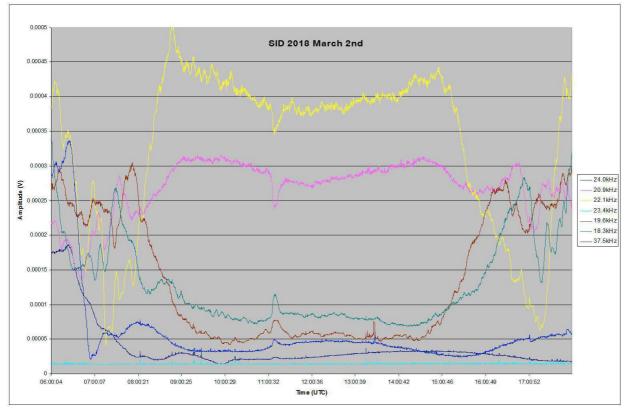




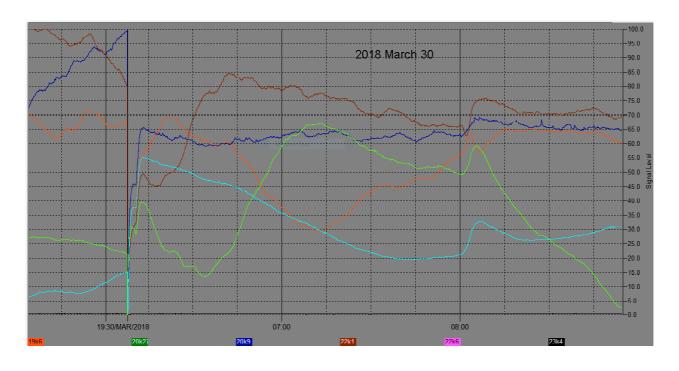
### **BAA Radio Astronomy Group.**

# 2018 MARCH.

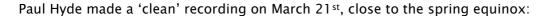
Solar flare activity remained low through March, with just two flares being recorded as SIDs. The background X-ray flux as measured by GOES15 was close to A2/3 all month apart from a few days around the two flares listed. The active regions responsible were very small, and did not remain visible for very long.

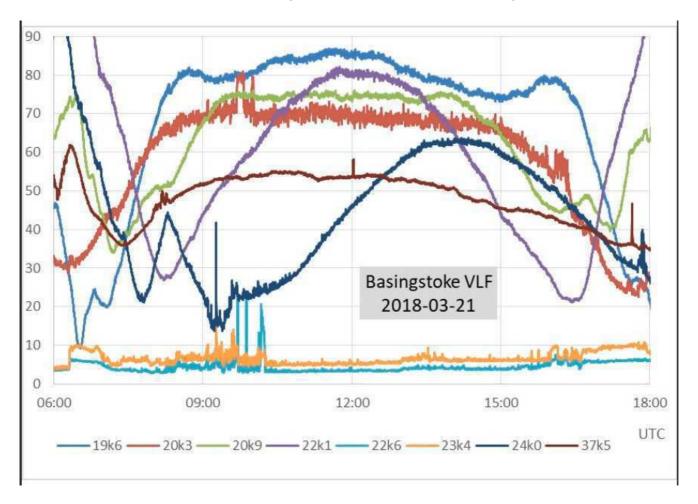


The first of the flares was at 11:08UT on the 2<sup>nd</sup>, shown in this recording by Mark Edwards. There were several small B-class flares before the C1.9, but they were too small to produce SIDs. Note the light blue trace at the bottom of the chart, showing that 23.4kHz was off-air. Apart from a few brief appearances, it was off for the entire month.



The second flare was at 08:09UT on the 30th, shown in the above recording by Colin Briden. There is a transient at the left of the chart where the day's recording starts. The C4.6 flare shows well at all frequencies, with strong 'spike-and-wave' SIDs at 22.1kHz and 19.6kHz. There were also some weaker B-class flares, again too small to produce SIDs.



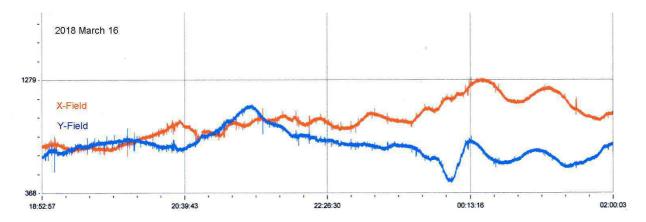


The 22.1kHz and 19.6kHz signals show nice diurnal curves with peaks in signal strength close to 12UT, while the more southerly paths at 20.9kHz and 20.3kHz show much flatter curves centred around 12UT. 24kHz and 37.5kHz are both westerly paths, but show very different diurnal curves. 24kHz peaks at around 14UT, as might be expected, but 37.5kHz appears to be peaking before 12UT which is rather odd. 23.4kHz and 22.6kHz are both off, although showing some interference. It would be interesting to repeat the recording close to the autumn equinox to see how it compares.

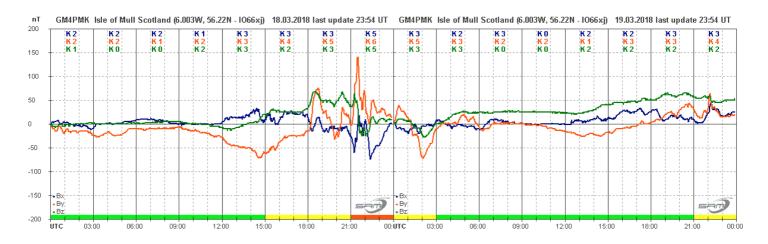
#### MAGNETIC OBSERVATIONS.

Satellite images showed a small CME leaving the sun early on the 6th, although no flares were seen at the time. This gave rise to some minor magnetic disturbances on the 9th and 10th. Small transients between 17:30 and 18:20UT in our magnetic recordings show its arrival. With a transit time of about three and a half days, this was a very slow CME, its effects fading by about 06UT on the 10th. The remainder of the magnetic activity was from coronal holes, starting with the stream seen at the end of February. This produced very minor activity on the 1st and 2nd.

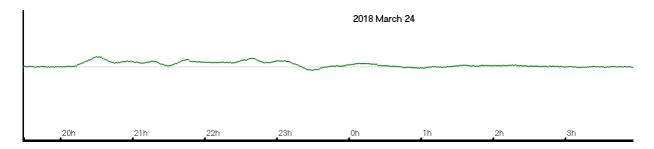
A much larger equatorial hole produced disturbances starting on the 14<sup>th</sup>. Initially these were fairly mild, as shown in this recording by Colin Clements from the 16<sup>th</sup> and 17<sup>th</sup>:



It became far more active overnight on the 18th and 19th, as recorded by Roger Blackwell:



A much smaller coronal hole appeared a few days later, giving further mild disturbances. My own single-axis recording shows the minor disturbance from about 20UT on the 23<sup>rd</sup>, and fading just after midnight. Similar minor disturbances followed on the 24<sup>th</sup> and 25<sup>th</sup>.



As can be seen from the Bartels diagram, these coronal holes are recurrent features that have been seen over the last three solar rotations, changing only in size and geometry.

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

BAA Radio Astronomy Group BARTELS DIAGRAM

ROTATION	KEY:		DISTU	IPRED			ACTIVE			SFE			всм	X = FLAF	PE MAGI	NITLIDE	:	S	ynodic ro		art						T
2478	20	21	22		24	25			2162		20		2015 Ap		AL WAG	4		6	(carrin	gton's).	0	10	44	40	42	14	15
	F	21		23 C	24	25 CC	CC	CCC	28 CC 2163	CCCC	30 CC	31	'		3	4 2015 M	ay	6	,	M	CCCC	10 CCCC	С	12 CMCC	13 CCC	14	15 C
2479	F CCCC	17 C	18 CCC	19	20	21 MMMM	22 CCMC	23 CMCC	24 C	25 C 2164	26 C	27	28	29	30	1	2	3 C	4 CCC	5 MMMX 2015Ju	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	<b>20</b> C	21	22	23 CC	24	25	26	27	28	29	30	31	1	2 C	3	4 CC	5 CC	6	7 CC	8
2481	9	10 CCC	11 CMCC	12 CC	13 MCCC	14 C	15 CC	16 CC	17 CC	2165 18 CCM	19 CCCC	20 MC	21 MCCM	22 CCCM	23 C	24 C	25 M	26	27	28 C	29 CCCC	<b>30</b> C	2015 Ju 1	ıly 2 C	3 CCCM	4	5
2482	6	7	8	9	10	11	12	13	14	2166 15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1
2483	7 MCCM 2015 Au	C ugust 3	4	5	<u>C</u>	7	8	9	C 10	11	2167	13	C 14	15	16	17	18	19	20	21	C 	23	24	25	26	27	C 28
	F			2015 Se	C eptember		СС	С		2168				С					CC	MCM	MCCM	CCCC	МССМ	CCCC	CC	М	CMCM
2484	F CCC	30 CC	31	1	2	3 C	4 2015 Oc	5 ctober	6	2169	8	9	10	11	12	13	14	15	16 CC	17 CMCC	18 C	19 C	CCM	21	22	23 CCC	24
2485	25 F	26 C	27 CMCC	28 MCMM	29 MMCM	30 CMCM	1	2 CCMM	3 CCCC	4	5	6	7	8	9	10	11	12	13 CC	14 CC	15 CCCC	16 MCCC	17 CCCC	18	19 CCC	20 C	21 CCC
2486	22 F	23	24	25	26 C	27	28 C	29 CC	30 CCCC	31 CCCM	2015 No 1 CCCC	2 CCCC	3	4 CMM	5	6	7	8	9 M	10 CC	11	12	13	14	15	16	17
2487	18	19	20	21 C	22	23	24	25	26	27	2171 28	29	30	2015 De 1	cember 2	3	4	5 C	6	7	8	9	10 C	11	12 CC	13	14
2488	15	16	17	18	19	20	21	22	23	24	2172 25	26	27	28	29	30	31	2016 Ja	nuary 2	3	4	5	6	7	8	9	10
2489	F 11	12	13	14	15	16	17	C 18	19	20	21	2173	23	M 24	25	26	27	28	29	30	31	2016 Fe	C ebruary	3	4	5	6
	F				С							2174					С	С	С				C	CC 2016 Ma	CCC arch		
2490	F C	8	9	10 C	11	MC	13 CMCM	14	15 CMCC	CC	17 CCCC	2175	19 C	20	21	22	23	24 C	25 C	26	27	28	29	1	2	3	4
2491	5 F	6	7	8 CB	9 C	10	11	12	13	14	15 CC	16	17 2176	18	19	20	21	22	23	24	25 B	26	27 BB	28	29	30	31
2492	2016 Ap 1 F	2	3	4	5	6 CC	7 CBCB	8 BC	9 CC	10	11 B	12 C	13	14 CC	<b>15</b> BC	16 C	17 BC	18	19 BB	20	21	22	23	24	25	26 BC	27
2493	28 F CCC	29	30 C	2016 Ma 1 C	ay 2 C	3	4 C	5	6	7 C	8	9	2177 10	11	12	13	14 CCCB	15 CCBC	16 C	17	18	19	20	21 BC	22 B	23	24 BBC
2494	25	26	27	28	29	30	31	2016 Ju 1	ne 2	3	4	5	2178 6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2495	21	22	CC 23	24	25	26	27	28	29	30	2016 Ju	ly 2	2179	4	5	BCC 6	7	B 8	C 9	C 10	11	12	13	14	15	C 16	17
2496	F 18	19	20	21	22	23	24	25	26	27	28	29	30	2180 31	2016 Au 1	igust 2	C	1	C 5	6	7	8	9	10	C 11	CCCB	C 13
	F C	С		CBCB	CCC	MMCC	MBCM	С	BB					2181			J	-	C 2016 Se		CCMC		С	В	С		
2497	14 F C	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
														2182								2016 O	ctober		В		
2498	10 F	11	12	13	14	15	16	17	18	19	20	21 CCB	22 CCCC	2182	24	25	26	27	28	29	30	2016 O	ctober 2	3	4	5 2016 No	6
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2499	10 F 7 F 3 F 30	8	9	10	11	12 C	16 13 9	14 B		16 B	17	CCB 18	19	23 2183 20	21	22		24	25	26	27	28	29	30	31	2016 No 1	ovember 2
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2499 2500 2501 2502	10 F 7 F 30 F CC 27 F	8 4 2016 De 1	9 5 ecember 2 29	6 3	7 4 31	12 C 8 5 2017 Ja	9 6 anuary 2	14 B 10 7	11 8 4	16 B	17 13 10	18 14	19 15	23 2183 20 16	21 2184 17 2185 14 2186	22 18 15	19 16 12 C	24 20 17 13	25 21 18	26 22 19	27 23 20 16	28 24 21	2 29 25 22 18	30 26 23	4 31 27 24 20	2016 No 1 28 C 25 21 CC	29 CCM 26
2499 2500 2501 2502 2503	10 F 7 F 30 F CC 27 F 23 F	8  4  2016 De 1  1  28	9 5 ecember 2 29 25	10 6 3 30 26	11 7 4 31 27	12 C 8 5 2017 Ja 1	9 6 anuary 2 29	14 B 10 7 3	15 11 8 4 31	16 B 12 9 5 2017 Fe	17 13 10	18 14 11 7	19 15	23 2183 20 16	21 2184 17 2185 14 2186 10	22 18 15	19 16	24 20 17 13	25 21 18 14	26 22 19 15	27 23 20 16 12	28 24 21 17	2 29 25 22 18	30 26 23 19	4 31 27 24 20 16	2016 No 1 28 C 25 21 CC	29 CCM 26 22
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2499 2500 2501 2502 2503 2504 2505	F 10 F 7 F 30 F CC 27 F 23 F 18 F	8 4 2016 De 1 28 24 20 BB 19	9 5 secember 2 29 25 21 20	10 6 3 30 26 22 C	11 7 4 31 27 23 22 18	12 C 8 5 2017 Ja 1 28 24 23	13 9 6 anuary 2 29 25 24	14 B 10 7 3 3 30 26 25 21	15 11 8 4 31 27 26	16 B 12 9 5 2017 Fe 1 28 B BCC	17 13 10 6 ebruary 2 2017 M: 1	18 14 11 7 3 arch 2 29	19	23 2183 20 16 13 9 5 4	21 2184 17 2185 14 2186 10 6 5 2017 Ap	22 18 15 11 2187 7 2188 6 2189 2 MMMMM	19 16 12 C 8 7 3 CCCM 2190 30 2191 27	24 20 17 13 9 8 4 CBCC 2017 M 1	25 21 18 14 10 9 5 CBB	26 22 19 15 11 10 6 CC	23 20 16 12 11 7 BC 4	28 24 21 17 13 12 8 C 5 [2017 Ju] 1	29 25 22 18 14 13 9 6	30 26 23 19 15 14 10 7	4 31 27 24 20 16 15	2016 No 1 28 C 25 21 CC 17 16 12 9	29 CCM 26 22 18 17
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2499 2500 2501 2502 2503 2504 2505 2506 2507	F 10 F 7 F 30 F CC 27 F 23 F 18 F 14 F 11 F 7 CB	8 4 2016 D0 1 1 28 24 20 BB 19 15 12	9 5 secember 2 29 25 21 20 16 13 9	10 6 3 30 26 22 C 21 17 14	111 7 4 31 27 23 22 18 C 15	12 C 8 5 2017 Ja 1 28 24 23 19 B 16	9 6 6 29 29 25 24 20 17 13	14 B 10 7 3 3 30 26 25 21 B 18	15 11 8 4 31 27 26 22 19	16 B 12 9 2017 Fe 1 28 B 27 BCC 23	17 13 10 6 2017 M 1 228 BC 24 21 17	18 14 11 7 3 3 29 25 22 18 18	19	23 2183 20 16 16 13 9 5 5 4 4 27 24 20	21 2184 17 2185 14 2186 10 6 5 1 BB 28 25 21	22 18 15 11 2187 7 2188 6 2189 2 20 MMMM 29 26 22	19 16 12 C 8 7 7 2190 30 2191 27 BB 2192 23 2193	24 20 17 13 9 8 4 CBCC 2017 M 1 18 BC 24	25 21 18 14 10 9 5CBB 22 29	22   19   15   11   10   6   CC   3   30   26	27 23 20 16 12 11 7 BC 4 31 C 27	28 24 21 17 13 12 8 C 5 2017 Ju 1 CCC 28	2 29 25 22 18 14 13 9 6 cure 2 CBC	30 26 23 19 15 14 10 7 3 CCC 30	4 31 27 24 20 16 15 11 8 4 2107 Jt. 1	2016 No 1  28 C  25  21 CC  17  16  12  9  5 C  Cully	29 CCM 26 18 17 13 10 6 3 M
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