

DAY	Xray class	Observers	John Cook (23.4kHz/22.1kHz)				Roberto Battaiola (18.3kHz)				Paul Hyde (22.1/23.4kHz)				Bob Middlefell (22.1kHz)			Mark Edwards (20.9/24.0/19.6kHz)		
			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	C1.2	4	11:51	11:54	12:00	1-	11:47	11:55	12:04	1-					11:53	11:58	12:14	1		
3	M1.3	1	04:03	04:05	04:08	1-														
6	C1.1	5	10:22	10:26	10:35	1-	10:16	10:26	10:37	1	10:22	10:26	11:25	2+	10:22	10:26	10:39	1-		
6	C3.6	7	13:10	13:13	13:52	2	13:07	13:14	13:47	2	13:09	13:14	14:07	2+	13:09	13:14	?	-		
6	?	1																		
6	C2.0	1													13:22	13:28	14:00	2		
6	C1.2	3					15:00	15:03	15:08	1-					15:04	15:06	15:13	1-		
6	M1.4	3									19:30	19:33	19:46	1-	19:30	19:35	20:28	2+		
7	C3.0	1	06:20	06:26	06:43	1														
7	C1.1	3	10:18	10:22	10:28	1-	10:15	10:23	10:37	1					10:20	10:22	10:34	1-		
8	?	2													09:16	09:28	?	-		
8	C1.9	2													09:48	10:06	10:50	2+		
8	C1.4	1													16:55	16:56	17:06	1-		
9	C2.2	1																		
9	C9.0	7	12:27	12:33	13:20	2+					07:23	07:27	07:40	1-						
9	C8.8	7	17:06	17:11	17:32	1+	17:03	17:12	17:47	2	12:27	12:31	13:29	2+	12:26	12:32	13:45	2+		
											17:05	17:12	18:25	2+	17:06	17:10	18:06	2+		
10	C2.4	1																		
10	C3.9	5	08:21	08:25	08:37	1-					08:21	08:28	09:11	2+						
10	C5.1	6	09:21	09:33	?	-					09:19	09:32	10:01	2	09:21	09:34	?	-		
10	C5.0	6	10:07	10:19	10:59	2+					10:06	10:18	10:48	2	10:05	10:19	10:53	2+		
10	X2.2	7	11:39	11:43	?	-					11:39	11:43	12:01	1	11:38	11:41	12:14	2		
10	X1.5	7	12:39	12:52	15:00	3+					12:38	12:45	15:00	3+	12:40	12:50	14:06	3		
11	M1.8	5	05:33	05:36	05:53	1					05:33	05:36	?	-	05:32	05:36	06:08	2		
11	C3.4	4	06:28	06:34	06:43	1-					06:28	06:35	06:57	1+						
11	C2.8	2									07:12	07:15	07:24	1-						
11	M3.0	8	08:03	08:14	?	-	08:01	08:10	08:38	2	08:03	08:10	08:49	2+	08:04	08:13	?	-		
11	X1.0	8	09:01	09:08	10:30	3	09:01	09:05	09:34	2	09:01	09:05	09:50	2+	09:01	09:09	10:15	2+		
11	C2.3	5	11:40	11:42	11:44	1-					11:40	11:43	12:08	1+	11:41	11:48	12:24	2		
11	C1.8	4	12:47	12:49	13:03	1-					12:46	12:50	13:10	1	12:48	12:54	13:13	1		
11	?	2													13:49	13:52	13:58	1-		
11	C1.7	4									15:17	15:21	15:41	1	15:18	15:21	15:43	1		
11	C2.6	3									16:26	16:31	17:02	2	16:27	16:30	16:55	1+		
11	C3.6	2													18:43	18:46	19:25	2		
11	M3.9	2													20:56	21:07	21:50	2+		
12	M2.0	4	04:17	04:22	04:37	1					04:18	04:20	?	-	04:18	04:21	04:22	1-		
12	C4.5	1																		
12	C3.7	4	06:42	06:47	07:01	1					06:42	06:46	07:22	2						
12	?	2																		
12	M1.8	9	09:34	09:38	?	-	09:35	09:41	10:00	1	09:24	09:39	?	-	09:37	?	?	-		
12	M2.7	8	10:17	10:23	11:29	2+	10:16	10:22	11:01	2	10:17	10:21	11:19	2+	09:34	09:38	?	-		
12	C3.8	8	13:15	13:21	13:40	1					13:13	13:21	14:12	2+	10:17	10:23	11:19	2+		
12	?	2													13:13	13:22	13:55	2		
12	*	1													14:30	?	?	-		
12	C7.8	8	16:01	16:07	17:08	2+	15:55	16:07	16:30	2	16:00	16:08	?	-	14:30	14:55	14:55	1		
12	C3.5	3									16:24	16:26	17:26	2+	16:00	16:09	?	-		
12	*	1													16:24	16:27	17:01	2		
12	C6.1	7	17:31	17:37	?	-					17:30	17:36	?	-						
12	M1.3	7	18:06	18:14	19:00	2+					18:06	18:16	19:02	2+	17:31	17:39	17:59	1+		
12	M1.1	4									20:01	20:04	20:11	1-	18:06	18:12	18:56	2+		
12	M1.0	2													20:01	20:05	20:41	2		
12	M3.1	2													21:10	21:15	21:28	1-		
13	C9.9	1													21:46	22:00	22:23	2		
13	?	1																		
13	M2.6	8	07:38	07:45	07:57	1	07:50	07:58	08:16	1+	07:34	07:58	08:57	2+	07:52	07:58	09:05	2+		
13	C3.8	7	09:16	09:20	09:40	1					09:12	09:21	09:45	2	09:16	09:19	09:36	1		
13	C3.7	7	10:45	10:54	11:28	2					10:42	10:53	11:16	2	10:45	10:54	11:39	2+		
13	C2.5	6	11:59	12:04	12:29	1+					11:59	12:03	12:19	1	11:59	12:03	12:24	1		
13	*	3													12:45	13:06	13:53	2+		
13	*	1													14:00	14:06	14:29	1+		
13	C2.4	5									15:23	15:26	15:42	1	15:23	15:28	15:42	1		
13	C2.1	4									16:17	16:22	16:41	1	16:18	16:23	16:29	1-		
13	C3.3	6									16:52	16:57	17:16	1	16:54	16:56	17:18	1		
13	*	2													18:12	18:18	18:36	1		
13	*	1													19:05	19:10	?	-		
13	?	1													19:26	19:30	?	-		
13	?	1													19:36	20:00	?	-		
13	C9.0	2													20:15	20:19	?	-		
13	C4.1	2													20:57	21:02	21:17	1		
14	C3.6	3	09:35	09:48	10:16	2									09:35	09:53	10:37	2+		
14	?	3	10:49	11:00	11:15	1+									10:52	11:01	?	-		
14	?	1													11:14	11:18	11:29	1-		
14	*	1													14:02	14:05	14:21	1		
14	?	3									14:48	14:51	15:00	1-	14:48	14:54	15:04	1-		
14	?	2													15:43	15:49	?	-		
14	?	1													15:59	16:09	16:30	1+		
14	?	2													16:38	16:46	17:07	1+		
14	C3.3	4									17:42	17:49	18:16	2	17:42	17:51	18:31	2+		
14	?	1													18:03	18:06	18:18	1-		
14	M1.4	4									19:27	19:29	?	-	19:26	19:33	20:58	3		
15	C7.5	5	06:02	06:07	06:25	1					06:02	06:08	06:46	2	06:01	06:05	06:10	1-		
15	C7.0	6	07:48	08:03	08:50	2+					07:40	08:08	10:24	3+	07:52	08:13	?	-		
15	?	1													08:15	08:19	10:04	3		
15	?	2													10:31	11:01	?	-		
15	M1.1	7	11:22	11:43	12:23	2+					11:16	11:41	?	-	10:32	11:40	?	-		
15	?	1													12:05	12:22	?	-		
15	C5.4	4									12:54	13:20	14:49	3	12:49	13:15	14:55	3+		
15	C2.6	6	15:20	15:24	?	-					15:20	15:26	15:46	1+	15:19	15:26	15:44	1		
15	C3.5	7	15:48	15:56	16:22	2					15:48	15:58	16:37	2+	15:49	16:00	16:48	2+		
15	C3.2	4									17:10	17:24	18:24	2+	17:09	17:23	18:41	3		
15	?	1													17:33	17:27	17:46	1-		
16	C2.8	4	07:35	07:40	08:00	1					07:32	07:44	08:26	2+	07:34	07:48	08:43	2+		
16	C1.5	2									11:28	11:31	11:35	1-	11:27	11:32	11:42	1-		
16	C1.1	1									12:20	12:24	12:35	1-						
16	C1.9</																			

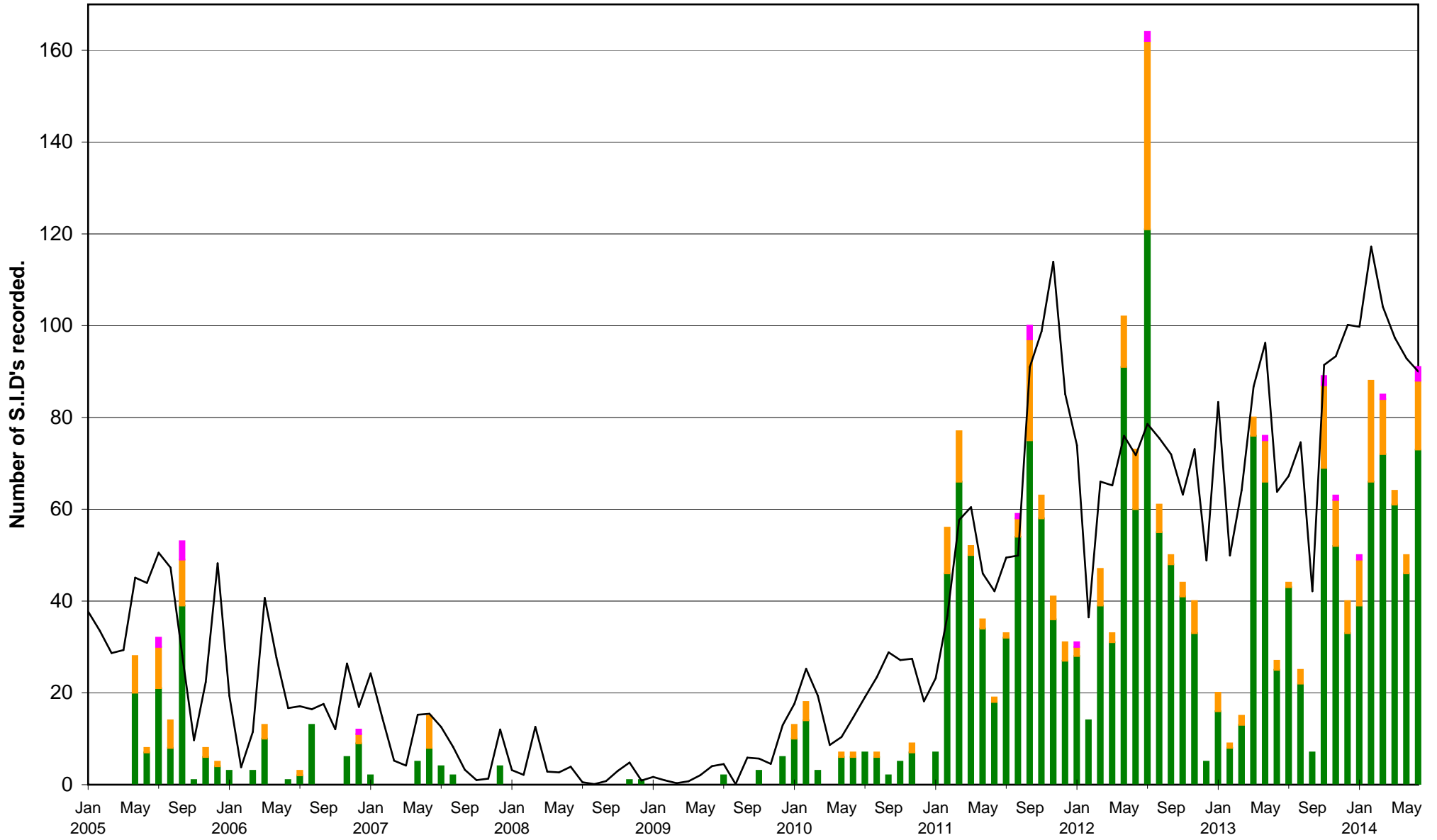
BAA Radio Astronomy Group.		2014 JUNE																						
17	C1.0	1																			13:18	13:22	13:51	2
17	C1.4	2																			17:51	17:58	18:14	1
18	C1.1	3								15:43	15:50	16:06	1								15:45	15:51	16:05	1
18	C1.8	3								16:23	16:27	16:39	1-								16:25	16:28	16:35	1-
19	C4.0	2																			19:09	19:25	20:02	2+
20	C5.0	6	10:58	11:23	12:28	3				10:57	11:23	12:27	3								10:59	11:24	12:30	3
20	C1.6	2																			18:29	18:34	?	-
21	C2.1	5	11:15	11:20	12:33	2+				11:14	11:23	12:28	2+								11:16	11:24	11:44	1+
22	B7.9	1																			13:13	13:18	13:34	1
24	B6.8	1																			10:35	10:48	11:01	1+
24	B6.3	1																			16:17	16:20	16:29	1-
24	B9.7	1																			18:42	18:49	19:28	2+
26	C2.2	6	09:14	09:19	09:30	1-				09:14	09:23	10:27	2+								09:16	09:22	10:08	2+
28	C3.4	4	07:39	07:45	08:05	1+				07:40	07:47	08:25	2								07:38	07:46	08:15	2
28	C1.1	1																			08:23	08:33	08:52	1+
28	C1.2	5								12:41	12:47	12:59	1-								12:42	12:46	13:13	1+
28	C1.0	1																			15:11	15:12	15:23	1-
28	?	1																			19:53	20:07	?	-
28	C4.2	1																			20:48	21:07	21:36	2+
29	C1.8	2																			08:03	08:16	08:59	2+
29	C4.9	8	11:39	11:54	12:42	2+	11:44	11:56	12:13	1+	11:38	11:54	12:46	2+	11:45	11:45	12:35	2+		11:38	11:55	?	-	
29	?	1																			12:31	12:37	13:01	1+
29	?	1																			12:43	12:50	13:01	1-
29	?	1																			13:39	13:48	14:08	1+
29	*	2																			14:45	14:50	14:58	1-
29	C1.8	2								15:09	15:11	15:20	1-								15:09	15:12	15:19	1-
29	C1.8	2								15:20	15:28	16:01	2								15:22	15:25	15:52	1+
29	C1.2	1																			18:06	18:13	18:38	1+
30	C3.4	1	04:15	04:19	04:48	2																		
30	?	1																			11:05	11:25	11:38	2
30	?	1																			12:32	12:41	12:45	1-
30	C3.4	7	13:09	13:22	13:43	2				13:10	13:21	14:16	2+								13:11	13:29	14:25	2+

DAY		Colin Clements (23.4kHz/22.1kHz)					Gordon Fiander (19.6/22.1kHz)				Richard Kaye (Various)				John Wardle (19.6/23.4kHz)				Steve Parkinson (Various)							
		AAVSO receiver, 0.76m screened loop aerial.					PC sound card.				Pre-amplifier + PC software receiver.				PC soundcard, 0.7m frame aerial.				Tuned radio frequency receiver, Spectrum Lab, frame aerals.							
		START	PEAK	END (UT)			START	PEAK	END (UT)			START	PEAK	END (UT)			START	PEAK	END (UT)			START	PEAK	END (UT)		
1	C1.2										11:49	11:57	12:18	1+												
3	M1.3																									
6	C1.1										10:23	10:28	10:36	1-												
6	C3.6	13:08	13:15	14:06	2+						13:11	13:15	14:06	2+							13:10	13:14	?	-		
6	?										14:09	14:23	14:33	1												
6	C2.0																									
6	C1.2	15:02	15:06	15:07	1-																					
6	M1.4										19:31	19:35	20:31	2+												
7	C3.0																									
7	C1.1																									
8	?										09:10	09:36	09:49	2												
8	C1.9										09:49	10:11	10:56	2+												
8	C1.4																									
9	C2.2																									
9	C9.0	12:27	12:34	13:36	2+						12:27	12:32	13:33	2+	12:25	12:33	13:27	2+		12:27	12:33	12:55	1+			
9	C8.8										17:06	17:11	17:37	1+	17:05	17:12	17:57	2+		17:05	17:11	17:50	2			
10	C2.4										06:22	06:34	06:42	1												
10	C3.9										08:21	09:28	09:04	2							08:20	08:27	09:00	2		
10	C5.1	09:15	09:32	09:54	2						09:19	09:33	10:06	2+							09:20	09:30	?	-		
10	C5.0	10:02	10:18	11:03	2+						10:06	10:19	10:51	2							10:09	10:20	10:45			
10	X2.2	11:38	11:42	12:32	2+						11:39	11:41	12:40	2+	11:39	11:43	12:41	2+		11:40	11:43	?	-			
10	X1.5	12:32	12:51	16:21	3+						12:40	12:50	14:57	3+	12:42	12:47	14:00	2+		12:41	12:50	13:50	2+			
11	M1.8										05:32	05:39	06:07	2							05:33	05:36	06:10	2		
11	C3.4										06:26	06:34	06:57	1+							06:29	06:36	06:54	1		
11	C2.8										07:12	07:15	07:21	1-												
11	M3.0	08:00	08:10	08:50	2+						08:03	08:11	08:51	2+	08:05	08:12	08:44	2		08:03	08:10	08:30	1+			
11	X1.0	08:57	09:08	10:26	3						09:02	09:09	10:32	3	09:01	09:08	09:47	2+		09:02	09:08	09:55	2+			
11	C2.3										11:39	11:45	12:27	2+	11:40	11:45	12:00	1								
11	C1.8										12:44	12:53	13:26	2												
11	?	13:41	13:42	14:05	1																					
11	C1.7	15:16	15:21	16:13	2+						15:17	15:21	15:39	1												
11	C2.6										16:22	16:31	17:01	2												
11	C3.6										18:42	18:47	19:29	2+												
11	M3.9										20:56	21:04	22:22	3												
12	M2.0										04:18	04:21	04:37	1												
12	C4.5										04:53	05:08	05:21	1+												
12	C3.7										06:42	06:47	06:55	1-							06:42	06:48	07:08	1+		
12	?																				09:24	09:30	?	-		
12	M1.8	09:23	09:40	10:16	2+						09:25	09:41	10:17	2+	09:34	09:41	10:09	2		09:34	09:41	10:00	1+			
12	M2.7	10:16	10:23	11:27	2+						10:17	10:24	11:27	2+	10:15	10:25	11:02	2+		10:17	10:24	11:10	2+			
12	C3.8	13:06	13:22	15:56	3+						13:11	13:24	13:50	2	13:13	13:26	14:00	2+		13:13	13:20	13:35	1			
12	?																									
12	*										15:27	15:38	15:57													
12	C7.8	15:56	16:08	17:00	2+						16:00	16:07	17:06	2+	16:00	16:14	17:06	2+		16:00	16:08	16:50	2+			
12	C3.5														16:20	16:25	16:30	1-								
12	*	17:00	17:01	17:27	1+																					
12	C6.1	17:27	17:36	18:03	2						17:31	17:37	18:05	2	17:29	17:39	17:51	1		17:30	17:37	?	-			
12	M1.3	18:03	18:15	19:13	2+						18:05	18:13	18:59	2+	18:07	18:16	18:51	2		18:07	18:16	19:00	2+			
12	M1.1	20:00	20:03	20:08	1-						20:01	20:05	20:48	2+												
12	M1.0										21:05															

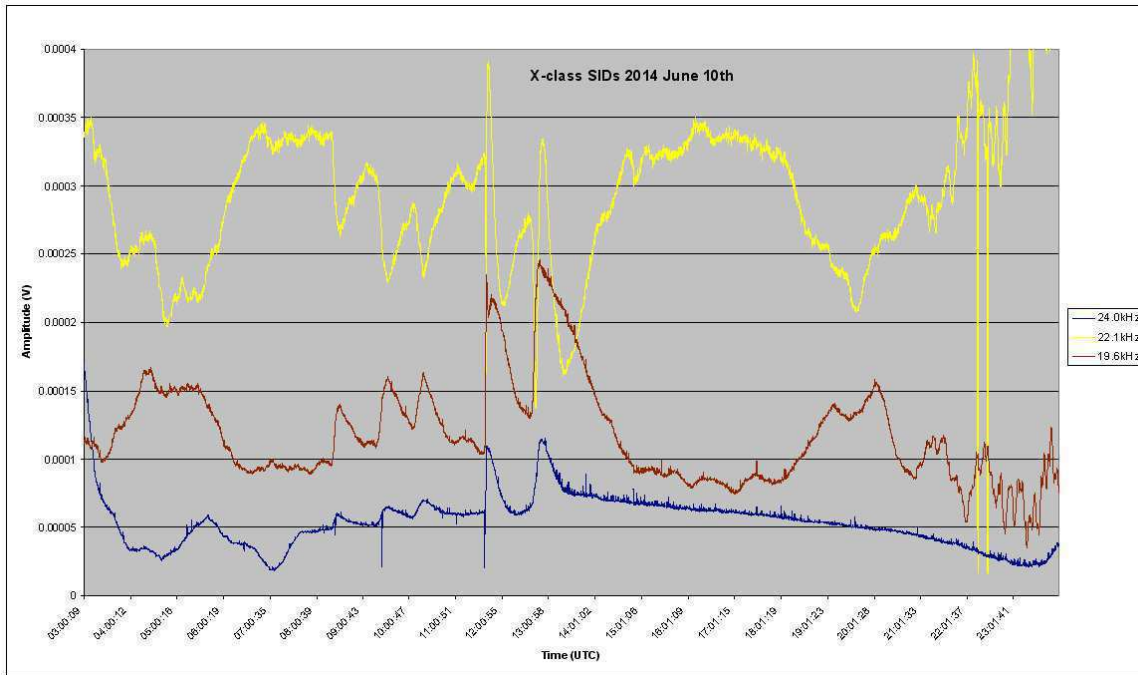
BAA Radio Astronomy Group.					2014 JUNE											
13	?															
13	C9.0				20:16	20:20	20:32	1-								
13	C4.1				21:00	21:01	21:17	1-								
14	C3.6				09:35	10:06	10:47	2+								
14	?				10:51	11:04	11:33	2								
14	?															
14	*															
14	?				14:49	14:56	15:06	1-								
14	?				15:38	15:48	16:20	2								
14	?															
14	?				16:36	16:48	17:18	2								
14	C3.3				17:43	17:49	18:17	2	17:40	17:49	18:07	1+				
14	?															
14	M1.4				19:27	19:32	20:29	2+	19:27	19:34	20:00	2				
15	C7.5				06:03	06:07	06:29	1+					06:03	06:08	06:20	1-
15	C7.0				07:56	08:16	09:23	3	08:00	08:11	09:00	2+	07:51	08:08	09:05	2+
15	?															
15	?				10:36	11:02	11:21	2								
15	M1.1	10:23	11:41	11:45	11:21	11:41	12:51	3	11:21	11:43	12:05	2	11:30	11:40	?	-
15	?															
15	C5.4	12:47	13:20	15:11	12:53	13:18	14:00	2+								
15	C2.6	15:11	15:27	15:42	15:20	15:27	15:47	1+					15:21	15:26	?	-
15	C3.5	15:47	16:00	17:07	15:47	16:02	16:28	2	15:47	16:00	16:25	2	15:50	15:58	16:20	1+
15	C3.2	17:07	17:18	18:13	17:11	17:27	18:35	2+								
15	?															
16	C2.8												07:34	07:45	08:10	2
16	C1.5															
16	C1.1												14:51	14:54	15:05	1-
16	C1.9															
16	C2.3				18:03	18:10	18:19	1-								
16	?				20:12	20:21	21:01	2+								
17	C3.0				08:18	08:28	09:12	2+					08:18	08:29	08:45	1+
17	B8.4				10:02	10:05	10:29	1+								
17	C1.0															
17	C1.4				17:49	17:58	18:13	1								
18	C1.1				15:45	15:49	16:03	1-								
18	C1.8				16:22	16:30	16:44	1								
19	C4.0				18:58	19:28	20:33	3								
20	C5.0	10:54	11:24	13:14	10:59	11:24	12:35	3					10:58	11:25	12:10	2+
20	C1.6				18:28	18:37	18:53	1								
21	C2.1	11:13	11:21	11:32	11:16	11:23	11:46	1+								
22	B7.9															
24	B6.8															
24	B6.3															
24	B9.7															
26	C2.2	09:34	09:35	09:49	09:15	09:26	10:06	2+					09:13	09:25	10:30	2+
28	C3.4												07:40	07:47	08:10	1+
28	C1.1															
28	C1.2	12:36	12:48	13:14	12:40	12:47	13:05	1					12:41	12:47	13:06	1
28	C1.0															
28	?															
28	C4.2															
29	C1.8												08:03	08:40	09:20	2+
29	C4.9	11:36	11:57	12:33	11:39	11:55	13:02	2+					11:41	11:54	12:30	2+
29	?															
29	?															
29	*				15:21	15:30	15:47	1+								
29	C1.8															
29	C1.8															
29	C1.2															
30	C3.4															
30	?															
30	?															
30	C3.4	13:06	13:27	14:59	13:12	13:27	14:25	2+	13:12	13:21	14:04	2+	13:12	13:22	14:00	2+

VLF flare activity 2005/14.

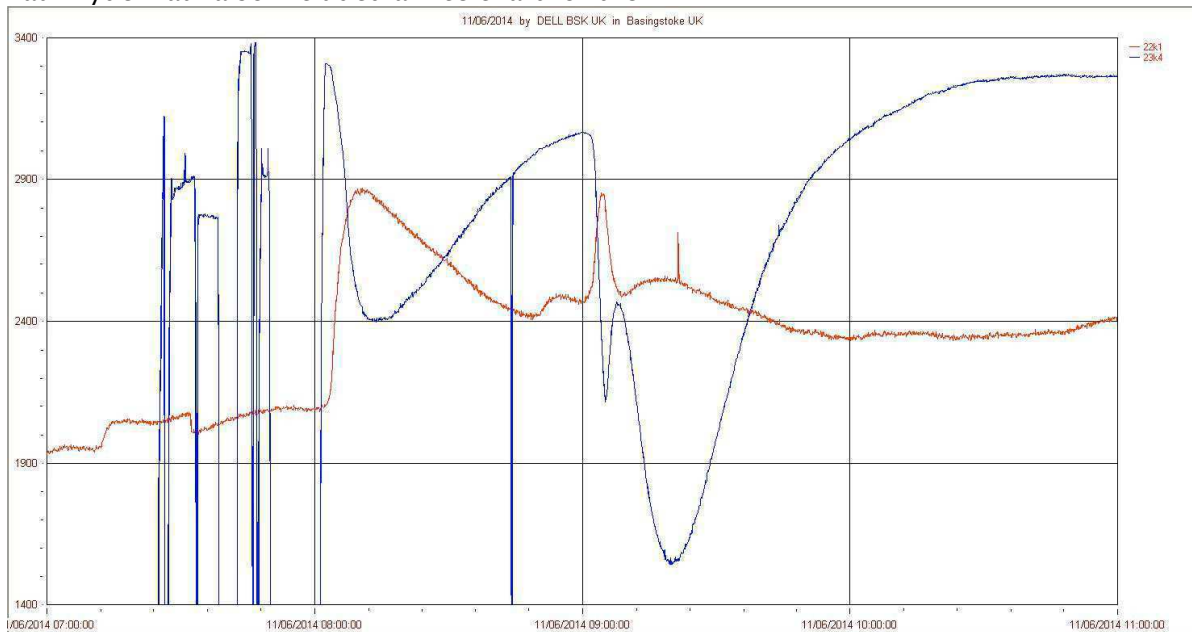
C M X — Relative sunspot number



We recorded one of the most active periods on the sun so far in cycle 24 during June. The total of 129 SIDs from 96 classified flares is the highest since the peak of 2012 July. The highlight was a trio of X-class plus two M-class flares within a 24 hour period on the 10th and 11th, followed by another 7 M-class flares on the 12th. In complete contrast, solar activity then decayed to the extent that four B-class flares were recorded as SIDs later in the month.

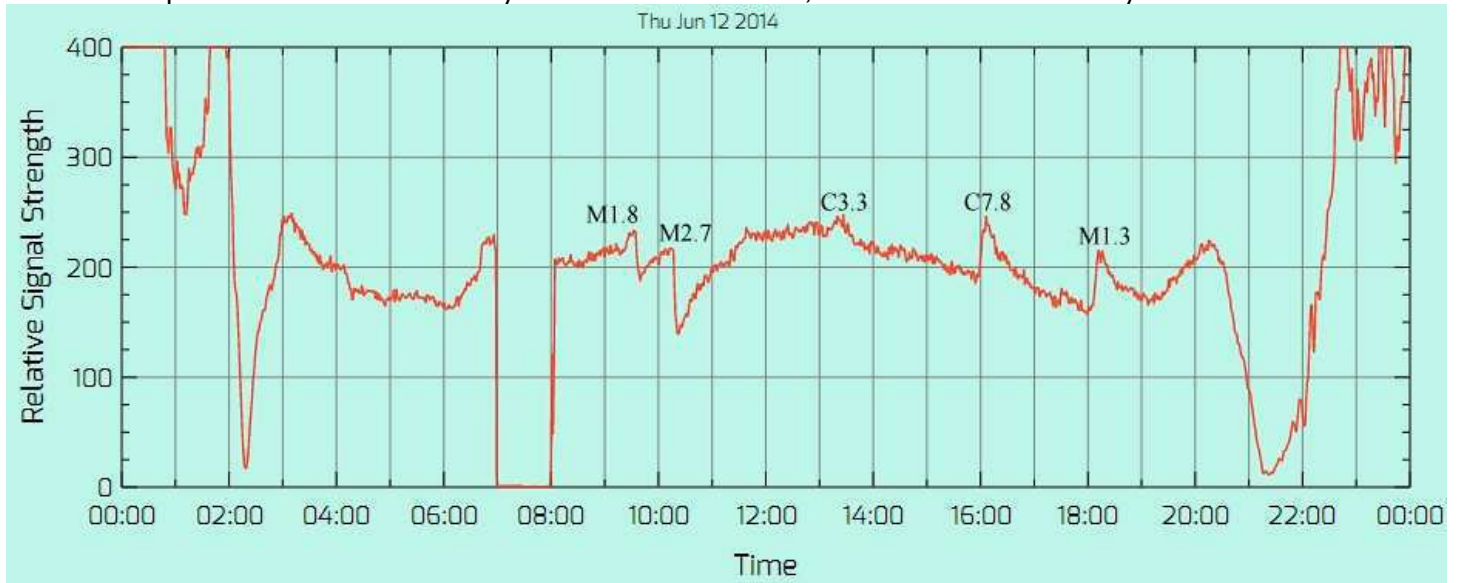


This chart by Mark Edwards in Coventry shows the two X-class flares on the 10th standing out from the earlier C-class activity. Although the first of these was the stronger (X2.2), for some observers it produced a much shorter SID than the following X1.5 flare. This effect also depended on the frequency monitored, as noted by Paul Hyde. Paul also included a nice chart for the 11th:



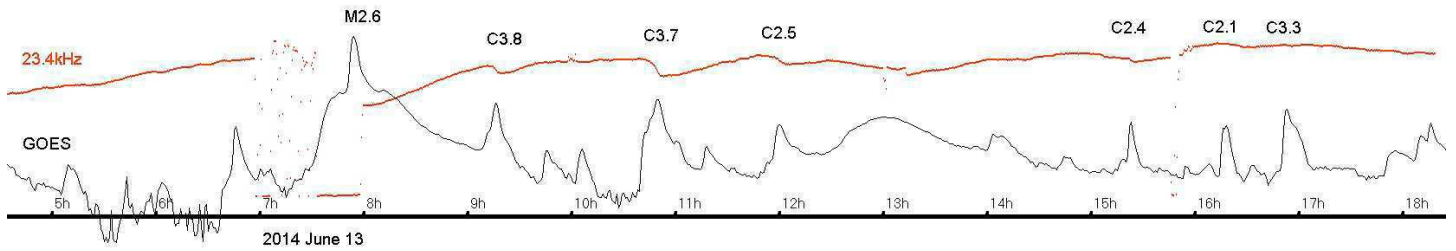
The breaks in transmission at 23.4kHz occur immediately before the M3.0 flare, the subsequent X1.0 flare being well shown at both frequencies (red = 22.1kHz, blue = 23.4kHz).

This period of enhanced activity continued on the 12th, as shown in the chart by Peter Meadows:



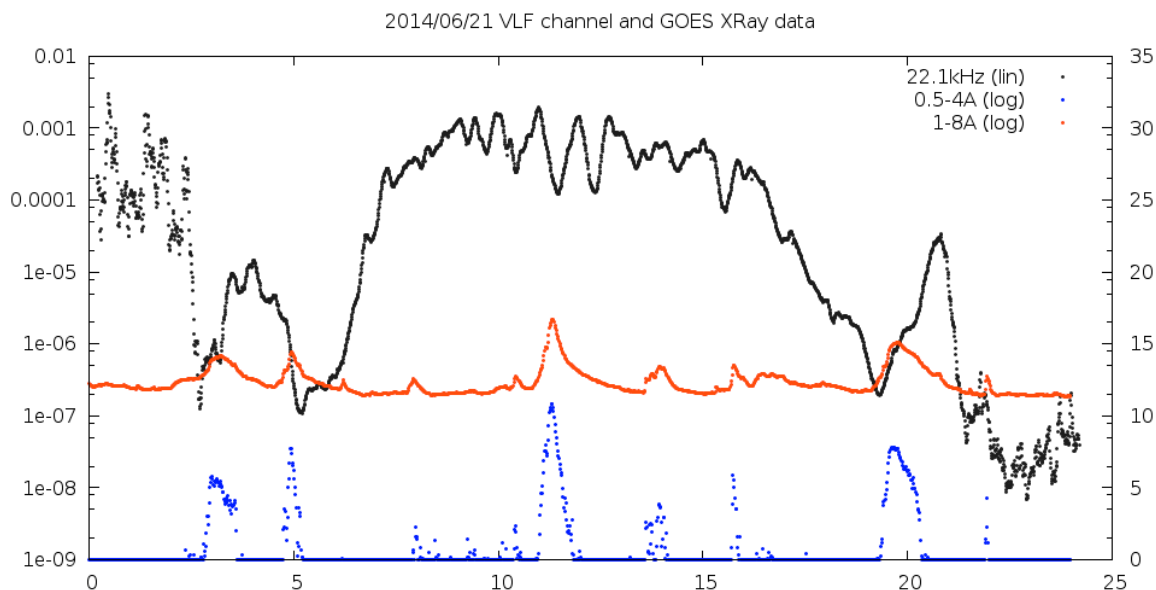
A change in SID polarity is quite noticeable in this recording, with a negative response in the morning and a positive peak in the afternoon.

The intensity of flares had decreased by the 13th, as shown in my own chart:



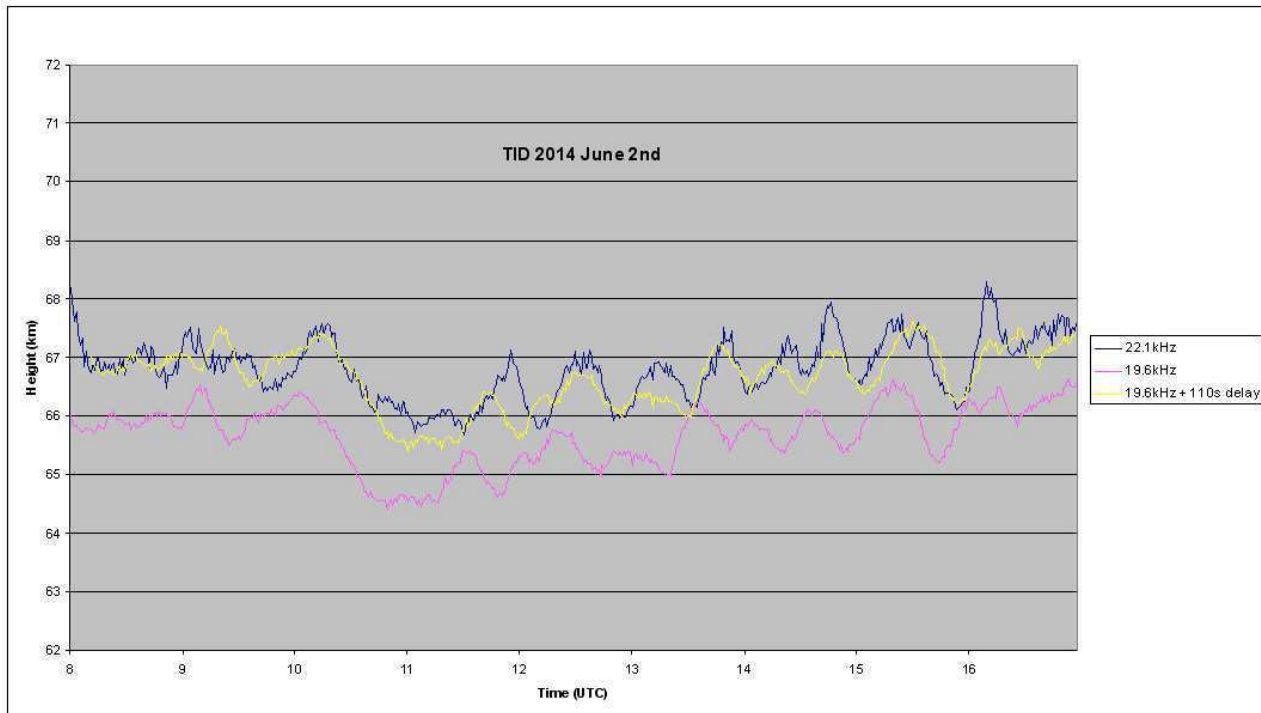
Many of these X-ray peaks are not classified in the SWPC lists, but can be detected with sensitive VLF receivers. Activity on the 14th and 15th continued to fade in a similar fashion, before building again in the last few days of the month.

Periods of very strong oscillations were also recorded, particularly around the 2nd/3rd and 21st of June. Richard Kaye in Birmingham recorded the strong oscillation on the 21st:



The C2.1 flare at 11:20 can be seen in the X-ray signal (red), but the 22.1kHz signal (black) is so unstable that any SID has been lost in the noise.

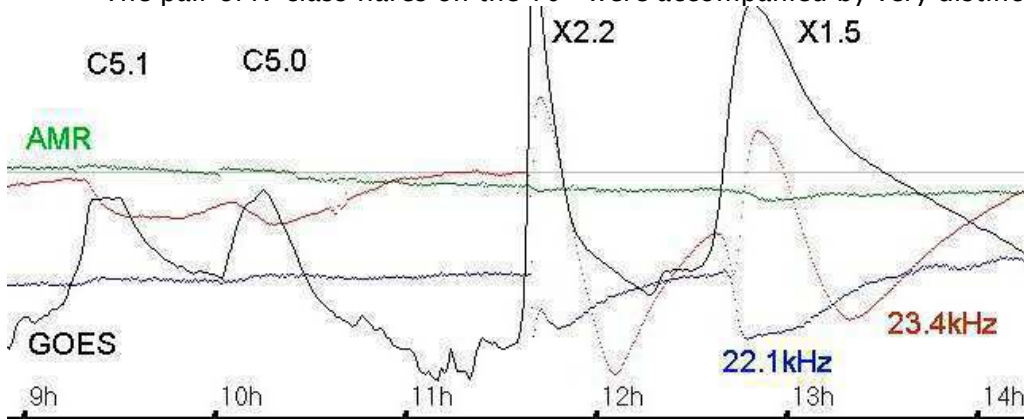
Mark Edwards has carried out an analysis of his recording for the 2nd, and produced the following chart of D-region height variation through the day:



The blue trace is the height deduced from the 22.1kHz signal from Anthorn, showing a roughly 1 to 1.5km variation. The red trace is the height deduced at 19.6kHz from Skelton. The average height at 19.6kHz is about 1km lower than at 22.1kHz, representing the different path lengths. There is also a noticeable phase difference. The yellow trace is a copy of the height at 19.6kHz, but shifted in time by 110 seconds so as to match the phase at 22.1kHz. It has also been shifted upwards to make the comparison easier. The 110s delay can be seen as a D-region disturbance travelling southwards at about 129m/s. The accuracy of the match is quite remarkable from 12:30 right up to 16:00. The sun was very quiet throughout this period, the only flare being a B4 at 14:48UT.

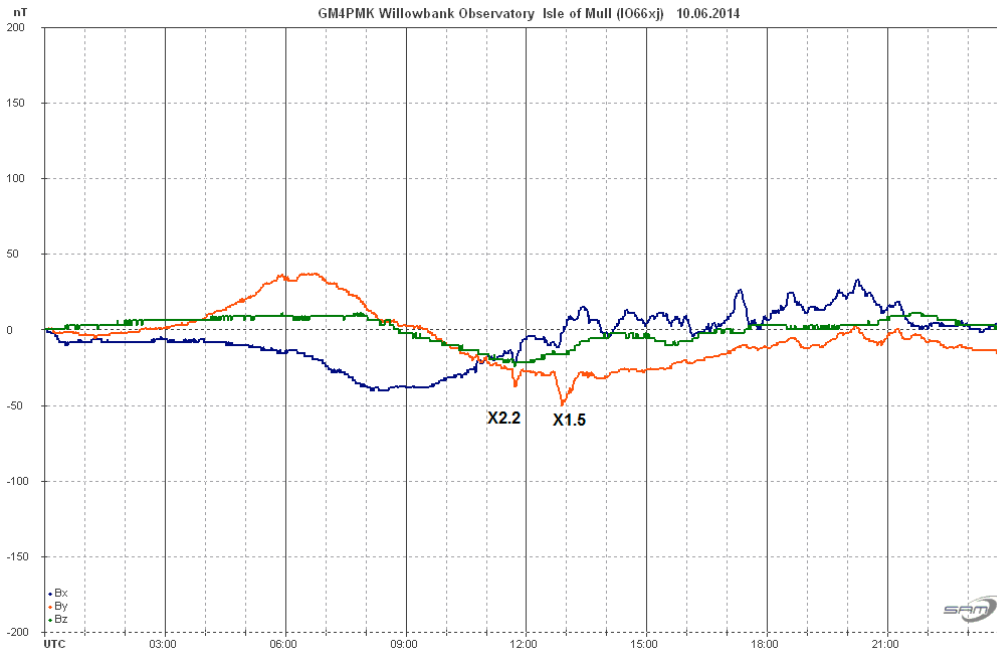
MAGNETIC OBSERVATIONS.

The pair of X-class flares on the 10th were accompanied by very distinct SFEs

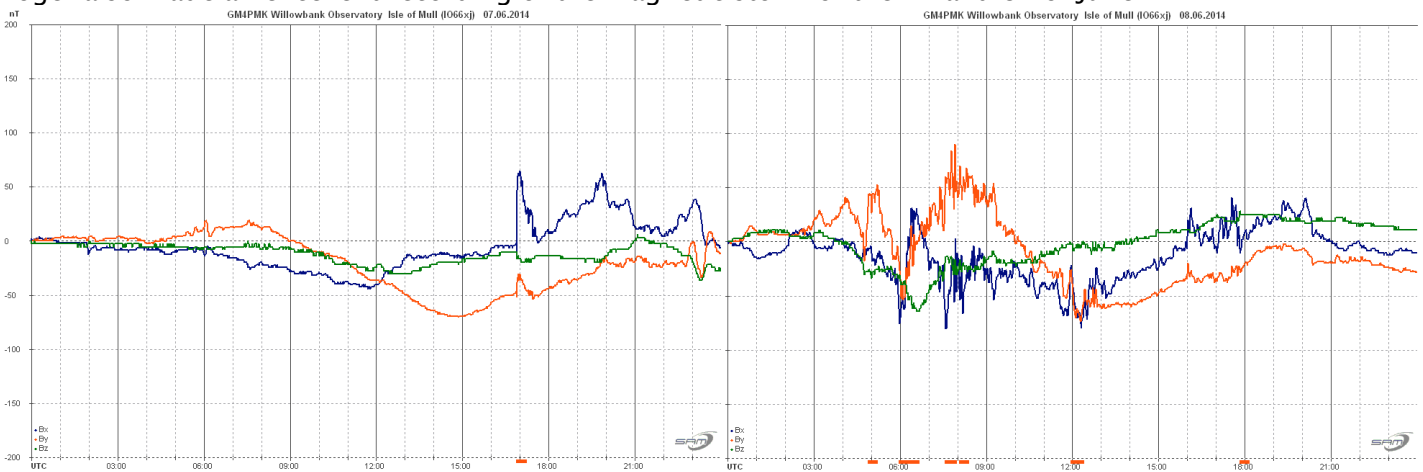


Small dips in the magnetometer (green) trace in my recording are quite clear for both SIDs.

The three-axis recording made by Roger Blackwell on the Isle of Mull shows them even more clearly:



Roger also made an excellent recording of the magnetic storm of the 7th and 8th of June:



A sudden storm commencement just before 17:00UT on the 7th shows in all three axes, followed by several hours of disturbance. By 05UT on the 8th the disturbance became very active with over three hours of rapid fluctuations in the field before calming down again. The source of the disturbance appears to have been a filament eruption on the morning of June 4th, followed by a CME in the early afternoon. As no x-ray flare was involved there was no SID to record. Note that the magnetometer output is reset to zero at midnight.

The disturbances shown on the Bartels diagram over the 17th to 21st were very minor, and mostly of unknown origin. CHSS effects were responsible for a roughly three hour disturbance starting at 22UT on the 18th. The influence of a southward pointing Bz was also present over this period.

Despite the large number of energetic flares, there were no Earth-directed CMEs produced.

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

Many thanks to all observers. Reports and observations to: jacook@jacook.plus.com.

BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).
2423						2108
2424						2109
2425						2110
2426						2111
2427						2112
2428						2113
2429						2114
2430						2115
2431						2116
2432						2117
2433						2118
2434						2119
2435						2120
2436						2121
2437						2122
2438						2123
2439						2124
2440						2125
2441						2126
2442						2127
2443						2128
2444						2129
2445						2130
2446						2131
2447						2132
2448						2133
2449						2134
2450						2135
2451						2136
2452						2137
2453						2138
2454						2139
2455						2140
2456						2141
2457						2142
2458						2143
2459						2144
2460						2145
2461						2146
2462						2147
2463						2148
2464						2149
2465						2150
2466						2151
2467						2152
2468						