



Please send all reports and observations to jacook@jacook.plus.com

BAA Radio Astronomy Section.

Director Paul Hearn.

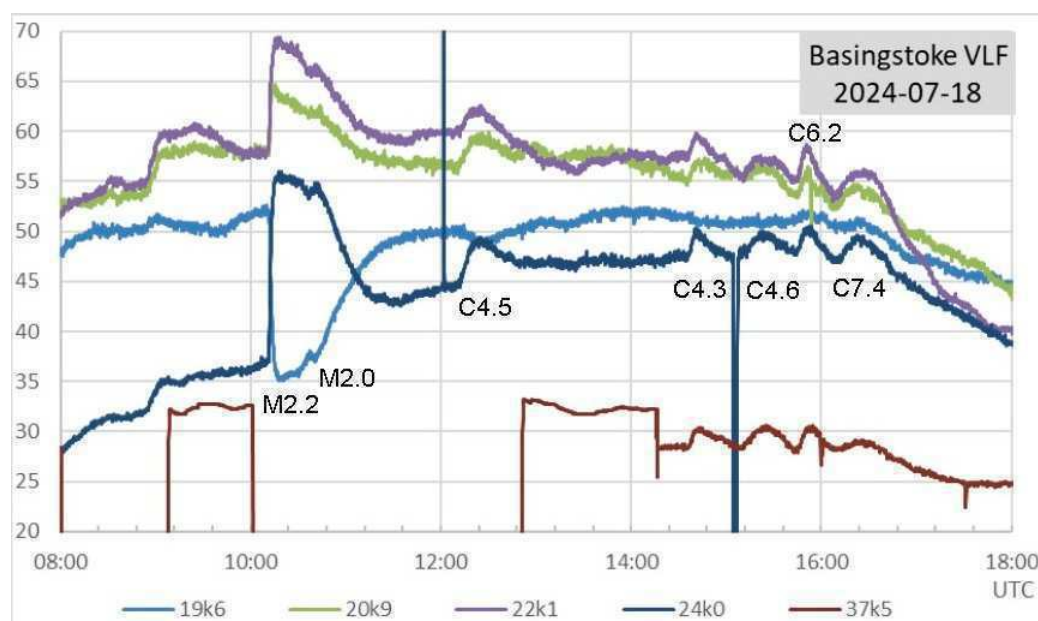
RADIO SKY NEWS

2024 JULY.

VLF SID OBSERVATIONS.

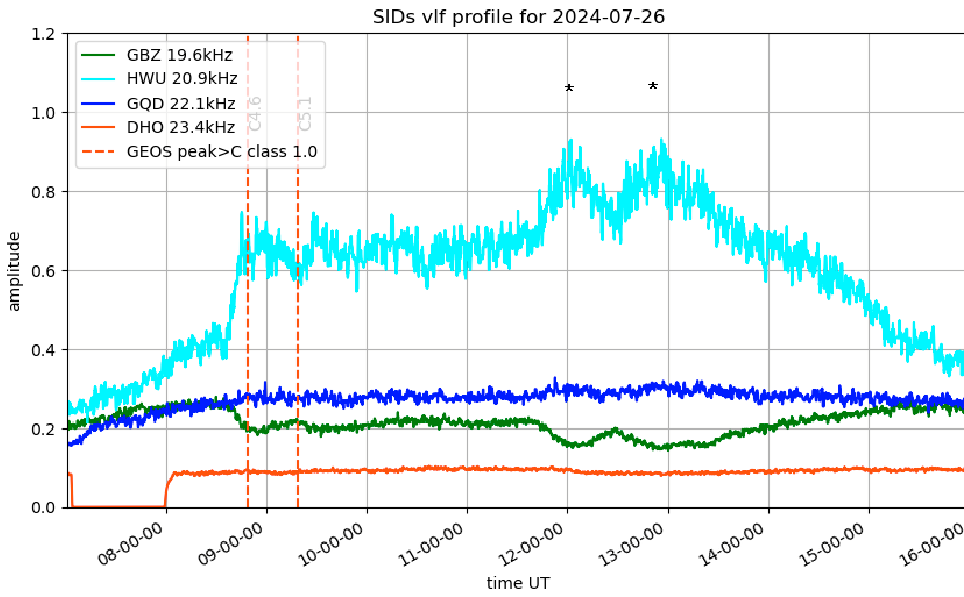
July has been another very active month, 173 classified events being recorded as SIDs. There was only one X-class flare, with 65 M-class and 107 C-class. 81 of the SIDs recorded did not have X-ray classifications in the SWPC satellite data or were not included in the list. The SWPC list did include a large number of events without classifications, these are shown in the timing tables as ‘*’, some of which appear to be quite strong. Two of these on the 26th were recorded by five observers. Events marked ‘?’ were not listed.

The X-ray background level was just below or at M-level for part of the month, so smaller flares did not produce SIDs. The density of M-flares also hides many C-flares that we would otherwise record. The 23.4kHz German signal was switched off for the first half of the month.

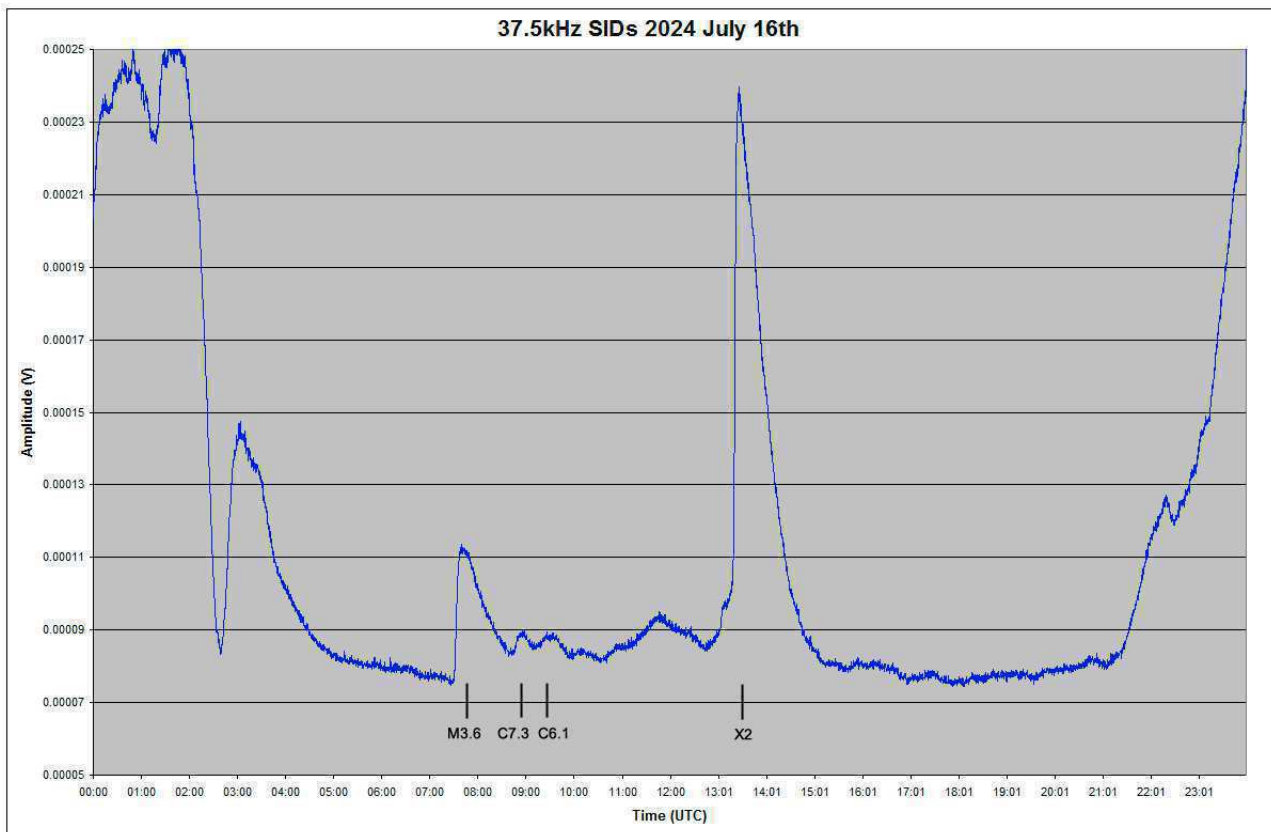


This recording from July 18th by Paul Hyde shows a pair of M-class flares that have almost merged into a single SID. My own recording shows just a single SID, other observers also recording it as a single event. The SWPC shows that both flares were from AR13751, a fairly large and complex sunspot group. The flares in the afternoon were much smaller, producing clear SIDs on the most of the signals in Paul’s recording.

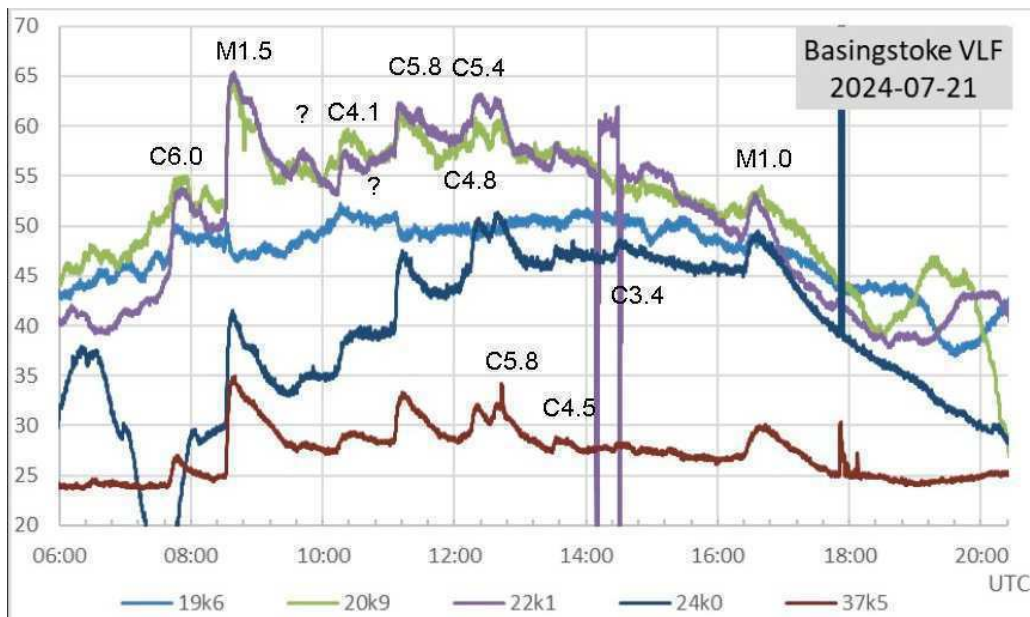
The two unclassified events on the 26th are clearly seen in the recording by Mark Prescott:



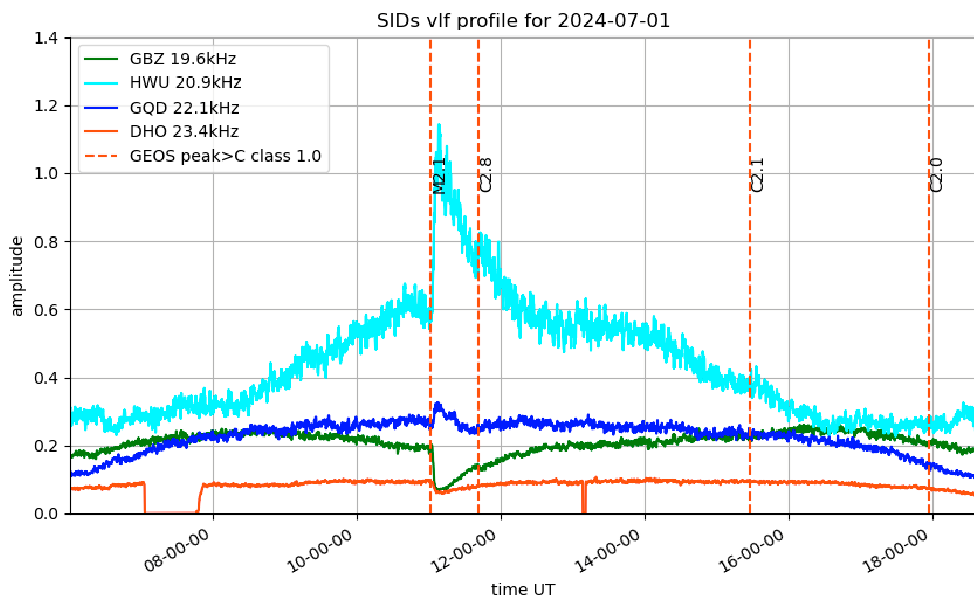
They show on both 20.9kHz and 19.6kHz, while 22.1 and 23.4kHz have not responded. The C4.6 and C5.1 flares earlier in the day have produced smaller SID, showing that the unclassified pair were at least C4 or C5 in strength.



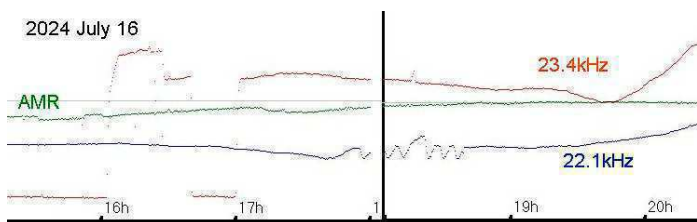
The strongest flare recorded was the X1.9 on the 16th. Mark Edwards' recording shows a very strong response at 37.5kHz, and includes the smaller flares earlier in the morning. The 23.4kHz signal had come back on air earlier in the day, but then went off again just as the X1.9 flare started.



Paul Hyde's recording from the 21st shows near continuous flaring through the day. I have attempted to label the SIDs as clearly as I can, but many of them overlap and some are barely visible. The SID from the M1.5 flare shows a double peak on some signals, but not all of them. The trio of C4.8, C5.4 and C5.8 have also merged into a single SID, the weaker C4.8 just about visible on the 22.1kHz signal. The day ended with a C4.7 flare at 20:14UT, just at the end of the chart.



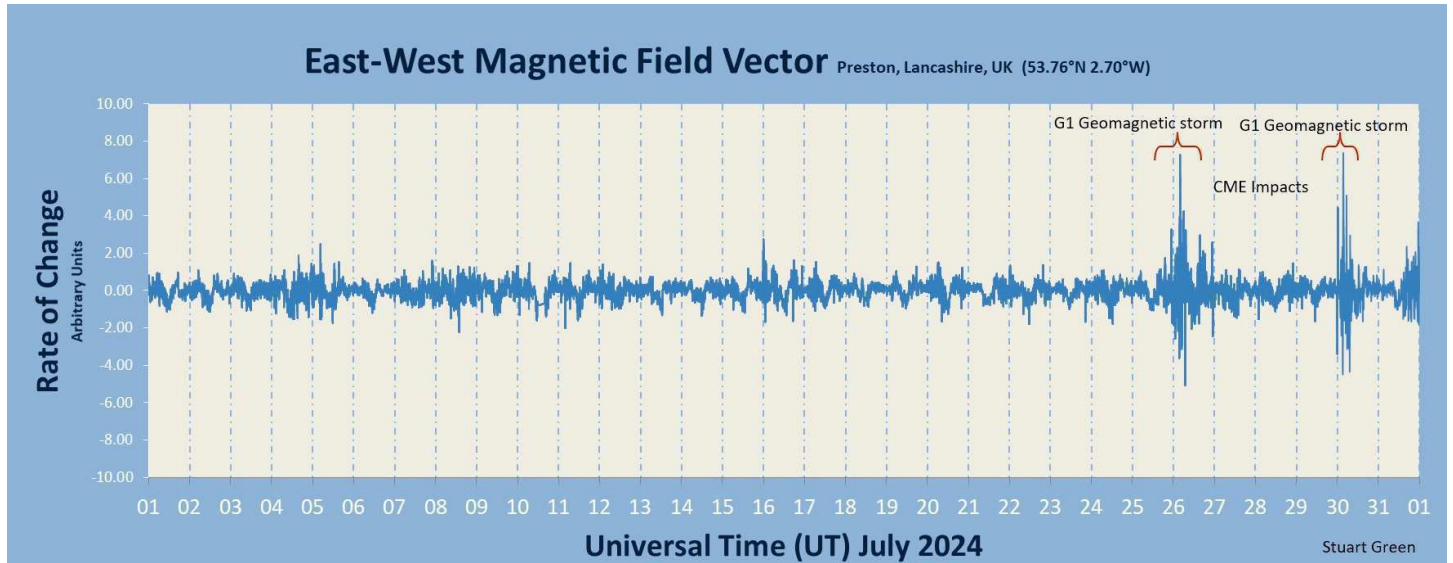
Activity on the 1st was much lower, Mark Prescott's recording showing just four flares, only two of which were recorded as SIDs. The C2.8 flare occurred just 40 minutes after the peak of the M2.1, and so the production of a SID was quite a surprise. It shows well at 19.6kHz, but is not present at 23.4kHz.



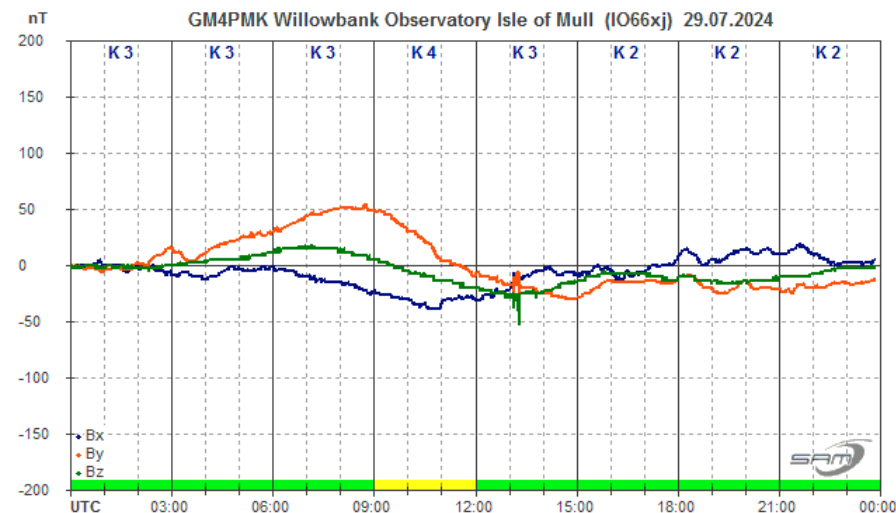
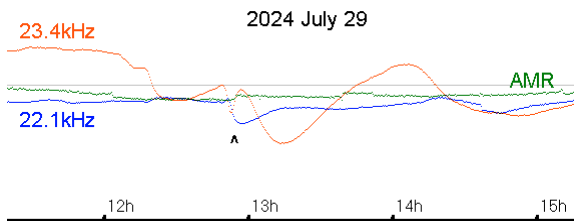
My own recording from the 16th shows some oscillation in the 22.1kHz signal from about 17:40 to 18:50 UT.

The break just after 18:00 is where the data was downloaded and the logger restarted. The cause of the oscillation is not clear, as it does not show at 23.4kHz.

MAGNETIC OBSERVATIONS.



Stuart Green's monthly summary of magnetic activity shows a very quiet start to July, with two storms in the last week of the month. Our SID recordings show that there was plenty of solar activity right through the month with plenty of strong flares. The STCE reports also include plenty of CMEs, but once again they mostly seem to have not been Earth-directed. The strong triple flare on the 29th may have produced a small SFE aligned with the M8.7. My recording shows the magnetometer (AMR) along with the VLF signals. The SFE is marked 'A', timed at 12:55UT. It could easily be from local interference, so difficult to interpret. Roger Blackwell also has a transient in his recording, although it appears to be a few minutes after 13:00.

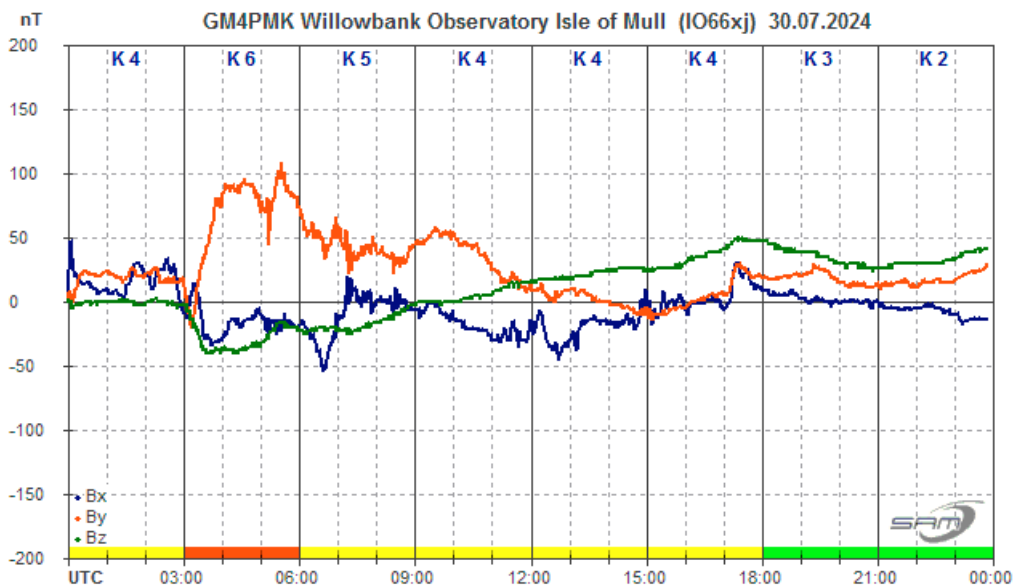
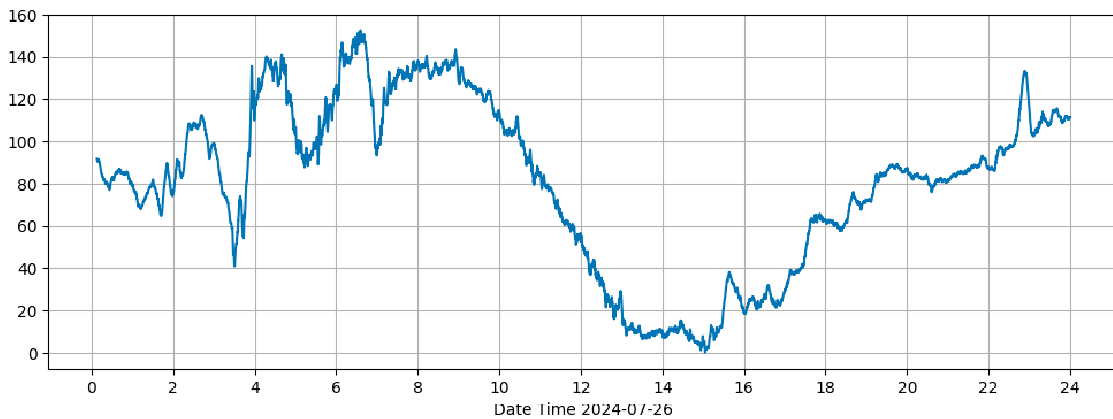


The first of the stronger storms was on the 26th, recorded by Thomas Mazzi in Italy:



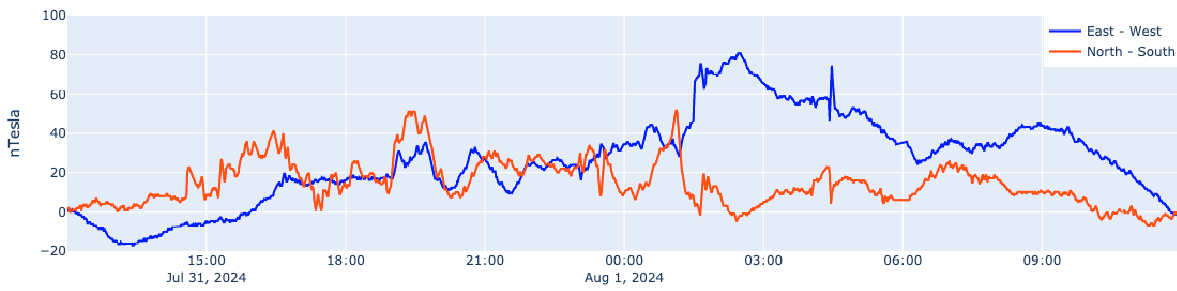
This seems to have been from a combination of weak CMEs and a change in the solar wind. Callum Potter's recording from Orkney shows the storm in a little more detail:

Wasbister Magnetometer (59.17N,3.06W)



Activity was lower on the 27th..29th, increasing again in the morning of the 30th, shown in Roger Blackwell's recording. Most of the 31st was also fairly quiet, but became more active in the late afternoon.

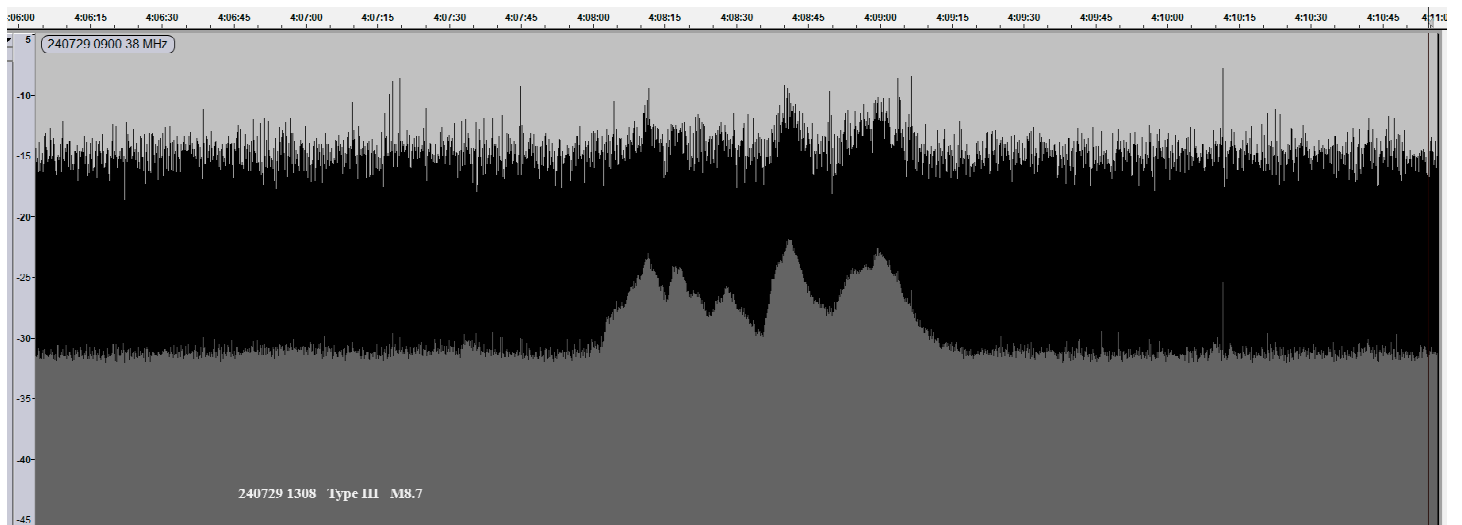
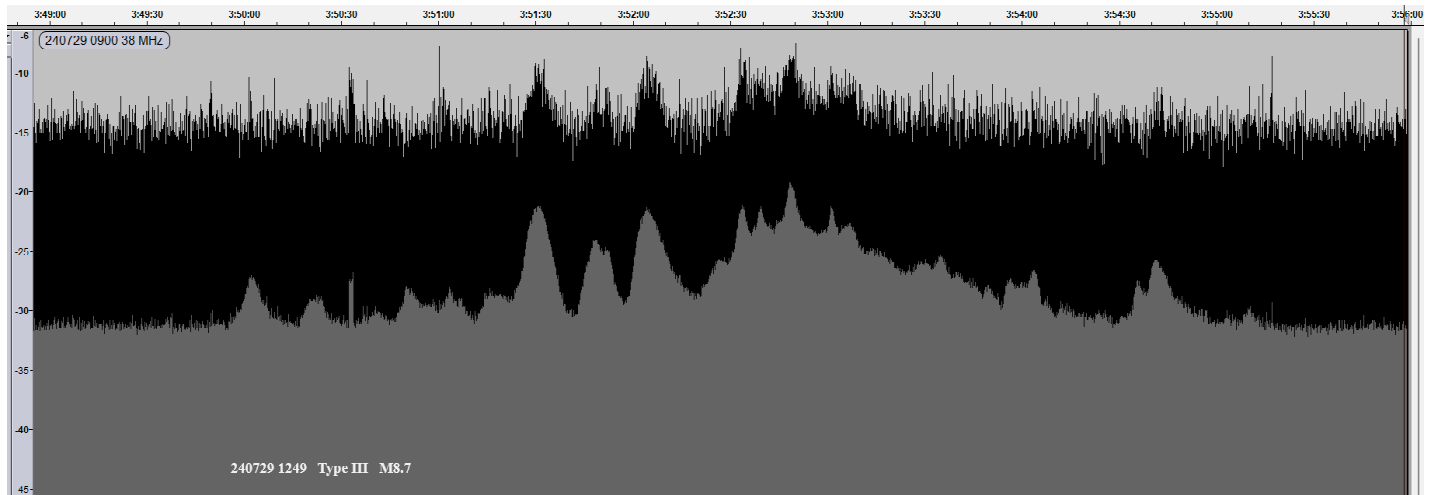
Steyning Magnetometer (50.8 North, 0.3 West)



Nick Quinn's recording shows a disturbed period starting just before 15UT, continuing into August 1st. There is also evidence of an SFE around 05UT on the 1st, more on that next month.

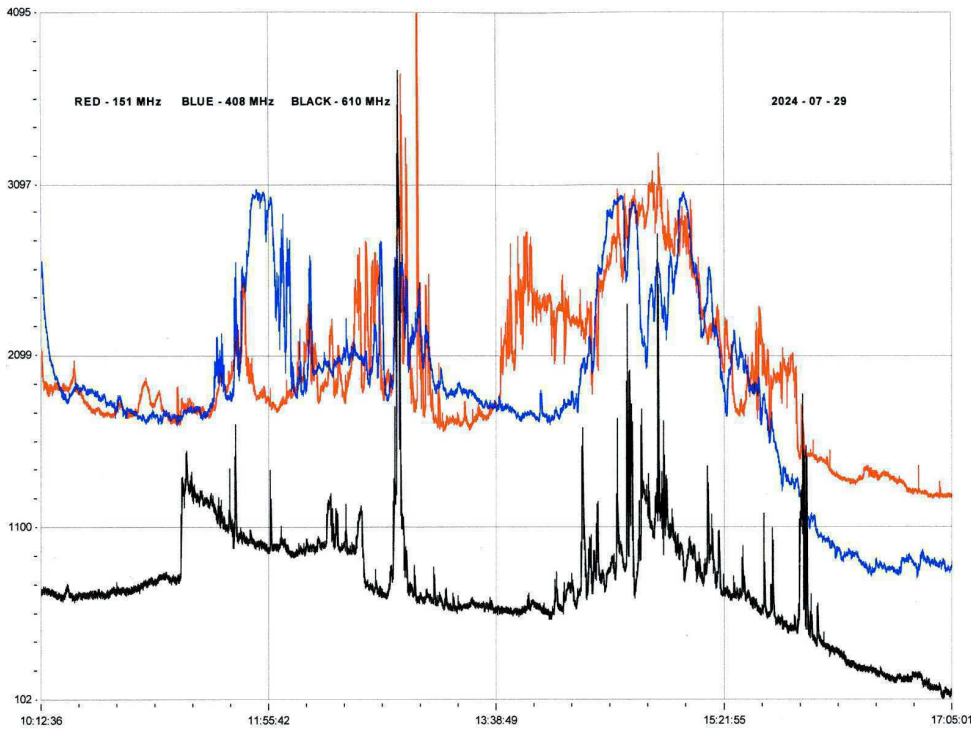
Magnetic observations received from Roger Blackwell, Stuart Green, Thomas Mazzi, Callum Potter, Nick Quinn and John Cook.

SOLAR EMISSIONS

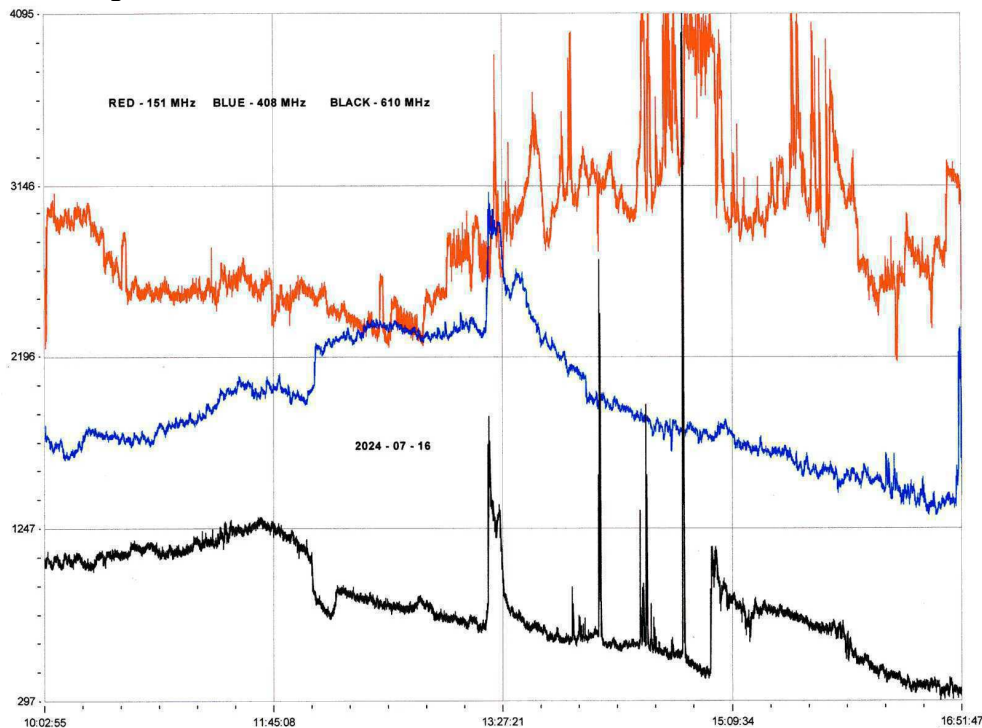


The strong triple flare on the 29th also produced some 38MHz emissions, recorded by Colin Briden. The first chart shows a type III emission starting at 12:49, the impulsive rise of the M8.7 flare. The second chart is

from 13:08, during the decay phase of the flare. They have an amplitude of about 12dB, the first being a little stronger and much more complex. Colin Clements also recorded strong VHF emissions:

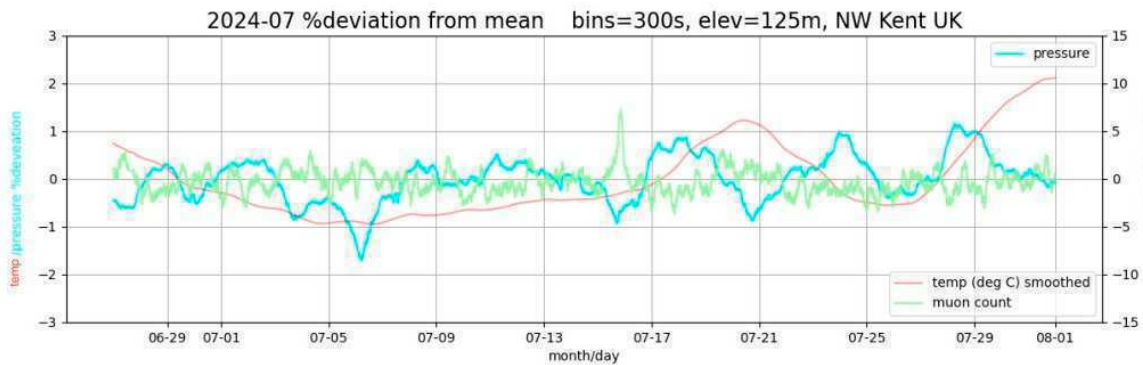
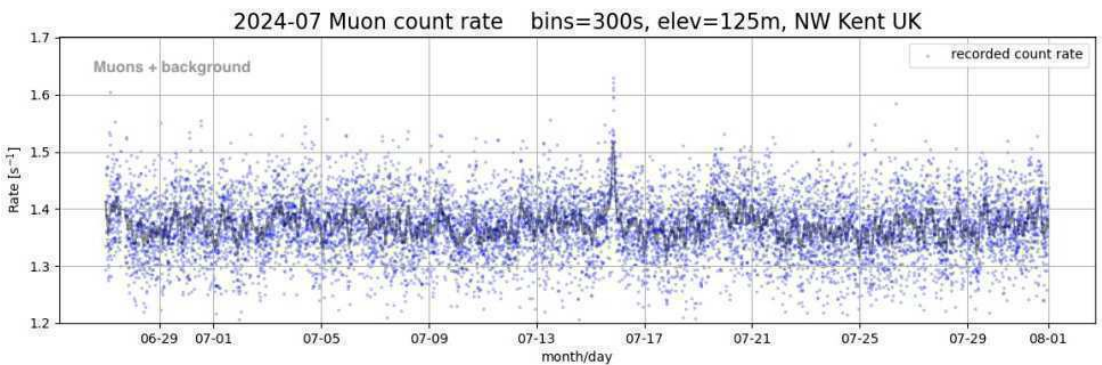
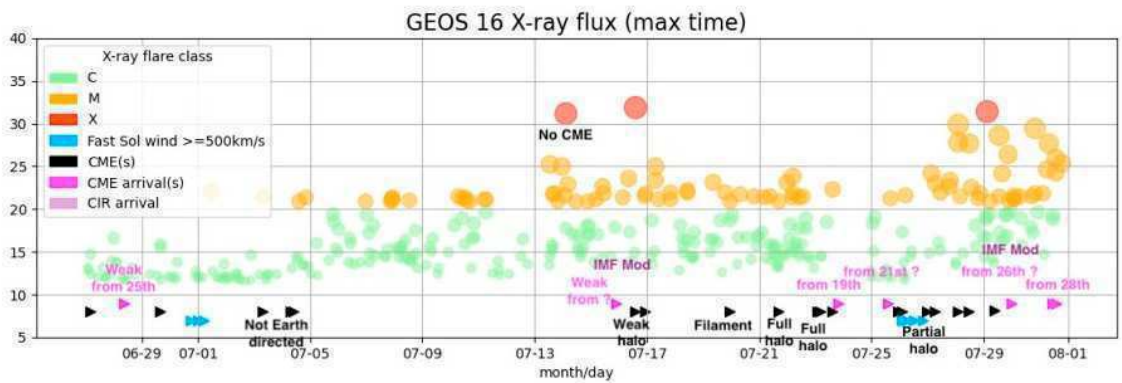
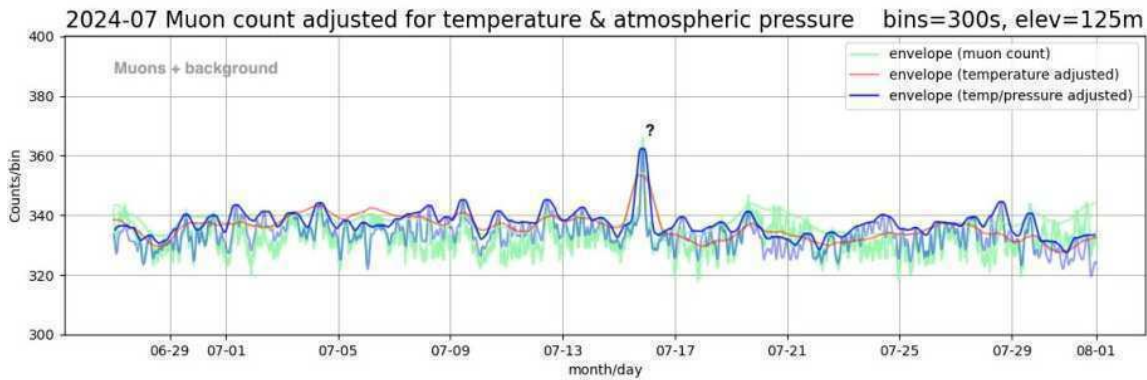


The strong spike on all three frequencies is at about 12:51UT, also matching the rise of the M8.7 flare. That is followed by a gap before the signal level rises again at about 13:40. The decay phase of the flare did last a long time, with the M4.2 flare peaking at 14:46 adding to the noise level. The SWPC X-ray data does show some unclassified flares around 11:30 to 12UT, that may be responsible for the earlier noise burst in Colin's recording.



The X1.9 flare on the 16th also generated some strong VHF emissions, mostly during its decay phase. Short spikes at 610MHz (black) and 408MHz (blue) mark the start of the flare. 151MHz (red) has a slower rise in signal level, but then remains very active well into the afternoon.

MUONS



Mark Prescott's Muon charts show a fairly calm month, apart from a sharp spike on the 15th / 16th. The source of this is not clear, although there was a weak magnetic disturbance around that time. Measuring the chart, the peak seems to be before the X1.9 flare on the 16th. The small dips in the Muon counts after this follow the increase in M-flares and CMEs.

BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).
2570	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			
2571	2022 February 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				
2572	2022 March 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				
2573	2022 April 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				
2574	2022 May 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				
2575	2022 June 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				
2576	2022 July 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				
2577	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				
2578	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				
2579	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 2				
2580	2022 October 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				
2581	2022 November 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				
2582	2022 December 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				
2583	2023 January 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				
2584	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				
2585	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				
2586	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				
2587	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				
2588	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				
2589	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					
2590	2023 July 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				
2591	2023 August 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					
2592	2023 September 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					
2593	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				
2594	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				
2595	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 9				
2596	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				
2597	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				
2598	2024 February 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					
2599	2024 March 29 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					
2600	2024 April 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				
2601	2024 May 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					
2602	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				
2603	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					
2604	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					

DAY	Xray class	Observers	John Cook (23.4kHz/22.1kHz)				Roberto Battaiola (21.75kHz)				Paul Hyde (22.1kHz/24kHz)				Mark Edwards (24.0/19.6/22.1kHz)				Colin Clements (21.75/18.3kHz)					
			Tuned radio frequency receiver, 0.58m frame aerial.				Modified AAVSO receiver.				Spectrum Lab / PC 1.5m frame aerial.				Spectrum Lab / PC 2m loop aerial.				Tuned Radio Frequency receivers, 0.76m screened loop aerial.					
			START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)		START	PEAK	END (UT)			
1	M2.1	7	10:09	11:02	12:10	3							10:58	11:02	11:32	2	10:59	11:06	?	-	11:04	11:10	12:11	2+
1	C2.8	1															11:39	11:44	?	-				
3	M1.5	2	07:35	07:40	08:15	2							07:34	07:43	08:48	2+	07:36	07:46	08:29	2+	07:31	07:53	08:52	2+
3	C2.5	2											12:07	12:15	12:35	1+	12:09	12:13	12:27	1-				
3	C2.5	1															19:26	19:27	19:32	1-				
4	C3.2	2											08:03	08:11	08:35	1+	08:05	08:25	08:36	1+				
4	C4.2	1															12:27	12:51	?	-				
4	C4.5	1															13:01	13:15	13:55	2+				
4	M1.0	7	14:16	14:25	15:01	2							14:13	14:27	15:21	2+	14:15	14:24	?	-	14:21	14:33	15:24	2+
4	?	1															15:22	15:27	15:35	1-				
4	*	1															15:57	16:14	16:41	2				
4	M1.4	2											19:57	20:06	20:44	2+	19:59	20:08	21:03	2+				
4	C3.4	1															21:43	21:50	21:50	1-				
5	C6.1	2	05:16	05:20	05:29	1-							15:05	15:13	15:26	1	05:17	05:23	05:26	1-				
5	C4.1	2											18:54	19:04	19:58	2+	15:12	15:14	15:25	1-				
5	C9.4	2											20:06	20:12	20:29	1	18:57	19:07	19:51	2+				
5	C8.6	2															20:08	20:12	20:43	2				
6	C6.7	7	09:19	09:24	09:42	1							09:18	09:30	10:35	2+	09:21	09:40	?	-	09:23	09:48	11:18	3
6	C6.1	1															10:19	10:26	10:41	1				
6	*	3															11:14	11:24	11:50	2				
6	?	1															12:18	12:22	12:32	1-				
6	C3.8	1															13:08	13:12	13:33	1				
6	*	1															13:35	13:38	13:53	1-				
6	*	1															15:24	15:31	15:38	1-				
6	*	1															17:56	17:59	18:05	1-				
6	C3.8	1															18:58	18:59	19:14	1-				
7	C8.2	1	05:14	05:28	05:36	1																		
7	C4.7	1	07:03	07:08	07:27	1																		
7	*	1																						
7	*	1																						
7	*	1																						
7	?	1																						
7	?	1																						
7	*	1																						
7	*	1																						
7	C4.5	4											15:01	15:06	15:39	2	13:48	14:00	14:14	1+				
7	C4.5	2											15:48	15:51	16:09	1	15:03	15:08	?	-				
7	*	1															15:50	15:54	16:04	1-				
7	C5.4	2															16:10	16:15	16:18	1-				
7	M1.0	2											17:40	17:48	18:11	1+	17:40	17:52	18:24	2				
7	M1.3	2											19:44	19:54	20:47	2+	19:45	19:57	20:57	2+				
7	*	2											21:18	21:27	?	-	21:20	21:28	21:46	1+				
8	C4.4	2	07:57	08:02	08:22	1							07:56	08:03	08:27	1+	08:45	08:48	?	-				
8	C6.4	5	08:44	08:47	09:12	1+							08:42	08:47	?	-	08:59	09:12	09:44	2				
8	?	2											08:57	09:05	09:36	2	11:11	11:19	?	-				
8	C4.2	2											11:09	11:14	?	-	11:30	11:38	?	-				
8	C4.2	3											11:31	11:34	11:48	1-	12:38	12:45	13:59	2+	12:43	12:52	13:38	2+
8	M1.1	6											12:37	12:40	13:59	2+	14:13	14:16	14:33	1				
8	C3.9	5	14:14	14:17	?	-							14:12	14:18	14:31	1								
8	C4.6	4	14:42	14:46	15:10	1+							14:40	14:46	?	-								
8	C4.2	3											15:00	15:06	15:37	2	15:02	15:09	15:33	1+				
8	C7.6	4	17:45	17:50	18:15	1+							17:43	17:51	18:14	1+								
9	C5.6	1	05:54	05:57	06:08	1-																		
9	C5.1	4	07:20	07:23	07:50	1+							07:18	07:23	07:46	1+	07:19	07:27	08:02	2				
9	C6.7	7	08:16	08:22	08:42	1+							08:14	08:23	08:53	2	08:17	08:25	09:07	2+	08:20	08:32	09:08	2+
9	C3.2	1															12:51	12:59	13:02	1-				
10	M1.5	5	05:54	06:00	06:40	2+	05:49	05:58	06:12	1	05:53	06:04	07:07	2+	05:46	05:57	06:06	1						
10	M1.3	4											09:04	09:21	10:36	3	09:06	09:47	10:30	2+	09:06	09:55	10:39	3
10	C6.0	4											10:53	11:01	11:33	2	10:54	11:05	11:26	1+	10:39	11:11	11:47	2+
10	M1.4	4	12:00	12:05	12:17	1-	11:45	12:03	12:19	2	11:45	12:04	?	-	11:50	12:04	?	-						
10	?	2											12:39	12:44	12:51	1-	12:41	12:44	?	-	11:47	12:11	12:58	2+
10	M1.1	7					12:53	13:05	13:17	1	12:58	13:04	13:53	2+	12:51	13:06	?	-						
10	?	1															13:27	13:36	13:58	1+	12:58	13:10	14:48	3
10	?	1															14:58	15:02	15:14	1-				
10	M1.0	8	15:30	15:36	16:02	1+	15:28	15:38	15:50	1	15:28	15:40	16:29	2+	15:30	15:38	16:07	2		15:36	15:49	17:16	3	
10	C3.2	1															17:42	17:43	?	-				
10	?	3											17:51	18:01	?	-	17:51	18:00	?	-				
10	C6.6	3											18:10	18:16	18:29	1	18:12	18:14	18:28	1-				
10	C6.8	1			</																			

