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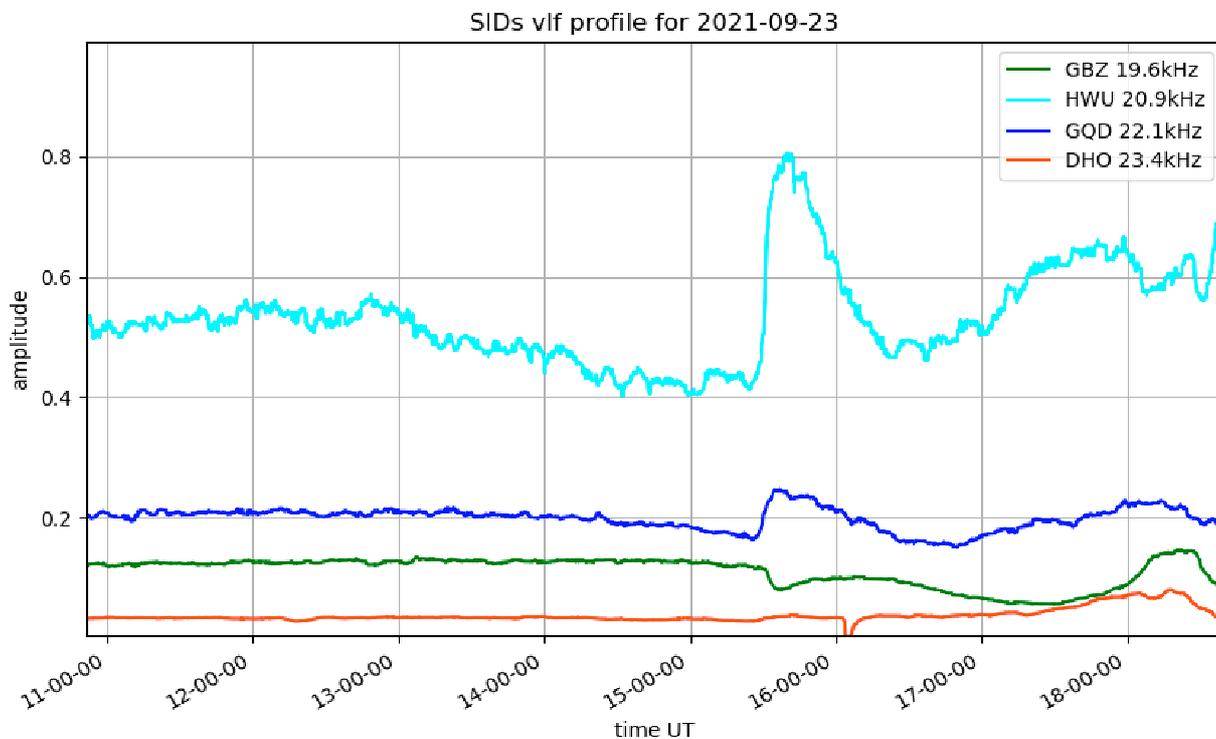


Please send all reports and observations to jacook@jacook.plus.com

BAA Radio Astronomy Section.

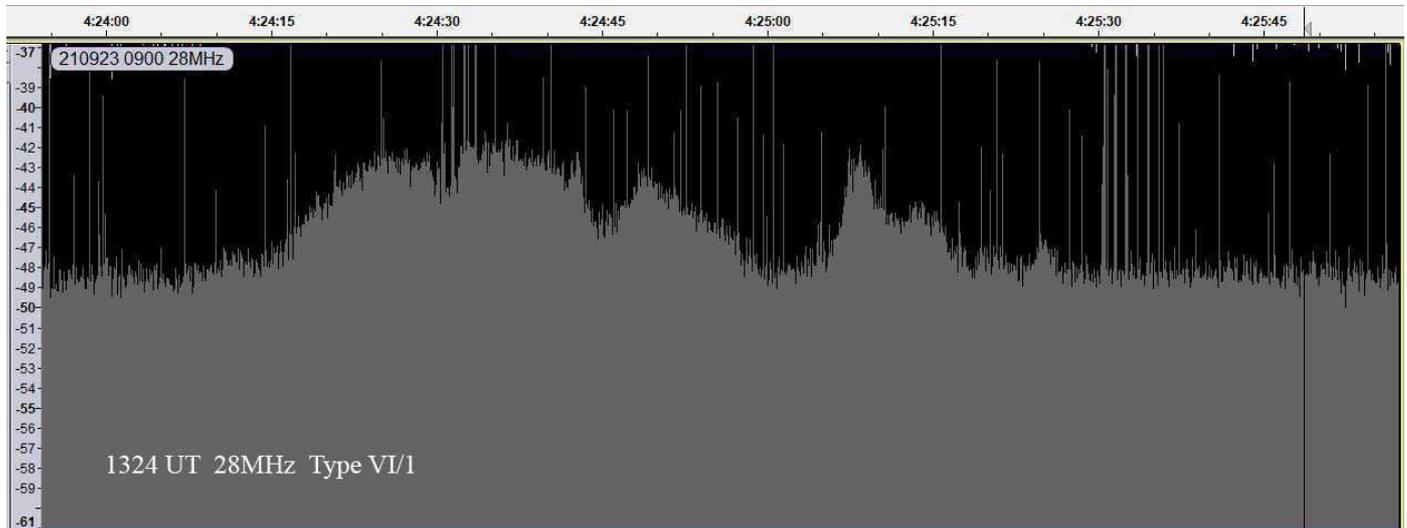
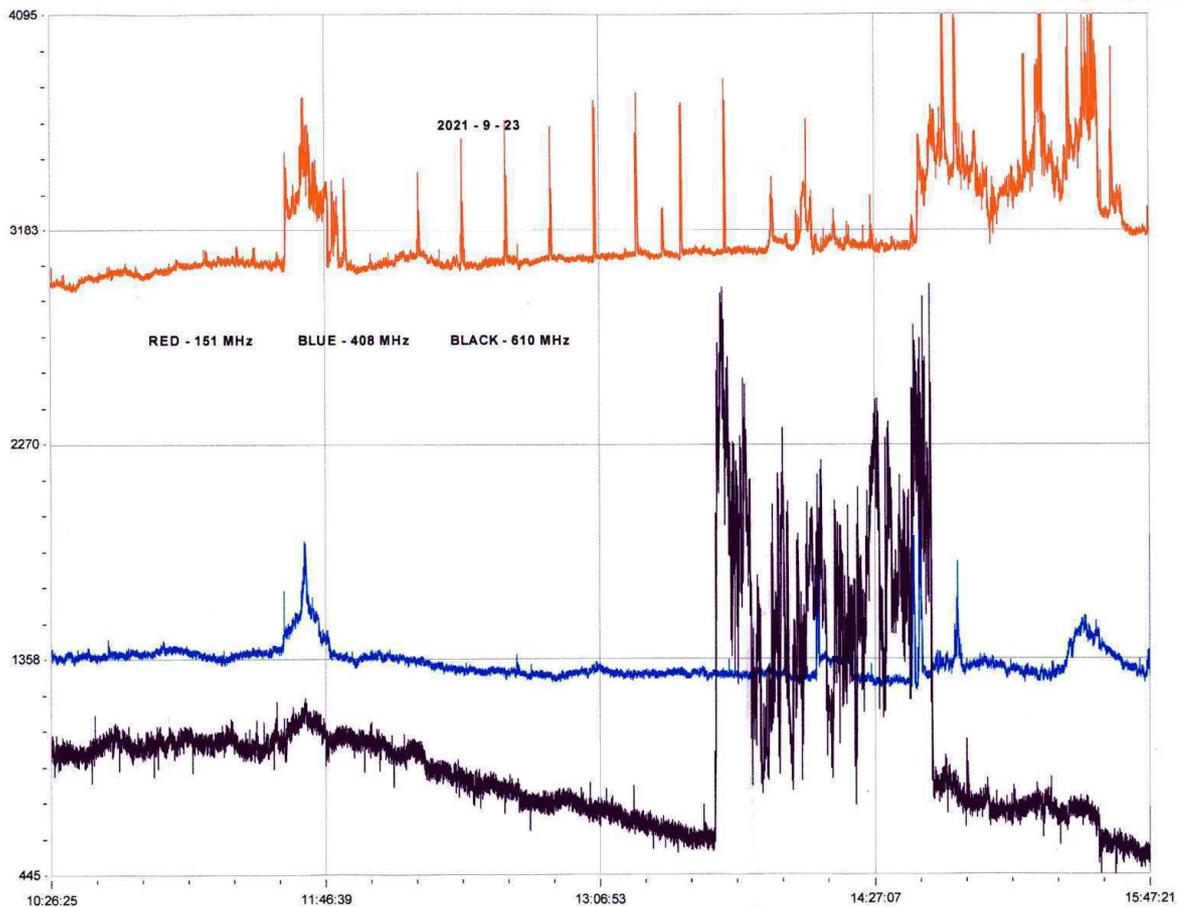
2021 SEPTEMBER.

The SID count in September was only half of that recorded in August, but it did include two M-class flares. The stronger of these, at M2.8, was rather early in the morning for northern-European observers, but it was recorded by Roberto Battaiola in Milan. The M1.8 flare was later in the afternoon and widely recorded. Mark Prescott made this recording:



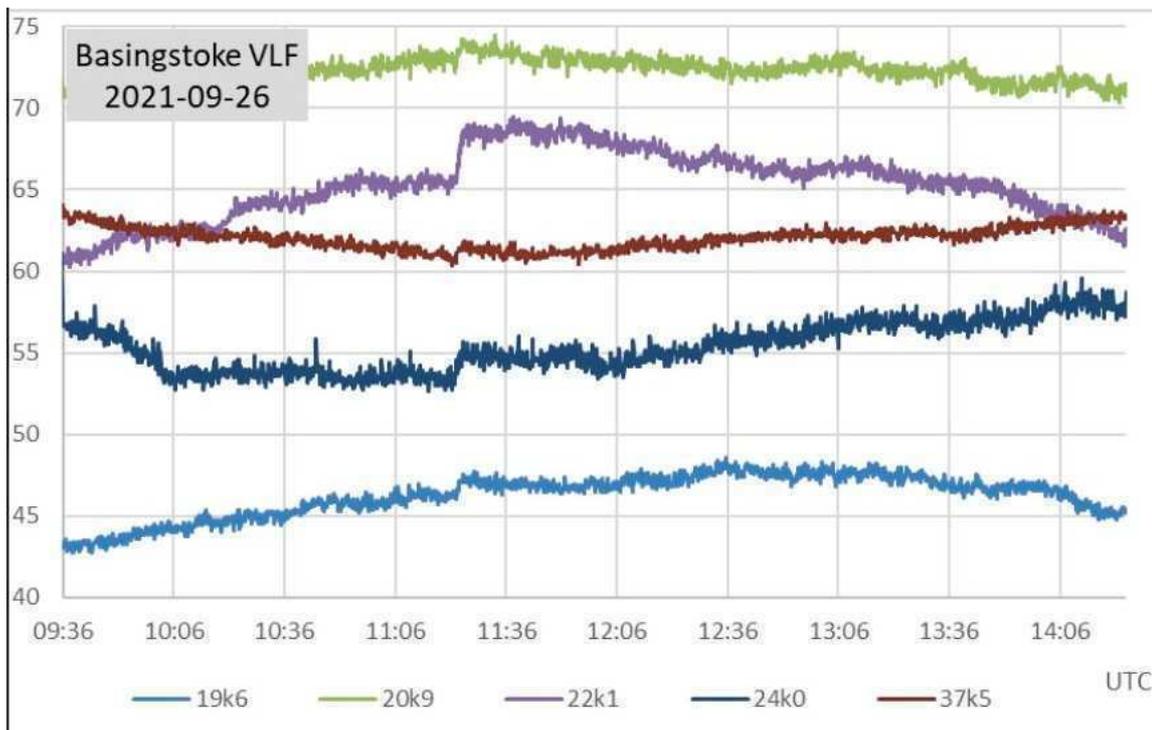
The response at 20.9kHz is very strong, with smaller SIDs at 19.6 and 22.1kHz. 23.4kHz shows a very small response, barely recognisable as a SID. It is followed by a short break in the signal just after 16:00UT. My own recordings gave a very similar response. The active region responsible for these flares was AR12871, close to the central meridian at the time. It appears to have been a reappearance of AR12860, responsible for the M4.7 flare on August 28th. These were the strongest flares of the month, among mostly small C-class and B-class events.

Some strong VHF activity was also recorded on the 23rd, some related to the M1.8 flare, and some occurring before hand. Colin Clements made recordings at 151, 408 and 610MHz, and Colin Briden made a 28MHz recording:



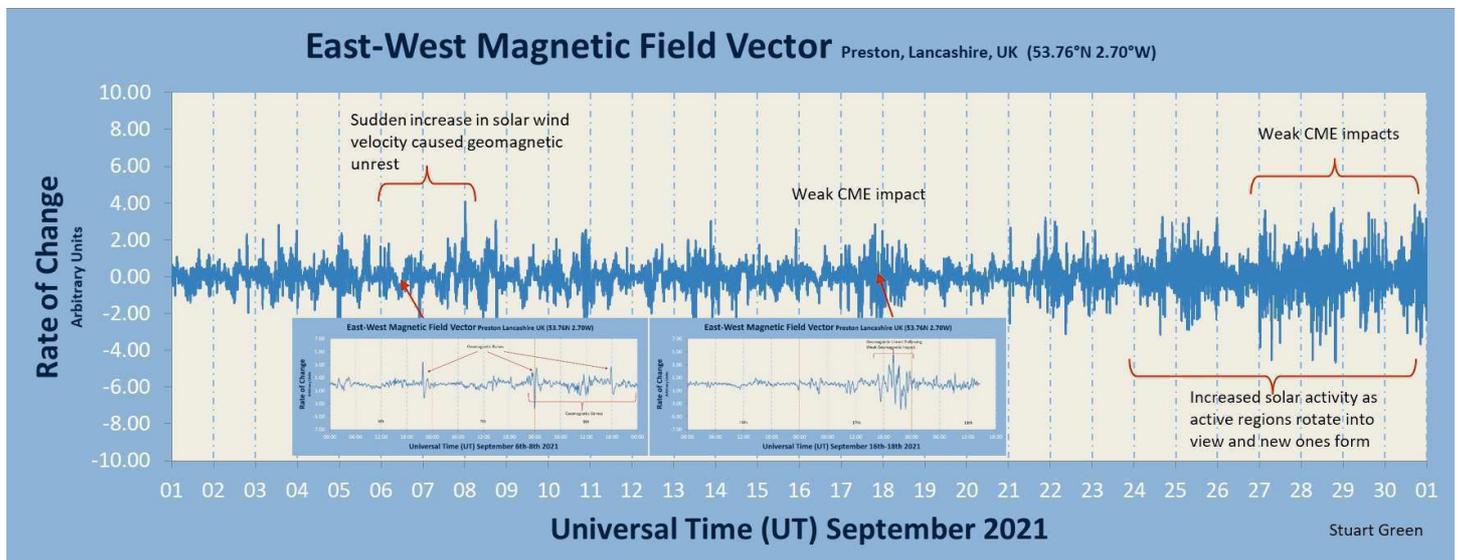
The 28MHz signal shows a type VI/1 signal, starting at 13:24UT, lasting for just over a minute. The type VI/1 designation implies multiple type III emissions in succession, of a small amplitude. The grey area in the chart is the time-averaged signal, varying over about 7dB. The black area shows the signal peaks, but they are mostly off the top of the chart, and so not visible.

Colin Clements' 151MHz signal (red) shows some local interference during the middle of the day, but has a clear burst from 14:40 to 15:50UT, covering the period of the flare. The 610MHz signal (black) lasts for a similar length of time, but starting at 13:40. The blue trace shows 408MHz, with only a very small signal overlapping that at 610MHz. All three show a small burst around 11:30 to 11:50.

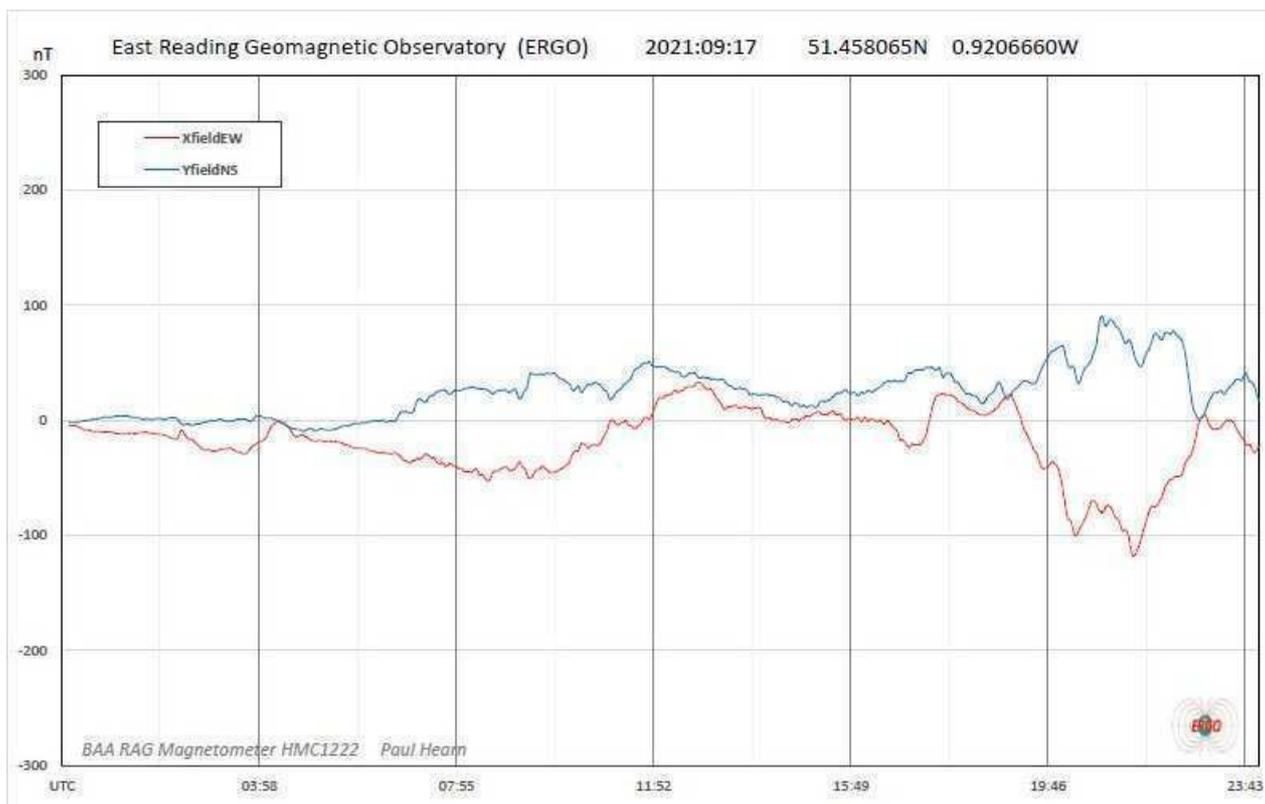


This recording from Paul Hyde shows the small C1.6 flare, peaking at 11:25UT on the 26th. 22.1kHz shows a very distinct SID, while 20.9 and 19.6kHz are much weaker. Considering that the paths at 19.6 and 22.1kHz are very close, the difference is quite surprising.

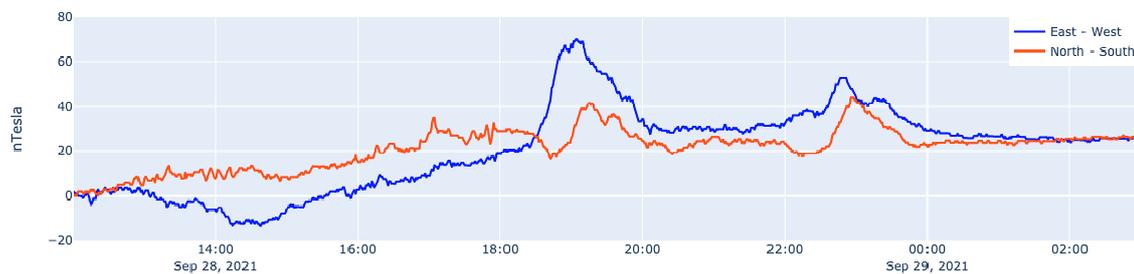
MAGNETIC OBSERVATIONS.



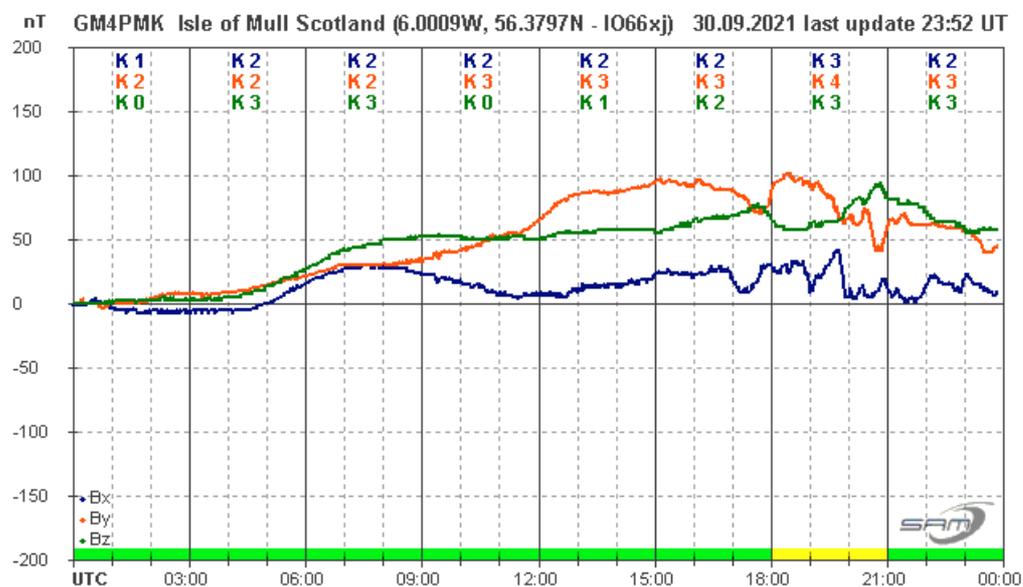
Stuart Green's summary of the month's activity shows a fairly quiet start, increasing in the last week. The mild disturbance over the 7th and 8th was from a coronal hole high speed wind, with some short transients shown in the inset chart on the 6th, 7th, and 8th. There were also a number of small CMEs shown in satellite images, the first of which arrived on the 17th. The chart on the next page by Paul Hearn shows the disturbance building through the day, although there is no clear sign of a CME arrival impact. Activity faded out in the early hours of the 18th.



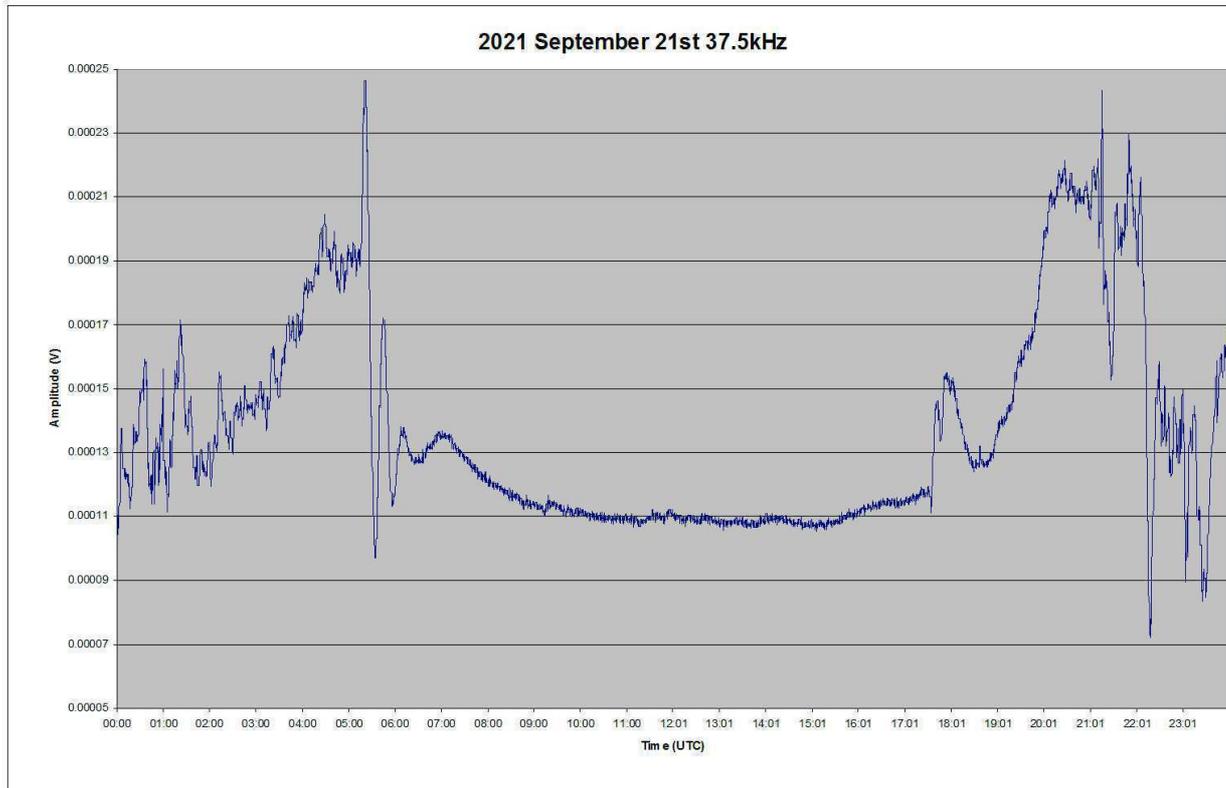
Steying Magnetometer (50.8 North, 0.3 West)



This chart from Nick Quinn shows activity from another CME on the 28th and 29th. Activity was again fairly mild, and continued into the evening of the 30th, shown in the chart from Roger Blackwell:



Mark Edwards recorded a 37.5kHz transient that appeared to be from a magnetic disturbance on the 21st:



The disturbance can be seen from 17:30 to 18:30UT, well before sunset takes over. Our own magnetic recordings do not show any significant activity at this time, although those from different parts of the world do show a strong disturbance. Those in the Americas seem to have been strongly disturbed, as well as in the Southern hemisphere.

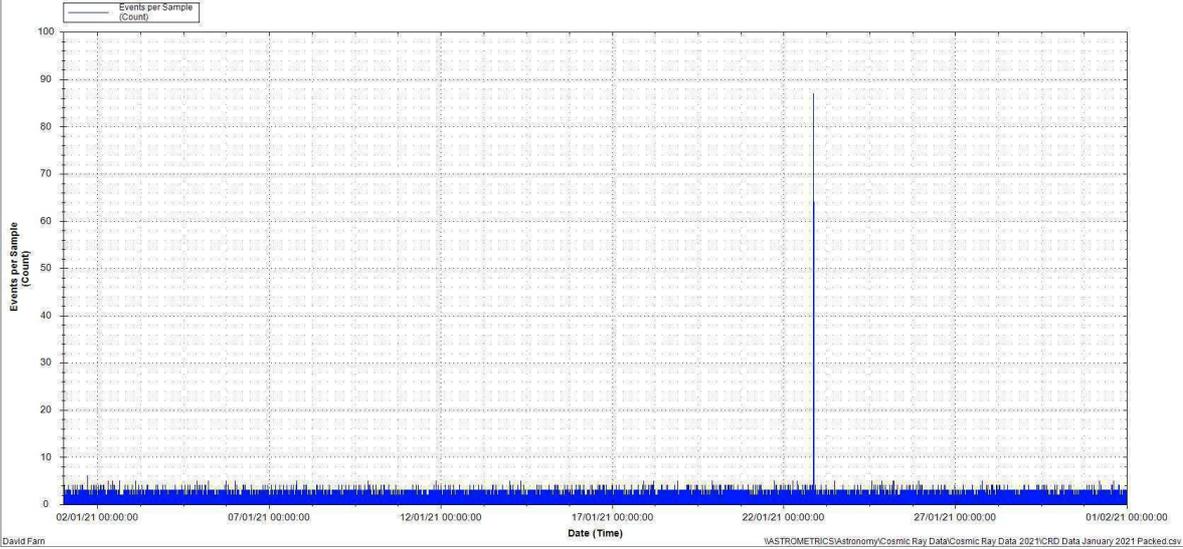
Magnetic observations received from Roger Blackwell, Colin Clements, Stuart Green, Paul Hearn, Nick Quinn and John Cook.

MUON DETECTION.

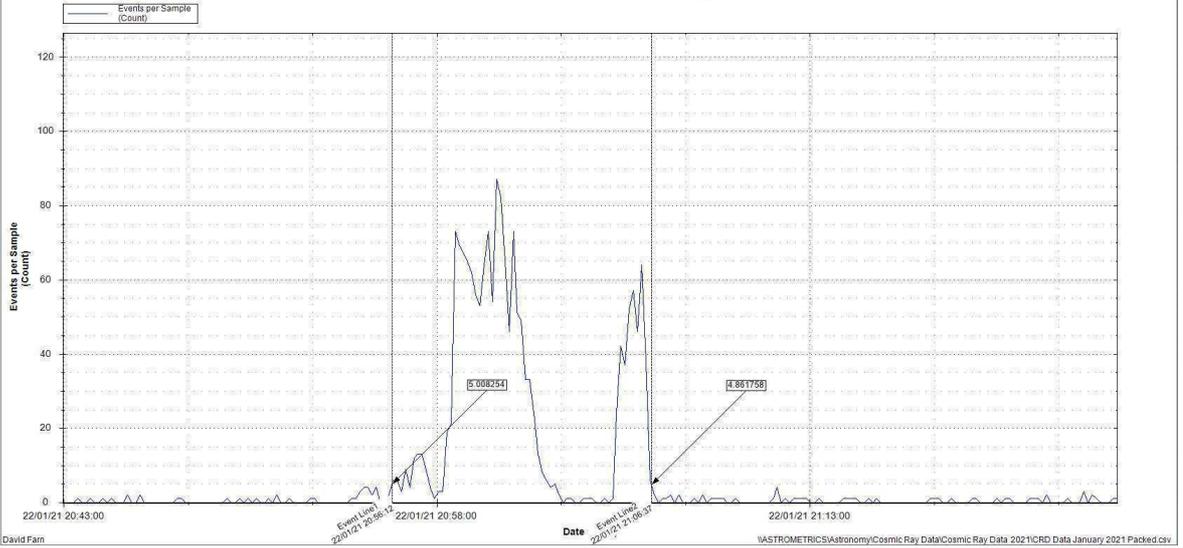
This is not a subject that we have covered previously, but David Farn has been experimenting with muon detection and has some interesting observations. His detector is based on plates of 5 STS-5 Geiger tubes, connected such that they don't cross-couple. The outputs are logged into memory so that counts can be made over time. The detector is mounted indoors, with a log of temperature and pressure being made to help avoid any local effects. It has been operating since 2020 April, and appears to be free from local interference.

The first chart shows counts in 2021 January. There is a low continuous background, with a sudden burst of activity on the 22nd. The second chart shows the detail of this activity, with two distinct peaks shown. They last for about 10 minutes, starting about 20:56UT. The cause is currently unknown, but monitoring is continuing. The third chart shows counts in August in more detail, with atmospheric pressure added. There are no 'super events' as in January, but just a small variation in background level. There appears to be no influence from atmospheric pressure.

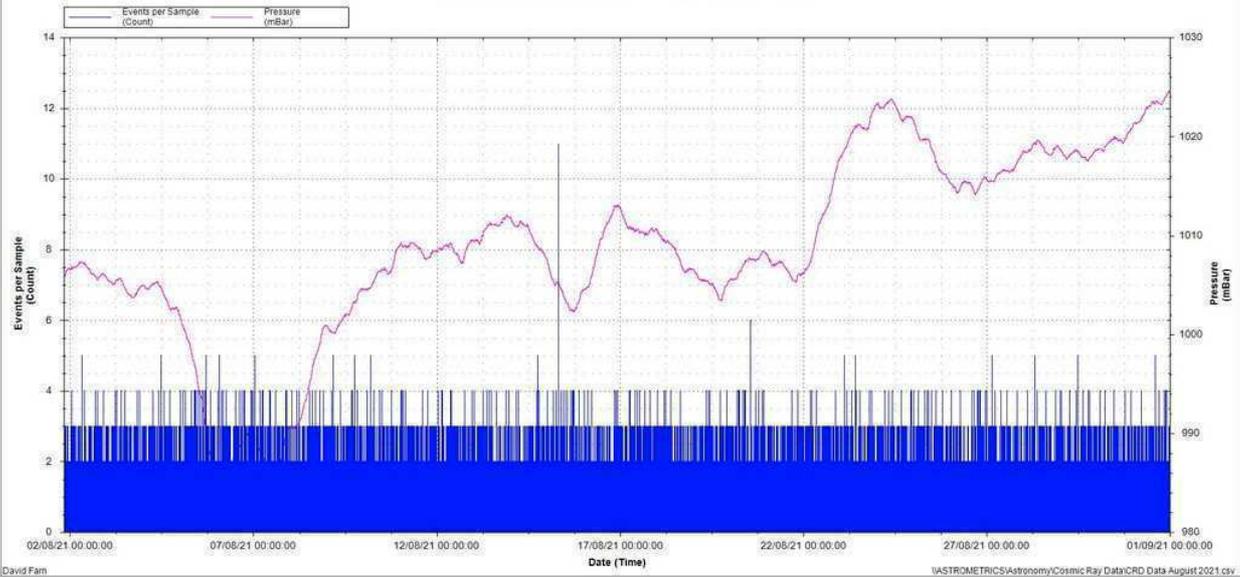
Astrometrics Cosmic Ray Data January 2021



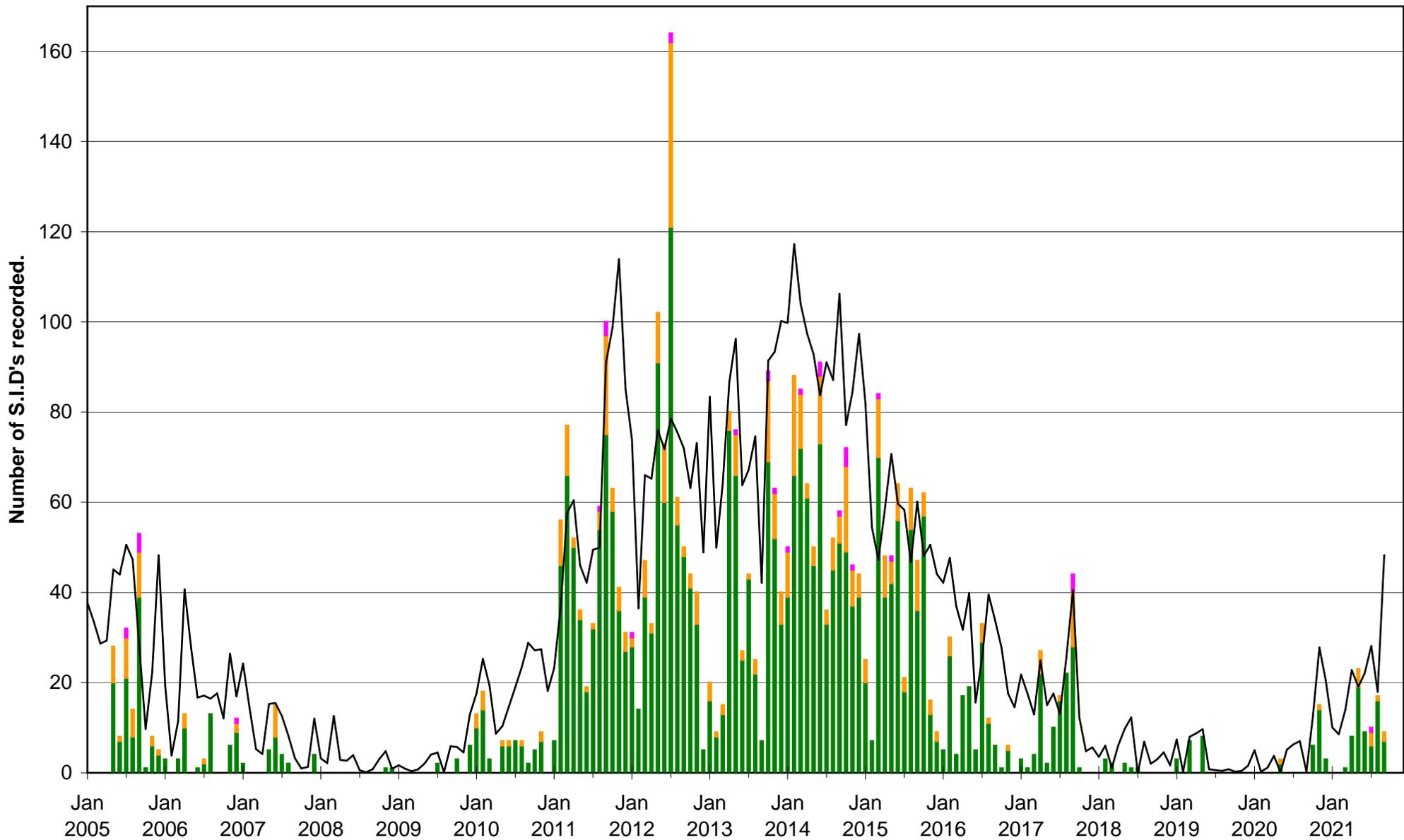
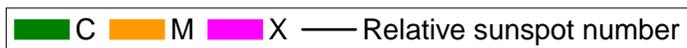
Astrometrics Cosmic Ray Data January 2021



Astrometrics Cosmic Ray Detector - August 2021



VLF flare activity 2005/21



BARTELS DIAGRAM

ROTATION	KEY:	DISTURBED.	ACTIVE	SFE	B, C, M, X = FLARE MAGNITUDE.	Synodic rotation start (carrington's).	
2529	F	26	27 28 29 30 31	1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	2019 January 2213	
2530	F	22	23 24 25	26	27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12	2019 February 2214
2531	F	18 19 20 21 22 23 24 25 26	27 28	1	2 3 4 5 6 7 8 9 10 11 12	2019 March 2215	
2532	F	17 18 19 20	21 22	23 24 25 26 27	28 29 30 31	1 2 3 4 5 6 7 8	2019 April 2216
2533	F	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	2019 May 2217	
2534	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	2019 June 2218	
2535	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	1 2	2019 July 2219	
2536	F	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	30	2020 January 2220	
2537	F	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	2020 February 2221	
2538	F	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	2020 March 2222	
2539	F	22 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 20 21	22	2020 April 2223	
2540	F	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	2020 May 2224	
2541	F	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	10 11	12 13 14 15 16 17 18 19 20 21	2020 June 2225	
2542	F	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 30 31	1 2 3	2020 July 2226	
2543	F	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 30 31	1 2 3	2020 August 2227	
2544	F	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 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 27 28 29 30	1 2 3	2020 September 2228	
2545	F	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	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	2020 October 2229	
2546	F	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 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	2020 November 2230	
2547	F	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 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	2020 December 2231	
2548	F	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 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 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 30 31	2020 January 2232	
2549	F	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 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 10 11 12 13 14	15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	2020 February 2233	
2550	F	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 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 30 31	2020 March 2234	
2551	F	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 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 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 30 31	2020 April 2235	
2552	F	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 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 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 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 23 24 25 26 27 28 29 30	2020 May 2236	
2553	F	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 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 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 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 20 21 22 23 24 25 26 27 28 29 30	2020 June 2237	
2554	F	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 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 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 30 31	2020 July 2238	
2555	F	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 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 30 31	2020 August 2239	
2556	F	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 30 31	2020 September 2240	
2557	F	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 30 31	2020 October 2241	
2558	F	16 17 18	19 20 21 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 21 22 23 24 25 26 27 28	2020 November 2242	
2559	F	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 30 31	2020 December 2243	
2560	F	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 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 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 30	2021 January 2244	
2561	F	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 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 30 31	2021 February 2245	
2562	F	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 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 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 23 24 25 26 27 28 29 30	2021 March 2246	
2563	F	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 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	2021 April 2247	
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2565	F	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 30 31	2021 June 2249	
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