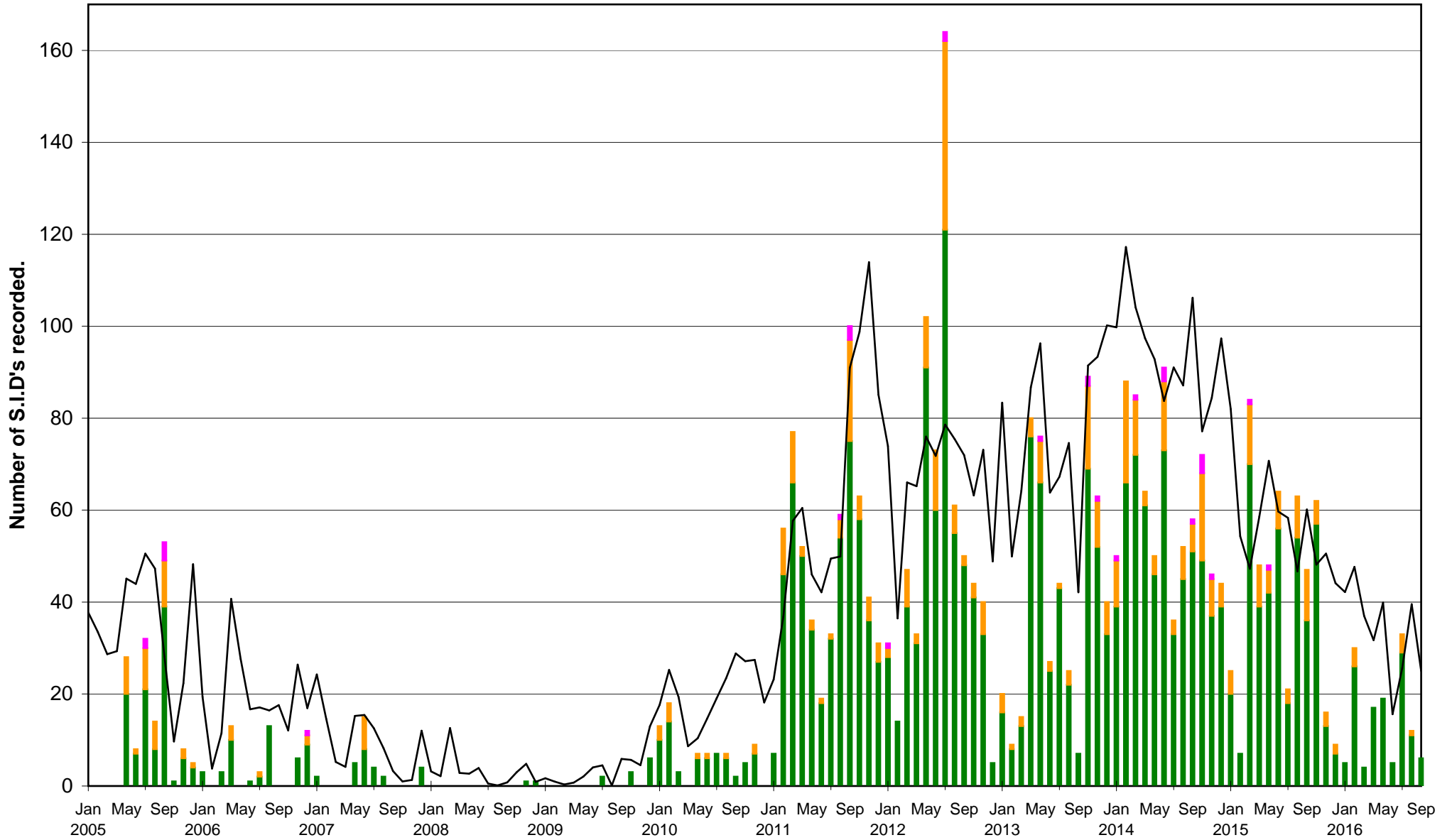
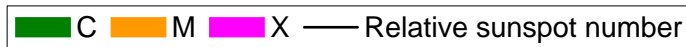


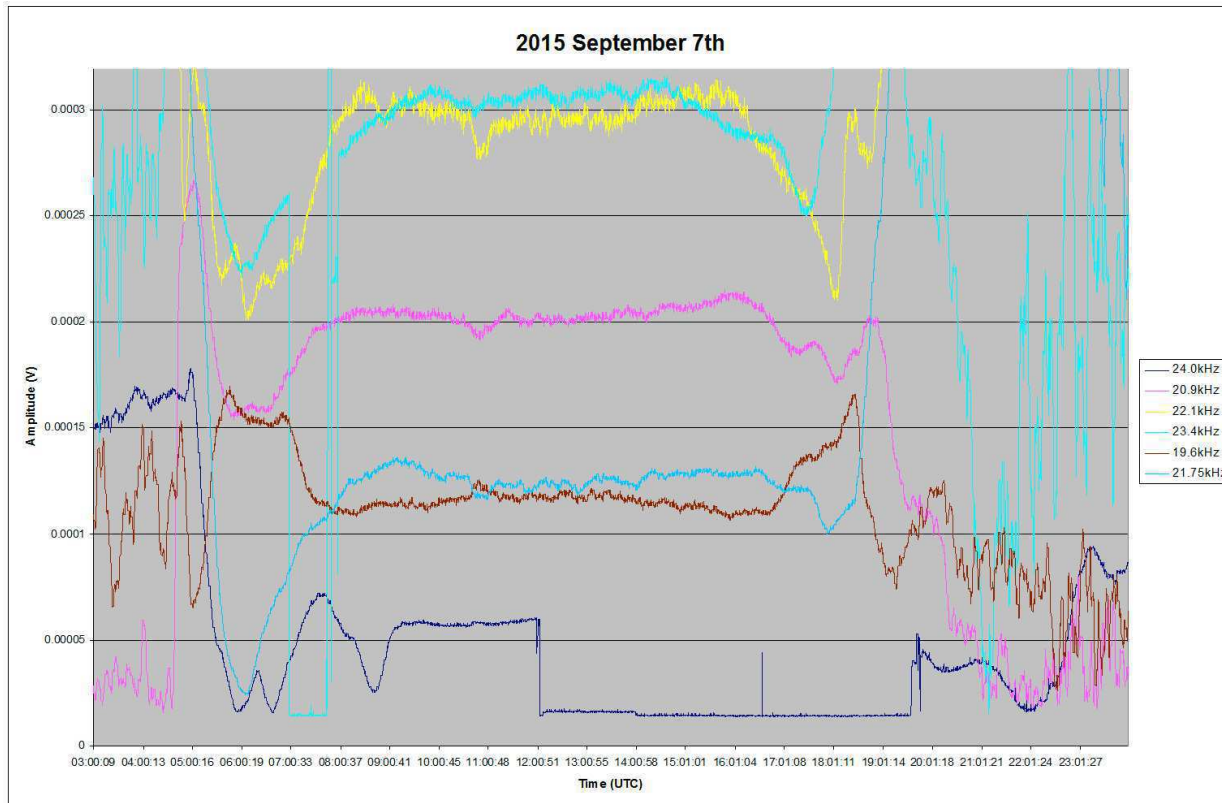
| DAY | Xray class | Observers | John Cook (23.4kHz/22.1kHz) | Roberto Battaiola (21.75kHz) | Paul Hyde (22.1kHz) | Mark Edwards (24.0kHz) | Colin Clements (23.4kHz/22.1kHz) |
|-----|------------|-----------|---|------------------------------|--------------------------------------|-----------------------------------|---|
| | | | 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. |
| | | | START PEAK END (UT) | START PEAK END (UT) | START PEAK END (UT) | START PEAK END (UT) | START PEAK END (UT) |
| 7 | B6.6 | 3 | 10:34 10:37 10:44 1- | | 10:39 10:44 11:04 1 | 10:40 10:43 10:57 1- | |
| 21 | C1.6 | 5 | 10:27 10:42 11:21 2+ | 10:29 10:53 11:18 2+ | 10:25 10:48 11:40 2+ | 10:29 10:41 ? - | |
| 21 | ? | 1 | | | | 10:53 10:59 11:35 2 | |
| 21 | C1.9 | 4 | 11:48 11:50 12:01 1- | | 11:48 11:55 12:19 1+ | 11:47 11:54 12:14 1+ | |
| 21 | B7.2 | 1 | | | | 14:35 14:40 14:51 1- | |
| 22 | C5.6 | 2 | | 05:38 05:47 06:38 2+ | 05:45 05:50 06:06 1 | | |
| 22 | C1.9 | 5 | 08:28 08:30 08:35 1- | 08:27 08:31 08:39 1- | 08:28 08:30 08:59 1+ | 08:29 08:31 08:33 1- | |
| 22 | C1.5 | 6 | 11:49 11:53 12:20 1+ | 11:45 11:59 12:20 2 | 11:49 11:54 12:34 2 | 11:49 12:02 12:30 2 | 11:48 11:59 13:09 2+ |
| 22 | C1.9 | 2 | | | 17:49 17:59 18:23 2 | 17:49 17:58 18:37 2+ | |

| DAY | Xray class | Observers | Steve Parkinson (Various) | John Wardle (19.6/23.4kHz) | Phil Rourke (23.4kHz) | Jim Barber | John Elliott (18.3kHz) |
|-----|------------|-----------|--|----------------------------------|----------------------------------|----------------------------------|--|
| | | | Tuned radio frequency receiver, frame aerials. | PC soundcard, 0.7m frame aerial. | Spectrum Lab, 0.6m frame aerial. | Spectrum Lab, 0.6m frame aerial. | Tuned radio frequency receiver, 0.5m frame aerial. |
| | | | START PEAK END (UT) | START PEAK END (UT) | START PEAK END (UT) | START PEAK END (UT) | START PEAK END (UT) |
| 7 | B6.6 | | | | | | |
| 21 | C1.6 | | 10:28 10:55 ? - | | | | |
| 21 | ? | | | | | | |
| 21 | C1.9 | | 11:49 11:53 12:20 1+ | | | | |
| 21 | B7.2 | | | | | | |
| 22 | C5.6 | | | | | | |
| 22 | C1.9 | | 08:27 08:30 08:45 1- | | | | |
| 22 | C1.5 | | 11:49 11:58 12:40 2+ | | | | |
| 22 | C1.9 | | | | | | |

VLF flare activity 2005/16.



Activity in September was confined to just three days in the month. Although there were several sunspot groups present, they remained fairly stable. The background X-ray flux dropped to about B2 by the 4th, remaining between B1 and B2 for the rest of the month. There were plenty of B3 to B4 flares recorded in the GOES data, most of which were too weak to produce a recordable SID. The first to be recorded was the B6.6 on the 7th.

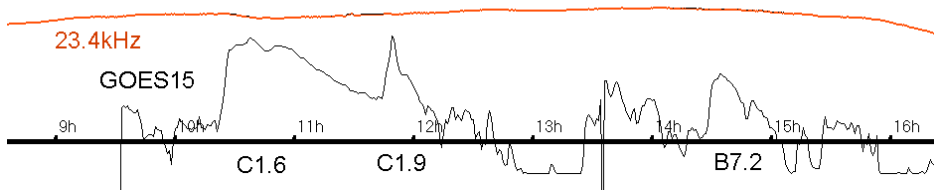


This recording by Mark Edwards shows a small but distinct SID, peaking around 10:45UT. Although the SWPC lists this as a B6.6 flare, the SID is quite strong for such a weak event. The GOES15 data has a resolution of 1 minute, and so a slightly higher peak could have been missed between samples. It could also be due to the nature of the flare. The SWPC classification is based on X-ray wavelengths of 0.1 to 0.8nm, whereas D-region ionisation is also affected by longer wavelengths into the UV part of the spectrum. The SEM sensor on the SOHO satellite records over the range 0.1 to 50nm, and does show this flare to be nearer C1 in magnitude. It may be that this particular flare was weaker in X-ray and stronger in UV, producing a correspondingly stronger SID. The matching of our SIDs to GOES15 data may perhaps be a little arbitrary, but does seem to work for the majority of flares that we record.

There were no reported SIDs over the next two weeks. X-ray data shows just a few flares in the range B2–B5 during our daytime, with some B7 flares during the night. There were no reports of oscillations over this period. The strength of the 22.1kHz signal from Anthorn dropped significantly mid-morning on the 12th, remaining low for the rest of the month.

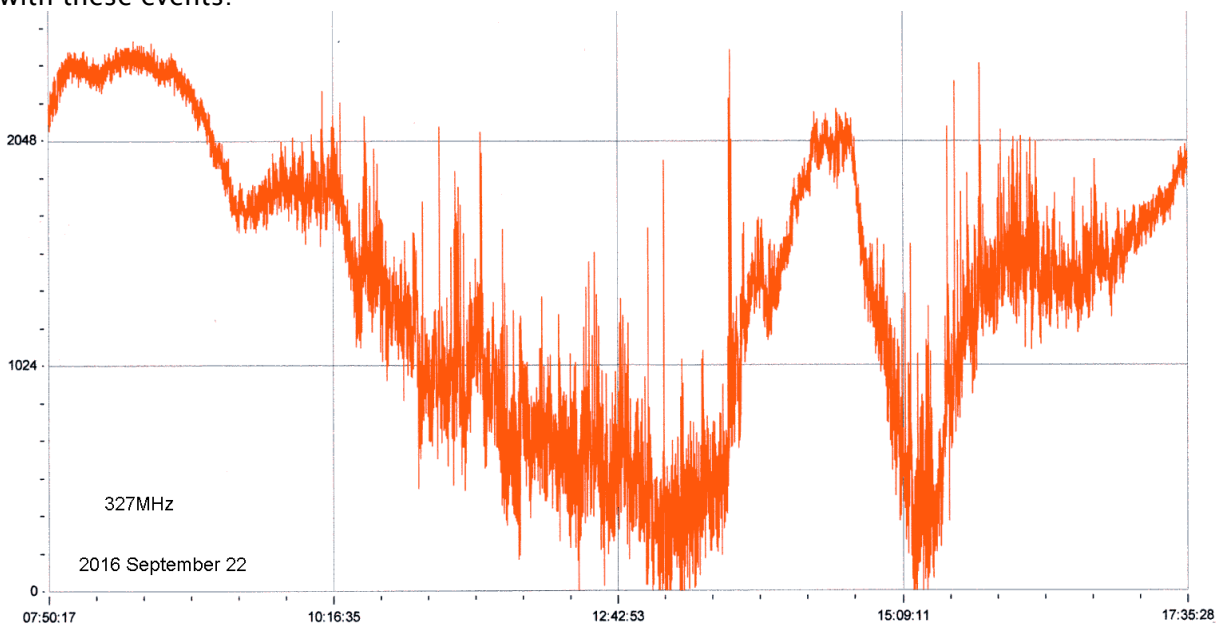
The first of the day-time C-class flares occurred on the 21st, with a double peaked C1.6 event starting around 10:30UT. My own chart shows the day's activity:

2016 September 21



The SIDs are rather subdued at 23.4kHz, and against a noisier background would be lost. Strangely, the C1.9 SID is even less distinct.

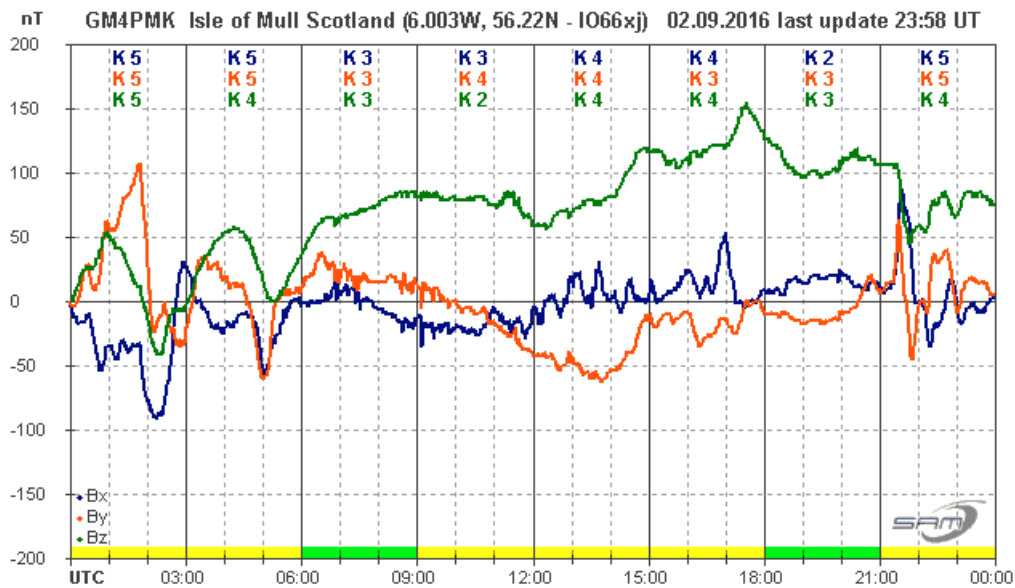
The strongest flare of the month was the C5.6, early on the 22nd. This was followed by three more small C1 class flares. Colin Clements has been trying a 327MHz receiver, and recorded some noise associated with these events:



Although this is still an experimental system, it shows some promise and represents emissions from lower in the solar atmosphere compared to his 151MHz system. Local interference remains a problem in today's radio-noisy environment.

MAGNETIC OBSERVATIONS.

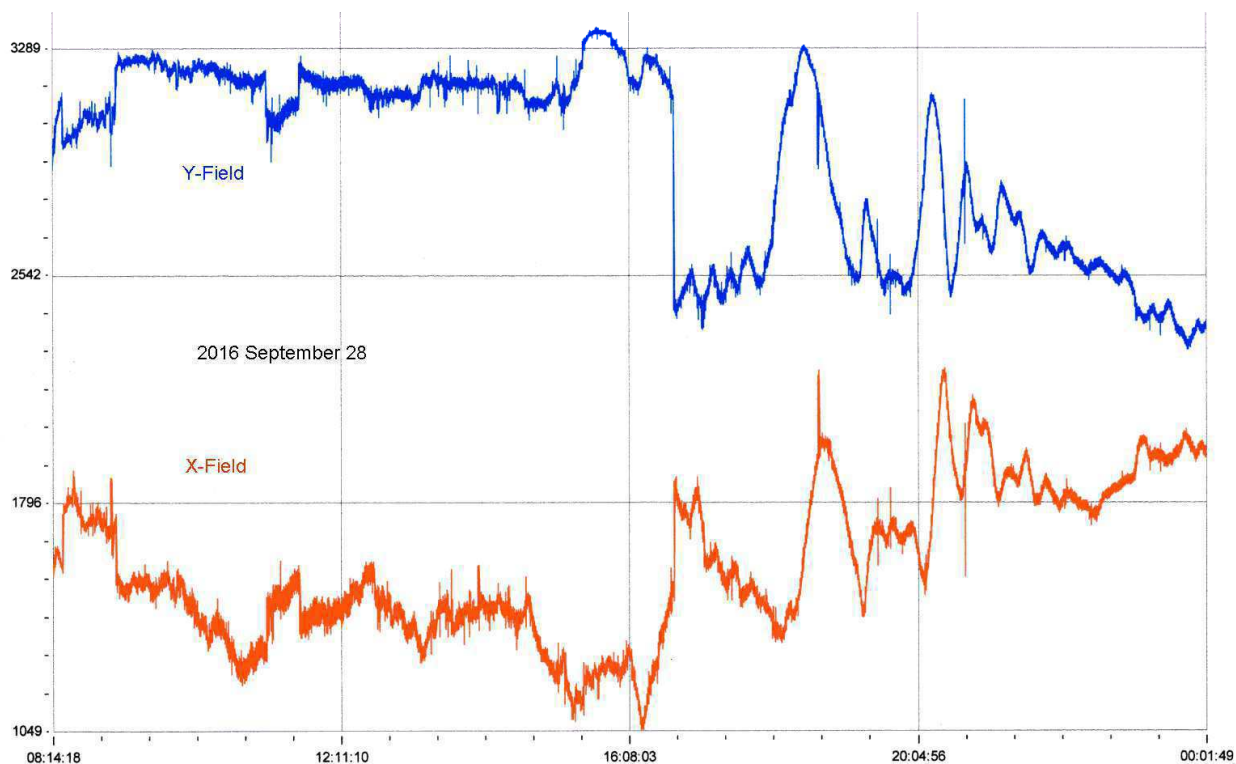
The Bartels diagram has a 27 day period, designed to show recurrent magnetic activity in a vertical column. One such recurrent feature is a large coronal hole, first appearing in our diagram around May 15th. The coronal hole has grown in size over the months, and by September 28th covered most of the Northern hemisphere, extending southwards to about 30 degrees. According to the STCE bulletin (STCEnews20160930.pdf) its area was then roughly equivalent to 880 times the Earth's surface area. At each rotation it has allowed a high speed wind to reach Earth, causing magnetic disturbances. Its effects again became apparent on September 1st, with some stronger activity on the 2nd, as shown in the recording by Roger Blackwell:



Through the day the Bz component (green trace) varied by about 200nT. My own single-axis sensor recorded a variation of about 140nT. This disturbance continued without a break until the morning of the 6th before returning to quiet conditions.

As already mentioned, the coronal hole made another appearance at the end of the month. These charts by Colin Clements record disturbances on the 25th, 26th, and 28th.





Although there is some local magnetic interference present, the very active period in the afternoon and evening of the 28th is clear. Roger Blackwell's sensor recorded a variation of over 200nT between 18:00 and 21:00UT in the By component. Gonzalo Vargas in Bolivia reported a moderate disturbance over the 26th to 30th.

A report on the space weather website for September 13th showed a recording of a period of two minute magnetic oscillations from Lofoten, Norway, on the 12th. A similar oscillation was seen in the local ground current. Lasting from 09:00 to 10:30UT, the effect was very distinctive. None of our recordings show anything unusual at this time, so this may have been a local effect. Lofoten is at 68 degrees North, off the West coast of Norway.

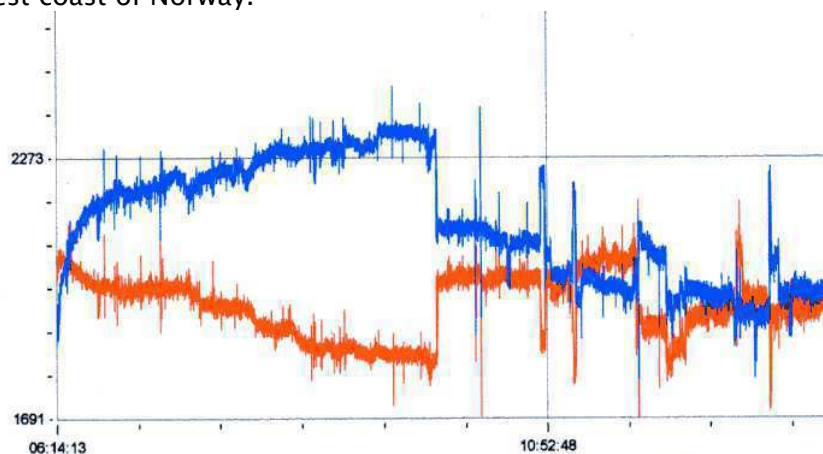


Chart Started 12/09/2016 by Brookmount Radio Obs in Lisburn, United Kingdom

Colin Clements' chart has a large local disturbance at 09:50, but shows only irregular variations over the period of the Lofoten report. Unfortunately, the Radio Astronomy Group no longer has anyone monitoring Earth currents, not easy measurements to make.

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

BARTELS DIAGRAM

| ROTATION | KEY: | DISTURBED. | ACTIVE | SFE | B, C, M, X = FLARE MAGNITUDE. | Synodic rotation start (carrington's). |
|----------|------|---|---|-----|-------------------------------|--|
| 2460 | F | 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 | | 2013 December | |
| 2461 | F | 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 | | 2014 January | |
| 2462 | 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 | | 2014 February | |
| 2463 | 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 | | 2014 March | |
| 2464 | 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 31 | 1 2 3 4 5 6 | | 2014 April | |
| 2465 | 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 | 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 | | 2014 May | |
| 2466 | F | 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 | 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 | | 2014 June | |
| 2467 | F | 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 | | 2014 July | |
| 2468 | F | 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 | | 2014 August | |
| 2469 | 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 | | 2014 September | |
| 2470 | F | 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 | | 2014 October | |
| 2471 | F | 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 | | 2014 November | |
| 2472 | F | 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 | | 2015 December | |
| 2473 | F | 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 | | 2015 January | |
| 2474 | 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 | 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 | | 2015 February | |
| 2475 | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 | | 2015 March | |
| 2476 | F | 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 | | 2015 April | |
| 2477 | F | 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 | | 2015 May | |
| 2478 | 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 | | 2015 June | |
| 2479 | F | 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 | | 2015 July | |
| 2480 | F | 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 | | 2015 August | |
| 2481 | F | 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 | | 2015 September | |
| 2482 | 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 31 | 1 | | 2015 October | |
| 2483 | 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 | 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 | | 2015 November | |
| 2484 | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 | | 2015 December | |
| 2485 | F | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 | | 2016 January | |
| 2486 | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 | | 2016 February | |
| 2487 | F | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 | | 2016 March | |
| 2488 | 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 | 1 2 3 4 5 6 7 8 9 10 | | 2016 April | |
| 2489 | 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 | 1 2 3 4 5 6 | | 2016 May | |
| 2490 | 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 31 | 1 2 3 4 | | 2016 June | |
| 2491 | F | 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 | | 2016 July | |
| 2492 | 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 | 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 | | 2016 August | |
| 2493 | F | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 | | 2016 September | |
| 2494 | F | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 | | 2016 October | |
| 2495 | F | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 | | | |
| 2496 | F | 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 | 1 2 3 4 5 6 7 8 9 10 11 12 13 | | | |
| 2497 | F | 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 | 1 2 3 4 5 6 7 8 9 | | | |
| 2498 | 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 6 | 1 2 3 4 5 6 | | | |