



British Astronomical Association

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BAA Solar Section Newsletter

Sunspot data 2024 March

Day	g	R
1	5	87
2	5	87
3	6	83
4	7	87
5	6	87
6	6	79
7	5	82
8	6	83
9	5	78
10	3	62
11	3	64
12	4	82
13	4	65
14	3	51
15	3	41
16	3	46
17	4	63
18	6	93
19	6	101
20	5	99
21	6	122
22	6	119
23	6	114
24	7	122
25	6	118
26	5	95
27	4	77
28	4	71
29	4	59
30	3	45
31	3	44

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Email: solar@britastro.org

Images for the web should be sent to Peter Meadows: peter@petermeadows.com and copied to me. All digital images must be in "JPEG" format with the same orientation as naked eye orientation. Include initials, date and time in the file name. Keep each image file to less than 1Mb.

On-line Reporting:

<https://britastro.org/solarwl>

<https://britastro.org/solarha>

Observers:

- | | |
|---------------------------|----------------------------|
| M J Armstrong, Kendal | R Johnson, Surrey |
| C Bailey, Suffolk | D Keep, Lincoln |
| R Battaola, Milan, Italy | K Kilburn, Staffordshire |
| M Boschat, Canada | M Kinder, Cheshire |
| C F Bowron, South Yorks | L Macdonald, Berkshire |
| A Bowyer, Epsom Downs | R Mackenzie, Kent |
| S Brown, Leicestershire | M Mattos, Spain |
| E Bryant, North Devon | P Meadows, Essex |
| M Buck, Bristol | A Mengus, France |
| L Cambon, France | H Meyerdieks, Germany |
| G Cauchi, South Australia | B Mitchell, Norwich |
| I Chouinavas, Greece | M Nicholls, Sheffield |
| G Clarke, Australia | P Norman, Worcester |
| E Colombo, Italy | C Potter, Orkney |
| J Cook, Wolverhampton | R Samworth, Leicestershire |
| A Coombs, Vic, Aust | J D Shanklin, Cambridge |
| P Curtin, USA | J Shears, Cheshire |
| S Dawes, London | D Smith, Essex |
| A Devey, Spain | L Smith, Angus |
| R Dryden, Oxon | N Spencer, York |
| F Dubois, Belgium | M Stephanou, Greece |
| T Emmett, Cambs | G Steigmann |
| T Figiel, Poland | A Stone, Bristol |
| M Giuntoli, Italy | T Tanti, Malta |
| D Glover, Essex | D Teske, Mississippi, USA |
| S Green, Lancs | C B Thielke, Denmark |
| K Hall, Warrington | Towarzystwo Milosnikow |
| B Halls, W Sussex | Towarzystwo Obs Slonca |
| K Hay, Canada | S Ove Thimm, Denmark |
| A W Heath, Nottingham | P Urbanski, Poland |
| R Heard, Suffolk | G Vargas, Bolivia |
| R Hill, Arizona, USA | F Ventura, Malta |
| J Janssens, Belgium | D Vidican, Romania |
| A Johnston, Denbighshire | S Viney, Cheshire |

Monthly Means

MDFg:	5.58	(44 observers)
MDFNg	2.80	(38 observers)
MDFSg	2.89	(38 observers)
Mean R:	85.80	(43 observers)

The Sun in White Light – March

The trend in March continued downwards with slight decreases in activity in both hemispheres. Activity during the month was very similar in both hemisphere with a corresponding slight drop in the Relative Sunspot number and the Quality value. Multiple sunspots groups were reported on all days of the month and thirty-four groups were assigned Boulder numbers. The largest or more active sunspot groups are reported on below.

AR3590 N23°/224° was reported near to the NW limb on the 1st as an irregular Hkx sunspot having survived from the previous month. Although not seen the following day, this group returned on the 17th for its second rotation, now numbered AR3614 (see below).

AR3591 S36°/158° another survivor from February and only notable due to its high latitude. The group was type Hax with a total area of 110 millionths on the 1st. It remained of similar size and type and was last reported nearing the SW limb on the 6th.

AR3595 N22°/164° was reported in February's report and by the 1st of March was just into the NW quadrant as a bi-polar Dao type group with an area of 540 millionths. By the following day, the leader had increased in size whilst the follower had split into two but the overall size of the group had reduced to 430 millionths. The group was last reported close to the NW limb on the 6th as a single Hsx type sunspot.

AR3598 S13°/177° had formed on the last day of the previous month just into the SW quadrant but on the 1st of March, substantially developed from an Hrx type sunspot to type Dao. More sunspots developed between the leader and follower on the 2nd with a second approached the limb on the 5th.

AR3599 S13°/066° was reported close to the SE limb on the 2nd. The preceding sunspot seemed to be a close collection of pores with the follower sunspot being a small penumbral with a network of faculae surrounding the group. The group remained C class until the 6th when it strengthened to type Dao with an area of 160 millionths. By now the leader was a penumbral sunspot with smaller sunspots trailing. The group underwent strengthening on the 7th with more small penumbral sunspots appearing and having a total area of 310 millionths. The group showed some complexity on the 9th with numerous small sunspots. The followers started to fade on the 12th as the group approached the SW limb and it rotated on the 13th.

AR3607 S17°/313° formed not far from the SE limb on the 12th and comprised of two small penumbral sunspots type Dao. By the 15th the group had extended in longitude and the follower sunspot had broken up into several minor sunspots. The group continued to reduce to type Bxo on the 17th but then strengthened back to type Dao on the 18th. As the group approached the SW limb on the 21st, once again the follower sunspot showed signs of decay which continued the following day. The group was then lost over the limb.

AR3613 S23°/323° developed on the disk in the SW quadrant to the south-west of AR3607 on the 16th. The group was type Cao with a small penumbral leader but developed small penumbral follower sunspots on the 17th to become type Dai. The group showed signs of fading on the 19th and continued to decline as it approached the limb on the 21st type Cao.

AR3614 N18°/220° being the return of AR3590, this second rotation commenced on the 17th when it rotated over the NE limb as an Hax sunspot. The group was much smaller than its previous passage being type Hax with an area of 270 millionths on the 20th. The group remained mostly a single asymmetric sunspot over the next few days being accompanied by a small trailing sunspot as it crossed the CM. The follower faded on the 25th and the group remained a single Hsx sunspot until it rotated over the limb on the 29th.

AR3615 S12°/214° rotated over the SE limb on the 18th as a collection of minor sunspots but already quite extensive in longitude, type Eao. The following day, the group showed strengthening particularly in the central section to type Eac. Further development took place on the 20th with the group sporting several small penumbral sunspots, the largest being in the centre of the group; many pores were trailing and interspersed throughout its length. Further development took place over the coming days with the group growing from an area of 420 millionths on the 20th to 1190 millionths on the 23rd. By this point the group comprised of several irregular penumbral sunspots and many pores and was approaching the CM. The group was truly impressive on the 24th when the size of the penumbral sunspots had

increased to give a total area of 1480 millionths. A region of Photosphere was seen within the leading penumbral sunspot. Further change had occurred by the 26th when the group was type Fkc; the follower penumbral sunspot was now the largest of the group. Further development occurred on the 27th with the total area now 1870 millionths and with the group approaching the SW limb on the 28th, the area increased once again to 2140 millionths with the follower still the largest component. The group started to rotate around the limb on the 29th with only the follower penumbral sunspot still being visible close to the limb on the 30th. The group was reported visible to the protected naked eye on the 23rd, 24th, 26th and 27th. 23 observers reported a Quality number of **16.98** for March.

The Sun in H-alpha

Prominences

18 observers reported a prominence MDF of **7.26** for March.

On the 1st a column prominence with a height of 90,000 km was reported on the SE limb. To the north of it was a low but extensive prominence hearth which was also reported on the 2nd and 3rd. On the 3rd the feature was much larger in both length and height, rising to about 95,000 km. An active, extensive prominence was also seen on the NE limb on the 3rd and an unconnected arch prominence hovered over the eastern limb at a height of 90,000 km and extending for 150,000 km.

A large active prominence with a spray element was observed on the NW limb on the 5th as well as a large flattened prominence on the SE limb.

Four tree-type prominences in close proximity were noted in the north polar region on the 6th which were also seen on the 7th although had undergone some shape changes. In fact, these prominences had been in existence from the start of the month in various configurations and continued to persist through to the 11th.

On the 14th, a complex and multi-component prominence hearth was seen on the SW limb consisting of several prominences close the limb and several blobs of plasma at approximately the same height above the limb. This feature was also reported as a cloud of plasma above the SW limb at a height of about 50,000 km. A fan type prominence was also reported on the SE limb at a height of about 40,000 km.

A column prominence was reported on the SW limb on the 16th rising to 80,000 km and on the 18th also on the SW limb, a large fan shaped prominence rose to 70,000 km.

A low but extensive prominence hearth appeared on the SE limb on the 22nd which had substantially developed by the following day. The base was about 250,000 km in extent and had a height of 70,000 km. On the 24th the feature was described "striking" and consisted of a main billowing loop of plasma and a leaning tower component to the north of the main section. The feature reduced in size over the next few days with the feature rotating onto the disk as a large filament. A broken loop prominence was also noted on the NW limb on the 24th.

On the 30th with AR3615 close to the SW limb, several short bright prominences were reported near the group together with two very thin and almost vertical prominences above the limb.

Bi-Polar Magnetic Regions, Filaments & Plage

17 observers reported a filament MDF of **9.03** and 15 observers reported a plage MDF of **4.48** for March.

A broad but irregularly shaped filament was aligned roughly north/south in the SE quadrant on the 1st. The filament rotated across the disk changing shape slightly and reached the SW limb on the 8th resulting in a prominence on the 9th.

On the 12th, a large filament was in the NE quadrant, a large curved filament was over the CM in the northern hemisphere and in the SW quadrant, several filaments were seen associated with AR3599. The large curved filament was also reported on the 15th approaching the NW limb and estimated to be about 260,000 km in length.

On the 16th a long filament was reported in the SW quadrant not far from the CM displaying a curious kink midway along its length and measuring about 350,000 km total length. The feature was not present the following day and likely erupted in the following hours as a

CME.

A dark north/south aligned filament accompanied AR3614 from the NE limb on the 18th through to the 21st fading on the 22nd but reappearing on the 23rd remaining with the group until it reached the NW limb on the 28th.

The large prominence hearth on the SE limb reported above, was sighted on the disk near the limb on the 27th as a substantial filament measuring about 240,000 km in length. The following day the feature was estimated at 300,000 km. On the 29th the central section had faded leaving substantial northern and southern elements. This configuration persisted through to the end of the month when the filaments were over the CM.

Plage was noted with most sunspot groups throughout the month. On the 24th, many bright areas of plage were seen within AR3615 near the centre of the disk although none were recorded as flares.

CaK

Numerous sunspot groups were seen with CaK plage throughout the month as well as prominences also detected in CaK wavelength. Flaring in CaK was reported on the 6th associated with the major and lesser sunspots of AR3599. Flaring was also detected in AR3599 on the 7th at 1000 UT but not as bright as in H-alpha wavelength. On the 23rd AR3615 showed flaring in CaK at 1315 UT and continued at 1346 UT. On the 24th regions AR3614, 3615, 3617, 3619, 3620 and 3621 sported CaK plage and also a region in the NE quadrant. CaK flaring was also noted within AR 3615 on the 27th at 0920 UT which brightened by 0940 with smaller areas flaring at 0945 UT from the area south-east of the main sunspot. On the 30th AR3615, 3617 and 3619 all displayed CaK plage and seven other CaK regions were noted without visible sunspots being present.

CaK MDF **6.20** (10 observations by Brian Mitchell). Report also received from Ella Bryant.

Flares

AR 3599, AR3614 and AR3615 proved to be the active flare producing regions during the month. Flares were reported by Arthur Bowyer, Ella Bryant, Laurent Cambon, Arthur Coombs, Andy Devey, Massimo Giuntoli, Stuart Green, Derek Glover, Andrew Johnston, Mario Mattos, Mick Nicholls, David Teske and Stephen Viney.

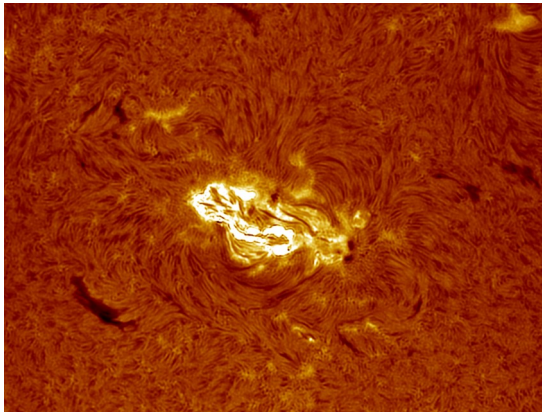
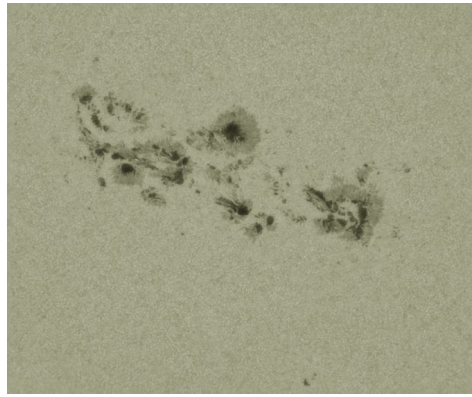
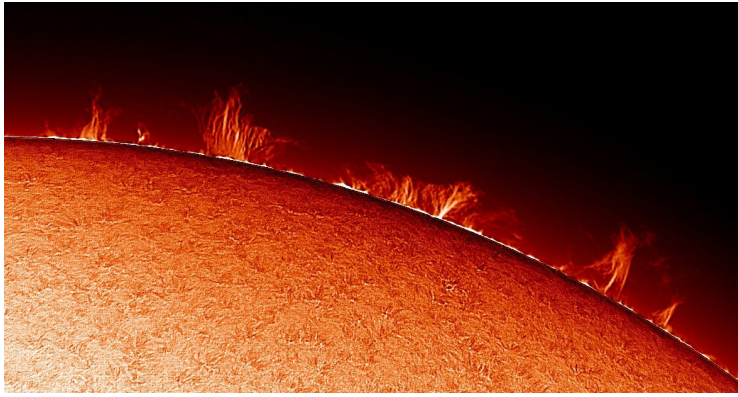
On the 23rd, M class flares were reported from AR3615 at 1420 UT by Mick Nicholls, at 1330 UT by Andrew Johnston and at 1609 UT by Andy Devey. Arthur Coombs recorded an M1.5 class flare within AR3615 on the 26th.

Polar Faculae

No polar faculae were reported during March.

MAGNETOMETER REPORT 2024 MARCH

DATE	DURATION (UT)		ACTIVITY	
3	00:00	02:00	Disturbed	
3	09:45	19:00	Active	
3/4	19:00	02:00	Disturbed	
4	21:30	23:00	Disturbed	
7	19:00	21:00	Disturbed	
8/9	20:15	06:30	Disturbed	
9	19:15	21:00	Disturbed	
12	00:30	02:00	Disturbed	Solid-state magnetometer, Uncalibrated. John Cook
13	06:00	18:00	Disturbed	
14/15	21:30	01:30	Disturbed	
18	20:00	23:30	Disturbed	
20	21:00	23:45	Disturbed	
21/22	11:00	04:00	Disturbed	
23	02:30	07:30	Disturbed	
23/24	10:30	05:00	Disturbed	
24	07:00	14:30	Disturbed	
24	14:30	20:00	Active	
24/25	20:00	13:00	Disturbed	



Top Left: Polar prominences that persisted throughout the first week of the month—imaged by Carl Bowron 20240304 at 1029 UT 120mm og f18

Top Right: White light image by Dave Smith showing the complexity of AR3615 20240324 at 0915 UT

Left: AR3615 flaring on 20240323 at 1414 UT imaged by Ella Bryant

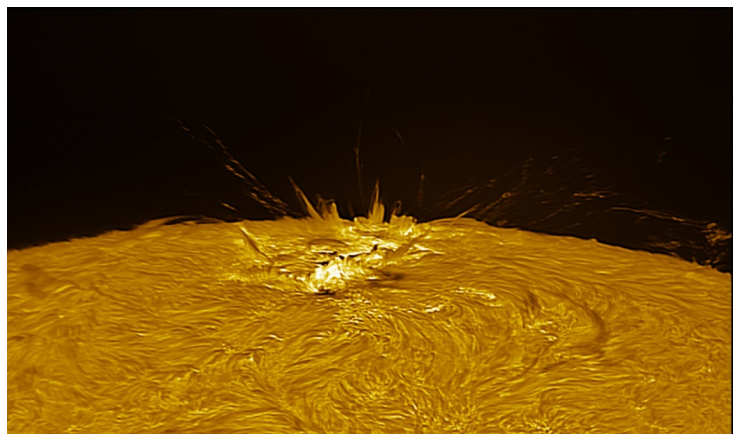
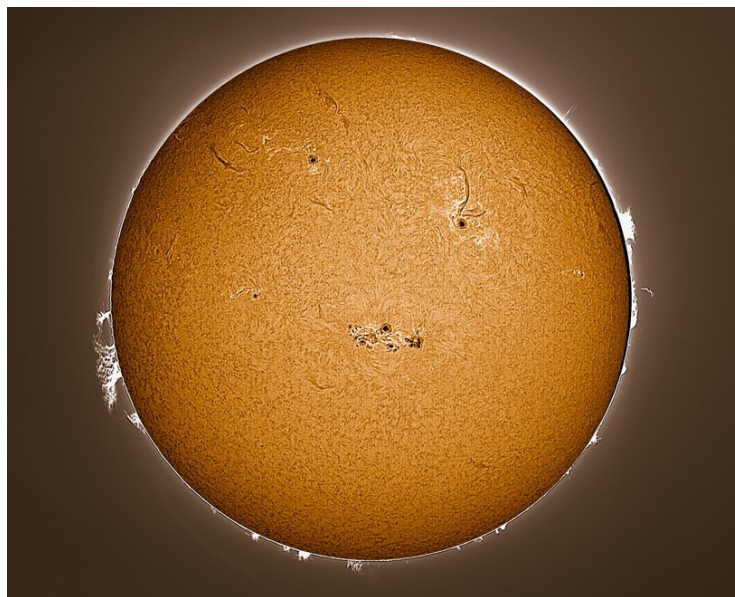
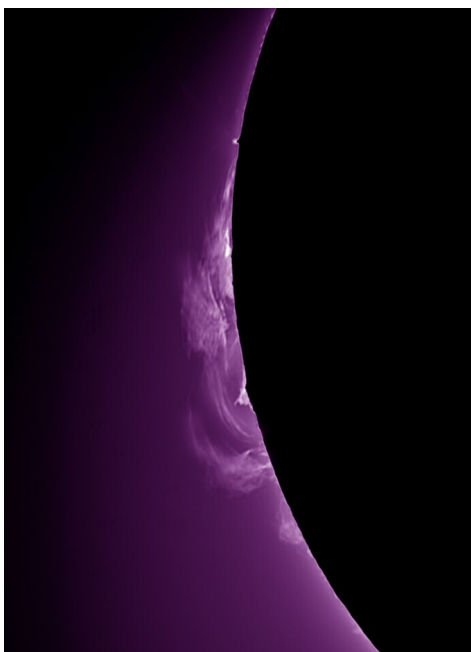
Below: Full disk image by Gottfried Steigmann showing AR3615 centre disk 20240324 imaged at 1038 UT

Below Left:

Calcium K-line image of the extensive Prominence on the SE limb imaged by Ella Bryant 20240303 at 1049 UT

Below Right:

H-alpha image by Stuart Green showing AR2615 arriving at the SW limb on 20240330 and imaged at 0805 UT



Section News

A timely reminder that our next Section meeting on Zoom is nearly upon us at 19.30 BST (18.30 UT) on Friday 26 April 2024. Two Section members, Stuart Green and Dave Smith, will be presenting a workshop on solar image processing.. No doubt, many other aspects of solar observing will be discussed as well, so please come along and join in the chat. If you prefer to just attend and listen in with your camera on or off, that is fine too. Also a heads-up for the BAA one day meeting at Greenock near Glasgow on Saturday 11th May 2024. There's an excellent line-up of speakers; full details and how to book on the BAA website.

<https://britastro.org/event/spring2024>

Topic: SOLAR SECTION WORKSHOP

Time: Apr 26, 2024 19:30 London (Conference will open at 19:15)

Join Zoom Meeting

<https://us02web.zoom.us/j/82405341934?pwd=eXpxOXkwVjFJOGVVZC96NTZjaWp5UT09>

Meeting ID: 824 0534 1934

Passcode: 565040

One tap mobile

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- +44 208 080 6592 United Kingdom
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- +44 131 460 1196 United Kingdom

Meeting ID: 824 0534 1934

Passcode: 565040

