



# British Astronomical Association



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## BAA Solar Section Newsletter

### Sunspot data 2024 January

Day	g	R
1	3	44
2	3	60
3	3	55
4	4	69
5	4	89
6	6	105
7	7	140
8	6	126
9	8	128
10	8	134
11	8	141
12	8	161
13	8	130
14	7	121
15	8	113
16	8	105
17	8	107
18	7	102
19	8	110
20	7	118
21	6	119
22	6	124
23	5	117
24	5	96
25	3	74
26	5	74
27	3	50
28	4	52
29	4	59
30	4	60
31	5	92

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Images for the web should be sent to Peter Meadows: [peter@petermeadows.com](mailto: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	D Keep, Lincoln
R Battaiola, 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	P Meadows, Essex
E Bryant, North Devon	A Mengus, France
M Buck, Bristol	H Meyerdierks, Germany
L Cambon, France	B Mitchell, Norwich
G Clarke, Australia	P Norman, Worcester
E Colombo, Italy	K Orrman-Rossiter, Australia
J Cook, Wolverhampton	Polskie Towarzystwo Mi-
A Coombs, Vic, Aust	losnikow
P Curtin, USA	C Potter, Orkney
A Devey, Spain	R Samworth, Leicestershire
R Dryden, Oxon	J D Shanklin, Cambridge
F Dubois, Belgium	D Smith, Essex
T Emmett, Cambs	L Smith, Angus
G D Ewen, Beds	N Spencer, York
M Giuntoli, Italy	A Stone, Bristol
D Glover, Essex	T Tanti, Malta
S Green, Lancs	D Teske, Mississippi, USA
K Hall, Warrington	C B Thielke, Denmark
B Halls, W Sussex	N Tonkin, Cornwall
K Hay, Canada	P Tosi, France
A W Heath, Nottingham	Towarzystwo Obs Slonca
R Heard, Suffolk	S Ove Thimm, Denmark
R Hill, Arizona, USA	P Urbanski, Poland
J Janssens, Belgium	G Vargas, Bolivia
M Jenkins, Cambridge	D Vidican, Romania
S Jenner, Kent	S Viney, Cheshire
A Johnston, Denbighshire	
R Johnson, Surrey	

#### Monthly Means

MDFg:	6.96	(45 observers)
MDFNg	3.43	(35 observers)
MDFSg	3.72	(35 observers)
Mean R:	106.92	(44 observers)

## **The Sun in White Light – January**

Activity in January was similar to that seen in December. There was a minor overall increase due to an uplift in southern hemisphere activity with the quality number also showing a slight increase. Multiple sunspot groups were recorded on every day of the month with the highest daily average occurring around the middle section of the month. Thirty-five sunspot groups were assigned a Boulder number, the largest or most complex are reported below.

**AR3536 N09°/152°** there was evidence of this sunspot group on the NE limb at the end of the previous month and by the 1<sup>st</sup> was fully on the disk accompanied by extensive faculae. The group was assessed as D class with 8 sunspots with a large asymmetric penumbral leader. The group was Eko by the 3<sup>rd</sup> consisting of two penumbral sunspots in close formation leading the group with three followers in a wide spaced triangular formation. The following day, the group was assessed as type Dac with an area of 250 millionths. The group crossed the central meridian on the 6<sup>th</sup> and by the 8<sup>th</sup> the followers were in decline. The group then underwent a rapid decline fading on the disk as it approached the NW limb.

**AR3537 N18°/151°** formed on the disc to the north of AR3536 on the 2<sup>nd</sup> type Cao but grew to type Dao by the 4<sup>th</sup> due to the development of a small penumbral follower. The group crossed the CM on the 6<sup>th</sup> and interestingly, SWPC assigned a separate Boulder number for the follower sunspot (AR3542) on the 6<sup>th</sup>. AR3537 then continued across the NW quadrant as a Hax sunspot, fading gradually before fading on the disk as it approached the NW limb. **AR3538 N21°/177°** formed on the disk in the NE quadrant on the 3<sup>rd</sup> to the west of AR3537 as collection of small sunspots type B but by the 4<sup>th</sup> was classified as Dri with 13 sunspots counted. Quite distinct white light faculae were reported with the group on the 6<sup>th</sup>. The group didn't appear to develop further until it was on close approach to the NW limb on the 9<sup>th</sup> when it strengthened but then rotated on the 10<sup>th</sup> from view.

**AR3540 S19°/094° & AR3541 S21°/096° & AR3552 S23°/083°** AR3540/AR3541 rounded the SE limb in unison during the 4<sup>th</sup>/5<sup>th</sup>. On the 6<sup>th</sup> AR3540 was type Dao with the largest sunspot being an elongated penumbral leader. AR3541 was a Hsx sunspot placed to the south of AR3540's leader. AR3541 became more elongated the following day and by the 8<sup>th</sup> had blossomed into type Dai. AR3540 had also developed with minor sunspots developing between the leader and follower components. By the 9<sup>th</sup> AR3540 was type Dac comprising of a collection of small penumbral sunspot and pores with a combined area of 300 millionths. As both groups crossed the CM on the 11<sup>th</sup> it became harder to discern one from the other and on the 13<sup>th</sup>, SWPC assigned the eastern most sunspots of AR3541 as AR3552. AR3541 became the more extensive of the two original groups as they crossed into the SW quadrant but thereafter faded quickly. Both groups were still visible approaching the SW limb on the 16<sup>th</sup> but both much reduced in area.

**AR3545 S06°/040°** was reported near the SE limb on the 9<sup>th</sup>, an Hsx sunspot calculated on the 10<sup>th</sup> to have an area of 550 millionths. The penumbral sunspot elongated on the 12<sup>th</sup> and the umbra split into two on the 13<sup>th</sup>. On the 15<sup>th</sup>, just passed the CM, the group comprised of a slightly asymmetric sunspot displaying a light bridge and several faint pores trailed the leader. The following day the group was estimated as 330 millionths in area. The followers had faded by the 17<sup>th</sup> the group being type Hkx. The following day the umbra was dissected by a light bridge and on the 19<sup>th</sup>, as it neared the limb, the group appeared foreshortened and faculae were clearly seen accompanying the group with a streak of facula cutting across the northern umbra. The group was reported seen with the protected naked eye on the 15<sup>th</sup>, 16<sup>th</sup> and 18<sup>th</sup>.

**AR3549 S20°/007°** rounded the SE limb on the 11<sup>th</sup> as a Hsx sunspot but the following day a small penumbral leader appeared over the limb, the group becoming type Dso. The following day this follower broke up into a line of pores that trailed the main sunspot over the coming days although they did get fainter as the group approached the CM. The group reverted from C class to type Hsx on the 21<sup>st</sup> when the followers faded on the disk. The remaining sunspot crossed the SW quadrant unchanged rounding the limb on the 24<sup>th</sup>.

**AR3555 S11°/318° & AR3561 S16°/326°** AR3555 rounded the SE limb on the 15<sup>th</sup> type Dso consisting of two small penumbral sunspots. The group was of similar appearance on

the 17<sup>th</sup> but on the 18<sup>th</sup> the follower decayed into minor sunspots. On the 19<sup>th</sup>, several small sunspots developed to the south-west of the leader of AR3555, this subsequently being numbered AR3561. This new group gathered in strength becoming type Dac by the 23<sup>rd</sup> and was now the dominant group of the pair. AR3561 strengthened once more overnight and the two groups were difficult to define, appearing as one mass of small penumbral and minor sunspots. The main sunspot of AR3555 persisted but AR3561 declined rapidly as it approached the limb. When last seen on the 26<sup>th</sup> close to the SW limb, the penumbral sunspot of AR3555 was visible and only two small sunspots remained from AR3561 to the south of it.

**AR3559 N28°/290°** appeared over the NE limb on the 18<sup>th</sup> being a small Dso type group. It was still small the following day but had extended in longitude to become type Eac. However, by the 22<sup>nd</sup>, the group had rapidly developed into an Fkc group with an area of 930 millionths. The group comprised of several parts; a pair of leading penumbral sunspots and an irregularly shaped penumbral sunspot with several umbrae was towards the following part of the group. Several pores were seen between the leader and follower penumbral regions. On the 24<sup>th</sup> with the group just past the CM, both the leader and follower penumbral sunspots were quite irregular in shape and there were fewer pores throughout the group. Its size had reduced to 810 millionths. When next reported on the 26<sup>th</sup>, the follower region had reduced to a small penumbral sunspot and a few pores. The leader was still irregular in shape appearing as two large penumbral sunspots linked by a curved penumbral area. The area of the whole group was estimated at 560 millionths. By the 28<sup>th</sup> there was more than 10° between the irregularly shaped leader and the single small follower for these sunspots to be counted as two separate groups. The group rotated over the limb on the 29<sup>th</sup> and was not seen on the 30<sup>th</sup>.

**AR3567 N20°/124°** rotated over the NE limb on the 29<sup>th</sup> as a D class group with four sunspots. The following day, the group was still foreshortened but was estimated as type Dao with a small penumbral leader and an elongated penumbral follower. The following day this follower was an irregular shaped penumbral sunspot containing several umbrae. 23 observers reported a Quality number of **22.07** for January.

### **The Sun in H-alpha Prominences**

14 observers reported a prominence MDF of **7.41** for January.

Prominence activity was low during the first half of the month.

A wedge-shaped prominence was on the SE limb on the 4<sup>th</sup> rising to about 50,000 km and with a width of 80,000 km.

Two fila-proms were reported on the 7<sup>th</sup> on the SE limb, one near to AR3540 and the other further south.

A prominence hearth consisting of two elements in a broken arch formation was on the SE limb on the 14<sup>th</sup>.

On the 15<sup>th</sup>, a pyramid prominence was seen rising to about 60,000 km in height from the SW limb. Also on the same day, a pyramid or tower type prominence was reported on the NE limb.

A fila-prom was reported extending from the north limb near to the Pole on the 16<sup>th</sup> and on the 17<sup>th</sup> another fila-prom was sighted on the NE limb extending inwards to the north of AR3559.

The following day, a large arch prominence was reported on the SE limb rising to about 60,000 km and extending around the limb for about 120,000 km.

On the 22<sup>nd</sup> an impressive and moderately sized detached prominence was reported above the western limb, estimated at about 80,000 km in height.

A detached platform arch plasma cloud was observed above the W limb on the 26<sup>th</sup>, at a height of between 25,000 km and 50,000 km above the limb and was estimated to have a length of between 170,000 km and 200,000 km.

### **Bi-Polar Magnetic Regions, Filaments & Plage**

13 observers reported a filament MDF of **9.29** and 12 observers reported a plage MDF of **6.08** for January.

A north/south aligned filament in the SE quadrant on the 1<sup>st</sup> persisted through to the 9<sup>th</sup> when it reached the SW limb.

Extensive dark bi-polar magnetic regions were visible in the NE quadrant on the 6<sup>th</sup> and also towards AR3540/AR3541 on the SE limb. Magnetic regions were also visible trailing AR3534 in the SW quadrant.

A large patch of filament was noted near the SE limb on the 9<sup>th</sup>.

On the 14<sup>th</sup> a filament was seen extending inwards from the NE limb which had moved away from the limb by the following day. Filaments were also seen in association with AR3548 on both days.

A strangely shaped filament was seen north of AR3545 on the 17<sup>th</sup> in the NW quadrant. The filament was quite broad on its northern half but a thin strand of plasma arched out from the southern end of the main body. A long east/west aligned filament was across the northern hemisphere mainly in the NE quadrant and a dark filament was to the south of AR3555.

Two east/west aligned filaments were at different latitudes in the northern hemisphere on the 26<sup>th</sup> and another long filament was in the SW quadrant near to the CM. Bright plage was observed with AR3359 and AR3560 and also in AR3561 near the SW limb.

On the 28<sup>th</sup> the filament seen on the 26<sup>th</sup> in the southern hemisphere near to the CM, was now in the SW quadrant and measured 220,000 km in length. On the 30<sup>th</sup> it was noted near to the SW limb at its northern tip.

Plage was noted with most sunspot groups throughout the month.

### **CaK**

Poor weather played its part in CaK observations but many areas of CaK emission were nonetheless reported. One large area of CaK emission could be tracked between 4<sup>th</sup> – 10<sup>th</sup> centred at N10°/135° associated with a nearby sunspot group. On the 26<sup>th</sup> CaK regions were identified in association with AR3559, 3560 3562 and an unidentified region. On the 30<sup>th</sup> CaK emission was seen with sunspot groups AR3565, 3567 and 3566 and also an unidentified region near the SE limb.

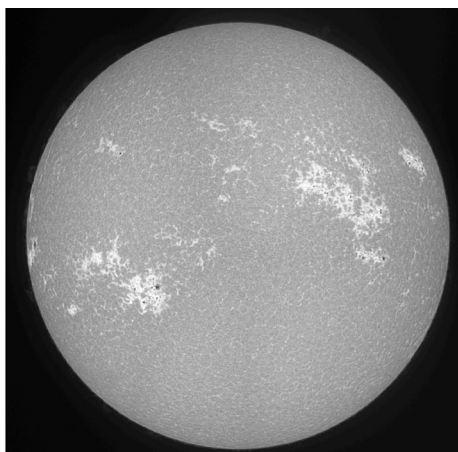
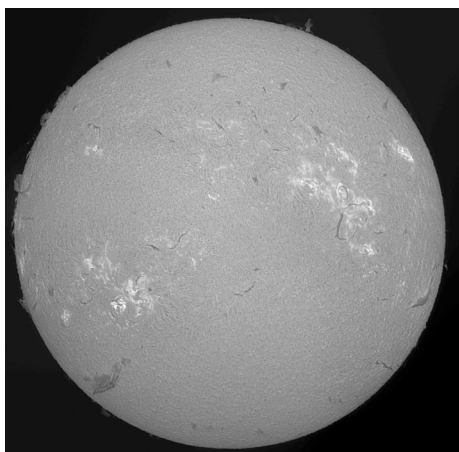
CaK MDF **7.6** B Mitchell (10 days).

### **Flares**

Flares were reported to the Section throughout the month by observers and imagers. Andy Devey reported an M5 class flare on the 1<sup>st</sup> at 1236 UT in association with AR3536 and Arthur Coombs reported an M class flare on the 4<sup>th</sup>.

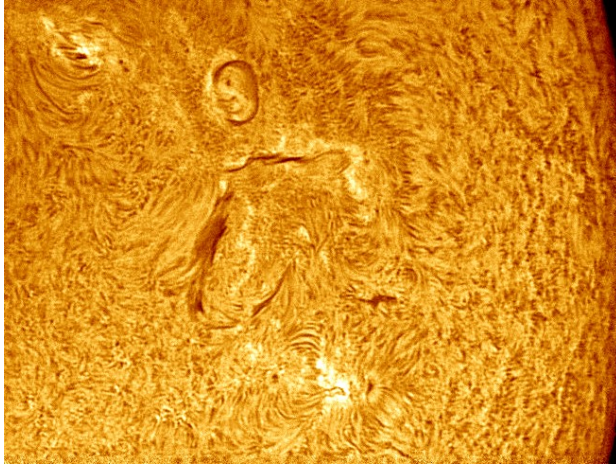
### **Polar Faculae**

Jan Janssens reported no polar faculae seen during his January observations.



**Images:**  
Full disks in  
H-alpha (left) and  
CaK (right) images  
by Stuart Green  
20240109  
1117 UT H-alpha  
1133 UT CaK



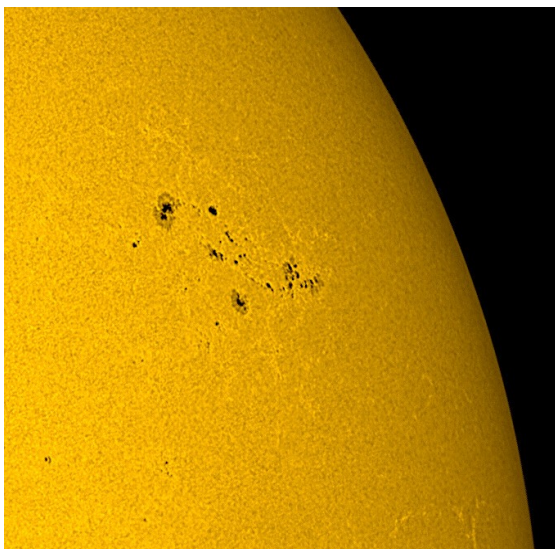
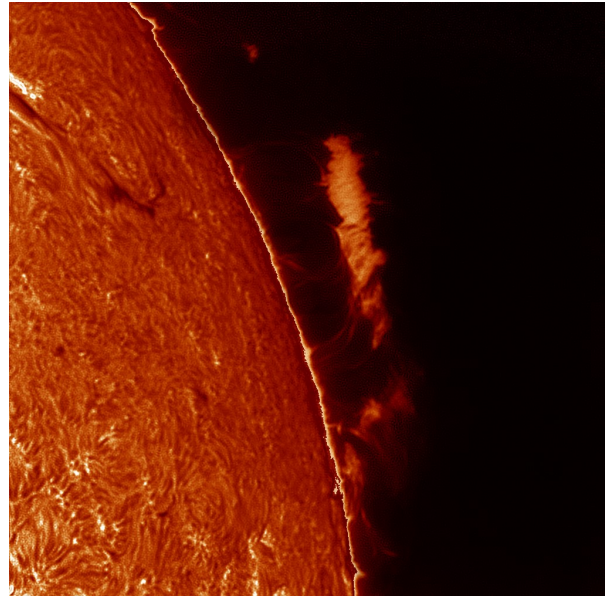
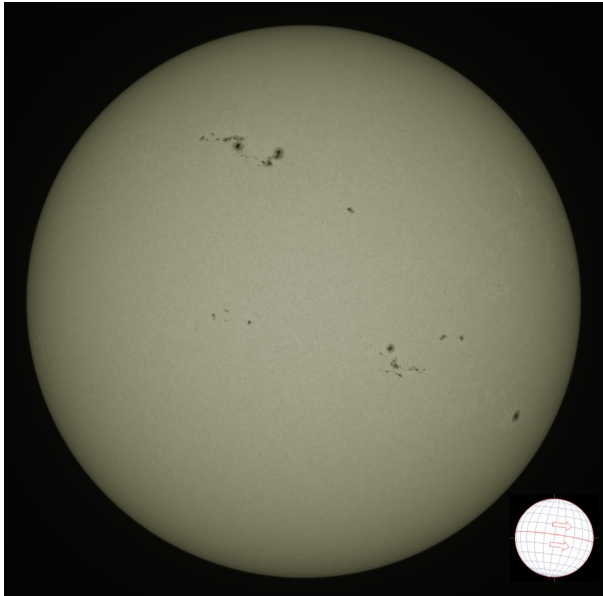


**Above Left:** H-alpha image by Arthur Coombs showing AR3536 and associated filaments 20240109 at 2044 UT

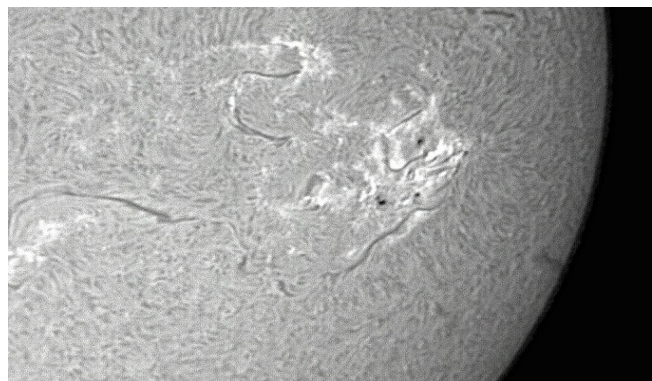
**Above Right:** AR3545 imaged in white light by Mick Jenkins at 1424 UT 20240116

**Below Left:** White light image of AR3559 (northern hemisphere) and AR3555/3561 (SW quadrant) imaged by Dave Smith 20240122 at 1124 UT

**Below Right:** Large prominence NW limb 20240126 imaged by Ella Bryant at 1356 UT



**Left & Below:** Images of AR3540/3541 in white light imaged at 1102 UT and H-alpha imaged at 1132 UT by Brian Halls 20240115



# Section News

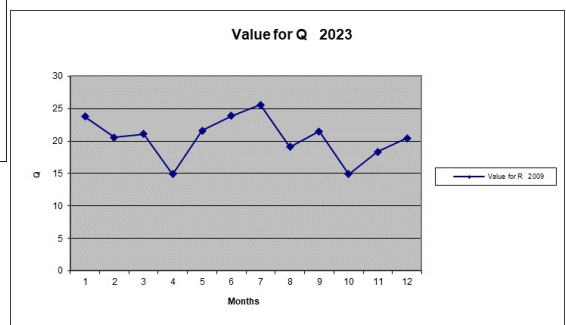
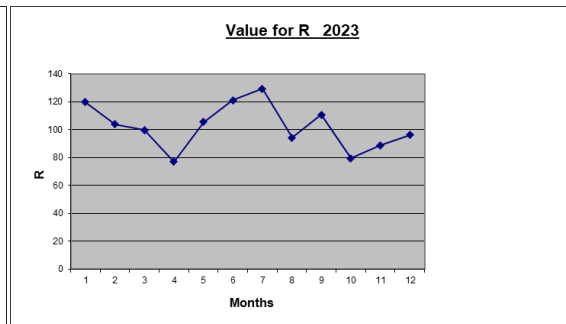
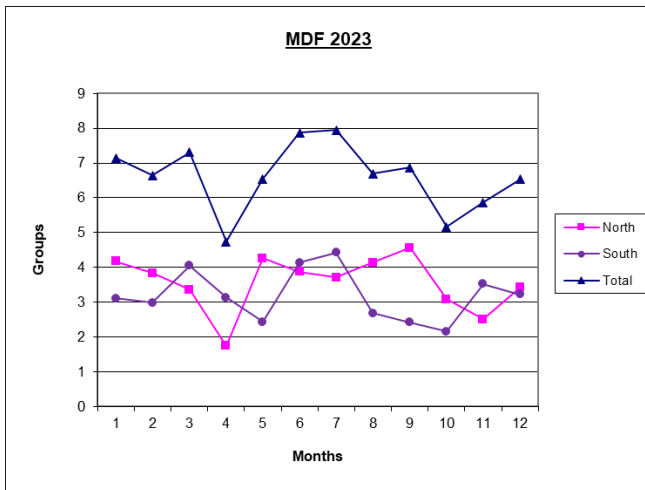
A big thank you to all that attended the latest Section meeting on the Zoom platform on Friday 16th February. 29 members attended. We will be holding another towards the end of April. I will circulate details nearer the time. Stuart Green will give a short presentation on image processing and I would be pleased to hear from anyone else that would like to share expertise on that subject or give a short presentation at the meeting.

## MAGNETOMETER REPORT 2024 JANUARY

DATE	DURATION (UT)		ACTIVITY
3	12:30	22:00	Disturbed
8	21:00	22:30	Disturbed
9	00:00	03:00	Disturbed
15/16	21:00	03:00	Disturbed
19/20	22:45	00:30	Disturbed
22	20:30	22:15	Disturbed
24	01:00	10:00	Disturbed
25	21:00	23:30	Disturbed
29	19:30	22:00	Disturbed.

**Solid-state magnetometer,  
Uncalibrated.**

**John Cook**



**Above & Right:** Annual (2023) Activity charts for the Solar Section, MDF, R and Q.

**Below:** East-West Magnetic Field Vector courtesy of Stuart Green.

