British Astronomical Association

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BAA Solar Section Newsletter

Sunspot data 2024 May

Day	g	R
1	5	79
2	5	95
3	6	115
4	7	132
5	7	132
6	7	124
7	6	118
8	5	113
9	6	117
10	6	115
11	6	117
12	8	140
13	11	163
14	8	136
15	10	137
16	10	149
17	9	136
18	7	117
19	7	118
20	6	94
21	7	118
22	6	126
23	5	101
24	6	88
25	6	82
26	6	89
27	7	103
28	7	118
29	6	105
30	5	102
31	5	107

Monthly Means

MDFg:	7.49	(41 observers)
MDFNg	3.56	(34 observers)
MDFSg	4.13	(34 observers)
Mean R:	123.16	(40 observers)

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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:

P Abel, Leicester
J Arnold, Leeds
C Bailey, Suffolk
R Battaiola, Milan, Italy
M Boschat, Canada
C F Bowron, South Yorks
A Bowyer, Epsom Downs
P Brierley, Cheshire
S Brown, Leicestershire
E Bryant, North Devon
M Buck, Bristol
L Cambon, France
G Cauchi, South Australia
I Chouinavas, Greece
E Colombo, Italy
J Cook, Wolverhampton
P Curtin, USA
S Dawes, London
A Devey, Spain
F Dubois, Belgium
T Emmett, Cambs
T Figiel, Poland
M Giuntoli, Italy
D Glover, Essex
S Green, Lancs
K Hall, Warrington
B Halls, W Sussex
K Hay, Canada
A W Heath, Nottingham
R Heard, Suffolk
R Hill, Arizona, USA
J Janssens, Belgium
M Jenkins, Cambridge
S Jenner, Kent
A Johnston, Denbighshire
R Johnson, Surrey
S L Karl, Aberdeen
K Kilburn, Staffordshire
M Kinder, Cheshire
K Kennedy, Dundee
L Macdonald, Berkshire
R Mackenzie, Kent
P Meadows, Essex
A Mengus, France
H Meyerdierks, Germany
B Mitchell, Norwich
L Morrone, Italy
M Nicholls, Sheffield
P Norman, Worcester
C Potter, Orkney
R Samworth, Leicestershire
J D Shanklin, Cambridge
D Smith, Essex
L Smith, Angus
N Spencer, York
M Stephanou, Greece
G Steigmann
T Tanti, Malta
P Taylor, Coventry
D Teske, Mississippi, USA
C B Thielke, Denmark
N Tonkin, Cornwall
Towarzystwo Milosnikow
Towarzystwo Obs Slonca
S Ove Thimm, Denmark
G Vargas, Bolivia
D Vidican, Romania
S Viney, Cheshire

The Sun in White Light – May

Activity during May was substantial returning to the high levels last seen in 2023 June/July. There was increased activity in both hemispheres on the previous month but the southern hemisphere performed the strongest as was the case in 2023 June/July. There was a corresponding increase in the Q value, being the second highest recorded by the Section during this solar cycle.

Forty-one sunspot groups were allocated a Boulder number during May, the largest/most active groups are reported below.

AR3654 S06°/136° survived from the previous month but by now was nearing the SW limb, type Eac with 13 sunspots counted within the group. As the group rotated over the limb the following day, it was reported as D class with 5 sunspots visible.

AR3663 N27°/036° emerged in the NE quadrant on the last day of April, the group strengthened to a small Dsc type group by 1st May. The group consisted of four small penumbral sunspots with a total group area of 220 millionths. The group rapidly developed over the next few days being type Ekc on the 3rd and on the 4th was described as a long system of spots and penumbral areas. By the 5th the group was 1150 millionths in area, the largest sunspot being the leader and was reported as F class. By the 7th the group had reduced type Eac with an area of 780 millionths, described as a string of penumbral sunspots. The group was by now approaching the NW limb and rotated on the 9th still strong. The group was reported visible to the protected naked eye (PNE) on the 5th.

AR3664 S17°/348° & AR3668 S17°/337° rotated over the SE limb on the 1st, type Dso comprising of a collection of small penumbral sunspots. The group strengthened on the 3rd but began rapid, strong development thereafter. On the 4th, AR3668 started to appear to the east of AR3664, in time adding to the extended appearance of the whole area even although this "supplementary" sunspot group never achieved more than a Dao classification. By the 5th AR3664 was type Dkc with an area of 970 millionths with the follower being quite elongated in both latitude and longitude and the largest sunspot within the group. The group continued to rapidly grow achieving type Fkc on the 7th with several more penumbral follower sunspots and an area of 1580 millionths, being 21° in longitude. Interestingly, AR3664 can be referred to as a "Great" sunspot group; the term being allocated to any sunspot group with an average area for disk-passage of 1500 millionths or more. The group straddled the central meridian (CM) on the 7th and the following day, was truly enormous having an area of 2240 millionths. The main irregular sunspot had increased further in size whilst some of the follower penumbral sunspots had merged to create another irregular sunspot. The group continued to grow on the 9th with the two irregular sunspots having merged to form an impressive main sunspot containing many umbrae and a region of photosphere. The group also increased in area to 3250 millionths. The group became the 12th largest group since the start of the Greenwich Sunspot Catalogue 150 years ago in 1874 achieving a maximum size of 3400 millionths. On the 10th the main sunspot became a little less irregular but still achieved an impressive size of 3090 millionths. Over the next few days, the group progressed towards the SW limb, still comprising of the main irregular sunspot with a small penumbral leader. On the 12th the group was 2570 millionths in size and was last seen crossing the limb on the 13th. The group was reported PNE on the 5th and from the 7th to 9th inclusive.

AR3679 S07°/200° rotated over the SE limb on the 12th type Hsx. The following day the group had achieved type Dao on the 13th and type Dac on the 15th with an area of 380 millionths. It was bi-polar group with the largest being the penumbral leader. The following day, a collection of pores broke out between the leader and follower sunspots and on the 17th, the group extended slightly in longitude. The group was type Eso on the 18th and the follower sunspot showed signs of decay on the following day. This remained the case on the 20th but the follower had a sudden outburst of growth on the 21st. This continued on the 22nd with group sporting several penumbral sunspots, type Ekc. The group maintained this new configuration as it approached the limb, crossing on the 24th.

AR3685 S13°/151° & AR3686 S06°/141° AR3685 rotated over the SE limb on the 16th type Dso consisting of three small penumbral sunspots. By the following day, the group was type

Eac with two small penumbral sunspots leading the group, a penumbral follower and several smaller sunspots in-between. Also, to the north-east of this group, another Hsx sunspot had emerged being AR3686. This smaller group accompanied AR3685 during its passage across the disk. On the 18th and 19th, AR3685 was of similar appearance with an area of 650 and 820 millionths respectively; the growth being due to enlargement of some of the central sunspots. On the 20th AR3685 was slightly reduced in size with an area of 640 millionths. Now the group sported two main sunspots to the southern edge of the group with several smaller penumbral sunspots forming a collection to its northern boundary. The follower was the largest and sported a few accompanying sunspots to its south over the coming days. The group was classified as Eac on the 23rd gradually reducing to type D as it crossed the SW quadrant being 320 millionths in area on the 26th. The group was close to the limb on the 27th still accompanied by AR3686 being a Cao type group north-east of AR3685.
AR3691 N24°/038° the return of AR3663 from the previous rotation, appeared over the NE limb on the 24th type Hsx. The following day, the group had developed into an irregular sunspot, classification Dac. On the 26th the group was of the same type, a compact collection of sunspots with an area of 820 millionths. The follower had extended latitude by the following day to make a slightly larger group with an area of 860 millionths, type Dkc. The group further extended to type Ekc as it approached the CM on the 30th and was into the NW quadrant by the 31st.
AR3697 S18°/353° the return of the Great sunspot AR3664 from its previous rotation. The group appeared over the SE limb on the 28th type Eho. Although greatly reduced from its previous configuration, the group was still sizable being type Eki on the 30th when fully visible on the disk. The group was led by an irregular penumbral sunspot with a similarly configured follower. The group showed some development in the central region between the leader and follower on the last day of the month.
21 observers reported a Quality number of **24.98** for May.

The Sun in H-alpha

Prominences

15 observers reported a prominence MDF of **7.78** for May.
On the 4th a possible active prominence was seen on the NE limb at 0919 UT as a fine loop which was not present at 0907 UT the same day.
A hedgerow prominence was reported on the SW limb with a substantial filament element making the feature quite impressive. The following day it was a large prominence which had extended further by the 9th. The height was estimated at 70,000 km and it extended around the SW limb for 190,000 km. Although reduced to about 50,000 km in height on the 10th, it had extended further around the limb to 210,000 km.
The following day, a large unconnected arch prominence was seen over the SW limb at height of 80,000 km and stretching around the limb for 270,000 km.
A very tall column prominence was reported on the NW limb on the 12th rising to around 120,000 km.
A possible eruptive loop prominence was on the SE limb at about 1540 UT on the 15th near to the location of the emerging sunspot region AR3685. A fine fila-prom was seen further south. The fila-prom was reduced the next day but still with a short prominence element. A small prominence was nearby on the 17th but by the 18th this had grown into a fine hedgerow type prominence and was not associated with the filament now on the disk nearby. The prominence grew the following day into a multiple loop prominence which had shortened in extent by the 20th but was still impressive in height as a double arch. A filament element extended onto the disk the following day making a fine fila-prom.
A cloud of plasma was seen over the NW limb on the 24th at a height of around 50,000 km. The following day, a hedgerow prominence graced the SW limb at a height of 40,000 km and stretching around the limb for 170,000 km. It was still present on the 26th but reduced.
An eruptive prominence was seen on the E limb on the 27th at 0855 UT consisting of several spikes and bright blob of plasma above the limb.

Filaments & Plage

13 observers reported a filament MDF of **9.75** and 12 observers reported a plage MDF of **5.69** for May.

A long diffuse north/south aligned filament was in the SW quadrant on the 1st approaching the CM. The filament persisted for several days progressing into the SW quadrant and was estimated at 270,000 km long on the 4th although reduced to 170,000 km on the 5th. The feature reached the SW limb on the 7th and formed the fila-prom referred to above.

On the 16th a long north/south aligned filament was east of AR3670/71 in the NW quadrant and extended southward to north-west of AR3676 in the SW quadrant. Another long filament preceded AR3680 in the NE quadrant which was joined by a similar parallel filament to its north-west the following day. Both filaments persisted through to the 18th and into the NW quadrant.

A long, broken east-west aligned filament was not far from the SE limb on the 18th which greatly reduced the following day.

A long filament extended inwards from the SE limb on the 27th and persisted to the end of the month, growing in length. On the 29th it was estimated to have a length of 400,000 km and was even larger by the 31st extending from the SE limb across the SE quadrant to centre of the Sun.

Bright plage was associated with AR3664 throughout is passage and also during its second rotation as AR3697. Bright plage was seen with AR3683 as it neared the SW limb on the 20th and a bright region of plage was reported with AR3685 on the 24th.

CaK

CaK plage was plentiful during the month. On the 10th a very bright CaK spot was visible only in this wavelength, at S13°/395° (AR3664/68). A prominence visible in CaK was observed on the E limb at S15° on the 27th and possibly the site of the bright spot emission seen on the 10th.

CaK MDF **7.84** (19 observations) Brian Mitchell.

Flares

Numerous flares were reported during the month, many M class; the main sunspot groups being AR3663 and AR3664/68.

Andy Devey reported an X1 flare on the 5th at 0609 UT associated with AR3663. Rik Hill imaged several M class flares on the 8th including an X1.02 flare at 2148UT. On the 9th Andy Devey and Jan Janssens reported X2 flares at 0903 UT and 0914 UT respectively, associated with AR3664. Mick Nicholls reported an X1.0 flare from AR3668 at 0940 UT that same day. Andy Devey also reported an X3.9 flare on the 10th from AR3664 and Brian Halls observed an X3.5 flare also from AR3664 on the 15th at 0850 UT.

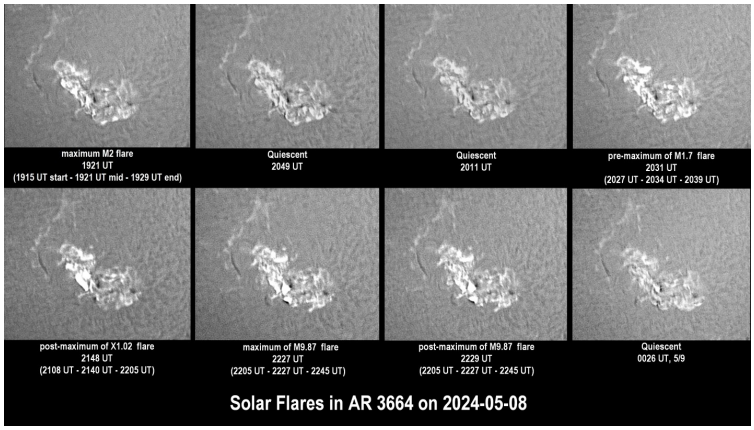
Polar Facuale—no polar faculae were reported.

MAGNETOMETER REPORT **2024 MAY**

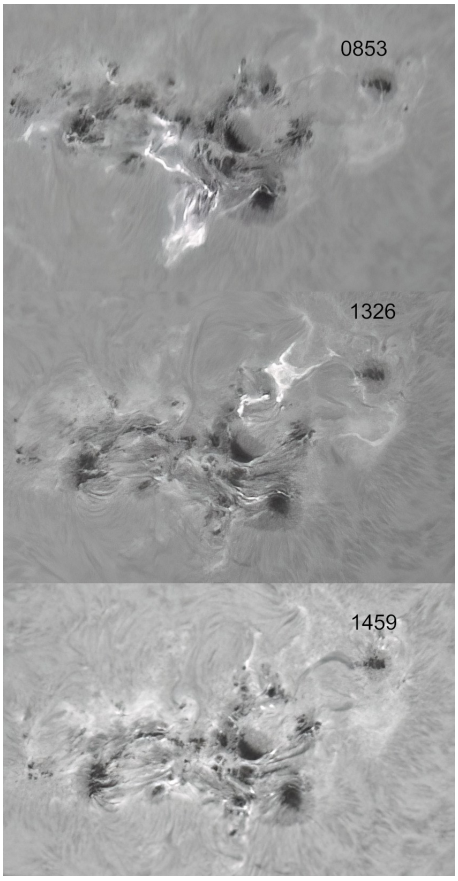
DATE	DURATION (UT)		ACTIVITY
2	14:00	22:30	Disturbed
4/5	21:00	02:30	Disturbed
5/6	21:45	02:00	Disturbed
10	00:00	02:30	Disturbed
10--12	17:00	02:00	Intense
12	02:00	10:00	Active
12/13	20:00	04:00	Active
13	04:00	13:00	Disturbed
14/15	22:00	03:00	Disturbed
15/16	19:30	02:00	Disturbed
16	05:00	11:00	Disturbed
17/18	12:45	06:00	Disturbed
23	20:30	23:00	Disturbed
24	03:00	07:00	Disturbed
30/31	20:00	07:30	Disturbed.

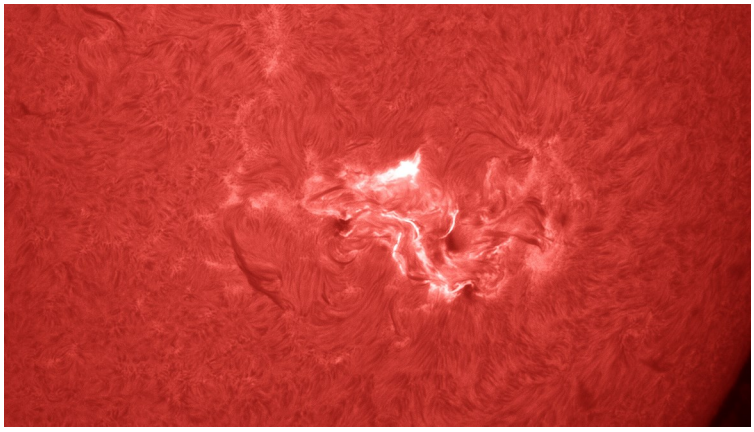
Solid-state magnetometer, Uncalibrated.

John Cook



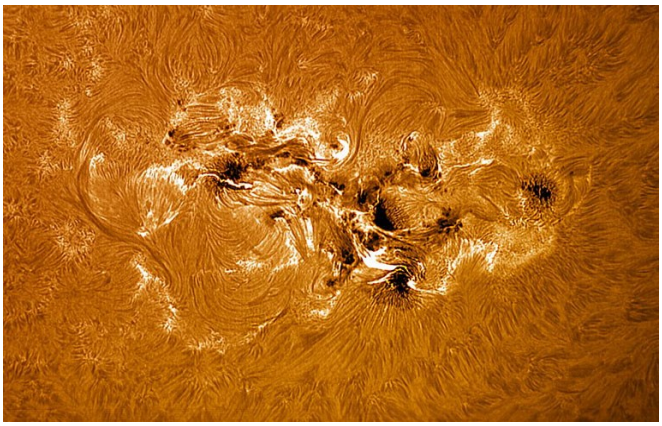
Above: Sequence of flares captured within AR3664 including X1.02 flare imaged at 1921 UT 20240508 by Rik Hill
Right: John Arnold captured flares within AR3664 on the 9th, imaged at 0853 UT, 1326 UT and 1459 UT

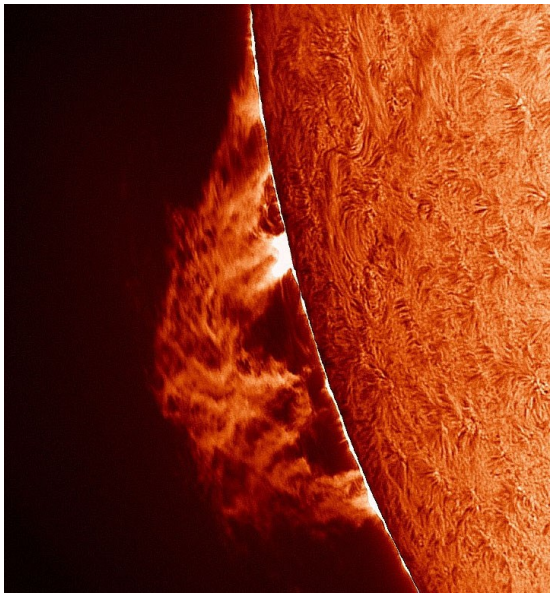


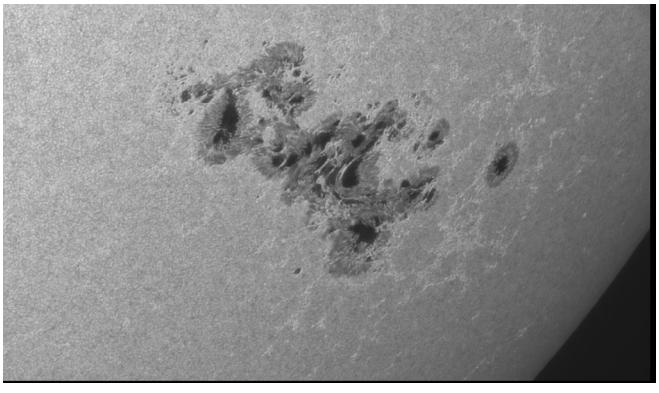


Left: X3 flare captured at 0730 UT 20240510 by Andy Devey AR3664
Below: AR3664/68 by Gottfried Steigmann 20240509 at 1038 UT

Below: The fine arch prominence hearth on the SE limb 20240519 imaged by Carl Bowron at 1010 UT
Bottom Right: White light image of AR3664 nearing the SW limb 20240511 Imaged by Stuart Green at 0941 UT







Section News

The next Section meeting on the Zoom platform will be on Friday 5th July 2024 at 19.30 BST (1830 UT). I am delighted to welcome Helen Usher, Director of the newly formed BAA Education & Outreach Section, not only to the Solar Section as an observer but also to our forthcoming meeting. Helen will outline the work of her Section and talk about the future of BAA outreach. Peter Meadows will then give us a short presentation regarding his Helio viewer software for calculating sunspot positions and area. As usual, I would encourage members to participate in the discussion and ask questions but if you wish to attend to listen in with your camera on/off, then that is perfectly OK. We hope to record the session so members can watch the video later by obtaining a link from me. However, these videos do not remain live on-line for long, so make sure you ask for the link soon after the 5th of July.
Over 450 images were received for May. Many can be viewed on the Section's webpages.

Lyn Smith is inviting you to a scheduled Zoom meeting.
Topic: SOLAR Workshop
Time: Jul 5, 2024 19:30 London
Join Zoom Meeting
https://us02web.zoom.us/j/84998918435?pwd=STZYWHZVcEFwNnFEWmRKZnhkMW9tZz09

Meeting ID: 849 9891 8435
Passcode: 785945

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- +44 203 481 5240 United Kingdom

Below:
The magnetic disturbance of 10/11 May is highlighted below which led to the significant aurora event of that night.
Data courtesy of Stuart Green.