British Astronomical Association

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Founded in 1890

BAA Solar Section Newsletter

Sunspot data 2024 July

Day	g	R
1	9	140
2	9	143
3	8	116
4	7	105
5	7	101
6	6	97
7	5	78
8	5	80
9	6	107
10	7	123
11	7	135
12	6	122
13	8	147
14	9	163
15	10	181
16	14	238
17	13	201
18	14	218
19	12	196
20	11	179
21	8	145
22	8	141
23	9	134
24	9	130
25	7	136
26	8	144
27	8	150
28	8	161
29	8	159
30	8	164
31	11	202

Monthly Means

MDFg:	9.57	(45 observers)
MDFNg	3.65	(38 observers)
MDFSg	6.26	(38 observers)
Mean R:	158.71	(45 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:

M J Armstrong, Kendal
C Bailey, Suffolk
R Battaiola, Milan, Italy
M Boschat, Canada
C F Bowron, South Yorks
A Bowyer, Epsom Downs
S Brown, Leicestershire
E Bryant, North Devon
M Buck, Bristol
L Cambon, France
I Chouinavas, Greece
G Clarke, Australia
E Colombo, Italy
J Cook, Wolverhampton
P Curtin, USA
S Dawes, London
A Devey, Spain
J A Dianes, Cambridge
F Dubois, Belgium
T Emmett, Cambs
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
D Keep, Lincoln
K Kilburn, Staffordshire
M Kinder, Cheshire
C Longthorn, Rugby
L Macdonald, Berkshire
R Mackenzie, Kent
M Mattos, Spain
P Meadows, Essex
A Mengus, France
H Meyerdierks, Germany
B Mitchell, Norwich
C C Moraes, Brazil
L Morrone, Italy
M Nicholls, Sheffield
P Norman, Worcester
G Palmer, Wales
R Samworth, Leicestershire
J D Shanklin, Cambridge
D Smith, Essex
L Smith, Angus
N Spencer, York
G Steigmann
T Tanti, Malta
C G D Taylor, Perthshire
P Taylor, Coventry
D Teske, Mississippi, USA
C B Thielke, Denmark
P Tosi, France
Towarzystwo Milosnikow
Towarzystwo Obs Slonca
B Tynan, Renfrewshire
S Ove Thimm, Denmark
P Urbanski, Poland
G Vargas, Bolivia
D Vidican, Romania
S Viney, Cheshire

The Sun in White Light – July

White light activity leapt to a high not seen for over two decades. Only activity during Cycle 23 recorded in 2001 September and 2001 December exceeded that recorded this month. Those figures were recorded by the Section as g = 9.74; R = 176.63 (2001 September) and g = 9.54; R 161.19 (2001 December). The southern hemisphere remained dominant although the number of sunspot groups over both hemispheres was impressive. The quality number (Q) was easily the highest recorded by the Section since 2016 when the log commenced. NOAA/SWPC assigned Boulder numbers to 53 sunspot groups during the month, the largest/most active are reported below.

AR3729 S02°/333° survived from the previous month, approaching the central meridian (CM) on the 1st. The group consisted of a string of several penumbral sunspots and pores throughout its length being type Eac and with a total area of 360 millionths. The group crossed the CM on the 2nd and by the 4th was of a similar size but had lost some sunspots. The group was much reduced on the 5th and when last reported on the 6th was of type Hsx approaching the SE limb.

AR3733 N05°/332° also survived from the previous month although did not feature in the June report. The group was of low latitude for this point in the solar cycle and was not particularly noteworthy at this point being a small C class group. The group was located directly north of AR3729 and lost its follower sunspot on the 2nd and appeared to be fading. However, on the 3rd the group underwent an outburst of growth developing a penumbral sunspot to the rear of the group and preceded by several smaller sunspots. A small penumbral leader formed on the 4th raising the group category to D class. The follower was more asymmetric in shape and became larger on the 5th to make the group type Dkc. As the group approached the limb, foreshortening played a part in its appearance but the follower remained visible and rotated over the limb on the 8th.

AR3738 S08°/212° rounded the limb as a small D class group consisting of 4 sunspots on the 5th. The following day the group was reported as a collection of small sunspots near to the SE limb, type Eac. The group developed more sunspots on the 7th and had an area of 650 millionths. The group continued to grow over the coming days as it traversed the SE quadrant and by the 9th had developed a large penumbral leader to make the group type Eki. The group was approaching the CM on the 10th and was by now a large and complex area of sunspot activity. The total area was estimated at 1080 millionths with the group now type Fkc. The leader continued to grow with the group estimated to be 1280 millionths on the 11th. By the 13th the group was mid-way across the SW quadrant and still impressive in appearance. The group still sported a large penumbral leader with the following portion of the group now split into two small umbral spots with partial penumbra surrounding the individual components. Many other small sunspots and pores were associated with both the leader and follower sunspots. The group was estimated at 1410 millionths on the 14th and was of similar appearance. A significant reduction was noted on the 15th with the follower portion of the group much reduced. This fade continued so that the group was of type Cko near to the SW limb on the 16th. The group was reported visible to the protected naked eye (PNE) on the 10th and 11th.

AR3751 S08°/094° & AR3761 S09°/081° AR3751 rounded the SE limb on the 14th as a small Dso group. By the following day the group was a string of 4 small penumbral sunspots. The group continued to grow over the coming days with an elongated penumbral leader which contained a broad light bridge across its umbra. There was a noted increase in the follower sunspots on the 18th and by the 19th was of type Ekc with an area of 600 millionths. Also, on the 19th a small outburst of sunspots east of the group took place which subsequently was assigned as AR3761. The following day, the gap between AR3761 and the follower sunspots of AR3751 shortened. This gap reduced further on the 21st with AR3761 also developing quite substantially. The entire region of AR3751/3761 was of type Fac with an area of 950 millionths. AR3751 was reduced by the 23rd and no sunspots could be detected between the groups on the 24th with AR3751 being type Cso and AR3761 type Dki, both now separate active regions once again. The groups rotated over the limb on the 25th and 26th respectively.

AR3762 S13°/015° was over the SE limb on the 21st as a D type group which rapidly expanded in longitude the following day to type Eai. The group was type Eac by the 24th consisting of three quite distinct penumbral elements with a collection of pores clustered around the central sunspot. Further growth on the 25th consolidated the leader and central sunspots into an active mass with the follower still quite detached, the group being now type Fac. After the group crossed the CM the following day, the follower started to decay but as it did so, the leaders strengthened. The group reduced in longitude and returned to type Eac by the 27th. Thereafter the group started fading and was last seen on the 30th close to the SW limb, type Dso with just 4 sunspots remaining visible.
AR3763 N05°/340°; AR3764 S02°/339°; AR3765 S11°/327°; AR3766 S05°334°; AR3767 S09°/323° & AR3770 N07°/326° all taken together as one huge area of activity at fairly low northern and southern latitudes during the second half of the month. AR3764/3766 subsequently being counted as one group according to the BAA 10-degree rule and also AR3765/3767. AR3763 was the first to round the NE limb on the 22nd as an Hsx type sunspot. This was followed on the 23rd by AR3764 and AR3765 of similar classification. AR3766 joined on the 24th and AR3767 on the 25th. None looked particularly promising at this point but by the 27th AR3766 and AR3767 had undergone rapid development. On the 28th AR3764 was type Hax with an area of 120 millionths and due south of it was the leading penumbral sunspot of AR3766 type Dai with an area of 300 millionths. This gave the appearance of one group with two penumbral leaders. Also, AR3765 and AR3767 had combined in longitude to form one Fkc group with an area of 860 millionths. Also, on the 28th, AR3770 formed on the disk to the east of AR3763. On the 30th the groups were just moving into the western hemisphere with AR3770 a Dac type group completing a very impressive show of solar activity which remained the case on the 31st.
23 observers reported a Quality number of **31.44** for July.

The Sun in H-alpha

Prominences

15 observers reported a prominence MDF of **8.06** for July.
Given the propensity of white light activity, most prominences were not particularly notable during the month.
Several small prominences adorned the south polar region during the first few days of the month. On the 4th, a moderately tall prominence was on the SE limb, estimated at a height of about 100,000 km.
A large jug-shaped prominence was reported erupting from the ESE limb on the 6th at 0900 UT.
A spray type prominence was reported on the SE limb on the 14th and an eruptive prominence was on the SW limb.
On the 16th a large arch prominence developed on the W limb as a result of a major flare from AR3738 approaching the limb. Material was also ejected and post flare loops were observed.
On the 17th an active prominence was seen on the W limb at 0935 UT together with a bright region of plage on the limb (probably relating to the rotated AR3738). Two flat arch prominences were also reported on the SE limb, both around 20,000 km in height and 60,000 km in length. A curved pillar prominence was near the south pole with a curtain type prominence alongside.
A broken arch prominence was on the W limb on the 19th with a height of about 35,000 km and a width of 50,000 km.
A hedgerow type prominence was on the SE limb on the 24th and once again a variety of small prominences appeared in the southern polar region through until the 30th.
A leaning pillar prominence was on the E limb also on the 30th and another similar prominence was reported on the NW limb.
The month ended with a long but low prominence hearth on the NE limb and several prominences on the SE limb but very low activity along the western limb.

Bi-Polar Magnetic Regions, Filaments & Plage

14 observers reported a filament MDF of **9.54** and 13 observers reported a plage MDF of **6.83** for July.

Plage was reported with most sunspot groups throughout the month particularly in the southern hemisphere. Bright plage was seen with AR3738 on the 10th and 5 filaments were associated with the group one being a fine "feathered" type filament arching north from the eastern edge of the main sunspot.

On the 13th the area between AR3743 and AR3747 was described as "active" with bright ribbon plage emanating south from AR3743 from the main follower sunspot. Also, there were small filaments surrounding this sunspot on three sides. An area of bright plage was also noted near to the eastern limb. A large arcing filament was north of AR3744 and just to the south, was a small dark filament.

A large magnetic region was observed on the 18th in the SW quadrant.

AR3751 had bright plage running east-west through the group on the 19th interspersed with small filaments. AR3761 also displayed bright plage and small filaments along the east-west line.

Numerous filaments were seen mostly in the SE quadrant associated with sunspot groups on the 24th. A similar picture was observed on the 28th but with the filaments more evenly distributed around the solar disk. A long east-west filament was to the north of AR3770 which was still present on the 30th and 31st.

A long-curved north-south aligned filament was in the SE quadrant on the 30th and 31st as were two shorter but broader filaments to the south of AR3768 and approaching the SW limb.

CaK

Many areas of CaK were recorded during the month, associated with the numerous sunspot groups.

On the 18th, flaring from AR3744 was observed in the Calcium K-line and later in the day flaring was also noted from AR3751. More flaring in CaK was seen the following day from the eastern section of AR3751 at 0900 UT and from AR3759 at 1008 UT.

Flaring was also visible on the 21st from AR3764 at 1053 UT.

On the 23rd, a number of CaK areas developed in the northern hemisphere.

At S15°/059° an area of CaK plage substantially developed over the coming days, finally fading on the 29th.

An M class flare event was observed in CaK on the 28th associated with AR3762 at 1047 UT. This event was bright and formed three areas within the sunspot group.

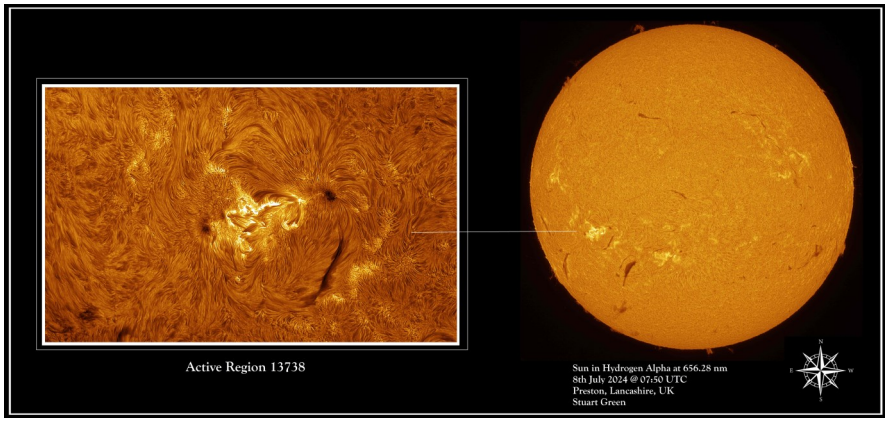
CaK MDF **11.40** (19 days)

Observers: Brian Mitchell & Ella Bryant.

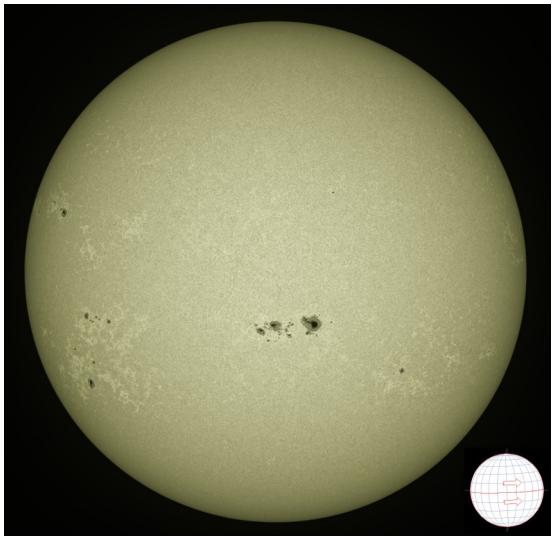
Flares

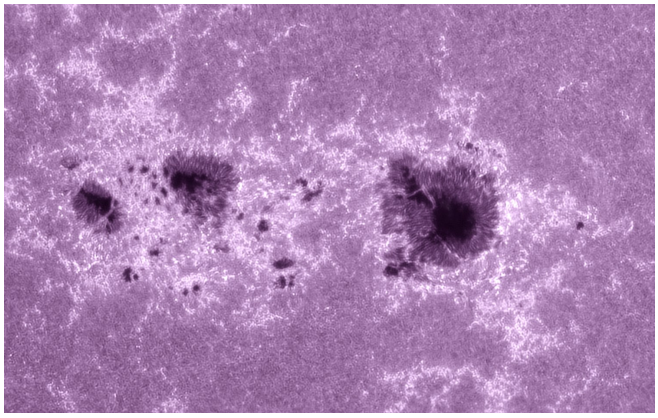
Numerous minor flares were reported by members during the month. M class flares were reported by Carl Bowron, Andy Devey, Brian Halls and Nic Spencer. Ella Bryant reported an X-class flare from AR3738 at 1326 UT on the 16th.

Polar Faculae – no polar faculae were reported.

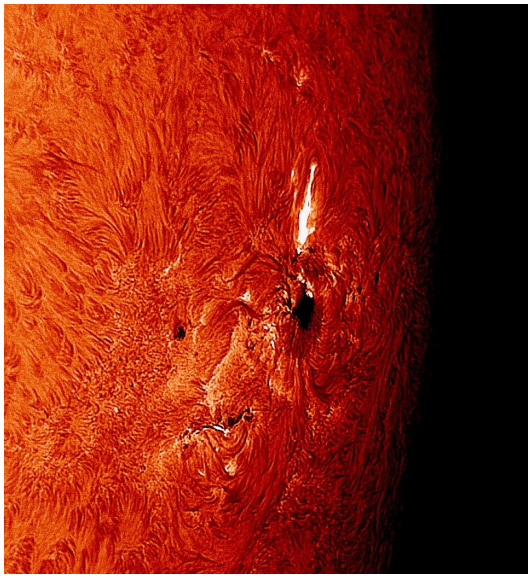


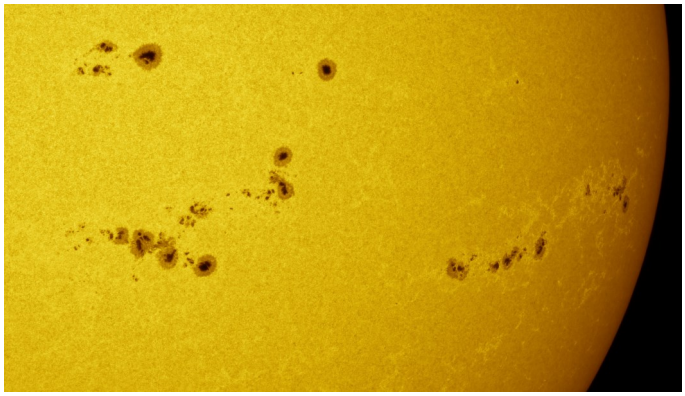
AR3738 imaged in H-alpha full disk and close up view, by Stuart Green, 20240708 at 0750 UT





Left: Full disk in white light featuring AR3738 centre disk. Imaged 20240711 at 0757 UT by Dave Smith
Above: AR3738 in CaK imaged at 1400 UT on the same day by Ella Bryant.



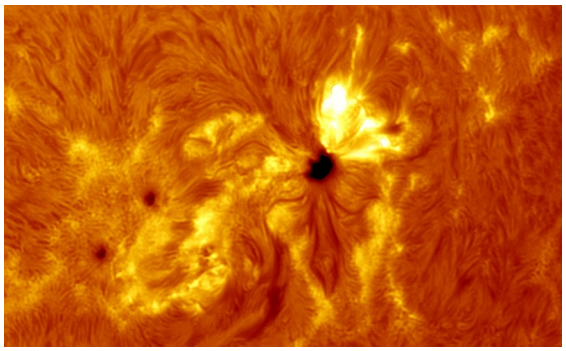


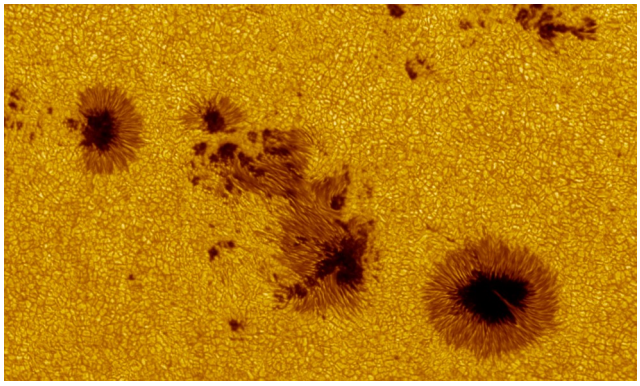
Left: Flare associated with AR3738 imaged Carl Bowron 20240715 at 0925 UT
Above: Nic Spencer captures the busy disk of 20240730 at 0639 UT featuring AR3370 (top left) with the larger combinations of AR3764/66 and AR3765/67 below. AR3768 is further westward.

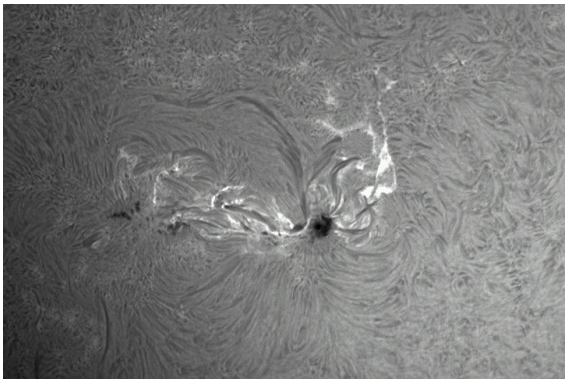
Right: Flare associated with AR3738 imaged by Ella Bryant on 20240713 at 1309 UT

Below Right: Another flare from AR3738 imaged by Brian Halls at 1315 UT 20240710

Below: AR3765 imaged in white light by Luigi Morrone on 20240728 at 0846 UT using C14 Edge HD 355mm Fornax 52 camera.







Section News

I would like to welcome three new members to the Section, Stuart Honey, Simon Lang and Brendan Tynan. Brendan has already been busy submitting many fine images to the Section for archiving and also for the Section's web pages.
Another Section meeting has been scheduled for Friday 4th October 2024 at 19.30 hrs GMT/UT. Details are below for sign-in on Zoom.

Topic: Solar Section workshop
Time: Oct 4, 2024 19:30 London

Join Zoom Meeting
https://us02web.zoom.us/j/84446748140?pwd=gdS2UEZkFNYyqZqFaszxDJBEBRiSMV.1

Meeting ID: 844 4674 8140
Passcode: 619986
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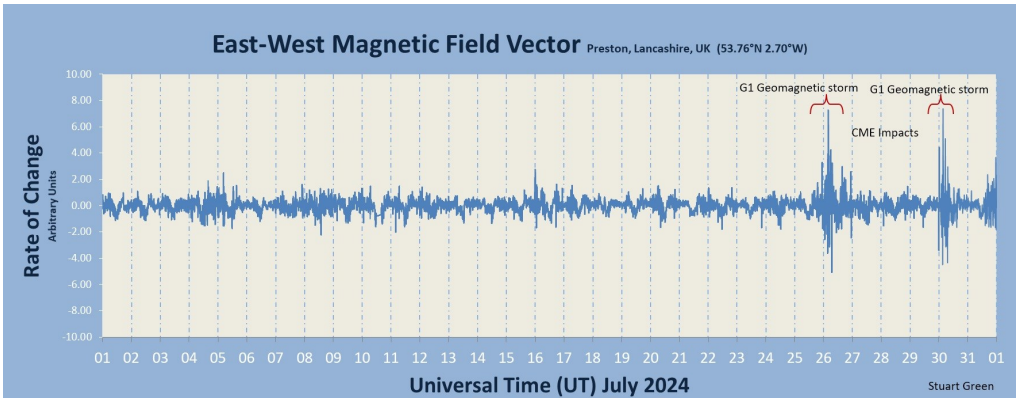
• +44 330 088 5830 United Kingdom
• +44 131 460 1196 United Kingdom

MAGNETOMETER REPORT 2024 JULY

DATE	DURATION (UT)		ACTIVITY
2/3	23:30	2:00	Disturbed
5	03:30	05:30	Disturbed
8	12:00	22:00	Disturbed
15/16	23:00	09:00	Disturbed
17	03:00	08:00	Disturbed
23	14:30	17:30	Disturbed
23/24	23:00	02:00	Disturbed
25/26	22:30	13:00	Disturbed
26	17:00	00:00	Disturbed
29	15:00	18:30	Disturbed
30	00:00	09:00	Disturbed
31/1	14:00	08:00	Disturbed

Solid-state magnetometer,
Uncalibrated.
John Cook



Data supplied by Stuart Green