British Astronomical Association

PO Box 702, Tonbridge, TN9 9TX

Email: office@britastro.org Website: britastro.org Telephone: 0207 734 4145

Founded in 1890

BAA Solar Section Newsletter

Sunspot data 2024 April

Day	g	R
1	2	23
2	2	20
3	2	26
4	3	39
5	4	54
6	4	61
7	5	62
8	3	47
9	3	42
10	3	38
11	4	67
12	4	67
13	6	91
14	8	111
15	8	119
16	9	139
17	10	139
18	9	158
19	10	181
20	9	179
21	9	158
22	11	203
23	11	205
24	10	168
25	10	160
26	8	103
27	6	102
28	5	86
29	5	69
30	4	62

Monthly Means

MDFg:	6.88	(45 observers)
MDFNg	3.77	(37 observers)
MDFSg	3.30	(37 observers)
Mean R:	108.27	(44 observers)

Lyn Smith, 1 Montboy Steading, Careston, Brechin, Angus DD9 6RX, Scotland, UK.
Telephone : 01356 630218 or mob: 07725 347711
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:

P Abel, Leicester
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
G Cauchi, South Australia
I Chouinavas, Greece
G Clarke, Australia
E Colombo, Italy
J Cook, Wolverhampton
A Coombs, Vic, Aust
P Curtin, USA
S Dawes, London
A Devey, Spain
F Dubois, Belgium
T Emmett, Cambs
G D Ewen, Beds
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
J Janssens, Belgium
M Jenkins, Cambridge
S Jenner, Kent
A Johnston, Denbighshire
R Johnson, Surrey
S L Karl, Aberdeen
D Keep, Lincoln
M Kinder, Cheshire
K Kennedy, Dundee
P Lawrence, Leicestershire
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
M O'Connell
C Potter, Orkney
M Ratcliffe, Utah, USA
R Samworth, Leicestershire
J D Shanklin, Cambridge
D Smith, Essex
L Smith, Angus
N Spencer, York
M Stephanou, Greece
G Steigmann
A Stone, Bristol
T Tanti, Malta
D Teske, Mississippi, USA
C B Thielke, Denmark
N Tonkin, Cornwall
P Tosi, France
Towarzystwo Milosnikow
Towarzystwo Obs Slonca
S Ove Thimm, Denmark
P Urbanski, Poland
G Vargas, Bolivia
F Ventura, Malta
D Vidican, Romania
S Viney, Cheshire

The Sun in White Light – April

April started with low activity but underwent an outburst particularly during the second and third weeks of the month. Both hemispheres produced a similar activity level with the monthly daily frequency and relative sunspot numbers being similar to that seen in 2024 January. The quality of sunspots also increased to that last seen in January. Forty-one sunspot groups were allocated Boulder numbers and the largest/most active regions are reported on below.

AR3628 N07°/359° rounded the NE limb on the 3rd as a single Hsx sunspot. The group was the largest sunspot on the solar disk and remained so for some days. When near to the central meridian (CM), the group had an area of 360 millionths and was type Hax, elongated in shape with two umbrae. Faint pores occasionally appeared upgrading the group to type C but they soon disappeared and the group rotated on the 15th as an H class group once again.

AR3633 S08°/319° appeared over the SE limb on the 6th type Hsx. The following day a smaller penumbral follower was revealed giving the group a Dso classification. The group was still Dso on the 10th with a total area of 140 millionths. The follower sunspot started to fade on the 11th. The group was type Cso for some days until only the leading penumbral sunspot remained on the 14th. The group then developed further pores changing position on a daily basis until the group rotated on the 18th type Cso.

AR3634 N27°/312° formed mid-way across the NE quadrant on the 10th, type Bxo. The group underwent rapid development and was type Dsi the following day. The leading sunspot continued to grow and elongate and by the 14th the group was type Dac with an area of 480 millionths. By the 17th the group had increased to 690 millionths but was by now approaching the NW limb and rotated soon after.

AR3639 N28°/221° appeared over the NE limb on the 14th as an Hsx sunspot but rapidly developed overnight to a Dao type group containing 7 small sunspots with the leader being the largest. Further development took place on the 16th when the group extended in longitude and became type Ekc with an area of 810 millionths. There were now two main penumbral sunspots with the follower being the more irregular and the largest. The following day the follower split and the group's area reduced to 520 millionths and type Eac. On the 18th the group had three centres of activity and a large bright photo-bridge within the leading sunspot. On the 20th the group was still a complex area of activity albeit eclipsed by the very active sunspot regions in the southern hemisphere. The central activity in the group faded and the leader and follower sunspots reduced as the group crossed the NW quadrant. The group had reduced to type Cso as it approached the NW limb on the 24th and was last seen as a single Hsx sunspot on the 25th.

AR3637 S11°/217°; AR3638 S16°/229°; AR3643 S10°/208°; AR3645 S10°/220° & AR3647 S10°/218° all these groups combined to cross the disk as visibly one extensive active area, the general location having been occupied by AR3615 on the previous rotation. The activity commenced with a small collection of sunspots appearing over the SE limb on the 13th, being AR3637 & AR3638. AR3643 followed onto the disk the next day with all three groups expanding as they rotated. AR3637 had been type Axx on the 13th but by the 16th was type Dao with an area of 320 millionths. The group further expanded to type Fai with an area of 490 millionths on the 17th and type Fkc with an area of 780 millionths on the 18th. NOAA went on to rename some of the sunspots to the northern perimeter as AR3645 and subsequently another area to its south was numbered AR3647 (also AR3650 trailed the activity at a similar latitude S11°/197°). As the regions crossed the CM on the 19th and 20th they could rightly be described as a "conglomeration" of activity with the leading groups having an almost circular appearance. AR3643 began fading on the 21st. As the groups progressed towards the SW limb on the 24th and 25th they were still impressive appearing visually as one Fac group but designated AR3643/3645. AR3638 remained quite small being type Dsi with an area of 130 millionths before reducing in size to type Csi. Only bright faculae remained near to the SW limb on the 26th.

AR3644 N12°/183°; AR3646 N21°/185°; AR3648 °N19/192° & AR3652 N15°/160° although not as impressive as their southern hemisphere counterparts, these four groups formed a large area of activity in the northern hemisphere from the 17th to the 29th. AR3644

was seen near to the NE limb on the 17th as two small penumbral sunspots type Dso. AR3646 was to its north consisting of two smaller sunspots. There was evidence of AR3648 on the 19th in the form of an Axx sunspot which faded again. On the 21st AR3652 formed to the east of AR3644 and further developed on the 22nd. AR3646 to the north also underwent rapid development on the 22nd to type Dai. The following day AR3648 re-emerged as an east/west string of sunspots. AR3646 became the largest group of the set with its largest sunspot being the follower. All four sunspot groups dominated the NW quadrant when seen on the 24th and 25th but AR3644/46 and 3648 were all in decline on the 26th. AR3652 was the last to rotate over the limb on the 28th type Hsx.
AR3654 S06°/134° rotated over the SE limb on the 21st type Axx. By the 23rd the group had developed to type D with 15 sunspots reported, several being small penumbral sunspots. The group was type Dsi on the 24th with the largest being the leader which continued to develop the following day. The group had also expanded in longitude to be type Eac with an area of 330 millionths. The following sunspots started to decay on the 26th but the group underwent strengthening on the 27th and developed into a Fac type group consisting of several moderately sized penumbral sunspots with an area of 810 millionths. The group was of similar appearance the following day and continued to be impressive as it approached the SW limb at the end of the month.
25 observers reported a Quality number of **22.22** for April.

The Sun in H-alpha

Prominences

16 observers reported a prominence MDF of **7.44** for April.
A small cloud of plasma was seen hovering over the NW limb on the 1st, at a height of about 100,000 km. Numerous small prominences were seen but a large hedgerow type prominence was reported on the SE limb.
Another hedgerow type prominence rising to about 50,000 km and with a similar width, was seen on the SW limb on the 7th.
The largest prominence seen on the 8th was an irregularly shaped arch on the S limb which was also widely recorded during the total eclipse in North America later that same day.
On the 14th, a bright prominence was seen on the SE limb and over the W limb, a cloud of plasma hovered above the limb at about 70,000 km.
An unusual prominence hearth consisting of an arch prominence and a long leaning tower was seen on the 15th on the SW limb. This consolidated into a lengthy hedgerow hearth the following day but then dissipated.
A large arch prominence, unconnected at its northern end, was on the SE limb on the 18th and stretched around the limb for about 130,000 km. It was not present the following day although to the north of its position was a flat arch prominence rising to about 40,000 km and stretching around the limb for 90,000 km.
On the 21st, a hedgerow type prominence consisting of four separate equal tree type elements was on the SE limb. Further south was a pyramid type prominence rising to about 50,000 km.
Two large prominences on the SE limb were reported on the 24th and two cloud type prominences were seen on the E and SE limb on the 25th.

Filaments & Plage

14 observers reported a filament MDF of **10.10** and 13 observers reported a plage MDF of **5.79** for April.
A total of 18 filaments were counted on the 1st of which 7 were described a “long but broken”. A large number of filaments was also reported on the 4th and 5th especially in the southern hemisphere.
On the 7th in the NE quadrant, 3 long filaments were reported alongside each other and measuring 150,000 km, 150,000km and 100,000 km respectively. Another report described 2 of these north/south aligned filaments as a spectacular V-shaped feature.
A long filament measuring about 300,000 km in length aligned east/west was in the southern hemisphere on the 11th .

An arch shaped filament was close to the NE limb on the 12th. This feature crossed the NE quadrant until the 16th when it disappeared thereafter and was about 200,000 kms in length. On the 27th many interesting filaments were seen including a large filament in the NW and a large fuzzy filament in the SE. The following day, a large dark filament was seen in the SE quadrant. This filament persisted through to the end of the month progressing towards the CM.
H-alpha plage was evident throughout the month and seen with most sunspot groups.

CaK

CaK reports were received from Ella Bryant and Brian Mitchell with Brian recording a CaK MDF for April of **7.14**. Ella reported CaK plage with most sunspot groups throughout the month and a small active prominence seen on the 20th on the SE limb at 1033 UT. Flaring was observed in this wavelength on the 21st in regions AR3644 and AR3645 from 0810 UT. Flare activity increased at 0810 UT. Slight flaring was also observed in AR3639 at 0822 UT as well as an increase in brightness in AR3644.
On the 23rd, slight flaring was seen in AR3645 at 1255 UT and AR3645 at 1312 UT. Flaring was also observed in AR3654 at 1325 UT.
CaK flaring was also seen in AR3655 on the 24th at 0832 UT and also numerous prominences.

Flares

Minor flares were recorded throughout the month by several observers. John Cook possibly recorded an M2.2 flare on the 21st at 1505 UT. Andy Johnston recorded a C3.5 flare from AR3635 on the 11th at 1115 UT and Brian Halls a C8.3 flare from AR3454 on the 18th. Other observers recording flares were Ella Bryant, Laurent Cambon, Arthur Coombs, Derrek Glover and Massimo Giuntoli.

Polar Faculae

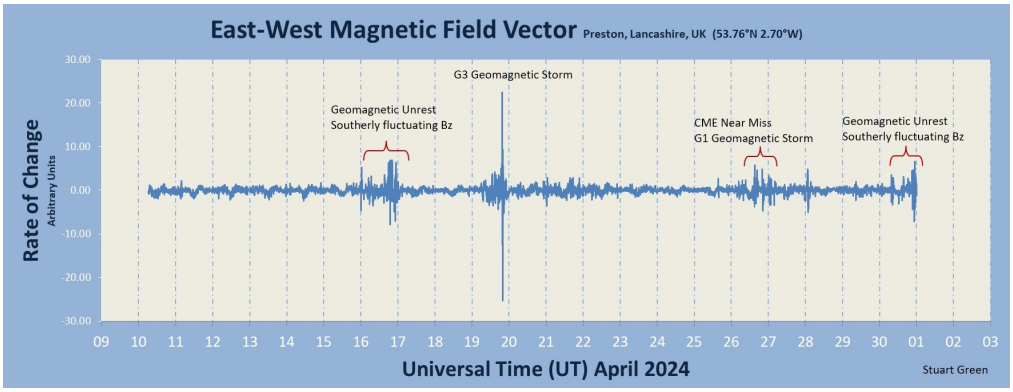
No polar faculae were recorded during April.

MAGNETOMETER REPORT 2024 APRIL

DATE	DURATION (UT)		ACTIVITY
4	20:00	23:30	Disturbed
9	06:30	09:00	Disturbed
9	20:00	21:00	Disturbed
16/17	00:00	01:00	Disturbed
19	05:30	19:00	Disturbed
19	19:00	20:00	Active
19	20:00	23:00	Disturbed
21	19:00	22:00	Disturbed
26	13:00	22:00	Disturbed
27	00:00	02:00	Disturbed
30/1	21:00	03:00	Disturbed

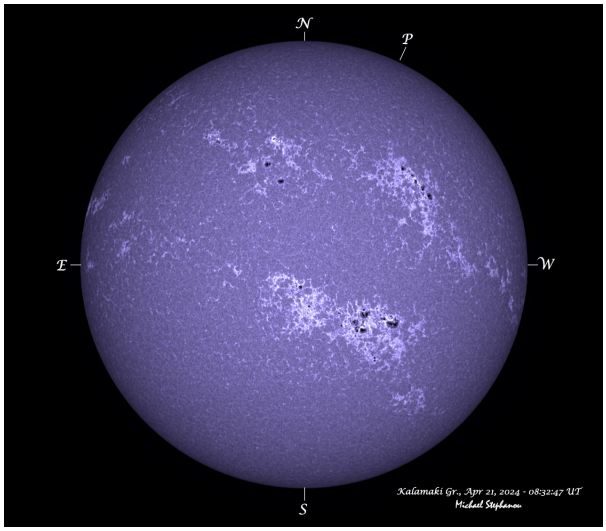
Solid-state magnetometer, Uncalibrated

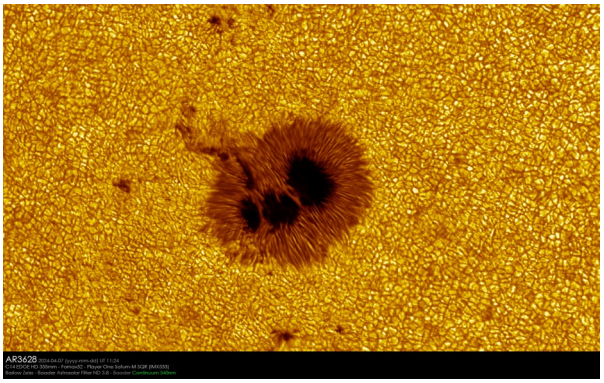
John Cook

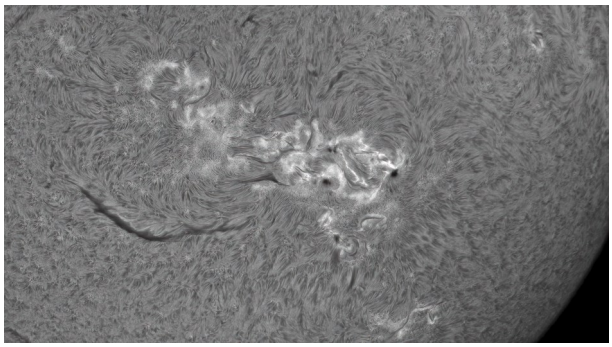


April data supplied by

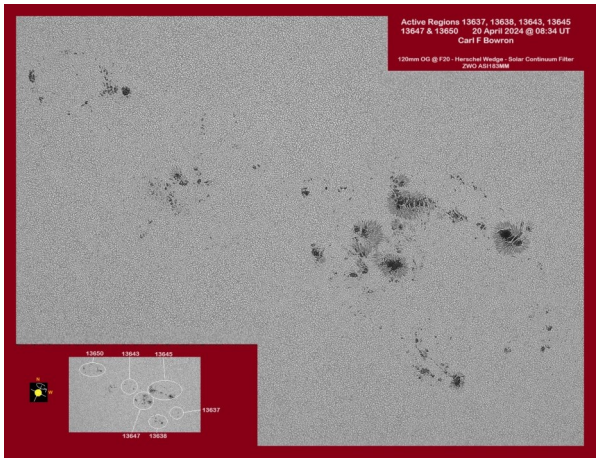
Stuart Green

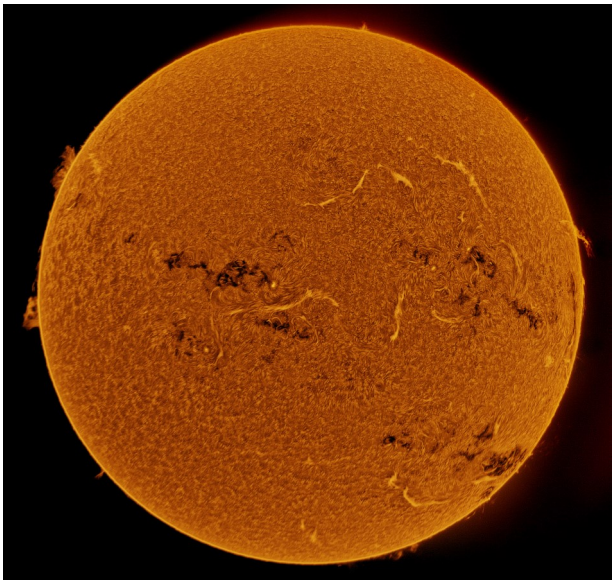




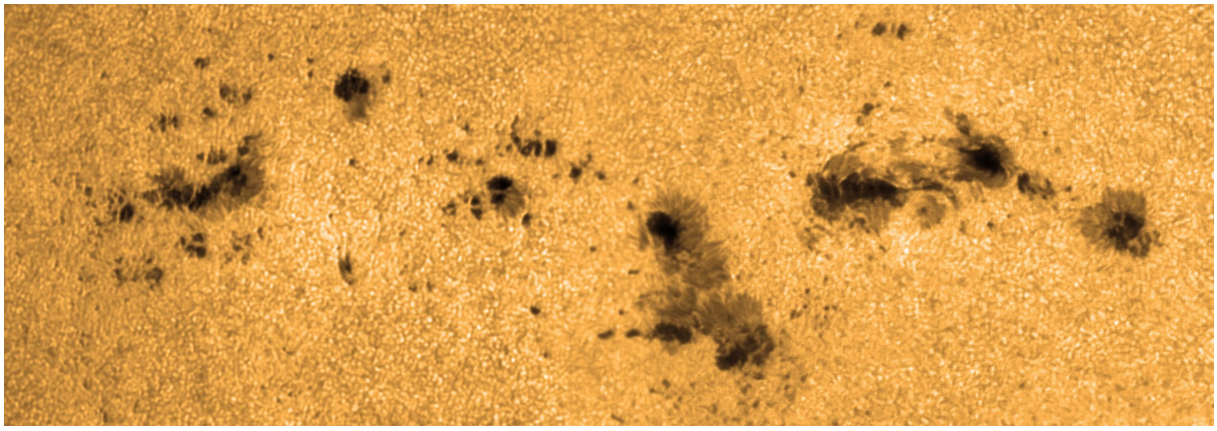


Above: Full disk CaK image showing two major areas of activity. Imaged by Michael Stephanou 20240421 at 0837 UT
Top Left:**:** AR3628 imaged early in the month in white light by Luigi Morrone 20240407 at 1124 UT
Below Left: H-alpha image by Gordon Ewan showing activity in AR3639 in the northern hemisphere 20240421 imaged at 1455 UT





Above Left: White light image by Carl Bowron 20240420 at 0834 UT using 120 mm og @ f20 and showing AR's 3637/38/43/45/47/50
Above Right: Inverted H-alpha image showing activity on 20240424 at 0928 UT by Dave Smith
Below: Mosaic by Simon Dawes showing AR's 3638/43/45/47 imaged on 20240418 at 0731 UT



Section News

Thank you to everyone that both presented and participated in the last Section Zoom meeting on the subject of solar imaging. The session was well received and many useful techniques and tips were shared. Dave Smith has written a precis of his advice on animations, published below.
The next Section meeting will again be via the Zoom platform commencing a 7.30 pm (1930 BST/1830 UTC) on Friday 5th July 2024. The link will be published in the next newsletter a couple of weeks prior to the meeting.
Nearly 300 images were received during April making the selection process for the newsletter extremely difficult! More can be viewed on the Section's web pages.

Animations by Dave Smith

Open FireCapture, choose and locate your target area (usually a prominence or active region) and locate and press the running man icon at the top of the screen
On this screen set the parameters at the top. I tend to choose 60 runs, ignore filter, limit 1000 frames, Delay 60 seconds.
When ready press "Start Autorun" and then fingers crossed that cloud keeps away.
There is a reticule that can be turned on, in the main page of FireCapture, and positioned to help with keeping the area of interest central on the screen during the taking of the animation.
To batch process the videos, select them all and open in AS!3 or AS!4. Only the first will show. When you start the processing, AS will process all the videos.
Next enter just one of the resulting TIF files into Imppg and adjust to your liking. There is no need to save the image but you do need to save the settings.
Go to "File" batch processing and select the files and settings file and choose an output directory.
The next task is to align the images. This is done in Imppg "Tools" which is self-explanatory.
To make the animation open the aligned files in PIPP and under the output tab choose animated GIF and select a suitable frame rate. Between 5 and 10 per second usually works.
Finally choose the "Do processing" tab and press "Start processing" and within a few seconds the animation is complete.
https://www.firecapture.de/
https://github.com/GreatAttractor/imppg/releases/tag/v1.9.1-beta
https://www.autostakkert.com/wp/download/

Total Solar Eclipse—20240408
Image left is by Michael O'Connell imaged at 1851 UT. Image right is by Pete Lawrence from Texas, USA showing 3rd contact diamond ring.