



British Astronomical Association



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BAA Solar Section Newsletter

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Sunspot data 2023 June

Day	g	R
1	7	113
2	7	108
3	7	103
4	7	98
5	7	117
6	9	114
7	9	137
8	8	124
9	8	116
10	7	101
11	6	104
12	5	73
13	5	63
14	6	84
15	6	83
16	6	91
17	6	101
18	7	106
19	8	130
20	9	141
21	11	162
22	12	167
23	11	154
24	12	165
25	9	133
26	7	112
27	7	119
28	6	107
29	4	75
30	4	69

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:

- | | |
|--------------------------|----------------------------|
| J Arnold, Leeds | D Keep, Lincoln |
| C Bailey | K Kilburn, Staffordshire |
| R Battaola, Milan, Italy | M Kinder, Cheshire |
| M Boschat, Canada | P Lawrence, Leicestershire |
| C F Bowron, South Yorks | L Macdonald, Berkshire |
| A Bowyer, Epsom Downs | R Mackenzie, Kent |
| P Brierley, Cheshire | M Mattos, Spain |
| S Brown, Leicestershire | A Mengus, France |
| E Bryant, North Devon | H Meyerdirks, Germany |
| M Buck, Bristol | B Mitchell, Norwich |
| L Cambon, France | L Morrone, Italy |
| G Clarke, Australia | M Nicholls, Sheffield |
| E Colombo, Italy | P Norman, Worcester |
| J Cook, Wolverhampton | G Palmer, Wales |
| P Curtin, USA | Polish Solar Obs Soc |
| S Dawes | C Potter, Orkney |
| A Devey, Spain | R Samworth, Leicestershire |
| R Dryden, Oxon | J D Shanklin, Cambridge |
| F Dubois, Belgium | J Shears, Cheshire |
| T Emmett, Cambs | D Smith, Essex |
| M Giuntoli, Italy | L Smith, Angus |
| D Glover, Essex | N Spencer, York |
| S Green, Lancs | W Spreng, Ohio, USA |
| K Hall, Warrington | M Stephanou, Greece |
| B Halls, W Sussex | G Steigmann |
| A Hart, Cheshire | A Stone, Bristol |
| K Hay, Canada | T Tanti, Malta |
| A W Heath, Nottingham | D Teske, Mississippi, USA |
| R Heard, Suffolk | N Tonkin, Cornwall |
| R Hill, Arizona, USA | P Tosi, France |
| J Janssens, Belgium | S Ove Thimm, Denmark |
| M Jenkins, Cambridge | P Urbanski, Poland |
| S Jenner, Kent | G Vargas, Bolivia |
| A Johnston, Denbighshire | F Ventura, Malta |
| R Johnson, Surrey | D Vidican, Romania |
| S L Karl, Aberdeen | S Viney, Cheshire |
| J Kartin, Denmark | J Warell, Sweden |

Monthly Means

MDFg:	7.87	(46 observers)
MDFNg	3.88	(38 observers)
MDFSg	4.14	(38 observers)
Mean R:	121.08	(44 observers)

The Sun in White Light – June

Activity in June surged back to the high levels seen in 2023 January. Although there was a slight decrease in northern hemisphere activity, the southern hemisphere more than made up for the short-fall. The month also produced one of the largest sunspot groups of the Cycle so far. Forty-three sunspot groups received Boulder numbers during the month with multiple groups visible every day. The largest/most complex groups are reported below.

AR3315 S17°/233° survived from the previous month, now approaching the SW limb. The leader and follower penumbral sunspots were still visible although the follower started fading on the 2nd as the leader reached the limb. The group then rotated out of view.

AR3319 S16°/201° also survived on the disc from the previous month, was type Eho on the 1st with an area of 540 millionths. The size of the leader reduced the following day but a few small penumbral sunspots developed between the leader and follower making the group type Eac. The group maintained this configuration until it rotated around the SW limb on the 4th.

AR3321 S14°/120° another survivor from May, a penumbral Hax sunspot with an area of 290 millionths, was in the SE quadrant not far from the limb on the 1st. The sunspot showed a distinct light bridge across the umbra on the 1st and developed an accompanying pore on the 3rd. By the 4th the umbra was quite curved but by the 6th had resumed a more circular shape. There was very little further change to this group as it made its way westward reaching the limb on the 11th.

AR3323 S07°/099° rounded the SE limb on the 1st consisting of several small penumbral sunspots and a few pores. The group was type Eac on the 3rd with an area of 570 millionths. It was probably at its most impressive on the 4th and 5th before starting to decline on the 6th as it crossed the CM. Sunspots in both the leading and following elements continued to fade and by the 7th the group only had an area of 100 millionths. By the 9th the group was type Cai with an area of 40 millionths. It faded on the disc in the following days as it approached the SW limb.

AR3327 S15°/050° rounded the SE limb on the 4th consisting of three small penumbral sunspots. By the 7th the group had grown into a compact Dac group with several small penumbral sunspots and pores. The following day it became type Eac with an area of 470 millionths. By the 10th, the leading section had begun to fade and by the 12th only a Bxo group remained mid-way across the SW quadrant. The group faded on the disc in the coming days.

AR3335 S13°/287° & AR3336 S20°/281° both groups rounded the SE limb on the 14th, AR3335 being the major group with AR3336 immediately to the south. AR3336 was initially type Dsc consisting of two small penumbral sunspots. By the 17th only a single small penumbral sunspot was visible and by the time AR3335 had reached the CM, AR3336 had dissolved on the disc. AR3335 initially appeared as a Dao group which by the 16th was showing development into type Eai. Further small penumbral sunspots appeared the following day making the group type Eac with the largest sunspot being the leader. By the 18th the group had an area of 530 millionths. The group reached the CM on the 20th and the following section of the group then started to decay. The decay continued in the following days and the group was reduced to type Dac and 380 millionths by the 22nd. The group was last reported close to the SW limb on the 25th surrounded by a network of bright faculae.

AR3340 N23°/237° appeared over the NE limb on the 18th as a single Hsx sunspot. The group developed several pores to the east and south of the main sunspot over the next few days, unusually quite apart from that sunspot. By the 22nd the trailing sunspots had begun to develop whilst the southern pores began to fade. The group was type Esi on the 23rd when it reached the CM and by the 25th had undergone strong development in the following section of the group. This proved to be its peak as the group started to fade after the 26th and was seen approaching the limb on the 28th as a Bxo type group.

AR3354 N16°/164° formed in the mid NE quadrant on the 26th as a minor Bxo type group. The group however underwent dramatic development overnight and by the 28th was a complex Dkc type group containing around 20 penumbral and other minor sunspots. The group crossed the CM on the 28th/29th and developed into type Ekc with an area of 1210 millionths. On the 29th this group comprised of two main irregular penumbral sunspots

in the central and following sections of the group; the leaders being a couple of small penumbral sunspots and a few pores. The group was easily seen with the protected naked eye. The group further extended in longitude on the 30th and became type Fkc. 24 observers reported a Quality number of **Q = 23.89** for June.

The Sun in H-alpha Prominences

18 observers reported a prominence MDF of **6.24** for June.

On the 1st a fila-prom was seen on the NE limb. The filament element was the longest and this elongated during the coming days whilst the prominence receded.

A moderately tall hedgerow prominence was seen on the NW limb on the 4th.

A hedgerow type prominence with three tree type elements was reported on the NE limb on the 7th, with a length of around 110,000 km and rising to about 50,000 km. This feature persisted through to the 8th although the middle element was reduced. Also, on the SE limb, another substantial hedgerow prominence rose to about 60,000 kms.

Two moderately tall but separate pillar prominences were seen on the SE limb. The northernmost formed a detached blob of plasma the following day which seemed to reconnect by the 14th and form a large curved plasma cloud attached to the limb by a thin stem.

A Slightly inclined, tall tower prominence was seen at high latitude on the NE limb on the 15th.

A long but low hedgerow prominence was on the NW limb on the 17th and a pyramid prominence was seen on the SW limb. This pyramid was also present on the 18th and had developed an arc of plasma to its northern edge. Further north along the limb was a fine arch prominence. Another fine detached prominence with a complex structure was reported off the NW limb and on the SE limb, a curtain prominence rose to about 40,000 km and extended around the limb for about 100,000 km. This latter prominence hearth persisted in various forms through to the 24th.

A long arch prominence formed on the NE limb on the 20th which was reported as a platform arch on the 21st extending for 100,000 km and rising to about 50,000 km with three small clouds of plasma associated with it. All that was left of the feature on the 22nd was a single large pillar with a hooked top curving southward.

A tall slender tower, slightly inclined northwards, was reported on the NE limb on the 26th rising to about 100,000 km.

Bi-Polar Magnetic Regions, Filaments & Plage

17 observers reported a filament MDF of **8.96** and 14 observers reported a plage MDF of **6.41** for June.

A very long, broad, roughly north/south aligned filament survived from the previous month in the SE quadrant, which was estimated to be 375,000 km long on the 1st. It persisted over the coming days into the SW quadrant but was not seen on the 4th. Also on the 1st, a fila-prom on the NE limb started to extend onto the disc. This continued over the next few days with the feature forming an incomplete polar crown in the northern hemisphere. The feature started to rotate over the NW limb on the 10th and remnants could still be seen on the 11th. Another long, broad, east/west aligned filament was reported on the 8th over the CM and into the NW quadrant, some distance south of the polar crown feature. The filament reached the NW limb on the 12th.

Also on the 8th, a long, broken and roughly east/west aligned filament was in the SE quadrant south of AR3327. The filament measured about 250,000 km in length. As the feature progressed into the SW quadrant, it became more diagonal across the quadrant and extended to 350,000 kms in length. The filament reached the limb on the 14th/15th.

Bright plage was observed with AR3327 and AR3331 on the 12th. Also on this day, a long, curved north/south filament was observed in the NW quadrant to the north of AR3329. The filament progressed to the NW limb arriving on the 16th where it formed a broad feature close to the limb. (It was also responsible for the long low prominence hearth on the NW

limb on the 17th.)

On the 14th, a broken filament was seen in the NE quadrant that developed the following day into a much longer and stronger feature. On the 16th it was a strong broken filament into the NW quadrant aligned mostly north/south. The filament was still strong on the 17th but not seen on the 18th.

Another curved, north/south aligned filament was close to the NE limb on the 20th. The filament was to the north-east of AR3340 and remained so over the coming days. It reached the CM on the 25th and followed the sunspot group towards the NW limb for the remainder of the month. During its progress it was estimated to be between 200,000 and 250,000 kms in length.

Bright plage was seen with sunspots groups approaching the W limb on the 24th and a bright spot of plage was observed within AR3351 near the NE limb.

On the 29th a large irregular bi-polar magnetic region was seen associated with AR3354 in the northern hemisphere.

CaK

Almost all CaK emission was associated with sunspot groups throughout the month. The exceptions were an area around N23°/015° which displayed an emission around 10° across 8th – 11th inclusive; an area 10° across remained after a sunspot group at S20°/093° faded on the 11th and remained visible through to the 15th; a larger area centred at about N30°/165° which remained visible after the associated sunspot group faded 26th – 30th.

CaK MDF 7.37 (19 days) observer - Brian Mitchell.

Polar Faculae

Jan Janssens reported a polar faculae MDF of North 0.25 and South 0.75 (4 days).

Flares

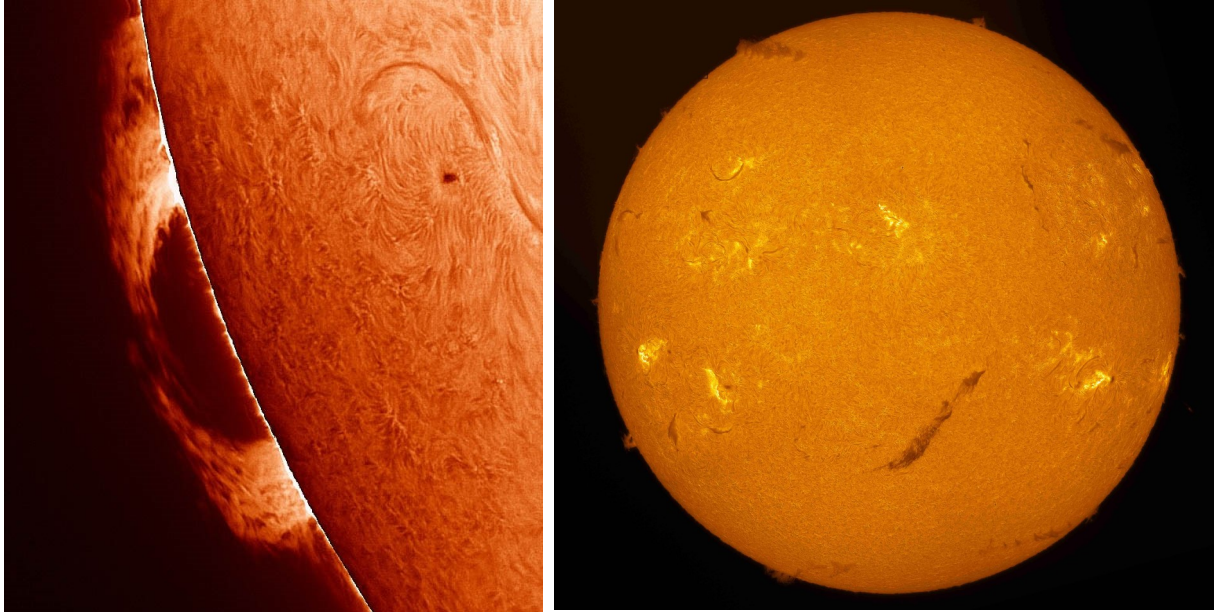
There were many minor flares reported to the Section during the month. Warren Spreng reported an M2.5 flare associated with AR3335 at 1356 UT on the 18th and Andy Devey reported an M class flare on the 28th at 0857 UT.

MAGNETOMETER REPORT

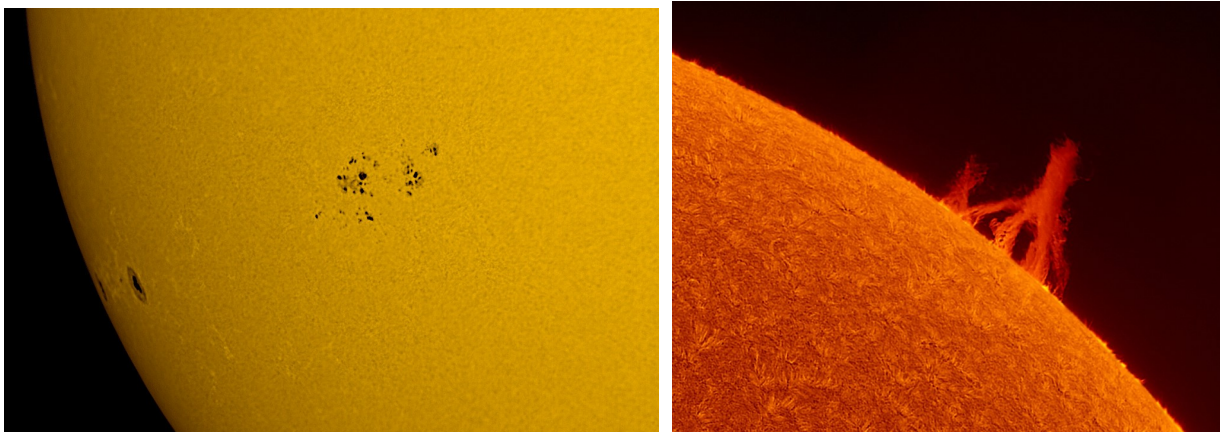
2023 JUNE

DATE	DURATION (UT)		ACTIVITY
1	00:45	09:00	Disturbed
11	02:30	07:00	Disturbed
13/14	23:00	02:00	Disturbed
15/16	12:45	16:30	Disturbed
19/20	20:00	04:00	Disturbed
20/21	22:45	03:00	Disturbed
21	22:15	23:30	Disturbed
22/23	19:30	01:00	Disturbed
24/25	20:30	03:00	Disturbed
25/26	23:00	01:30	Disturbed
26	10:00	22:00	Disturbed
28/29	20:45	09:00	Disturbed
29/30	17:30	03:00	Disturbed

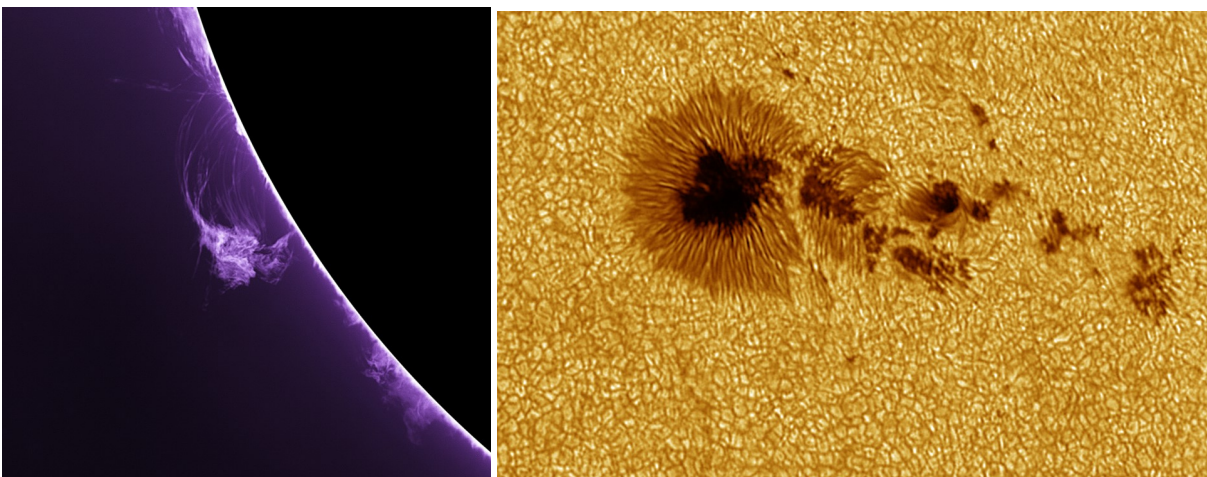
**Solid-state magnetometer, Uncalibrated.
John Cook**



Above: Large loop prominence SE limb 20230609 imaged by Carl Bowron at 1419 UT
Above Right: Full disc in H-alpha showing the fine filaments of 20230602 imaged by Stuart Green at 0908 UT
Below: AR3327 and AR3331 (near the limb) imaged in white light by Brian Halls 20230607 at 0755 UT
Below Right: A fine prominence, again on the SE limb, imaged by Gary Palmer 20230621



Below: Superb image of a prominence in Calcium K-line by Nic Spencer 20230614 at 0740 UT
Below Right: AR3333 imaged in white light by Luigi Morrone at 0909 UT 20230617

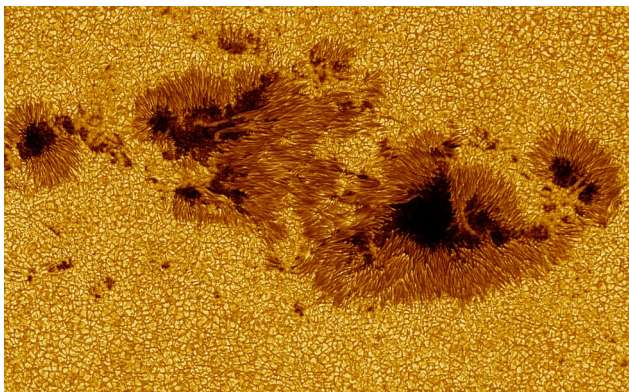


Section News

There are several BAA meetings coming up in the next few months. The Autumn weekend meeting is in Leicester this year from Friday 22nd to Sunday 24th September and will be themed “Practical Amateur Astronomy”. Professor Fletcher will talk about the JUICE mission to Jupiter’s moons and Pete Lawrence will give useful advice on imaging the Planets. Other talks will be on how to observe comets, video meteors and observe aurora and STEVE as well as advice from the BAA President about buying the right telescope for your needs.

The BAA AGM will be at the Institute of Physics in London on Wednesday 25th October, which I hope to attend. The ever popular Christmas Meeting will also be at the Institute of Physics on Saturday 9th December 2023.

Further information can be obtained via the Events section on the BAA website.

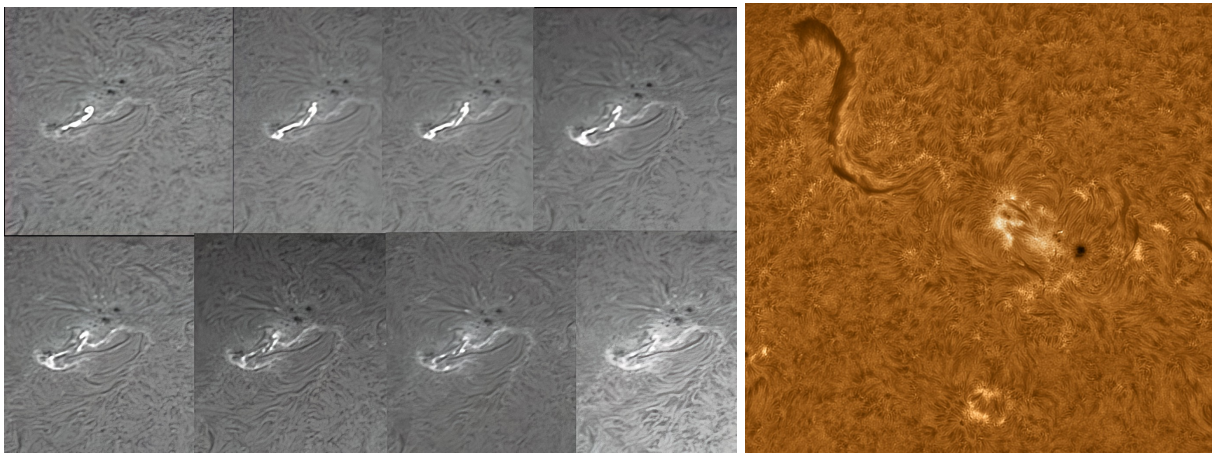


Left: AR3354 imaged by Luigi Morrone 20230629 at 0901 UT

Below Left: Flare sequence of AR3340 imaged by John Arnold 20230626 1621—1714 UT

Below Right: AR3340 and curving filament imaged by Dave Smith 20230622 at 1213 UT

Far Below: AR3354 in various wavelengths imaged by Stuart Green 20230629 0638—0730 UT



430 nm CaK 393.4 nm H-Alpha 656.28 nm

Active Region 13354 at Various Wavelengths
29th June 2023 06:38 - 07:30 UTC
Preston, Lancashire, UK
Stuart Green