



# British Astronomical Association



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## BAA Solar Section Newsletter

### Sunspot data 2024 June

Day	g	R
1	7	136
2	8	147
3	9	154
4	9	160
5	8	124
6	7	125
7	8	129
8	9	135
9	8	101
10	6	92
11	5	73
12	7	104
13	7	99
14	7	113
15	6	112
16	6	107
17	5	102
18	4	98
19	4	91
20	6	120
21	6	113
22	6	120
23	7	117
24	8	117
25	7	106
26	8	125
27	8	119
28	8	127
29	10	149
30	10	161

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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     | C Longthorn, Stratford     |
| J Arnold, Leeds           | L Macdonald, Berkshire     |
| C Bailey, Suffolk         | R Mackenzie, Kent          |
| R Battaïola, Milan, Italy | M Mattos, Spain            |
| M Boschat, Canada         | P Meadows, Essex           |
| C F Bowron, South Yorks   | A Mengus, France           |
| A Bowyer, Epsom Downs     | H Meyerdirks, Germany      |
| S Brown, Leicestershire   | B Mitchell, Norwich        |
| M Buck, Bristol           | C C Moraes, Brazil         |
| L Cambon, France          | L Morrone, Italy           |
| I Chouinavas, Greece      | M Nicholls, Sheffield      |
| G Clarke, Australia       | P Norman, Worcester        |
| E Colombo, Italy          | G Palmer, Wales            |
| J Cook, Wolverhampton     | C Potter, Orkney           |
| P Curtin, USA             | M Ratcliffe, Utah, USA     |
| S Dawes, London           | R Samworth, Leicestershire |
| A Devey, Spain            | J D Shanklin, Cambridge    |
| F Dubois, Belgium         | J Shears, Cheshire         |
| T Emmett, Cambs           | D Smith, Essex             |
| G D Ewen, Beds            | L Smith, Angus             |
| M Giuntoli, Italy         | N Spencer, York            |
| D Glover, Essex           | M Stephanou, Greece        |
| S Green, Lancs            | G Steigmann                |
| K Hall, Warrington        | A Stone, Bristol           |
| B Halls, W Sussex         | T Tanti, Malta             |
| K Hay, Canada             | C G D Taylor, Perthshire   |
| A W Heath, Nottingham     | P Taylor, Coventry         |
| R Heard, Suffolk          | D Teske, Mississippi, USA  |
| R Hill, Arizona, USA      | C B Thielke, Denmark       |
| J Janssens, Belgium       | P Tosi, France             |
| M Jenkins, Cambridge      | Towarzystwo Milosnikow     |
| S Jenner, Kent            | Towarzystwo Obs Slonca     |
| A Johnston, Denbighshire  | S Ove Thimm, Denmark       |
| R Johnson, Surrey         | P Urbanski, Poland         |
| S L Karl, Aberdeen        | G Vargas, Bolivia          |
| D Keep, Lincoln           | F Ventura, Malta           |
| K Kilburn, Staffordshire  | D Vidican, Romania         |
| M Kinder, Cheshire        | S Viney, Cheshire          |

#### Monthly Means

MDFg:	7.76	(45 observers)
MDFNg	2.32	(38 observers)
MDFSg	5.55	(38 observers)
Mean R:	128.19	(45 observers)

## **The Sun in White Light – June**

Activity increased on that seen last month with 43 active regions being assigned Boulder numbers. Although there was a decrease in northern hemisphere activity, the southern hemisphere produced more sunspot groups to give an overall increase in the Relative Sunspot number (R). R was the second highest recorded of Cycle 25, the highest so far being achieved in 2024 July. However, the Quality number rose to the highest recorded of the Cycle so far indicating the arrival of more mature sunspot groups than previously seen.

The largest/most active sunspot groups are reported below.

**AR3697 S17°/349°** survived from the previous month, being the second rotation of AR3664. The group was in the mid SE quadrant on the 1<sup>st</sup> led by two strong penumbral sunspots which by the following day, had broken up into two elongated penumbral areas, rather like pincers extending westward. The group had an area of 990 millionths on the 2<sup>nd</sup> with an extensive area of penumbra linking the leading and following sunspots. The group underwent various shape changes as it crossed the central meridian (CM) in the coming days but had a look of decay with disintegrating sunspots, even although the overall group was still substantial. By the 6<sup>th</sup> the group had reduced to 570 millionths in area and was type Ekc mainly due to the large irregular sunspot in the centre of the group. The following day the leader and follower sections condensed into more definite areas which continued on the 8<sup>th</sup> with the group being assigned classification Dac. The group was last seen on the 9<sup>th</sup> near to the SW limb as type Dao.

**AR3701 S05°/342°** was seen on the 1<sup>st</sup> as an Axx sunspot forming to the north-east of AR3697 and not far south of the solar equator. The group underwent rapid growth overnight to type Dac. The group accompanied the larger group into the SW quadrant on the 5<sup>th</sup> and thereafter the follower sunspots started to decline. The group was type Cao on the 7<sup>th</sup> before reducing to a single Hsx sunspot and thereafter faded on the disc approaching the SW limb.

**AR3703 S07°/325°** was another satellite sunspot group to AR3696 forming on the 3<sup>rd</sup> to the east of AR3701. Initially the group was type Dro but strengthened the following day to type Dao. By the 6<sup>th</sup> the group was type Dac with an area of 430 millionths and just west of the CM. The group was bi-polar comprising of several moderately sized irregular sunspots. On subsequent days the group reduced in size and number of sunspots. By the 9<sup>th</sup> the area was estimated at 260 millionths and type Dso. The group was last reported approaching the SW limb on the 10<sup>th</sup> type Cso.

**AR3712 S24°/168°** formed on the disc on the 12<sup>th</sup> just over the SE limb, type Dao. The group developed substantially on the 13<sup>th</sup> and was type Dkc with an area of 960 millionths on the 14<sup>th</sup>. The group consisted of three irregular penumbral sunspots, the middle one expanding by the 15<sup>th</sup> to give the group an overall area of 1200 millionths and type Ekc. The shape of the group changed as the group progressed reaching the CM on the 16<sup>th</sup> when it had an area of 1300 millionths. By the 19<sup>th</sup> the group had increased to 1460 millionths in area still being classified as the Ekc. On the 20<sup>th</sup> the group was approaching the SW limb but still comprised of three large penumbral sunspots with two faint light bridges being observed across the umbra of the central component. The group was still type Ekc on the 22<sup>nd</sup> when near to the limb and was last reported on the 23<sup>rd</sup> as type Dko before rotating.

**AR3713 S13°/156°** rotated over the SE limb on the 12<sup>th</sup> type Dso to the north-east of AR3712. By the 14<sup>th</sup> the group was type Dsc with an area of 340 millionths, the follower being the largest sunspot with a string of pores extending towards the smaller leader. The group appeared the poor relation to the much larger AR3712, however on the 18<sup>th</sup> the group started to develop and by the following day was a substantial Dac group with an area of 600 millionths. On the 20<sup>th</sup> further rapid development had taken place and the group was now a complex Dkc group with an area of 1190 millionths, due to a large irregular sunspot that had developed in the central area of the group. The group was slightly larger on the 21<sup>st</sup> at 1300 millionths but was of similar appearance. The large sunspot had split the following day and the group was in decay. This decay continued as the group approached the limb, being last reported on the 25<sup>th</sup> as type Dko.

**AR3716 N10°/162°** was the third group completing the impressive display during the middle of the month. The group formed in the northern hemisphere over the NE limb on

the 13<sup>th</sup> completing the line-up with AR3712 and AR3713. Initially the group was of type Dao but started to expand on the 15<sup>th</sup> to type Dsi. Further development took place with the group being type Dac with an area of 540 millionths by the 17<sup>th</sup> as it approached the CM. There was further development into the NW quadrant becoming type Eac on the 20<sup>th</sup> with an area of 650 millionths, comprising of several irregular penumbral sunspots throughout the group. The group rotated around the limb on the 23<sup>rd</sup> with the follower sunspot only being seen late in the day, type Hsx.

**AR3722 S10°/028° & AR3724 S13°/028°** were reported over the SE limb on the 22<sup>nd</sup> as a close pair of Hsx type sunspots, aligned north-south. Due to the closeness of these two small penumbral sunspots, they formed one group, however each received a Boulder number. The sunspots both persisted unchanged as they traversed the disk and were still visible in the SW quadrant at the end of the month.

**AR3727 S18°/353°** rotated over the SE limb on the 24<sup>th</sup> as an Hsx type sunspot. Although not particularly notable, the group was the third apparition of AR3664/3697 in a much reduced form. The group sprouted occasional pores over the coming days to give a Cso classification and was approaching the CM by the end of the month.

**AR3729 S03°/333°** rotated over the NE limb on the 26<sup>th</sup> close the solar equator. The group was a Dso type group which became quite extended in longitude over the coming days, due to a detached penumbral follower sunspot. The group was type Eao by the 28<sup>th</sup> and showed further development between the follower and the leading sunspots by the 30<sup>th</sup>.

24 observers reported a Quality number of **26.22** for June.

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

### **Prominences**

20 observers reported a prominence MDF of **7.40** June.

The western limb sported a variety of small prominences on the 1<sup>st</sup>, several on the NW limb extending into a fine platform arch prominence the following day, extending for about 100,000 km. A second platform arch prominence on the SW limb extended for 50,000 km and another was noted on the SE limb.

A weather sock type prominence was reported on the eastern limb on the 7<sup>th</sup> along with a long low hedgerow prominence on the SW limb extending for about 130,000 km. This latter prominence was much taller on the 8<sup>th</sup> but thereafter reduced.

A large prominence was reported on the NE limb on the 13<sup>th</sup> and a large and complex prominence was seen on the SE limb. Both persisted through to the following day.

On the 16<sup>th</sup> a long hedgerow prominence was on the E limb rising to about 50,000 km and extending around the limb for 140,000 km.

Prominences were generally quieter until the 27<sup>th</sup> when a substantial bush type prominence was on the SE limb. Two small arches could be clearly seen within the structure the following day.

Three complex prominence hearths were seen stretching across the southern polar region on the 28<sup>th</sup> which persisted in various forms through to the end of the month.

### **Filaments & Plage**

18 observers reported a filament MDF of **9.10** and 15 observers reported a plage MDF of **6.17** for June.

The month opened with a long-broken filament extending from the SE limb towards the NW quadrant, terminating to the south of AR3699. Another long broken, but fainter filament extended from the CM through the SW quadrant to the SW limb. A much shorter curved filament was seen in association with AR3697. These features remained constant through to the 4<sup>th</sup> when the fainter of the two long filaments rotated around the SW limb. The stronger of the two long filaments reached the limb on the 6<sup>th</sup>, the leading portion forming the long low prominence hearth on the SW limb on the 7<sup>th</sup> and the higher structure on the 8<sup>th</sup>. The curved filament with AR3697 persisted to the SW limb.

On the 15<sup>th</sup> a prominence hearth on the E limb started to progress onto the disk as a filament. By the 16<sup>th</sup> this feature formed a long thick filament measuring around 150,000 km in length.

The filament made impressive progress across the southern hemisphere reaching a length estimated at 350,000 km by the time it was approaching the SW limb on the 24<sup>th</sup>. However, it was not seen rotating around the limb on the following day and assumed to have been ejected.

A shorter filament was seen extending into the SE quadrant from the limb on the 24<sup>th</sup> which rotated across the quadrant, becoming thicker and broken by the 27<sup>th</sup>. The feature was approaching the CM by the 28<sup>th</sup> but thereafter reduced and dissipated into the SW quadrant. Plage accompanied most sunspot groups throughout the month.

**CaK**

From 13<sup>th</sup> through to the 19<sup>th</sup>, centred at N10°/220°, an east-west bar of CaK emission persisted, eventually rotating over the NW limb. Also, from 25<sup>th</sup> to the end of the month, a similar east-west bar of emission was noted at N17°/125°. Generally, extended areas of CaK emission were seen around the many sunspot groups during the month.

CaK MDF **8.00** (20 days) Brian Mitchell.

**Flares**

Numerous flares were reported by members throughout the month. No X class flares were recorded. Lyn Smith reported an M2.6 flare on the 5<sup>th</sup> at 1000 UT associated with AR3697; Brian Halls recorded an M4 flare and surge prominence on the 6<sup>th</sup> at 0805 UT associated with AR3709; Andy Devey reported M class flares on the 3<sup>rd</sup>, 5<sup>th</sup>, and 10<sup>th</sup> and an M1 class flare associated with AR3712 at 0807 UT on the 17<sup>th</sup>. Two further M class flares were recorded by Andy from AR3712 one on the 22<sup>nd</sup> at 0855 UT and the other on the 24<sup>th</sup> at 1559 UT.

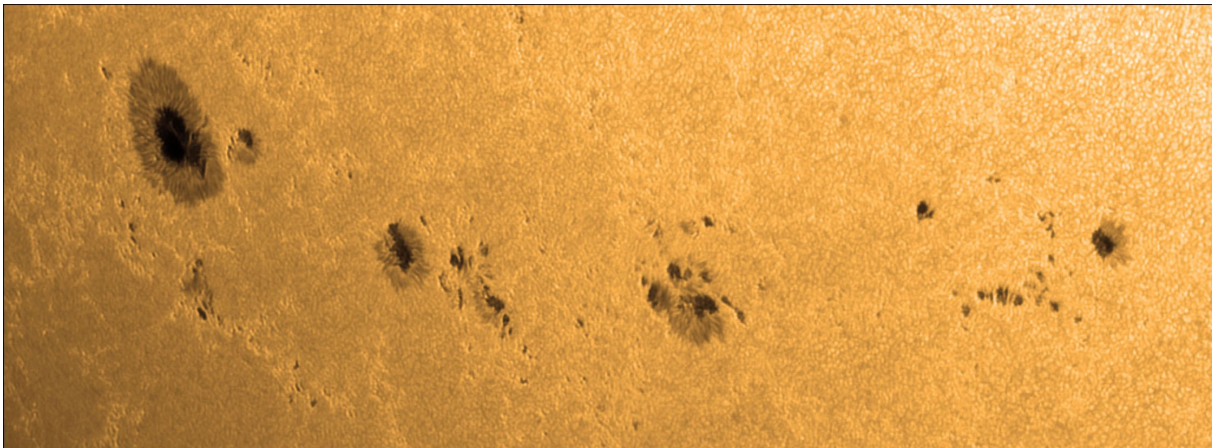
**Polar Faculae** – no polar faculae were reported.

**MAGNETOMETER REPORT**

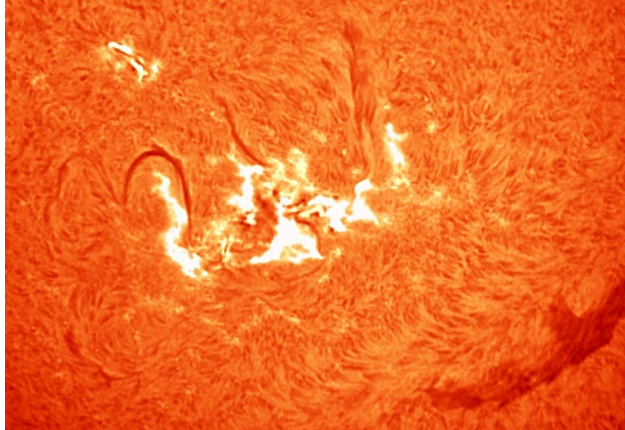
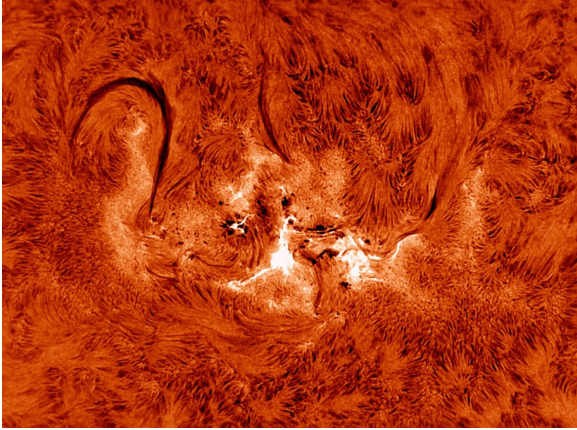
**2024 JUNE**

DATE	DURATION (UT)		ACTIVITY	
7	11:30	17:00	Disturbed	
7/8	22:00	04:00	Disturbed	
10	18:00	20:00	Disturbed	
11	00:15	08:00	Disturbed	
15	07:45	17:00	Disturbed	<b>Solid-state magnetometer Uncalibrated John Cook</b>
15/16	22:00	00:30	Disturbed	
16	11:00	21:00	Disturbed	
17	01:30	09:00	Disturbed	
17	19:30	23:30	Disturbed	
18	06:30	16:30	Disturbed	
23	06:30	10:00	Disturbed	
28/29	21:30	16:00	Disturbed	
30	22:00	23:15	Disturbed	

**Below:** Left to Right, AR3727, AR3728, AR3723 imaged by Simon Dawes on 20240626 at 0705 UT using Meade 127mm refractor, Baader Herschel wedge, Televue 4x Powermate, GPCAM II





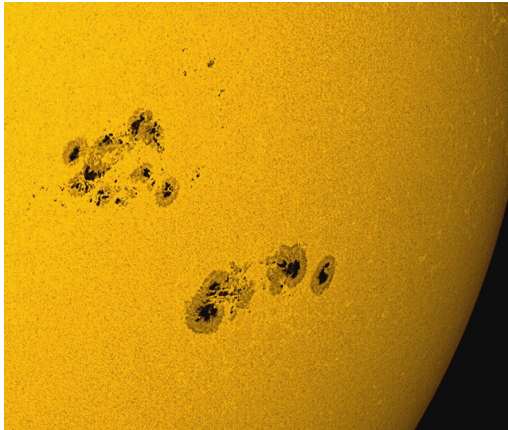
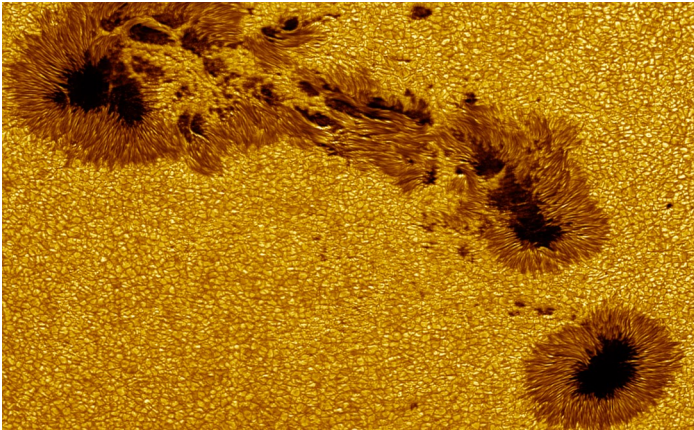


**Above Left:** Pre-flare image of AR3697 at 0944 UT 20240602 by Carl Bowron using 120mm OG, Daystar Chromosphere, ZWO ASI 183 mm camera.

**Above Right:** C6;0 flare from AR3697 imaged by Mick Nicholls 20240602 at 1012 UT

**Below Left:** AR3712 imaged by Luigi Morrone at 0853 UT 20240618 using C14 EDGE 355mm

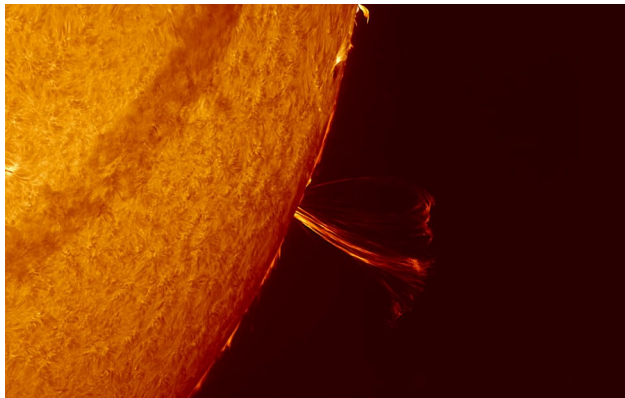
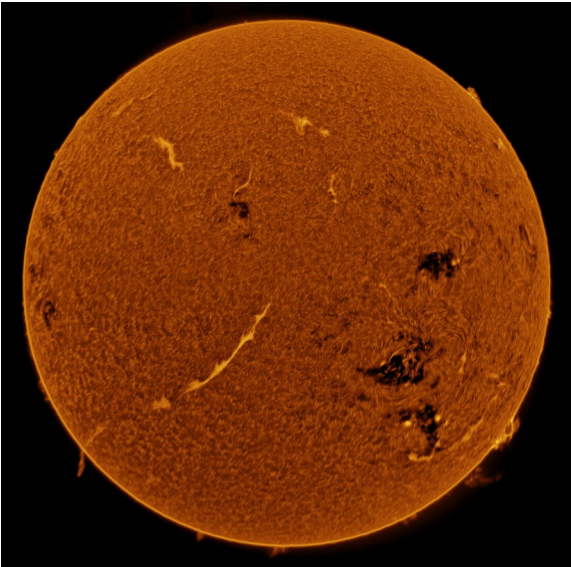
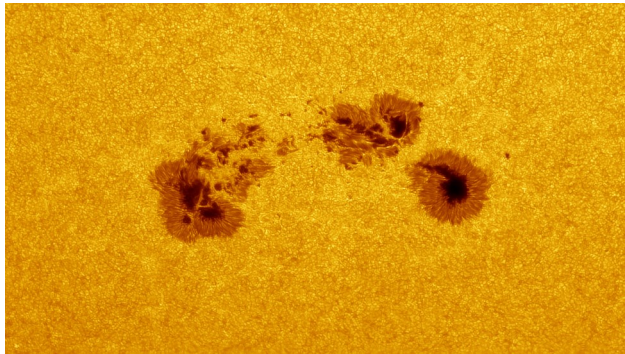
**Below Right:** AR3712 and AR3713 approaching the western limb on 20240620 image by Brian Halls at 0914 UT



**Right:** AR3712 imaged G band 24th 1500 UT

**Below Right:** Eruptive prominence captured by Gary Palmer on 20240624

**Below:** Full disk (inverted) in H-alpha by Dave Smith imaged on 20240620 at 0742 UT





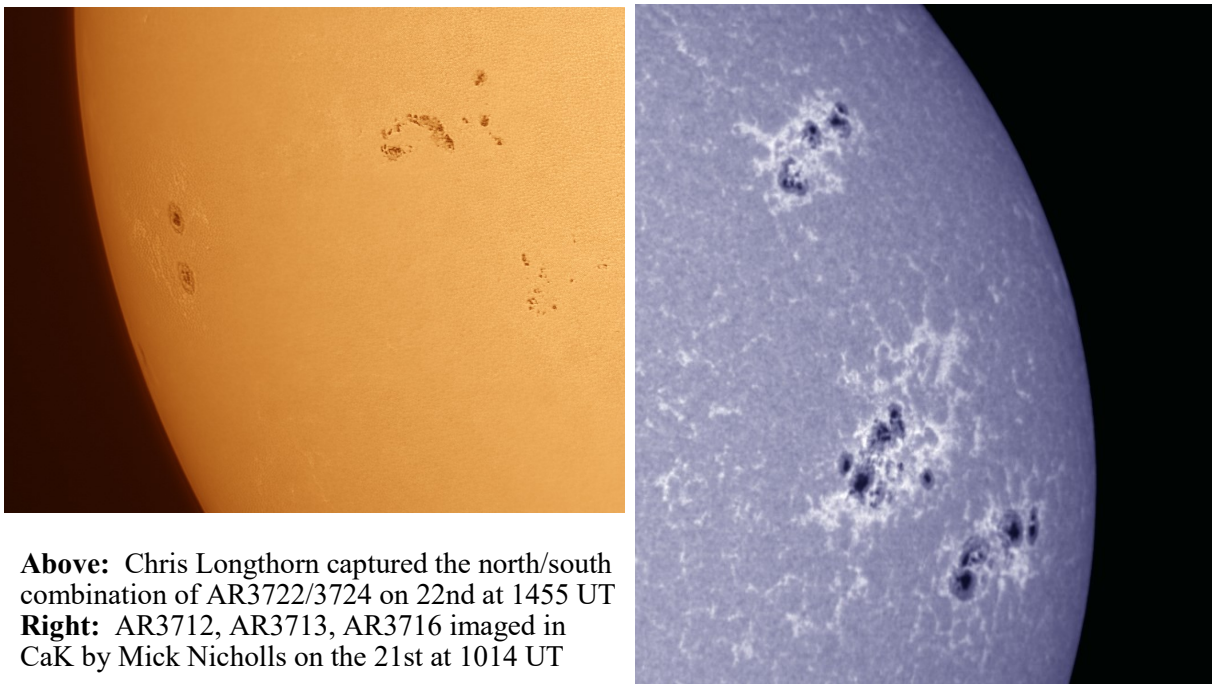
# Section News

Thank you to everyone that both contributed and attended the last Section meeting. If you would like to catch up then the recording can be accessed by pasting the below link into your browser. You will need the password to access. Please note this link will not be available for long.

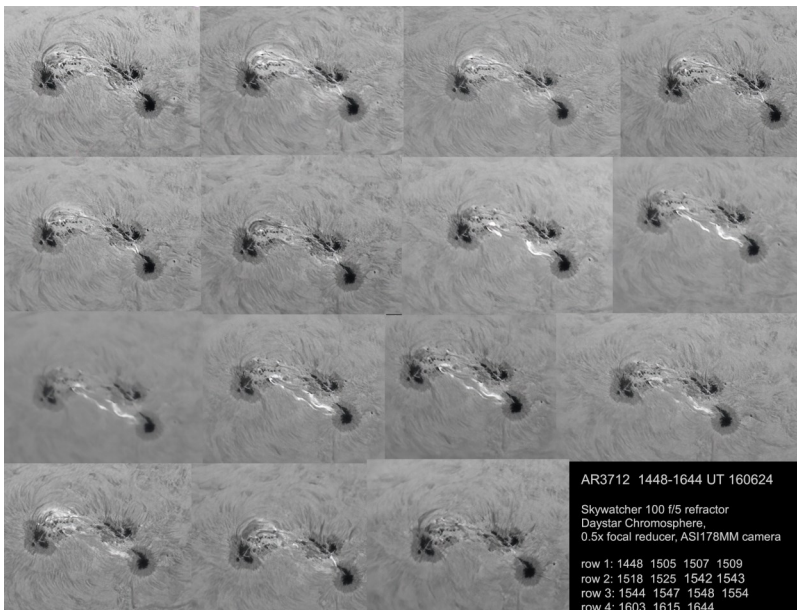
[https://us02web.zoom.us/rec/share/eL87BqLgTc5VyPa9JdoYNGXOki-6AhQXBpVNBrUwq-t9lqaXJLMs\\_qVmUkV0ughh.a090qJxBOOs7u6w9](https://us02web.zoom.us/rec/share/eL87BqLgTc5VyPa9JdoYNGXOki-6AhQXBpVNBrUwq-t9lqaXJLMs_qVmUkV0ughh.a090qJxBOOs7u6w9)

Password: =^E%3zh1

The Section imagers have been busy with the Sun so active. 461 images were received during the month for archiving. A small selection reflecting June activity is produced in the newsletter but many more can be viewed on the Section's webpages.



**Above:** Chris Longthorn captured the north/south combination of AR3722/3724 on 22nd at 1455 UT  
**Right:** AR3712, AR3713, AR3716 imaged in CaK by Mick Nicholls on the 21st at 1014 UT



**Left:**  
A fine sequence by John Arnold showing AR3712 on 20240616 between 1448—1644 UT.  
Skywatcher 100 f/5 Refractor  
Daystar Chromosphere  
ASI 178mm camera

AR3712 1448-1644 UT 160624  
Skywatcher 100 f/5 refractor  
Daystar Chromosphere,  
0.5x focal reducer, ASI178MM camera  
row 1: 1448 1505 1507 1509  
row 2: 1518 1525 1542 1543  
row 3: 1544 1547 1548 1554  
row 4: 1603 1615 1644