

MONTHLY BULLETIN ON SOLAR PHENOMENA

Tokyo Astronomical Observatory

Explanatory Note

This note gives the explanation of the data contained in the "Monthly Bulletin on Solar Phenomena" issued by the Tokyo Astronomical Observatory. The Bulletin is available free of charge on a data exchange basis.

1 Relative Sunspot Numbers

The observation of sunspots is carried out visually and photographically with a 20 cm refractor. Sunspot numbers are counted on a projected solar image of 24 cm diameter. The column in the table are as follows :

- 1) Date
- 2) g = Number of sunspot groups
- 3) f = Total number of distinct spots. Umbrae and penumbrae are counted separately
- 4) R = Relative sunspot number defined as $R = k (10g + f)$. The reduction factor k is adopted to be 0.72 from 1 January 1960.

2 Hours of $H\alpha$ Patrol

The $H\alpha$ patrol observation is made with a monochromatic heliograph (SECASI, band-width 0.75 Å). The table summarize the intervals in U.T. when the $H\alpha$ filtergrams are available.

3 Solar Flares

The solar flare data are presented in the table, which contains the following information :

- 1) Date
- 2) Beginning time in U.T. The figure in parentheses indicates the beginning time of the observation (not the flare)
- 3) Ending time in U.T. The figure in parentheses indicates the ending time of the observation (not the flare)
- 4) Time of maximum brightness in U.T.
- 5) Heliographic latitude in degrees
- 6) Central meridian distance in degrees

7) Importance of the flare on the I.A.U. dual classification scheme summarized below :

Corrected area (in square degrees) of the flare region at the time of maximum brightness	Relative intensity evaluation at the time of maximum brightness		
	faint	normal	bright
1.0 - 2.0	Sf	Sn	Sb
2.1 - 5.1	1f	1n	1b
5.2 - 12.4	2f	2n	2b
12.5 - 24.7	3f	3n	3b
> 24.7	4f	4n	4b

- 8) Nature and completeness of observations
 C = A complete, or quasi complete, sequence of photographs was obtained
 P = One or few photographs of the event were obtained resulting in incomplete time coverage
 V = All (or most of) the development of the flare was visually observed
 S = The flare was seen visually for a small part of its probable duration

Combination of two symbols may be used for intermediate circumstance

- 9) Time of area measurement in U.T.
 10) Apparent (i.e. projected) area in millionths of the solar disk (not hemisphere)
 11) Corrected area in square degrees evaluated by "sec θ -law" for flares less than 65° from the center of the solar disk. For flares near the limb, the corrected area is not listed, but the first importance figure is estimated from the apparent area by the following relationship :

Importance	Apparent area			
	65°	70°	80°	90°
limit S - 1	90	75	50	45
limit 1 - 2	280	240	180	170
limit 2 - 3	600	500	350	300

- 12) Group number and type of the nearest sunspot group as assigned by our observatory
 13) Remarks in the following system :

A = Eruptive prominence for which the base has a heliocentric distance of at least 90°
 B = Probably the end of a more important flare
 C = Invisible 10 minutes before
 D = Brilliant point
 E = Two or more brilliant points
 F = Several eruptive centers
 G = No spots visible in the neighborhood
 H = Flare with high velocity dark surge
 I = Very extensive active region
 J = Plage with flare shows marked intensity variations
 K = Several intensity maxima
 L = Filaments show effects of sudden activation
 M = White light flare
 N = Continuous spectrum shows effects of polarization
 O = Observations have been made in the calcium II lines H or K
 P = Flare shows helium D_3 in emission
 Q = Flare shows the Balmer continuum in emission
 R = Marked asymmetry in $H\alpha$ line
 S = Brightening follows disappearance of filament (same position)
 T = Region active all day

U = Close and somewhat parallel bright filaments (II or Y shape)
 V = Occurrence of an explosive phase
 W = Great increase in area after time of maximum intensity
 X = Unusually wide H α emission
 Y = Onset of a system of loop-type prominences
 Z = Major sunspot umbra covered by flare

4 Prominences and Filaments

The data on prominences and filaments are summarized in the table, whose contents are as follows :

- 1) Date
- 2) Phenomenon
 - DSD = Dark surge on disk
 - BSL = Bright surge at limb
 - ADF = Active dark filament
 - APR = Active prominence region
 - EPL = Eruptive prominence at limb
 - SDF = Sudden disappearance of filament or prominence
- 3) Importance

DSD, BSL		
Importance		Apparent length
1		5 - 10 % R \odot
2		10 - 20 % R \odot
3		20 - 40 % R \odot
3 ⁺		> 40 % R \odot
ADF, APR, EPL		
Importance		General activity
1		Clear indication of activity
2		High activity
3		Very high activity
SDF		
Importance		Greatest extension before activation
1		10 $^{\circ}$ - 20 $^{\circ}$
2		20 $^{\circ}$ - 40 $^{\circ}$
3		> 40 $^{\circ}$
- 4) Beginning and ending times in U.T. The figure with parentheses shows the beginning or ending time of the observation (not the phenomenon)
- 5) Heliographic latitude and meridian distance in degrees
- 6) Remarks in the following code :
 - For phenomena except SDF ;
 - A = Not associated with flare
 - B = Associated with S or 1 flare
 - C = Associated with 2 flare
 - D = Associated with 3 or 4 flare
 - E = Outgoing sightline velocities > 50 km/s
 - F = Tangential velocities > 50 km/s
 - G = Associated with large sunspots
 - H = Associated with yellow coronal emission
 - For APR only ;
 - J = Loop prominence of small activity
 - K = Loop prominence of medium activity
 - L = Loop prominence of high activity

- M = Downflowing streamers (coronal rain) without clear focus of material
 - N = Downflowing streamers with focus of material. Position of the focus is indicated in the "Position" column
 - P = Sprays at limb of small magnitude
 - Q = Sprays at limb of medium magnitude
 - R = Sprays at limb of high magnitude
- For EPL only ;
- S = With maximum height < 40 % R
 - T = With maximum height > 40 % R
 - V = With unusually high velocity. The velocity is indicated as V (km/s)
- Photographic material (H α filtergram) available ;
- W1= Good individual photographs of the phenomenon
 - X1= Good cinematograms of the phenomenon
- For SDF :
- 1 = Photographic recordings of the phenomenon are available
 - 2 = A flare was observed in the neighborhood before integration started
 - 3 = A flare was observed at nearly the same position as the filament shortly after its disappearance
 - 4 = Surges penetrated the object before disintegration started
 - 5 = Another filament (prominence) approached the object before disintegration started

5 Coronal Emission Line 5303 A

The solar corona is observed with a coronagraph of 10 cm aperture at the Norikura solar observatory. The intensity of the emission line 5303 A is measured every 5 degrees of position angle. The results, presented in tabular form, give the following information :

- 1) Date
- 2) Time in U.T. (mean of the start and end time of the observation)
- 3) Heliographic position angle
- 4) Intensity in units of millionths of the center of the sun's disk as measured at the same wavelength
 - = no observed emission, or emission is below the threshold of detectability
 - x = no observations made