

White light Mean Daily Frequencies, 2001 December

Observer	AA				R		Q	
	North	South	Total	Days	Total	Days	Total	Days
R. Dryden	5.3	5.1	10.3	15	166.1	15	-	-
A. Gabriël	4.6	4.5	9.1	16	152.1	16	-	-
G. Johnstone	4.4	5.4	9.8	14	-	-	-	-
P. Meadows	5.5	5.9	11.3	13	175.4	13	32.8	13
K. Medway	4.3	3.9	8.2	24	-	-	-	-
G. North	5.5	4.5	10.0	8	186.1	8	-	-
E. Richardson	5.9	4.7	10.4	15	143.8	15	21.3	15
J. Shanklin	5.0	5.3	10.3	16	157.0	16	-	-
D. Storey	4.0	6.7	10.7	3	-	-	-	-
E. Strach	4.2	4.5	8.6	20	154.4	16	26.3	20
MEANS	4.8	4.8	9.6	144	159.9	99	26.5	48

AA = active areas, R = sunspot number, Q = mean quality estimate (JBAA 98,6,pp282-286)

White light activity, 2001 December

White light activity during the month remained at a high level and at a similar level to that of the last six months.

Activity at the start of the month was particularly high. The largest group seen by Meadows on the 1st was just past the central meridian at N05/138 which was of type Ekc with an area of 680 millionths. The main leading spot had a thin region of penumbra extending towards the following part of the group. There were also several small spots surrounding the group including one that Strach reports was lying just 1° N of the equator. When the group was last seen by Meadows on the 4th, the total area had reduced to 510 millionths due mainly to the decay of the central penumbral region. Another Ekc group was reported by Meadows on the 1st at S06/87 with an area of 410 millionths; this comprised of three irregularly shaped penumbral spots at the leading, middle and following parts of the group together with a few smaller spots. On the 4th, this group had just passed the central meridian and its area had increased to 630 millionths due to an increase in the number of penumbral spots throughout the group. When seen on the 6th, the total area had increased further to 790 millionths as the leading and middle penumbral spots had increased in size. By the following day, the 7th, Meadows observed that the middle penumbral spot had rapidly decayed while the leading spot had reduced as well; the group was now of type Dkc with an area of 510 millionths.

On the 4th Meadows observed a high latitude Bxo group at N37/82. By the 6th it had developed into a Dsi group with an area of 80 millionths and then into an Eao group by the 7th with a slightly larger area of 90 millionths. On the 8th Strach reports observing two high latitude spots at N35/56 and N37/75.

Although the number of groups had reduced by the 10th, there was another moderately sized group on the disk. This was seen by Meadows at S20/21 and it was of type Dki with an area of 500 millionths. Observations by Meadows after the 10th showed a slightly extended group on the 11th (now type Ekc) with a slightly larger area due to a larger leading spot. On the 14th, the group was of type Eko near the western limb. Strach reports that a curious group was seen on the 10th. The penumbral leader was at N13/317 whilst the complex follower was in the shape of an arc of 8 spots, some penumbral, at around N12/304. On the 12th this pattern was changed when the follower arc broke up and its spots developed penumbrae, outshining that of the leader. It crossed the central meridian on the 14th when it started to decay. It crossed the western limb on the 20th. The maximum area was estimated by Meadows to be 390 millionths on the 10th.

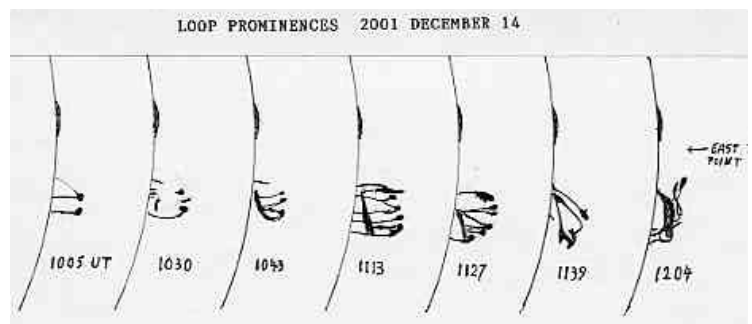
On the 16th Strach observed a group near the eastern limb at N08/214 which developed into an Eai group on the 19th, with one large penumbral spot. Immediately after crossing the central meridian on the 22nd it developed further and sported 4 penumbral spots. On this date Meadows notes that the three main penumbral spots were seen within a region of 10° by 10° and the total area had doubled from the 20th to 680 millionths. On the 23rd Meadows observed that additional small penumbral spots had appeared to make the group type Fkc with an area of 890 millionths; the two largest spots were at the same longitude at the leading part of the group separated by 5° in latitude. Observing on the 25th, Strach classified it as a Fki group containing 37 individual spots. On the 26th Meadows observed that the group had changed substantially with there being one large main leading spot and one small following penumbral spot together with a few other spots. The leading spot appears to have formed by the merger of the two leading spots seen on the 23rd; the spot covered 8° in both latitude and longitude but because of foreshortening, as the group was now nearing the western limb, this spot appeared to be elongated in latitude.

Ha activity, 2001 December

Medway comments that in contrast to previous months, prominence activity was at a high level, with activity well distributed across the sunspot zones and up to $\pm 70^\circ$. Meanwhile, Strach comments that the prominence count has remained at the high level that has prevailed since November 1998.

Strach observed many outstanding prominences during the month. On the 2nd a short but thick tree trunk prominence was seen at S33 on the W limb; its top spread northwards for some 12° and southwards for 7° . At S40 a large curved prominence seemed like a barrier to the main structure but unconnected with it. On the 8th a dense almost square prominence was seen by Strach at 0° to N07 on the W limb whilst at N26 a giant roman number IV was seen. Also in the W a dense candle-like prominence was seen at S63. The 14th produced a mere 2 prominences but one of them was of great interest as it generated loops, often seen like condensation at the tips of stalks which is caused by the tips turning sharply towards the limb. Strach followed these constantly changing loops from 1005 to 1222 (see sketches below). On the 25th, Strach observed a detached prominence crossing the E point from N01 to N11; its most northerly part being 45,000 km distant from the solar limb. Medway observed a really beautiful prominence on the 26th on the NE limb at N04. This took the form of a spectacular arch with, at its base, a broad mound. Strach comments that perhaps the most remarkable prominence he observed during the month was seen on the E limb at S31 on the 28th at 1115. It resembled a giant bird in flight, its beak picking up something from the solar limb. At 1130 the northern 'wing' started to separate and it fragmented at 1205. On the 29th Strach observed another loop prominence on the E Limb. At 1015 it was seen as a low arc extending from S20 to S27. At 1045 it became a higher arc with three slender jets emerging to variable heights. There were rapid changes in its appearance and at 1140 the summit of the original arc sharpened to a point and formed a condensation whilst the three slender jets developed condensations at their tips, typical of loops. As expected, a sunspot was seen on the 30th at S22/18. Both Strach and Medway observed, on the 30th, huge arc prominences in the NE extending from N15 to N52. Some remnants of them were observed by Strach on the 31st extending from N30 to N48. On the 30th Medway observed a minor prominence eruption on the SE limb at 1126 adjacent to a small pair of sunspots close to the SE limb.

Many filaments were seen by Strach during the month with an outstanding one being a large S shaped structure in the NE quadrant on the 10th. It was still present on the 12th when its southern part had reached the CM. Strach saw it last on the 17th close to the W limb. A dense and broad filament was seen by Strach in the NW on the 29th. On the 31st it had reached the W limb at N20 to N31 and was seen as part prominence and part filament. An inverted L shaped filament was seen by Strach near the E limb starting at N31 on the 29th, extending to the W and then southwards. It was still seen by him on the 30th and 31st.



2001 December 14. Loop Prominence on the Eastern Limb. Eric Strach.

Flares, 2001 December

Date	Time UT	Lat.	CMD	Type	Obs.	Date	Time UT	Lat.	CMD	Type	Obs.
4	1140	S07	W03	SF	EHS	15	0926	N17	W10	SN	AG
9	1121	N01	W70	SN	KJM	20	0932	N11	E18	1F	AG
9	1123	S22	W03	SN	KJM	20	1105	N12	E13	SF	EHS
10	0933	S23	W25	1N	AG	22	1325	N18	W03	SF	KJM
12	1225-1240	N16	E27	SF	EHS	26	1104	N09	W60	SF	KJM
14	0922	N18	E05	SN	AG	28	1115	S08	W02	SF*	EHS
14	1203	N12	E04	SF	EHS	28	1115	S09	E10	1N*	EHS

* Strach wonders if these were the end of a major flare.

Prominence Mean Daily Frequencies, 2001 December

Observer	All Latitudes				0-40°			40-90°		
	North	South	Total	Days	North	South	Total	North	South	Total
A. Gabriël	5.0	5.0	10.0	13	4.6	4.2	8.8	0.4	0.8	1.2
K. Medway	7.8	5.5	13.2	10	5.9	4.2	10.1	1.9	1.3	3.2
E. Strach	5.0	4.8	9.8	15	4.1	3.4	7.5	0.9	1.4	2.3