

## 6. Preliminary Report on Airglow Observations at 5577 Å made at Mt. Abu in 1957-1958

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**Abstract**—In this report, the observations on airglow intensities at 5577 Å made at Mt. Abu ( $24^{\circ}.6$  N) towards the pole in the first half of 1957 and 1958 are summarized. There are significant diurnal and seasonal variations. In the winter months, the maximum intensity occurs 1 or 2 hr before midnight, while in the equinoctial months March-May, the maximum intensity occurs at a later hour, shortly after midnight, and its value is also greater. There are large day-to-day variations of intensity in all the months.

Airglow observations on 5577 Å, 5300 Å, 6300 Å and 5893 Å using RCA and EMI photomultipliers and interference filters transmitting about 150 Å round the specified wavelengths have been carried out at Mt. Abu ( $24^{\circ}.6$  N) since the end of 1956.

The present report deals with observations on 5577 Å with the photometer directed towards the pole. The angle of aperture of the instrument was about  $15^{\circ}$ . The d.c. current from the photomultiplier was amplified and recorded on a recording milliammeter. The voltages were kept constant, and the readings were standardized daily against the deflections caused by a radioactive luminescent source.

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The measurements were made on all nights on which the sky was cloudless or lightly-clouded on about 15 days round the new moon. The daily curves obtained in February and May 1958 are shown as samples (Fig. 1). It will be seen that there are large variations of intensity from day-to-day but there was a clear tendency for the maximum intensity to occur 1 or 2 hr before midnight in February and at, or

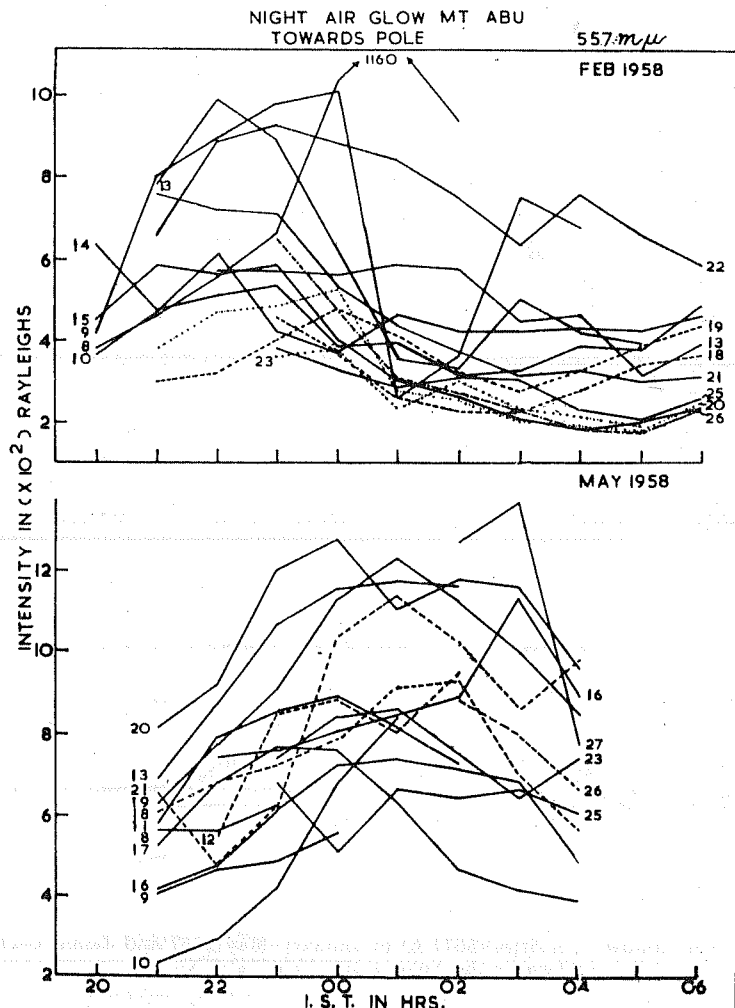


Fig. 1. Variation of airglow intensity (5577 Å) at Mt. Abu on different nights in February 1958 and May 1958.

slightly after, midnight in May. The day-to-day and diurnal variations of 5300 Å were much smaller.

The mean intensities observed in the months January to May 1957 and January to June 1958 are shown in Fig. 2. Observations could not be obtained in the monsoon months owing to cloud and rain. In both the years, the mean intensity was minimum in January, February and maximum in April, May.

The Abu photometer was calibrated against Dr. ROACH's travelling standard photometer when he visited India in May 1958 (ROACH, 1958).

All the readings recorded in 1957 and 1958 with the photometer directed towards the pole were reduced to Rayleighs. The total number of days on which observations were available at each hour of the night in January–February 1957 and 1958

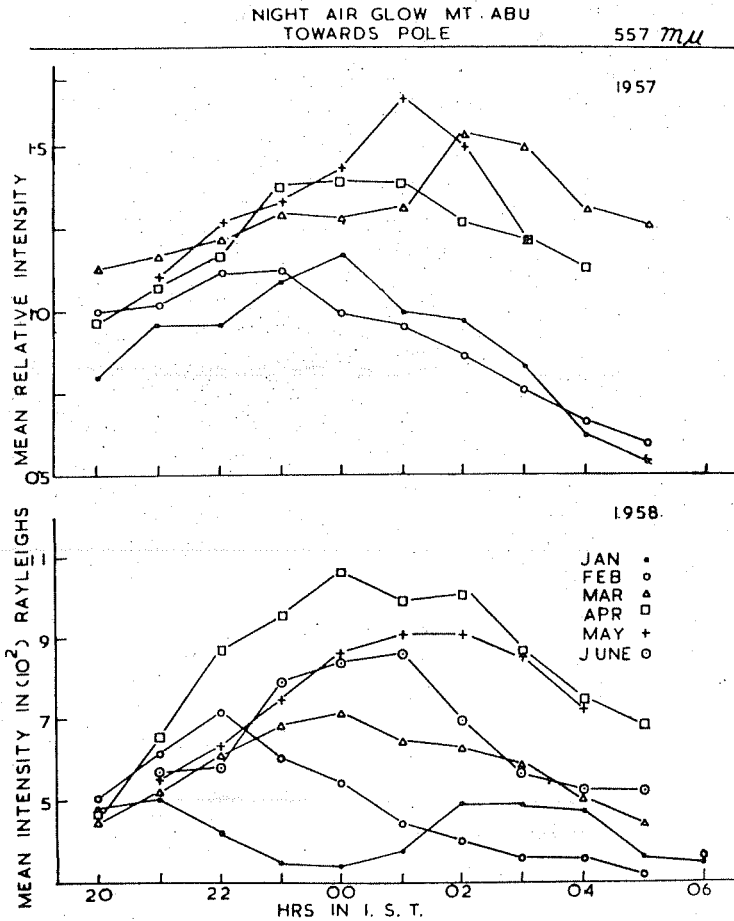


Fig. 2. Mean airglow intensities (5577 Å) in January–May 1957 and January–June 1958 towards the Pole at Mt. Abu (24°·6 N).

and in March–May 1957 and 1958, and also the highest and lowest values recorded at each hour are given in Table 1. The intensities towards the zenith will, on the average, be smaller by a factor of 2.

To bring out the differences in the intensities of the airglow (5577 Å) and in their diurnal variations in the months January–February and in March–May, curves are drawn in Fig. 3 showing the limiting values of intensity in Rayleighs, which were exceeded on 25 per cent, 50 per cent and 75 per cent of the days of observation at different hours of the night. The highest and lowest values recorded at each hour are also marked on the same diagram. It is clearly seen that in January–February,

Table 1. Total number of observations in January–February and in March–May 1957 and 1958 and the highest and lowest values of intensity (in Rayleighs) recorded towards the pole

Jan.–Feb. 1957–1958	Time (hours) 75° EMT										
	2000	2100	2200	2300	2400	0100	0200	0300	0400	0500	0600
<i>n</i>	20	36	39	47	47	46	46	45	43	40	26
Max.	796	1110	1470	1270	1199	1176	1033	970	980	970	913
Min.	310	265	215	120	175	175	225	170	170	160	125
March–May 1957–1958											
<i>n</i>	17	39	56	61	61	57	54	45	42	22	0
Max.	1294	1317	1246	1459	1602	1602	1578	1625	1388	1015	—
Min.	300	227	292	417	464	425	410	369	265	274	—

*n* = number of observations, max. = highest value, min. = lowest value.

the mean maximum air glow intensity (5577 Å) occurs at Mt. Abu about 1 or 2 hr before midnight and decreases thereafter in the early morning hours, reaching a value lower than in the early hours of the night, while in March–May, though the values at sunset start at about the same level as in January–February, the maximum

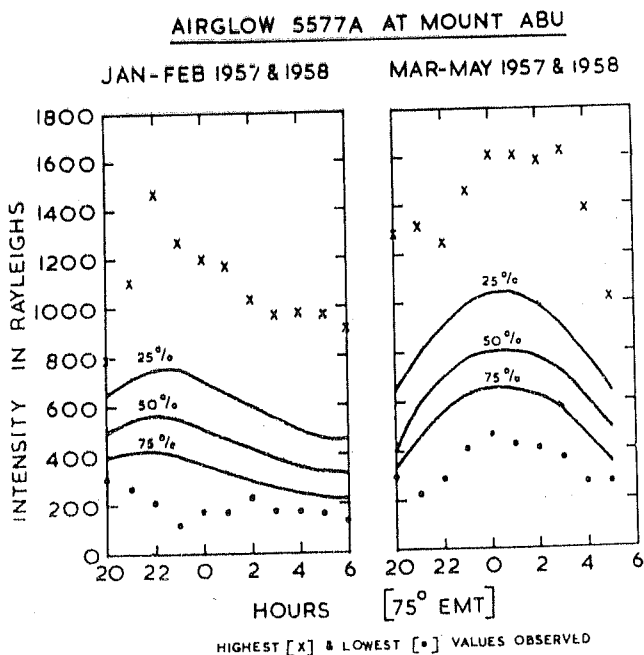


Fig. 3. Limiting values of airglow intensity (5577 Å) towards the Pole at Mt. Abu, in Rayleighs, which were exceeded on 25, 50 and 75 per cent occasions at different hours of the night in January–February and March–May 1957 and 1958.

value is higher and occurs after midnight. The subsequent pre-dawn value is, on the average, nearly the same as the post-sunset value.

It has not so far been possible to detect any variation of airglow intensity (5577 Å) with magnetic disturbances. More data are being collected and are being subjected to detailed analysis.

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#### *Reference*

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