LETTERS TO THE EDITOR

RADIOWAVE FADING AT WALTAIR DURING I.G.Y.

FADING analysis of the ionospheric drift records taken during the International Geophysical Year (I.G.Y.) at Waltair (17° 43′ N; 83° 18′ E; Geo. Mag. Lat. 7·4° N.) was carried out and the results have been reported earlier (Rao and Rao[1]). Further results obtained are presented in this communication. Following the method given by Rice[2] the fading frequency is calculated in cycles per minute by counting the number of peaks per minute in a fading record. About 350 records taken on 2·3 Mc./sec. in the E region and 300 records taken on 5·6 Mc./sec. in the F_2 region during magnetically quiet days were analysed.

With a view to study the difference in fading frequency during daytime and night time, all the fading frequency data taken on 2·3 Mc./sec. was separated into daytime (0700–1800 hours) and night time (1900–0600 hours) data. Night time records were taken on E_s reflections. The average fading frequency in the E region during daytime and night time was found to be 10·96 and 14·62 cycles/minute respectively. The observed increase in the fading frequency during night time is in conformity with the result of Millman,[3] who arrived at a similar conclusion from a study of fading data taken on a frequency of 150 Kc./sec. The observed increase in the fading frequency during night time may partly be due to the ionisation produced by meteors in the upper layers of earth's atmosphere. It would be worthwhile here to quote Rao and Rao[4] who reported positive correlation between meteor activity and E region fading. It has already been reported that at Waltair drift speed is greater during night compared to daytime (Rao and Rao).[5] Part of the increase in fading frequency can therefore be attributed to the larger drift speeds observed during night time. A similar analysis in the case of F_2 region reflections taken on 5·6 Mc./sec. was carried out and the average fading frequency during night time and daytime came out to be 11·22 and 8·37 cycles/minute respectively. The observed increase in the night time value of the fading frequency may be due to the presence of spread echoes at night time in the F region levels, which is more frequent at Waltair during I.G.Y.

Rao and Rao[1] from a study of the diurnal variation curves of fading frequency and drift speed in the E region at Waltair and Yamagawa concluded that the diurnal variation of fading frequency may be used as a fairly good index of the diurnal variation of drift speed. In order to test whether this is true in the case of F_2 region, the values of fading frequency available at intervals of one hour are averaged and these values are plotted against local mean time (LMT) (Fig. 1). The values of drift speed

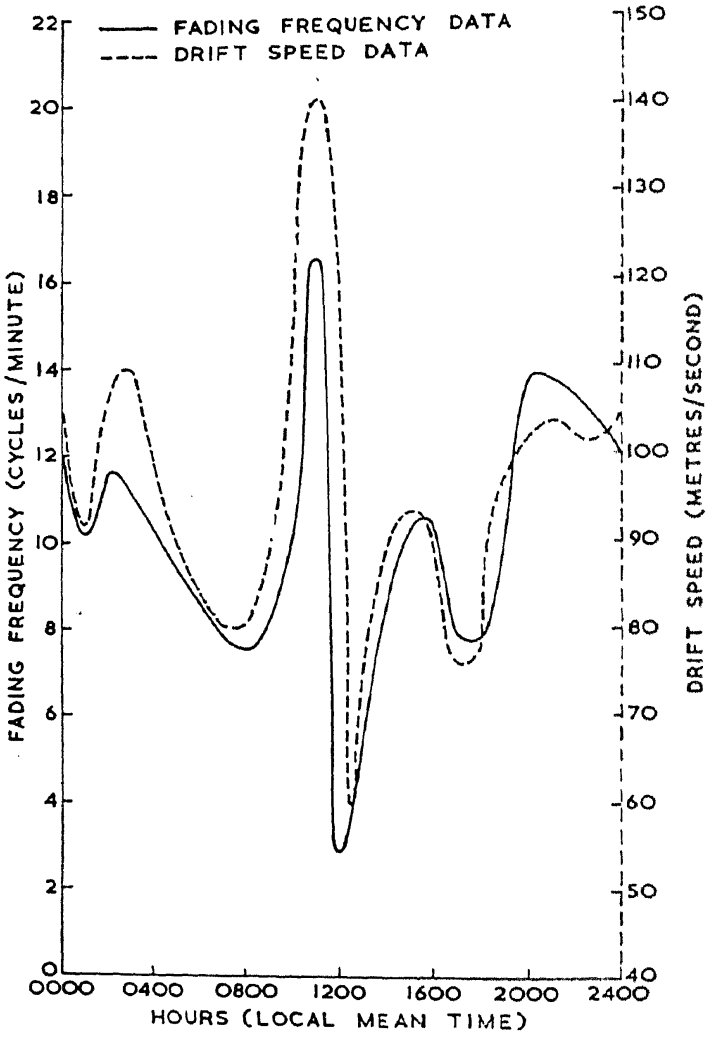

FIG. 1. Diurnal variation of fading frequency and drift speed in the F_2 region.

(calculated by the 'Similar fades method' due to Mitra)[6] available at interval of one hour are averaged and the average values are plotted against local mean time in the same figure. It will be interesting to note that these two diurnal variation curves are remarkably similar. In order to establish the extent of similarity statistically, standard statistical methods were used and the correlation coefficient

came out to be 0·84 (P = 0·01 level). From this highly significant correlation, we can definitely conclude that the diurnal variation of fading frequency can be taken as a fairly good index of the diurnal variation of drift speed. As the fading frequency measurement can be made by a very simple technique, this offers a possible method of studying the mean diurnal variation of drift speed without having recourse to elaborate experimental techniques required for drift measurements.

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