DRIFT AND ANISOTROPY OF THE IRREGULARITIES IN THE LOWER F-REGION UNDER MAGNETICALLY ACTIVE CONDITIONS

CORRELATION analysis of Briggs *et al.*[1] and Phillips and Spencer[2] has been applied to the fading records obtained by the spaced receiver method of Mitra[3] on a magnetically disturbed day (28-10-1961), with a view to study the effect of magnetic activity on the drift and anisotropy characteristics of the irregularities in the lower F-region. Observations are available for three different levels of which the lower level of 175 km. is represented by an average value of three independent observations pertaining to that level. Results of the drift and anisotropy characteristics for the three levels, the true heights of which are deduced from manually taken h'-f records by Schmerling's[4] five points method, are presented in Table I along with the corresponding values of the parameters for magnetically quiet conditions obtained from nine sets of observations taken on different days. A detailed comparison has been made of the results presented in this table with a view to study the effect of magnetic activity on the various parameters.

It can be seen from Table I that the true drift speed v is found to decrease and the apparent drift speed v_a is found to increase with magnetic activity. The true drift speed is found to increase with height continuously on quiet days whereas for disturbed days it shows a maximum at 200 km. and decreases on either side. The variation of the apparent drift speed with height is, however, found to be similar for both disturbed and quiet conditions.

The characteristic velocity V_c is found to increase considerably with magnetic activity at the level of 200 km. and decrease at levels below and above 200 km. The variation of V_c with height is found to be similar to that of V for disturbed conditions exhibiting a maximum at 200 km. while for quiet conditions V_c is found to decrease with height. The increase with

TABLE I

Drift and anisotropy parameters for magnetically quiet and disturbed days

'h' in km.	$v(=V_x/2)$ in m./sec.		$v_a(=V_a/2)$ in m./sec.		ϕ in deg. E of N		ϕ_a in deg. E of N		a in metres		r		θ in degrees		V_c in m./sec.		V_c/V	
	Quiet	Dist.	Quiet	Dist.	Quiet	Dist.	Quiet	Dist.	Quiet	Dist.	Quiet	Dist.	Quiet	Dist.	Quiet	Dist.	Quiet	Dist.
175	80	62	100	122	252	232	240	239	330	364	2·22	1·8	27	21	158	128	0·99	1·03
200	84	79	121	127	246	223	250	270	419	630	2·35	2·6	21	16	153	188	0·9	1·2
230	100	66	76	85	213	309	231	270	356	294	2·6	2·1	20	24	132	100	0·66	0·76

magnetic activity of the random change factor V_c/V, a measure of random changes relative to pure drift in causing fading, is found to be not appreciable, though it is a little more for the level of 200 km.

The true and apparent drift directions ϕ and φ lie mostly in the SW quadrant for both quiet and disturbed conditions. The variation of ϕ with height reveals the drift vector to be rotating anti-clockwise sense in the region below and clockwise sense in the region above the level of 200 km. for disturbed conditions, while for quiet conditions the rotation of the vector is consistently anti-clockwise in the height range of investigation.

From a study of the anisotropy characteristics of the characteristic ellipse of 0·5 correlation, it appears that the length of the semi-major axis 'a' is more for disturbed conditions at the levels of 175 and 200 km., the increase with magnetic activity being highest for the latter. The length of the semi-major axis varies with height exhibiting a maximum at 200 km. which is very prominent on disturbed days compared to quiet days. The axial ratio 'r' increases continuously with height on quiet days whereas on a disturbed day it shows a maximum at 200 km. From a study of the average inclination 'θ' of the major axis with NS direction it can be said that the irregularities align with their major axis very close to the NS direction for both disturbed and quiet conditions. The values of θ presented for the three height levels reveal that the irregularities are more closer to NS direction at the level of 200 km. for disturbed conditions whereas for quiet days the irregularities tend to be more closer to the NS direction at higher levels.

We are indebted to the Council of Scientific and Industrial Research of India for the financial support of these investigations. One of the authors (P. Balarama Rao) is grateful to the Council for the award of a Senior Research Fellowship.

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Visakhapatnam, *October* 14, 1963.

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