551.510:62 (541)

DISTRIBUTION OF RADIO REFRACTIVITY IN NORTHEAST INDIA

Northeast India comprises of Assam, Manipur, Tripura, Mizoram, Nagaland, Meghalaya and Arunachal Pradesh. This part contains the highly uneven terrain because of river *Brahmaputra* and the sub-Himalayan ranges. As a result, communication link is a big problem. UHF and microwave communications are widely used in this region to have efficient mode of communication. The radio propagation in lower troposphere in these frequencies is severely affected by weather. Radio refractive index (RRI) is a parameter which describes the effect of pressure ,temperature and humidity on radio wave propagation. According to CCIS Group V, units change in RRI results in O.2db change in signal strength. Hence, the distribution of this, parameter over this uneven terrain during the different months will be a useful information for planning and monitoring the radio communication equipments and their performance.

Modified radio refractive index has been computed for 12 stations well spread in the region from the monthly mean values of temperature, pressure and humidity derived from 20 years data and isopleths were drawn and analysed. All these stations have their lowest RRI values in winter (Kulshrestha and Chatterji 1966) and have annual variation of RRI between 50 and 60 N units (Maheswari 1965).

From the monthly pattern it was found that January to March have same pattern as shown in Fig.1 with lowest values over Manipur. During April there is a 'high' over Arunachal and part of upper Assam. There is a steep gradient in the northen parts (Fig. 2). But the pattern drastically changes in May as seen in Fig. 3. The RRI field is almost flat over the region.

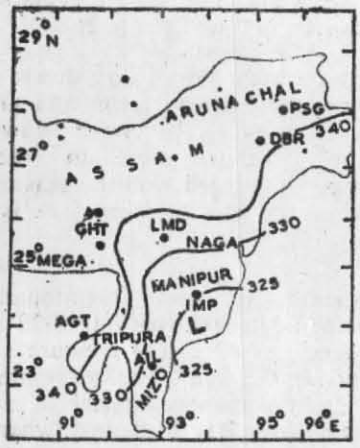

Fig.1. Winter (Jan to Mar) pattern of RRI lines

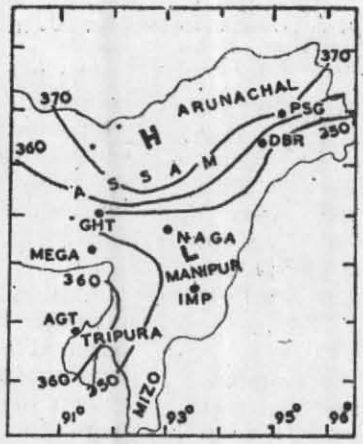

Fig. 2. RRI pattern during April

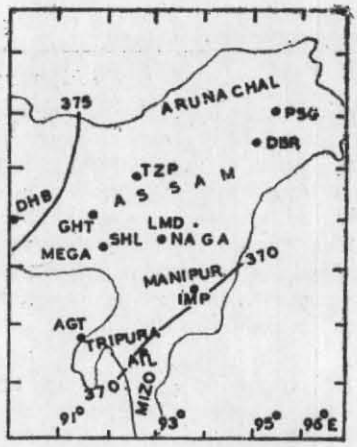

Fig. 3. RRI pattern in May

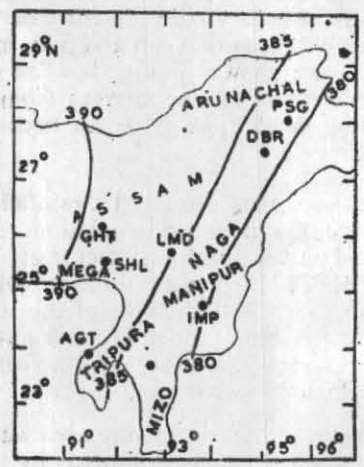

Fig. 4. RRI pattern, Jun/Sep

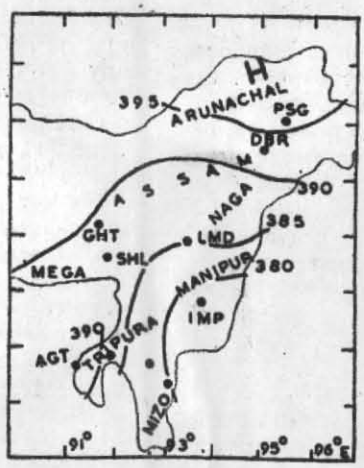

Fig. 5. Monsoon pattern of RRI

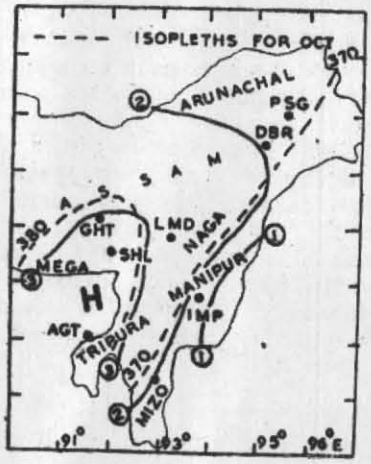

Fig. 6. RRI pattern, Oct-Dec

①: 340 FOR NOV & 330 FOR DEC, ②: 350 FOR NOV & 340 FOR DEC, ③: 360 FOR NOV

By June a sort of west to east gradient develops (Fig.4). Fig.5 presents the monsoon pattern valid for July and August. Two highs are seen one over Arunachal Pradesh and another over southwestern parts of Tripura. September pattern is exactly same as June with even the RRI values remaining more of less same. However, October is the month when the distribution is again changing. There is high in southwestern part with a protruberance in northeastern direction. The high over Arunachal of monsoon season disappears. This distribution pattern persists upto December except the values of RRI coming down. This picture is depicted in Fig. 6.

Thus, though all the stations exhibit minimum in winter and maximum in monsoon the distribution pattern of RRI is not uniform over the region through the months in a year.

References

Kulshrestha, S.M. and Chatterji, K., 1966, *Indian J. Met., Geophys.*, 17, p. 367.

Maheshwari, R.C., 1965, *Indian J. Met., Geophys.*, 16, p. 467.

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