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Letters to the Editor

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LOWER STRATOSPHERIC WINDS OVER DIBRUGARH

The study of stratosphere is an important part of atmospheric physics. Raja Rao and Joseph (1969) have studied the stratospheric winds over Thumba and some other stations. Several more attempts (Raja Rao & Lakhole 1978, Narayanan *et al.* 1980, Ranjit Singh 1985) have also been made to investigate this region of atmosphere in India.

With the installation of EEC radar at the Dibrugarh airport located at Mohanbari, upper atmospheric winds are available since 1979 for this remote station in NE India. Dibrugarh being a station at Lat. 27°N can well represent the boundary between the tropics and extratropics. Since the tropopause occurs over this place around 15 km height, the winds at a height of 14.1 km and above were analysed and zonal and meridional components were computed.

Fig. 1 gives the time section of zonal component distribution during the years studied. It was noticed that there was high consistency in wind direction at each month within these six years. It is a known fact that there is a reversal of stratospheric wind direction in equatorial region with a period of about 24 to 26 months called "Quasibiennial oscillation" of stratospheric wind direction. Such a phenomenon could be seen even in tropical regions. But no such reversal of wind direction could be seen in lower stratosphere over Dibrugarh.

Westerly regime is dominant during October to June with maximum speeds during peak winter months. In fact this latitude is close to the latitude of subtropical jet stream observable in winter. However, during July to September easterlies of higher levels could well descend to lower stratosphere so that the westerly regime is broken completely. These are the summer easterlies in stratosphere.

This behaviour is reflected in meridional component distribution also (Fig 2). Though the component values are small (less than 10 mps) southerlies could be seen during most part of the period between October to June while northerly component was present in July, August and September.

The percentage steadiness of wind direction is defined as the percentage occurrence in a month when the wind blows from the same direction. The same was calculated for each month. It was 85% or more for all months from September to May. It falls to about 50% in June and further down to about 10% in July. It improves to 55% in August. When September was divided into fortnights and analysed, the steadiness was 75% in first fortnight while it becomes 90% in second fortnight. Hence it can be said that September being the switch over month, only by late September winds get better steadiness and westerlies are established.

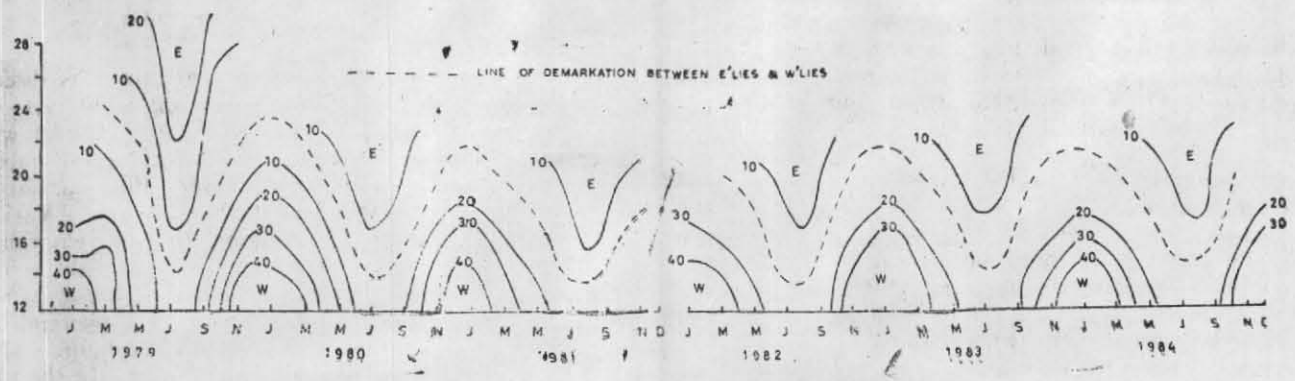

Fig. 1. Zonal component winds in mps

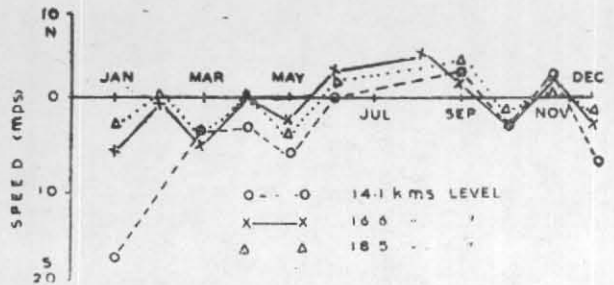

Fig 2 Mean meridional winds

As turbulance is a phenomenon associated with jet stream or higher wind speeds, wind shear was computed in the boundary region of troposphere and stratosphere, that is, 14.1 to 16.5 km, and the next higher level (between 16.5 & 18.5 km agl). If dv is change in wind speed in a layer of thickness dz, then dv/dz is defined as the wind shear. Table 1 presents the wind shear values. It is found that there is a large variation of wind shear in the layer between 16.5 & 18.5 km levels. It goes to 11×10^{-3} sec^{-1} in February from 4×10^{-3} sec^{-1} in October. The shear falls to October value by April.

TABLE 1

Wind shear in $\times 10^{-3}$ sec^{-1}

Month	Between 14 & 16 km	Between 16.5 & 18.5 km
October	3	4
November	5	7
December	5	8
January	5	7
February	6	11
March	4	9
April	5	4
May to September	5	$\leqslant 4$

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