

Temp. values of basic profiles for Mohanbari

TROPOSPHERIC FEATURES OVER MOHANBARI

Till a few years ago no aerological observatory was available to the east of Guwahati though a vast landmass of Assam, Nagaland and Arunachal Pradesh lies to the northeast of this place. Since 1978, radiosonde observations commenced at Mohanbari (Lat. 27°N, Long. 94.5°E) which is the airport for the Dibrugarh town of Assam. The temperature and humidity data collected during the years 1978 to 1985 for various levels were analysed to derive the vertical profiles and, thus, the note contains features of the troposphere over this northeastern part of the country.

The mean tropospheric extent varied from 15 to 17 km in any year (1986). The annual range of variations of surface temperature was 18° which reduced to 7° at 200 hPa level. At Mohanbari temperature is less at all levels than over Guwahati in all the months. Though both Guwahati and, Mohanbari are on the banks of *Brahmaputra* river, moisture content up to 500 hPa is always more over Mohanbari than Guwahati. The location being surrounded by the tributaries of *Brahmaputra* and, *Brahmaputra* being broader near Dibrugarh may perhaps be the reason.

Troposphere over Mohanbari on any day is found to arise from three basic types, namely, (1) Winter type (2) Summer type and (3) Transition type.

| Level (hPa) | Winter type profile | | Summer type profile | | Transitional season type profile | |
|-------------|---------------------|--------------|---------------------|--------------|----------------------------------|--------------|
| | Temp. (°C) | Dew Pt. (°C) | Temp. (°C) | Dew Pt. (°C) | Temp. (°C) | Dew Pt. (°C) |
| Surface | 9.5 | 9.0 | 27.5 | 25.0 | 25.5 | 22.0 |
| 850 | 10.0 | 2.5 | 21.0 | 18.0 | 18.0 | 14.0 |
| 700 | -1.5 | -9.0 | 12.0 | 9.0 | 9.0 | 3.5 |
| 500 | -13.0 | -23.5 | -2.0 | -8.0 | -7.0 | -14.0 |
| 300 | -39.0 | — | -25.0 | -35.0 | -32.0 | — |
| 200 | -51.5 | — | -47.0 | — | -50.0 | — |
| 150 | -55.0 | — | -62.5 | — | -62.0 | — |
| 100 | -63.0 | — | -73.0 | — | -70.0 | — |
| 70 | -64.0 | — | -66.0 | — | -63.0 | — |

These are depicted in Table 1. Nearly in half the number of days during winter ground inversion occurs in temperature profile over Mohanbari. Elevated inversions also occur often and it can be as high as 12 km even. Elevated inversions around 3 km height are found to cause multiple freezing levels also.

Lapse rate of temperature varies between 4° and 6.5°/km in any year. The lapse rate is found to be more in the lower troposphere (up to 500 hPa level) than in upper

TABLE 2

Precipitable water vapour over Mohanbari

| Month | Water vapour (gm) | Average rainfall (cm) |
|-----------|----------------------|--------------------------|
| January | 2.029 | 3.49 |
| February | 1.830 | 6.1 |
| March | 2.455 | 10.0 |
| April | 3.047 | 20.0 |
| May | 3.370 | 35.6 |
| June | 5.037 | 51.4 |
| July | 6.432 | 51.6 |
| August | 5.540 | 41.7 |
| September | 4.971 | 34.1 |
| October | 3.543 | 16.6 |
| November | 2.309 | 2.7 |
| December | 1.980 | 2.2 |

levels during the winter months for this place, namely, December to mid-April while reverse is the case during the remaining period of the year.

Total precipitable water vapour for each month was computed from the average monthly moisture profile and presented in Table 2 alongwith the climatic monthly rainfall. The values are a little less than the values reported for Guwahati by Ananthakrishnan *et al.* (1964). Though the maximum rainfall occurrence in July coincides with maximum precipitable water vapour amount, other individual month's values do not go by the same order. The fact that the chances and the mechanism of realising precipitation are not same in all the months may be the reason for this.

Reference

- Ananthakrishnan, R., Mary Selvam, M. and Chellappa, R., 1964, Precipitable water vapour in atmosphere over India, India Met. Dep. pre-publ. Sci. Rep.

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5 May 1987