

551.510.528 : 551.52(540.15)

**TEMPORAL VARIATION OF TROPOPAUSE HEIGHT AND TEMPERATURE OVER PATIALA DURING 1999-2004**

1. Six year's radiosonde data of daily upper air soundings at 0000 UTC and 1200 UTC starting from 1<sup>st</sup> January 1999 to 31<sup>st</sup> December 2004 have been used for the study. Tropopause occurring at a height of less than 14.0 km is treated as first tropopause or extra Tropical tropopause (Extra T.T) and that which occurs at 14.0 km and above is treated as second tropopause or Tropical tropopause (T.T). If both the tropopauses occur below or above 14.0 km, then lower one is treated as the first and the higher one as the second tropopause [Radiosonde observation Manual, (1976)].

2. Fig. 1. and Fig. 2. show the month wise maximum & minimum heights of extratropical tropopause at 0000 UTC and 1200 UTC respectively. During SW monsoon (June-September) extratropical tropopause is not observed. The lowest height of extratropical tropopause was observed in January (08.1 km) 1200 UTC and the highest one was also observed in January (13.89 km) 1200 UTC. It varied from 8.1 km to 13.89 km, *i.e.*, 5.78 kms.

3. Fig. 3. and Fig. 4. show the monthwise maximum & minimum heights of tropical tropopause at 0000 UTC and 1200 UTC respectively. Tropical tropopause is observed throughout the year above 14.0 km. The lowest height was observed in January (14.00 km) 1200 UTC and the highest one was observed in July (19.91 km) 1200 UTC. It varied from 14.0 km to 19.91 km, *i.e.*, 5.91 kms.

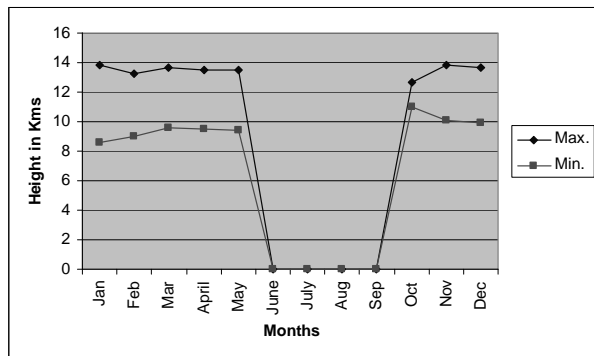


Fig. 1. Maximum/Minimum height of extratropical tropopause (EXT. T.T) at 0000 UTC

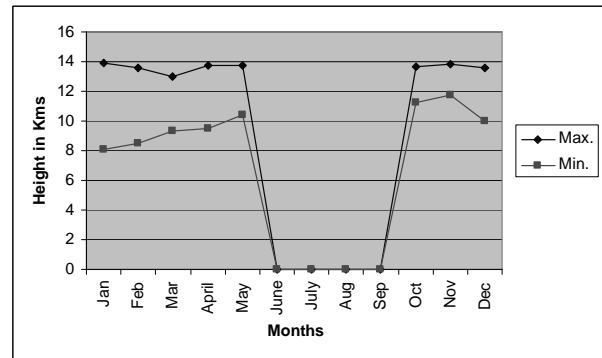


Fig. 2. Maximum/Minimum height of extratropical tropopause (EXT. T.T) at 1200 UTC

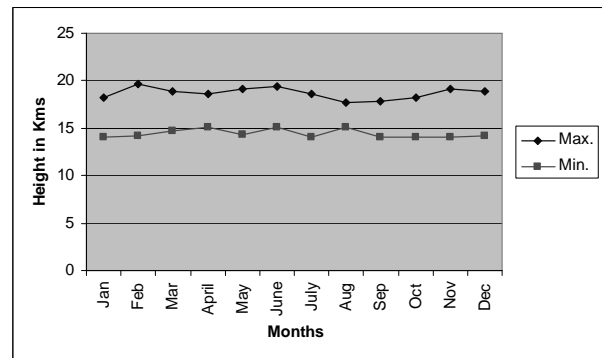


Fig. 3. Maximum/Minimum height of tropical tropopause (T.T) at 0000 UTC

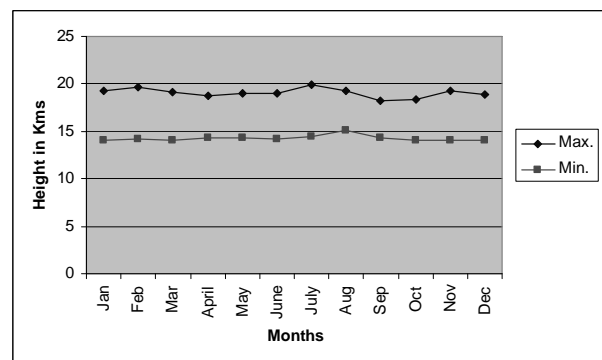


Fig. 4. Maximum/Minimum height of tropical tropopause (T.T) at 1200 UTC

4. Fig. 5. and Fig. 6. show the monthwise maximum & minimum temperatures of extratropical tropopause at 0000 UTC and 1200 UTC respectively. The lowest temperature was observed in December (-76.1 °C), 0000 UTC and the highest temperature was observed in January (-39.3 °C) 1200 UTC. It varied from -39.3 °C to -76.1 °C, *i.e.*, -36.8 °C.

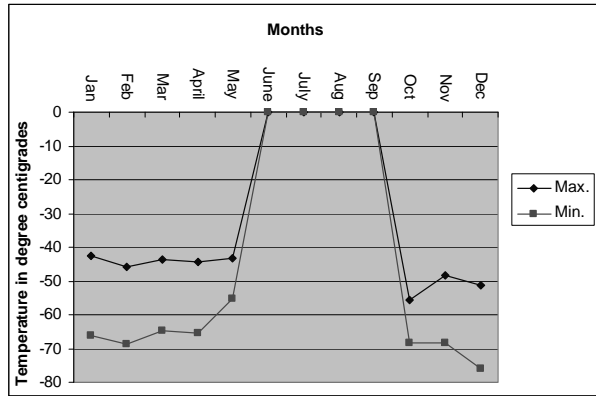


Fig. 5. Maximum/Minimum temperature of extratropical tropopause (EXT.T.T) at 0000 UTC

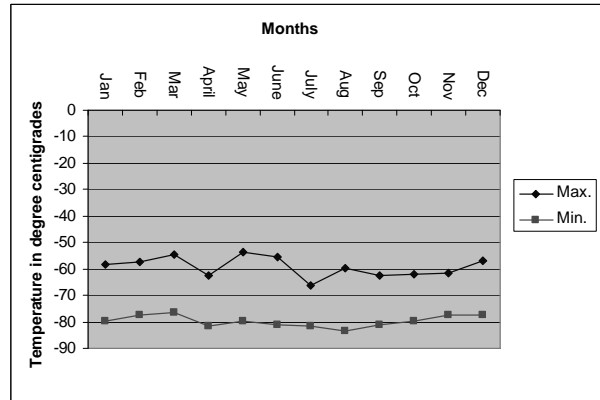


Fig. 8. Maximum/Minimum temperature of tropical tropopause (T.T.) at 1200 UTC

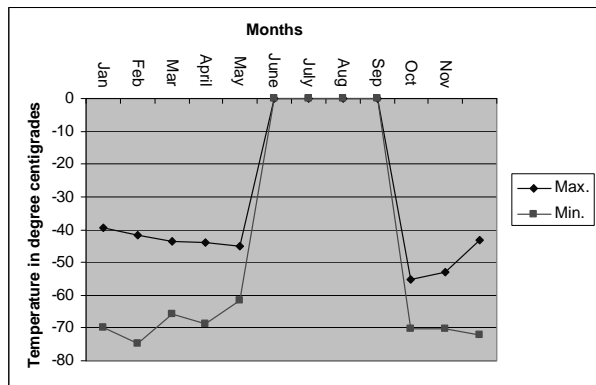


Fig. 6. Maximum/Minimum temperature of extratropical tropopause (EXT.T.T) at 1200 UTC

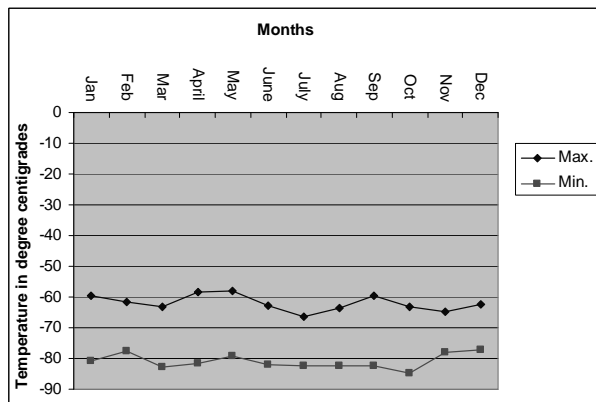


Fig. 7. Maximum/Minimum temperature of tropical tropopause (T.T.) at 0000 UTC

5. Fig. 7. and Fig. 8. show the monthwise maximum & minimum temperatures of tropical tropopause at 0000 UTC and 1200 UTC respectively. The lowest temperature was observed in October (-84.9 °C) 0000 UTC and the highest temperature was observed in

March (-54.7 °C) 1200 UTC. It varied from -54.7 °C to -84.9 °C, *i.e.*, -30.2 °C.

6. Extratropical tropopause showed the following features over Patiala.

(i) No extratropical tropopause is observed during SW monsoon season, *i.e.*, from June to September.

(ii) It has the lowest height in January and the highest also in January. Variation in height remained around 5.8 kms.

(iii) Extratropical tropopause is observed below 14.0 km height.

(iv) The lowest temperature is observed in December while the highest in January. Variation in temperature remained -36.8 °C.

7. Tropical tropopause showed the following features over Patiala.

(i) Tropical tropopause is observed throughout the year.

(ii) The lowest height is observed in January while the highest in July. Variation in height remained around 6.0 kms.

(iii) Tropical tropopause is observed above 14.0 km height.

(iv) The lowest temperature is observed in October while the highest in March. Variation in temperature remained around -30.0 °C.

The author is thankful to Dr. O. P. Singh, D.D.G.M, Regional Meteorological Centre, New Delhi for encouragement. Thanks are also to Shri Rajeev Kumar, B. K. Bhat, L. K. Gupta and Onkar Singh for assistance. Thanks are also to the referee for guidance.

#### References

Fairbridge, R. W., 1976, "The Encyclopedia of Atmospheric Sciences and Astrogeology", Volume II, New York, Reinhold Publishing Corporation, p1038.

IMD, 1976, Radiosonde Observation Manual, Chapter V, DDGM (IP) New Delhi, Appendix 5E, 17-18.

Reiter, E. R., 1967, "Jet Streams" in the Encyclopedia of atmospheric sciences and Astrogeology Volume II, New York, 510-514.

Sheppard, P. A., 1964, "Basic ideas in General circulation of the atmosphere," Problems in Palaeoclimatology, New York, Interscience Publishers, 322-331.

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