



Tropopause inversion layer and water vapour

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The tropopause inversion layer (TIL) is a phenomenon located close to the tropopause, characterized by an enhanced static stability (N^2) right above the temperature inversion of the tropopause and by its adjacent minima. There is low understanding of formation and maintenance of the TIL, but different hypotheses exist. On one hand, the balanced dynamic in this region has an important impact on the evolution and sustainment of the TIL. On the other hand, the radiative effects of ozone and water vapor near the tropopause might play an important role for the formation and maintenance of the TIL.

We use high resolution radiosonde data over the Meteorological Observatory Lindenberg, Germany for the period February 2000 to April 2001 to investigate the impact of water vapor on the TIL. Starting from the mean profiles, we analyze the main features of the tropopause and the TIL. As it is known from the literature, we find a stronger TIL in summer compared to winter. However, our results show a complementary behavior in the seasonal cycle of the tropopause height and the TIL strength.

The influence of the relative humidity over ice (RH_i) on the TIL was also investigated. We show that high values of RH_i lead to a cooler tropopause temperature and an enhanced strength of the TIL. This means that the maximum of the static stability is higher for high values of RH_i and the adjacent minima are smaller than for low values of RH_i.