



The tropopause inversion layer in baroclinic life cycles over the North Atlantic: a pre-WISE case study and climatology

Thorsten Kaluza, Peter Hoor, and Daniel Kunkel

Johannes Gutenberg-University Mainz, Institute for Atmospheric Physics, Mainz, Germany (dkunkel@uni-mainz.de)

Studies of baroclinic life cycles recently revealed that the tropopause inversion layer (TIL) in the extratropics is significantly strengthened by diabatic processes related to moist tropospheric dynamics as well as by breaking of the baroclinic wave itself. However, these findings summarize the results from idealized model simulations and the contribution from processes related to baroclinic life cycles relative to other processes enhancing the lower stratospheric static stability (stratospheric dynamics, seasonal variation of radiative feedbacks) to the observed TIL at midlatitudes has yet to be assessed. Further the role of the TIL for stratosphere-troposphere exchange (STE) is currently still under debate. In preparation of the up-coming field campaign WISE (Wave driven isentropic exchange) we explore the state and variability of the TIL over the North Atlantic between August and October in analysis model data. We use high resolution operational analysis from the European Center for Medium Range Weather Forecast to study the mesoscale structure of the TIL. The main focus is on case studies of the TIL in real baroclinic life cycles, in particular on small scale enhancements within the baroclinic disturbances and the relation to STE. Moreover, a summary is presented about the quasi climatological state of the tropopause location and sharpness over the North Atlantic over recent years.