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Study of mixing processes above the 370 K-isentrope during the TACTS/ESMVal campaign 2012

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We will report on an investigation of inter-stratospheric mixing processes in the northern mid-latitude lowermost stratosphere above the 370K-isentrope extending up to 400 K. The study is based on in-situ trace gas measurements during the TACTS (Transport and Composition in the UT/LMS) and ESMVal (Earth System Model Validation) campaign 2012.

Tracer-tracer-correlations of CO with ozone and N2O indicate mixing of chemically aged / processed stratospheric air with CO and N2O values of less than 22 ppbv and 301 ppbv, respectively with younger stratospheric air. Further analysis of the synoptic situation and 10-day backward trajectories gives additional information on the origin of the evaluated air masses.

The comparison of tracer-tracer-correlations with the observed vertical and latitudinal distribution of tracers, e.g., N2O, SF6, H_2O and CH4 shows reservoirs of air masses with different stratospheric age which mix. Further we distinguish between isentropic transport and subsequent mixing of air which originates from the tropical lowermost stratosphere and the descending branch of the Brewer-Dobson circulation in the extratropics.