



Observation of mixing above the 370 K-isentrope during TACTS 2012

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During the measurement campaign TACTS (Transport and Composition in the Upper Troposphere/Lowermost Stratosphere) in August and September 2012, several flights with the new German research aircraft HALO (High Altitude and Long Range Research Aircraft) were performed over Europe and Northern Africa. In-situ measurements of CO₂, CO, N₂O and CH₄ were carried out with a QCL-spectrometer to investigate dynamic processes in the UTLS-region up to 15 km. We focus on the survey of a trough over the Eastern Atlantic in the last week of August. A first analysis of the measurement data shows minimum CO and N₂O values of less than 22 ppbv and 301 ppbv, respectively indicating chemically aged / processed stratospheric air.

Tracer-tracer-correlations with ozone show regions of mixing above the 370 K-isentrope extending up to 400 K. These filamented structures are associated with a baroclinic wave breaking event, which transports air of tropical origin deep into the extratropical lowermost stratosphere above 370 K. Further analysis of the synoptic situation gives additional information on the origin of the evaluated air masses and their pathway into the stratosphere.