



Global climatologies of cross-tropopause fluxes of mass and ozone

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The downward flux of ozone across the tropopause is an important yet highly uncertain component of the tropospheric ozone budget. Current estimates are based mainly on global model calculations and differ significantly. In this study a recently developed Lagrangian approach to diagnose stratosphere-troposphere exchange (STE) events is applied to the ERA40 reanalysis data set for the time period 1958 to 2002. This data set contains a three-dimensional ozone field which offers the possibility to quantify the ozone flux associated with every individual STE event. In addition to estimate the up- and downward fluxes of ozone at the tropopause level, the Lagrangian approach allows to infer the quantitative effect of stratospheric ozone intrusions at different vertical levels in the troposphere.

The presentation will first introduce the trajectory-based method to identify STE and the utilized ERA40 data set including the assimilation procedure of ozone. Then, for a selected time period of 10-20 years global climatologies of the cross-tropopause fluxes of mass and ozone will be presented. The evaluation focuses on the interannual variability, the seasonal cycle, interhemispheric differences and the geographical patterns. Finally, the results will be compared with previous ozone flux estimates.