



Analysis of convective mixing between a tropopause fold and a warm conveyor belt

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MOZAIC observations (Measurements of Ozone, Water Vapour, Carbon Monoxide and Nitrogen Oxides by In-service Airbus Aircraft, <http://www.aero.obs-mip.fr/mozaic/>) from commercial aircraft can be used to validate Lagrangian and Eulerian models regarding stratosphere-troposphere exchange and mixing processes across airstreams in extratropical lows. We have conducted such an analysis for a case study of a tropical storm evolving into an extratropical low over the East coast of North America in July 2002. The life-cycle of the storm involves the conceptual model of the split front (Browning and Monk, 1982), i.e. a cold front in which the upper front has advected ahead of the surface front. MOZAIC observations capture the dry airstream and the tropopause fold during descent into New York City and the divergent outflow of the warm conveyor belt at cruise level (11 km altitude) over Canada. Analysis of O₃ and CO time series suggest convective mixing between the tropopause fold and the warm conveyor belt. This hypothesis is tested with air parcel trajectories calculated by Lagrangian transport models: the LAGRANTO model without convective parameterisation (Wernli et al., 1997), the FLEXPART model with convective parameterisation (Stohl et al., 2000), and with stratospheric and boundary-layer tracers in a grid-nested simulation of the Meso-Nh model (Lafore et al., 1998). Our analysis will show the results of this sensitivity study.