



## **A sensitivity study of dehydration at the tropical tropopause to the representation of vertical transport in trajectory calculations**

**M. Bonazzola** (1), B. Legras (1), R. James (1) and S. Fueglistaler (1,2)

(1) Laboratoire de Météorologie Dynamique, PVI, CNRS & ENS, Paris, France (2) ETH, Zurich, Swiss (bonazzola@lmd.jussieu.fr)

The water vapour budget in the tropical lower stratosphere depends on encountered temperatures in the tropical tropopause, which are thought to limit the flux of water vapour into the stratosphere by freeze-drying.

Backward trajectory calculations from the tropical lower stratosphere were performed to determine the role of the large-scale circulation, of its different components (horizontal transport, vertical transport) and the role of temperature variability on dehydration (eg Fueglistaler et al 2004, 2005, JGR; Bonazzola and Haynes, 2004). However, the results depend on the accuracy of the trajectories and of the analyzed temperatures. The vertical velocity field on which the trajectories are based is certainly not likely to be accurate at levels where convection is important and may also be inaccurate at higher levels due to the finite resolution of the data and the difficulties of dealing with the complex physical and dynamical processes in this region.

We thus present a sensitivity study of the calculated water vapour mixing ratios in the lower stratosphere to different transport representations. We compare for different years and seasons the circulation and its implications in terms of dehydration while using ECMWF winds analysed at different time resolutions, and vertical velocities deduced from ECMWF diabatic heating rates.