



Transport across the tropical tropopause layer and convection

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We investigate how air parcels detrained from convective sources enter the TTL. The approach is based on the comparison of unidimensional trajectories and Lagrangian backward and forward trajectories, using TRACZILLA and ERA-Interim. Backward trajectories are launched at 380K and run until they hit a deep convective cloud. Forward trajectories are launched at the top of high convective clouds identified by brightness temperature from CLAUS dataset. 1D trajectories are computed using Gardiner's method. Results show that the warm pool region during winter and the Bay of Bengal / Sea of China during summer are the prevalent sources as already identified in many previous studies and we quantify the respective role of the various regions. We show that the 1D model explains qualitatively and often quantitatively the 3d results. We also show that in spite of generating very high convection, Africa is quite ineffective as providing air that remains in the TTL while on the opposite the Tibetan Plateau is the most effective region in this respect although its total contribution is minor. Finally, we compare ERA-Interim, JRA-55 and MERRA reanalysis and find large similarities between the two formers.