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Convective Transport of VSLS to the TTL in a High Resolution Global Model

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Convection plays an important role in shaping the structure and composition of the tropical tropopause region. Transport of boundary layer pollutants to the upper troposphere and lower stratosphere (UTLS) can be separated into two main components, convective and large scale. The extent to which these contribute to the overall transport is unclear; furthermore both components have spatial and temporal variations therefore quantifying their relative effect on global stratospheric ozone and water budget is complex.

Coarse resolution climate models lack the ability to resolve the smaller spatial scales associated with tropical convection. By using a high resolution version of the Unified Model many features associated to large storms and tropical convective systems start to emerge; analysis of such features and comparison against satellite data and ECMWF analysis, show that the model is capturing the extent and spatial distribution of the mean convective activity within the tropics.

We investigate the Australian-Indonesian pre-monsoon period (November 2005) to quantify the relative effect of convective overshooting and large scale transport on the composition of the UTLS. Particular attention is given to short-lived halogenated species (e.g. bromoform). If transported quickly to the lower stratosphere, these short-lived species are likely to contribute to ozone depletion.