Comparison of WRF simulated mass fluxes with those derived from radar observations for the Tropical Western Pacific

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The Australian Monsoon during Austral summer experiences vigorous convection rapidly delivering air masses from the surface to the tropical tropopause layer (TTL). The tropical western pacific is of crucial importance in determining very short lived substance delivery from the ocean and land surfaces to the stratosphere [*Fueglistaler and Haynes*, 2005]. In particular, the stratospheric halogen [*Salawitch*, 2006] and sulfur budgets, and the oxidative capacity of the tropical atmosphere are defined by these meso-scale dynamical processes. A critical examination of the mass fluxes is made using the Weather Research and Forecasting (WRF) convection resolving case studies during Stratospheric-Climate Links with Emphasis on the Upper Troposphere and Lower Stratosphere (SCOUT-O3) and Tropical Warm Pool International Cloud Experiment (TWP-ICE) campaigns (November 2005 and January - February 2006 respectively). The SCOUT-O3 campaign occurred before the main monsoon period, and experienced biomass burning conditions [*Frey et al.*, 2015]. Two 5-day simulation periods during TWP-ICE are examined, during break and monsoon conditions respectively [*Hassim et al.*, 2014]. These simulated mass-fluxes are compared with observational estimates from radar and the implications for trace-gas delivery are discussed. The rate at which air-masses are replaced, an important quantity in chemistry climate modelling, is explored through the determination of detrainment rates from WRF simulations and radar observations.

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