



## Latent heating controls by convection scheme parameters

T. Crueger and B. Stevens

Max-Planck Institute for Meteorology, Atmosphere, Hamburg, Germany

We explore the tropical latent heating (LH) of experiments performed with two versions of the atmospheric component of the Max Planck Institute Earth System Model (MPI-ESM1.2), which only differ w.r.t. parameters of the convection scheme, namely in experiment EC-En we increased the entrainment rate for penetrative convection. For evaluation, the satellite retrieved TRMM PR Spectral Latent Heating is used.

EC-En reveals a worse mean state, a better MJO, and a more realistic top-heavy heating profile than the control experiment. The experiments also differ in their LH amounts, and the partitioning between convective and stratiform heating. We found a control change of LH by large-scale circulation, as represented by the vertical velocity in 500 hPa ( $w_{500}$ ). This change favors the more top-heavy profile in EC-En.

Furthermore, a shift from moderate to strong vertical motions in EC-En enhances the impact of the changed control of LH by  $w_{500}$ . This additionally contributes to a more top-heavy profile. However, the change of the large-scale circulation further increases its bias that is already evident in the control experiment.

Thus, the improved mean LH profile in EC-En is achieved at the cost of a realistic large-scale circulation.