Tropical Cyclone Genesis and Development Experiment with Three Different Cumulus Parameterization

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To understand tropical cyclone genesis and development processes in global model which is the atmospheric component of the Meteorological Research Institute earth system model (MRI-ESM) for global warming experiment, we conduct the real case tropical cyclone 200422(Ma-on) simulation. Horizontal resolution is TL959(about 20km), so it is necessary to use a cumulus parameterization.

If the group effect of the individual convection is correctly reflected to the grid scale by cumulus parameterization, it is possible to reproduce the disturbances like a tropical cyclone to some degree even if not explicitly resolving the individual convection processes (Tory et al, 2006).

In the genesis stage, occurrence of the Vortical Hot Towers (Hendricks et al, 2004, Montgomery et al, 2006) is very important and the size of this VHTs depends on the horizontal resolution of the model. It is necessary to express this VHTs appropriately by cumulus parameterization scheme. We compare three different schemes to examine how to express the VHTs in genesis stage.