We are investigating the representation of cumulus convection in JMA-GSM, by comparing with satellite observations and a non-hydrostatic limited area model. The JMA-GSM is a global hydrostatic model. It is the operational global NWP model in Japan. The spatial resolution is 20-km-mesh. The convection scheme of the model is the prognostic Arakawa-Schubert scheme (Randall and Pan, 1993; Arakawa and Schubert, 1974).

In the presentation, we will show a result of a comparison of $Q_1 - Q_R$ between JMA-GSM and Shige et al. (2007) along TRMM orbits. Shige et al. (2007) had evaluated the value of $Q_1 - Q_R$ based on TRMM observations and CRM simulations.

In the result, JMA-GSM seemed to represent the heating averaged over the area at least larger than 0.5-degree quadrangle, though the horizontal resolution of the model was 20-km-mesh. We think it is because of that the prognostic Arakawa-Schubert scheme assumes the area occupied by convective clouds is negligibly smaller than the area of grid box. A new cumulus convection scheme in which the area occupied by convective clouds is explicitly taken into account should be required. We are therefore currently developing a package of moistening process with such a convection scheme.