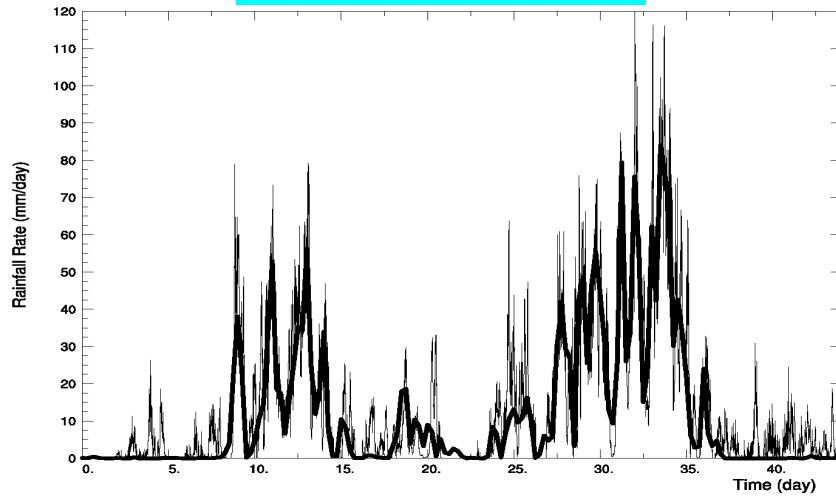# GCE model long-term (>40 days) simulated rainfall and water vapor (qv) for SCSMEX (S. China Sea 1998) case

Time series of rainfall
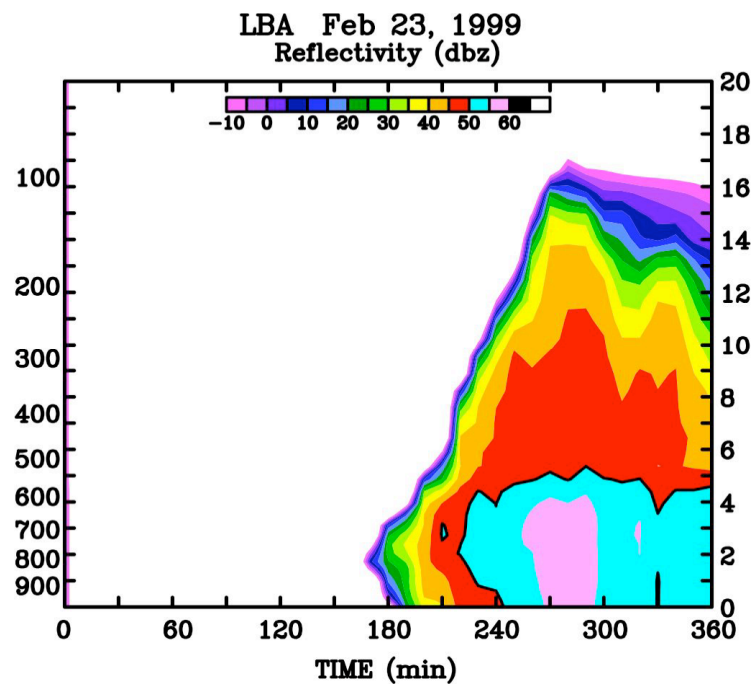
Time series of rainfall
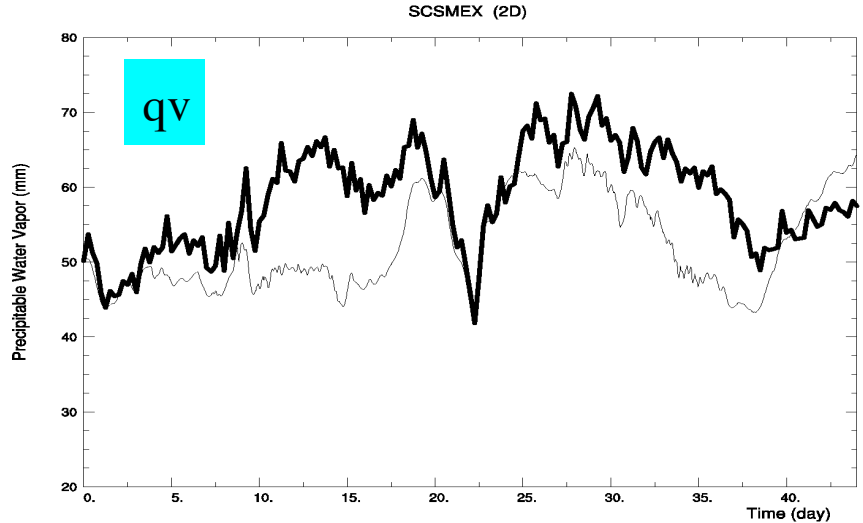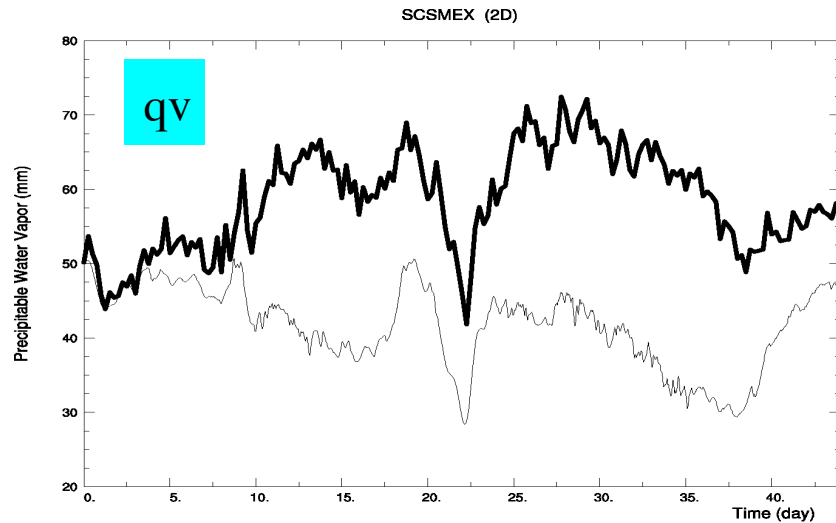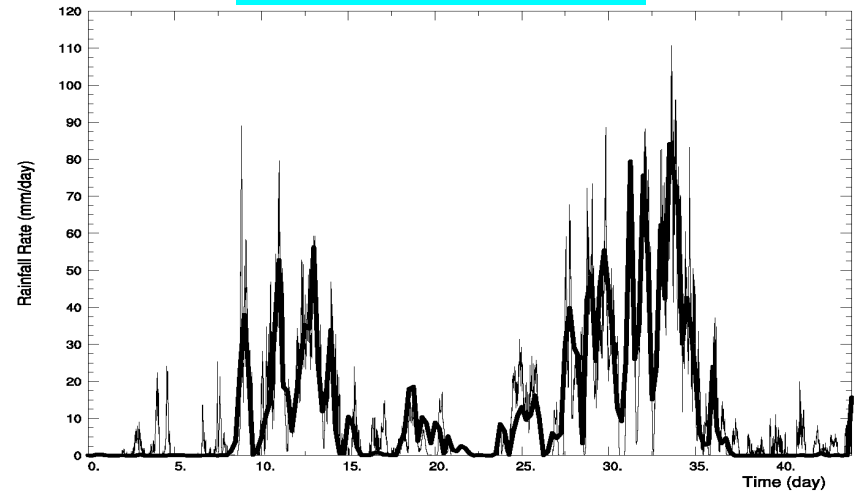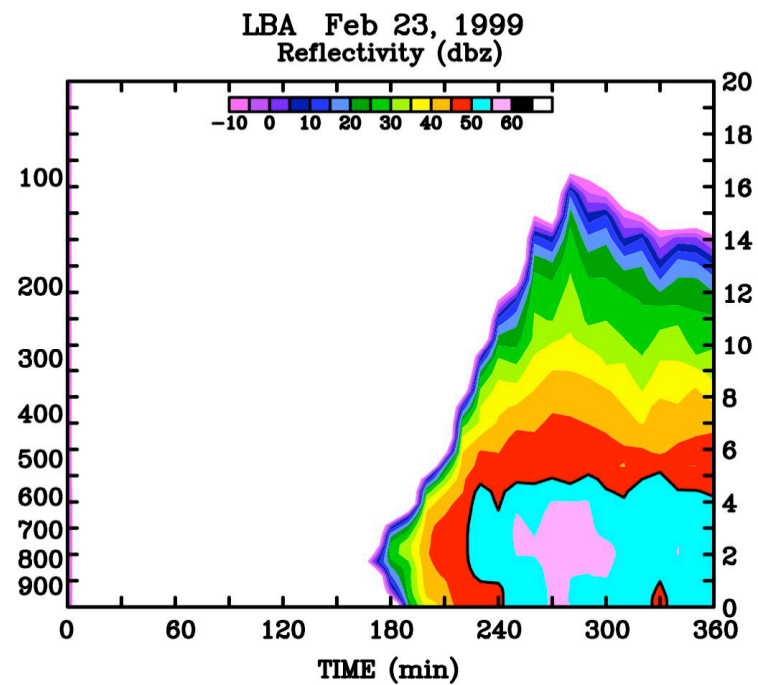

Original ice processes

Improved ice processes

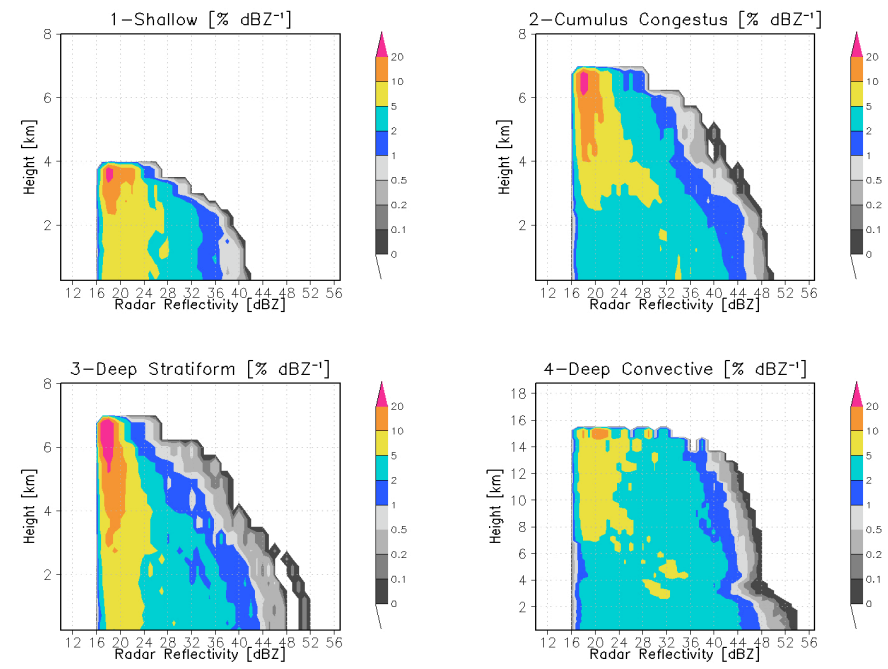# *Reduce 40dBZ at high altitude*
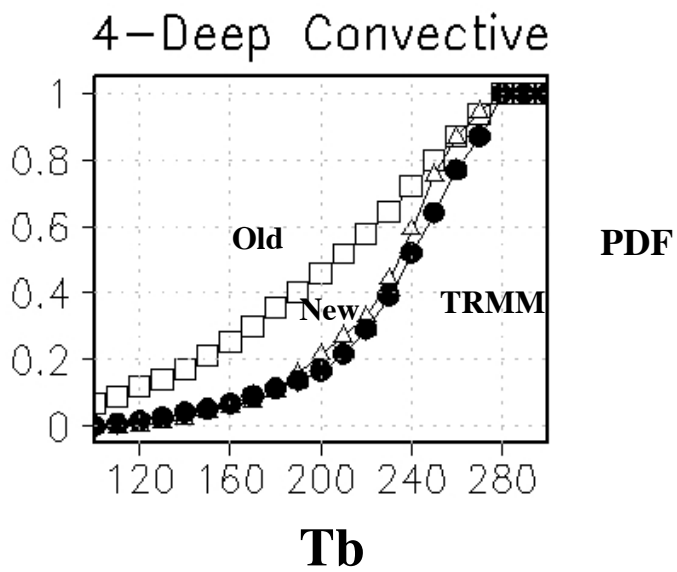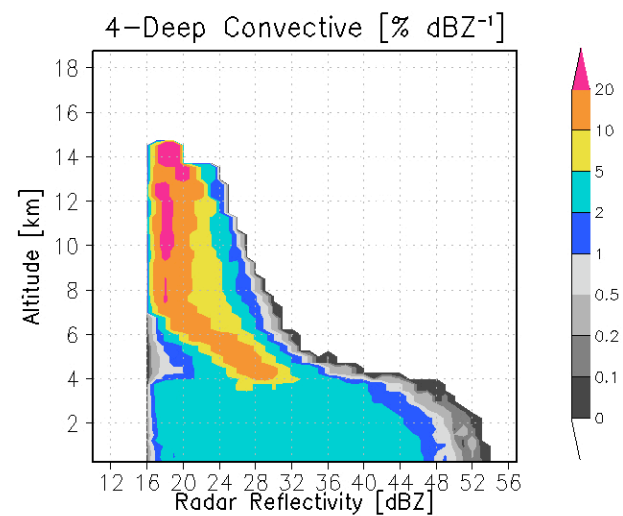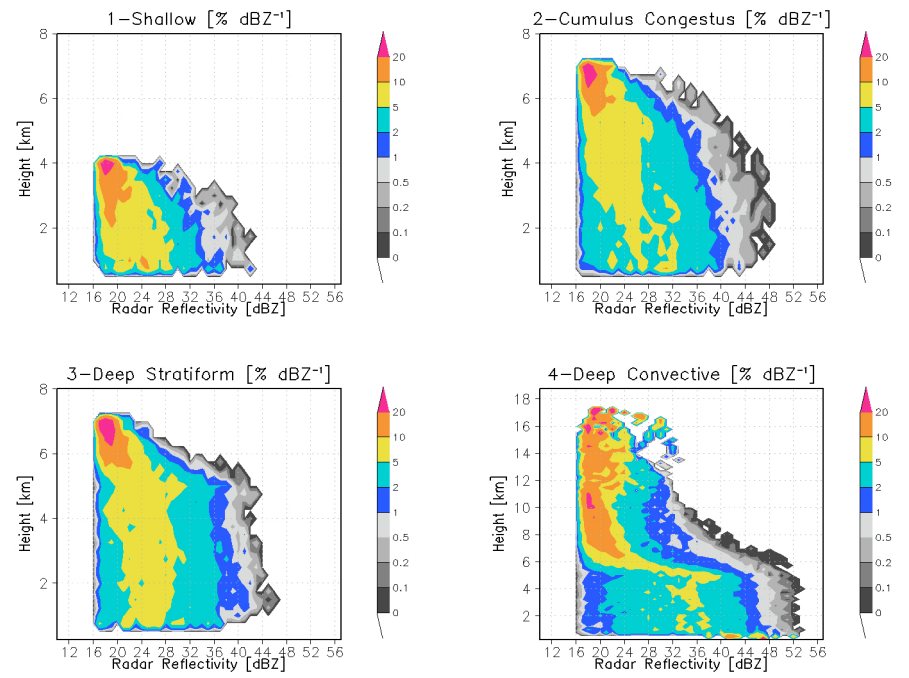
Lang et al. (2007)

Lang et al. (2009)

Using Spectral Bin Microphysics to improve bulk scheme to develop TeDD for bulk scheme (Matsui *et al.* 2009)
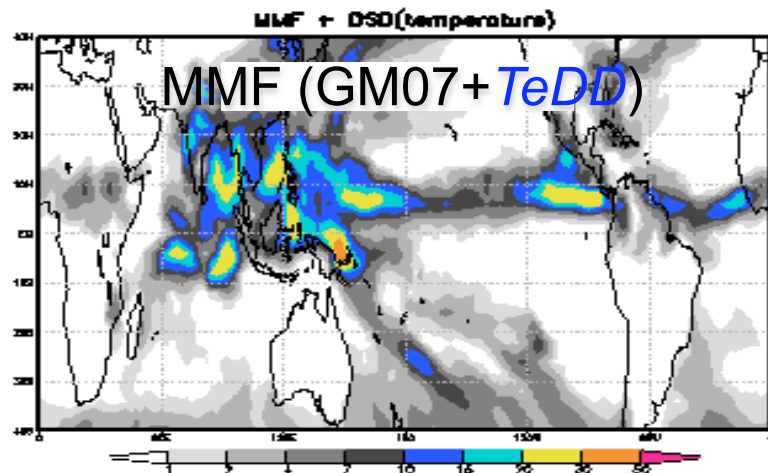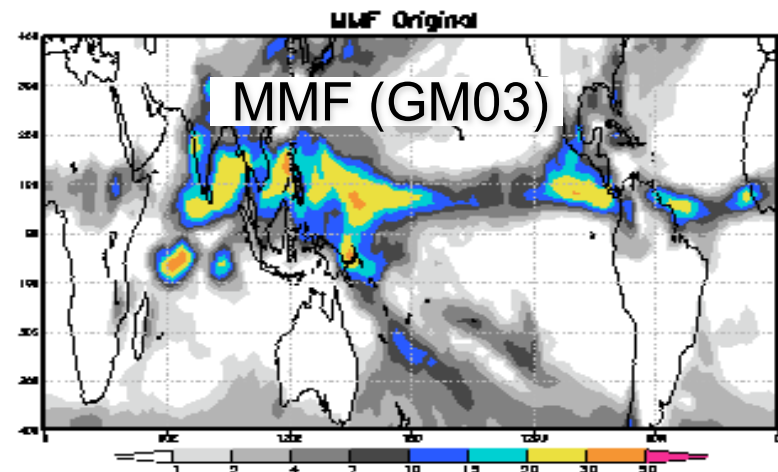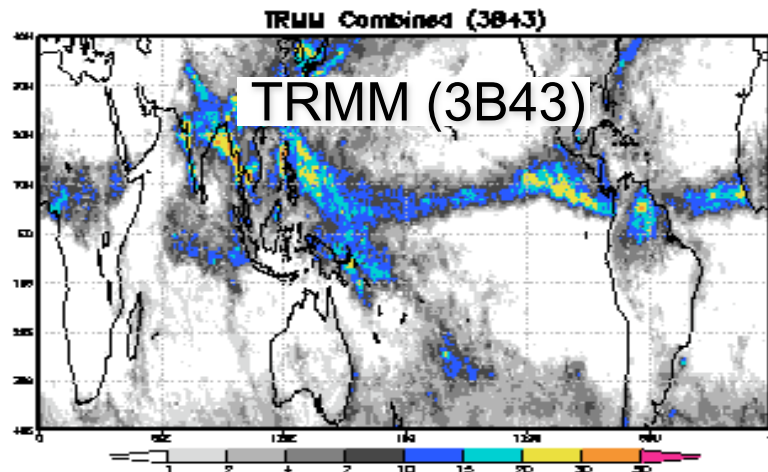
Surface Precipitation

Monthly Mean Precipitation in JULY 2006

TRMM (3B43)

MMF (GM03)

MMF (GM07+*TeDD*)

TeDD reduced precipitation biases in tropical warm pool.

Current - Future Model Improvements (with GMAO, CSU and others)
To utilize the satellite simulator to identify the strengths and weaknesses of model-

- Model Improvements

  Complete the MMF and LIS coupling

  Implement an improved microphysics in CRM that is embedded within MMF

  Investigate the impact of terrain effect on MMF's performance

  Couple with 3D GCE MPI, GEOS5, an ocean mixed model, and an Non-hydrostatic GCM

- Scientific Applications

  Conduct 10-year MMF integrations and examine the physical processes associated with diurnal variation of cloud/precipitation over land

  Examine the explicit cloud-aerosol-radiation interactions (GOCART)

  Investigate the flood/draught events in USA

  Investigate the impact of surface processes on weather/climate events in local, regional scale

- MMF (1998, 1999, May 2005 to September 2007), WRF and GCE cloud data is current available through Goddard web site:

  Website for mesoscale modeling group and cloud library

  http://portal.nccs.nasa.gov/cloudlibrary/index2