

A 2D version of the semi-Lagrangian Eulerian model (EULAG) is used for these simulations. The model is documented in Smolarkiewicz and Margolin (1997) and solves the nonhydrostatic anelastic equations using a non-oscillatory forward-in-time integration scheme. Here the bulk ice microphysics scheme of Morrison and Grabowski (2008a) is combined with the warm bulk scheme of Morrison and Grabowski (2007; 2008b). Shortwave and longwave radiative transfer is given by the Community Climate Model Version 2 (Kiehl et al. 1994), assuming Independent Column Approximation. Because of inconsistencies between the between assumed particle habit between the ice microphysics and the ice optics in the CCM2 radiation, the ice effective radius of ice particles used in the radiation code depends on the combined ice and snow water content based on measurements in tropical anvils reported by McFarquhar and Heymsfield (1997) and applied in Grabowski (2000). However, using the effective radius derived from the microphysics has a relatively limited impact on the results here. Boundary-layer mixing and surface turbulent fluxes are given by the simple nonlocal scheme of Troen and Mahrt (1986).

The model steep consists of a domain of 201 x 24 km, with 1 km grid spacing in the horizontal dimension. There are 97 levels in the vertical with a stretched coordinate that includes 15 levels in the lowest 2 km.

Additional notes on submitted files****

1) Currently the radar simulator is not ready, and so we have not included any model results involving reflectivity or Doppler velocity.

2) EULAG solves the combined sedimentation and vertical advective flux convergence, thus we have combined both terms into 'QHadv'. 'QHsed' has not been submitted.

3) Our current lookup table for ice microphysics does not include total projected area of ice particles, so 'Ai' has not been submitted. However, if it is felt that this is an important variable we can rerun the lookup table and simulation to include this quantity in the output.

4) Although our model is 2D, for the '3D' netcdf fields we did include the 'y' with number of columns in this dimension set to 1. Northward wind component 'v' has not been submitted.

5) Our optical depth calculations do not include rain (only cloud water and/or ice).

6) All relevant variables correspond with the east-west and vertical grid centers, including radiative flux, thermodynamic, and dynamic quantities.

7) Sensitivity simulation will be uploaded shortly. These results are designated with 'EULAG_SENS.*'

For questions, please contact Hugh Morrison: morrison@ucar.edu

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