Scientist

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Model Name and History

- COAMPS(R) Large Eddy Simulation version. (Footnote: COAMPS(R) is a registerered trademark of the Naval Research Laboratory.)
- COAMPS-LES

Model type: 3D

Numerical Domain:

- Domain size in x and y: 4800 x 4800 m
- Domain size in z: 32 km
- Number of grid points in x,y,z: 96 x 96 x 124
- Grid spacing in x and y: 50 m
- Grid spacing in z: 20 m from surface to 1810 m, stretched above up to a maximum grid spacing of 3000 m (for radiation calculations).

Numerical Technique:

- Finite-difference.
- Second-order cenetered advection for momentum variables (u,v,w), Bott positive definite advection with second order polynomials for scalars
(theta, qv, qx).
- Leapfrog for momentum variables, forward for scalars.
- Anelastic pressure solver.
- Fourth order numerical diffusion for momentum variables (0.001).
- Double periodic boundary conditions.
- Rayleigh damping in the upper 19 model levels (2800 m and higher).
- Translation velocity corresponding to half the geostrophic winds (-6.5,-1.5).

Physical Parameterizations:

- Louis (1979) surface layer parameterization. Surface roughness based on Fairall et al. 1996. Surface sensible and latent heat fluxes imposed following intercomparison specifications.
- LW and SW radiation based on Harshvardhan et al. (1987).
- Vertical domain was extended to 32 km to use radiation parameterization.
- Microphysical specices: cloud water, rain, ice crystals, snow and graupel.
Single-moment scheme based on Rutlege and Hobbs (1983,1984). Drizzle parameterization based on Khairoutdinov and Kogan (2000). Mixed Fletcher and Cooper and Haines (1986) ice nucleation.
- Deardorff-type TKE LES subgrid scale model.

Documentation:

* S. Chen and Coauthors, 2003: "COAMPS(TM) Version 3 Model Description

-- General Theory and Equations". NRL Publication, NRL/PU/7500--03-448.

* Golaz, J.-C., S. Wang, J. D. Doyle, and J. M. Schmidt, 2005: "COAMPS (R)-LES:
Model evaluation and analysis of second and third moment vertical velocity
budgets". Bound.-Layer Meteor., 116, 487517.