



Hamiltonian particle-mesh simulation for a non-hydrostatic vertical slice model.

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We develop a non-hydrostatic vertical slice model in the context of the Hamiltonian Particle-Mesh Method (HPM) for the dry adiabatic atmosphere. The slice model is tested with the bubble-experiments described in Robert (1992) and the gravity wave experiment in Skamarock and Klemp (1994). The solutions are maintained smooth largely due to a "regularization" in the absence of the artificial diffusion. The regularization is implemented in harmony with a conservative force field and does not interfere with the hydrostatically balanced reference state. The accuracy of the HPM simulation is comparable to those in these references and the model performances show that the HPM method is potentially applicable to non-hydrostatic atmospheric flow regimes.