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Leslie M Smith* (lsmith@math.wisc.edu), Department of Mathematics, 480 Lincoln Dr,
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Moist convection in the atmosphere directly impacts the formation and dynamics of cloud structures on many different horizontal length scales, from small-scale vortical hot towers, to intermediate-scale squall lines, to the merger of the polar and subtropical jets on large scales. Here we present a minimalist approach to the theory and modeling of precipitating convection, based on asymptotically fast cloud microphysics. Conservation laws for momentum, energy, moist entropy and total water are all retained, but have a simple nontrivial form. Performance and analysis of the model will be discussed for test cases on small and intermediate scales, as well as the systematic derivation of a precipitating quasi-geostrophic system to describe atmospheric large scales with dynamic phase changes. (Received August 19, 2016)