Abstract Submitted
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Multiscale Atmospheric Physics Modeled by Cumulant Expansions BRAD MARSTON[1], Brown University, GREG CHINI[2], University of New Hampshire — We investigate a systematic and physically based approach to modeling subgrid physics statistically with the use of an expansion in equal-time cumulants. To accomplish this we replace the zonal average employed in previous work[3] with a low-pass filter that separates small and large scales in the zonal direction. The statistics are non-local, inhomogeneous, and anisotropic; the sole approximation is the neglect of 3-point and higher correlation functions. The closure respects the conservation of energy, enstrophy, and angular momentum. An advantage of the formulation is that correlations between large and small scale processes are treated explicitly without the introduction of phenomenological parameterizations. The approach is tested against full numerical simulation of idealized 1- and 2-layer models of the atmospheric general circulation[4] and shown to yield accurate low-order statistics. (The computer model used to perform these tests runs on OS X and is publicly available.[5]) We identify important multiscale interactions and discuss the computational cost of the new scheme.

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[5]URL http://appstore.com/mac/gcm

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