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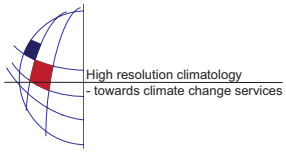

Parameterizing Clouds and Turbulence in Coarse-Grid Cloud-Resolving Models

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We have used results from large-domain large-eddy simulations of several cloud systems (deep convection, shallow cumulus-topped boundary layer, stratocumulus-topped boundary layer, and a clear convectie boundary layer) to test the assumed PDF method. We have coded and tested a simplified turbulence closure model following Redelsperger and Sommeria (1986), and combined it with a double Gaussian PDF closure. We diagnosed the turbulence length scale that is appropriate for use in coarse-grid cloud-resolving models, such as the MMF (Multiscale Modeling Framework), from the large-eddy simulation results. We have tested new formulations of the turbulence length scale for use in coarse-grid cloud-resolving models. We have extended the Redelsperger and Sommeria turbulence closure by including non-local (counter-gradient) effects in the diagnosed turbulent vertical fluxes of the conserved thermodynamic variables, and tested the impacts.