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A Multi-scale Modeling System with Unified Physics

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Numerical cloud resolving models have been extensively applied to cloud-scale and mesoscale processes during the past four decades. Recent GEWEX Cloud System Study (GCCS) model comparison projects have indicated that CRMs agree with observations in simulating various types of clouds and cloud systems from different geographic locations. Cloud resolving models now provide statistical information useful for developing more realistic physically based parameterizations for climate models and numerical weather prediction models. It is also expected that NWP and regional scale models can be run in grid size similar to cloud resolving model through nesting technique. A review of developments, improvements and applications of the multi-scale modeling system with unified physics will be presented.