

Radiative-convective-equilibrium as a “boutique” configuration of the Simple-Cloud-Resolving-E3SM-Atmosphere-Model (SCREAM)

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The Simple-Cloud-E3SM-Atmosphere-Model (SCREAM) is currently being developed as the high resolution (~3 km grid spacing) version of the US Department of Energy's new Energy Exascale Earth System Model (E3SM). A new suite of cloud physics parameterizations has been implemented to accommodate the partially cloud resolving resolution of SCREAM. In particular, turbulence, shallow convection, and macrophysics are handled by the Simple Higher Order Closure (SHOC) and microphysics is handled by the Predicted Particle Properties (P3) scheme.

In order to efficiently examine and scrutinize the new model's physical soundness - especially as it pertains to clouds - a Radiative-Convective-Equilibrium (RCE) configuration run on a reduced radius aquaplanet has been implemented. This presentation will highlight the utility of RCE as a testbed for new generation cloud resolving climate models and in the process of doing so will introduce a new cloud and precipitation diagnostic framework that could be used in any RCE model to quantify the sources and sinks of cloudiness.

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Authors: BEYDOUN, Hassan (Lawrence Livermore National Laboratory); CALDWELL, Peter (Lawrence Livermore National Laboratory); HANNAH, Walter (Lawrence Livermore National Laboratory); DONAHUE, Aaron (Lawrence Livermore National Laboratory); BOGENSCHUTZ1, Peter

Presenter: BEYDOUN, Hassan (Lawrence Livermore National Laboratory)

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