



Non-Hydrostatic Atmosphere Project

aka the Simple Cloud-Resolving E3SM Atmosphere Model (SCREAM)

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Strategy

- Target global 3 km atmosphere to:
 - resolve deep convection, a key source of climate-change uncertainty
 - provide enough concurrent work for next-gen supercomputers
- Simplify parameterizations as much as possible:
 - because you shouldn't trust a model you can't understand
 - because at 3 km more processes are explicitly resolved
 - with the expectation that more (sophisticated) processes will need to be added later to fix model deficiencies
- Write in C++/Kokkos to
 - enable good performance on both CPUs and GPUs
 - attract programming talent and modernize culture (e.g. testing)
 - take advantage of better compiler support/ecosystem

Development Overview

Clouds and turbulence will be handled by the Simplified Higher-Order Closure (**SHOC**)

Radiation will be handled by **RTE + RRTMGP** and NOT rewritten by this project

Microphysics will be a simplified and rewritten version of the Predicted Particle Properties (**P3**) scheme

Parameterizations will be coupled via an object-oriented driver

Non-hydrostatic dynamics has already been developed, but needs to be coupled to physics