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