

This model-observation intercomparison project (MIP) focuses on an intense Arctic cold-air outbreak (CAO) case that was observed during the Cold-Air Outbreaks in the Marine Boundary Layer Experiment (COMBLE; [Geerts et al., 2022](#)). Despite the frequent occurrence of Arctic CAOs, many numerical models have difficulty representing various aspects of this mixed-phase cloud system. Using a quasi-Lagrangian approach, we have solicited participation of large-eddy simulation and single column models to examine mesoscale cloud organization, cloud phase partitioning, and boundary layer structure and turbulence while relying on upwind aerosol observations, downwind COMBLE observations, and satellite measurements.

The COMBLE MIP is also a featured project under the Global Atmospheric System Studies (GASS) Global Energy and Water Exchanges (GEWEX) program. More detailed information on planning and participation can be found in the GASS project [white paper](#) and on the [project website](#). Case forcing was officially released on December 1st, 2023, and the first round of model outputs are requested by March 1st, 2024. To be added to the project e-mail list, please contact [Tim Juliano](#), [Florian Tornow](#), (or [Ann Fridlind](#)).