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Large Eddy Simulations of Springtime Arctic Mixed-Phase Clouds ERIKA ROESLER, DEREK POSSELT, University of Michigan — Observations and modeling results have shown the high latitudes' environment changing in a warmer climate. The research presented here focuses on understanding diifferences in the parameterizations made to simulate the Arctic mixed-phase stratocumulus (AMPS) clouds and the sensitivity of the AMPS to changing environmental conditions. The level of complexity needed to simulate this cloud is investigated with two microphysics routines and two subgrid scale turbulent closure models. It was found the both microphysics accurately produced macrophysical properties of the observed cloud, and that the less computationally expensive microphysics parameterization could be used to reproduce the AMPS. When the subgrid scale turbulent closure models were evaluated with the microphysics routines, it was found the choice of turbulent closure model had more of an effect on the cloud properties than the choice of microphysics. Knowledge of the parameterizations needed for representing the AMPS were applied to a paramter-space-filling uncertainty quantification technique in DAKOTA to understand the sensitivity of the AMPS to changes in its environment. It was found from the environmental sensitivity study that the AMPS did not form unconditionally, and that environmental thresholds exist.

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