

A sea-ice model with resolved melt ponds: Comparisons with observed pond statistics over a limited area

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Simulations of melting sea ice are presented using a high resolution (5 cm) model that employs a water-table based scheme for determining melt pond depth. The model is initialized using sea ice surface topography based on laser-estimated values from ice along the coast of Barrow, Alaska. Heat fluxes are parameterized using bulk formula for surface sensible and latent heat, and a delta-Eddington approach for penetrating solar radiation in the ice (following the NCAR Community Earth System Model CESM1.0 parameterization). Comparisons between simulated ice pond fraction and observations are presented using model forcing based on observations from Barrow, AK. Experiments are also conducted under idealized conditions and used to test the standard sea ice parameterization employed in the CESM1.0 model.