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A continuum model of melt pond evolution on Arctic sea ice

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Melt ponds are poorly represented in global climate models (GCMs) despite their significant influence on the albedo of sea ice during the melting season. Melt ponds cover up to 50% of sea ice during the melt season and decrease the surface albedo by up to 10%. We present a new model of the evolution of melt pond area and depth that treats vertical drainage, enhanced melting of pond covered ice, and lateral redistribution of melt water that uses the thickness distribution function included in existing GCMs. We present results using our melt pond model alone and results obtained when this model is included into the well-known Los Alamos CICE sea ice model.