

## Realistic representation of melt pond cycle in CICE

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Inclusion of melt ponds in sea ice models has been demonstrated to have a significant impact on summer melts due to the albedo feedback mechanism, as well as on winter basal growth during the period of melt pond refreezing. However, the net effect of melt ponds on reducing extent and volume of sea ice is currently underestimated in climate models. In order to assess the full impact of these processes, one needs to correctly represent the temperature profile throughout the ice layer during and after the formation and refreezing of trapped ponds. We present a new vertical thermodynamics and melt pond scheme in CICE that allows us to model multiple concurrent phases relevant to the melt pond cycle (i.e. open melt pond, trapped melt pond with an ice lid, refrozen melt pond) with a goal to realistically account for heat transfer and heat storage in ponded sea ice throughout the year, and we will discuss its impact on Arctic variability and predictability.