Geophysical Research Abstracts
Vol. 17, EGU2015-5065, 2015
EGU General Assembly 2015

Growth of false bottoms under sea ice

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In the summer months, melt water from the surface of Arctic sea ice can percolate through the relatively porous ice and collect at the ice-ocean interface, filling hollows in the base of the ice. These pools are called under-ice melt ponds. Freezing can occur at the interface between the fresh water and the oceanic mixed layer, forming a sheet of ice called a false bottom. These have been observed to thicken and migrate upwards over time. False bottoms insulate the true base of the sea ice from the ocean and their formation is a significant mechanism of Arctic sea ice summer growth.

Current parameterisations of basal ablation of sea ice in climate models do not account for these processes, the inclusion of which could improve the accuracy of predictions of Arctic sea ice.

In this poster, a one-dimensional thermodynamic model of the evolution of under-ice melt ponds and false bottoms is presented. Our aim is to develop a parameterisation of the impact of under ice melt ponds and false bottoms on basal ablation of Arctic sea ice appropriate for use in gridded climate models.