



Sea ice salinity and salt flux from a growing ice sheet in the presence of an oceanic heat flux

C. Petrich and P.J. Langhorne

Department of Physics, University of Otago, Dunedin, New Zealand
(cpetrich@physics.otago.ac.nz)

Growing sea ice is a source of brine released into the ocean. We perform two-dimensional computational fluid dynamics simulations of the growth of sea ice sheets to determine the dependence of sea ice salinity and salt flux on the oceanic heat flux. In the absence of an oceanic heat flux the fluid dynamics model produces ice sheets with salinity profiles that are compatible with the forward explicit one-dimensional model of Cox and Weeks (1988). The simulations suggest that the “stable” salinity profile of an ice sheet is independent of the oceanic heat flux, and that it can be predicted from the temperature gradient through the ice at the time of ice formation. However, the salt flux depends on the oceanic heat flux and is a function of growth velocity.