Validating Simulations of Sea Ice Brine Dynamics with Field Observations

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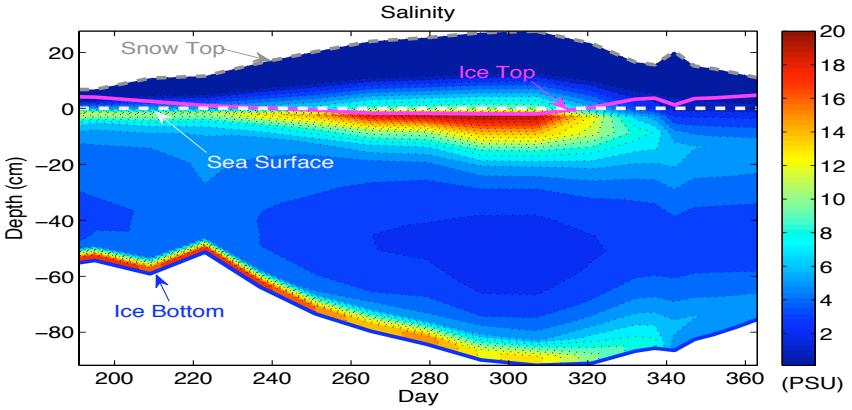
Objective

Developing a model of brine dynamics that reproduces field observations of sea ice paves the way for biogeochemical ice modeling in coupled climate model applications. Here we use transport parameterizations in a dynamic salinity model to simulate sea ice in the Weddell Sea

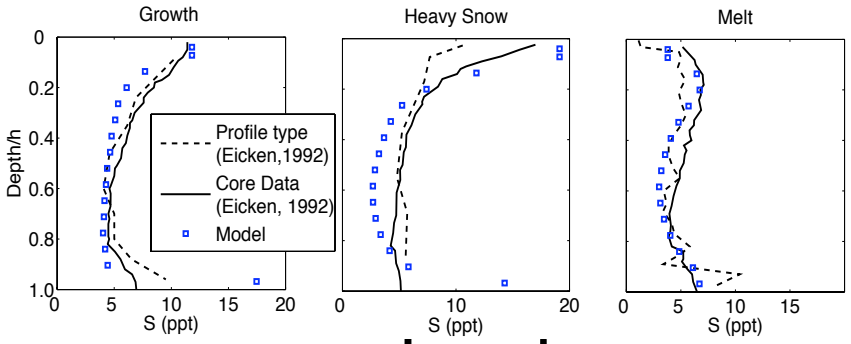
Research

- In sea ice, salt (and chemical compounds) are expelled during ice growth and melt processes.
- We parameterize these processes in the Los Alamos sea ice model (CICE)
- Using field observations from ISPOL (Ice Station *POLarstern*), we simulate sea ice and compare with ice core data

Simulated ice salinity contours over 180 Days



Modeled Salinity (blue) and observations (black)



Impact

Salinity profiles are a good match for field observations over all three dynamical regimes: growth, snow-ice formation (snow loading) and melt. Results validate the "physics" of ice biogeochemical modeling.

Jeffery, **N. and Hunke, E. C. 2014. Modelling the winter-spring transition of first-year ice in the western Weddell Sea.** ***J. Geophys. Res. Oceans,*** **119, doi:10.1002/2013JC009634**