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# The impact of salinity parametrizations on sea-ice thermodynamics

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It is still an open question in what detail sea-ice salinity should be treated in earth system models. We approach this question using a 1D multi-phase halo-thermodynamic sea-ice model. We evaluate the differences in the simulated sea ice between models using (a) a complex salinity parametrization, (b) a simple salinity parametrization, or (c) a prescribed fixed salinity. More specifically, we compare how the thermal resistance, stored energy, and freshwater column evolve in the three different model setups, which are forced with reanalysis data.

The complex parametrization simulates the brine flux as a 1D Darcy flow and buoyancy driven convection. This parametrization was initially developed to reproduce small scale laboratory measurements and to imitate 2D numerical simulations. The simple parametrization relaxes the salinity profile to fulfill certain stability criteria or to resemble field data. The third approach of prescribing a fixed salinity is the most widespread approach used in climate earth system models today.