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Modeling and numerical analysis of sea ice

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Sea ice is one of the important components in global circulation models used for weather forecasting and especially for climate prediction. Sea ice is modeled as a 2D layer between the atmosphere and the ocean. While sea ice covers only the polar regions of the Earth, the sea ice component usually takes on the role of a coupler between the ocean and the atmosphere and is responsible for all energy transfer between these two phases.

We focus on the dynamics of sea ice and provide an introduction to modeling it as a 2D fluid. Different rheologies are considered. The most established are approximations to a viscous plastic model.

Finally, we describe the special requirements in terms of numerical discretization and implementation of such a sea ice model, which should fit well into the general framework of global climate models.

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