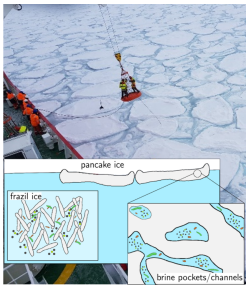
University of Stuttgart
Germany

Institute of Mechanics, Structural Analysis
and Dynamics of Aerospace Structures
Head of Institute: Prof. Dr.-Ing. Tim Ricken

Announcement – Master's Thesis

Development of a micro-macro linking scheme for liquid-to-solid phase transition by the example of Antarctic sea ice formation

Motivation:



Antarctic sea ice formation and its mutual effects on ocean biology and chemistry is very sensitive to climate change. The formation of 'pancake' ice floes and the coupled physical-biogeochemical (P-BGC) processes can be modeled by using the continuum-mechanical multi-phase description of the extended Theory of Porous Media (eTPM), and simulated with the Finite Element Method (FEM). The ice formation can be described via a salinity-temperature equilibrium of the enclosed ocean water.

Tasks:

Implementation of ice formation on a micro-scale using a micro-macro linking scheme to the macroscopic variables of temperature and salinity and verification by data from literature or possible experimental data provided by the University of Cape Town (UCT).

Procedure:

The existing model (FEAP 8.4) will be enhanced by implementing a micro-scale for ice growth solved by the Finite Difference Method (FDM). For that, the salinity-temperature equilibrium has to be re-written to a rate formulation.

Requirements:

Ideally you have experience with continuum mechanics or even TPM, numerical simulations and FEM (Introduction to FEM, Numerics) as well as programming experience (Fortran).

Editor:
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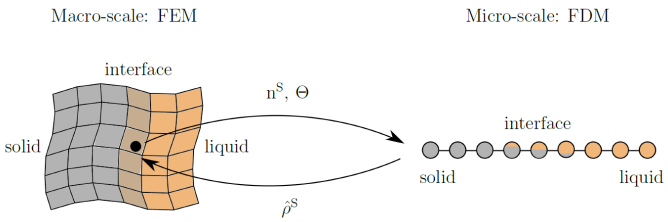

Please don't hesitate to contact
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