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PROCEEDINGS

Modelling and Simulation of Fluid Flow Evolution in Porous Sea Ice Based on TMPD

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ABSTRACT

Granular and columnar sea ice formed random pores containing gas and brine while growing in a polar environment. Building an appropriate microstructure of sea ice model to reveal its material singularities using standard methods is difficult. In this study, we develop a porous sea ice model based on coupled thermos-mechanical peridynamics [1-3] by considering the fluid flow and material transport in pores. The novel features of using the porous sea ice peridynamic model are as follows:

(1) To establish the porous sea ice model, the sea ice pore equation is combined with the peridynamic equations.

(2) The proposed model can simulate the fluid-structure interaction in the pore of sea ice.

(3) The numerical model can reproduction the fluid flow process and the material transport in the sea ice pore well.

KEYWORDS

Sea ice; porous media; fluid flow; peridynamics

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