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# *Interactive comment on* "An Operational Thermodynamic-Dynamic Model for the Coastal Labrador Sea Ice Melt Season" *by* Ian D. Turnbull and Rocky S. Taylor

**Anonymous Referee #1**

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The paper describes a model for predicting the sea ice break up near the coast. The skill in predicting such events is important for offshore industries operating in cold regions. I have two major concerns to this paper: justifications of developing this particular model and reproducibility of results.

There exist a few open source communities for sea ice modeling, e.g. CICE and LIM for a standalone sea-ice model and MITgcm for coupled ocean and sea ice. The manuscript does not address potential deficiencies of these tools in predicting the sea-ice break up, which should be the motivation for developing a new model. It is also unclear that the model presented in the manuscript performs better than these existing tools. In the present form, the paper does not articulate the advantages or needs of

creating a new model for this application.

The model is largely based on the published one-dimensional thermodynamic sea-ice model, and the paper does not contain new formulations of physics or adaptations of innovative methods to solve the governing equations. The model ability to predict the break up is sensitive to the initial snow depth over the ice. This raises a doubt in applying this tool as a generic forecasting platform, and the authors do not discuss a possible mitigation strategy to constrain the uncertainties. Furthermore, the model code will not be shared with readers, which questions the reproducibility of the results in the future. In summary, I do not see that this manuscript fits the goal of the journal in the present form, and therefore, I recommend rejection at this stage.

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