



## **Thermodynamic modelling of sea ice: deciding on a good atmosphere-ice interface**

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A capability for multilayer thermodynamics is now common in sea ice models used for global coupled climate modelling. When coupling such a sea ice model to an atmosphere model, a choice must be made regarding which model is to calculate the fluxes and temperature at the ice surface. To assess which option produces the more accurate simulation of ice and surface variables, a one-dimensional multilayer sea ice model is coupled to a atmosphere boundary-layer model and subjected to idealised forcing.

The model is run at high temporal resolution to generate a reference solution, then the two approaches are tested at coupling intervals more typical of global climate models. It is found that a considerably more accurate simulation of all variables, including the top layer ice temperature, is obtained by allowing the surface variables to vary on the shorter timestep of the atmosphere mode, The likely reasons for this are analysed, and the applicability of this result in 3D simulations is discussed.