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A multi-thickness sea ice model accounting for sliding friction

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A multi-thickness sea ice model explicitly accounting for the ridging and sliding friction contributions to sea ice stress is developed. Both ridging and sliding contributions depend on the deformation type through functions adopted from Ukita and Moritz's kinematic model of floe interaction. In contrast to most previous work, the ice strength of a uniform ice sheet of constant ice thickness is taken to be proportional to the ice thickness raised to the power of $3/2$, as is revealed in discrete element simulations by Hopkins. The new multi-thickness sea ice model for sea ice stress has been implemented into the Los Alamos CICE sea ice model code and is shown to improve agreement between model predictions and observed spatial distribution of sea ice thickness in the Arctic.