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Sensitivity model study of Arctic ice-ocean interactions during the Little Ice Age using different radiative and wind stress forcings

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In the past, the main drivers of the Little Ice Age (LIA) have been identified as volcanic eruptions, insolation changes and greenhouse gas changes. Furthermore, changes in the global ocean circulation have been detected from proxy data. One component which links the atmosphere and the ocean circulation is the sea ice. This study investigates the role Arctic sea ice has played in shaping the LIA climate using a global intermediate complexity model with an EMBM for the atmosphere, a GCM for the ocean, and a dynamic-thermodynamic model for the sea ice. In order to carry out this study, different wind stress fields for the LIA period are used for the model. In addition to a climatological wind stress field and one obtained from an AGCM run for the LIA, three other wind stress fields have been developed using NAO reconstructions for the LIA. The results of a sensitivity study are presented using these different wind stress and radiative forcings, and in particular, the changes to the sea-ice cover and ocean circulation are examined.