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Decadal predictability of the Arctic sea ice from Nordic Seas deep convection

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Predicting sea ice conditions up to a few years in advance has so far proven challenging. One potential cause is that the role of the ocean, and in particular what drives oceanic heat transport into the Arctic, is still not fully understood. Using multi-ensemble simulations of the global coupled model EC-Earth, initiated at different states of decadal variability and totalling 2000 years, we here determine the potential for predictability of the oceanic heat transport through Fram Strait and the Barents Sea Opening (BSO), focusing notably on the dynamical relationship between poleward oceanic heat transport into the Arctic and deep water formation in the Nordic Seas. The deeper the convection and in particular the larger the volumes involved, the weaker the Fram Strait transport. The location of deep convection itself as determined by principal component analysis has little effect on the Fram Strait transport but can in contrast reverse the transport through the BSO. This is probably because BSO is too shallow for the convection depth to matter; its presence through the water route is enough to block the flow. We now investigate the mechanisms behind these relationships, especially the role of the atmosphere and sea ice.