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# Oceanic Forcing of Arctic Sea Ice Melt

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The warming and decline of the ice pack in the Arctic Ocean has received a lot of attention within the science community and general public. Satellite records of the Arctic sea ice cover show a decreasing trend in ice extent and concentration since 1979. This trend, superimposed over large seasonal and interannual variability, has been coincident with the high-index polarity of the Northern Hemisphere Annular Mode (NAM also known as the Arctic Oscillation (AO) or the North Atlantic Oscillation (NAO)) represented by a reduced winter weather regime over mid- to high-latitude continental regions of the Northern Hemisphere. The reduction of the Arctic ice pack has been primarily associated with anomalies of surface air temperature and circulation over the Arctic and those in turn have been linked to the Arctic Oscillation (AO). Such studies typically assume the dominant role of external atmospheric forcing and neglect effects of processes internal to the Arctic Ocean. Especially overlooked tends to be the oceanic thermodynamic control of sea ice through the under-ice ablation and lateral melt along marginal ice zones. The oceanic heat, in addition to atmospheric radiative and sensible heat input, contributes to sea ice melt, especially in regions coincident directly downstream of oceanic heat advection from the Pacific and Atlantic oceans. Such ice-ocean interactions may act to de-correlate AO forcing and could help explain some of the timing issues between AO/atmospheric forcing and sea ice variability.

We use a high resolution coupled ice-ocean model of the Pan-Arctic region forced with realistic atmospheric data to investigate oceanic forcing of interannual variability of melting Arctic sea ice cover. In particular, a possible mechanism for the removal of sea ice cover over the Greenland shelf in recent years will be discussed.