

Impact of a Projected Future Arctic Sea Ice Reduction on the NAO and Rossby Wave Breaking

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Abstract

The impact of a reduced Arctic sea ice cover on wintertime extratropical storminess is investigated by conducting atmospheric general circulation model (AGCM) experiments. The AGCM ECHAM5 is forced by the present and a projected future seasonal cycle of Arctic sea ice. In the experiment with projected sea-ice concentrations significant reductions in storminess were found during December and January in both midlatitudes and towards the Arctic. However, a substantially larger reduction in extratropical storminess was found in March, despite a smaller change in surface energy fluxes in March than in the other winter months. The projected decrease in storminess is also related to the negative phase of the North Atlantic Oscillation (NAO). The March response is consistent with a forcing from transient and quasi-stationary eddies associated with negative NAO events. The greater sensitivity to sea-ice anomalies in late winter is analyzed in regard to Rossby wave braking.

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