2023 PAMIP Webinar Series

Arctic sea-ice loss and winter temperature extremes

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Abstract

Observed rapid Arctic warming and sea-ice loss are likely to continue in the future, unless and after greenhouse gas emissions are reduced to net-zero. Here, we examine the possible effects of future sea-ice loss at 2°C global warming above pre-industrial levels on winter temperature extremes across the Northern Hemisphere, using coordinated experiments from the Polar Amplification Model Intercomparison Project. 1-in-20-year cold extremes are simulated to become less severe at high- and mid-latitudes in response to Arctic sea-ice loss. 1-in-20-year winter warm extremes become warmer at northern high latitudes due to sea-ice loss, but warm by less than cold extremes. We compare the response to sea-ice loss to that from global sea surface temperature (SST) change also at 2°C global warming. SST change causes less severe cold extremes and more severe warm extremes globally. Except northern high latitudes, the response to SST change is of larger magnitude than that to Arctic sea-ice loss.

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