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## Observationally constrained multi-model atmospheric response to future Arctic sea ice loss

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The possibility that Arctic sea ice loss could weaken mid-latitude westerlies and promote more severe cold winters has sparked more than a decade of scientific debate, with support from observations but inconclusive modelling evidence. Here we analyse a large multi-model ensemble of coordinated experiments from the Polar Amplification Model Intercomparison Project and find that the modelled response is proportional to the simulated eddy momentum feedback, and that this is underestimated in all models. Hence, we derive an observationally constrained model response showing a modest weakening of mid-latitude tropospheric and stratospheric winds, an equatorward shift of the Atlantic and Pacific storm tracks, and a negative North Atlantic Oscillation. Although our constrained response is consistent with observed relationships which have weakened recently, we caution that emergent constraints may only provide a lower bound.

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