



Arctic sea-ice changes and Northern Hemisphere atmospheric circulation

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Over the past half century, the Arctic has warmed at about twice the global rate (Arctic amplification) with important and worrying sea-ice declining in the region. As the climate continues to warm further reduction is expected: coupled model projections suggest that perennial Arctic sea-ice could disappear within the next few decades. Of particular interest is the understanding of the effects of Arctic sea-ice reductions on the winter climate of Europe, North America and parts of Asia. To analyze the co-variability between Arctic sea-ice and Northern Hemisphere atmospheric circulation we applied statistical analysis. Preliminary results suggest that there are regions (both in summer and winter) over Europe/Mediterranean and Eastern US/Asia sectors with a linked variance of those variables larger than 25-30%. Implications for the main circulation patterns of the Northern Hemisphere winter (i.e. NAO, Arctic Oscillation and Pacific North American pattern) as well as possible relationship between the climatological jet latitude and the jet response to polar surface heating are investigated as well. A suite of atmospheric model experiments with prescribed sea-ice complements the finding from atmospheric reanalysis. Implications and aspects of predictability for winter sea-ice conditions and related atmospheric circulation are discussed.

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