

# Declining Arctic sea ice influences European weather—but isn't a cause of colder winters

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The dramatic loss of Arctic sea ice through climate change is unlikely to lead to more severe winter weather across Northern Europe, new research has shown.

A pioneering new study has explored how Arctic sea-ice loss influences the North Atlantic Oscillation (NAO) weather phenomenon, which affects winter weather conditions in Northern Europe, in places such as the UK, Scandinavia and the Baltic states.

Previous studies have suggested that Arctic sea-ice loss causes the NAO to spend longer in its 'negative phase' - generating more easterly winds that bring colder air from Scandinavia and Siberia to the UK. This might be expected to cause more frequent cold winters, such as the deep freeze experienced in the UK in the winter of 2009/2010.

However the new study, carried out by Dr James Screen from the University of Exeter, crucially suggests that Arctic sea-ice loss does not cause colder European winters.

Dr Screen suggests this surprising result is due to a 'missing' cooling response - meaning that the expected cooling brought about by more easterly winds is offset by the widespread warming effects of Arctic sea-ice loss.

The study is published in leading science journal, *Nature Communications*.

Dr Screen, a Senior Lecturer in Mathematics at the University of Exeter said: "We know that the NAO is an important factor in controlling winter weather over Northern Europe".

"The negative phase of the NAO is typically associated with colder winters. Because of this it has been reasonable to think that we would experience more severe [winter weather](#) if Arctic sea-ice loss intensifies the negative phase of the NAO".

"This research indicates that although sea-ice loss does intensify the negative NAO, bringing more days of cold easterly winds, it also causes those same winds to be warmer than they used to be. These two competing effects cancel each other out, meaning little change in the average temperature of European winters as a consequence of sea-ice loss".

The NAO phenomenon describes large-scale changes in atmospheric wind patterns over the North Atlantic. Importantly, the NAO relates to changes in the strength and position of the North Atlantic jet stream - a band of very fast winds high in the atmosphere. The position of the jet stream has a substantial impact on weather in Northern Europe.

Using the sophisticated UK Met Office climate model, Dr Screen conducted computer experiments to study the effects of Arctic sea-ice loss on the NAO and on Northern European winter temperatures.

Dr Screen added: "Scientists are eager to understand the far-flung effects of Arctic sea-ice loss. On the one hand this study shows that sea-ice loss does influence European wind patterns. But on the other hand, Arctic sea-ice loss does not appear to be a cause of European temperature change, as some scientists have argued."

**More information:** The missing Northern European winter cooling

response to Arctic sea ice loss by Dr James Screen is published in *Nature Communications*. [DOI: 10.1038/NCOMMS14603](https://doi.org/10.1038/NCOMMS14603)

Provided by University of Exeter

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