

Researchers reveal variations in Arctic amplification effect during past millennium

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The recent amplified warming in the Arctic during the last decades has

received much attention. But how Arctic amplification (AA) has varied on longer time scales and what drives these variations remain unclear.

Recently, a study has provided a new perspective on the AA effect during the past millennium based on the best available paleoclimate data and novel data assimilation methods.

The study was published in *Nature Communications* on April 6. It was conducted by researchers from the Northwest Institute of Eco-Environment and Resources of the Chinese Academy of Sciences (CAS), the Institute of Tibetan Plateau Research of CAS, the Lund University and the University of Gothenburg.

The researchers produced a new millennium-long temperature reconstruction over the Northern Hemisphere by combining [climate model simulations](#) with newly available paleoclimate proxy records from the Past Global Changes 2k Network (PAGES2k) consortium, resulting in physically consistent and spatiotemporally continuous temperature fields.

Additionally, to quantify the variations in the strength of the AA, the researchers reconstructed a millennial AA index series, which revealed a significantly declining AA effect on the millennial time scale.

The millennial AA index series revealed that AA exhibited strong variations over a broad range of time scales, which can be explained, to a large part, by the phase of the Atlantic Multi-decadal Oscillation (AMO) and recent anthropogenic greenhouse gas forcing.

This result highlights the importance of the AMO and enhanced [greenhouse effect](#) in modulating AA, and suggests that there is predictability in AA on multi-decadal time scales.

The findings of this study may help fill the gaps in understanding the AA variation over the preindustrial era, improve the predictive ability of the Arctic and [global climate change](#) on the multi-decadal time scale, and distinguish the contributions of the natural variability of climate system and anthropogenic forcing to AA variation.

More information: Miao Fang et al, Arctic amplification modulated by Atlantic Multidecadal Oscillation and greenhouse forcing on multidecadal to century scales, *Nature Communications* (2022). [DOI: 10.1038/s41467-022-29523-x](#)

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