

# PAMIP Webinar Series

## Arctic Ocean Amplification by enhanced poleward ocean heat transport

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### Abstract

The Arctic has been experiencing the most notable climate change over the past few decades. The rise of near-surface air temperature in the Arctic is more than twice that of the global average, a phenomenon known as “Arctic Amplification”. This has received much attention from both the scientific community and the public. In contrast, the ongoing and future changes of the underlying ocean are less well understood.

Here, we use state-of-the-art climate models and show that the Arctic Ocean is also warming much faster than the global mean. We call this phenomenon the “Arctic Ocean Amplification”. The upper 2000 m of the Arctic Ocean warms at 2.3 times the global mean rate within this depth range. The strongest warming is found at intermediate depths, in the Atlantic water layer. The Barents Sea will have the greatest future temperature increase in the Arctic Ocean. The amplified Arctic Ocean warming can be attributed to a substantial increase in poleward ocean heat transport, which will continue to outweigh sea surface heat loss in the future. Arctic Ocean Amplification is therefore largely a fingerprint of Arctic Atlantification, a process of anomalous ocean heat advection from the North Atlantic to the Arctic Ocean.



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