

New discoveries improve climate models

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New discoveries on how underwater ridges impact the ocean's circulation system will help improve climate projections.

An underwater ridge can trap the flow of cold, dense water at the bottom of the ocean. Without the ridge, deepwater can flow freely and speed up the ocean [circulation pattern](#), which generally increases the flow of warm surface water.

Warm water on the ocean's surface makes the formation of sea ice difficult. With less ice present to reflect the sun, surface water will absorb more sunlight and continue to warm.

U.S. Geological Survey scientists looked back 3 million years, to the mid-Pliocene warm period, and studied the influence of the North Atlantic Ocean's Greenland-Scotland Ridge on surface water temperature.

"Sea-surface temperatures in the North Atlantic and Arctic Oceans were much warmer during the mid-Pliocene warm period than they are today, but [climate models](#) so far have been unable to fully understand and account for the cause of this large scale of warming," said USGS scientist Marci Robinson. "Our research suggests that a lower height of the Greenland-Scotland Ridge during this geologic age was a contributor to the increase of poleward [heat transport](#)."

"This is the first time the impact of a North Atlantic underwater ridge on the [ocean circulation](#) system was tested in a mid-Pliocene experiment," said Robinson. "Understanding this process allows for more accurate

predictions of factors such as ocean temperature and ice volume changes.

Research was conducted on the mid-Pliocene because it is the most recent interval in the earth's history in which [global temperatures](#) reached and remained at levels similar to those projected for the 21st century by the Intergovernmental Panel on Climate Change. Therefore, it may be one of the closest analogs in helping to understand the earth's current and future conditions.

More information: The article was published in the journal, *Palaeogeography, Palaeoclimatology, Palaeoecology*, and can be viewed at [dx.doi.org/10.1016/j.palaeo.2011.01.004](https://doi.org/10.1016/j.palaeo.2011.01.004)

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