

# Researchers find bottom of Pacific getting colder, possibly due to Little Ice Age

January 4 2019, by Bob Yirka

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Cold waters that sank in polar regions hundreds of years ago during the Little Ice Age are still impacting deep Pacific Ocean temperature trends. While the deep Pacific temperature trends are small, they represent a large amount of energy in the Earth system. Credit: : Larry Madin, Woods Hole Oceanographic Institution

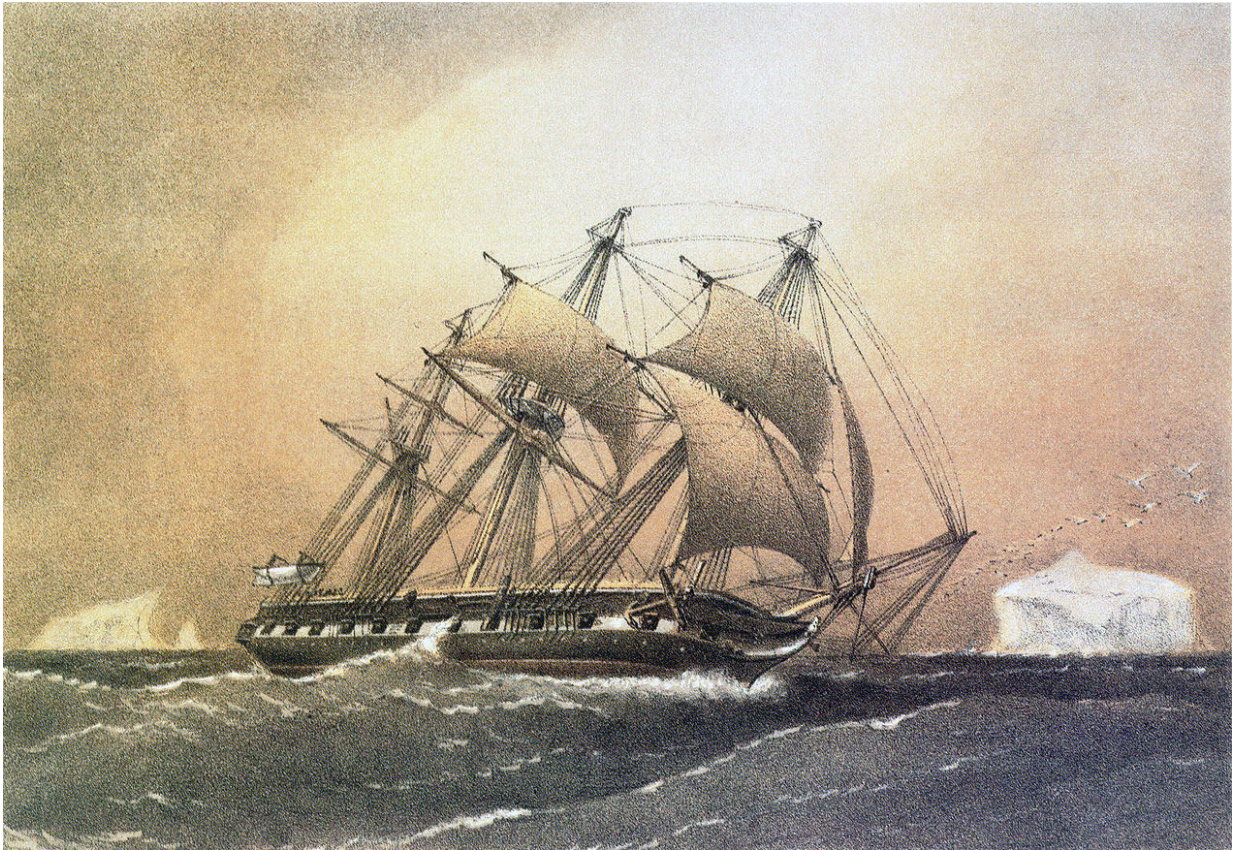
A pair of researchers, one with the Woods Hole Oceanographic

Institution, the other Harvard University, has found evidence of deep ocean cooling that is likely due to the Little Ice Age. In their paper published in the journal *Science*, Jake Gebbie and Peter Huybers describe their study of Pacific Ocean temperatures over the past 150 years and what they found.

Prior research has suggested that it takes a very long time for water in the Pacific Ocean to circulate down to its lowest depths. This is because it is replenished only from the south, which means it takes a very long time for water on the surface to make its way to the bottom—perhaps as long as several hundred years. That is what Gebbie and Huber found back in 2012. That got them to thinking that [water temperature](#) at the bottom of the Pacific could offer a hint of what surface temperatures were like hundreds of years ago. To find out if that truly was the case, the researchers obtained data from an international consortium called the Argo Program—a group of people who together have been taking [ocean](#) measurements down to depths of approximately two kilometers. As a comparative reference, the researchers also obtained data gathered by the crew of the HMS Challenger—they had taken Pacific Ocean temperatures down to a depth of two kilometers during the years 1872 to 1876. The researchers used the data from both projects to build a [computer model](#) meant to mimic the circulation of [water](#) in the Pacific Ocean over the past century and a half.

The model showed that the Pacific Ocean cooled over the course of the 20<sup>th</sup> century at depths of 1.8 to 2.6 kilometers. The amount is still not precise, but the researchers suggest it is most likely between 0.02 and 0.08° C. That cooling, the researchers suggest, is likely due to the Little Ice Age, which ran from approximately 1300 until approximately 1870. Prior to that, there was a time known as the Medieval Warm Period, which had caused the deep waters of the Pacific to warm just prior to the cooling it is now experiencing.





The HMS Challenger, a three-masted wooden sailing ship originally designed as a British warship, was used for the first modern scientific expedition to explore the world's ocean and seafloor. Gebbie and Huybers compared the cooling trend found in the model to ocean temperature measurements taken by scientists aboard the HMS Challenger in the 1870s and modern observations from the World Ocean Circulation Experiment of the 1990s. Credit: Painting of the HMS Challenger by William Frederick Mitchell originally published for the Royal Navy.

**More information:** G. Gebbie et al. The Little Ice Age and 20th-century deep Pacific cooling, *Science* (2019). [DOI: 10.1126/science.aar8413](https://doi.org/10.1126/science.aar8413)

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Citation: Researchers find bottom of Pacific getting colder, possibly due to Little Ice Age (2019, January 4) retrieved 3 May 2024 from <https://phys.org/news/2019-01-bottom-pacific-colder-possibly-due.html>

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