

Climate contrarian uncovers scientific error, upends major ocean warming study

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Researchers with the University of California, San Diego's Scripps Institution of Oceanography and Princeton University recently walked back scientific findings published last month that showed oceans have

been heating up dramatically faster than previously thought as a result of climate change.

In a paper published Oct. 31 in the journal *Nature*, researchers found that ocean temperatures had warmed 60 percent more than outlined by the United Nation's Intergovernmental Panel on Climate Change.

However, the conclusion came under scrutiny after mathematician Nic Lewis, a critic of the scientific consensus around human-induced warming, posted a critique of the paper on the blog of Judith Curry, another well-known critic.

"The findings of the ... paper were peer reviewed and published in the world's premier scientific journal and were given wide coverage in the English-speaking media," Lewis wrote. "Despite this, a quick review of the first page of the paper was sufficient to raise doubts as to the accuracy of its results."

Co-author Ralph Keeling, climate scientist at the Scripps Institution of Oceanography, took full blame and thanked Lewis for alerting him to the mistake.

"When we were confronted with his insight it became immediately clear there was an issue there," he said. "We're grateful to have it be pointed out quickly so that we could correct it quickly."

Keeling said they have since redone the calculations, finding the ocean is still likely warmer than the estimate used by the IPCC. However, that increase in heat has a larger range of probability than initially thought—between 10 percent and 70 percent, as other studies have already found.

"Our error margins are too big now to really weigh in on the precise

amount of warming that's going on in the ocean," Keeling said. "We really muffed the error margins."

A correction has been submitted to the journal *Nature*.

According to the most recent IPCC report, climate emissions need to be cut by 20 percent by 2030 and then zeroed out by 2075 to keep warming from exceeding 2 degrees Celsius (3.6 degrees Fahrenheit) above preindustrial levels.

Authors of the recent study had previously claimed that emissions levels in coming decades would need to be 25 percent lower to keep warming under that 2-degree cap.

While papers are peer reviewed before they're published, new findings must always be reproduced before gaining widespread acceptance throughout the scientific community, said Gerald Meehl, a climate scientist at the National Center for Atmospheric Research in Boulder, Colo.

"This is how the process works," he said. "Every paper that comes out is not bulletproof or infallible. If it doesn't stand up under scrutiny, you review the findings."

The report relied on a novel approach that still has the potential to revolutionize how scientists measure the ocean's temperature.

Much of the data on [ocean temperatures](#) currently relies on the Argo array, robotic devices that float at different depths. The program, which started in 2000, has gaps in coverage.

By comparison, Keeling and Laure Resplandy, a researcher at Princeton University's Environmental Institute who co-authored the report,

calculated heat based on the amount of oxygen and carbon dioxide rising off the ocean, filling round glass flasks with air collected at research stations around the globe.

Keeling said they will continue to experiment with the data in coming years in an attempt to fine-tune the data.

"It's a promising new method, but we didn't get the precision right on the first pass," he said.

The study is still the first to confirm that the ocean is warming using a method independent of direct [ocean](#) temperature measurements.

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