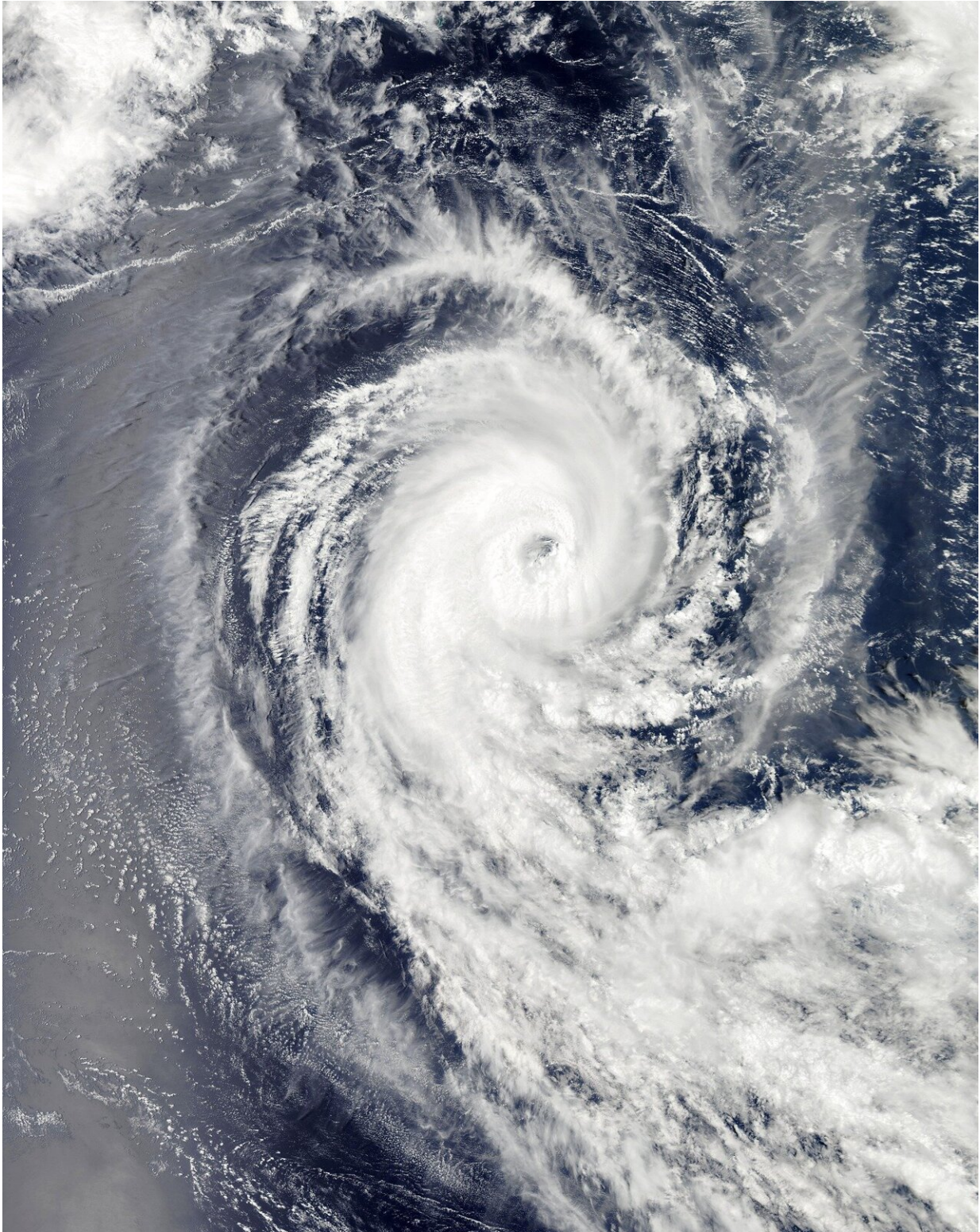


# **Hurricanes found to push warm water deep into ocean, impacting climate in distant locales**

June 21 2023, by Bob Yirka

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A team of oceanographers at the University of California's Scripps Institution of Oceanography, working with one colleague from Brandeis University and two from Oregon State University, has found evidence of typhoons/hurricanes pushing warm water deep into the ocean, where it is carried to distant places. In their research, reported in *Proceedings of the National Academy of Sciences*, the group studied ocean conditions before and after three typhoons over parts of the Philippine Sea.

Prior research has shown that typhoons and hurricanes get their start when [warm water](#) in the tropics evaporates into the air. Much research has explored the impact of such storms when they encounter human populated [land areas](#), but little work has been done to learn more about the impact of such storms on the ocean.

To overcome that deficit, the team sailed throughout the Philippine Sea in the fall of 2018, during which three typhoons formed, stirring up the ocean. To learn more about their impacts, the team deployed probes deep into the sea to measure both [water movement](#) and temperature before and after a typhoon struck.

They found that each of the typhoons pushed warm surface water deep below the surface. They also caused churning of the water, mixing warm water from above with colder water from below. That was followed by underwater waves created by the typhoon pushing the warmer water downward and cooler water at the surface being rewarmed by the sun. The team found that the storms pushed the warm water to depths of 300 meters and that the heated water persisted for at least three weeks following a cyclone's passage.

The researchers also found that after the warm water was pushed downward, it was carried away by [deep ocean currents](#)—they found some evidence suggesting that the warm water from the storms was transported all the way to the coasts of Ecuador and California. Once



there, it was transported to the surface by shoaling currents and turbulent mixing near the shore. They suggest that the movement of warm ocean water by [typhoons](#) and hurricanes could impact weather in distant locales as it makes its way back to the surface.

**More information:** Noel Gutiérrez Brizuela et al, Prolonged thermocline warming by near-inertial internal waves in the wakes of tropical cyclones, *Proceedings of the National Academy of Sciences* (2023). [DOI: 10.1073/pnas.2301664120](https://doi.org/10.1073/pnas.2301664120)

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