

Study rethinks the ocean's role in Pacific climate

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Drs. Amy Clement and Pedro DiNezio from the University of Miami were part of a new study that can aid scientists in better understanding regional and global effects of climate change in the Pacific. Credit: University of Miami

University of Miami (UM) Rosenstiel School of Marine & Atmospheric Science researchers have climate scientists rethinking a commonly held theory about the ocean's role in the global climate system. The new findings can aid scientists in better understanding and predicting changes in the Pacific climate and its impacts around the globe.

According to the study's lead author, UM Rosenstiel School Professor Amy Clement, the tropical [atmospheric pressure](#) system known as the Southern Oscillation (a periodic fluctuation of atmospheric pressure commonly observed as the El Niño Southern Oscillation, which brings unusually warm water across the Pacific Ocean basin) plays a bigger, more fundamental role in the [climate](#) system than just being El Niño's atmospheric counterpart.

Scientists have long believed that the Southern Oscillation exists due to its connection to the ocean. "This study changes the textbook version of one of the most fundamental aspects of atmospheric circulation," said Clement, whose study was published in the August 2011 issue of American Meteorological Society's *Journal of Climate*.

In two sets of experiments, Clement, recent UM alumnus Pedro DiNezio, and co-author Clara Deser from the National Center for Atmospheric Research modeled two climate scenarios – one with a static, current-free ocean and another with a fully dynamic ocean. The team showed that atmospheric pressure, surface temperature, and precipitation were the same in both ocean scenarios, which reveals that the Southern Oscillation's global signature is still present even when the ocean and atmosphere are disconnected.

In a news item in the Sept. 29 issue of the journal *Nature*, Research Institute for Global Change scientist Jing-Jia Luo said, "...Clement et al. argue impressively that it is not necessary to couple [ocean](#) dynamics to the atmosphere in models to reproduce tropical climate modes and their associated global connections."

British physicist Sir Gilbert Walker discovered the [Southern Oscillation](#) in the early 20th century when trying to understand and predict India's monsoons, which caused torrential rains and widespread famine in the region. He proved that this large-scale sea-level pressure in the tropics

connected India's weather with other weather patterns across the world.

"This new development can help link climate patterns between distant region, such as rainfall patterns in Australia and drought in the Southwestern U.S.," said Clement.

Provided by University of Miami Rosenstiel School of Marine & Atmospheric Science

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