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RECENT SHIFTS IN PACIFIC WINDS MAY SUPPORT El NIÑO FORMATION

Wind data for the Pacific Ocean obtained by NASA's Quick Scatterometer spacecraft-also know as Quikscat-are documenting episodes of reversed trade winds that are responsible for unseasonable cyclone conditions in the northwest and southwest Pacific, and which may be a precursor of a future El Niño.

A research team led by Dr. W. Timothy Liu, a senior research scientist at NASA's Jet Propulsion Laboratory in Pasadena, Calif., used wind speed and direction data from Quikscat to detect a shift in the trade winds on February 25. The winds shifted from their normal easterly direction to a westerly direction, blowing from Indonesia toward the Americas along the equator. This trade wind shift, which lasted for about a week, contributed to the spawning of twin cyclones--Super Typhoon Mitag, which threatened the Philippines; and Tropical Cyclone Des, which passed through New Caledonia.

"In addition to unusual cyclonic activity, such trade wind reversals typically trigger Kelvin waves of warm water, which can be an early indicator of future El Nino conditions," said Liu. "During periods of reversed trade winds, which typically last from a few days to a week or more, equatorial westerly winds generate a counterclockwise vortex in the northern hemisphere and a clockwise vortex in the southern hemisphere. Once spawned, the resulting Kelvin waves may travel across the Pacific and reach the coastline of the Americas in approximately one to two months, warming the waters of the eastern Pacific and creating El Niño conditions when the effects are accumulated."

Sustained Kelvin wave activity could have a major impact on global weather patterns according to JPL oceanographer Dr. William Patzert. "If trade wind patterns continue to experience reversals through the spring and summer, the resulting strong, warm Kelvin waves will cross the Pacific like a conveyor belt, depositing warm water near South America where the ocean is normally cold," he said. "Such a 'warm pool' could alter weather all over the planet, with rains that would normally soak the western Pacific shifting toward the Americas, and places such as Indonesia and India becoming drier. We're really in a 'wait and see' situation at this point."

A similar westerly wind flow and twin cyclones were documented by Liu and his team using Quikscat data last December. The wind reversal at that time, which lasted 10 days, triggered a Kelvin wave that just recently reached South America, as revealed by NASA's Topex/Poseidon satellite.

The Quikscat images are available at:

http://earthobservatory.nasa.gov/Newsroom/NewImages/images.php3?img_id=7779

More details of the two westerly winds events can be found at:

http://airsea-www.jpl.nasa.gov/enso

Launched June 19, 1999, the Quikscat spacecraft operates in a Sun-synchronous, 800-kilometer (497-mile) near-polar orbit, circling Earth every 100 minutes, taking approximately 400,000 measurements over 93 percent of Earth's surface every day.

In recent years, data from JPL's Quikscat scatterometer have proven useful in improving forecasts of extreme wind events, such as hurricanes, and in monitoring longer-term climatic effects such as El Niño. Quickscat's SeaWinds scatterometer instrument is a specialized microwave radar that continuously measures both the speed and direction of winds near the ocean surface in all weather conditions.

JPL manages Quikscat for NASA's Office of Earth Science, Washington, D.C. JPL also built the scatterometer instrument and provides ground science processing systems. NASA's Goddard Space Flight Center, Greenbelt, Md., managed development of the satellite, designed and built by Ball Aerospace & Technologies Corp., Boulder, Colo.

More information on Quikscat is available at:

http://winds.jpl.nasa.gov/missions/quikscat/quikindex.html

The U.S.-French Topex/Poseidon mission has been making precise measurements of ocean surface topography since 1992. These data are used to map ocean currents, improve the understanding of ocean circulation, measure global sea level change and improve global climate forecasts. Topex/Poseidon's ability to measure sea-surface height has made it an invaluable tool for studying ocean events such as El Niño, its little sister La Niña and the much larger and longer-lasting ocean event called the Pacific Decadal Oscillation. Topex/Poseidon is managed by JPL for NASA's Earth Science Enterprise, Washington, D.C.

More information on Topex/Poseidon is available at:

http://topex-www.jpl.nasa.gov/

NASA's Earth Science Enterprise is a long-term research and technology program designed to examine Earth's land, oceans, atmosphere, ice and life as a total integrated system.

JPL is a division of the California Institute of Technology in Pasadena.

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