NEWS

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TROPICAL DEPRESSIONS CAN'T HIDE BEHIND CLOUDS ANYMORE

Tropical storms churning into potentially dangerous hurricanes often hide behind a cloak of clouds. But NASA has given forecasters a new way to peek under the covers and identify storms much faster.

Scientists traditionally rely on satellite pictures to study the telltale swirl of clouds of a forming storm. However, the SeaWinds instrument aboard the QuikSCAT satellite can look through the cloud cover and measure winds at the ocean's surface.

According to a new study by National Oceanic and Atmospheric Administration (NOAA) and NASA researchers expected to be published in a major scientific journal, SeaWinds can detect the closed circle of winds that characterize a tropical depression up to 46 hours sooner than conventional means.

"The SeaWinds data can help us in two ways," says paper author Kristina Katsaros, director of NOAA's Atlantic Oceanographic and Meteorological Laboratory, Miami, FL. "They can detect tropical depressions early and help us improve our models. With more accurate information on the surface wind speed and direction in hurricanes at all stages, our models can do a better job of predicting a hurricane's evolution and course."

QuikSCAT was launched in June 1999. It travels over ninety percent of the ice-free oceans every day with a high-frequency microwave scatterometer that provides detailed information on sea surfaces that can be translated into wind speed and direction.

In their NASA-supported study, Katsaros and her colleagues looked at SeaWinds data from the regions where 12 of the named storms in the 1999 hurricane season formed. Eight of the storms eventually developed into hurricanes. The researchers then examined the data collected 12 to 48 hours in advance of the storms being declared tropical depressions.

While the SeaWinds instrument wasn't always upstream of all 12 storms, it was in position to provide wind data on eight. In those cases, it was able to detect the closed wind circulation well before it could be seen as cloud swirls on the GOES satellite image. The lead times ranged from three hours for Hurricane Irene to 46 hours for Hurricane Lenny.

Being able to detect tropical depressions early is especially important in increasing warning times in regions like the Gulf of Mexico, where storms can grow quickly into hurricanes and can make landfall within a few days. Early detection also may help the National Hurricane Center plan the best use of its resources to keep watch on developing storms.

"The ability of SeaWinds to see tropical depressions at their earliest stage gives us the opportunity to identify and study the elements that create hurricanes," says co-author W. Timothy Liu, the project scientist of SeaWinds at NASA's Jet Propulsion Laboratory, Pasadena, CA. The Jet Propulsion Laboratory built and operates the QuikSCAT spacecraft for the Office of Earth Sciences, NASA Headquarters, Washington, DC.

During the current hurricane season, scientists from the National Hurricane Center and the Hurricane Research Division are comparing SeaWinds data with wind information from computer models, reconnaissance aircraft, satellites, and devices that measure temperature, moisture and relative humidity.

In a separate study, Liu combined SeaWinds data on winds with information from another instrument, the Tropical Rain Measuring Mission. TRMM can also can see through clouds and measure rainfall in hurricanes. "Hurricanes are especially devastating when they are accompanied by strong winds and heavy rain," says Liu. "QuickSCAT and TRMM provide the only opportunity for us to view the interplay between wind and rain before landfall and help us to understand and predict hurricanes." The results of this study appeared in the June 6 issue of EOS, Transactions of the American Geophysical Union.

"This year the QuikSCAT data will be incorporated into a surface-wind analysis system of NOAA's Hurricane Research Division to produce the surface windfields in tropical storms in near real time," says Kastaros. "This will help the National Hurricane Center in making decisions about warning the public when a storm threatens landfall."

QuikSCAT data are available from NOAA's National Environmental Satellite and Information Service on the Internet at: http://manati.wwb.noaa.gov/quikscat/

Near real-time wind maps can be viewed or downloaded at: http://airsea-www.jpl.nasa.gov/seaflux/

Information on NASA's Oceanography program can be found at: http://oceans.nasa.gov/

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