Tagged sharks give weathermen a new hurricane warning

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Scientists in the United States have enlisted sharks and tuna to help to predict hurricanes, fitting them with tracking devices that allow the fish to record data from the deep and relay it to weathermen via satellite.

Sensors fitted to the creatures' dorsal fins collect information about the temperature, depth and salinity of the water — all of which is critical in hurricane forecasting — then beam it to satellites each time they surface.

By building a map of the ocean's heat content at varying depths, scientists can predict the intensity of approaching storms with greater accuracy, since they gain in strength as they cross warm water. The use of fish to take precise readings, rather than surface buoys, underwater drones or sensors dropped from aircraft, raises the potential for safer, cheaper, swifter and more reliable forecasting.

"The fish can give a gazillion pieces of information, and that represents a really exciting opportunity," said Nick Shay, one of the oceanographers leading the project at the University of Miami's Rosenstiel School of Marine and Atmospheric Science, in Florida.

The team began tagging large-finned fish such as hammerhead and tiger sharks, Atlantic tarpon and blue marlin a decade ago in order to track migratory patterns, reproduction and feeding.

As they move through the Gulf of Mexico, the Atlantic and the Caribbean seas, they follow water temperatures of 26C (79F).

The 26C isotherm is of importance in meteorology because it marks the lower threshold at which tropical cyclones form. If the isotherm is shallow, a storm may weaken as it passes over it and churns up cooler water from below; if the isotherm runs deep, the storm will gain intensity.

"The fish act as biological sensors. They dive, so they create a vertical picture of what the water temperature looks like," said Jerald Ault, co-leader of the study.

The team has tagged 750 fish and is seeking government and private funding to add hundreds more to the study. Among those it tracks are two hammerhead sharks nicknamed Heff and Angel that frequent the US eastern seaboard, and a tiger shark named Sweet Caroline that moves between the Gulf of Mexico and the Caribbean.

Data from tagged dorsel fins of fish will help predict onset of hurricanes

An underwater "glider" usually used for assessing ocean temperatures costs $200,000, but a fish-borne sensor costs $4,000 and yields more comprehensive, higher-resolution data taken from across a broader area. Some fish swim up to 100 miles a day.

The fish's usefulness varies according to their species. For example, nurse sharks flee when they sense the air pressure dropping — a sign that a storm is strengthening — making them useful as "early warning" sentinels. Blue marlin and tarpon stick around for storms; as Hurricane Ivan crossed the Gulf of Mexico in 2004, and Hurricane Katrina in 2005, satellite-tracked blue marlin and tarpon relayed data from directly below the tempests.