



**NOAA** NATIONAL OCEANIC AND  
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Contact: Shelley Dawicki  
508-495-2378  
[Shelley.dawicki@noaa.gov](mailto:Shelley.dawicki@noaa.gov)

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## **Hudson Canyon Gives Up Secrets**

*Sonar images reveal possible deepwater corals, methane gas deposits*

Scientists studying Hudson Canyon off the coast of New Jersey, one of the largest underwater canyons in the world, have found evidence of deepwater corals and crater-like depressions that may be methane gas blowouts, not seen before on the Northeastern U.S. continental margin. Extensive burrowing by golden tilefish, a commercially valuable fish typically found in submarine canyons, was also observed.

Using an autonomous underwater vehicle (AUV) called *Eagle Ray*, researchers from NOAA's Fisheries Service, Rutgers University and the National Institute for Undersea Science and Technology (NIUST) have produced high resolution sonar maps of the canyon bottom. The maps provide details that other equipment such as sonar mounted on a ship's hull cannot detect, and will be used to direct visual searches for the various bottom features during subsequent work in the area this summer.

The maps reveal crater-like depressions several hundred feet across and tens of feet deep, as well as hard-topped pock marks resembling deepwater coral habitats found elsewhere. The maps also showed steep slopes like those that support sponges and soft corals in New England canyons, and revealed expanses of hummocky terrain created by long-term tilefish burrowing.

"Hudson Canyon is a very large seafloor feature that has not been well documented. Being able to produce high-resolution seafloor maps while we were at sea revealed these new features and enabled us to adapt our sampling efforts during the cruise," said Vince Guida, an ecologist at the J.J. Howard Laboratory of NOAA's Northeast Fisheries Science Center (NEFSC) in Sandy Hook, N.J, and co-chief scientist of the cruise. "For example, we collected water samples near the craters to test for continuing methane release that could support production of chemosynthetic bacteria in the canyons."

Mary Scranton, a marine scientist at Stony Brook University in New York, is analyzing the water samples. Chemosynthetic bacteria use chemicals from the earth's interior, rather than sunlight or photosynthesis, to survive and to support other forms of marine life on the ocean floor. The bacteria are often associated with methane seeps or areas where the seafloor is geologically active.

The crater-like depressions on the ocean floor occur when gas hydrates (methane gas frozen in ice crystals below the surface) dissolve and release the methane gas, thereby

collapsing the sediments to form craters. Similar features have been found in the Gulf of Mexico and in other areas on the continental shelf, but would be a new discovery off the Northeast U.S.

“We found evidence of what may be large structural corals down deep in the Hudson Canyon at depths between 350 and 400 meters (1,100 to 1,300 feet) where there is very little sunlight,” Guida said. “Similar types of structures have been found off North Carolina, along the southern U.S. coast, and in Canadian waters farther north, but not off the Northeast coast. We think these corals may be *Lophelia*, a cold-water species that forms large reef structures. Another possibility is that they may be masses of specialized clams, mussels or tube worms fed by chemosynthetic bacteria supported by methane release. Their true nature will remain uncertain until they can be seen visually at close range.”

Marine life in the Hudson Canyon is very diverse. Invertebrates include red crabs, lobsters and squids, while typical fish species encompass blackbelly rosefish, flounder, hakes, monkfish and black sea bass. Some species live only in shallower depths on the shelf while others live deep in the canyon, which starts about 100 miles southeast of New York City on the continental shelf and runs some 300 miles into very deep water. Comparable in size to the Grand Canyon, Hudson Canyon is the largest known ocean canyon on the U.S. East Coast and one of the largest underwater canyons in the world.

Guida, who has been conducting research in the canyon area since 2001, and geologist Peter Rona of Rutgers University’s Institute of Marine and Coastal Sciences served as co-chief scientists on the summer 2009 cruise. Together with colleagues from NIUST, a joint venture of NOAA, the University of Mississippi and the University of Southern Mississippi, they have explored the canyon every year since 2007 aboard NOAA ships, and mapped progressively deeper sections. Another cruise is planned during the summer of 2010 aboard the NOAA Ship *Henry B. Bigelow*.

“We plan to use the NIUST AUVs *MolaMola* to take high quality still images of the features we found this year with multibeam sonar, and will also use the *Eagle Ray* to continue making detailed bottom maps,” Guida said. “We have no idea how extensive the methane seep deposits are, or how large the structural feature we think is a deepwater coral reef is. There may also be soft corals and other marine life in the area that we haven’t yet seen.”

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Related links:

James J. Howard Marine Sciences Laboratory: <http://sh.nefsc.noaa.gov/>

NOAA Ship *Henry B. Bigelow*: <http://www.nefsc.noaa.gov/Bigelow/>

NOAA Ship Tracker: <http://shiptracker.noaa.gov/>

NIUST: <http://niust.org/>