

Scientists map canyon below Atlantic

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Although just 100 miles off the New Jersey-New York coast, the features of the Hudson Canyon have been largely hidden beneath hundreds of feet of water. Created by the Hudson River centuries ago, parts of the massive, undersea region rival the Grand Canyon in scale. Now, for the first time, scientists have a vivid picture of what the mysterious region looks like.

A four-year study using high-tech tools has produced maps that will allow scientists to study many things, including whether methane gas trapped in frozen sediment below the sea floor is escaping and exacerbating global warming.

Also of interest is whether gas releases could spark undersea landslides that produce tsunamis. Such landslides could also cleave the undersea phone cables that handle much of the nation's overseas communications, said Peter A. Rona, a Rutgers University professor who led the team that produced the maps.

"This region, the Hudson Canyon, is on the doorstep of one of the largest metropolitan areas of the world, and it is an exploration frontier," Rona said as he examined the 3 1/2-by-5-foot maps at the Institute of Marine & Coastal Sciences at Rutgers' Cook College campus.

The maps became available this summer, free from the U.S. Geological Survey and researchers not involved in the project gave the results good reviews.

The map "adds significant new detail to the Hudson Canyon subsea landscape," said William Ryan, a senior scholar at the Lamont-Doherty Earth Observatory of Columbia University. "The map reveals for the first time all of the tributaries of an extraordinary underwater drainage network that is strikingly similar to terrestrial rivers."

Another marine geologist at Lamont-Doherty, Cecilia M. McHugh, said the new maps are great work that will allow scientists to track contaminants from six abandoned dump sites off New York Harbor.

The response is gratifying to professor Rona, who spent three weeks in 2002 on a research vessel traversing the region to gather the data. Starting 200 miles out at sea, the boat would travel on a 60-mile line roughly parallel to the coast as a multi-beamed sonar system attached to the keel bounced sound waves off the ocean floor more than a mile below.

The shape and depth of the sea floor was determined by how long it takes for the sound to return to the ship and the speed of sound through the water.

After completing each line, the vessel would then move closer to the coast to scan a new 60-mile long swath. It repeated this process about 50 times, covering a rectangle 100 miles long and 60 miles wide — 6,000 square miles.

Over the next four years, Rona and his team "cleaned" the data, removing extraneous matter caused by waves and other noises. "It was all done for less than \$1 million," Rona said.

The team included researchers from Rutgers, the U.S. Geological Survey, Woods Hole Oceanographic Institution in Massachusetts, and Stony Brook University in New York.

Much of the Hudson Canyon was formed during the last Ice Age, over 10,000 years ago, when the sea level was about 400 feet lower and the mouth of the Hudson River was near the edge of the continental shelf, about 100 miles east of its present site.

Rona said the map is the most comprehensive ever done of the region, yet it only illuminated formations larger than a football field. He is seeking funding to get greater detail by sending unmanned submarines to locations of special interest.

On the Net:

Hudson Canyon map: <http://pubs.usgs.gov/of/2004/1441/index.html>

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