

Sounds of Antarctic revealed: Earthquakes, icebergs, pygmy whales

by Bend_Weekly_News_Sources

NEWPORT — A team of Oregon State University researchers has returned from Antarctica, where they retrieved an array of sensitive hydrophones they are using to listen for clues to the unique seismology, ice field movements and biology of the region.

Their preliminary findings suggest that this remote region in the Bransfield Strait is much more seismically active than scientists previously thought and its ongoing earthquakes — in proximity to massive ice fields — create an unusual relationship that may not occur anywhere else on Earth.

—This is a small subduction zone that supposedly has ceased its tectonic activity, but we recorded an awful lot of earthquakes during the expedition, said Robert Dziak, an Oregon State oceanographer based at OSU's Hatfield Marine Science Center in Newport, Ore. —So it may not be ceased after all. There isn't a lot known about the seismicity — or biology, for that matter — of this region because it supposedly has some of the worst weather in the world and it's fairly remote.

—But what we are able to learn from the deployment of these hydrophones suggests that this is truly a unique area that deserves a lot more research, Dziak added.

The project is a component of the National Oceanic and Atmospheric Administration's (NOAA) Ocean Explorer program. In December of 2005, the researchers deployed several hydrophones — built by OSU technicians at the Hatfield Marine Science Center — that were designed to withstand the frigid temperatures of Antarctic waters. Dziak and his colleagues returned to the region in December of 2006 to retrieve the data from the hydrophones, which had a year's worth of recordings, and then redeploy them.

What they have found thus far in analyzing the data is a symphony of sounds revealing undersea earthquakes, the movement of massive icebergs, and the vocalizations of whales, penguins, elephant seals and other marine mammal species.

The scientists were particularly intrigued by the humming sounds recorded from the movement of icebergs following the earthquakes. Icebergs that are grounded on the seafloor often get slowly pushed by currents and wind, causing them to vibrate like a tuning fork and make a loud hum.

—With the big Antarctic ice sheets, you can pick up the hum they make as far away as Tahiti, Dziak said. —That has been well-documented. But we also picked up the same humming sounds right after earthquake activity, suggesting that the undersea seismic activity may play a role in the breakup of ice sheets, or at least the movement of existing icebergs.

This relationship between earthquakes and ice fields is a new idea and unique to the region, Dziak pointed out.

“This is the only place at either pole where large earthquakes occur in proximity to ice sheets,” he said. “In fact, while our instruments were deployed here, a magnitude 7.5 quake hit the region, generating a small tsunami. It’s a very active area.”

This region of the Antarctic is near the South Sandwich Islands, which are active volcanoes that are monitored primarily through satellite observation because of their remoteness. The researchers worked from Deception Island, which also is volcanically active, having erupted in 1970.

Though their research is primarily designed to study the seismic activity of the region through the use of hydrophones, the scientists also used a remotely operated vehicle to explore the comparatively shallow waters of Deception Island’s caldera, hoping to discover hydrothermal vents. They were unable to locate the vents because of equipment problems, but did document an array of underwater creatures, including a ton of brittle stars and urchins, as well as unusual plant life that has rarely if ever been seen, Dziak said.

“There was a real sense of accomplishment in even being able to conduct our deep-water survey in this incredibly hostile environment,” Dziak said. “We got somewhat lucky with the weather.”

In addition to the sounds of earthquakes and moving icebergs, the hydrophones picked up the sounds of numerous marine mammals and birds. Kate Stafford, a University of Washington biologist on the trip, identified the vocalization of a pygmy blue whale, which wasn’t known to frequent the area.

Whales have unique “voices” that can not only be differentiated by species, the researchers say, but by geographic dialect. In other words, blue whales from one part of the world have a different “accent” than blue whales from the other side of the globe.

The researchers’ activities were documented by Bill Hanshumaker, an outreach specialist at the OSU Hatfield Marine Science Center, on a daily blog. He also interacted with K-12 classes as part of the NOAA-funded project. His reports are available online at: <http://hmscblog.blogspot.com/>

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