UNH ocean scientists shed new light on Mariana Trench

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An ocean mapping expedition has shed new light on deepest place on Earth, the 2,500-kilometer long Mariana Trench in the western Pacific Ocean near Guam. Using a multibeam echo sounder, state-of-the-art equipment for mapping the ocean floor, scientists from the University of New Hampshire Center for Coastal and Ocean Mapping/ Joint Hydrographic Center found four "bridges" spanning the trench and measured its deepest point with greater precision than ever before.

Researchers professor James Gardner and affiliate professor Andrew Armstrong, both of UNH's Center for Coastal and Ocean Mapping/ UNH-NOAA Joint Hydrographic Center (CCOM/JHC), presented their findings at the recent American Geophysical Union meeting in San Francisco, the world's largest annual meeting of Earth and planetary scientists.

Mapping the entire Mariana Trench - approximately 400,000 square kilometers -- from August through October 2010, the researchers discovered four bridges spanning the trench and rising as high as 2,500 meters above its floor. While satellite images had suggested the trench might be spanned by one such ridge, Gardner says the mapping mission confirmed the existence of four such features. "That got me excited," he says.

The ridges are being formed as the 180-million-year-old Pacific and far younger Philippine tectonic plates collide. Because the ocean's crust cools as it ages, "the Pacific crust is much, much older, so it's diving underneath the Philippine plate," Gardner says. As seamounts on the Pacific plate are pulled beneath the Philippine plate, they are compacted against the wall of the trench, forming these ridges.

"It's incredibly complex geology. These seamounts haven't been completely subducted, they're getting jammed up against the plate," Gardner says. He
The expedition also yielded the most precise measurement yet of Challenger Deep, the trench's (and the Earth's) deepest point, finding it to be 10,994 meters deep, plus or minus 40 meters. Calculated from thousands of depth soundings as well as detailed analysis of how the how the water column can alter the echo sounding signals, the new measurement is similar to other claims of the Challenger Deep's depth, some of which are deeper.

"When you're dealing with something that's 11 kilometers deep, you have to deal with inherent uncertainties in the system," says Gardner, noting that Challenger Deep is deeper than Mount Everest is high.

Multibeam echo sounders measure depth by sending sound energy to the ocean floor then analyzing the returning signal. Mounted beneath a