

FSU: Atlantic Research Expedition Uncovers vast Methane-Based Ecosystem

A marine research expedition that included a Florida State University researcher and was sponsored by the U.S. Bureau of Ocean Energy Management (BOEM) and the National Oceanic and Atmospheric Administration (NOAA) has led to the discovery of perhaps the world's largest methane cold seep by a research team of university and government scientists.

The seep, which is a fissure in the seabed, lies deep in the western North Atlantic Ocean, far from the life-sustaining energy of the sun. Mussels blanketing the seep rely on bacteria that use the methane to make energy. The process, known as chemosynthesis, constitutes the basis for life in the harsh environment and could help scientists better understand how organisms survive under these types of extreme conditions.

"We are still fumbling around in the dark, literally and figuratively, in understanding the deep oceans," said FSU researcher and co-chief scientist Sandra Brooke. "The fact that a massive cold seep, possibly the largest ever documented has only just been discovered less than 70 miles off one of the busiest U.S. coastlines is evidence of how much we have to learn."

The new seep discovery is only the third documented seep site on the U.S. Atlantic Coast, and by far the most extensive; the two seep areas at this site are estimated to be at least a kilometer long and in places hundreds of meters across. Sea cucumbers were also seen tucked into the tight mounds of mussels and shrimp swam above them. Many species of fishes, including some with unusual behaviors, were also common around the unique ecosystem.

Added Brooke, "Chemosynthetic communities use chemicals coming from beneath the seafloor for energy production. This dependence makes them vulnerable as they cannot simply move into another area if their habitat is damaged. With ever increasing human activities in the deep sea, it is important that we identify and conserve habitats that support unique, ancient or fragile communities, such as this new methane cold seep."

Stationed aboard NOAA's Ronald H. Brown research vessel, the research teams used the diverse and high-tech capabilities of the Woods Hole Oceanographic Institution's Remotely Operated Vehicle (ROV), Jason II, to document and study the newly discovered methane seep. The teams have been able to capture high definition video, sample the sediment at the site, collect live mussels for genetic and reproductive studies, collect large dead shells and rocks for aging analysis, take water samples to examine water chemistry, and sample associated animals to examine food webs.

The seep discovery could potentially play an important role in advancing scientific understanding of hydrocarbon resources and gas hydrates (important possible future energy resources) along the US continental slope.

Major funding for the research expedition was provided by the Bureau of Ocean Energy Management, with NOAA providing funding for the Ronald H. Brown and Jason ROV. U.S. Geological Survey and other collaborators also provided a variety of resources.