

Subsurface Oil Exists: USF Researchers

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(PhysOrg.com) -- Layers of degraded oil found suspended at depths of 400 meters to 1,400 meters.

Researchers at the University of South Florida's College of Marine Science have confirmed the presence of distinct layers of degraded oil in the deep waters of the northern Gulf of Mexico many miles from the Deepwater Horizon explosion site.

After a series of tests conducted by both USF and the National Oceanic and Atmospheric Administration, USF scientists are continuing research on the subsurface oil to determine if it can be conclusively linked to oil found at the surface of the gulf.

NOAA tests separately link the surface oil to the Deepwater Horizon well. The NOAA analysis was unable to directly link the subsurface samples to the Deepwater Horizon spill because the sample was too small to produce conclusive results.

"We have not concluded our comparison of the oils," said Ernst Peebles, USF's lead scientific investigator on the R/V Weatherbird II trip. "Preliminary results show similarities at least at the surface."

This research was funded by NOAA and led by Peebles, a biological oceanographer; Robert Weisberg, a physical oceanographer; chemical oceanographer David Hollander; and geological oceanographer David Naar.

Researchers discovered the subsurface oil after models developed by Weisberg, director of USF's [Ocean Circulation](#) Group, indicated that subsurface oil - commonly referred to as “plumes” - would have been pushed in that direction from the ruptured Deepwater Horizon well.

(A power point used in the June 8, 2010 news conference, showing particle findings and sample locations, can be viewed by [clicking here](#).)

Degraded oil was found suspended at depths of 400 meters (one-quarter mile) and 1,000-1,400 meters (two-thirds to three-quarters of a mile) beneath the Gulf's surface in the form of small particles or droplets.

The 400-meter layer was approximately 30 meters (100 feet) thick, and was observed to extend for at least 45 nautical miles northeast of the Deepwater Horizon site.

The deeper 1,000-1,400 meters layer had hydrocarbons that looked identical to the 400 meter samples but were at twice the concentration. That layer was observed in deeper waters to the south approximately 24 nautical miles east of the Deepwater Horizon site.

During a May 22-28 trip on the R/V Weatherbird II, USF scientists discovered the 400-meter layer using a combination of 28 kHz sonar and an optical particle sensor.

The layer at 1,000-1,400 meters was located using particle-sensor data from depths below the range of the ship's sonar.

Water filtrations from both layers produced dark-colored filter pads, which proved the existence of particles or droplets without immediately revealing their composition or origin. USF scientists have since been using a variety of analytical approaches to characterize these materials, including gas chromatography/mass spectrometry, compound-specific

and bulk stable isotope mass spectrometry, and optical fluorescence spectroscopy.

The gas chromatography/mass spectrometry analysis has already yielded conclusive results, indicating that the material retained on the filter pads is oil and not suspended sediments or the remains of decaying plant life.

This analysis also revealed that the smaller hydrocarbon molecules were largely missing from the deep oil, which is characteristic of oil that has been exposed to an early level of degradation by microbes. This could be taken as a good sign, as consumption of oil by microbes is one potentially important means of removing oil from Gulf waters. Future tests will be directed at determining conclusively if these deep oil layers are derived from natural seeps or from [oil](#) leaking from the Deepwater Horizon site.

Provided by University of South Florida

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