Gulf of Mexico methane gas concentrations have returned to near-normal levels

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The NOAA Ship Pisces is in the background. Credit: Texas A&M University and NOAA

Calling the results "extremely surprising," researchers from the University of California, Santa Barbara and Texas A&M University report that methane gas concentrations in the Gulf of Mexico have returned to near normal levels only months after a massive release occurred following the Deepwater Horizon oil rig explosion.

Findings from the research study, led by oceanographers John Kessler of Texas A&M and David Valentine of UCSB, were published today in Science Xpress, in advance of their publication in the journal Science. The findings show that Mother Nature quickly saw to the removal of more than 200,000 metric tons of dissolved methane through the action

of bacteria blooms that completely consumed the immense gas plumes the team had identified in mid-June. At that time, the team reported finding methane gas in amounts 100,000 times above normal levels. But, about 120 days after the initial spill, they could find only normal concentrations of methane and clear evidence of complete methane respiration.

"What we observed in June was a horizon of deep water laden with methane and other hydrocarbon gases," Valentine said. "When we returned in September and October and tracked these waters, we found the gases were gone. In their place were residual methane-eating bacteria, and a 1 million ton deficit in dissolved oxygen that we attribute to respiration of methane by these bacteria."

Kessler added: "Based on our measurements from earlier in the summer and previous other measurements of methane respiration rates around the world, it appeared that (Deepwater Horizon) methane would be present in the Gulf for years to come. Instead, the methane respiration rates increased to levels higher than have ever been recorded, ultimately consuming it and prohibiting its release to the atmosphere."

While the scientists' research documents the changing conditions of the Gulf waters, it also sheds some light on how the planet functions naturally.

"This tragedy enabled an impossible experiment," Valentine said, "one that allowed us to track the fate of a massive methane release in the deep ocean, as has occurred naturally throughout Earth's history."

This shows the deployment of the CTD Rosette system for collecting water samples. Credit: Texas A&M University and NOAA

Kessler noted: "We were glad to have the opportunity to lend our expertise to study this oil spill. But also we tried to make a little good come from this disaster and use it to learn something about how the planet functions naturally. The seafloor stores large quantities of methane, a potent greenhouse gas, which has been suspected to be released naturally, modulating global climate. What the Deepwater Horizon incident has taught us is that releases of methane with similar characteristics will not have the capacity to influence climate."

The Deepwater Horizon offshore drilling platform exploded on April 20, 2010, about 40 miles off the Louisiana coast. The blast killed 11 workers and injured 17 others. Oil was gushing from the site at the rate of 62,000 barrels per day, eventually spilling an estimated 170 million gallons of oil into the Gulf. The leak was capped on July 15, and the well was permanently sealed on Sept. 19.

The research team collected thousands of water samples at 207 locations covering an area of about 36,000 square miles. The researchers based their conclusions on measurements of dissolved methane concentrations, dissolved oxygen concentrations, methane oxidation rates, and microbial

community structure.

Provided by University of California - Santa Barbara