MEETINGS

Unexpected Sink for Deepwater Horizon Oil May Influence Future Spill Response

Town Hall: Marine Oil Snow Sedimentation and Flocculent Accumulation (MOSSFA); Mobile, Alabama, 27 January 2014

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A town hall meeting was organized by the Marine Oil Snow Sedimentation and Flocculent Accumulation (MOSSFA) inter-consortia Gulf of Mexico Research Initiative (GoMRI) working group and the Center for Spills in the Environment in conjunction with the Gulf of Mexico Oil Spill and Ecosystem Science Conference. The meeting had the goal of evaluating sedimentation to the seafloor as a significant pathway and fate of oil after the Deepwater Horizon (DwH) well blowout in 2010. About 78,000 cubic meters of crude oil were released into the Gulf of Mexico from a depth of 1500 meters for 86 days, spreading over a large area. Natural and chemically enhanced dispersion, evaporation, dissolution, burning, surface skimming, and direct capture at the wellhead accounted for a significant proportion of the released oil, but the fate of at least 30% of the oil remains unknown. Scientists from different research consortia studying sediments and marine snow in the Gulf began to observe signs of increased sedimentation and hydrocarbon deposition. Sediment mass accumulation rates for the northern Gulf of Mexico increased sixfold to eightfold in 2010, directly following the DwH blowout.

The purpose of the town hall meeting was to bring together academic scientists interested in these processes with Coast Guard and National Oceanic and Atmospheric Administration (NOAA) oil spill responders. At the meeting, the MOSSFA working group summarized findings regarding marine oil snow sedimentation and flocculent accumulation processes, highlighting vertical transport pathways and post-depositional processes that could significantly affect distribution patterns and effects of sediment-associated oil in deep-sea habitats. During a panel discussion, Coast Guard and NOAA oil spill responders examined ways in which mitigation measures used during the spill may have intensified MOSSFA processes and considered how to incorporate MOSSFA in future oil spill response planning.

An estimated 3% to 25% of the oil released during the spill accumulated on the seafloor due to MOSSFA-related processes. MOSSFA processes were possibly intensified during the spill by chemical dispersant application, in situ burning, and releases of large volumes of Mississippi River water containing suspended solids and nutrients. Understanding the role of the Mississippi, and river systems in general, is particularly important because 85% of deep-water oil exploration worldwide occurs adjacent to deltaic systems.

The discussion among the 50 participants identified the importance of collaboration between academic scientists and Coast Guard and NOAA responders. It was agreed that more focus is needed on the potential for long-term contamination of benthic habitats. The consensus of the group was that accumulation of oil at the seafloor may provide a pathway for the protracted exposure, uptake, and continued metabolism of toxic and carcinogenic petroleum hydrocarbons by ecologically, economically, and recreationally important benthic fish. Additionally, it was concluded that MOSSFA processes must be included in numerical models used for predictions of the effects of spill response measures on the fate of spilled oil. More information on MOSSFA, including documented transport pathways and research needs, can be found at http://www.deep-c.org/mossfa or at http://cse.unh.edu.

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