

FSU Study Finds Use of Dispersants can Increase Oil Penetration into Sandy Marine Sediments

A Florida State University researcher working as part of the Gulf of Mexico Research Initiative (GoMRI) investigated the effects of dispersants on the movement of crude oil through water-saturated marine sand and found that dispersants potentially facilitate penetration of oil components into the seabed, where oxygen concentrations may affect the degradation of the oil.

Experiments using sand-filled columns ranging from 10 to 50 centimeters in length found that the addition of dispersants caused hydrocarbons such as oil to penetrate deeper into sediment layers and potentially extend the time the hydrocarbons stay in the environment.

Based on these experiments, researchers postulate the deeper penetration of hydrocarbons may slow their degradation due to a decrease in oxygen in deeper sediment layers and thus extend the time the hydrocarbons remain in the environment. However, in fully oxygenated sand, a deeper penetration may increase the number of microbes involved in the biodegradation and decomposition of the hydrocarbons.

Researchers also concluded from the experiments that the presence of dispersants allow oil components to permeate faster and deeper into sands.

“There is relatively little information on the effects of dispersants on oil deposition and transport in water-saturated sandy sediments,” said Markus Huettel, a member of the study team and a professor in the Florida State University Department of Earth, Ocean and Atmospheric Science. “This study shows that the use of dispersants can potentially have both positive and negative impacts, depending on the oxygen content of the sand.”

Huettel, who worked with Alissa Zuijdggeest on the study, is among a number of GoMRI scientists studying the impact of the Deepwater Horizon oil spill. The research is made possible in part by a grant from GoMRI through the Florida Institute of Oceanography and Deepsea to Coast Connectivity in the Eastern Gulf of Mexico (DEEP-C) Consortium.