Remote sensing assessment of surface oil transport and fate during spills in the Gulf of Mexico

Ian MacDonald, Dmitry Dukhovskoy, Samira Daneshgar Asl, Mark Bourassa, Jørgen Skancke, Oscar Garcia, Chaunmin Hu, and Mark Reed

Results of work carried out during the this project contributed to advancing the state of the art for remote sensing of oil by improving the methods for detection of floating oil and in understanding the influences of environmental factors such as wind and currents that spread and dissipate surface slicks. Remote sensing data provided a means for tracking a critical component of this discharge: movement of oil across the ocean surface. It is this component of the DwH oil spill that generated contaminated marine snow, injured mesophotic corals, and oiled over 2100 km of the Gulf coast. Modeling efforts improved understanding of chemical alterations that occur as surface oil weathers over time. The structure of the near-surface velocity profile and the related dynamics still remain a fundamental knowledge gap for simulating surface oil transport. Results from this project demonstrate the differences in how hydrodynamic models represent surface velocity given their numerical schemes and vertical grid discretization, as well as the impact Stokes drift can have in inducing current shear at the surface. Comprehensive project results have been published as OCS Study BOEM 2017-030. Project results also contributed to some 25 peer-reviewed articles and datasets, as well as numerous presentations at scientific meetings, with additional publications in progress.