Deepwater Horizon oil-residues as tracers of subsurface transport, partitioning, and fate of toxic compounds in the Gulf of Mexico

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The Deepwater Horizon (DWH) is the largest accidental spill in history, with ~4 million barrels of oil released beneath the ocean's surface in the Gulf of Mexico (GoM). Following the DWH blowout, the formation of an unexpected and extended sedimentation event of oil-residues associated with marine snow and/or particles occurred over an extensive area of the seafloor (~11,0000 km^2) with deep to shallow communities exposed to high levels of toxic compounds. We investigated the distribution of hydrocarbons (e.g., polycyclic aromatic hydrocarbons, hopanes, steranes) over a large spatial and temporal scale. Results indicate that as a consequence of the portioning of oil-residues at depth, most oil-derived toxic compounds were deposited offshore (depths >200m). Also, weathered oil residues are still present 8-years after the spill, and are distributed relative to seafloor topography and physical processes (e.g., resuspension). Altogether, results suggest a long-term fate of oil residues in the marine environment, critical for explaining the decline of multiple deep-sea taxa in the GoM, years after the DWH.