MISSION

CARTHE brings together over 50 of the nation's top ocean modelers and air-sea interaction experts to share knowledge and explore the fate of the hydrocarbons released as a result of the Deepwater Horizon oil spill. Funded through the Gulf of Mexico Research Institute, this collaborative effort will produce the first-ever comprehensive modeling hierarchy that offers a combined space and time (3D+1) description of the oil and dispersants' fate and transport. From their current studies of oceanic and atmospheric turbulence

Above: CARTHE researchers releasing the first custom drifter from the R/V Walton Smith near the site of the Deepwater Horizon oil spill.

and mixing, tropical cyclones, and coastal and nearshore observations, the team members will:

- **Develop a multi-scale modeling tool that incorporates state-of-the-art knowledge.**
- **Conduct *in-situ* observations and laboratory experiments specifically designed to quantifying and follow dispersion.**
- **Create a robust set of tools to assess model performance and quantify predictive uncertainty.**
- **Establish sampling strategies and investigations that may be used in other petroleum release scenarios.**

PARTNERS IN THIS ACTIVITY INCLUDE SCIENTISTS FROM:

City University of New York — Staten Island
Florida International University
Florida State University
Naval Postgraduate School
Naval Research Laboratory
Nova Southeastern University
Texas A&M University-Corpus Christi
Tulane University
University of Arizona
University of Delaware
University of Miami
University of Texas at Austin

www.carthe.org

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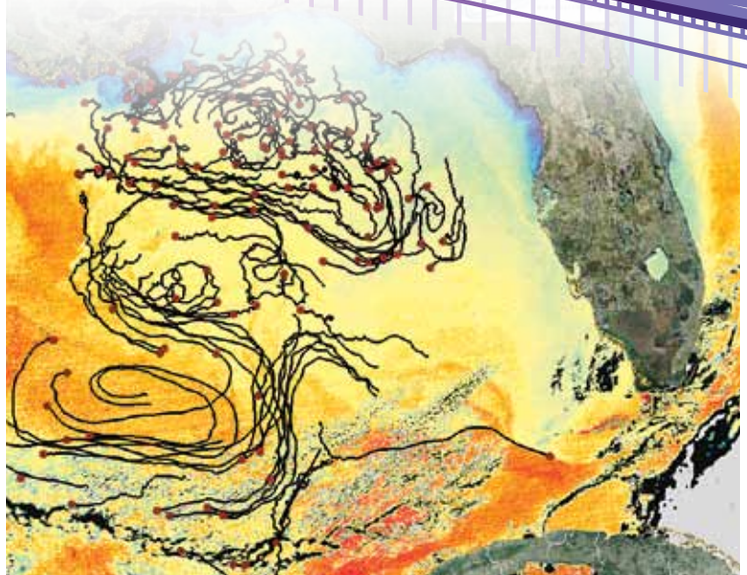

CARTHE

CONSORTIUM

for ADVANCED RESEARCH on TRANSPORT of HYDROCARBON in the ENVIRONMENT

A Project of the Gulf of Mexico Research Initiative

GULF OF MEXICO RESEARCH INITIATIVE

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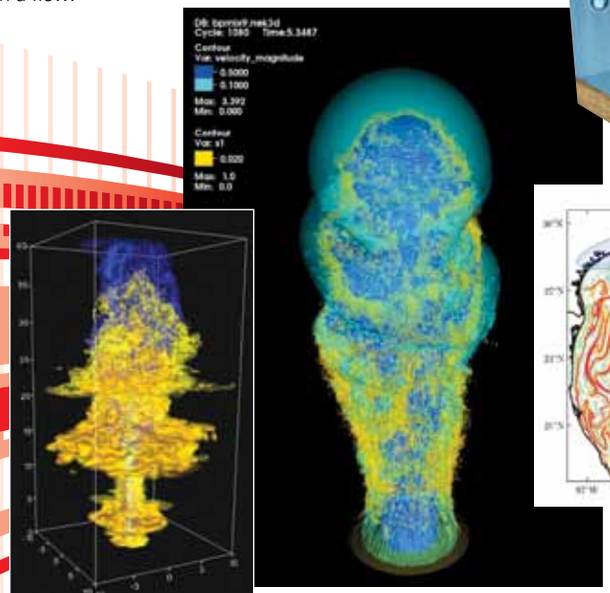
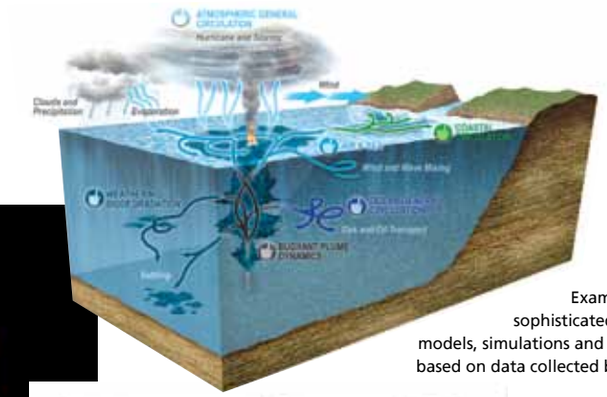
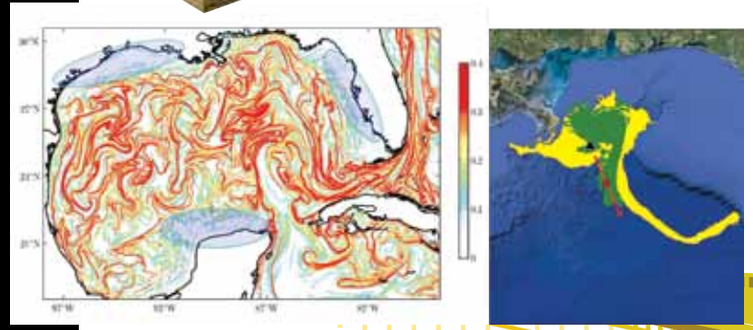
BUOYANT PLUME DYNAMICS

Using Large Eddy Simulations (LES), the team is studying how these structures transport small-scale disturbances with them as they migrate through a flow.







Examples of the sophisticated computer models, simulations and animations based on data collected by CARTHE.

OCEAN & COASTAL MODELING

Regional ocean models are being used to identify surface and subsurface transport pathways from injection into the water column to nearshore coastal regions and ultimately to landfall.

COUPLED HURRICANE MODELING

CARTHE investigators are developing physically-based and computationally-efficient coupled models that take into account atmosphere, waves, oceans and land.

UNCERTAINTY ANALYSIS

Advanced mathematical tools are used to quantify the sensitivity of models' solution space to the physical parameters of the oil spill problem.

DISPERSION EXPERIMENTS

Investigators are engaged in a wide-ranging set of field and laboratory experiments that will allow them to better understand shelf to inshore transport, surfzone dynamics and changes in hydrocarbon isotope composition over time. Follow them online at carthe.org.

Right: Student with Miami Science Museum's IMPACT program learning to collect scientific data.

JOIN US!

CARTHE members are regularly out in the community, sharing their research and insights. They give lectures to the community, go into middle and high school classrooms, and engage students in hands-on experiments. One example is their participation in the Miami Science Museum's IMPACT program, a 6-week marine science and technology learning experience for high school students, based at the University of Miami's Rosenstiel School. The IMPACT program provides low-income youth with training, mentoring, and academic enrichment. CARTHE provides these students with an opportunity to see real science in action!

You can get involved by attending one of our community activities, or by following us on Facebook! For more information, please contact us at carthe@rsmas.miami.edu.

GLAD (GRAND LAGRANGIAN DEPLOYMENT)

The CARTHE team deployed 300 custom-made drifters near the Deepwater Horizon site. The GLAD experiment was an essential first step to study the complex and elusive surface ocean currents that transport pollutants. The 6 million data points from the drifters will help us to better understand the role of near-surface ocean flows in spreading and dispersing oil.

SCOPE (SURFZONE COASTAL OIL PATHWAY EXPERIMENT)

CARTHE investigators also conducted a coastal experiment in the Florida Panhandle to explore how offshore pollutants make landfall across the complex surfzone. The team used drifters, dye, and airborne observing systems.

Below: Vessel prepared to deploy drifters in the Gulf of Mexico.