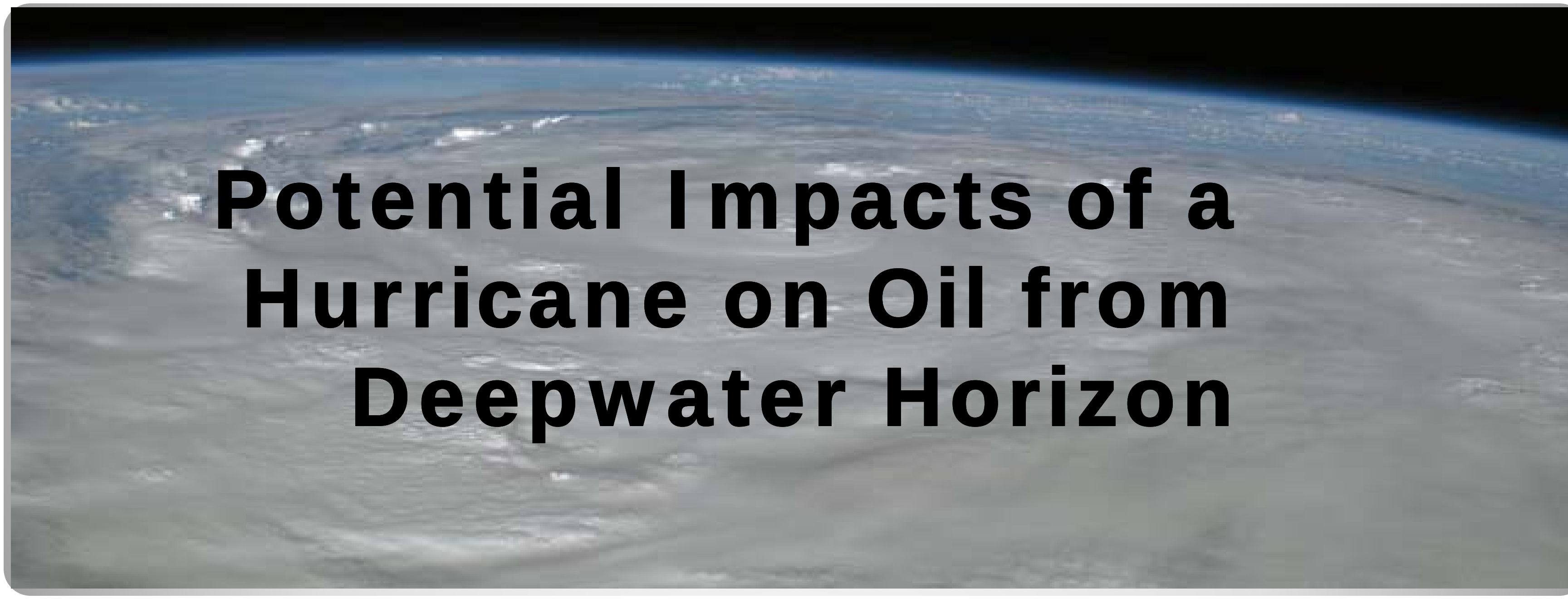
Potential Impacts of a Hurricane on Oil from Deepwater Horizon



Rick Luettich, Professor and Director
Institute of Marine Sciences and
Center for the Study of Natural Hazards and Disasters
University of North Carolina at Chapel Hill

June 30, 2010

THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

1) Likely Consequences

High winds should help mix/ disperse oil in the water column

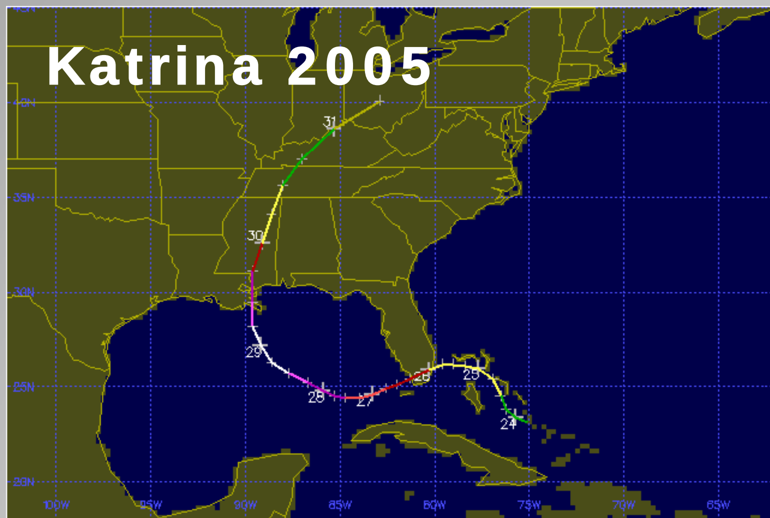
help with dilution and degradation

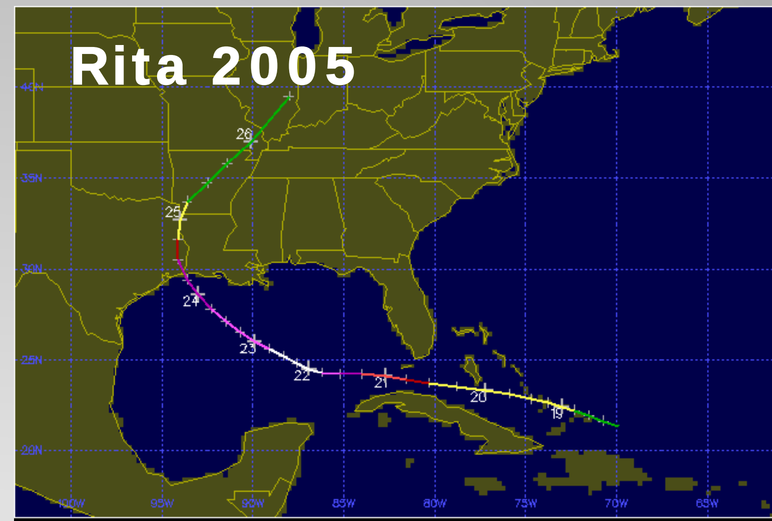
2) Likely Consequences

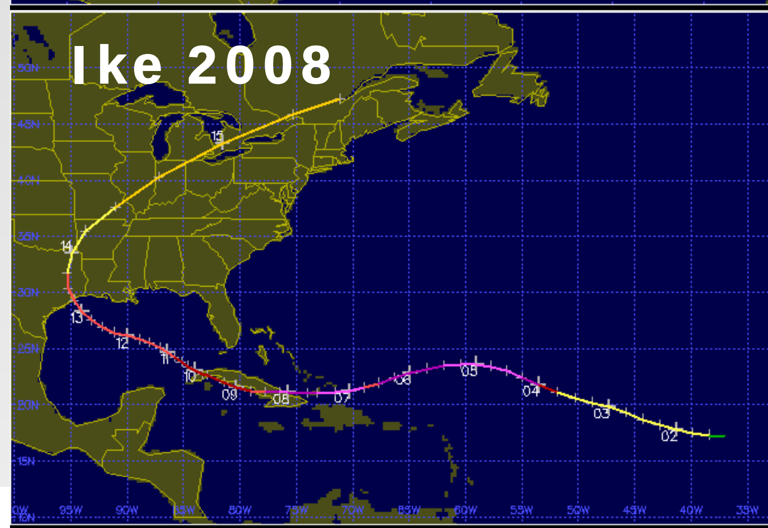
High winds & currents move water/oil *on shore or off shore* depending on relative location of storm

Push water on shore to right of storm - pull water off shore to left of storm

Four Recent Significant Hurricanes

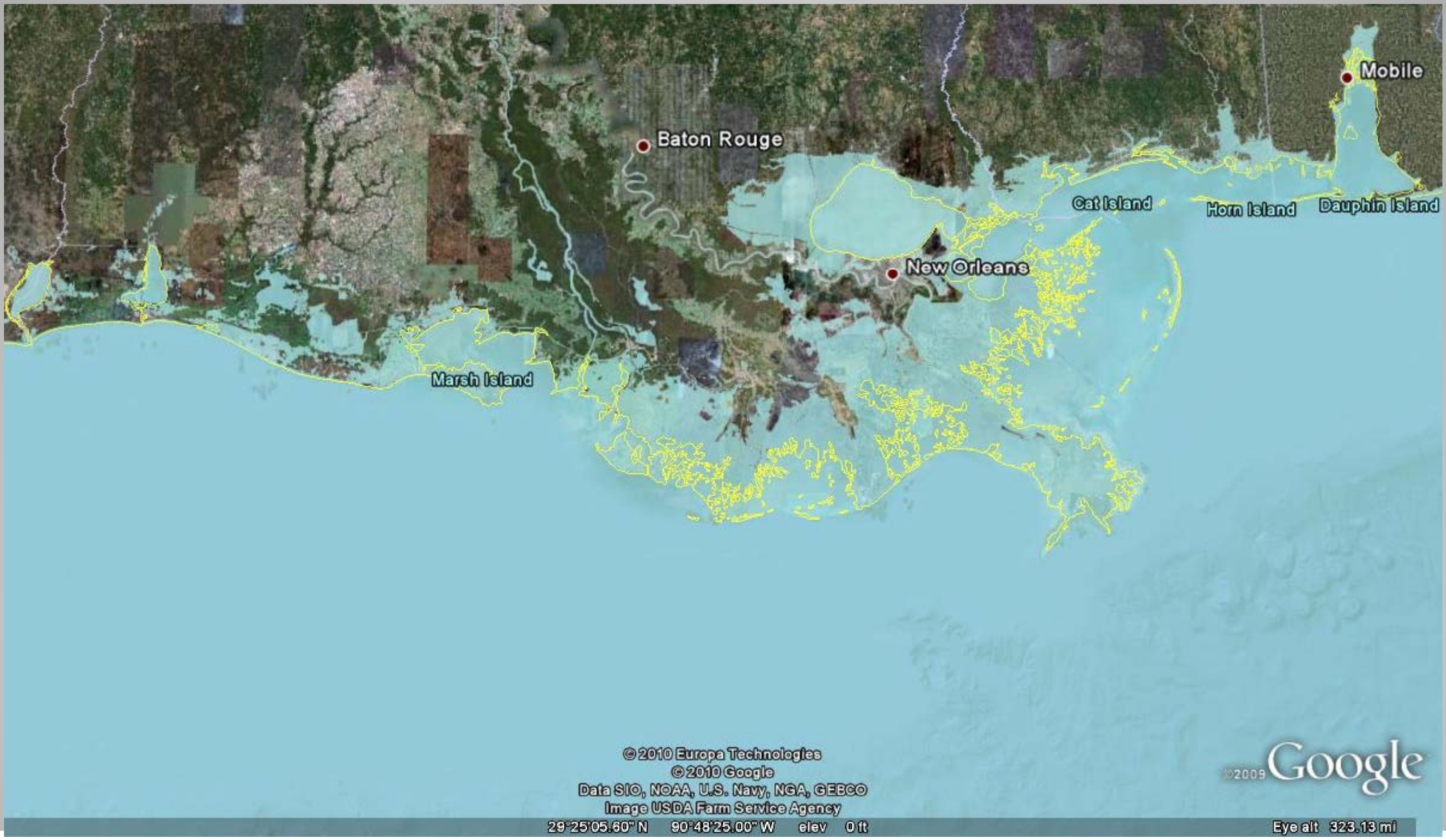




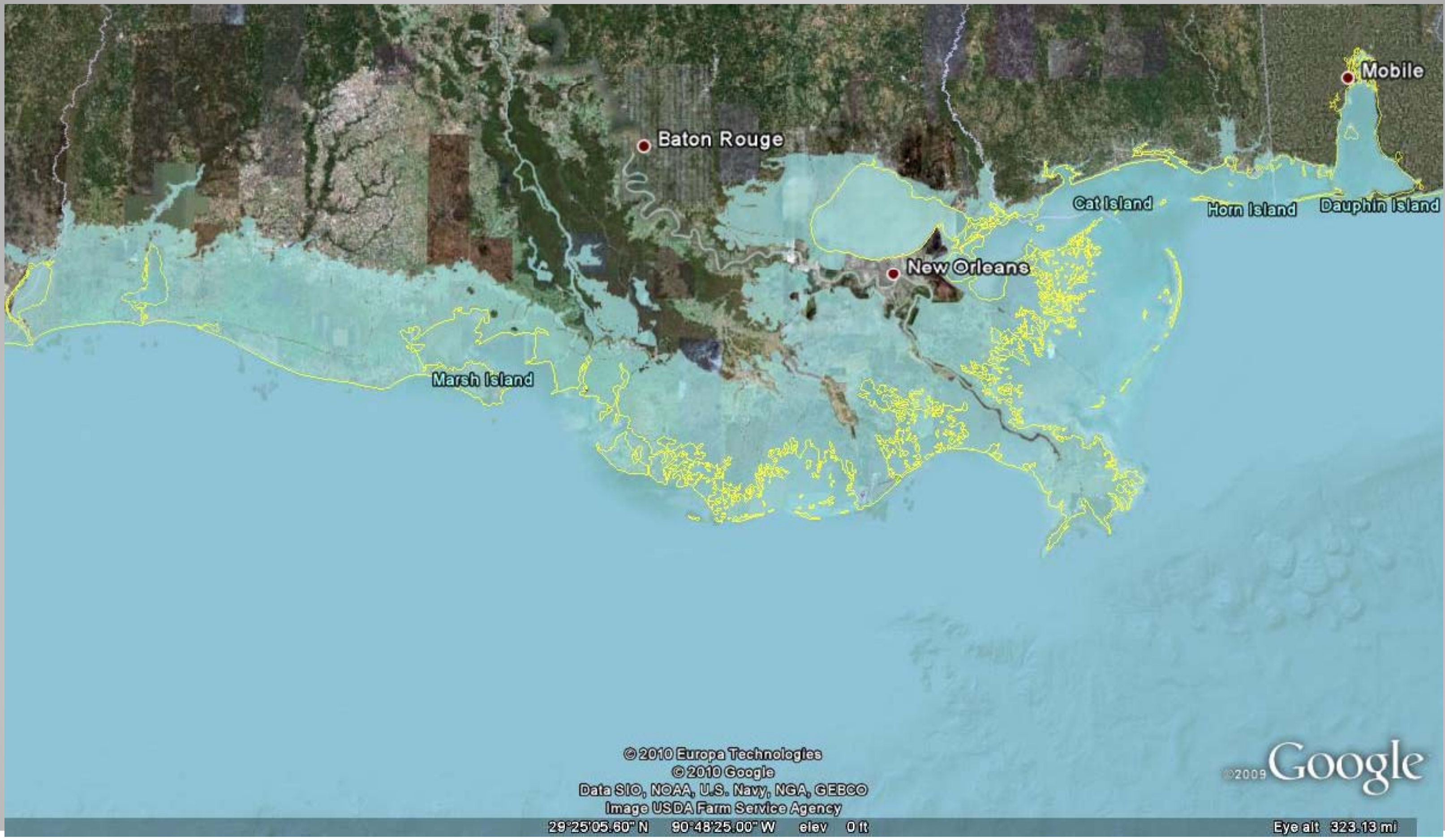


Inundation Region Northern Gulf of Mexico

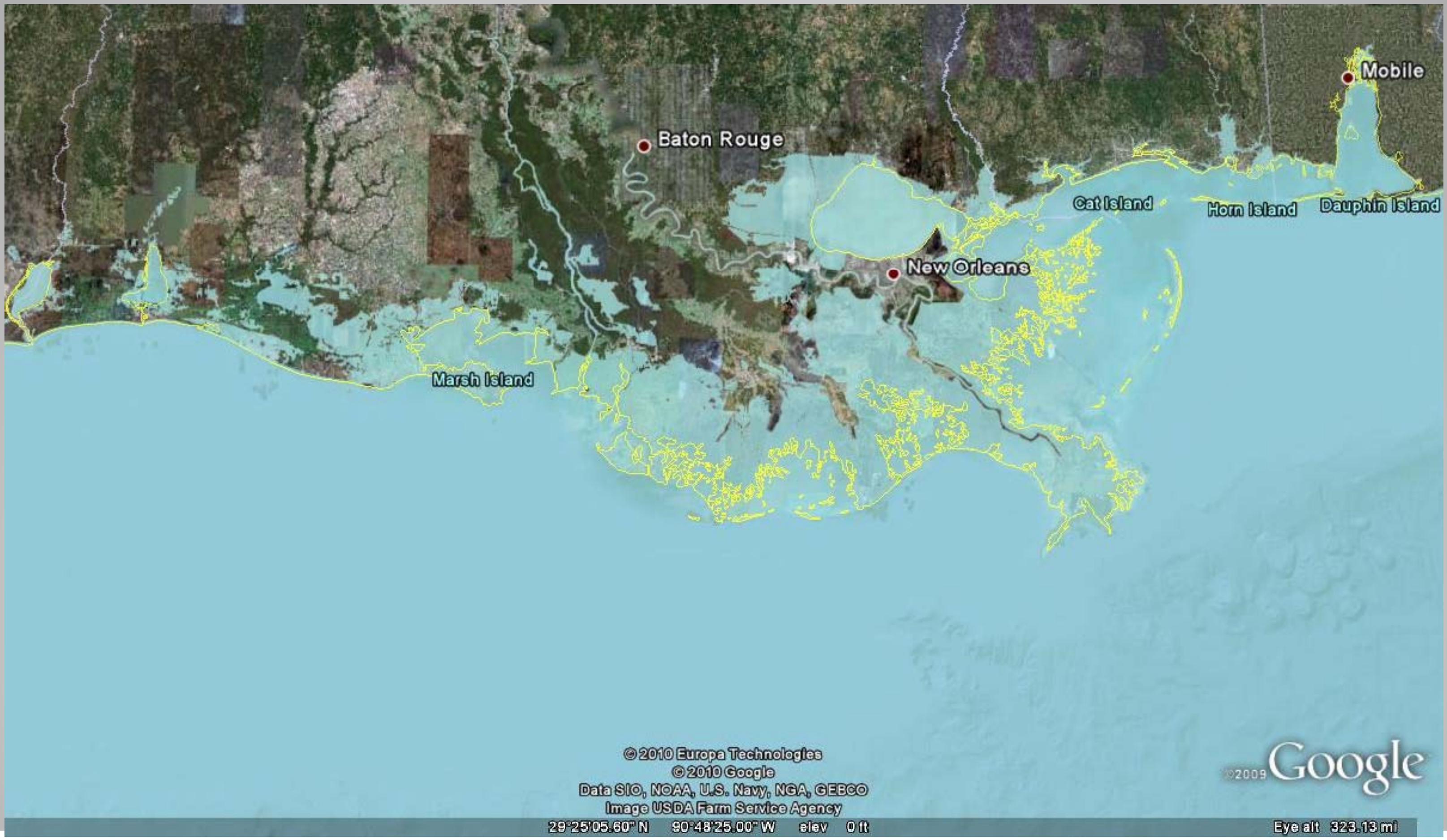
Areas Inundated Northern Gulf of Mexico Hurricane Katrina 2005



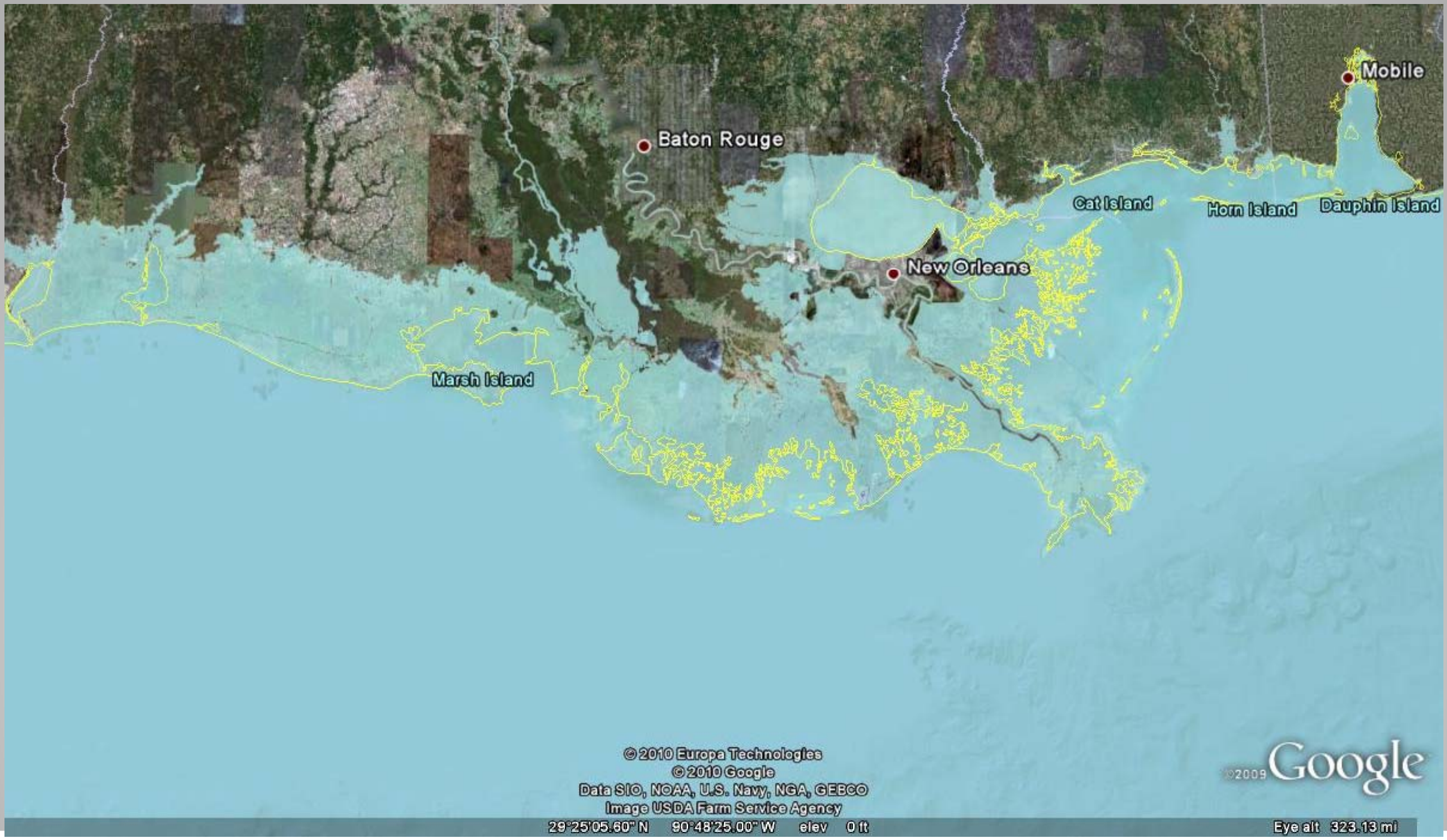
Areas Inundated Northern Gulf of Mexico Hurricane Rita 2005



Areas Inundated Northern Gulf of Mexico Hurricane Gustav 2008



Areas Inundated Northern Gulf of Mexico Hurricane Ike 2008

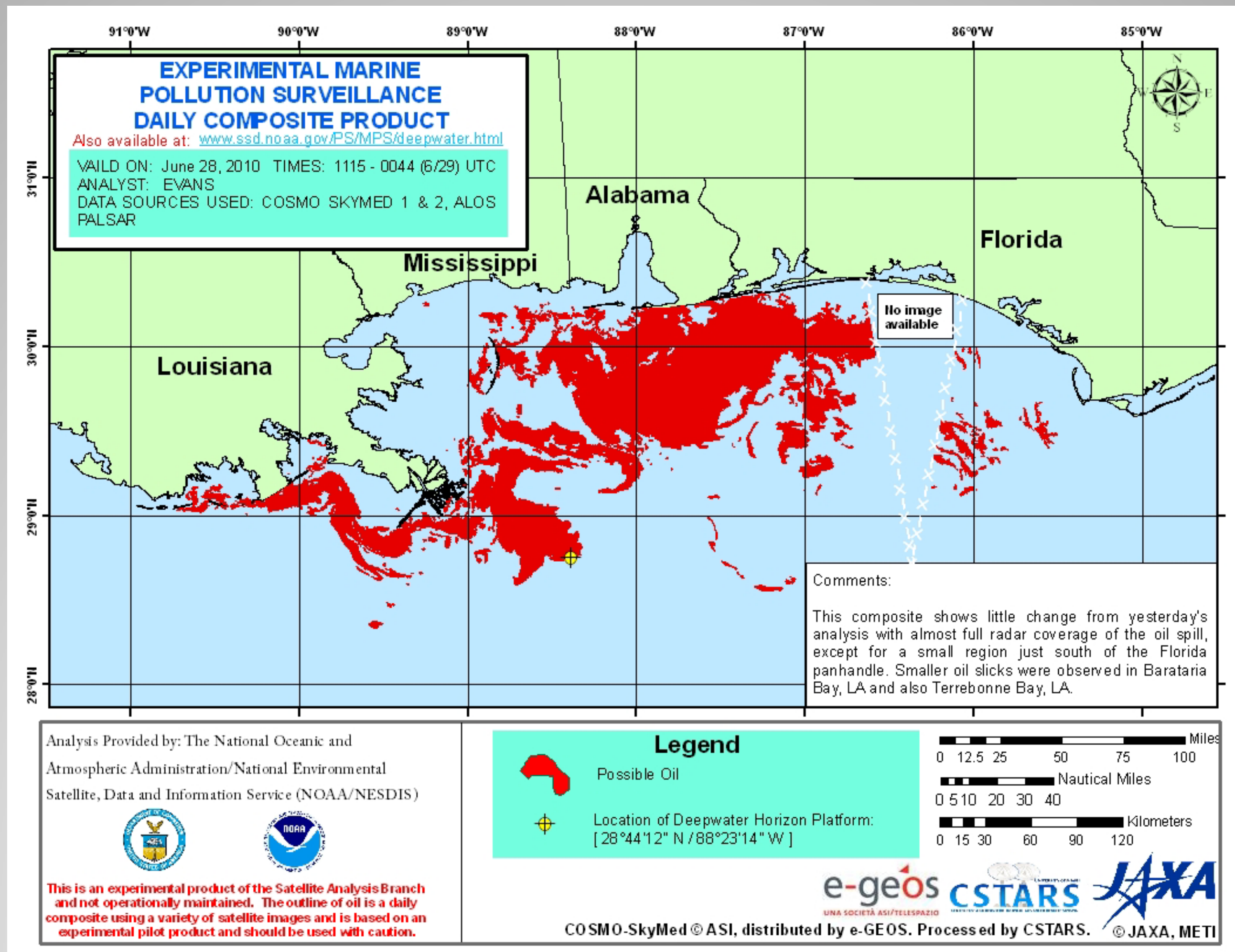


3) Likely Consequences

High winds & currents move water/oil over large *along shore* distances - net counter clockwise direction in the Gulf

Expose coastline areas alon the east side of the Mississippi delta and in the western Gulf.

Recent Surface Oil Location



Example of Distance Traveled During Hurricane Ike 2008

NOTICE/DISCLAIMER

This animation depicts wind velocity, water levels, inundation and passive particle movement obtained from a simulation of **Hurricane IKE** in 2008 computed using the ADCIRC coastal circulation model coupled to the unstructured SWAN wave model.

The initial particle distribution does not reflect actual oil location, but rather provides a general representation of potential movement in the near shore to mid-shelf region.

Particles in the animation move with the depth-averaged water velocity and most accurately represent water movement in shallow estuarine, near shore and continental shelf waters that are strongly mixed during the storm. Particle motion beyond the continental shelf is not reliable.

During the simulation, particles do not disburse, stick or degrade in any way. They may not accurately represent the movement of oil.

These results should not be used to forecast the movement of material at the sea surface or in the water column during any future event.

ACKNOWLEDGEMENT

This animation was a joint effort of the following groups:

- Univ. North Carolina at Chapel Hill, Institute of Marine Sciences
- Univ. Notre Dame, Computational Hydraulics Laboratory
- Univ. Texas, Computational Hydraulics Group, ICES
- Univ. Texas, Center for Space Research
- Univ. Texas, Texas Advanced Computing Center
- Seahorse Coastal Consulting

Funding for this work was provided by:

- National Science Foundation TeraGrid
- National Science Foundation RAPID Grant - Office of Cyber Infrastructure
- Dept. Homeland Security Science & Technology Directorate through the Center of Excellence for Natural Disasters, Coastal Infrastructure and Emergency Management (DIEM)

The content does not necessarily represent the views of these agencies.

Example of Distance Traveled During Hurricane Katrina 2005

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Summary

1.) High winds should help mix/disperse oil in the water column

2.) Counter clockwise winds push water/oil onshore to the right of the storm and pull it offshore to the left

3.) Counter clockwise winds push water/oil counter clockwise around Gulf for significant distances.