

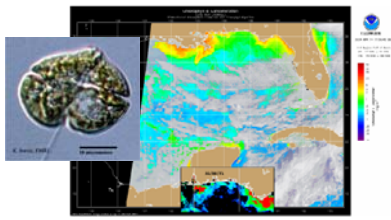


# Satellite and In Situ Optical Assessment of Algal Bloom Events in the Northern Gulf of Mexico

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## PURPOSE

The purpose of this project is to refine and evaluate optical approaches to detect and monitor bloom events of harmful algal species.

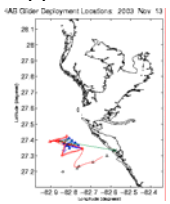
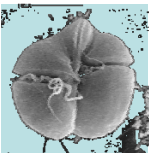
## CONTRIBUTION TO NOAA GOALS

This project complements the goals and objectives of the Northern Gulf Institute by addressing ecosystem management issues, public health and water quality. All of these topics are prominent elements in NOAA's strategic vision. This research will contribute to the Gulf of Mexico Alliance priority of promoting water quality for healthy beaches and shellfish beds.

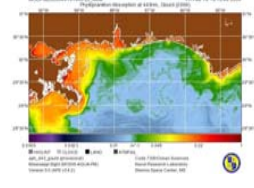
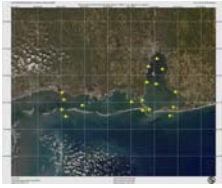
## PROJECT ELEMENTS

Project elements include the following:

- Glider-based deployment of automated in situ instrumentation that has been shown to be effective for optical detection and quantification of *Karenia brevis*, a HAB species. In addition to examining the utility of this approach for detection and assessment of *K. brevis* populations in the northern Gulf, the scope will be expanded to examine the utility of optical approaches for the detection and monitoring of *Pseudo-nitzschia* spp., another HAB species.



- This effort will be complemented by analysis of satellite observations and in situ water sampling of phytoplankton taxa and environmental variables. The analysis of satellite imagery will involve an examination of alternative algorithms applied to both MODIS and hyperspectral data that could improve capabilities for discriminating HAB events. It is anticipated that this project will yield a predictive capability for environmental conditions conducive to HAB development in turbid waters.

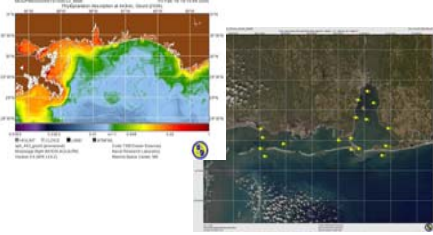
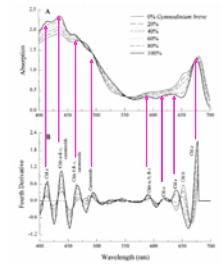


### HAB species detected in MS waters

- *Pseudo-nitzschia* spp. (Amnesic SP)
- *Karenia brevis* (Neurotoxic SP)
- *Karenia mikimotoi* (NSP)
- *Gymnodinium sanguineum* (Paralytic SP)
- *Dinophysis caudata* (Dianthellin SP)
- *Prorocentrum* (C. Species) (DSP)
- *Heterocapsa triquetra* (Hypoxic, Jubilee)

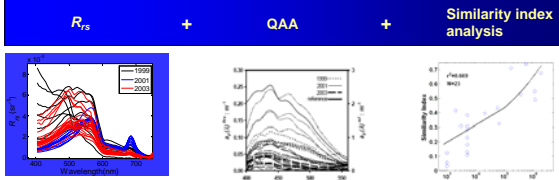
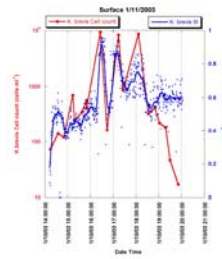
## PROJECT APPROACH

"Brevebuster" capillary waveguide payload will be integrated into Web Slocum glider. This system will provide hyperspectral absorption measurements, which have been shown to provide diagnostic information about *Karenia brevis*.



A combination of satellite observations and in situ monitoring will be used to monitor and assess algal bloom formation and relate to environmental variables.

Glider deployments will be made in conjunction with in situ sampling to provide wider spatial coverage. Prior work has demonstrated the utility of hyperspectral observations for discriminating *K. brevis*. Here, we will examine its application to other bloom-forming taxa, such as *Pseudo-nitzschia* spp.



Measurements of hyperspectral remote sensing reflectance can also provide diagnostic information and their application in the more optically complex coastal waters of the northern Gulf will be explored.

## ACKNOWLEDGEMENTS

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