

BOEM ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

BOEM OCS Region: [Gulf of Mexico](#)

Title: A Study of Long-Term Trends in Environmental Parameters Along the Louisiana/Mississippi Outer Continental Shelf Using Ocean Color Remote Sensing Data (GM-92-42-129)

Planning Area: Central

Total Cost: \$200,642

Period of Performance: FY 2006– 2011

Conducting Organization: [Coastal Marine Institute, Louisiana State University](#)

BOEM Contact: [Dr. Margaret Metcalf](#)

Description:

Background: Satellite remote sensing makes it possible to conduct surveillance on large areas of the world's oceans for natural conditions and changes related to human activities. Plankton biomass, chlorophyll concentrations, colored dissolved organic material, suspended sediments, and water clarity are all indicators used in various ways to describe the water quality condition. In river-dominated areas such as coastal Louisiana, the use of satellite imagery to track water quality parameters is complicated by the variable characteristics of the river inflow. In this project, standard NASA algorithms and regionally developed interpretations of remote sensing data will be compared to each other and to samples collected in the field to improve the understanding and use of NASA SeaWiFS and MODIS Aqua satellite ocean color data.

Objectives: The objectives of this study are to:

- assess and compare standard NASA ocean color algorithms with algorithms derived for the localized region;
- evaluate the performance of a regional ocean color CDOM algorithm;
- analyze long-term time series ocean color data for variability and trends, and
- examine the chlorophyll and CDOM images in response to hurricanes or oil spills if either occurs during the project.

Methods: Ocean color satellite data will be obtained from National Aeronautics and Space Administration Distributed Active Archive Center (NASA DAAC) and processed using NASA SeaDAS software. Existing optical data sets and data obtained during projected cruises will be processed and analyzed using MATLAB and other processing tools. To account for cloud cover interference, an analysis of trends using weekly composites will be performed. The project will include three short field trips along the Louisiana shelf to collect optical data and water samples. Samples will be collected at a minimum of three water depths from approximately 20 stations. Field sample results will be used to estimate constituents and to validate ocean color products.

Products: Products to be delivered to BOEM include quarterly status letters, a final report and a PowerPoint slide presentation.

Importance to BOEM: The BOEM will use the findings of this project to better understand the capabilities of ocean color remote sensing to characterize variability of Mississippi River water and its influences in the northern Gulf of Mexico.

Current Status: The draft report is in progress.

Final Report Due: February 2011

Publications: D'Sa, E.J. and D. S. Ko. 2008. Short-term Influences on Suspended Particulate Matter Distribution in the Northern Gulf of Mexico: Satellite and Model Observations. *Sensors*. 8, Pp. 4249-4264.

D'Sa, E. J. and M. Korobkina. 2008. Colored dissolved organic matter in the northern Gulf of Mexico using ocean color: seasonal trends in 2005. In Charles R. Bostater Jr., Stelios P. Mertikas, Xavier Neyt, Miguel Velez-Reyes, eds. *Remote Sensing of the Ocean, Sea Ice, and Large Water Regions*, Proc. of SPIE Vol. 7105, 710505.

D'Sa, E. J. and S. F. DiMarco. 2009. Seasonal variability and controls on chromophoric dissolved organic matter in a large river-dominated coastal margin. *Limnol. Oceanogr.*, 54(6), 2233–2242.

Shatrughan S, E.J. D'S, and E.M. Swenson. 2010. Chromophoric dissolved organic matter (CDOM) variability in Barataria Basin using excitation–emission matrix (EEM) fluorescence and parallel factor analysis (PARAFAC) *Science of the Total Environment* 408 (2010) 3211–3222.

Affiliated WWW Sites: None

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