Michigan Tech Research Institute

Developing a PACE Hyperspectral Bio-optical Algorithm Framework for Detection of Freshwater Harmful Algal Blooms

Overall Goal: Generate a suite of validated hyperspectral HABs algorithms to supporting research and operational HAB monitoring applications such as the NOAA HAB Tracker

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NASA

PACE Plankton, Aerosol, Cloud, ocean Ecosystem

Michigan Tech Research Institute

HARBOR BRANCH FLORIDA ATLANTIC UNIVERSITY

GLERL Great Lakes Environmental Research Laboratory

Environment and Climate Change Canada

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Overview

The frequency and extent of Cyanobacteria Harmful Algal Blooms (CHABs) events are increasing in the Great lakes, and in particular the Western Basin of Lake Erie (WBE). Prolonged CHAB events have human health, recreational, and economic consequences as well as degrading water used for human consumption. Ocean color satellites are used to monitor CHABs, but have performance limitations in respect to algal type and concentration estimates. The new PACE hyperspectral imager has the potential to generate more quantitative CHABs information.

Mission Benefit

- Provide enhanced CHABs information for operational monitoring such as the NOAA GLERL HAB Tracker
- The new hyperspectral based algorithms will provide enhanced CHABs information for resource managers including NOAA Early Adopters (EA) in WBE and Chesapeake Bay
- The algorithms will produce a set of CHABs products that will be ready for use immediately after the PACE satellite completes IOC

Approach

- Develop new adaptive CHABs indices based on historical MSS approaches, but modified using the additional hyperspectral bands available on PACE
- Develop novel adaptive semi-analytic bio-optical models for different algal groups and physiological conditions using our extensive IOP freshwater data base
- Develop a CHABs detection product application with confidence levels based on the adaptive and bio-optical algorithms
- Generate a suite of demonstration products for stakeholders using PACE analog data sets

Schedule

36 Month Program