

Effects of Rivers Discharge on the Spatial and Temporal Variability of Colored Dissolved Organic Matter (CDOM) and Cyanobacteria in Mayaguez Bay, Puerto Rico

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Statement of the Problem: In coastal environments, where terrestrial discharges are important, the Colored Dissolved Organic Matter (CDOM) must be considered at the moment of calculating biomass of phytoplankton using remote sensing. According to new evidence cyanobacteria can be more abundant when light intensity is limited, and thus they could compete for light availability with other phytoplanktonic populations. The abundance and distribution of cyanobacteria, however, have never been studied in Mayaguez Bay. If these organisms are in high concentrations along the Bay, it is possible that traditional sampling methods for primary producers are not accounting for this important component due to its small size. Such condition could explain the relative low values of biomass (i.e. Chlorophyll-a) reported in Mayaguez Bay in the past. Therefore, it is critical to understand the role of the cyanobacteria in the Bay and its relationship with other parameters like available light, suspended sediments, and CDOM. This project supports the doctoral student of Marine Sciences Patrick Reyes and the master student of Biology Yvette Ludeña.

Objectives of the research: The following questions are addressed:

- What is the bio-optical contribution of the CDOM produced by the rivers?
- What is the seasonal (dry versus wet seasons) and spatial (inshore to offshore) distribution of the terrestrial CDOM and marine CDOM end members?
- How the CDOM signal is affected by the interaction with the suspended sediments, photo-degradation and marine water dilution effects during *in vitro* experiment and compared with the *in-situ* measurements? (Models will be applied in order to make these comparisons.)
- What is the role of suspended sediments on degradation or any other alteration of the CDOM signal, and how are they related to the rivers runoff from the terrestrial environment affecting the Bay?
- What is the spatial and temporal variability of the cyanobacteria populations?
- How these cyanobacteria are related to the optical properties?
- What is the spatial and temporal relationship between the abundance of cyanobacterial populations and chlorophyll-a?