# Phytoplankton Community Structure, Biomass and Photosynthetic Competency Associated with Microscale Features and Frontal Zones of the Gulf Stream

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Variations in chlorophyll pigment along phytoplankton-rich Gulf Stream frontal zones can be observed by both in-situ and satellite measurements. Though satellites can detect these elevated chlorophyll levels, in situ observations are necessary to map the community composition of these diverse blooms. Understanding the water conditions in which different phytoplankton groups are found, as well as the spectrum of satellite measurements they register is the key to eliminating the need for costly research cruises. In situ measurements from a NOAA funded research cruise in November 2014 were analyzed alongside chlorophyll, sea surface temperature (SST) and Kd490 measurements from the VIIRS and Aqua MODIS satellites. Level 2 satellite images from the duration of the cruise were binned into level 3 images, and data of the selected geophysical variables was extracted from them. Phytoplankton samples (imaged with FlowCam technology) in areas of satellite measured increases in chlorophyll-a were analyzed to map the community structure and photosynthetic competency of phytoplankton along Gulf Stream frontal zones. The largest phytoplankton communities were found in mesohaline frontal zones. The presence of large Diatom-Diazotroph Assemblage (DDA) clusters in combination with low variable fluorescence was indicative of the end of a Diatom bloom due to nitrogen depletion in the water. Further examination of shipboard imaged phytoplankton samples and the spectrum of remote sensing reflectance bands should allow for the development of a method to map community structure using only remotely-sensed measurements.