

## Phytoplankton Carbon and Primary Productivity Group

Our group will make multiple measurements of phytoplankton carbon, growth rates, and primary production. Collectively, these data will assess photosynthetic activity across the gross to net primary production continuum. Phytoplankton carbon will be measured using direct and proxy measurements. Different incubation experiments will yield information about physiology and growth rates. These measurements along with modeling approaches will provide multiple observations of the same property of interest (see table below). These comparisons are critical for testing and constraining algorithms and models utilizing optical measurements gathered in-situ or from remote sensing platforms. Supporting measurements of phytoplankton pigments, total particulate organic carbon, and phytoplankton community composition will also be collected.

An exciting new method for directly measuring phytoplankton carbon will be applied on this cruise. Relating these measurements to backscattered light allows for high-resolution modeling of production in-situ using a model originally developed for satellite application. These results will be directly compared with results from  $^{14}\text{C}$  incubation experiments, a method commonly used to measure production in the field. In addition, samples collected on this cruise will include coastal waters that are more optically complex. This will allow us to test our existing relationship between phytoplankton carbon and backscattered light that was developed using open ocean samples.

Phytoplankton Carbon	Growth Rate ( $\mu$ )	Primary Production ( $\text{C} \times \mu$ )	Supporting Measurements
Direct measurement	Carbon-based Productivity Model (CbPM)	$\text{C}^{14}$ – multiple incubation durations (Gross & Net PP)	HPLC Pigments
$b_{\text{bp}} - C_{\text{phyto}}$ proxy	Dilution Experiments	CbPM (Net PP)	Total POC
Flow-cytometry	Species-specific $\mu$ (sequence-based)		Community Composition

### Team Leaders:

Mike Behrenfeld

### Group Participants:

Mike Behrenfeld, Kim Halsey, Jason Graff, Allen Milligan, Toby Westberry, Nerissa Fisher, Matt Brown

### Cruise Participants:

Kim Halsey, Jason Graff, Allen Milligan, Nerissa Fisher, Matt Brown

