

Size Matters: Variation in Phytoplankton Biovolume Observed in Remote Sensing Imagery Across a Putative Nutrient Gradient Nearshore to Offshore of Southern California



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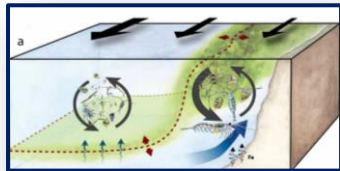
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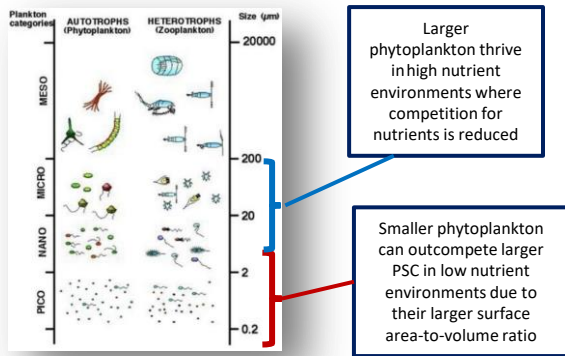
Background

Prior studies have described a nutrient gradient caused between stronger coastal upwelling and weaker, offshore wind-stress upwelling within the California Current System (CCS).



Ohman et al. 2013

The nature of eastern boundary currents force wind patterns that drive greater magnitudes of upwelled nutrients onshore but greater volumes of nutrients over large regions offshore.



This nutrients gradient, in turn, causes a gradient between ecosystem regimes within phytoplankton community structure

Our Question

How does phytoplankton biodiversity vary perpendicular to shore, across a nutrient gradient, from a coastal upwelling to a wind-stress curl upwelling region?

How well can remotely sensed images portray this phytoplankton size class (PSC) distribution?

Methods

We will be using CalCOFI *in situ* data to validate remotely sensed imagery

California Cooperative Oceanic Fisheries Investigation (CalCOFI)

- Over 70 years of *in situ* oceanographic data
 - Cruises collect data quarterly
 - Cast and bottle sampling
- Frontal system study conducted 24 October 2008, collecting PSC data

NASA's Aqua-MODIS Satellite

- Launched in 2002
- Data collected daily
- Larger regions of data collection
- Greater source for error from atmospheric correction

Anticipated Results

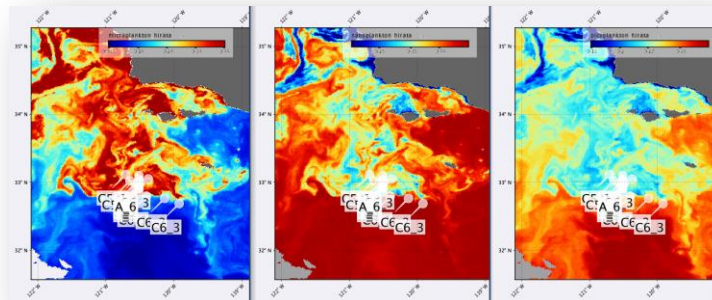


Figure 1. Displaying the three phytoplankton size classes of interest (micro- (left), nano- (middle) and pico- (right)) within our frontal case study. Microplankton (larger) is far more populated within the colder, more nutrient rich water and picoplankton (smaller) is populating the warmer, less nutrient rich water.

- will show matchups between *in situ* data and remotely sensed data supporting a PSC gradient between onshore and offshore upwelling systems
- There will be match-ups in PSC distribution between MODIS-Aqua remotely sensed data and the frontal system case study *in situ* findings

Conclusion and Discussion

What does this mean?

- The validation of remotely sensed data with data collected “on-the-ground” ensures accuracy of PSC detection
- Once validated, PSC distributions can be more consistently tracked and observed over larger regions using satellite imagery

Comparison of CalCOFI to MODIS-Aqua has its limitation when looking at PSC

- Difficult to find clear day match-up dates (quantity of data is limited)
- CalCOFI transects do not always provide PSC validations

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