

Collaborative Research: Diatoms, Food Webs and Carbon Export - Leveraging NASA EXPORTS to Test the Role of Diatom Physiology in the Biological Carbon Pump

Central Hypothesis: *Diatom community composition and taxon-specific metabolism ultimately determine the efficiency of diatom carbon export from the surface ocean.*

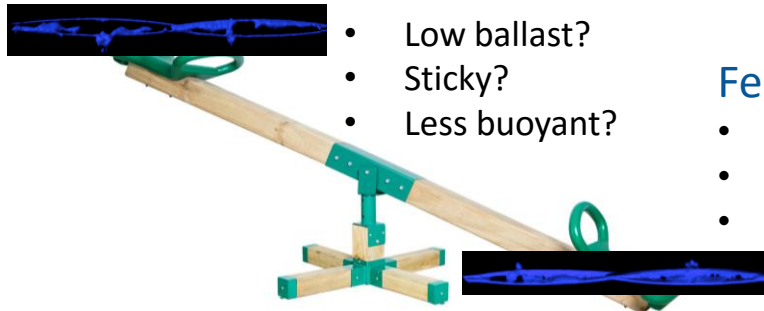
- Goals:**
- Quantify diatom nutrient limitation
 - Determine diatom community composition and elemental stoichiometry.
 - Establish metabolic profiles for different diatom taxa via combined molecular and tracer studies
 - Test how well export paths are predicted from metabolic profiles through collaborations with EXPORTS PIs and samples that will allow for the determination of diatoms following a particular export pathway.

Si limitation

- Low ballast?
- Sticky?
- Less buoyant?

Fe limitation

- More ballast?
- Smaller?
- Less buoyant?



Images Heather McNair (Brzezinski lab)

TEAM MEMBERS



Bethany Jenkins (URI) PI:
diatom communities and nutrient field relationship to exports pathways



Kristen Buck (USF) Co-PI:
measurements of dissolved Fe, biologically bound Fe, and Fe uptake rates



Mark Brzezinski (UCSB) Co-PI:
measurement of size fractionated primary production, nutrient uptake rates

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LOGISTICS




Trace metal clean sampling (from clockwise: rosette, van and bubble)



Deckboard incubations to measure nutrient uptake and stress

MEASURED PARAMETERS

- diatom growth in response to nutrient addition
- uptake rates of stable Fe and NO_3^- and  Si isotopes
- size fractionated primary production
- cell specific Si deposition
- taxa-specific metabolism as measured by gene expression



Phytoplankton biomass collected on filter for genetic analysis (Left)

All photos courtesy of Cara Peckarcik