

Current and Future Scenarios of Phytoplankton Community Composition (PCC) and Harmful Algal Blooms in the Northern Gulf of Mexico

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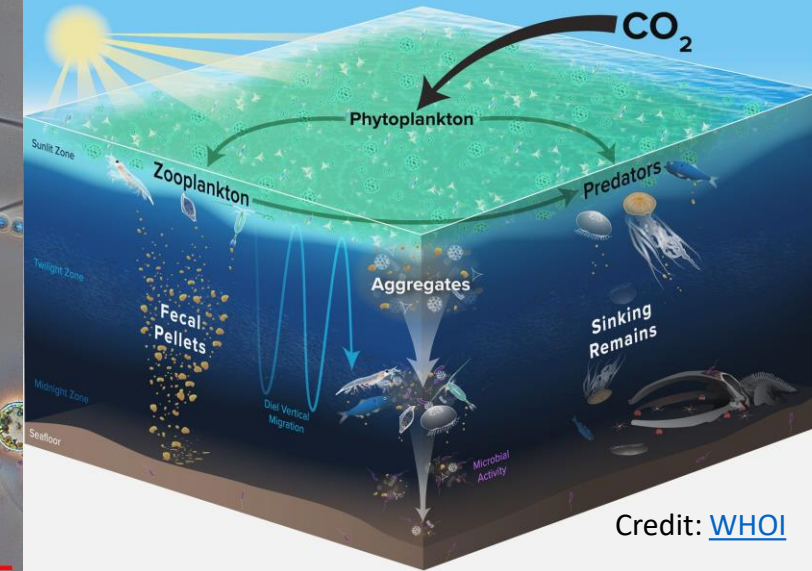
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Phytoplankton Community Composition

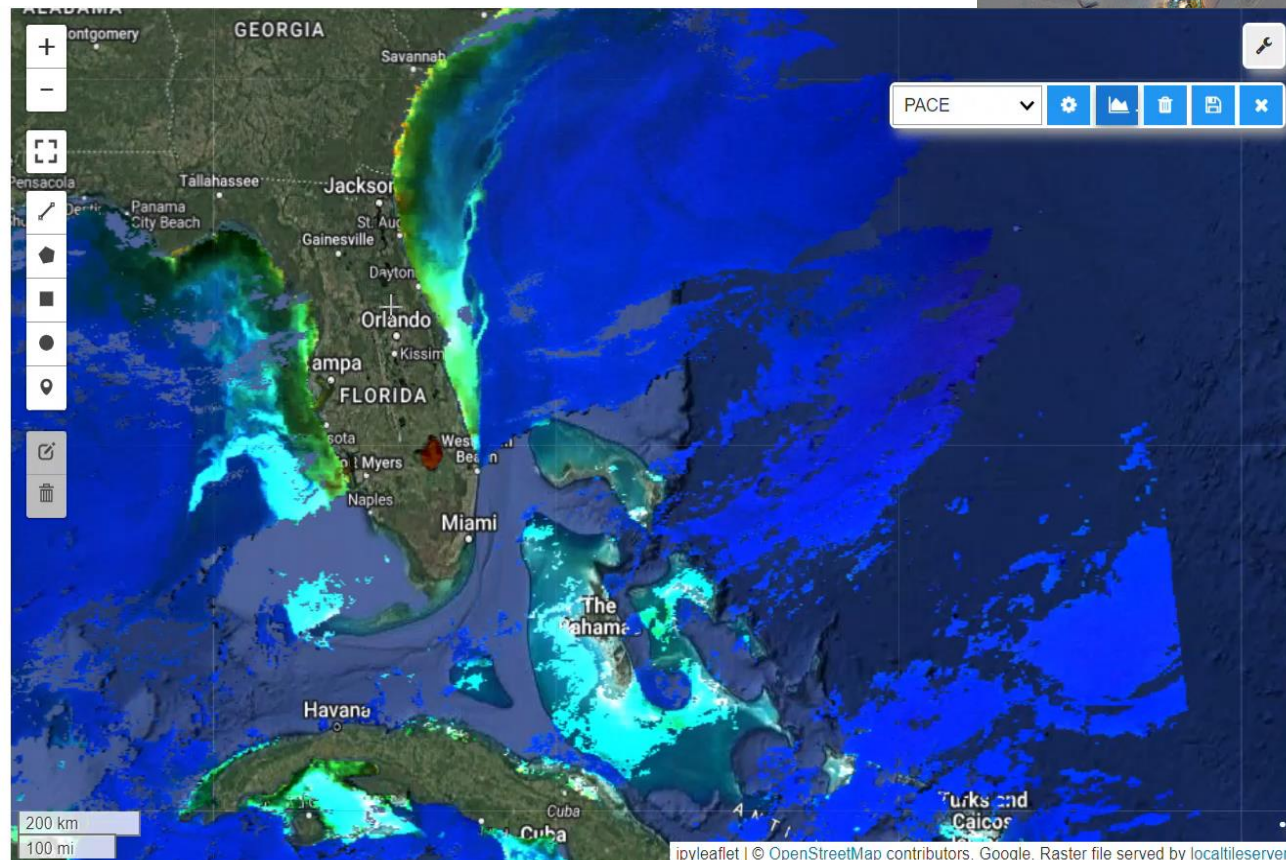


Credit: [WHOI](#)

Credit: [Nostoca algae Laboratory](#)

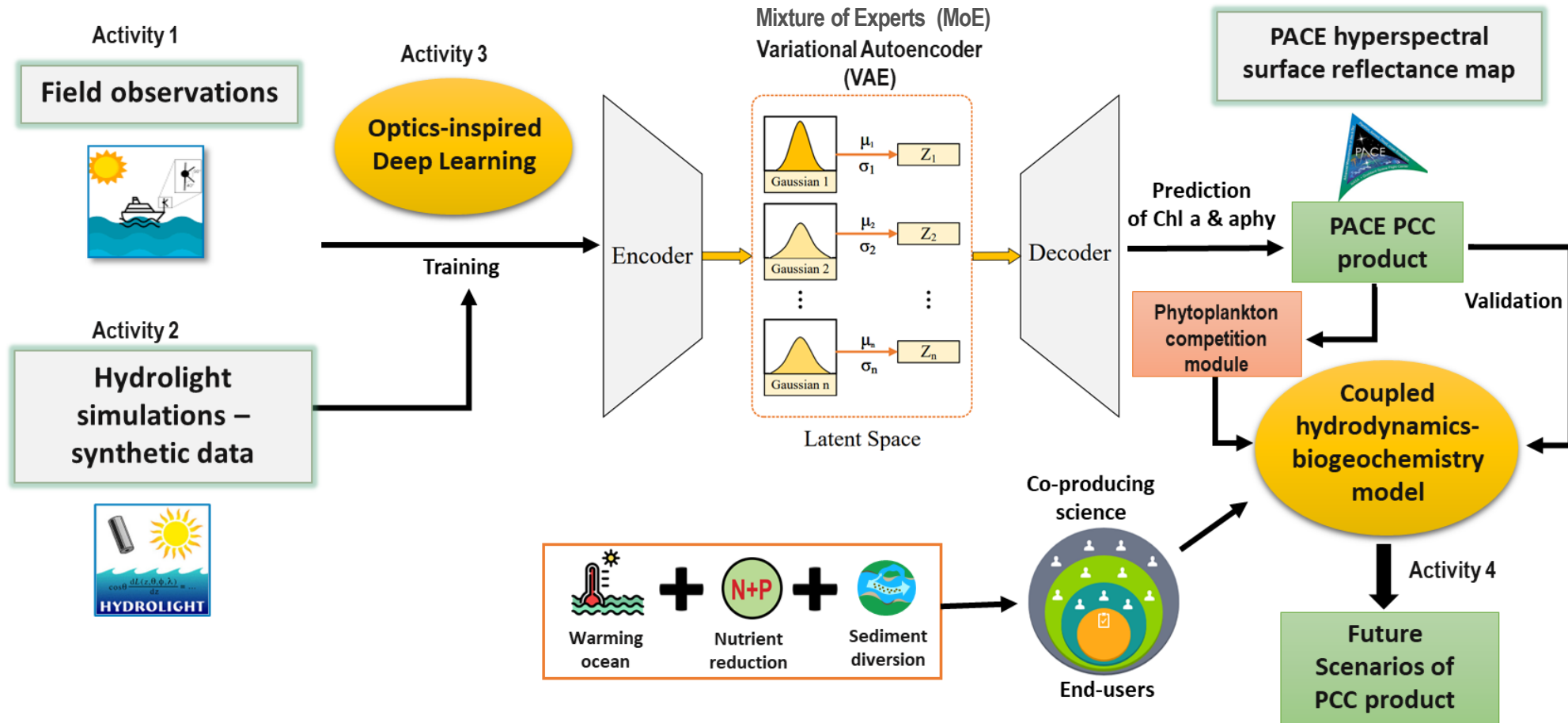
Phytoplankton is an extremely **DIVERSE** set of microorganisms!

- Cell morphologies
- Size
- Pigments
- Biogeochemical functions
- Physiological response to climate-related factors

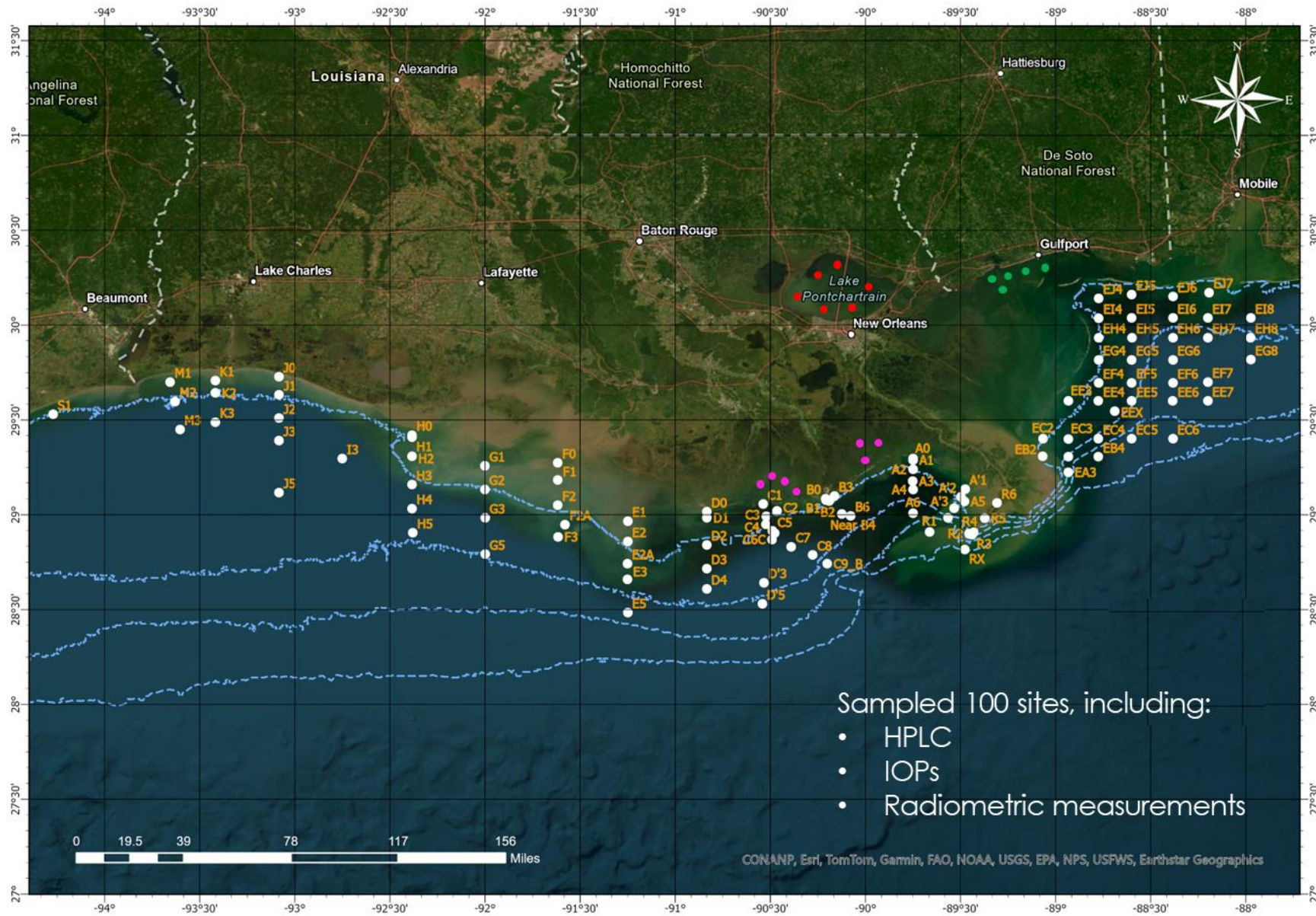


Objectives and Research Activities

- **Objective 1:** Generate and validate PACE products of Chl-a, phytoplankton absorption, and phytoplankton community composition (PCC) in estuarine-coastal waters.
- **Objective 2:** Modeling of PCC for future scenarios in the context of changing climate.



Preliminary Results



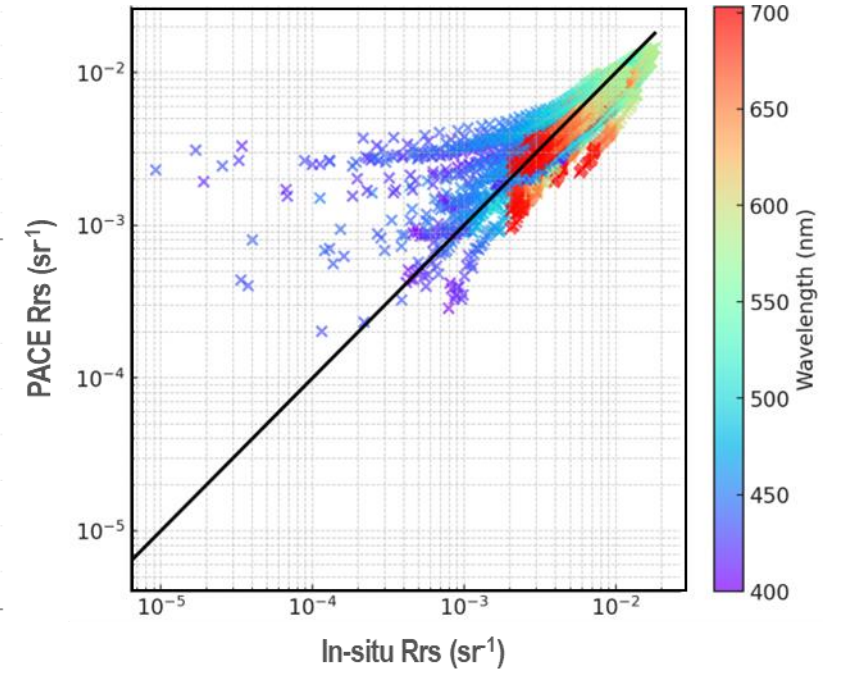
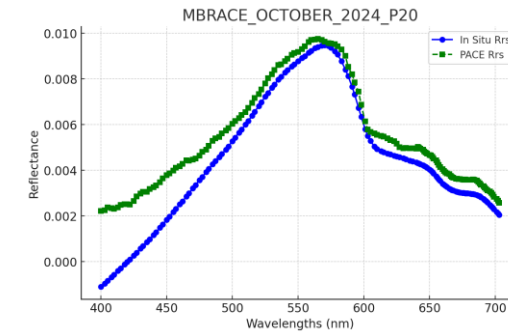
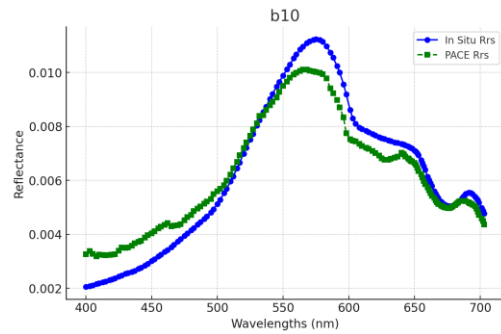
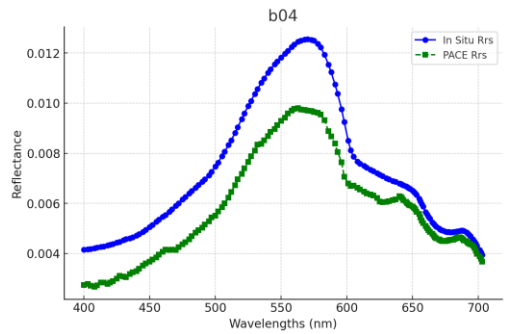
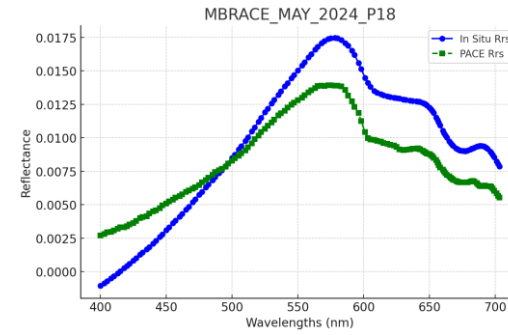
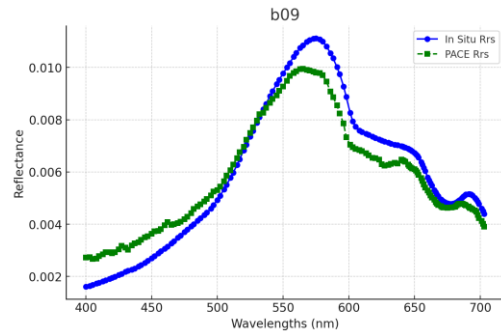
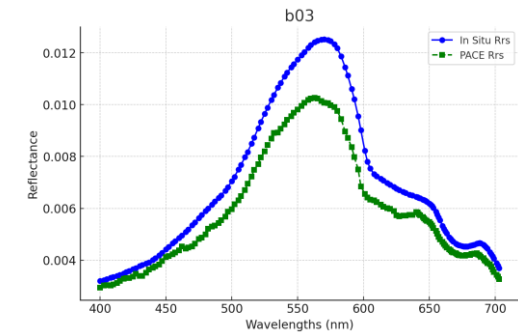
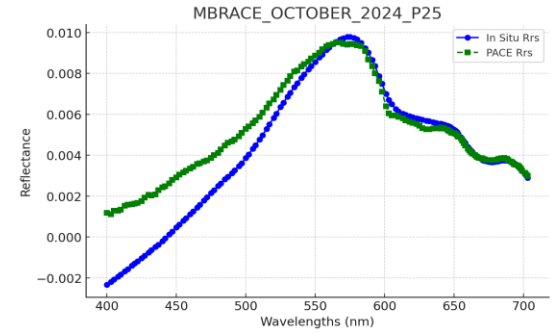
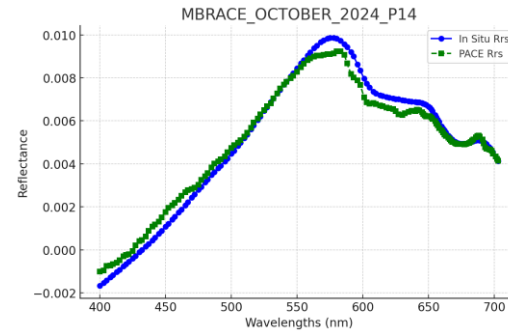
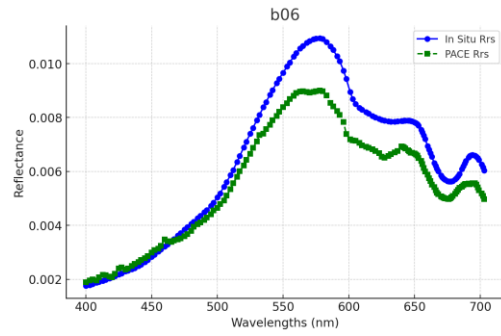
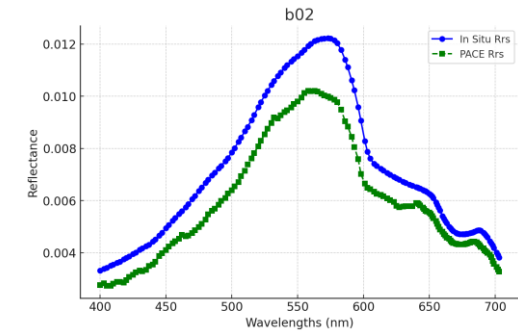
Hypoxia Cruise (7/21-8/2, 2024)



Pontchartrain estuary (9/25/2024)

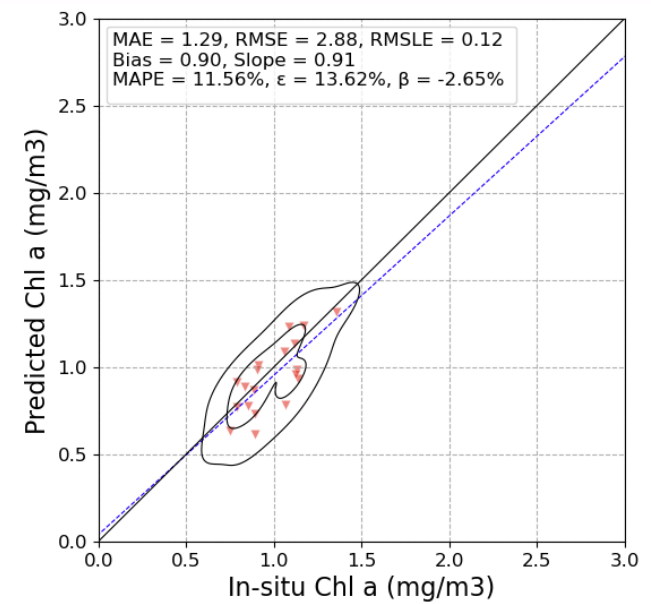
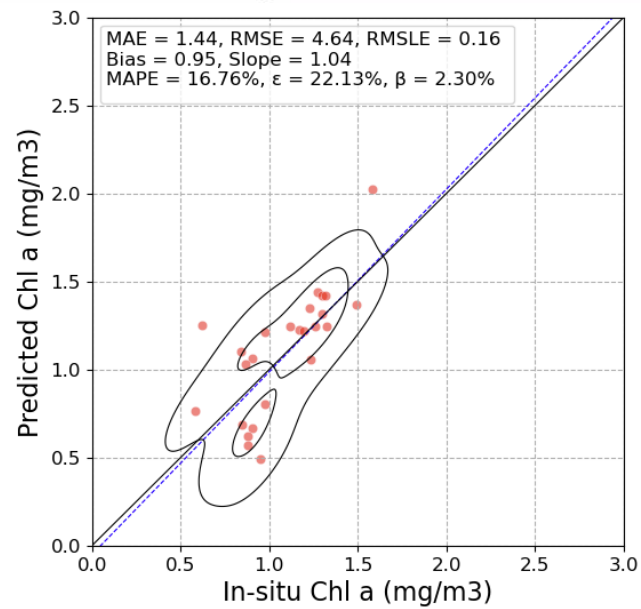
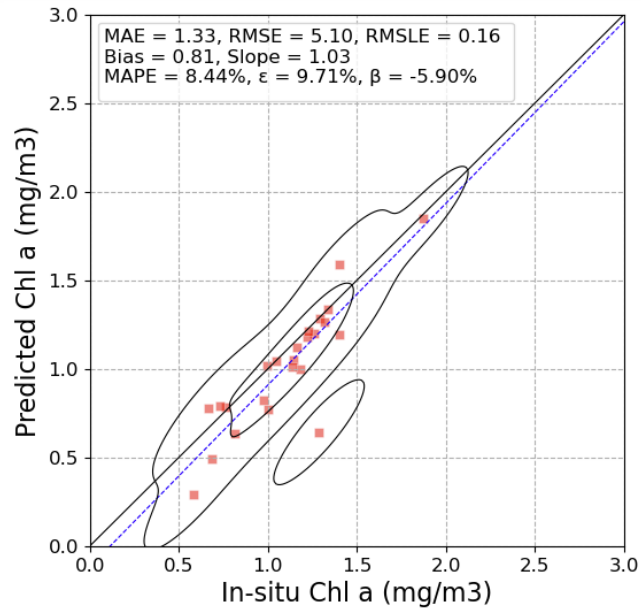
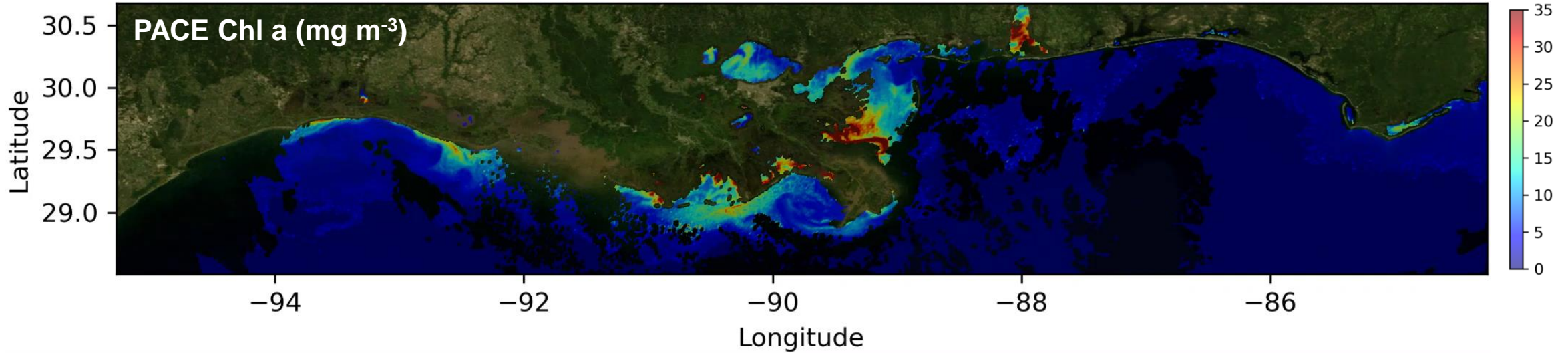


Preliminary Results

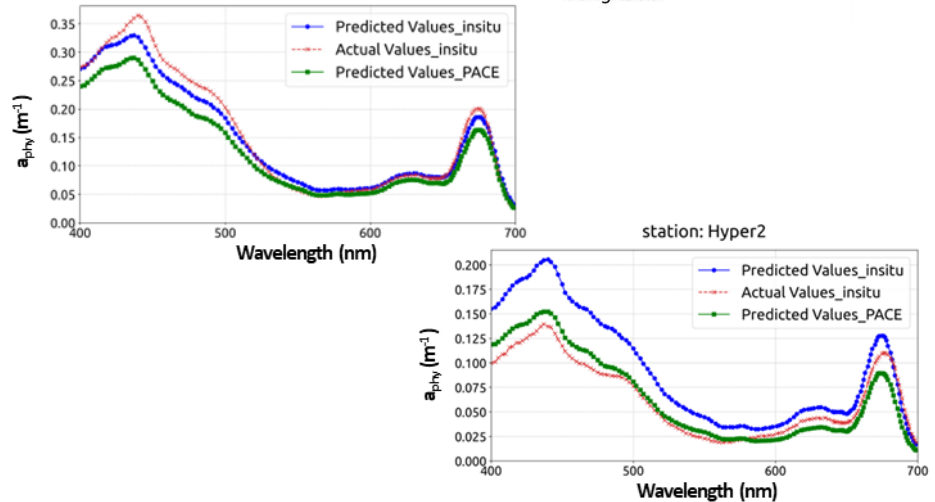
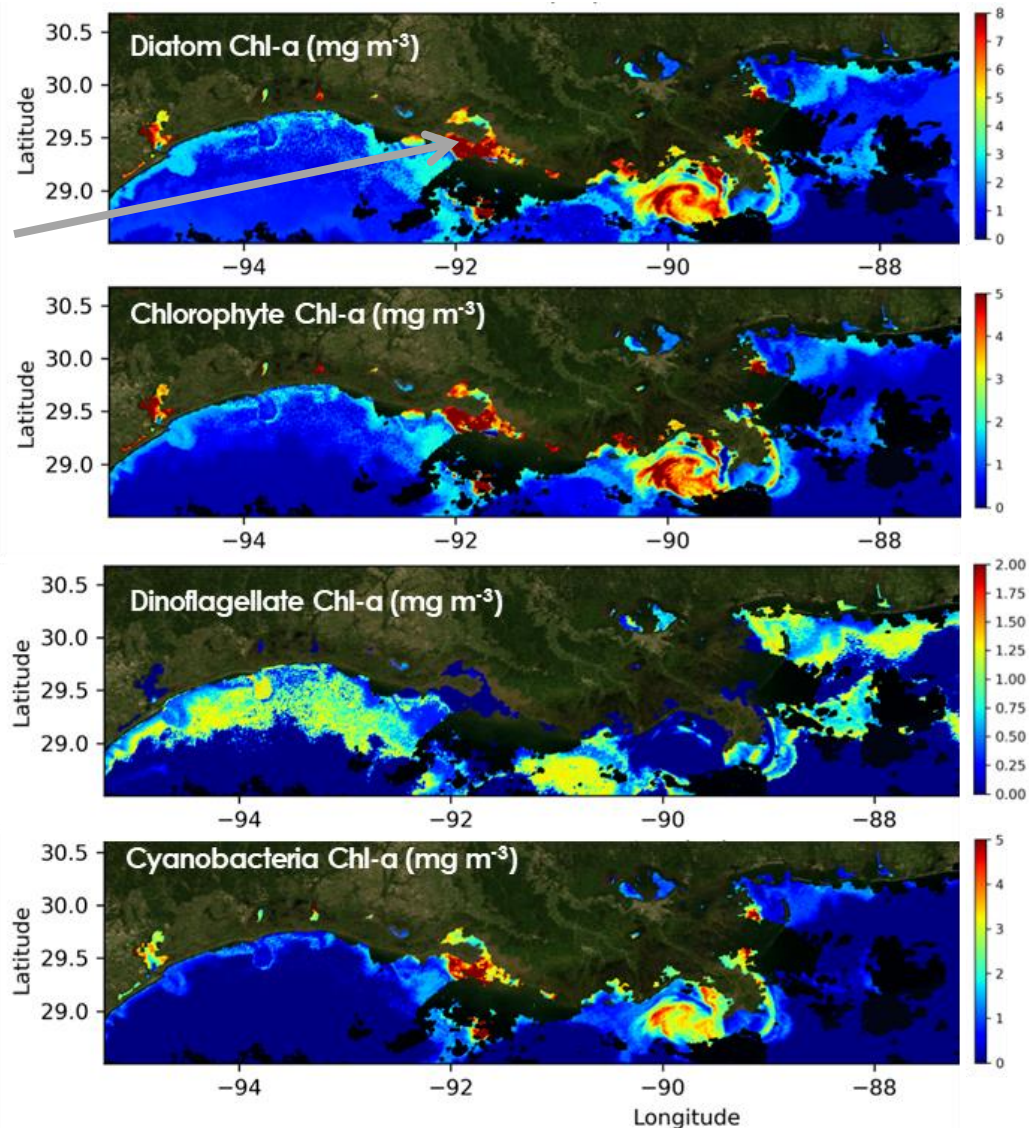
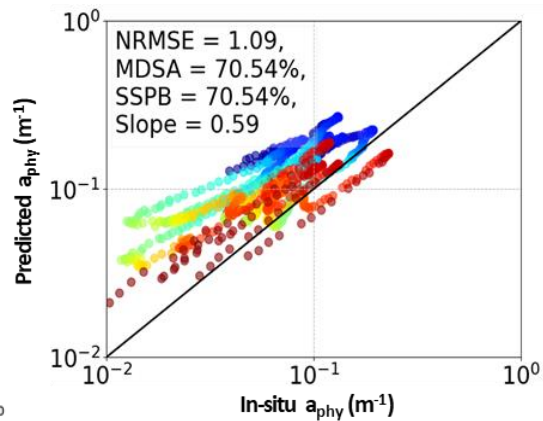
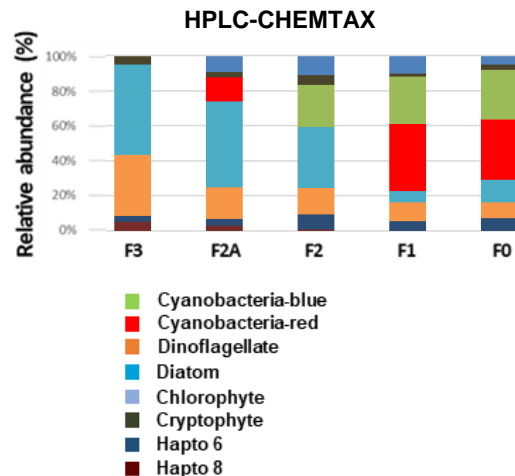
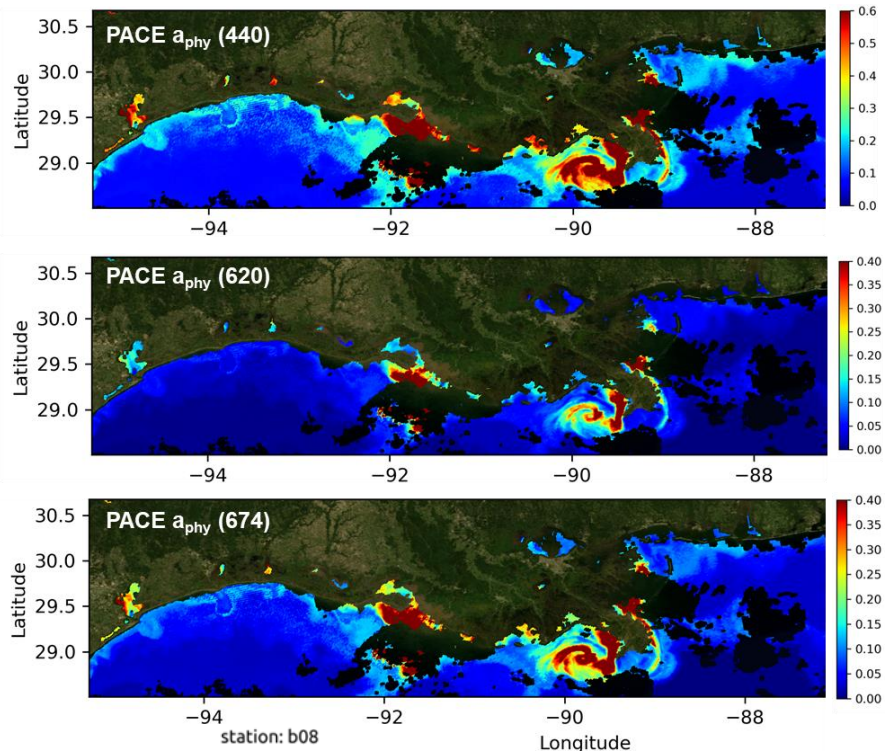


Preliminary Results

04_23_2024_PACE

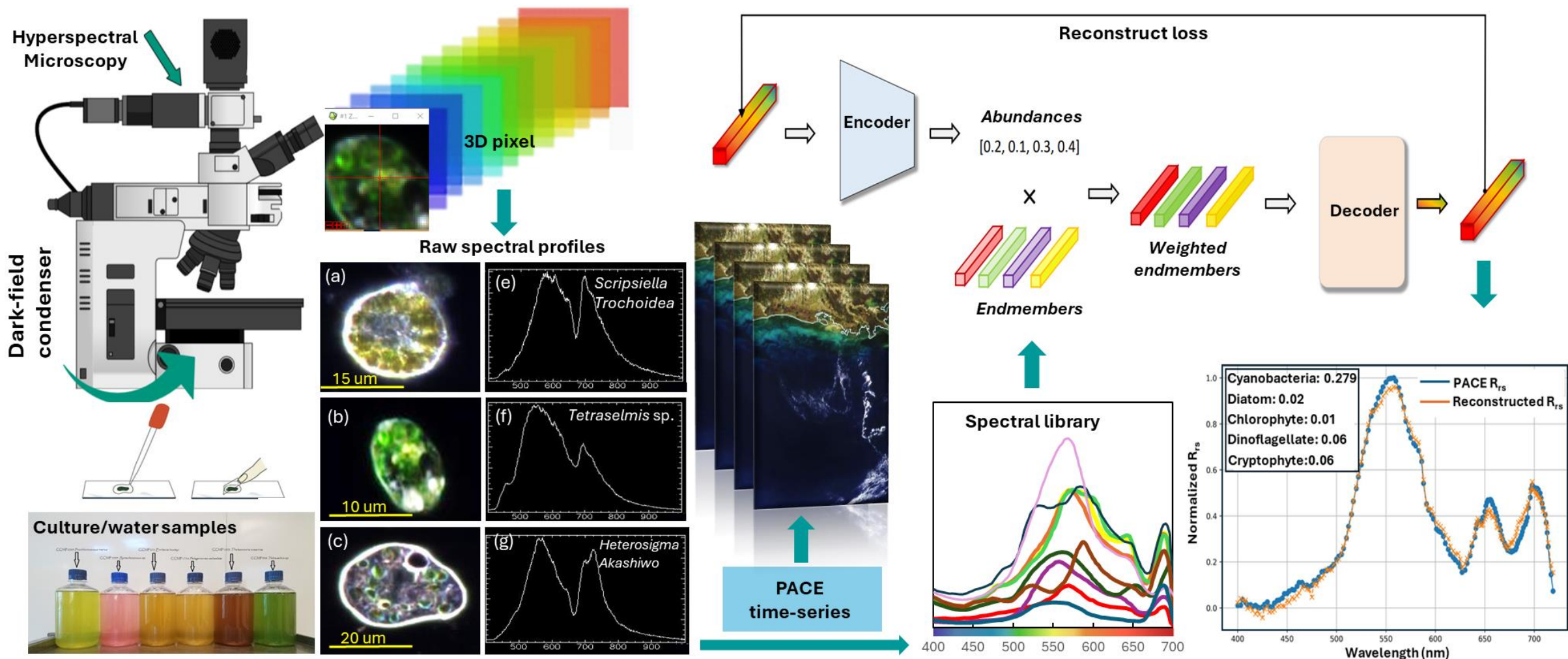


Validation work is on going...



Liu et al., 2025 (In Prep.)

Hyperspectral unmixing to retrieve PCC

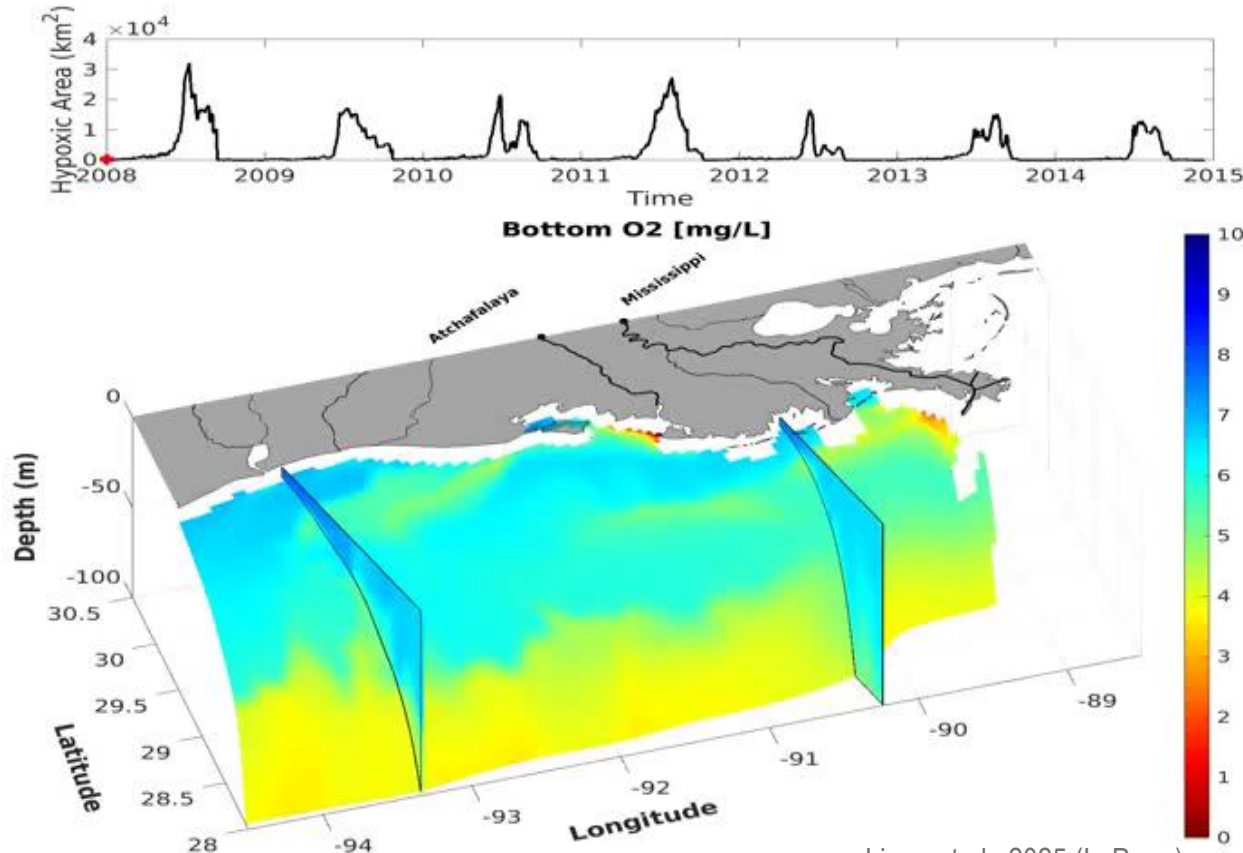


Moving forward...

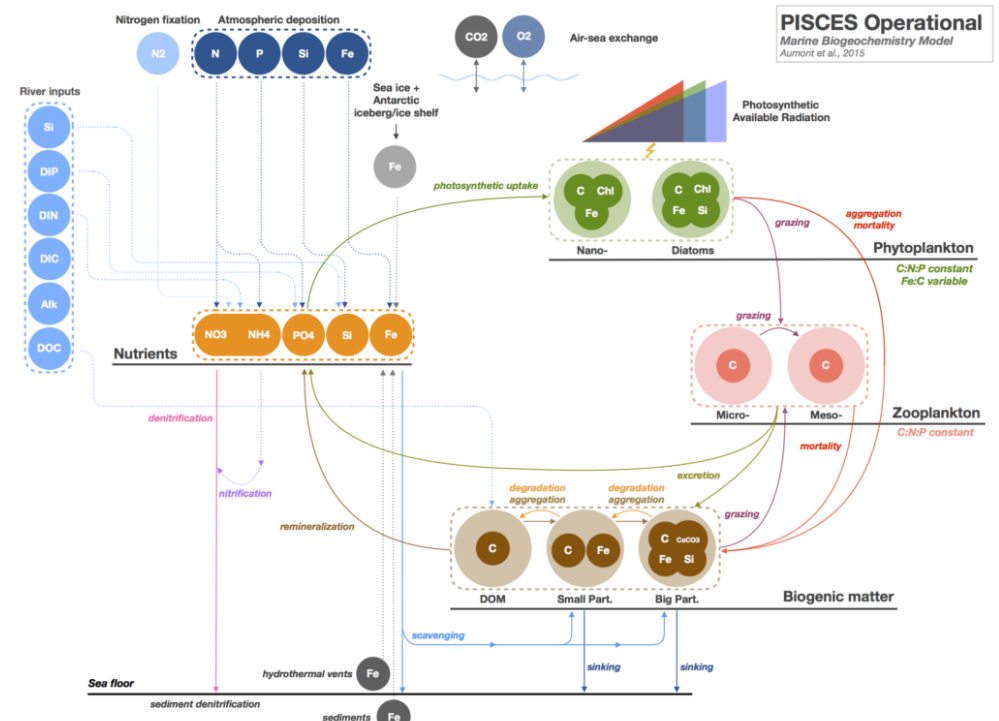
- Expand the hydrodynamic-biogeochemical coupled model (CROCO-PISCES) to include more phytoplankton groups/HAB species informed by PACE phytoplankton products.
- Three-dimensional projection simulations for the northern Gulf of Mexico to explore future phytoplankton community structure.



Coastal and Regional Ocean COmmunity model



Liang et al., 2025 (In Prep.)



Aumont et al. (2015)

Thank you!



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