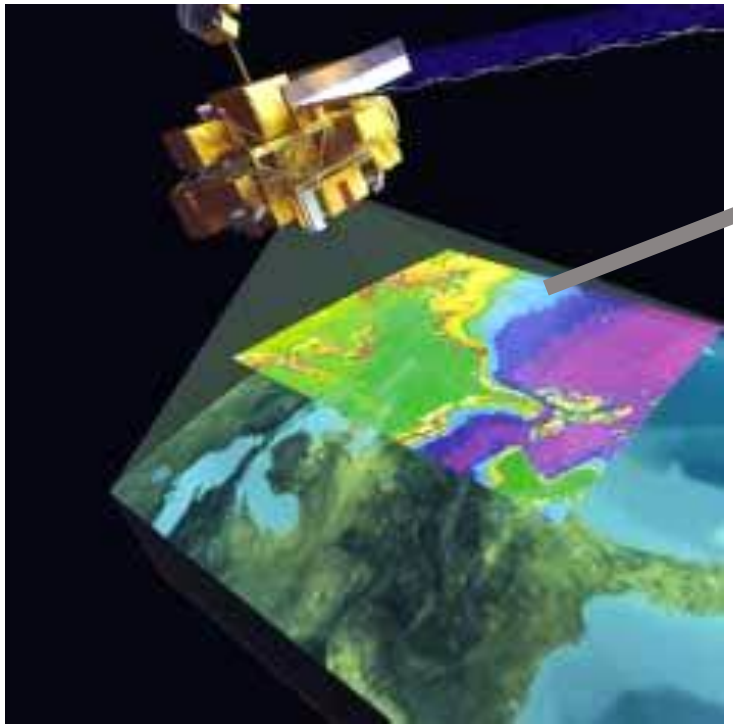
Quantifying uncertainties in phytoplankton absorption coefficients for accurate validation of the PACE ocean color sensor: moving towards satellite retrieved phytoplankton functional types (PFTs)

Collin Roesler

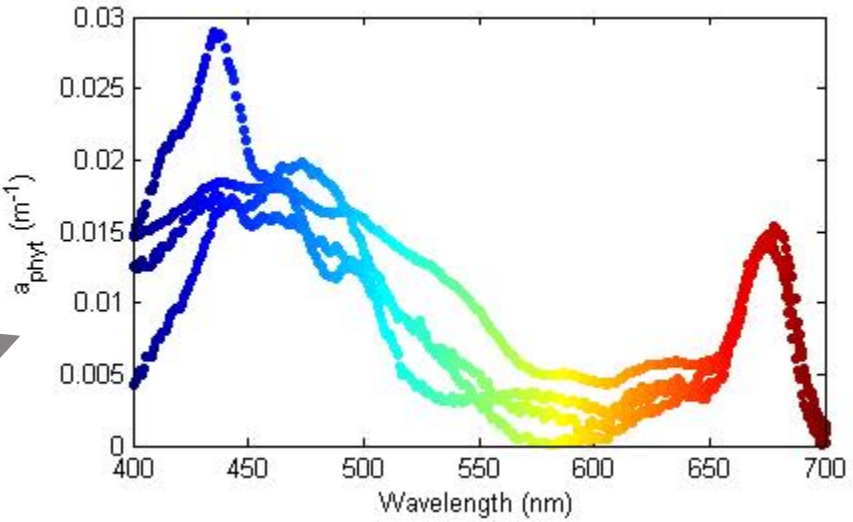
Department of Earth and Oceanographic Science

Bowdoin College

So in thinking about my project objectives I worked my way backward

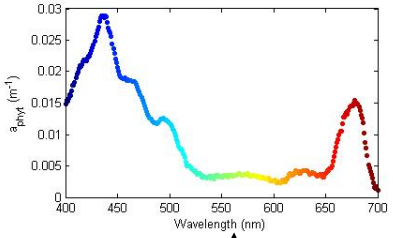


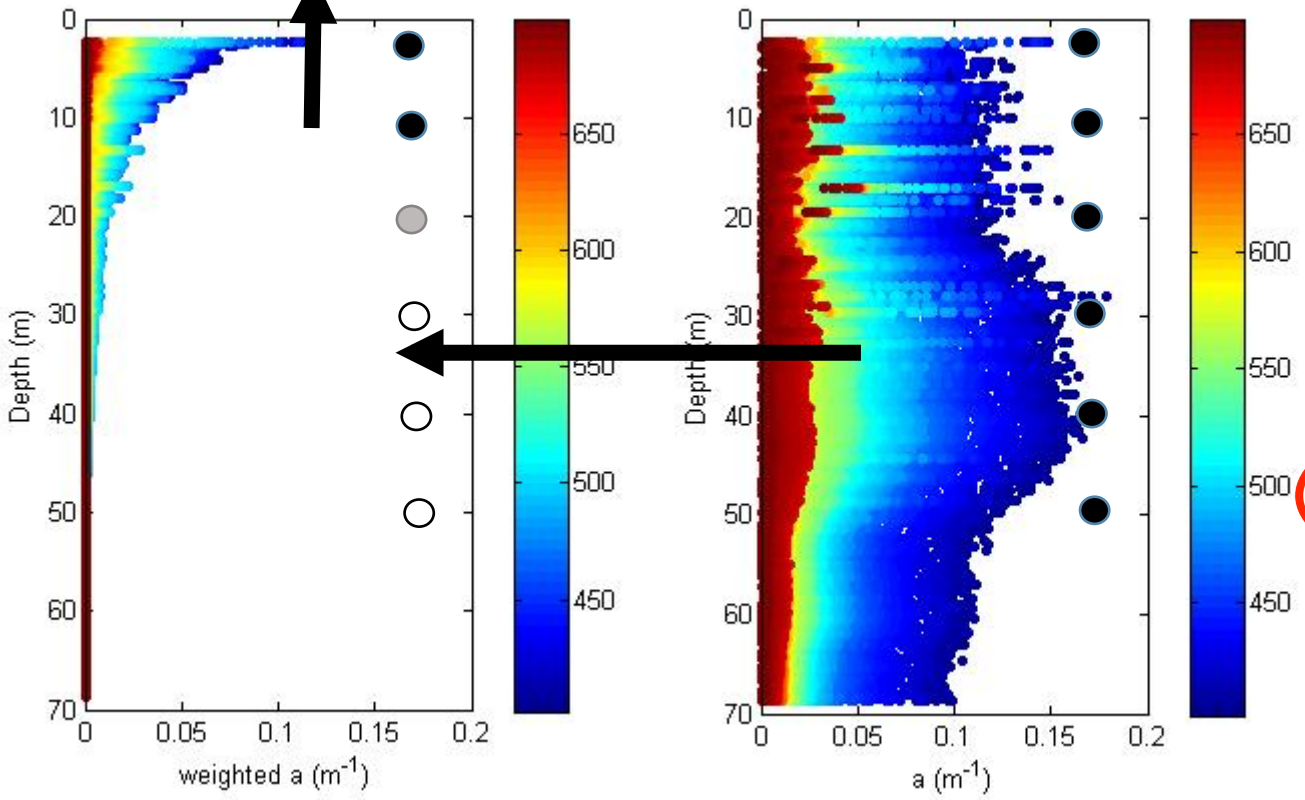
http://wamis.meraka.org.za/modis-basics



- Invert ocean color signal to retrieve hyperspectral phytoplankton absorption coefficients
- Requires capability to validate with uncertainties

Step 1. Retrieved phytoplankton absorption spectrum validated against exponentially-weighted profile of spectral phytoplankton absorption





Collaboration

Ackleson

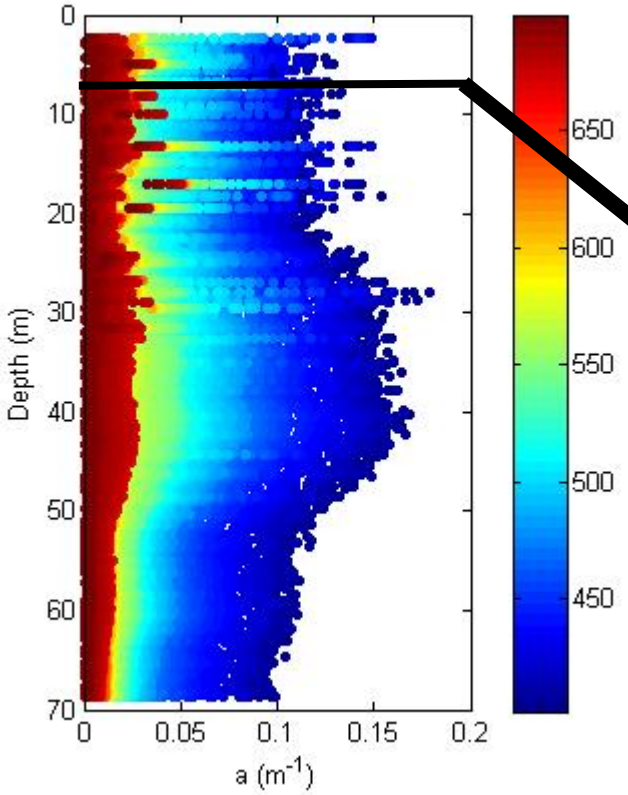
- 2. $K_d(\lambda,z)$
- 3. Profile $a(\lambda)$
  - Environmental considerations
  - Spatial temporal scales
- 4. No scattering error
- 5. Phytoplankton signal extracted

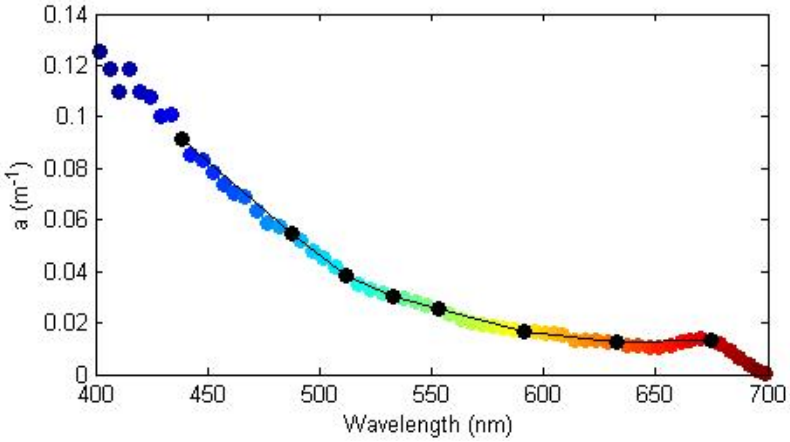
Step 4. Profile of hyperspectral absorption with minimized scattering error, quantified uncertainty

<u>Collaboration</u>

Twardowski, Sullivan, Boss

- Hyperspectral, but scattering error
  - WETLabs acs
- No scattering error, but multispectral
  - Turner ICAM



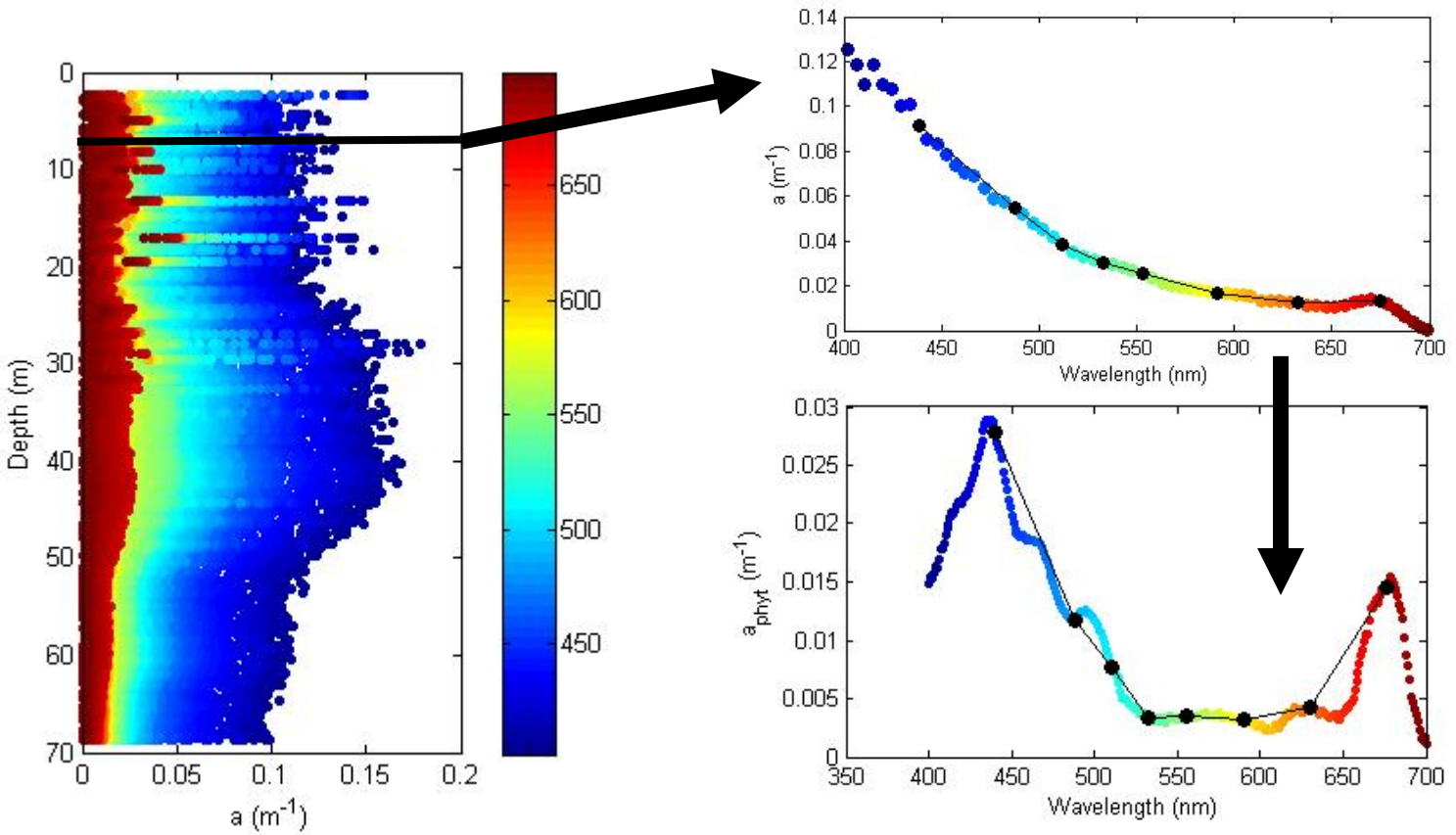


Step 5. Extract phytoplankton absorption signal from total absorption from existing (and new) models, quantifying model uncertainties

<u>Collaboration</u>

Stramski, Reynolds

$$a_T = a_w + a_{phyt} + a_{nap} + a_{cdom}$$

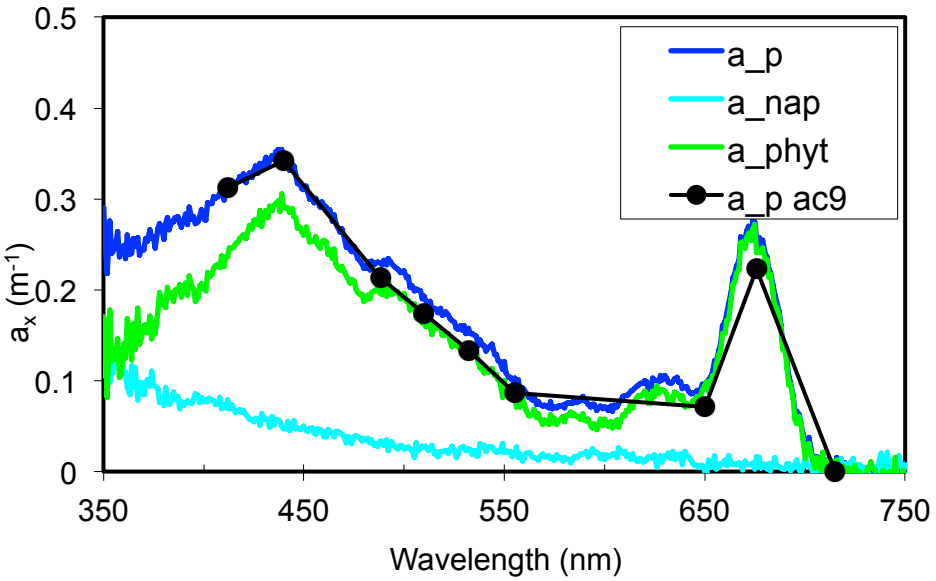


Step 6. Validate model estimation against in situ phytoplankton absorption spectra determined spectrophotometrically on glass fiber filter pads, quantifying uncertainty in QFT

<u>Collaboration</u>

Stramski, Reynolds

Mitchell?



- 7. filter pad absorption configuration
  - scattering error
  - beta correction
- 8. Retrospective reprocessing

Conclusions