

Phytoplankton pigments & diatom biomass from PACE

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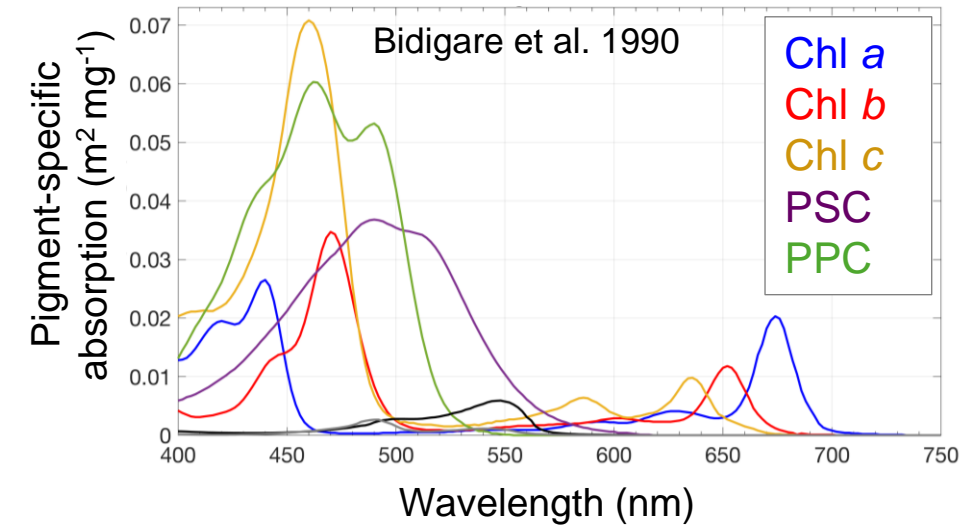
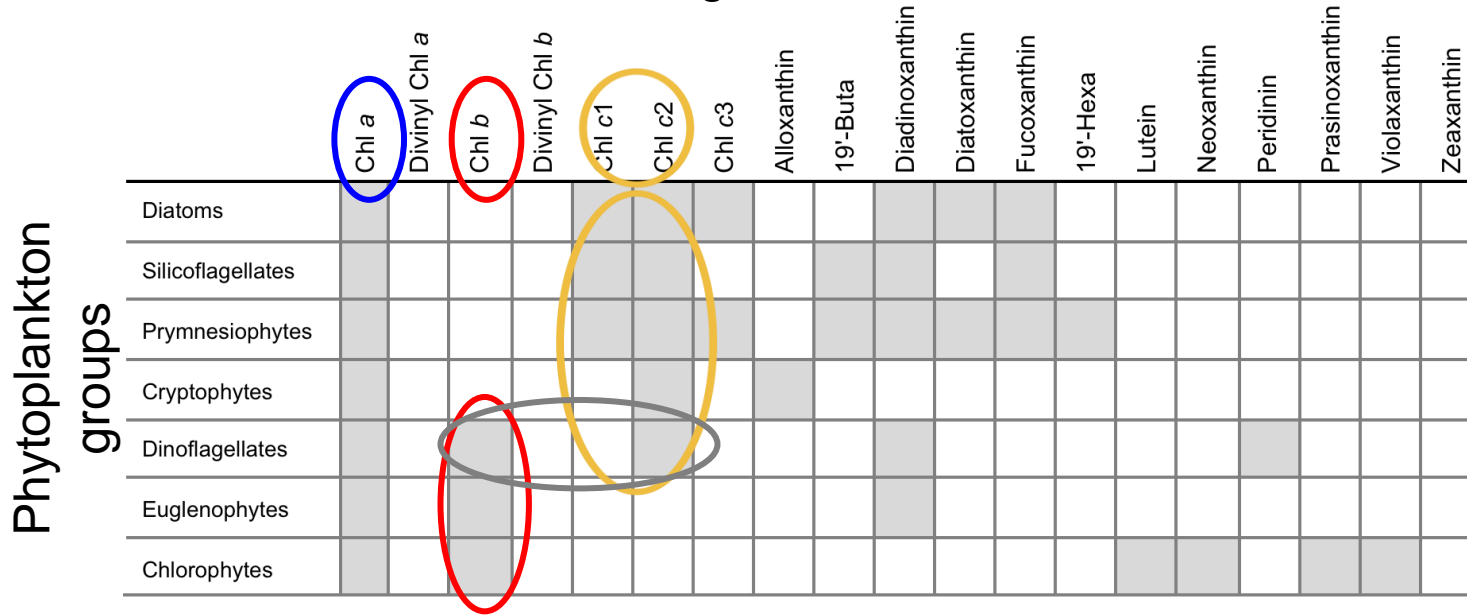
PACE³ Meeting, New York, NY
February 18-21, 2025



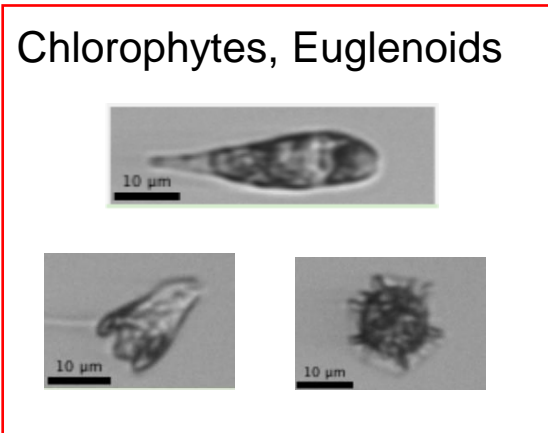
Applied Physics Laboratory
UNIVERSITY of WASHINGTON

Phytoplankton groups and associated pigments

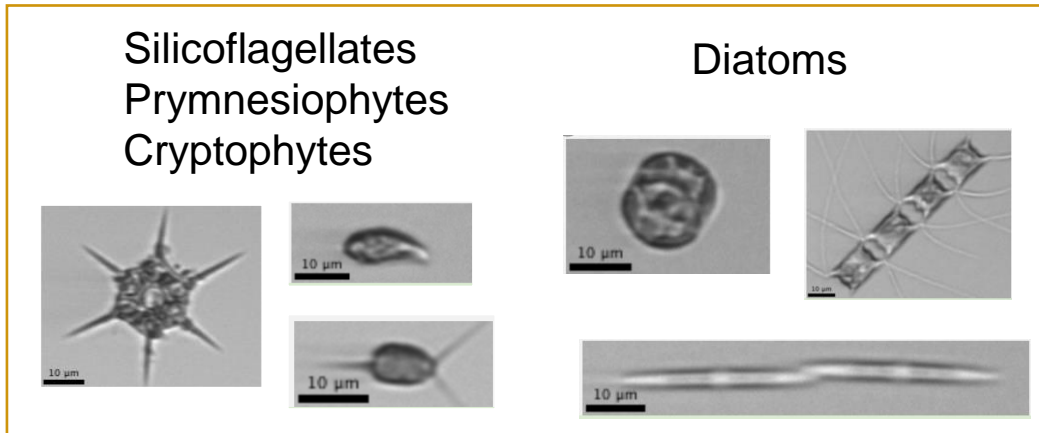
Pigments from HPLC



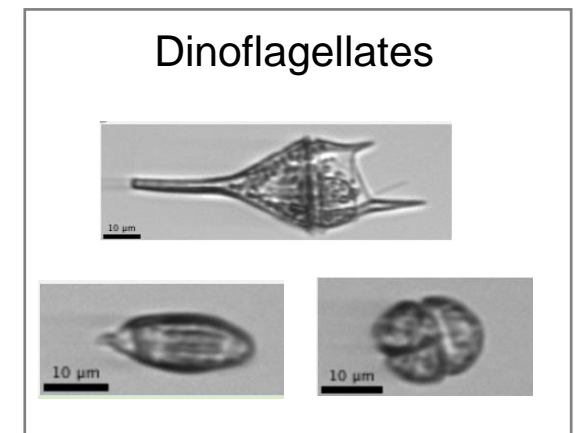
Chlorophyll b



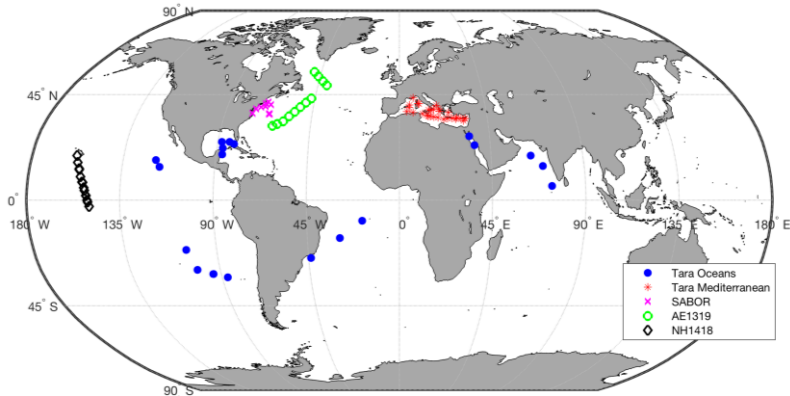
Chlorophyll c



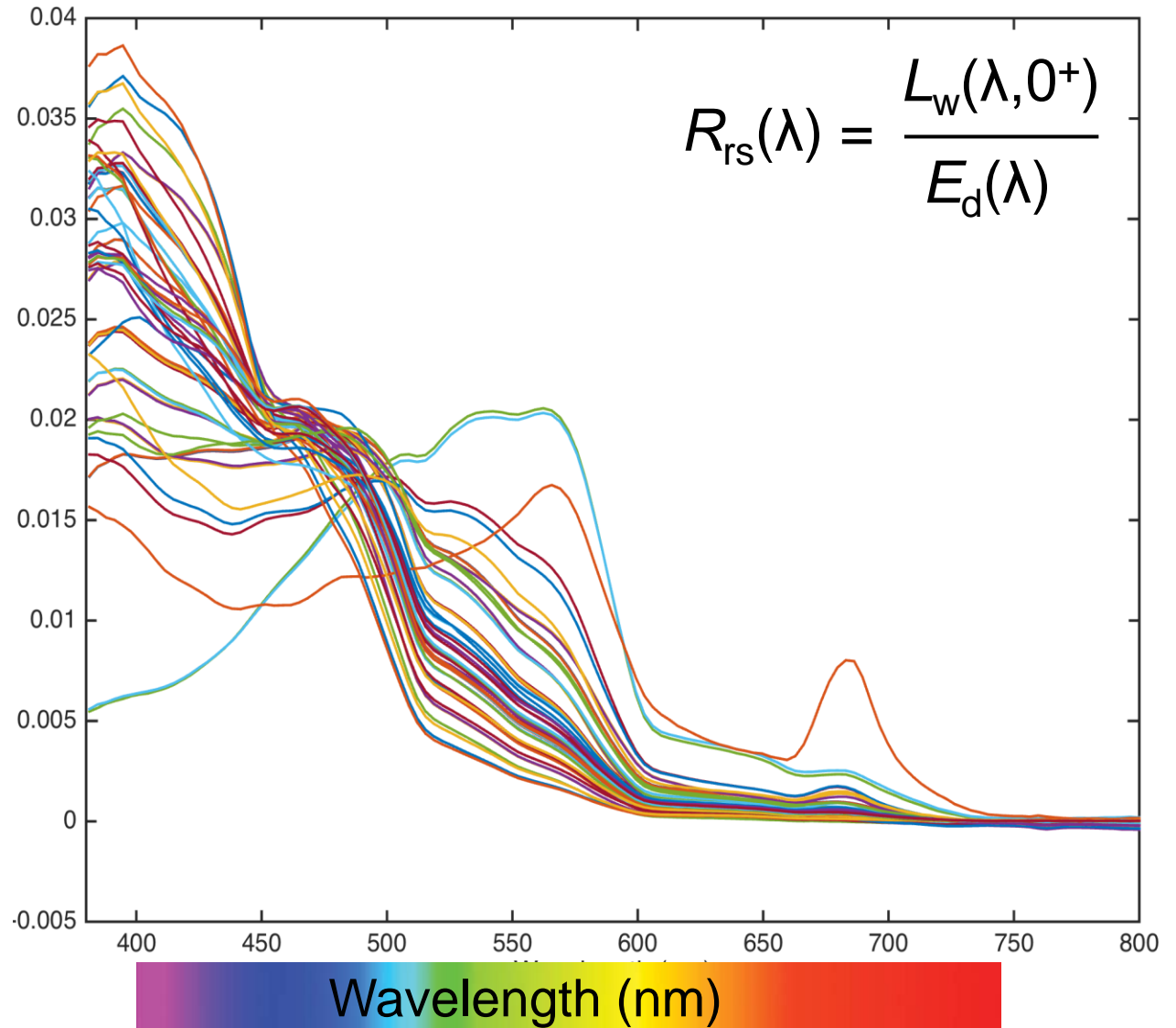
Chlorophylls b & c



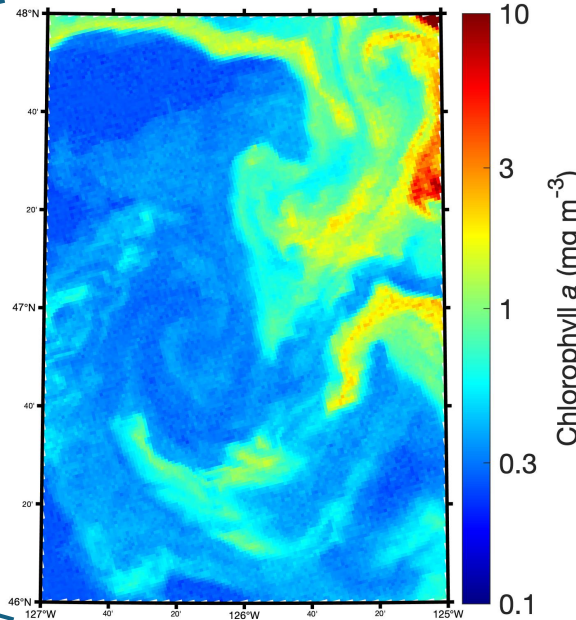
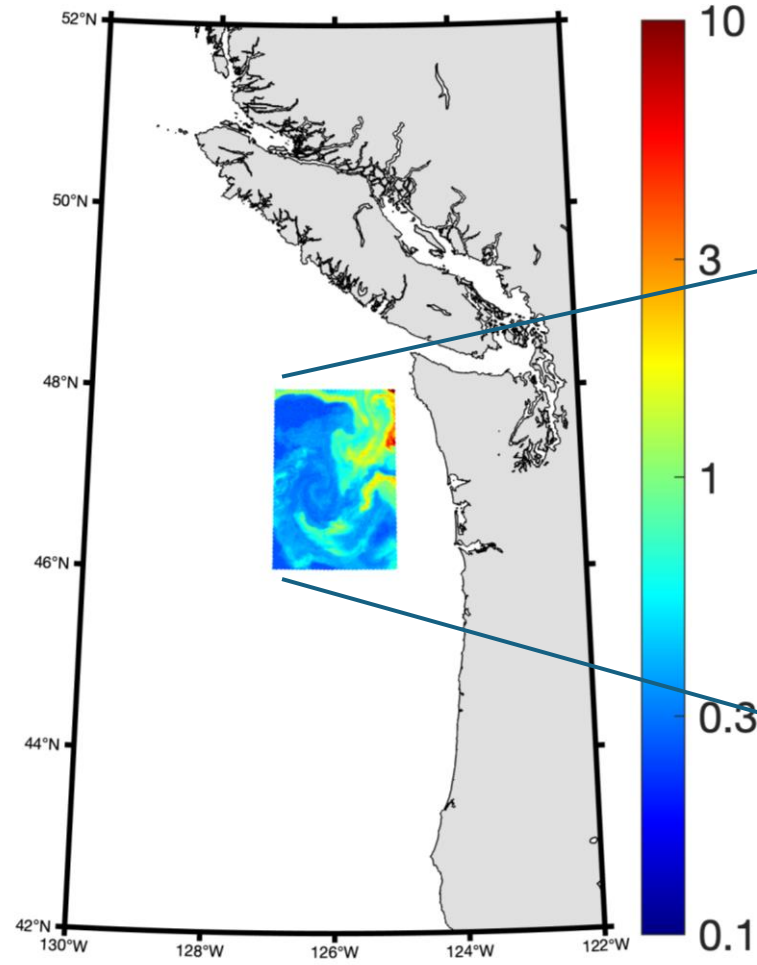
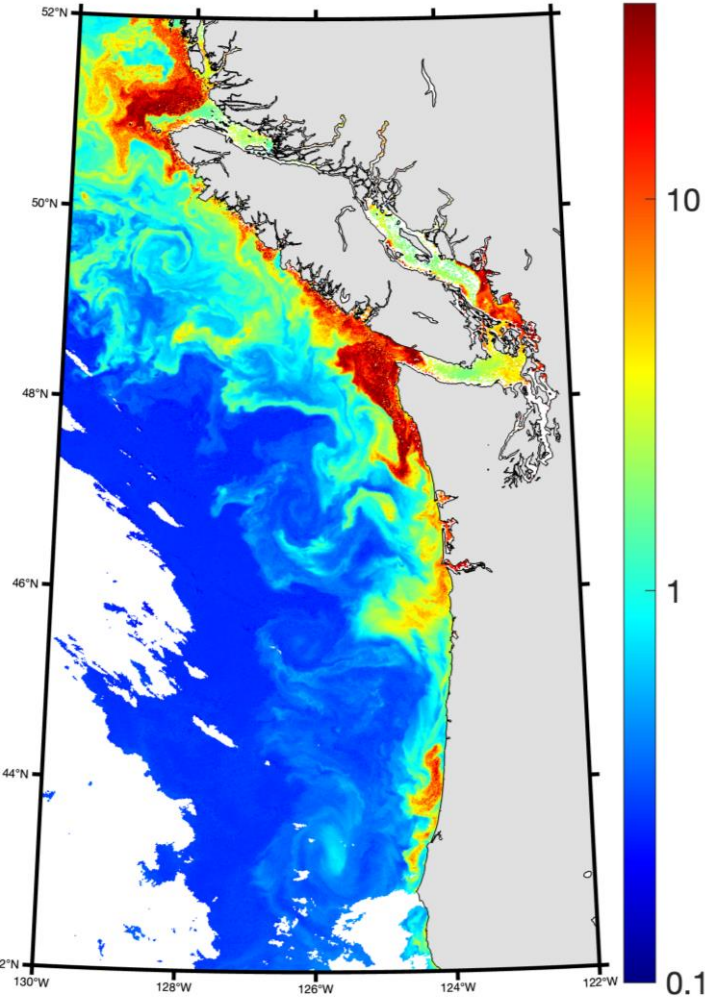
Pigments estimated from $R_{rs}(\lambda)$ spectra measured *in situ*



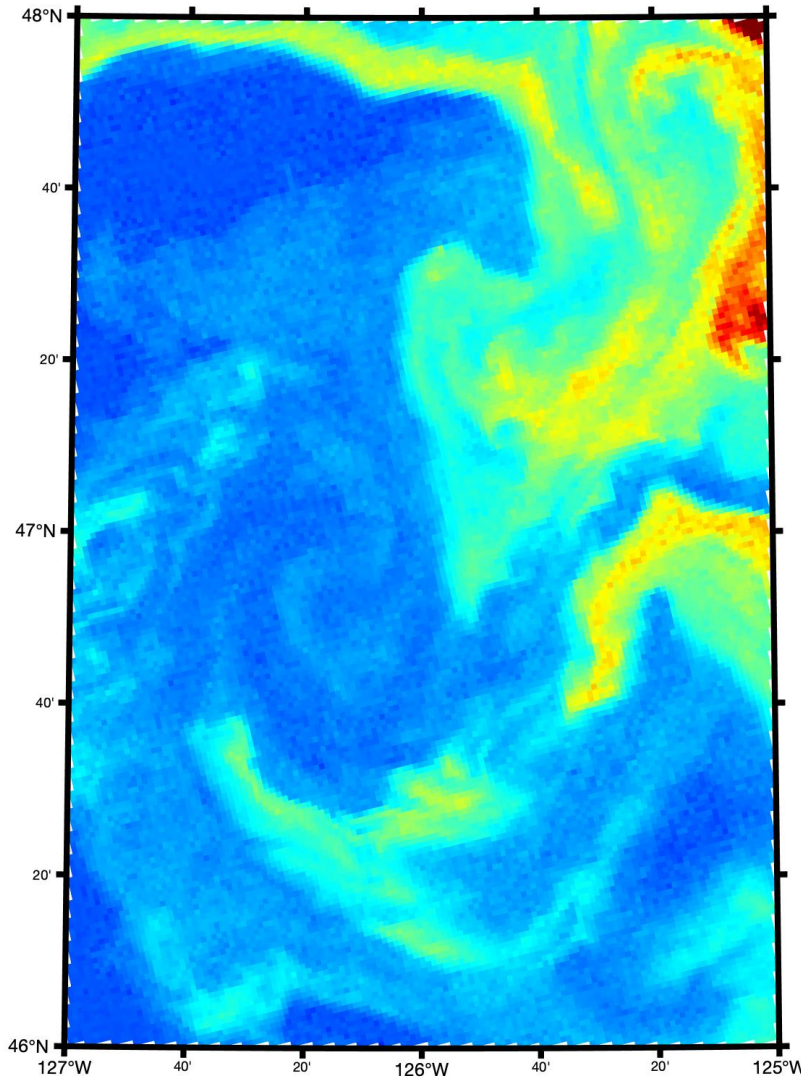
Normalized $R_{rs}(\lambda)$



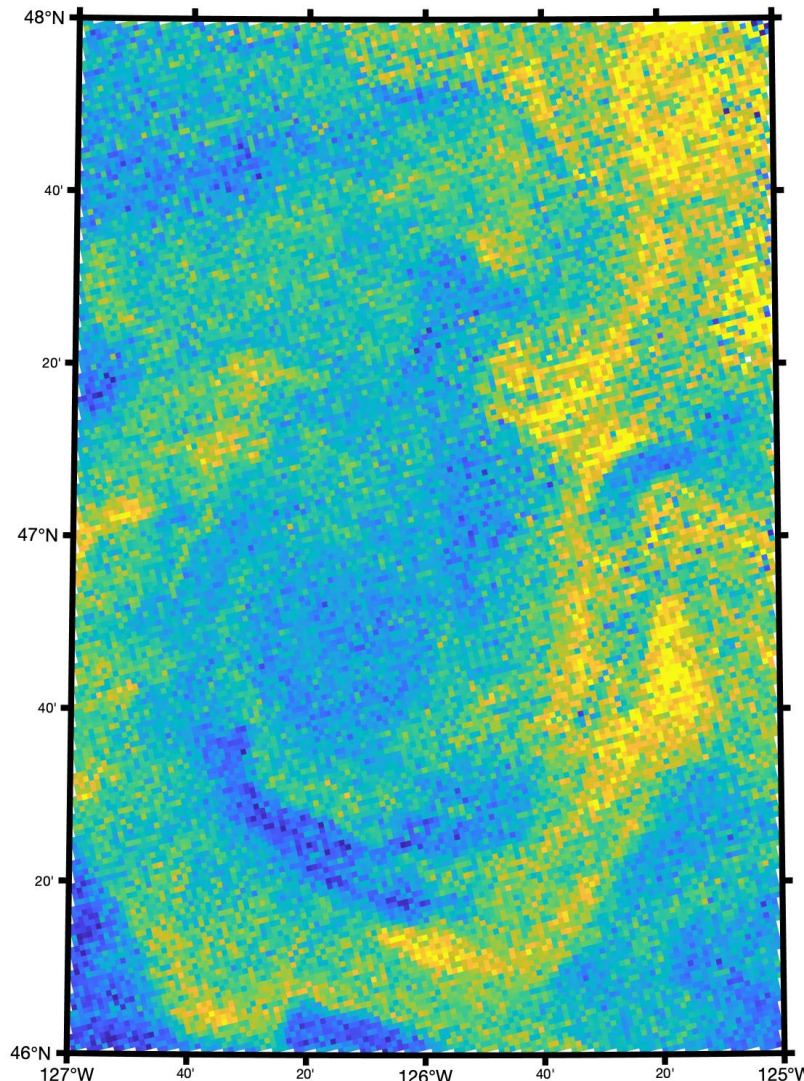
PACE OCI L2 Chlorophyll a – April 18, 2024



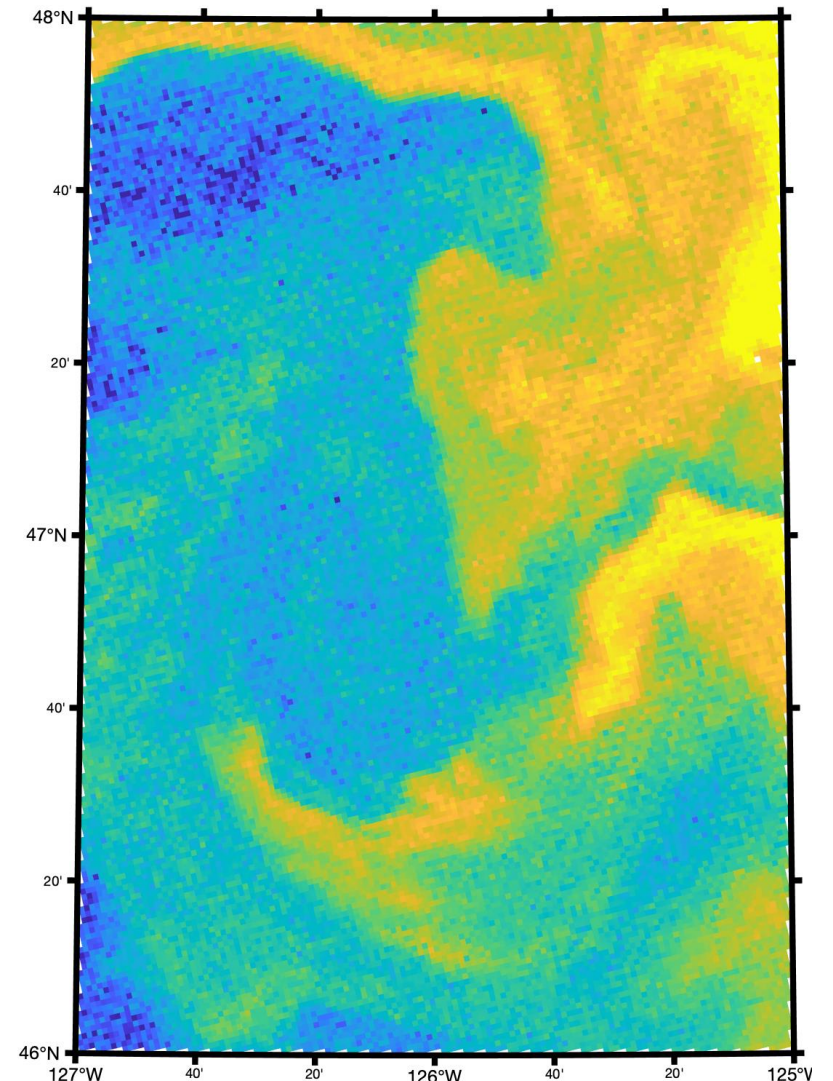
Pigments estimated from OCI L2 $R_{rs}(\lambda)$ spectra – April 18, 2024



Chlorophyll *a*



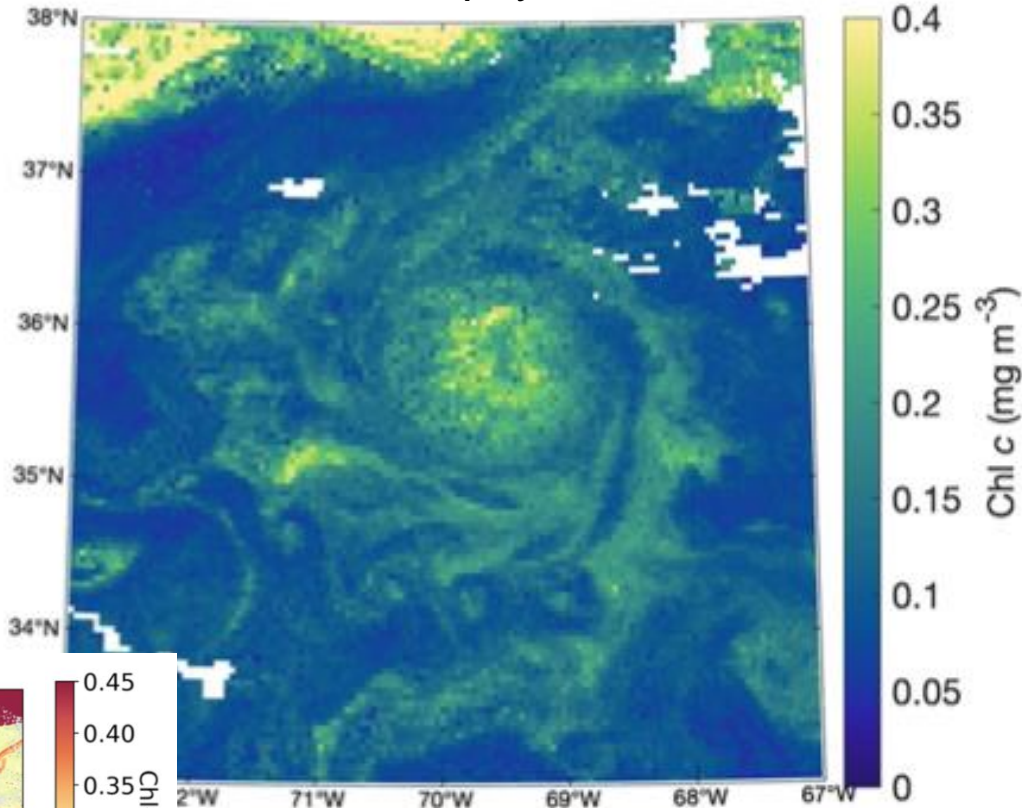
Chlorophyll *c*



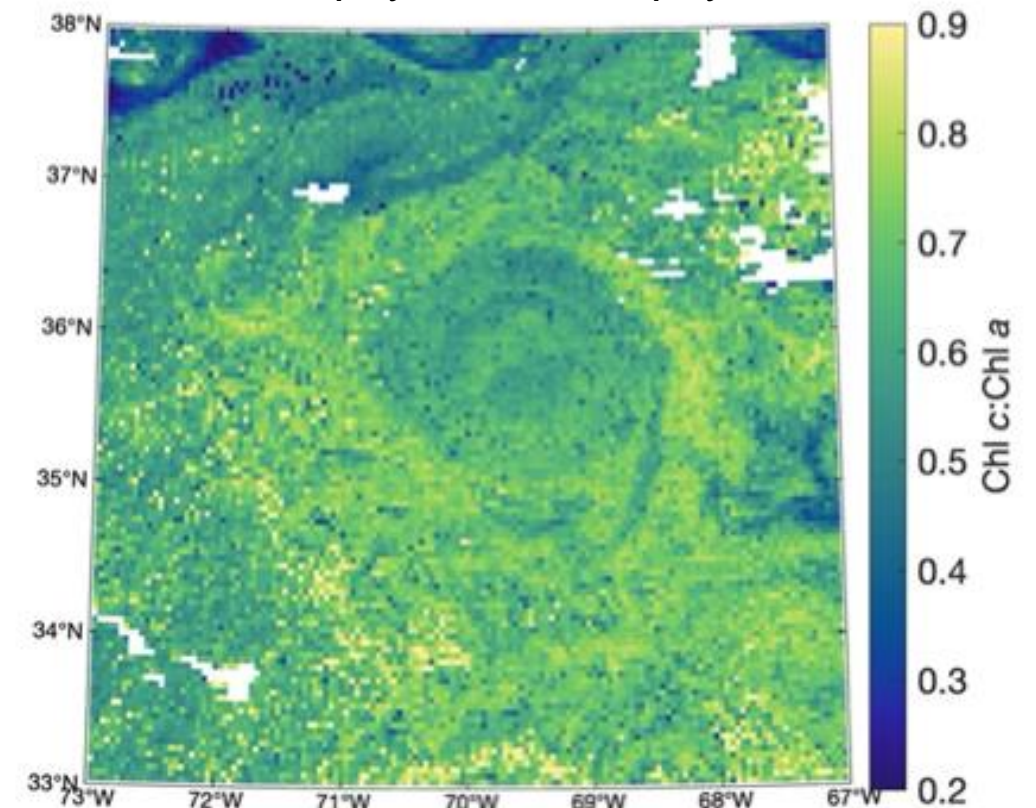
Chlorophyll *b*

Pigments estimated from OCI L2 $R_{rs}(\lambda)$ spectra – April 14, 2024

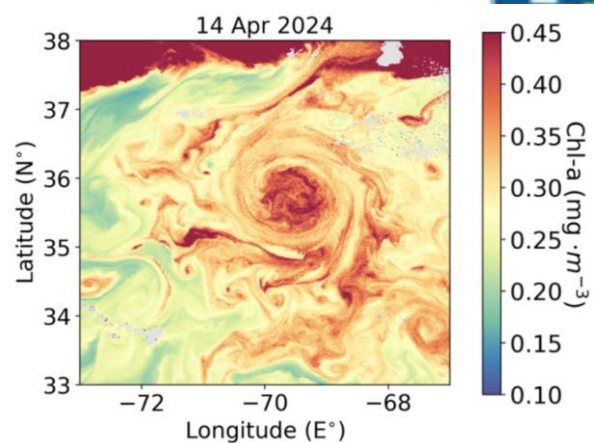
Chlorophyll c



Chlorophyll c : Chlorophyll a



Chlorophyll a



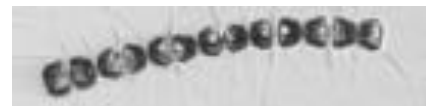
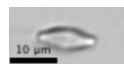
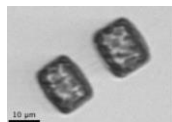
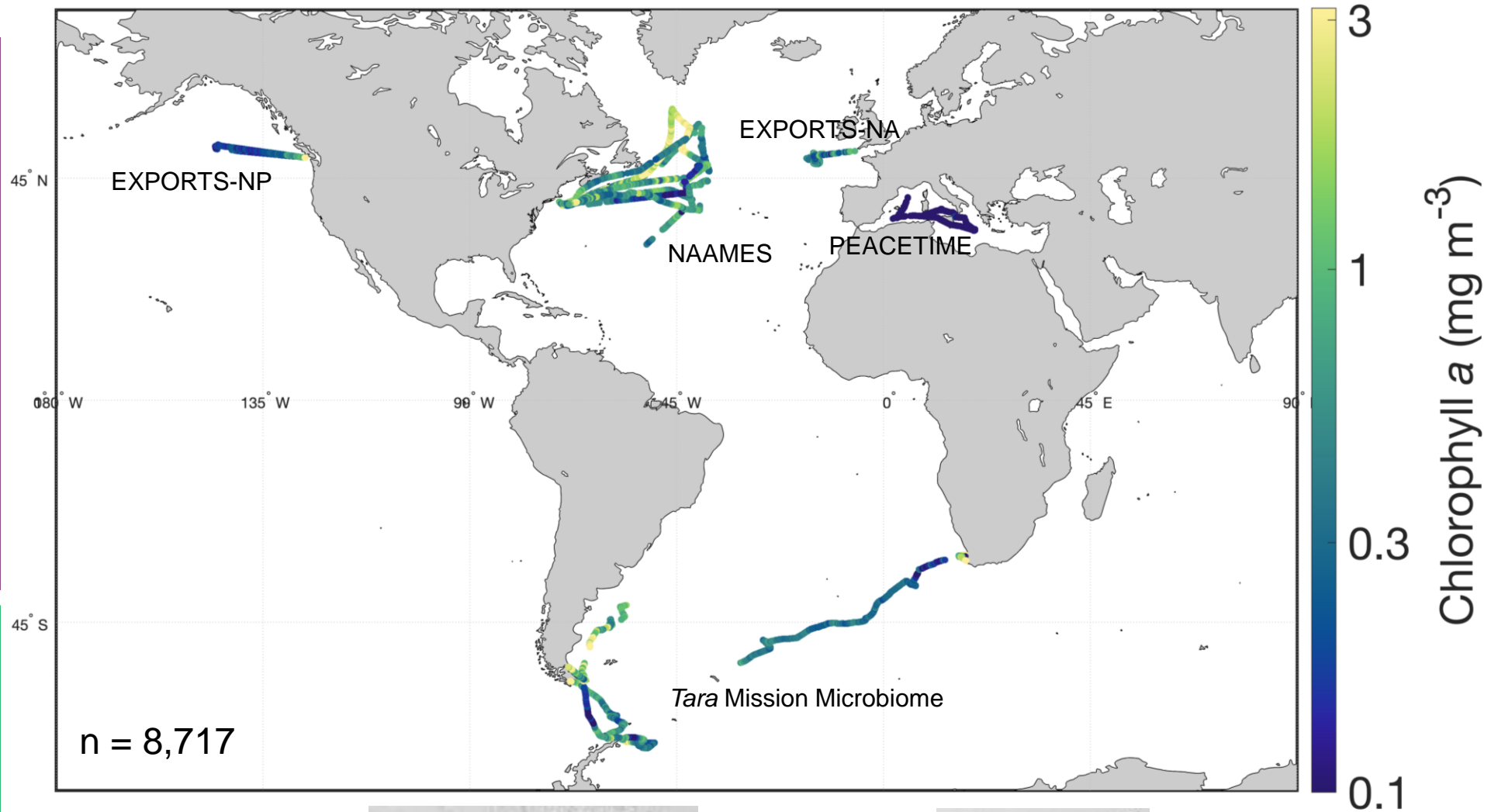
Continuous underway measurements provide in situ data across diverse regimes

- Temperature
- Chl *a*
- Accessory pigment absorption
- Particulate backscattering

Inputs

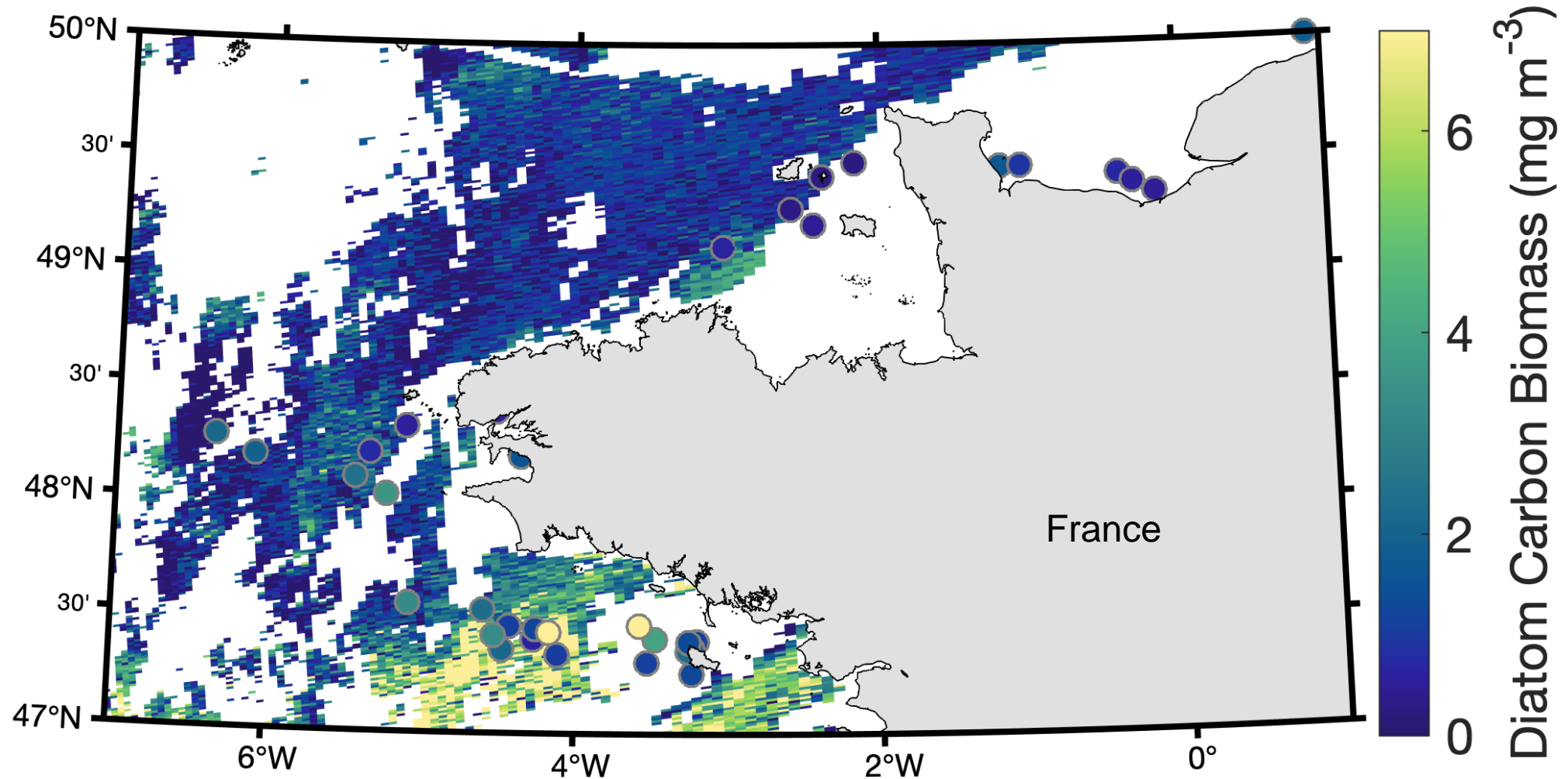
- Quantitative plankton imagery (IFCB)

Target



Diatom images from the IFCB

Diatom Carbon Biomass – April 28, 2024



Diatom biomass estimated from the RF model using pigments derived from PACE OCI, with IFCB-derived diatom biomass (Biotherm IMOCA) overlain (filled dots)

Contact

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- Emmanuel Boss, Lee Karp-Boss, Nils Haëntjens, Guillaume Bourdin for data collection
- UW MSDS Capstone team of Chandler Ault, Yamina Katariya, Yash Manne, and Aditi Shrivastava for work on the PIVOT tool
- Emmett Culhane and Hisham Bhatti for work on CNN code development

Code and Resources



alisonpchase

Code repositories and workflow documentation for image classification available at:

<https://github.com/ifcb-utopia>

