

Phytoplankton pigments from hyperspectral R_{rs} : The Spectral Derivatives Pigment (SDP) model for PACE

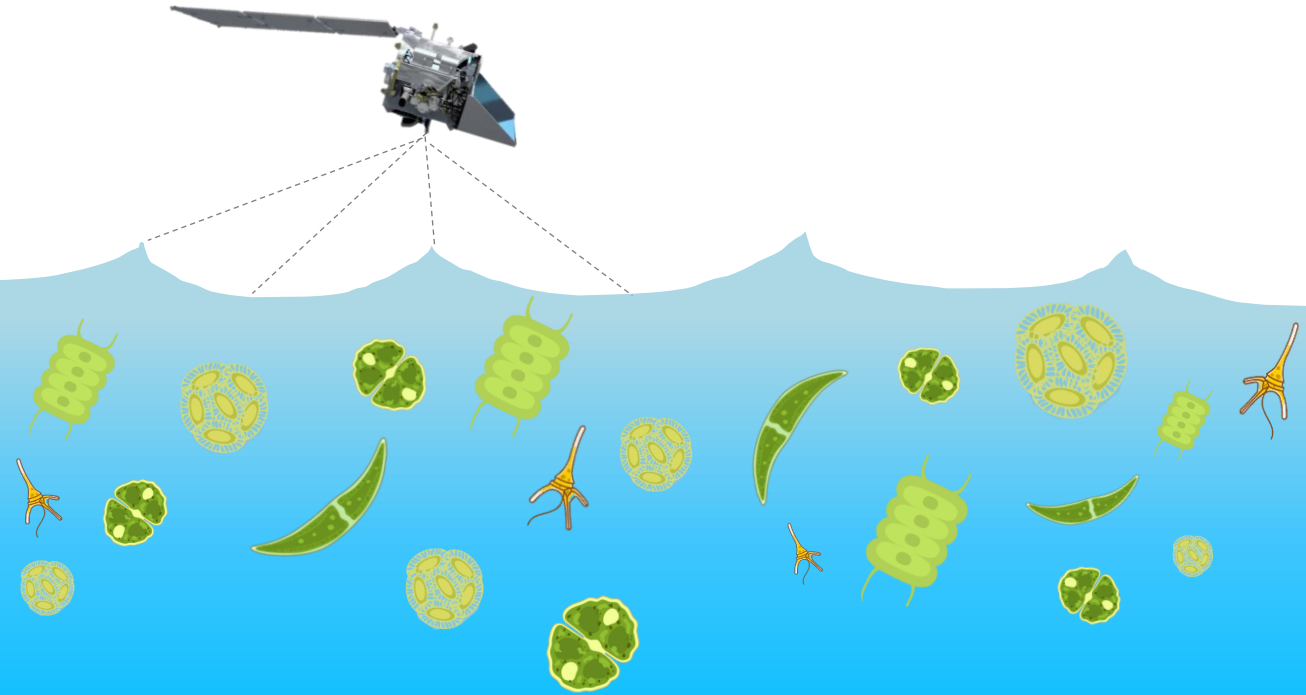
Dave Siegel, Stéphane Maritorena, and Sasha Kramer

skramer@mbari.org

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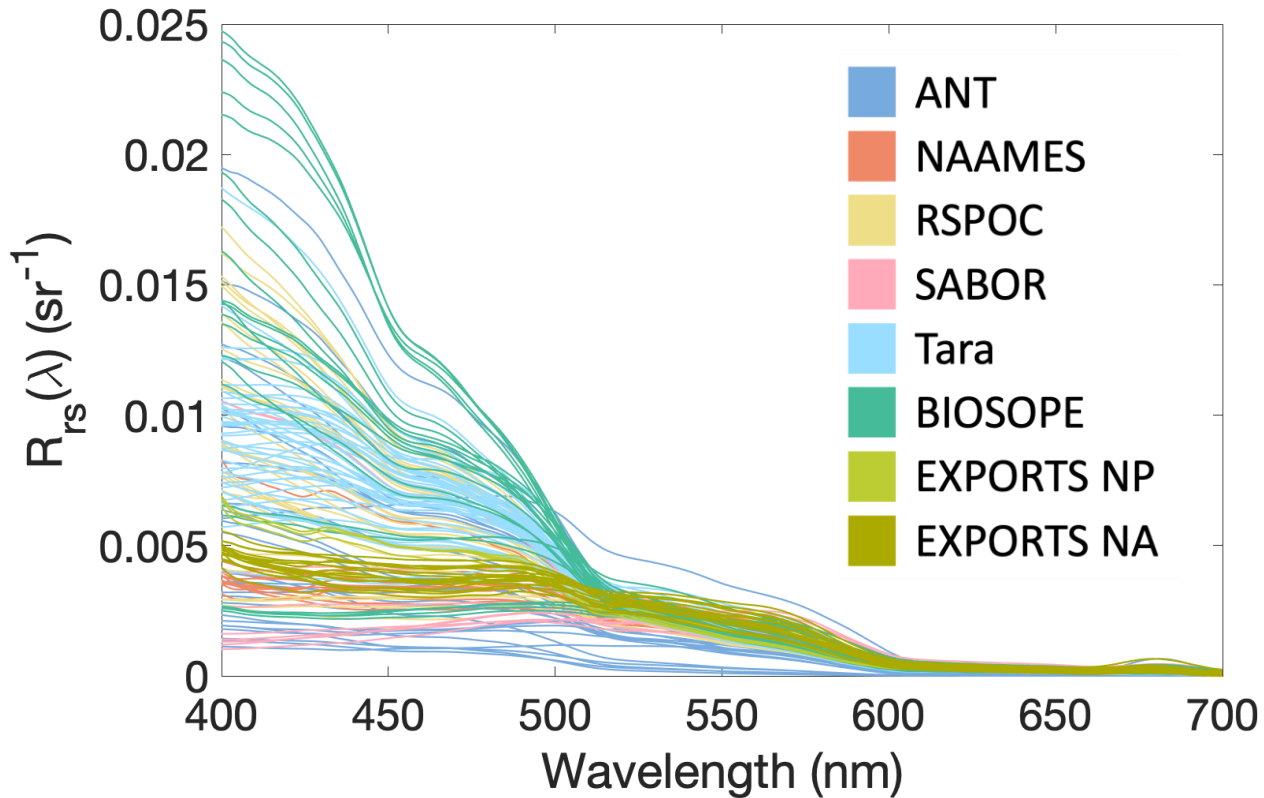
Goals for our project

- 1) Model surface ocean phytoplankton pigments from $R_{rs}(\lambda)$: the Spectral Derivative Pigments model
- 2) Explore applications of the $R_{rs}(\lambda)$ residual spectrum for understanding surface ocean phytoplankton variability

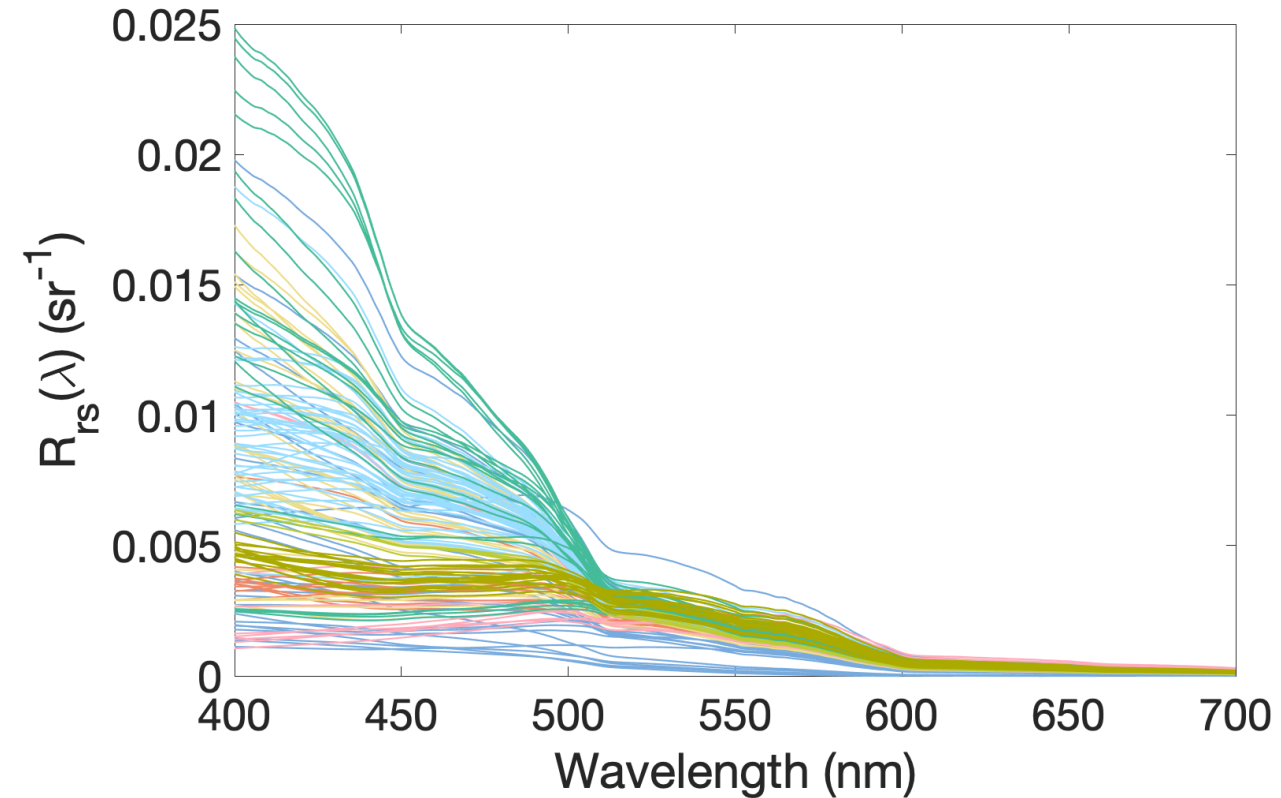


The SDP model: creating the R_{rs} residual

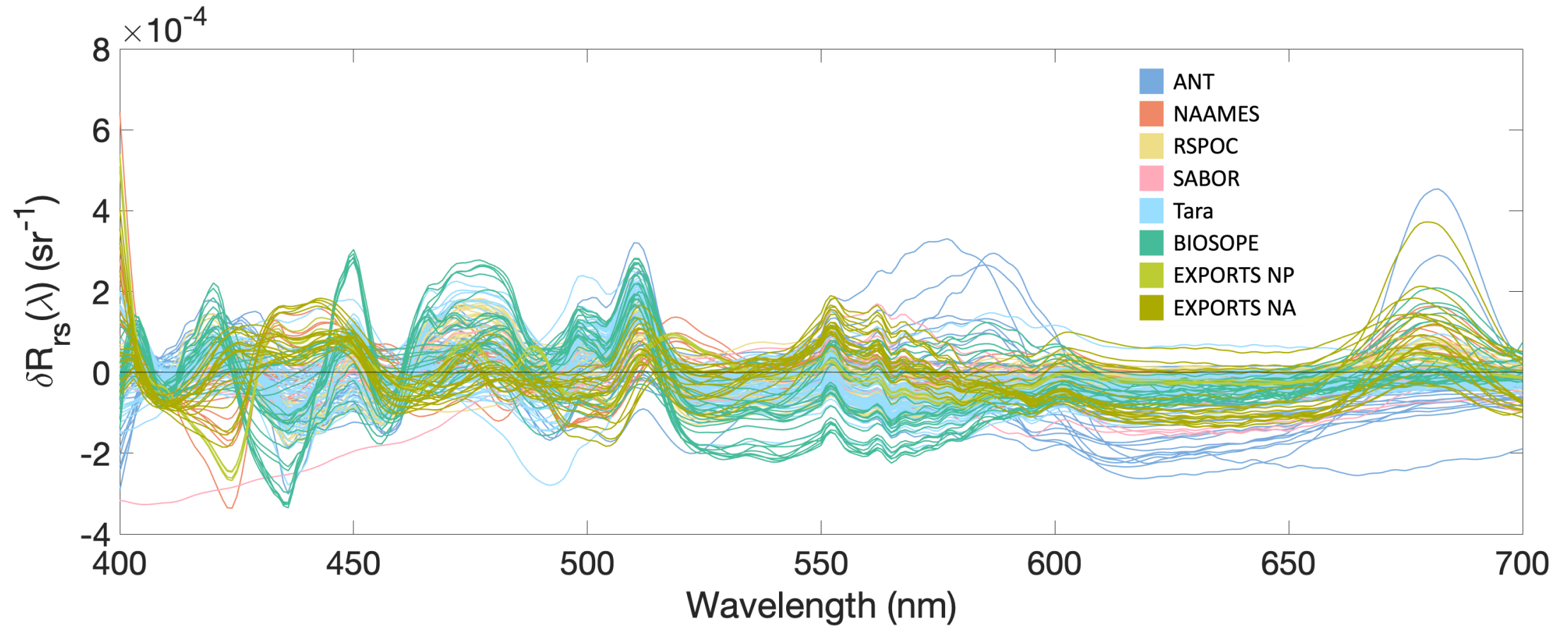
Measured spectra



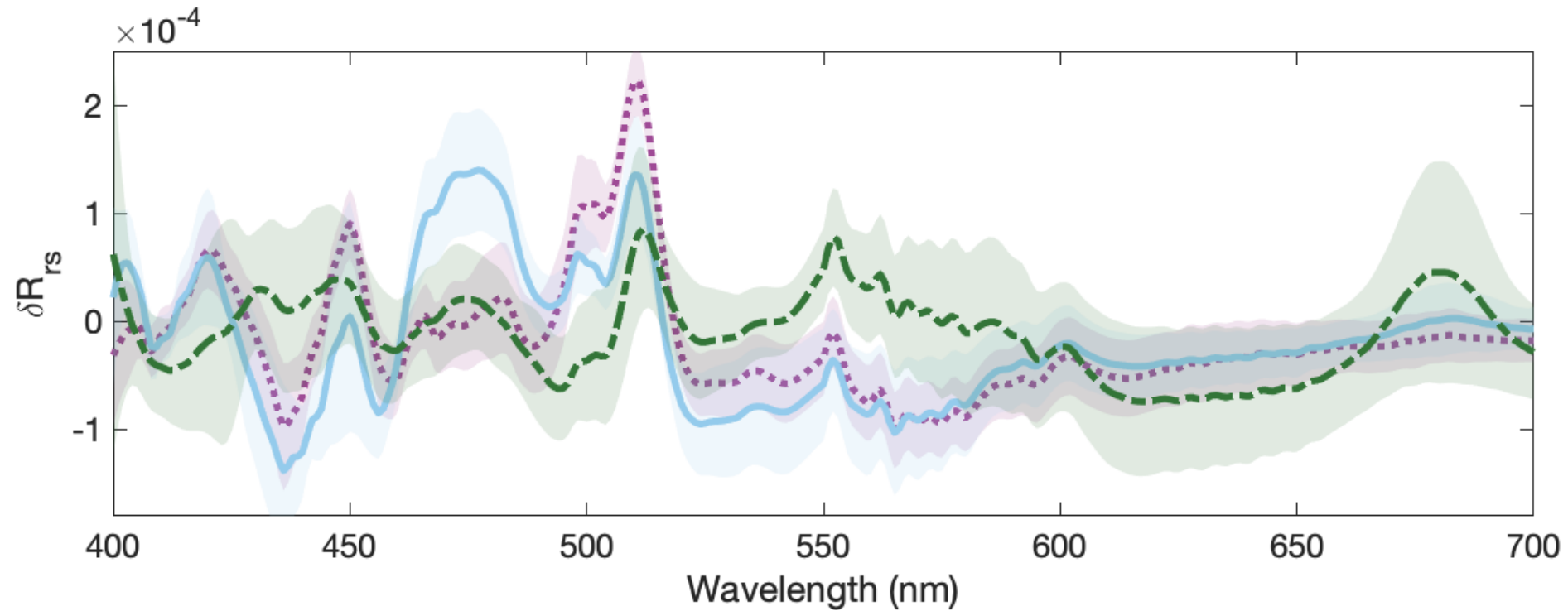
Modeled spectra



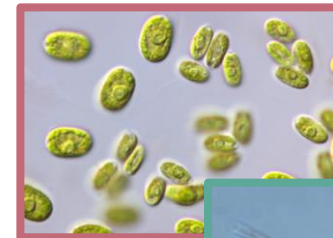
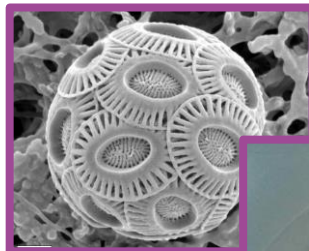
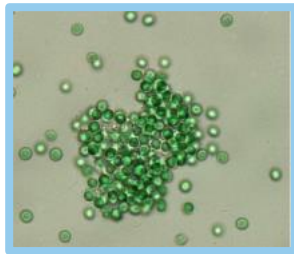
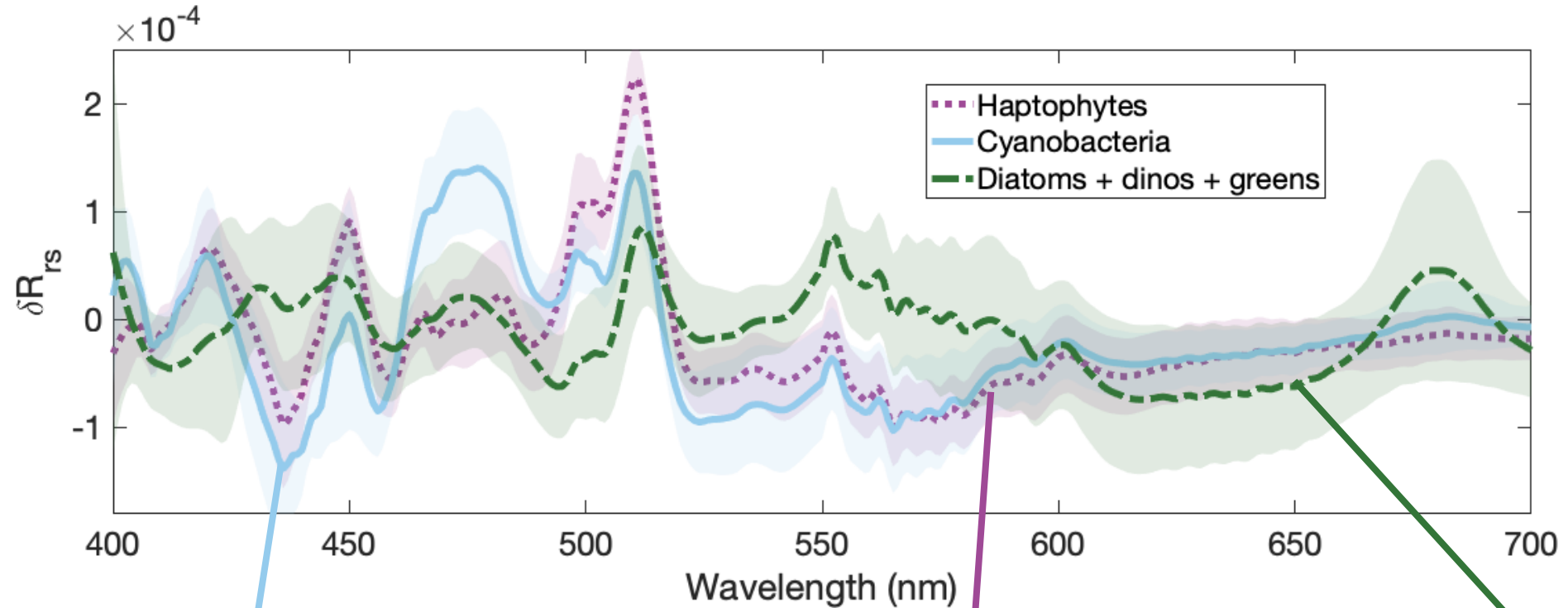
What else can we do with the R_{rs} residual (δR_{rs})?



Community detection analysis: 3 δR_{rs} communities



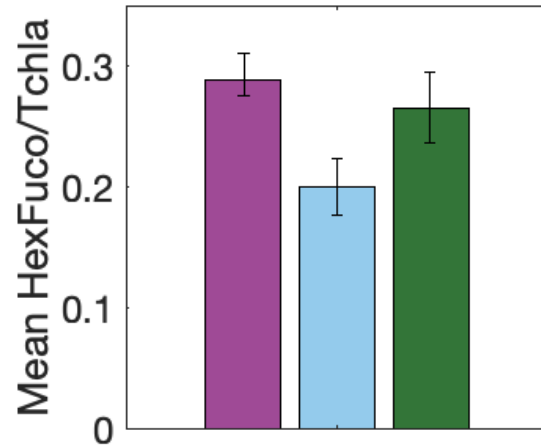
Community detection analysis: 3 δR_{rs} communities



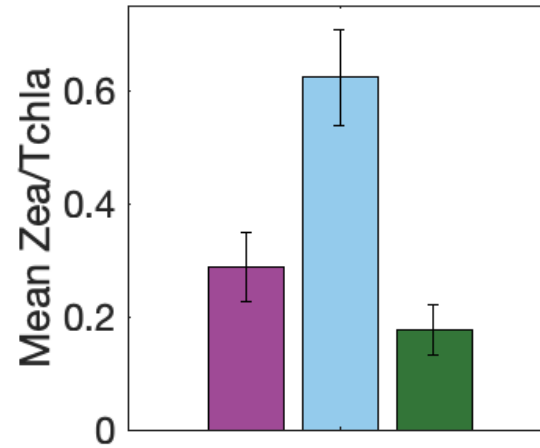
Three communities also separate from HPLC pigments

δR_{rs}

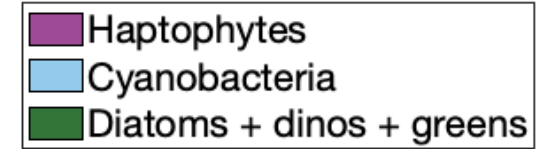
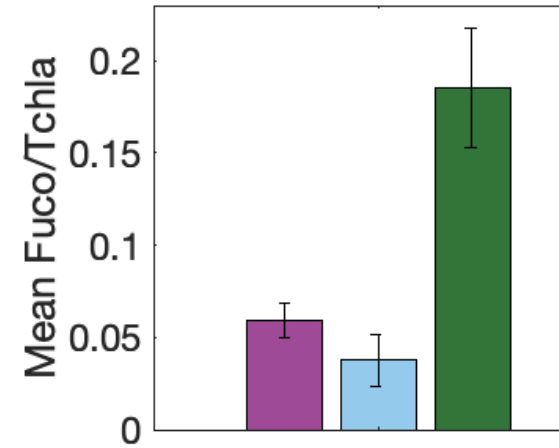
Haptophytes



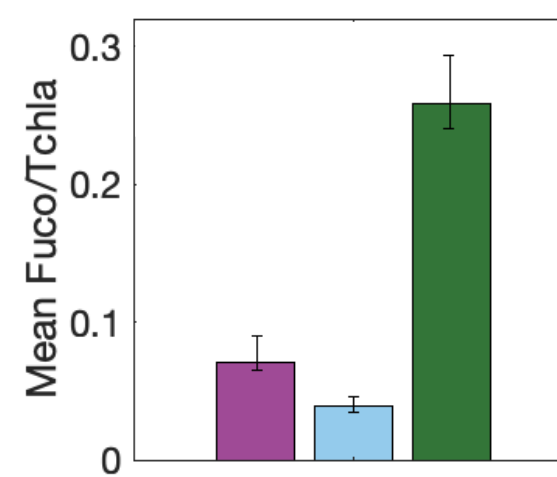
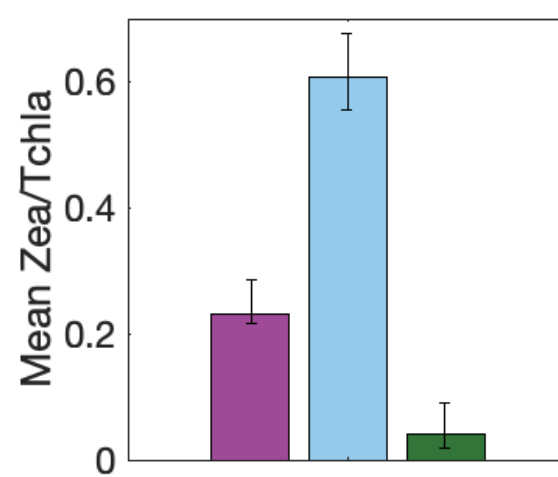
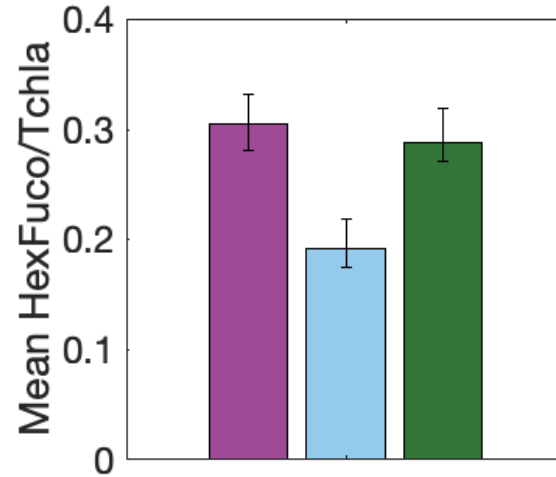
Cyanobacteria



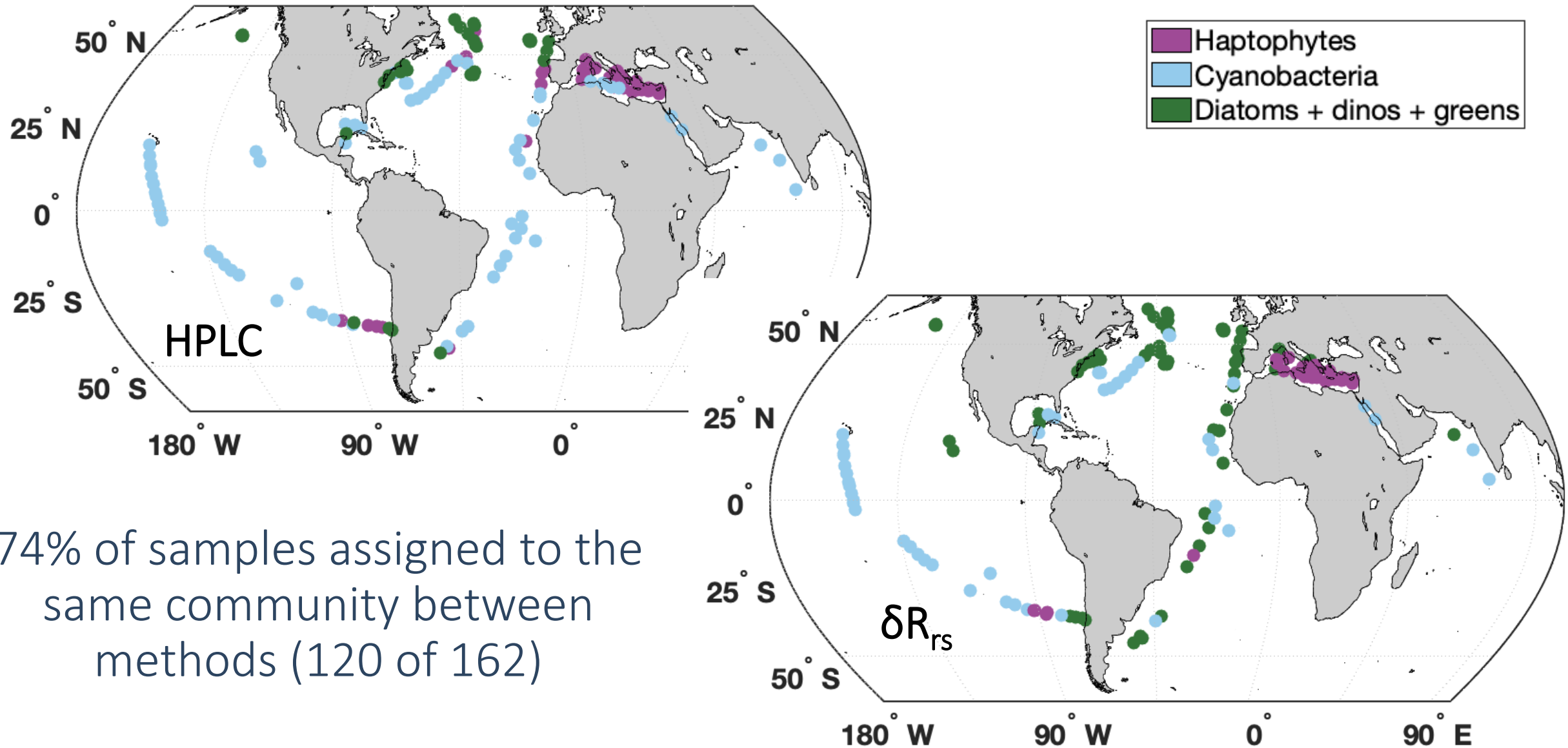
Diatoms



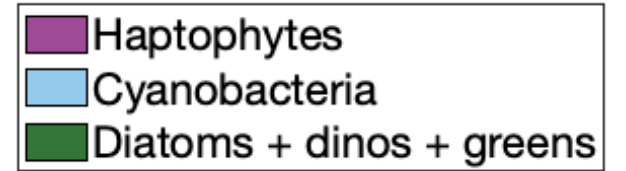
HPLC



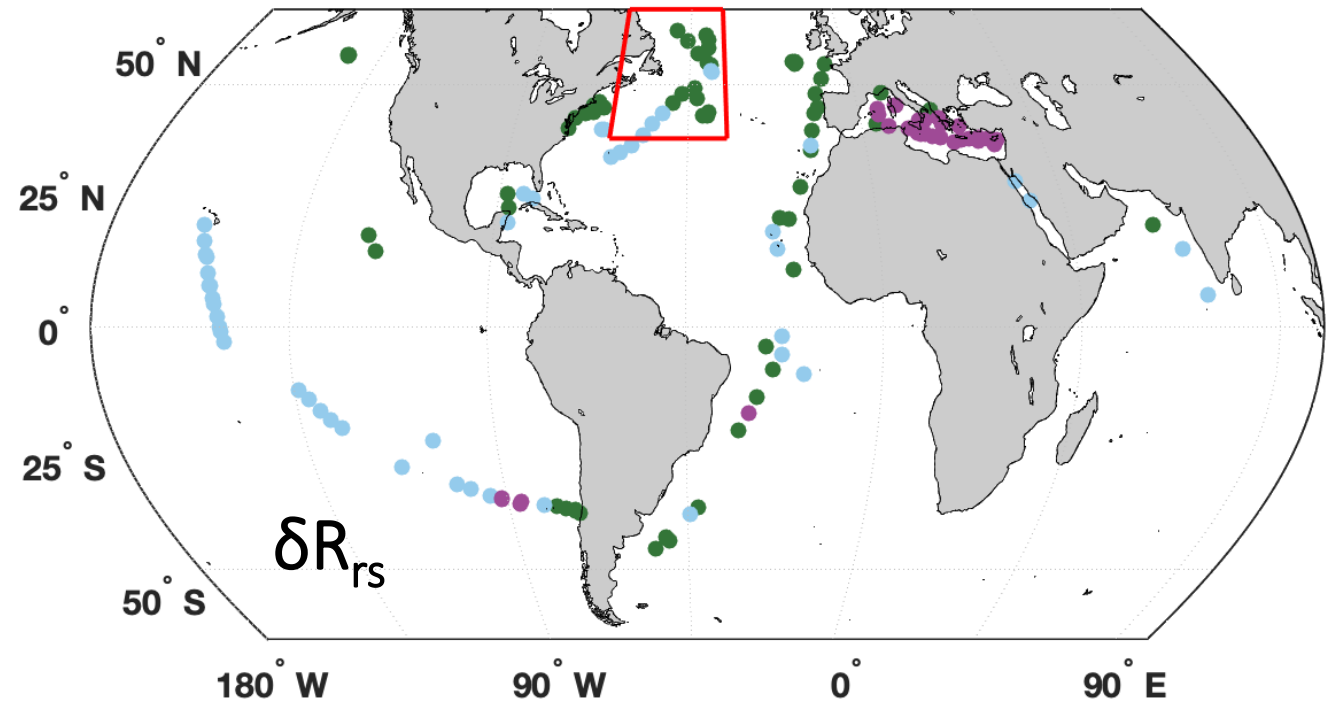
Global distribution of 3 pigment vs. δR_{rs} communities



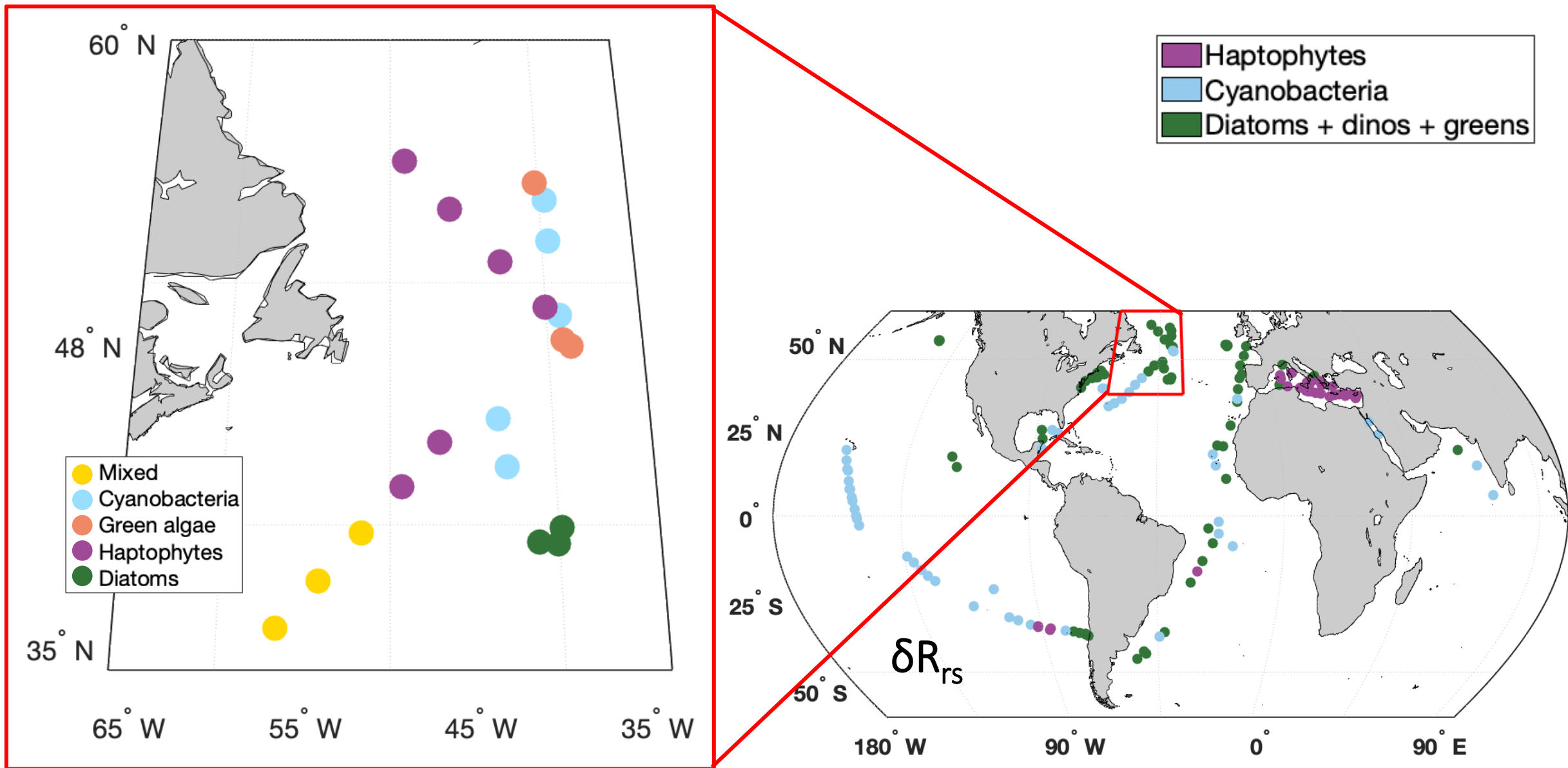
Global vs. regional δR_{rs} communities



What happens when we repeat the community detection analysis on a subset of the data?



Global vs. regional δR_{rs} communities



Example δR_{rs} spectra from PACE V2 data

Currently:
implementing SDP for PACE

Next steps: testing with V3 data, comparing to PVST pigments, refining SDP, testing regional vs. global

