



# High-frequency Validation of Radiometric Measurements, Inherent Optical Properties and Phytoplankton Functional Types in the Coastal Waters of Sagami Bay (C030)

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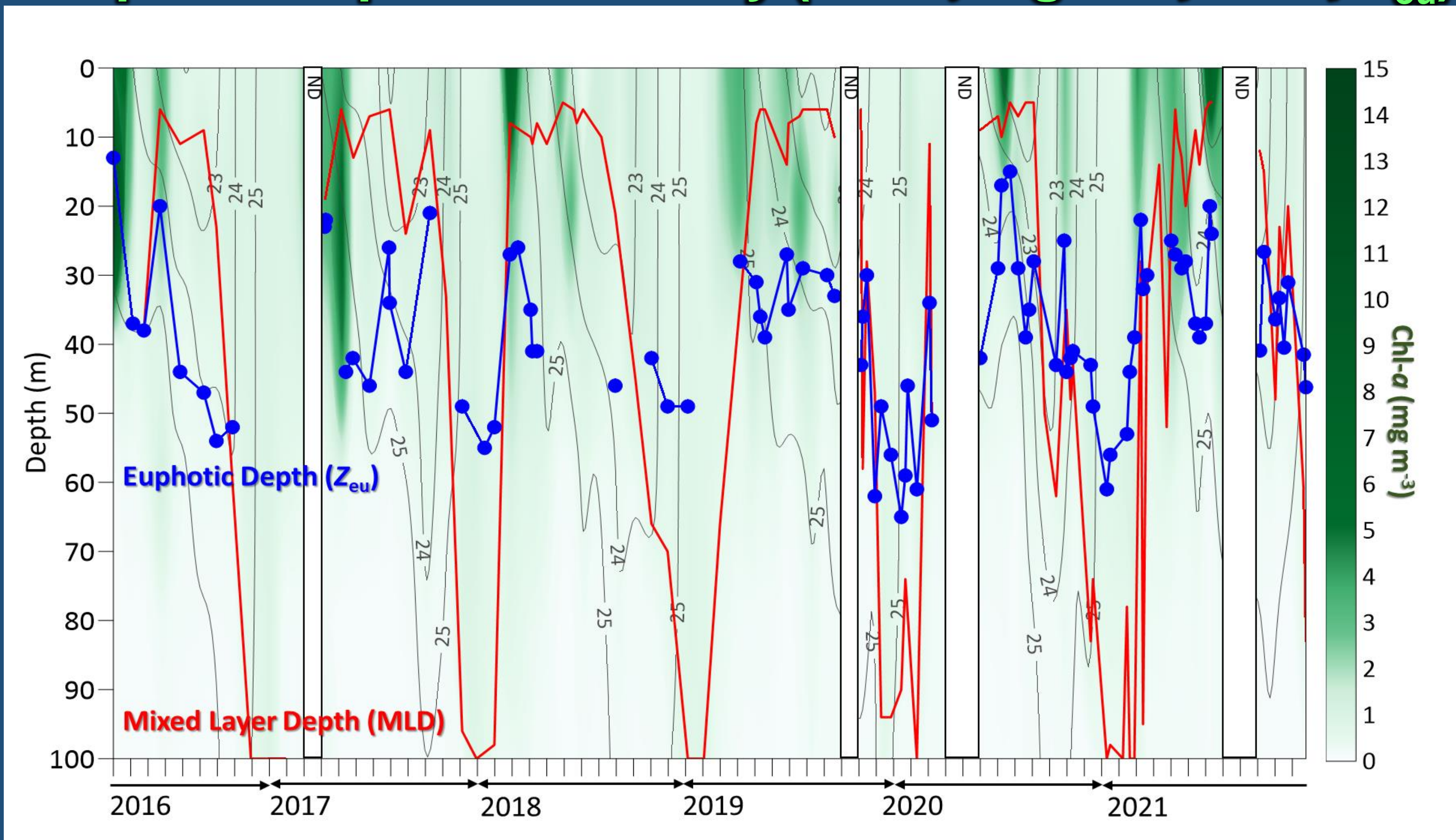
## Problem:

Coastal oceans remain one of the most difficult marine environments to optically characterize spatially and temporally due to multiple complexities, e.g., proximity to land mass, shallow environment, high turbidity, complex stratification/mixing, boundary effects on circulation, river and terrestrial input, high primary production, complex biogeochemical interactions, high biodiversity, etc.

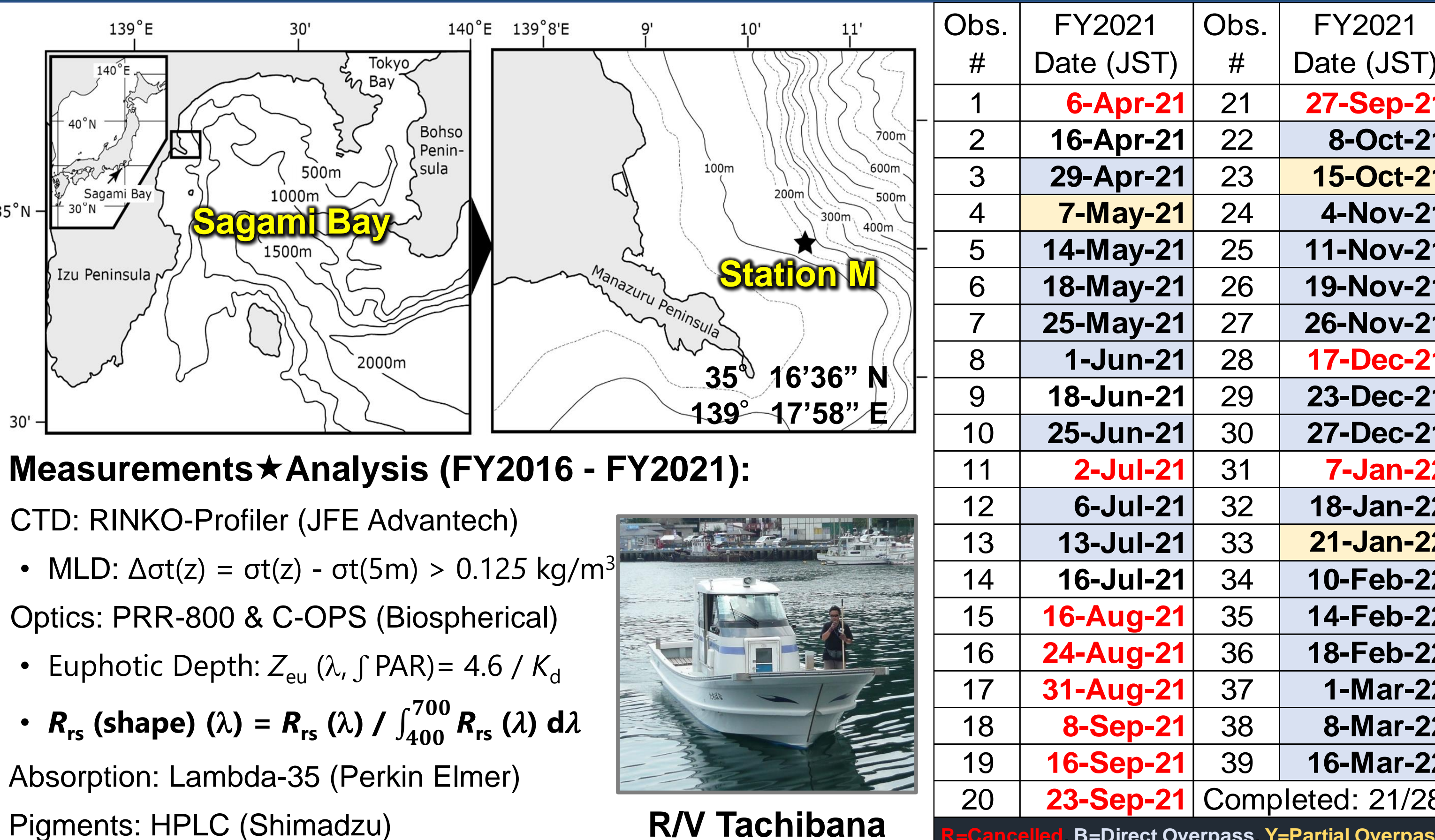
## Purpose:

Accurately quantify at relatively high-frequency (monthly) *in situ* radiometric measurements, inherent optical properties (IOPs) and phytoplankton functional types (PFTs) from Sagami Bay, Japan towards resolving coastal ocean bio-optical complexities and vicarious validation efforts of the GCOM-C/SGLI (*Shikisai*) ocean color remote sensing observational platform.

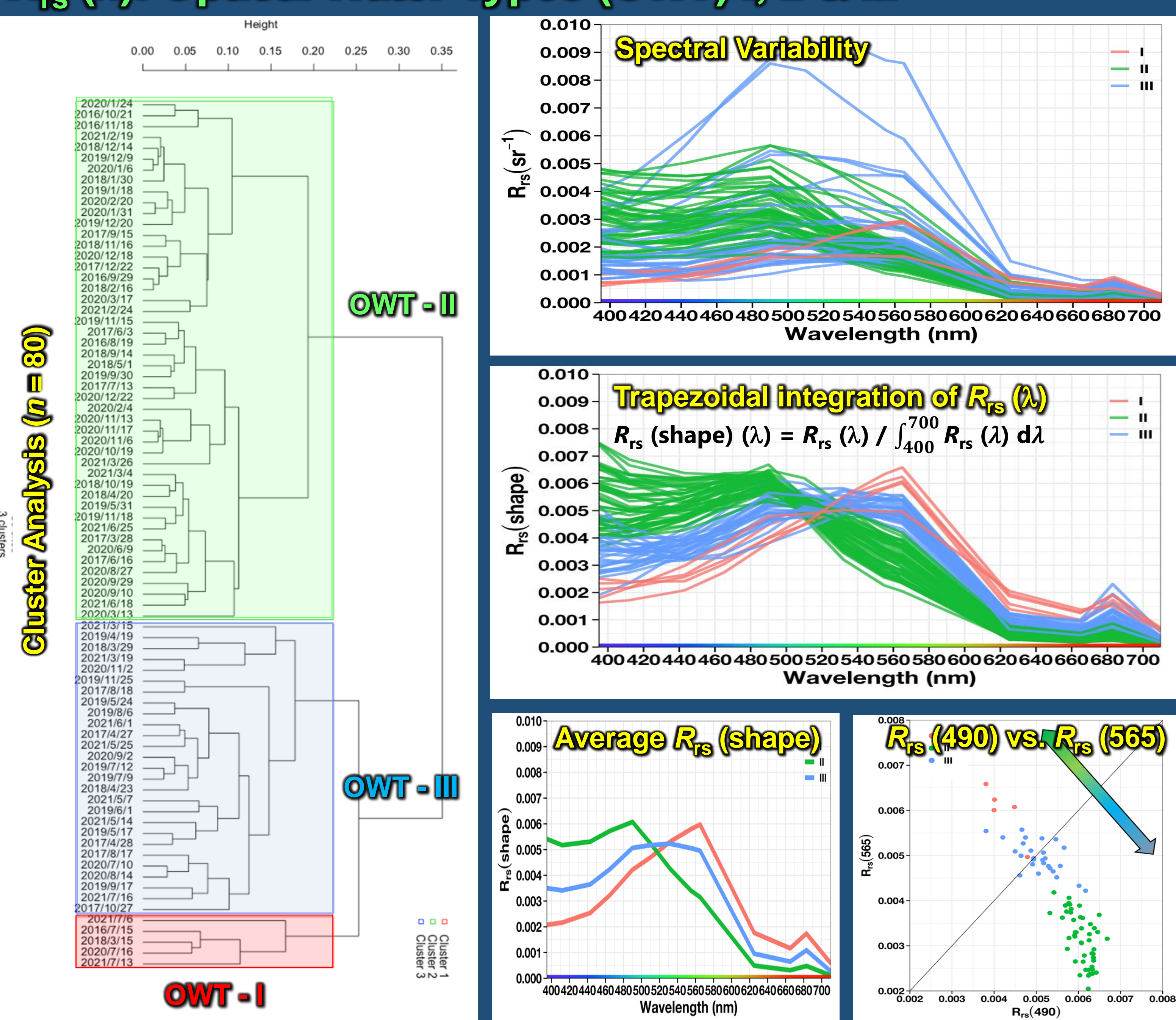
## Temporal & Spatial Variability (Chl-a, Sigma-t, MLD, Z<sub>eu</sub>)



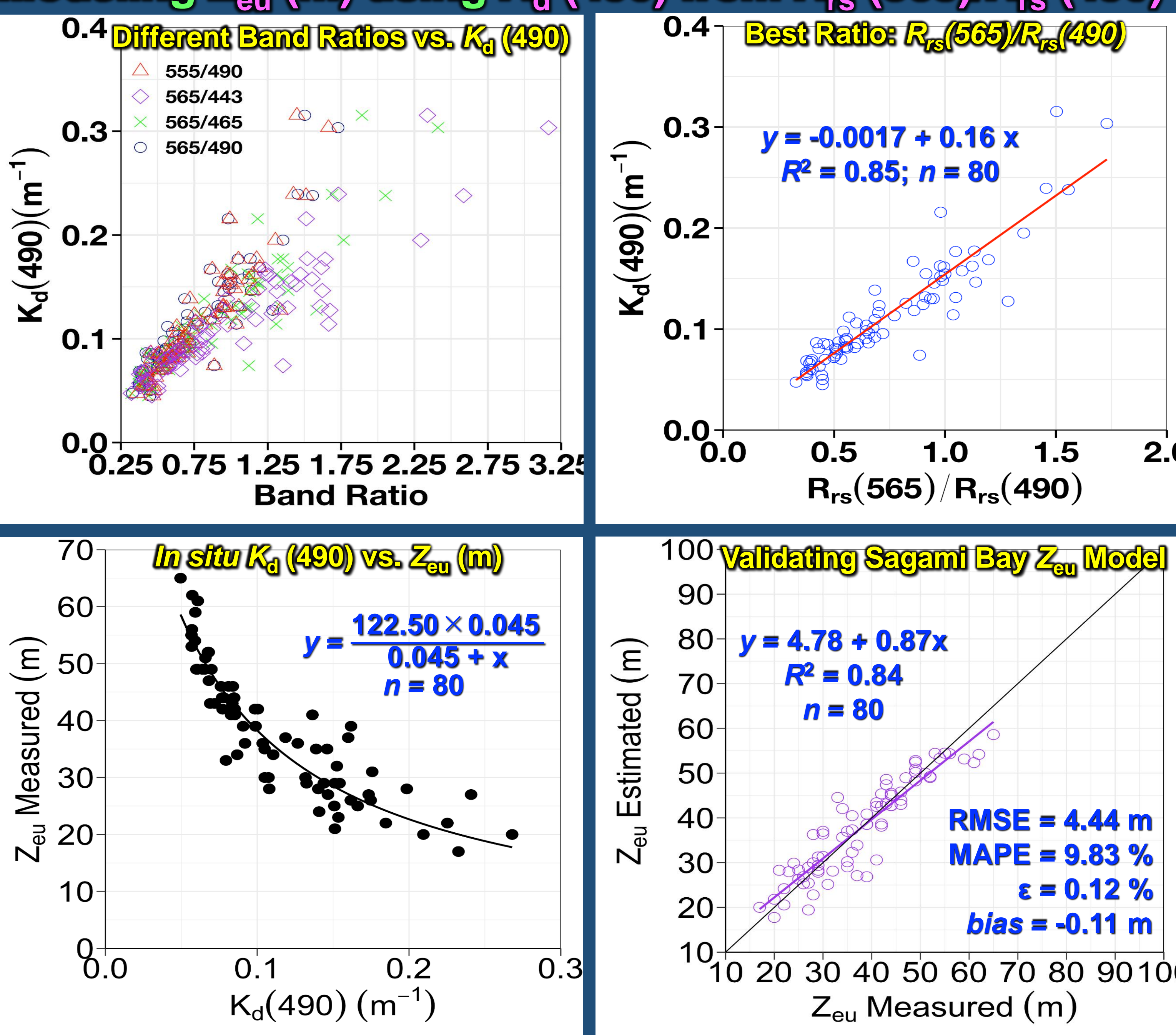
## Material & Methods:



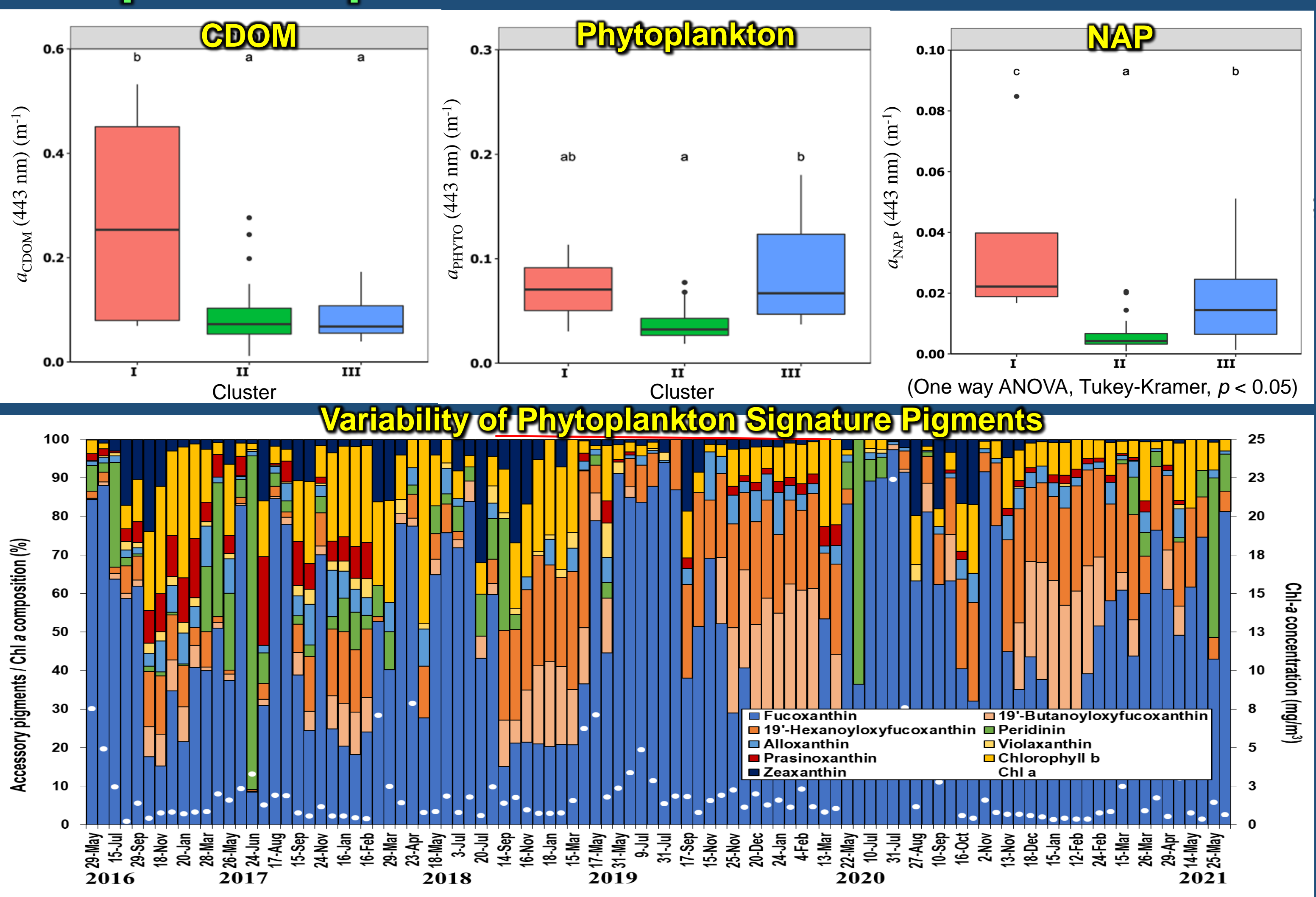
## R<sub>rs</sub>(λ): Optical Water Types (OWT) I, II & III



## Modeling Z<sub>eu</sub> (m) using K<sub>d</sub> (490) from R<sub>rs</sub> (565)/R<sub>rs</sub> (490)



## Bio-optical Properties & PFTs



## Conclusions & Acknowledgements

- Sagami Bay revealed three ( $R_{rs}$ ) Optical Water Types [OWT-I = CDOM significant; OWT-II = Transparent (clean) Coastal Waters; OWT-III = Transition Coastal Waters) based on 80 *in situ* radiometric measurements
- CDOM absorption was significant in OWT-I, and phytoplankton biomass (absorption) was relatively significant in OWT-III compared to other OWTs; all bio-optical factors (IOPs) were low in OWT-II, suggesting *transparent* coastal waters
- Phytoplankton signature pigments showed clear seasonality with high diatom biomass in Spring-Summer and relatively high cyanobacteria in Summer-Fall
- Coccolithophore bloom was observed in Sagami Bay in May 2020 based to “*Shikisai*”; the first documentation in 25-years (data not shown)
- Plankton diversity (Envi.DNA) and PFTs (CHEMTAX) were determined and preliminary relationship to *in situ* optical data was determined (data not shown)
- Robust euphotic zone depth ( $Z_{eu}$ ) estimation model was developed based on  $K_d(490)$  derived from  $R_{rs}(565)/R_{rs}(490)$  band ratio
- $Z_{eu}$  research product can be calculated from *Shikisai* with high confidence in Sagami Bay – validation match-ups will be tested and analyzed

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