Copernicus FICE 2025

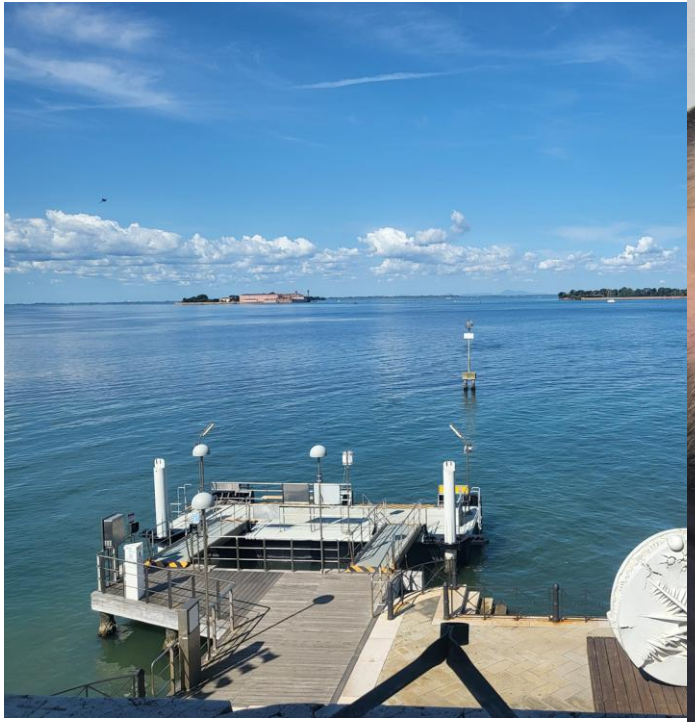
Training on
In situ Ocean Colour Above-Water Radiometry towards Satellite Validation

Final Group Presentation

Ana Dogliotti, Ceridwyn Hunter, Remika Gupana, Sorin Constantin

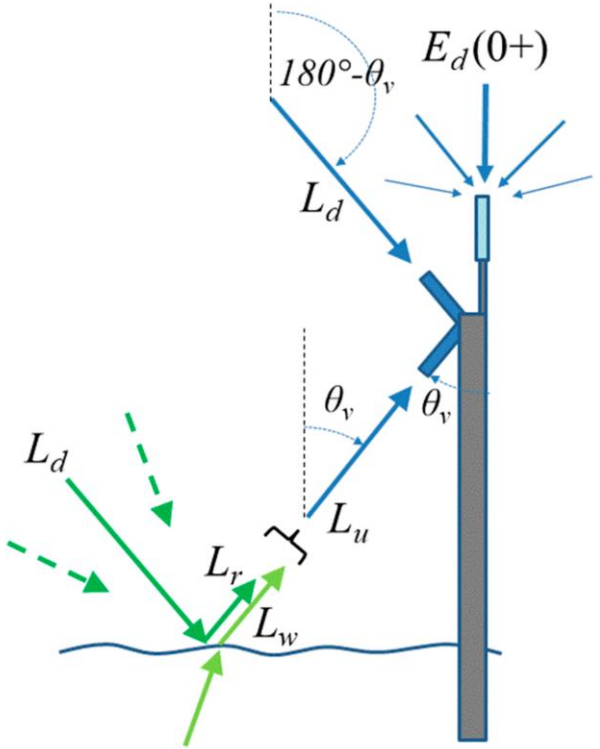
19 June 2025
Venice, Italy

We arrived!



Coffee break team

1. Field measurements



Ruddick, K.G.; Voss, K.; Boss, E.; Castagna, A.; Frouin, R.; Gilerson, A.; Hieronymi, M.; Johnson, B.C.; Kuusk, J.; Lee, Z.; et al. A Review of Protocols for Fiducial Reference Measurements of Water-Leaving Radiance for Validation of Satellite Remote-Sensing Data over Water. *Remote Sens.* **2019**, *11*, 2198. https://doi.org/10.3390/rs11192198

San Servolo

Remika
Notes + anchoring tent

Ana
Dark caps + photos

Ceridwyn + Sorin:
Field condition and data collection
(+ impersonating a tilt correction device)

San Servolo

Clear skies/low wind

Issues:

Dock arrangement posed issues for instrument viewing angle

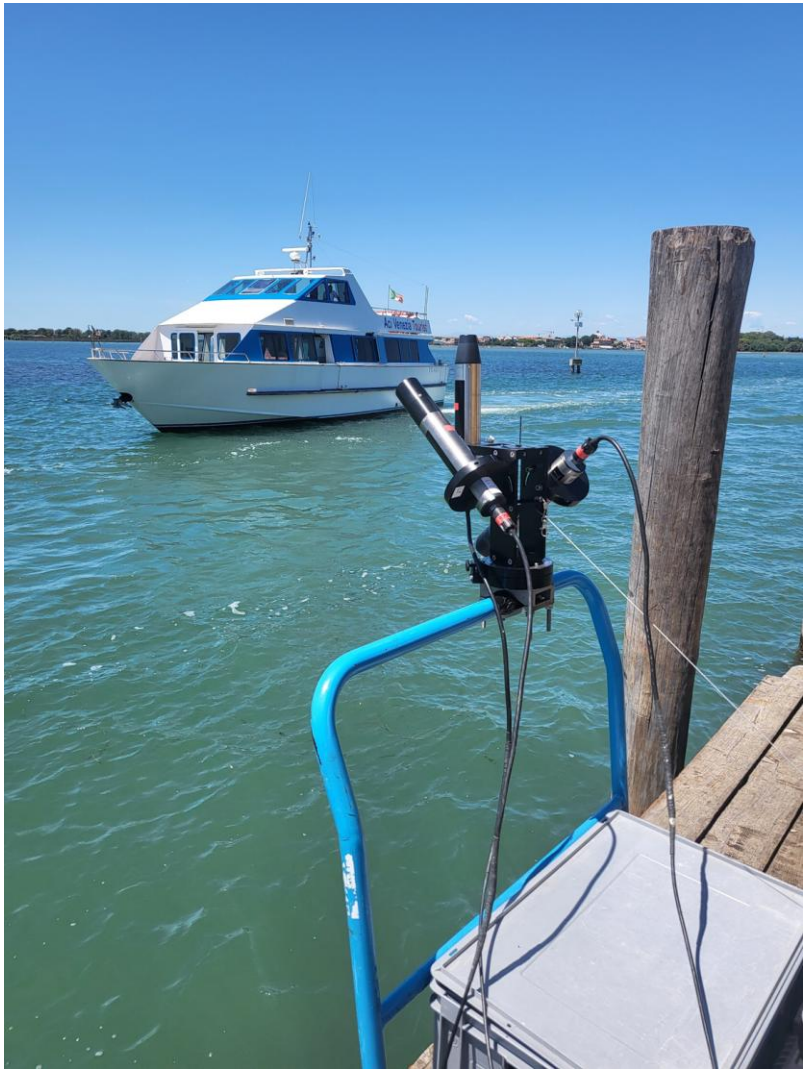
> Best available angle chosen

Transparent caps for darks

> Wrapped in black duct tape (not perfect)

Boat wake/vegetation in the water

> Notated perturbation events in field log

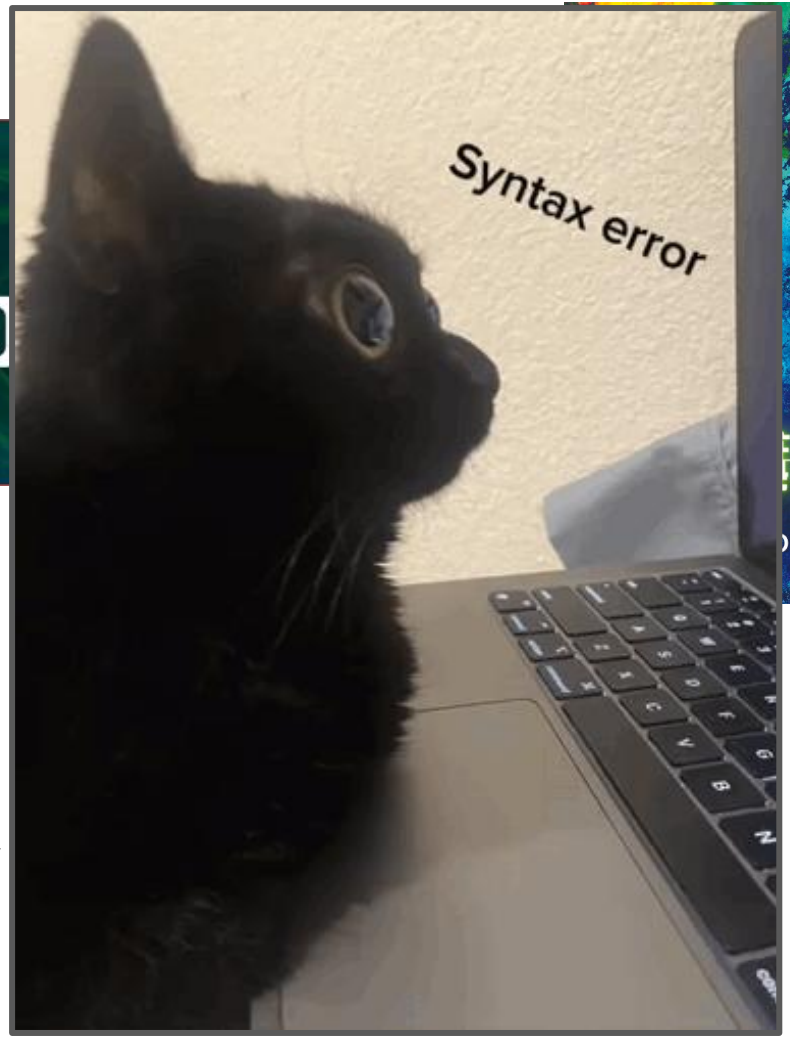


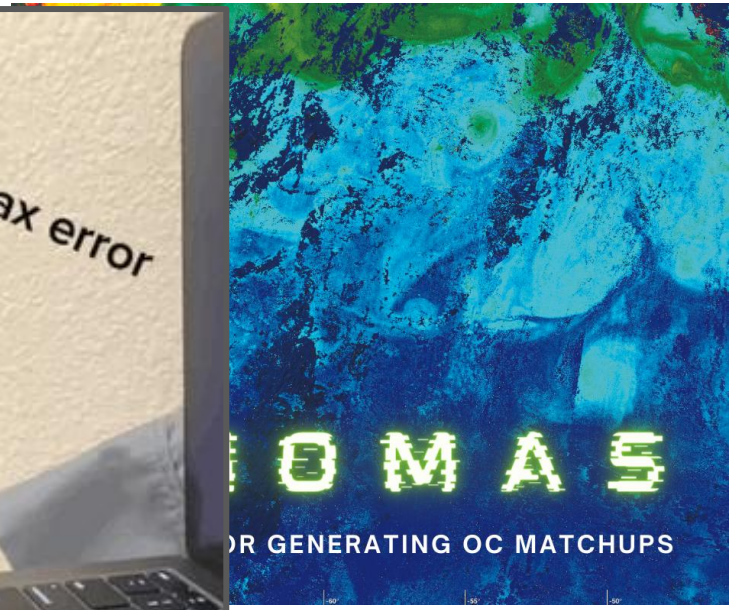
AAOT Field Visit

Optimal positioning of radiometers

Relatively easy access to field site

Multiple characterized radiometers (FRM and non-FRM compliant) for intercomparison





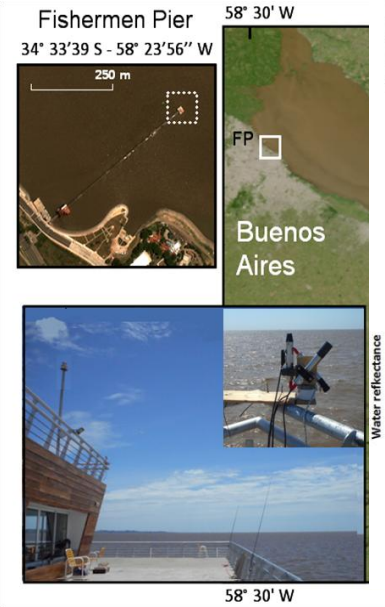
2. HyperC

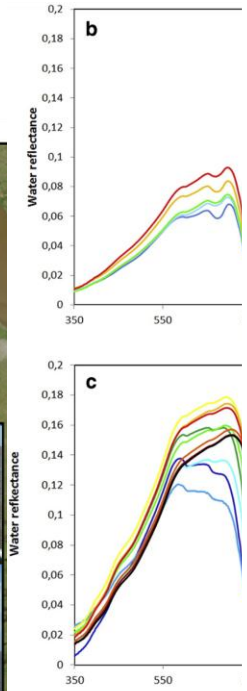
HyperCP - w/ TriOS in Rio de la Plata, Argentina

Field campaign end of a pier on 01 Dec 2020

Chl-a= 34.2 mg/m3; **T**= 67 FNU; **SPM**= 76 g/m3

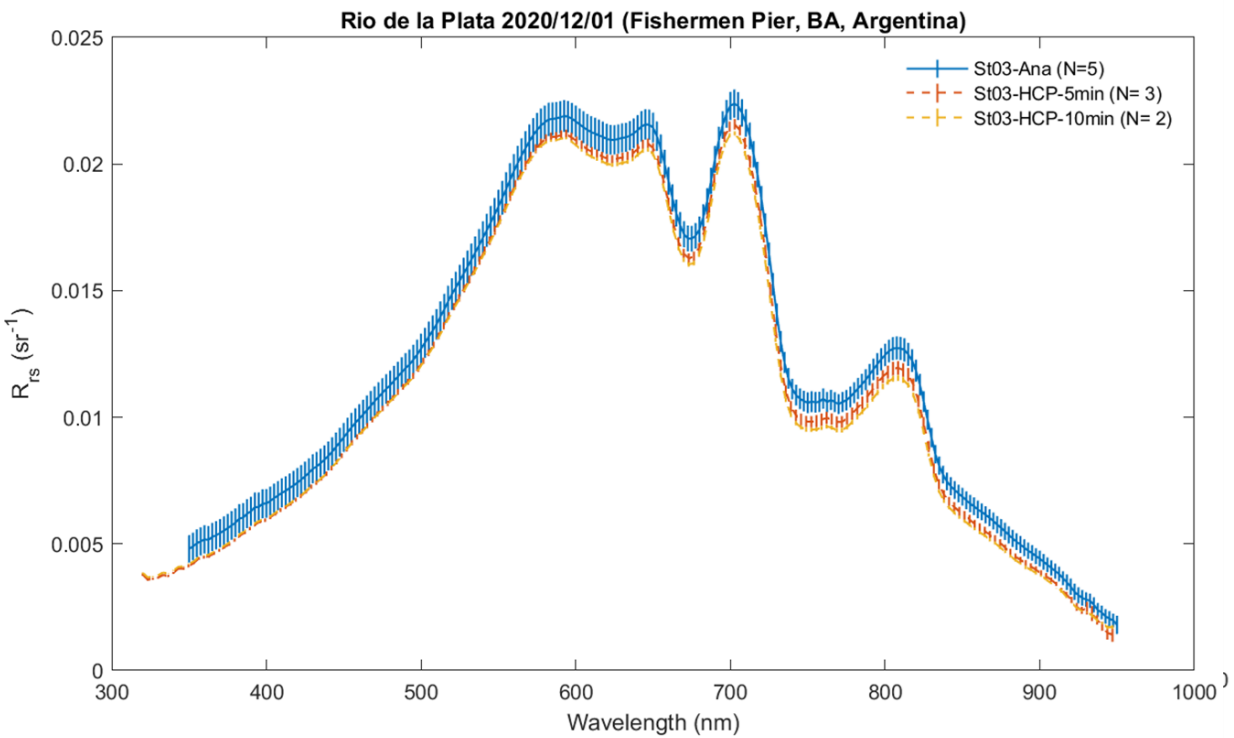
- TriOS/RAMSES - Calibrated w/o uncertainty
- Lt(NIR)>Lt(UV) -> NO
- Mobley99
- No skyglint correction



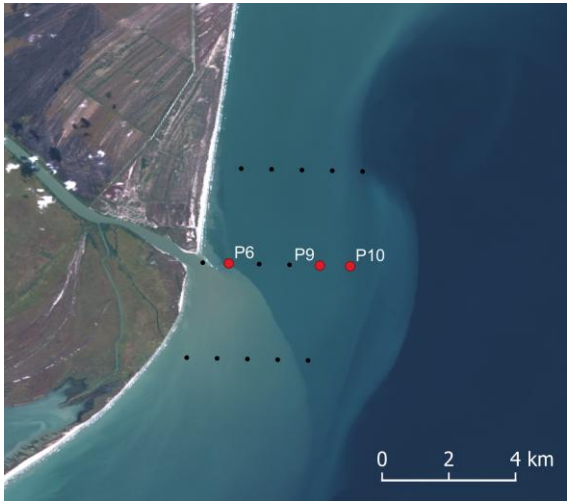


Knaeps et al. 2015

- TriOS Ed has an internal Inclination/Pressure sensor (SAMIP_XXX.ini) -> change to fit
- Change Station numbers to fit format



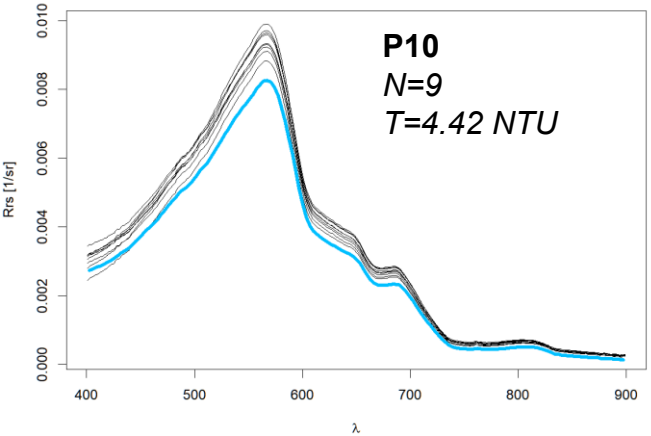
HyperCP + ThoMaS - w/ TriOS in Danube Delta, Romania

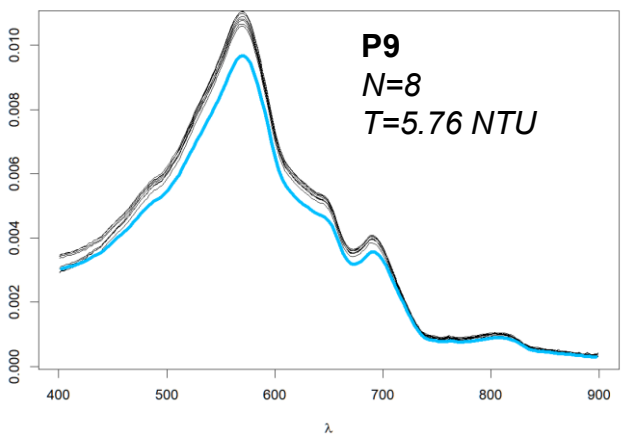


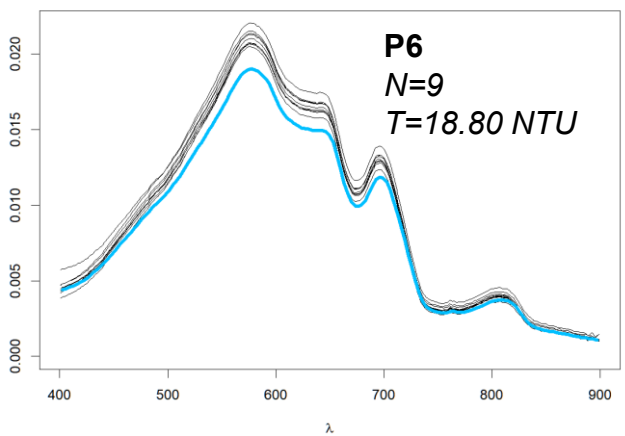
In-situ Trios measurements from June 7, 2024

Black lines = R_{rs} spectra with on surface reflectance factor applied (ρ = 0.028)
Blue lines = R_{rs} spectra processed with HyperCP (ρ = 0.0266 or ρ = 0.0267)

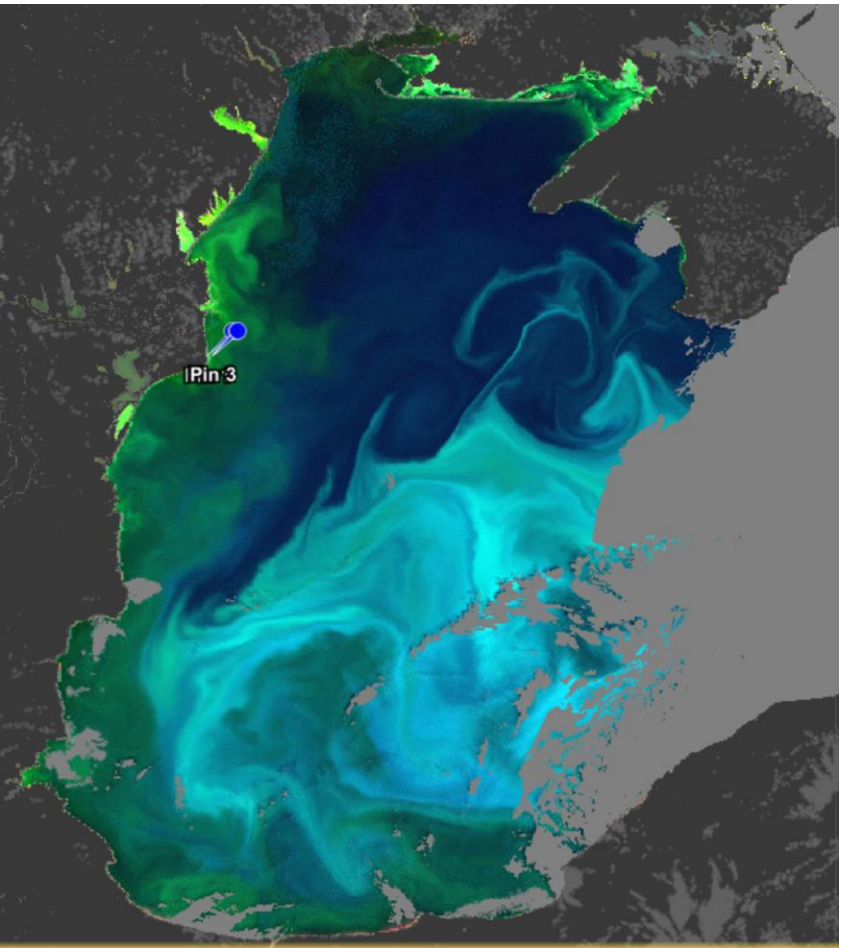
- Glint correction: M99
- NIR residual correction: SimSpec
- BRDF: L11



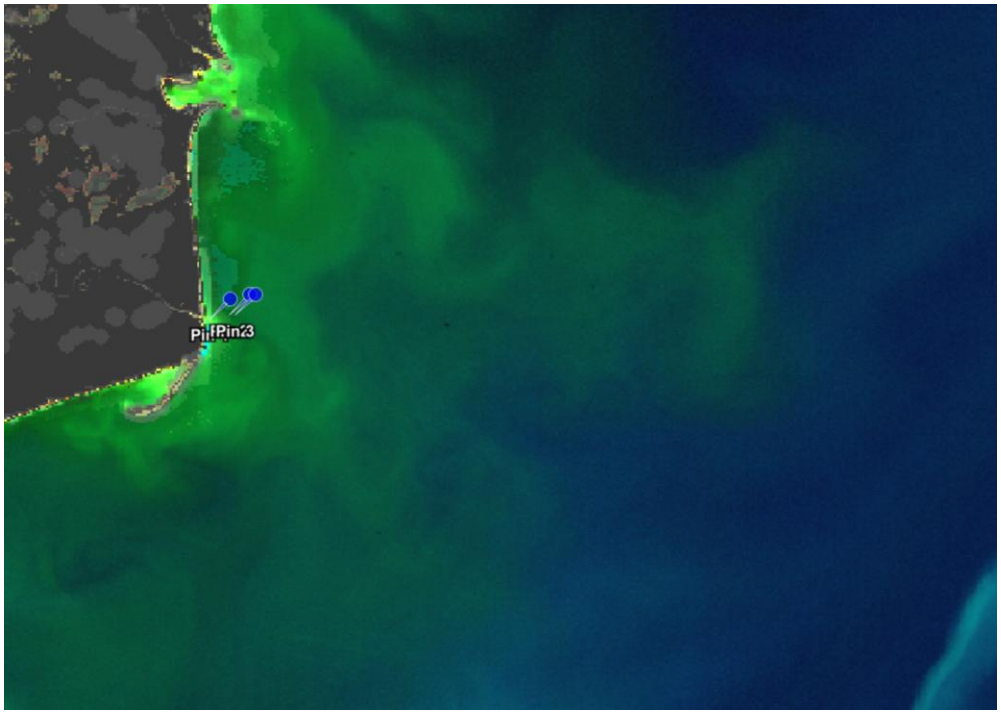




HyperCP + ThoMaS - w/ TriOS in Danube Delta, Romania



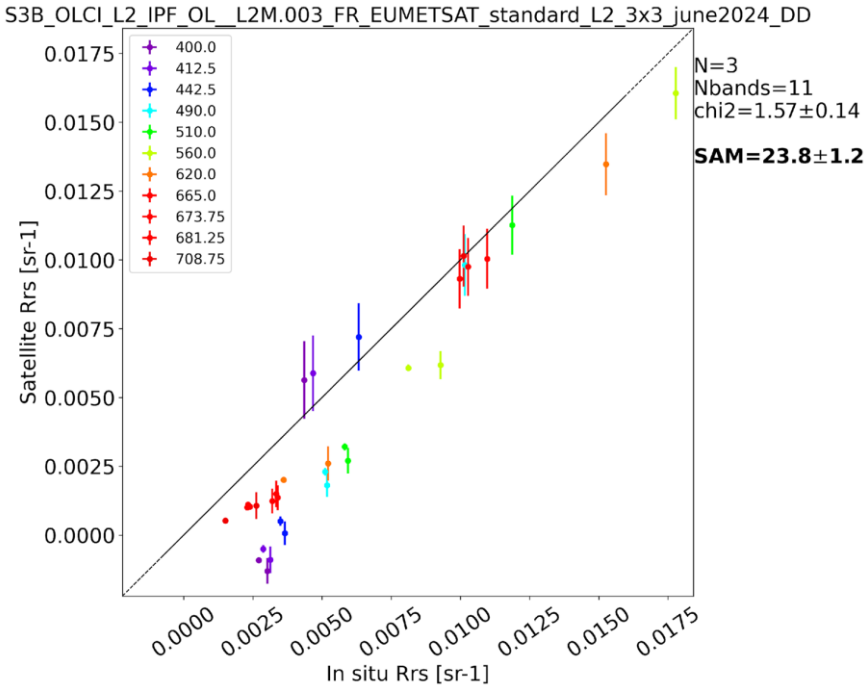
Sentinel-3 image for the same day (June 7, 2024)

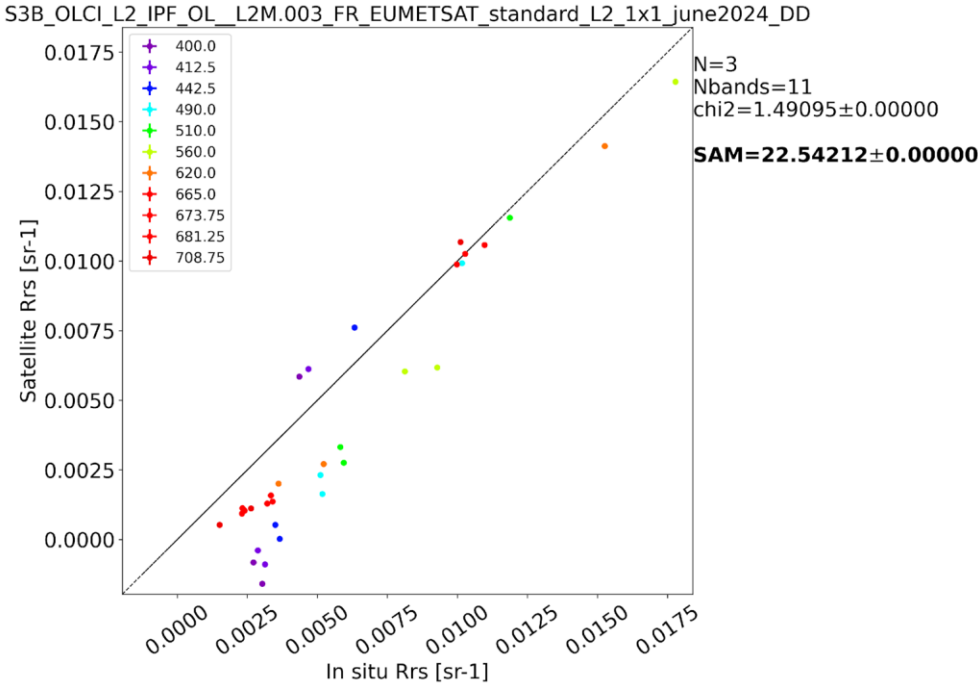


HyperCP + ThoMaS - w/ TriOS in Danube Delta, Romania

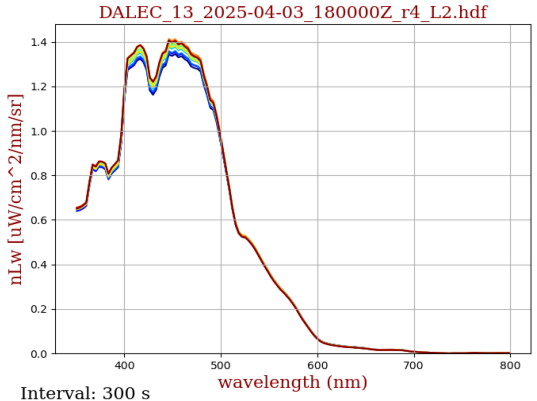
Match-ups with Thomas

- Both in-situ and satellite were BRDF corrected (Lee et al., 2011)
- Extraction window: 1x1 and 3x3
- Extraction protocol: EUMETSAT standard Level 2

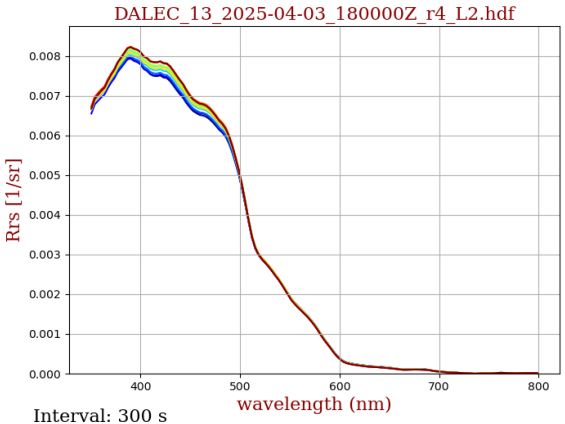




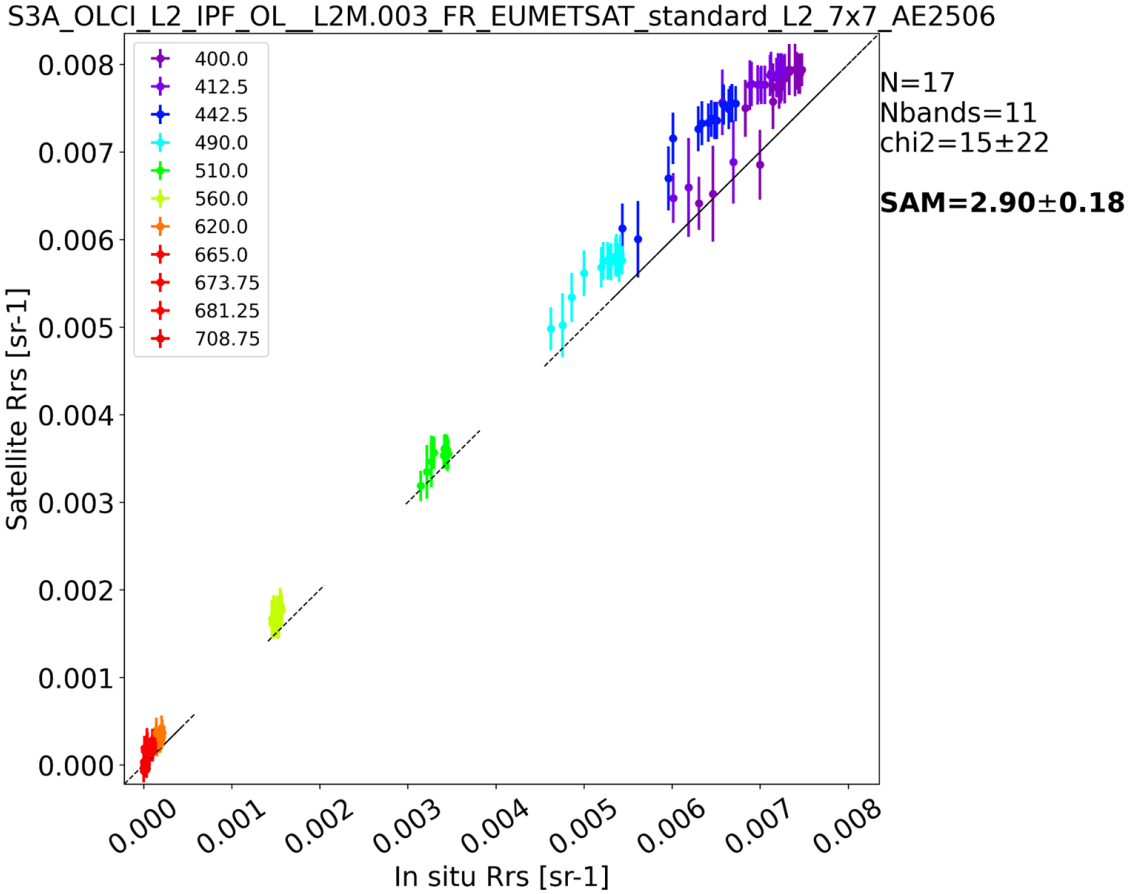
HyperCP + ThoMaS - w/ DALEC in Bermuda, N. Atlantic



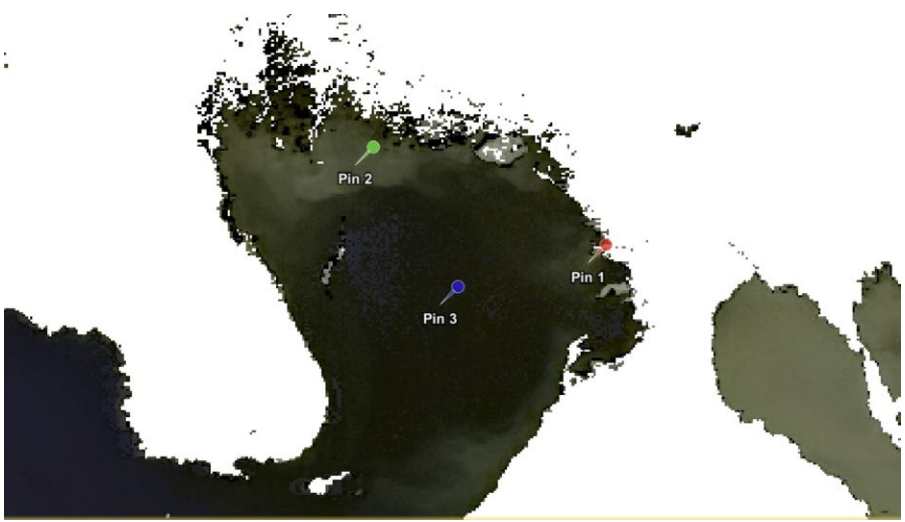
Interval: 300 s

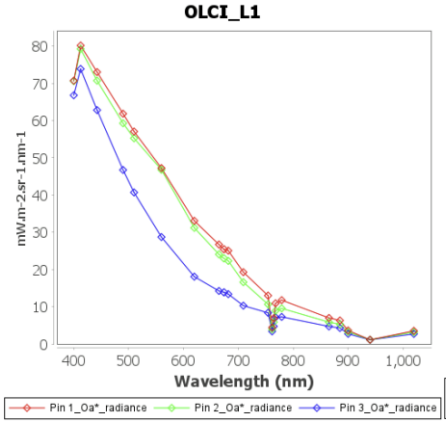


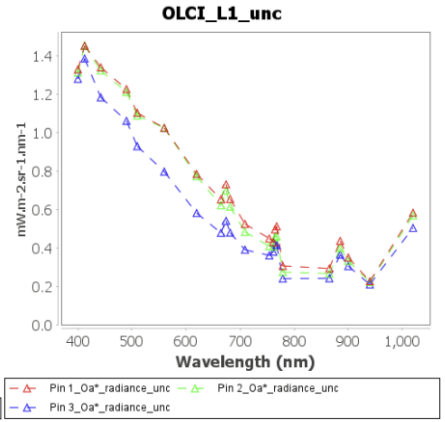
Interval: 300 s

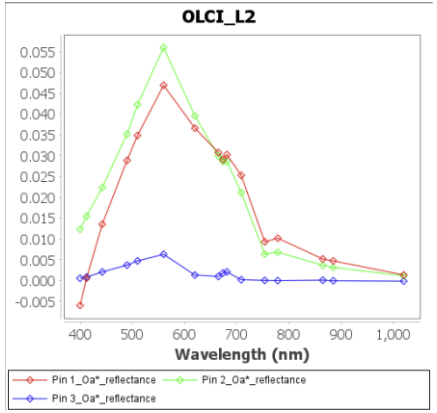


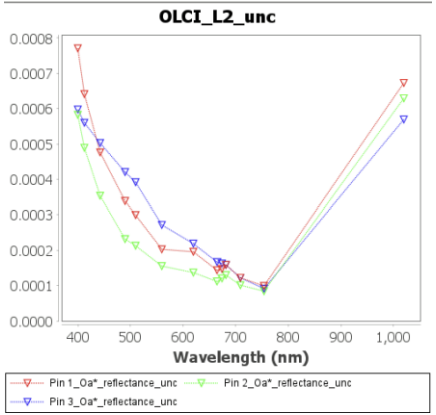
ThoMaS - Satellite data extraction in Manila, Philippines











Challenges and recommendations

HyperCP

- TriOS/DALEC application
- Developing ancillary file/code for HyperCP format
- Incorporation of TriOS SAMIP files format
- Near-surface radiometry (SBA) setup in HyperCP

ThoMaS

- Using reference lat/lon for a site
  - Specifically for AERONET sites where the platform may affect matchups
- Incorporate other satellites (S2, Landsat…)
- Interpolating in time when more than 1 measurement

fiducial reference measurements for satellite ocean colour

3. FRM quality and future prospects

Challenges

- Obtaining calibration uncertainties
- Instrument characterization
- Make other sensors FRM compliant
- Ship-based data collection
- Non-ideal environmental conditions for data collection year-round

Next Steps

- Establishing/finding labs for calibration & characterization
  - Local/regional existing facilities
- Possibility of renting FRM4SOC radiometers
  - Where FRM sensors are not available
- Improving current set-ups and evaluating individual superstructure optimization


Copernicus FICE 2025
Training on
In situ Ocean Colour Above-Water Radiometry towards Satellite Validation
Venice International University


APER
TCHIN - TCHIN