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

Cicchetti y Tapas Team 💃 💅

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Venice, Italy

1. Experience during San Servolo and AAOT measurements

- **Main challenges during the measurements in San Servolo**
  - Coordination between team members and synchronization of operations
  - Logistical difficulties due to the limited space on the jetty and cable management
  - Installing and stabilizing the radiometers was not easy
- **Unexpected issues and solutions**
  - Interference from the jetty structure: we had to change the installation location of the setup
- **Individual roles during the measurements**
  - One person was responsible for triggering the casts and the sensors
  - One person took care of the logbook and notes (e.g. time, weather, instrument ID)
  - One person was dedicated to taking photos and videos
  - Coordination was important to make the work easier and more efficient
- **Comparison between San Servolo and AAOT protocols**
  - San Servolo protocols were easier to follow, offered easy access to the water but the working space was limited and there was less equipment available
  - AAOT protocols require more effort but there was more space to work and better technology and instruments were available
- **Differences when using TriOS compared to other instruments**
  - TriOS requires special attention for the setup and for maintaining the correct geometry between radiometers
  - The setup needs to be manually moved to stay correctly located with the Sun
  - The calibration and data management are more structured and reliable

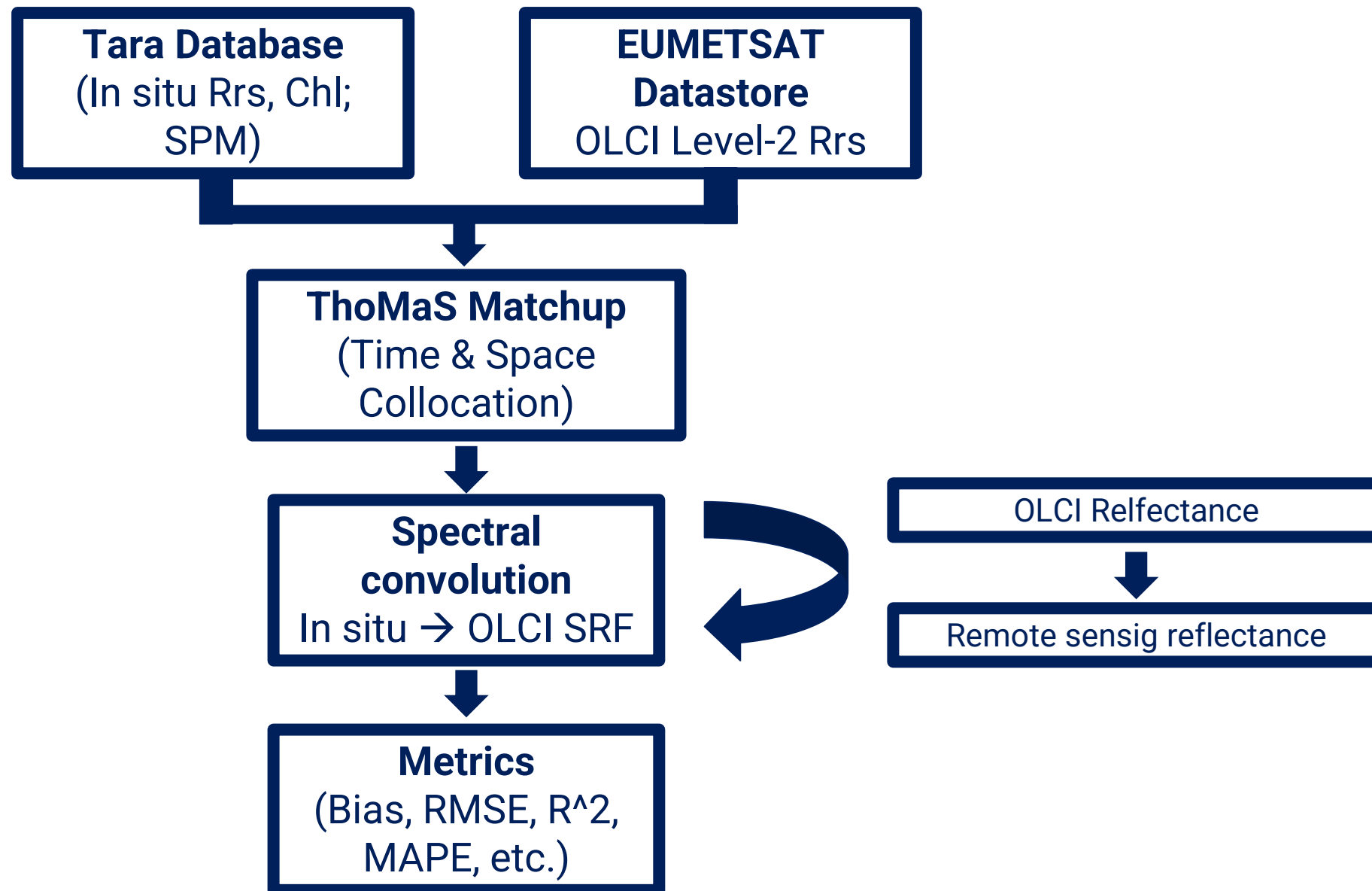# 1. Experience during San Servolo and AAOT measurements

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2. Workflow

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┌──────────────────┐        ┌──────────────────┐
│  Tara Database   │        │    EUMETSAT      │
│ (In situ Rrs, Chl;│       │    Datastore     │
│     SPM)         │        │ OLCI Level-2 Rrs │
└──────────────────┘        └──────────────────┘
           │                         │
           └───────────┬─────────────┘
                       ▼
          ┌────────────────────────┐
          │   ThoMaS Matchup       │
          │   (Time & Space        │
          │    Collocation)        │
          └────────────────────────┘
                       │
                       ▼
          ┌────────────────────────┐        ┌──────────────────────────┐
          │      Spectral          │   ⟲    │     OLCI Relfectance      │
          │    convolution         │        └──────────────────────────┘
          │ In situ → OLCI SRF     │                     │
          └────────────────────────┘                     ▼
                       │                    ┌──────────────────────────┐
                       ▼                    │ Remote sensig reflectance │
          ┌────────────────────────┐        └──────────────────────────┘
          │       Metrics          │
          │ (Bias, RMSE, R^2,      │
          │    MAPE, etc.)         │
          └────────────────────────┘
```

2. Our Area of Interest
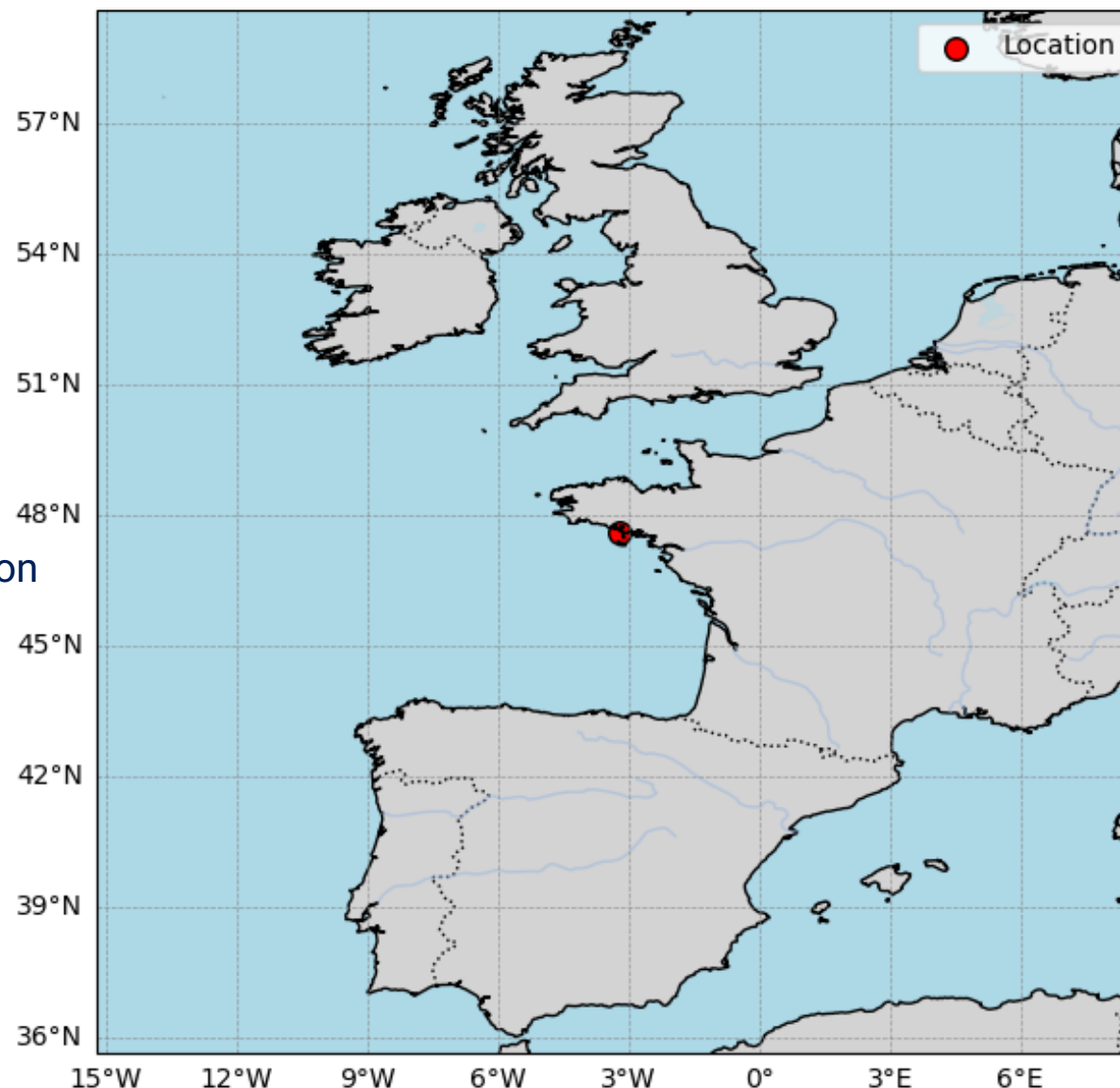
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From the **TARA** dataset:

SoRad Rrs (340:899 nm) sr-1
TChla mg m-3
SPM mg L-1

Figure 1: Ria Etel, created with python

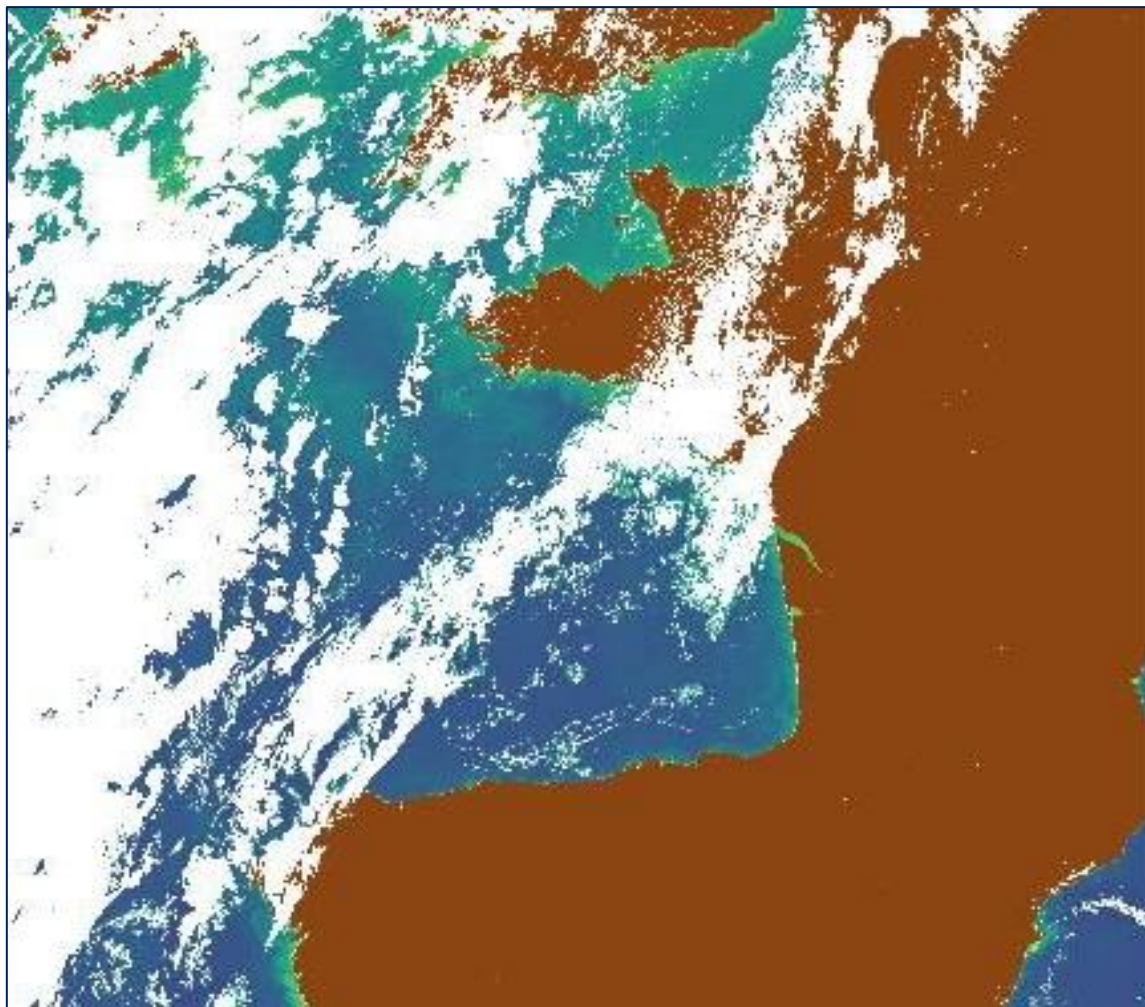## 2. Our Area of Interest:

Figure 2: Ria Etel, Sentinel-3 OLCI, 25/09/2023

ThoMaS

Global workflow:

- SatData, minifiles and EDB

SatData: L2 images from S3A & S3B, FR.

Minifiles and EDB were in window size 5x5

[Lat, Lon] = 47.6209, -3.2354
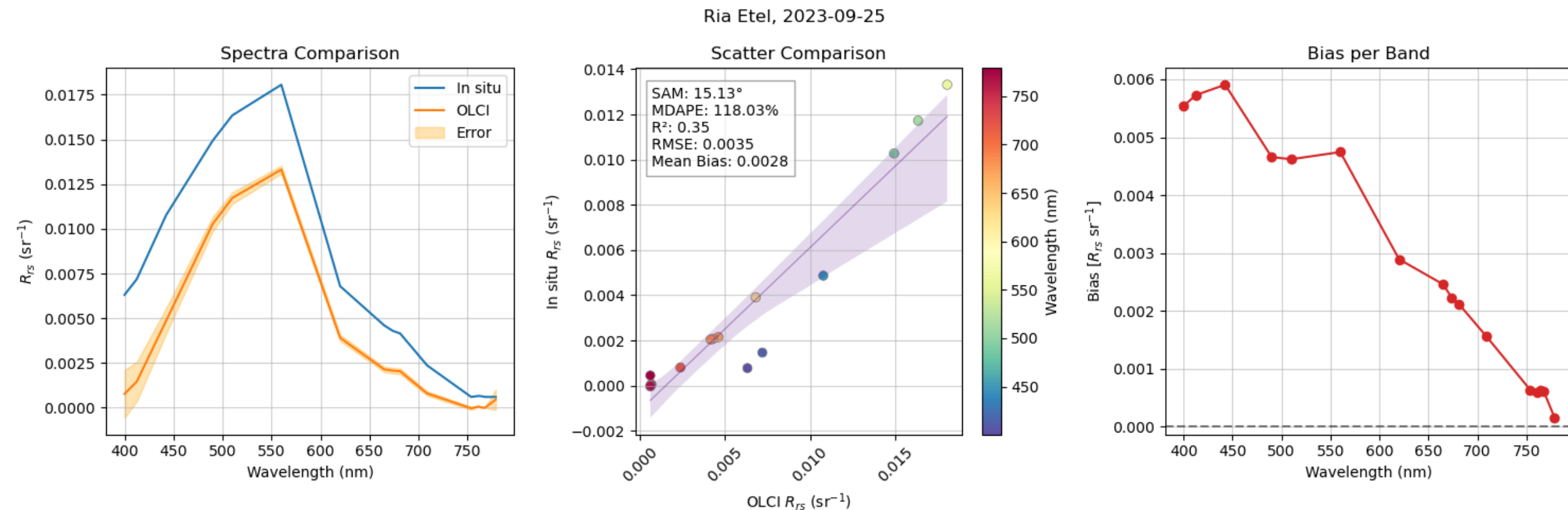
Start Time: 2023-09-25T06:00:00
Stop Time: 2023-09-25T12:00:00

2. Our Results:

Figure 3: Matchup comparison through Spectra and Scatter plot, bias per band
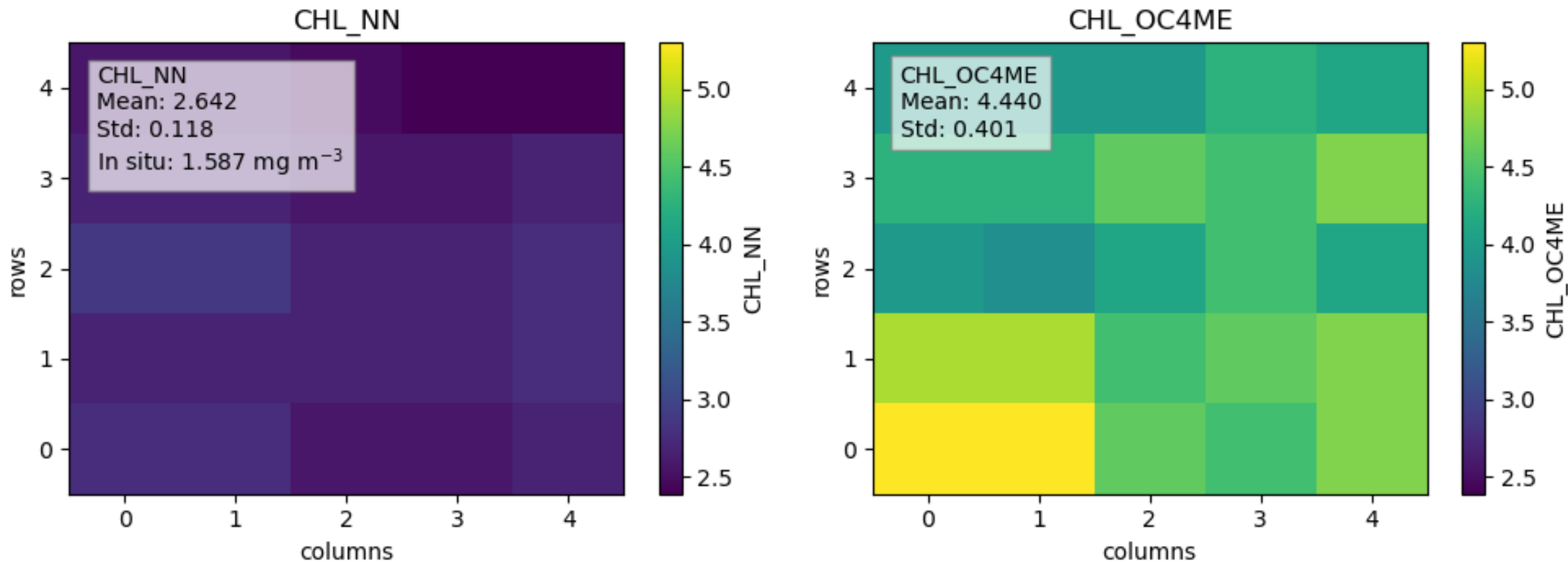
2. Our Results:

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Figure 4: Comparison of Chlorophyll-a
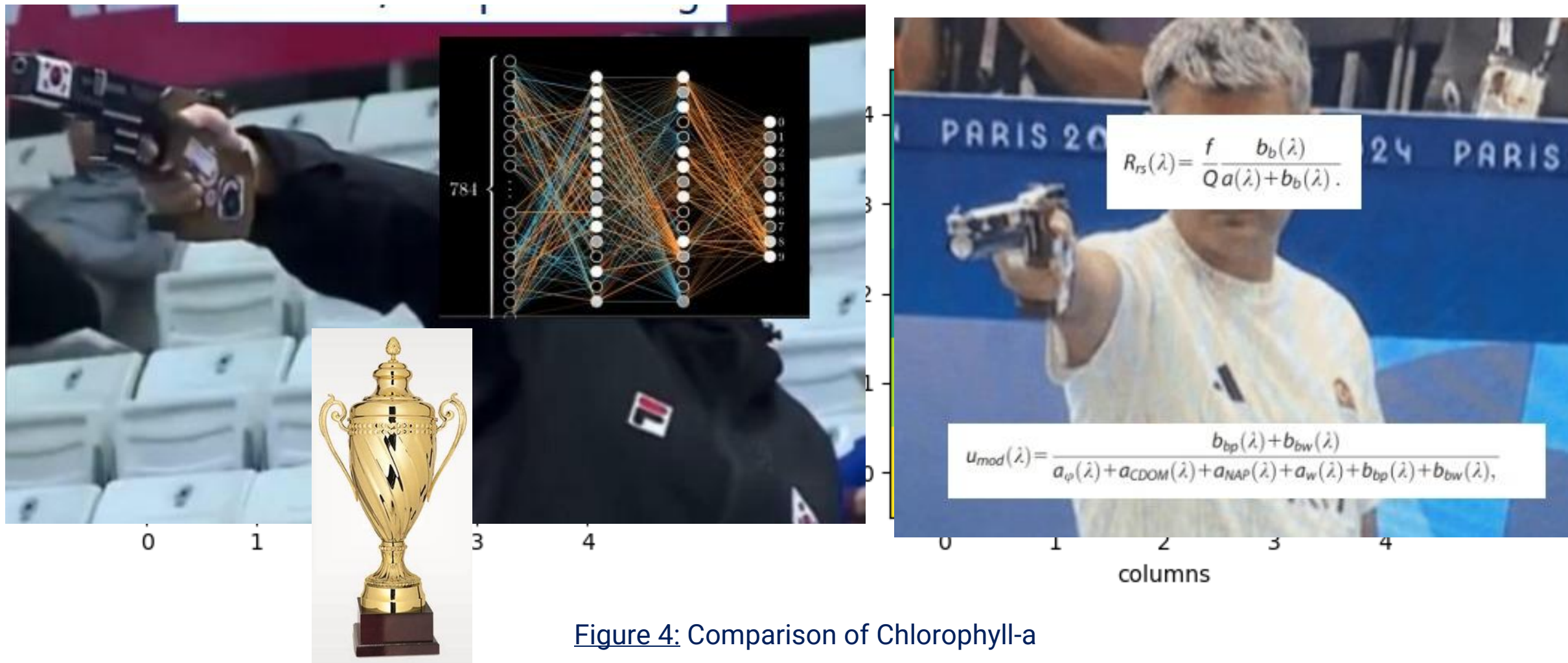
2. Our Results:

Figure 4: Comparison of Chlorophyll-a
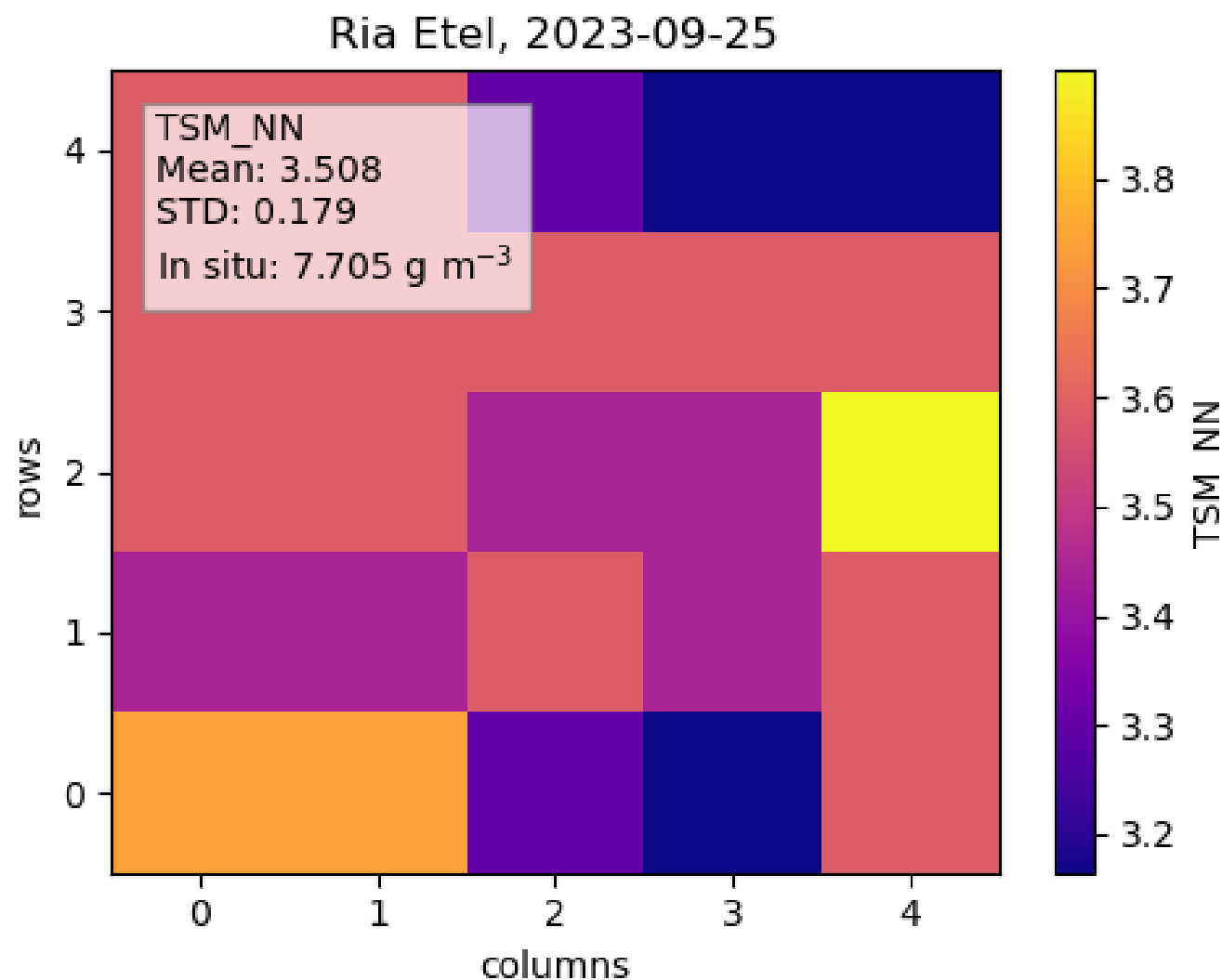
2. Our Results:

Figure 5: TSM_NN from S3

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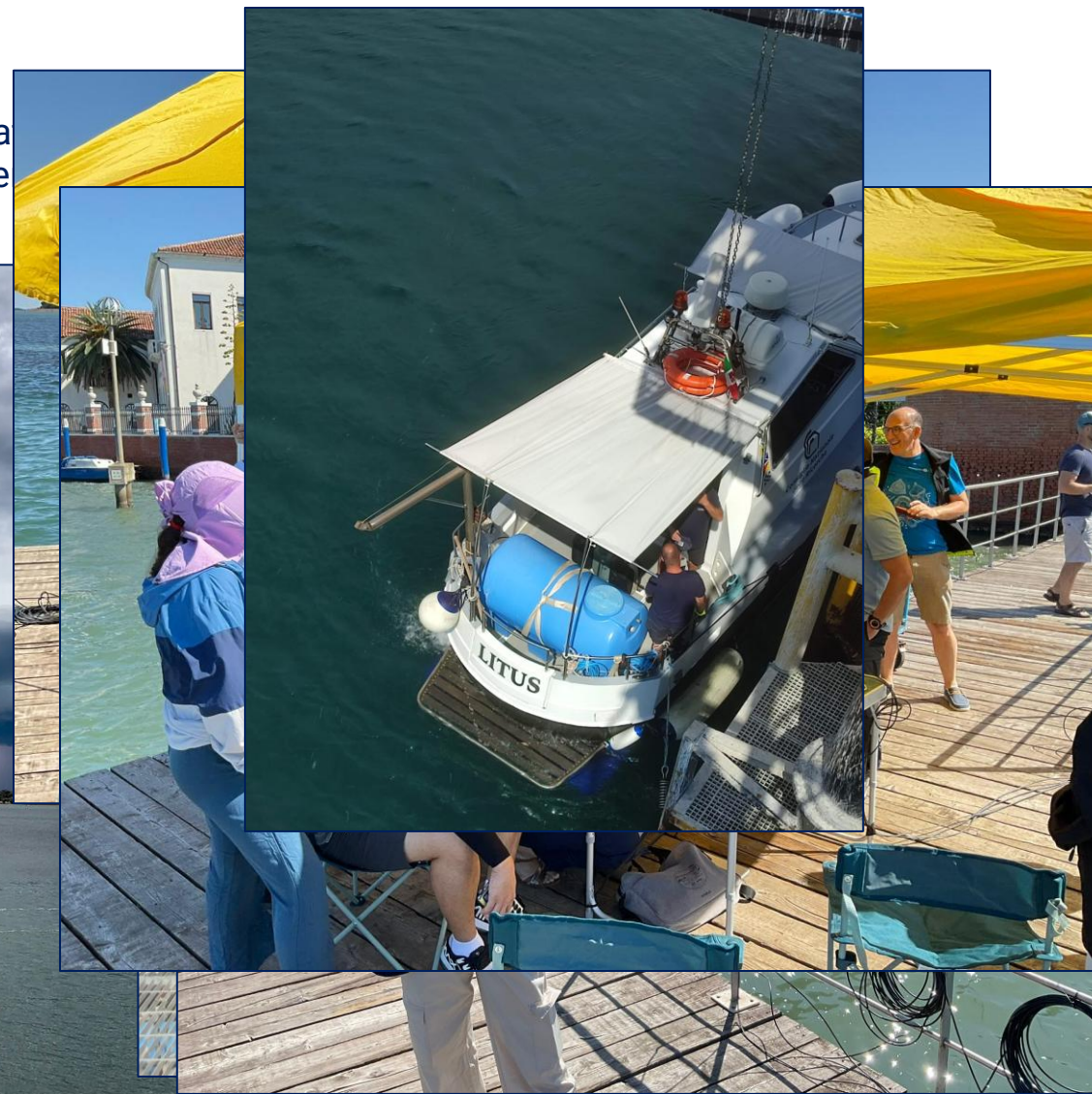
3. Achieving FRM quality in our future measurements

- **Main current challenges at your sites**
  - Lack of certified or recently calibrated instruments.
  - Logistical difficulties in frequently accessing the sea or offshore pla
  - Highly variable environmental conditions (turbidity, unstable weathe
  - Lack of trained field personnel to fully follow the protocols.*
- **Current compliance with FRM principles**

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3. Achieving FRM quality in our future measurements

- **How the community can support you**
  - Provide open-source and updated tools for data processing (e.g. HyperCP, ThoMaS).
  - Establish forums or community hubs to share cases, tools, and updates.*
  - Continuous training programs and support for instrument calibration.
- **Use of HyperCP / ThoMaS: experiences and suggested improvements**
  - Initial learning curve is rather high for new users.
  - Greater documentation and step-by-step practical examples are needed.*
  - Some parameters are hard to adapt to local conditions (e.g. very turbid or deep waters).
  - A simplified interface or a web-based version for field use would be useful.

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