Copernicus FICE 2025

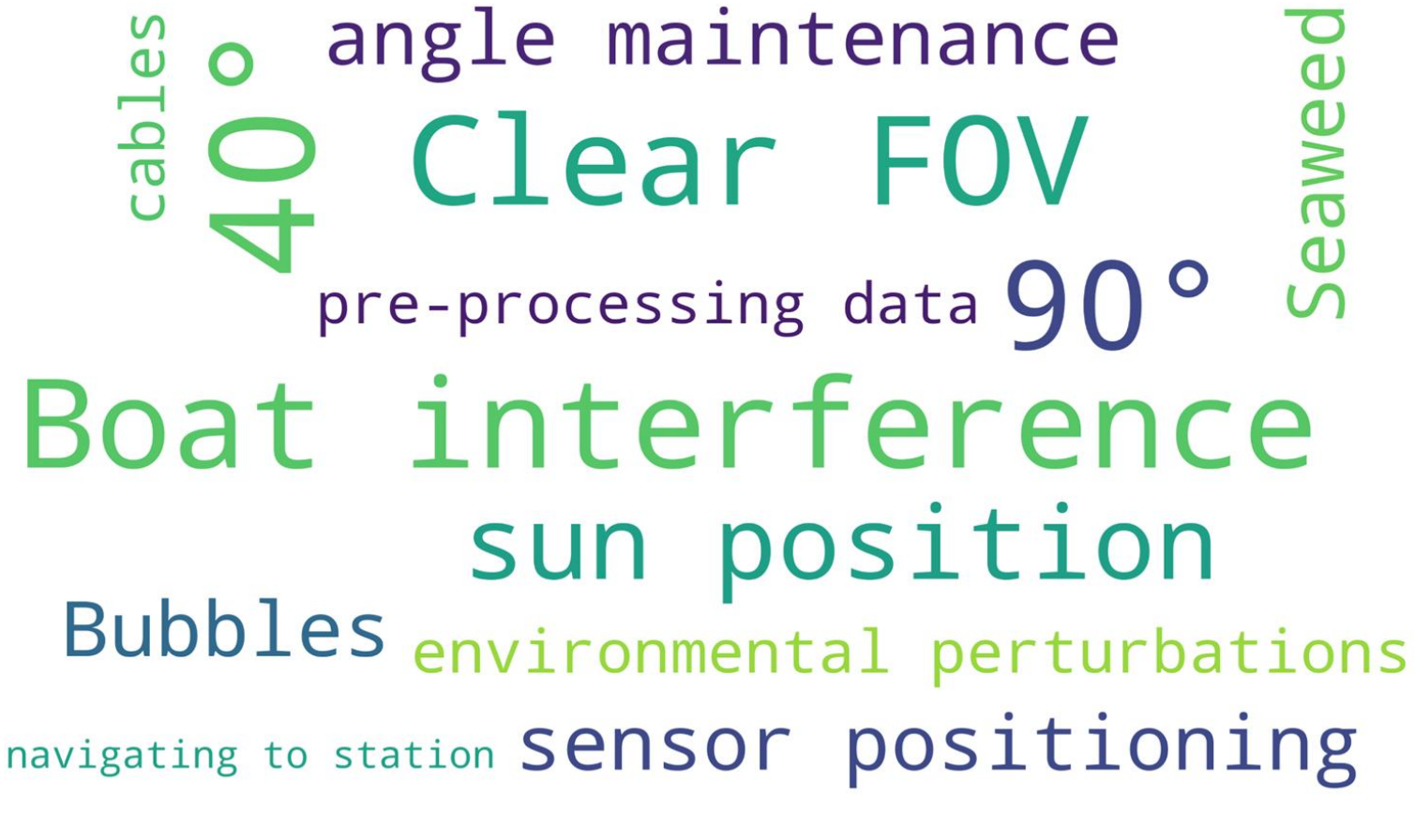
Training on
In situ Ocean Colour Above-Water Radiometry towards Satellite Validation

AAOT Group Assignment

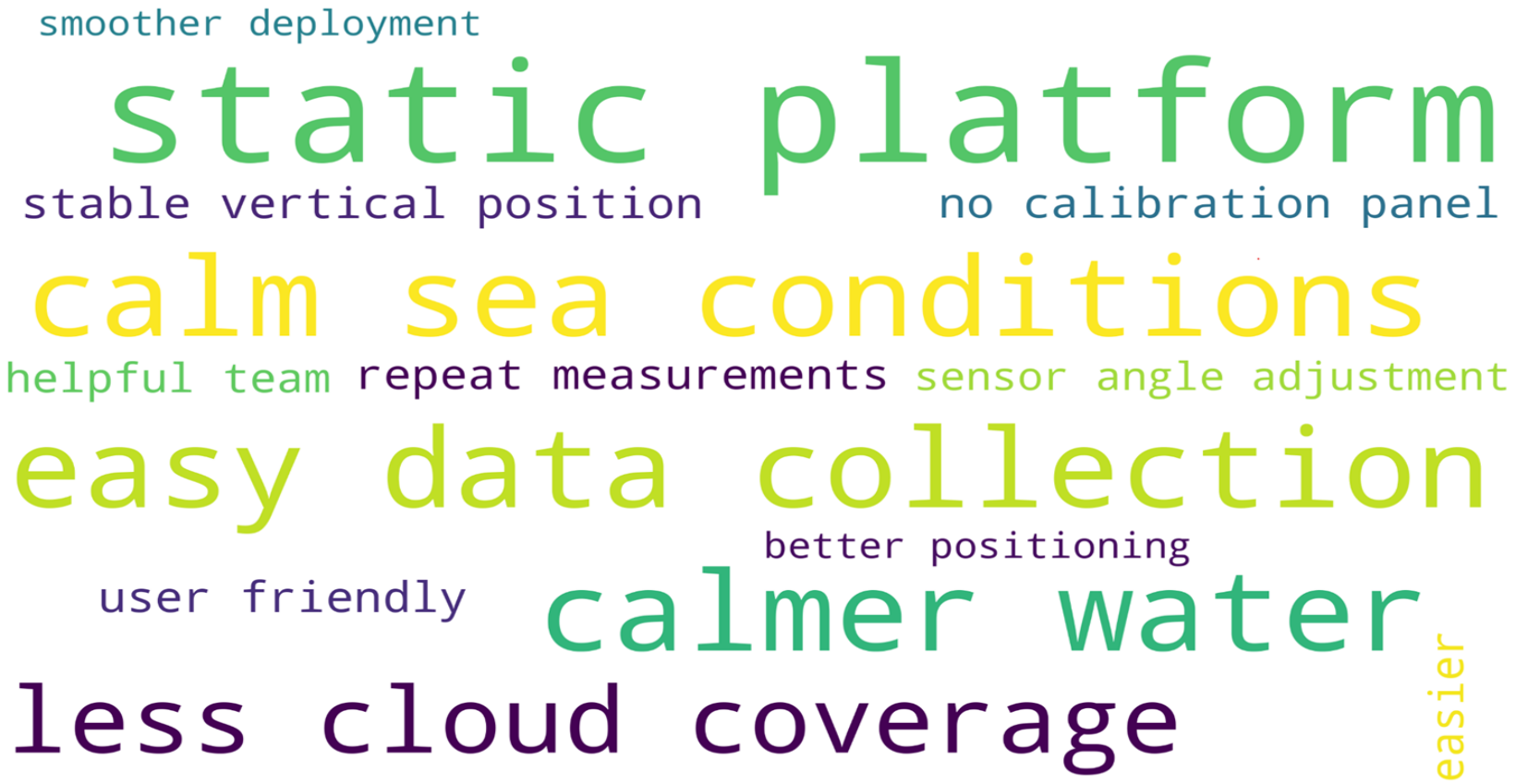
Eva Cullen, Gemma Kerrisk, Ekaterina Koltsova, Roy Armstrong, Alejandro Román

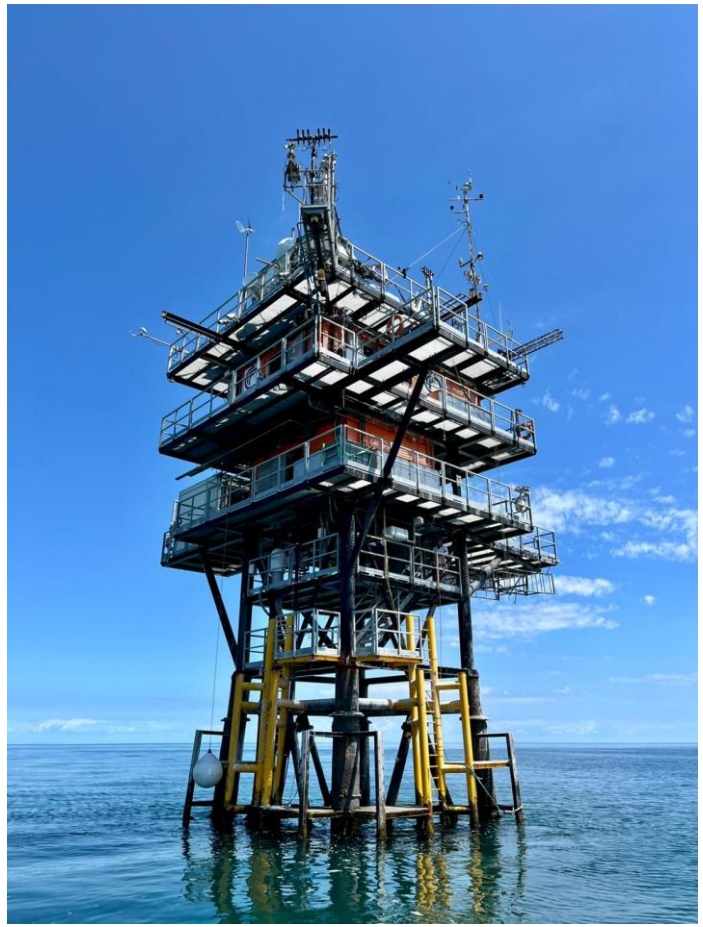
7-20 July 2025
Venice, Italy

Our experience during the field measurements in San Servolo and AAOT - CONS



Our experience during the field measurements in San Servolo and AAOT - PROS



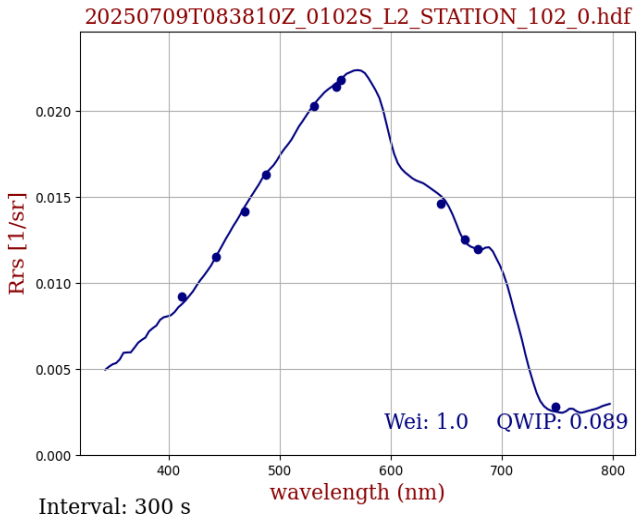


Station 01-02: San Servolo Comparisons

1. Non-FRM processed L2 outputs (M99) with no caps
2. FRM class specific characterisations (M99) with caps on
3. FRM sensor specific full char Processed with **No** Caps on dark (M99)
4. FRM sensor specific full char Processed with caps on darks (M99)
5. FRM sensor specific full char Processed with caps on darks (Sky Glint: Zhang 2017)
6. FRM class specific uncertainties Rrs

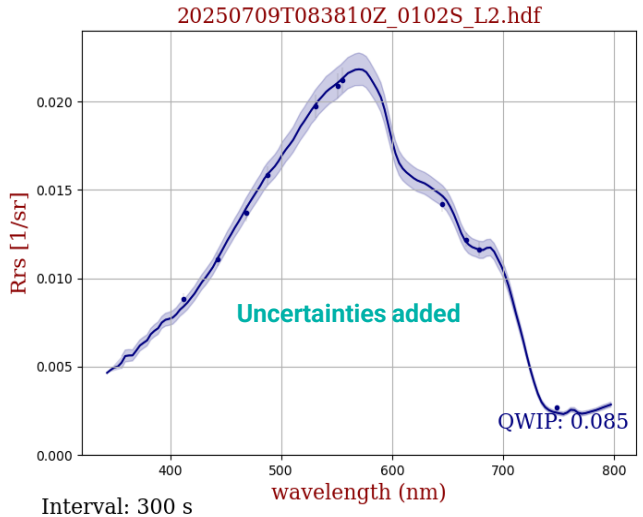
Rrs

1. Non-FRM factory cal only (M99): STN_01-02



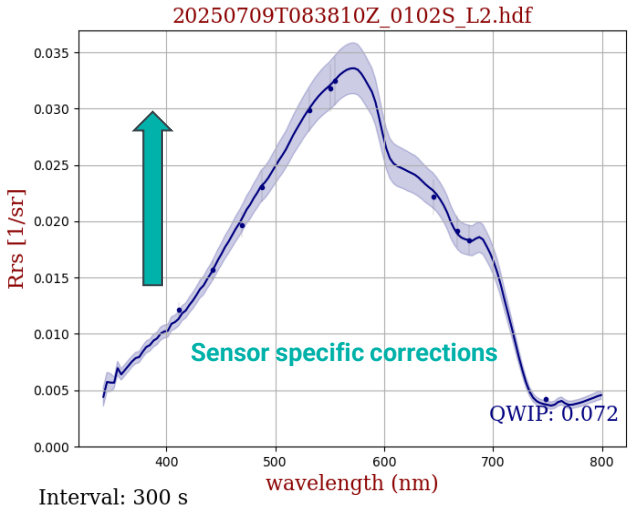
Interval: 300 s

2. FRM class specific characterisations (M99) **with** caps on darks: STN_01-02



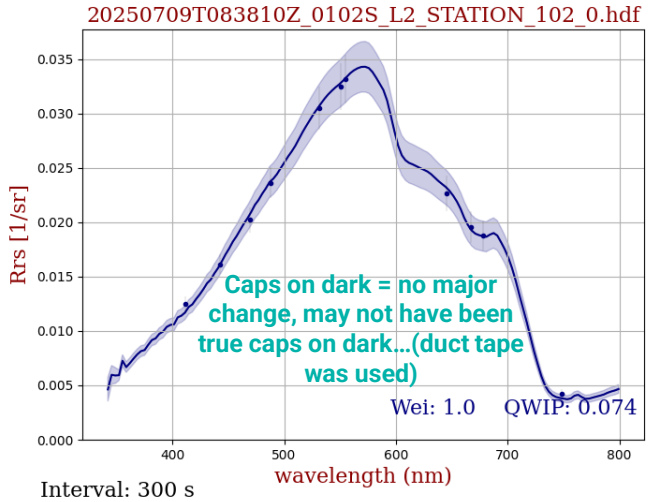
Interval: 300 s

3. FRM sensor specific full char Processed with **No** Caps on dark (M99): STN_01-02



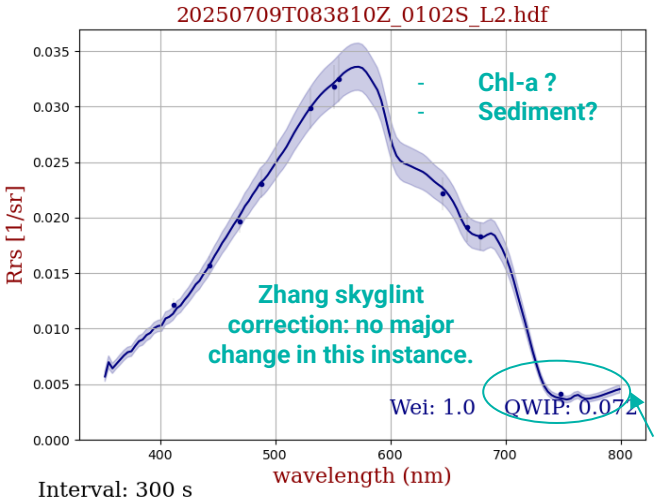
Interval: 300 s

4.FRM sensor specific full char Processed **with** caps on darks (M99): STN_01-02



Interval: 300 s

5. FRM sensor specific characterisations (Zhang 2017) **with** caps on darks: STN_01-02



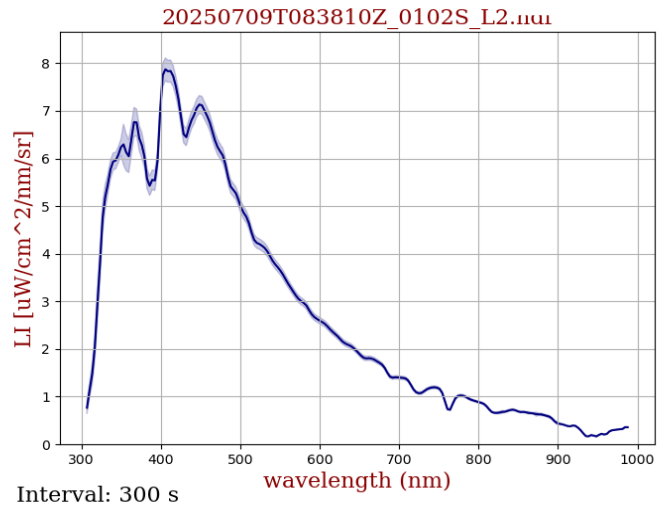
Interval: 300 s

Bubbles or other spectral contamination ?

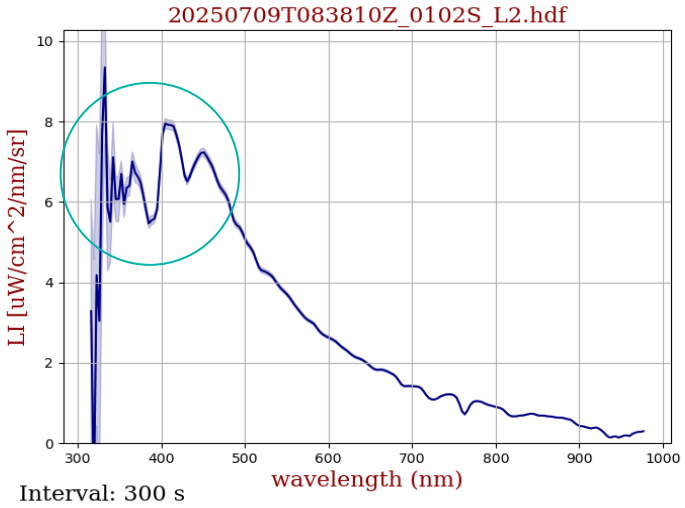
Li

1. Non-FRM factory cal only (M99): STN_01-02

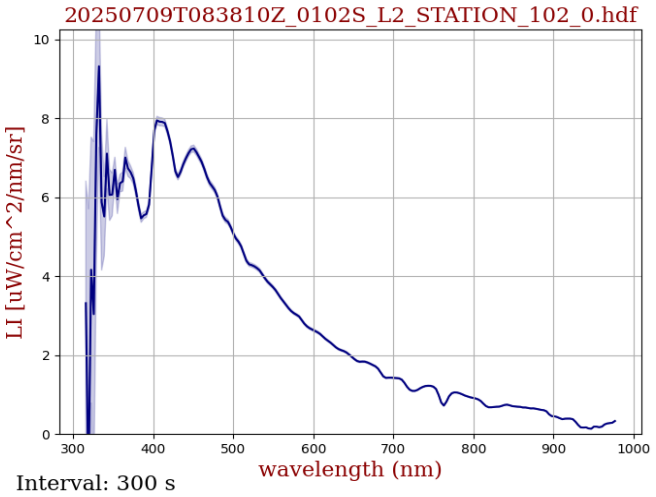
2. FRM class specific characterisations (M99) with caps on darks: STN_01-02



3. FRM sensor specific full char Processed with **No** Caps on dark (M99): STN_01-02

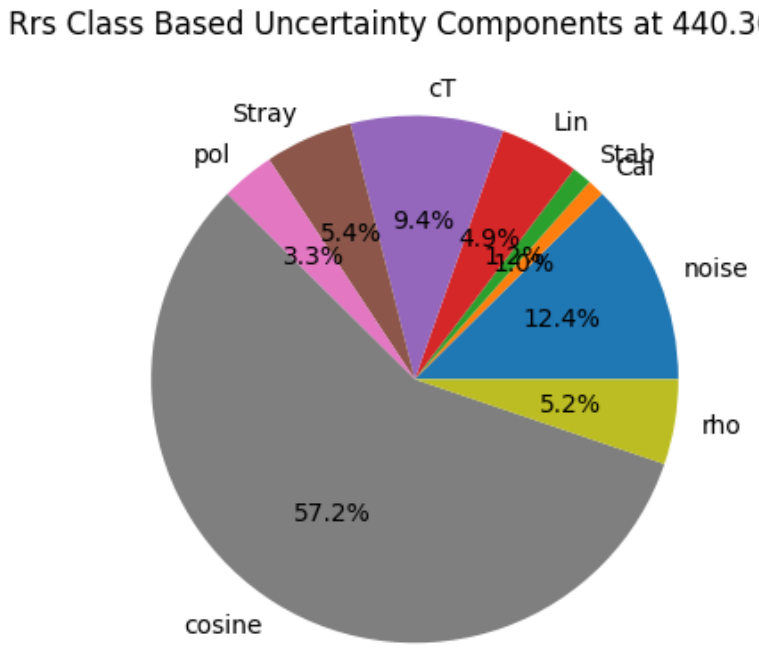


4. FRM sensor specific full char Processed with caps on darks (M99): STN_01-02

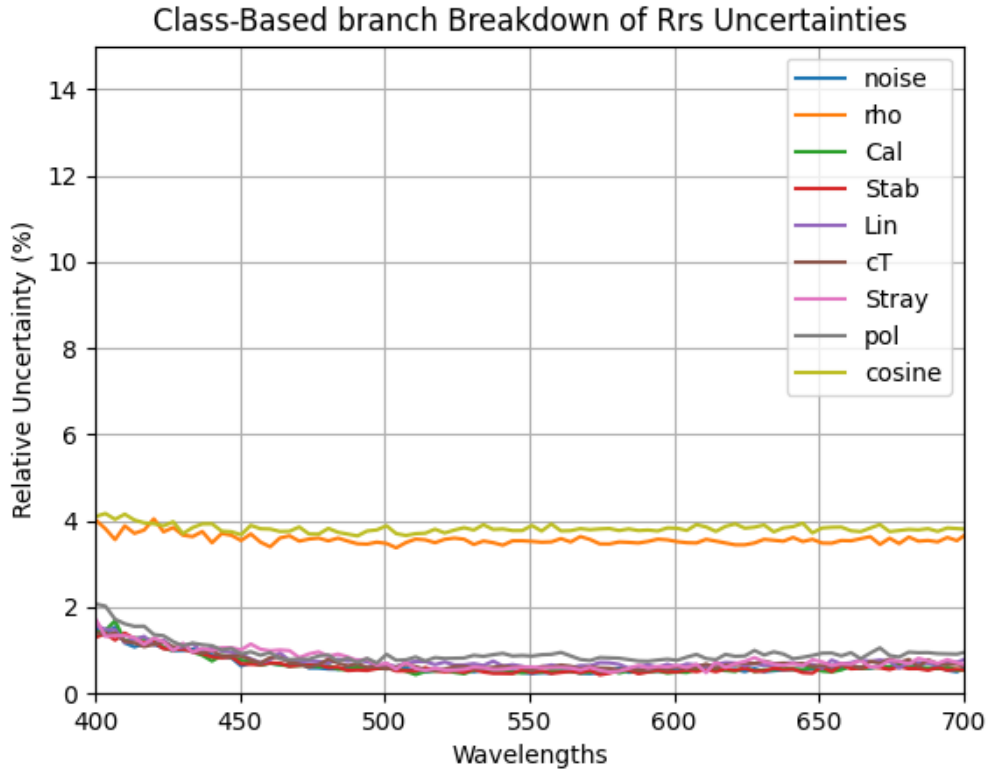


- Sensor specific characterisation and correction appears to increase noise and uncertainty in the lower wls of Li
- Approaching the lower end of the sensors limitations: increased noise in the signal.

Class based uncertainty Rrs STN_01-02



At 440.36 nm, uncertainty in Rrs: cosine is the largest contributor.



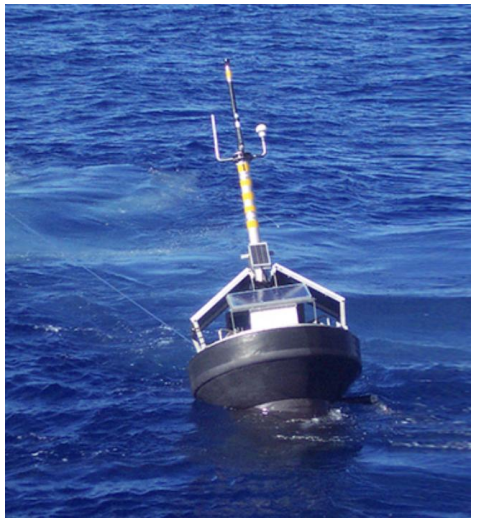
Blue wls have the higher uncertainty over all. Especially from cosine and noise. Lower end of the TriOS measurement range

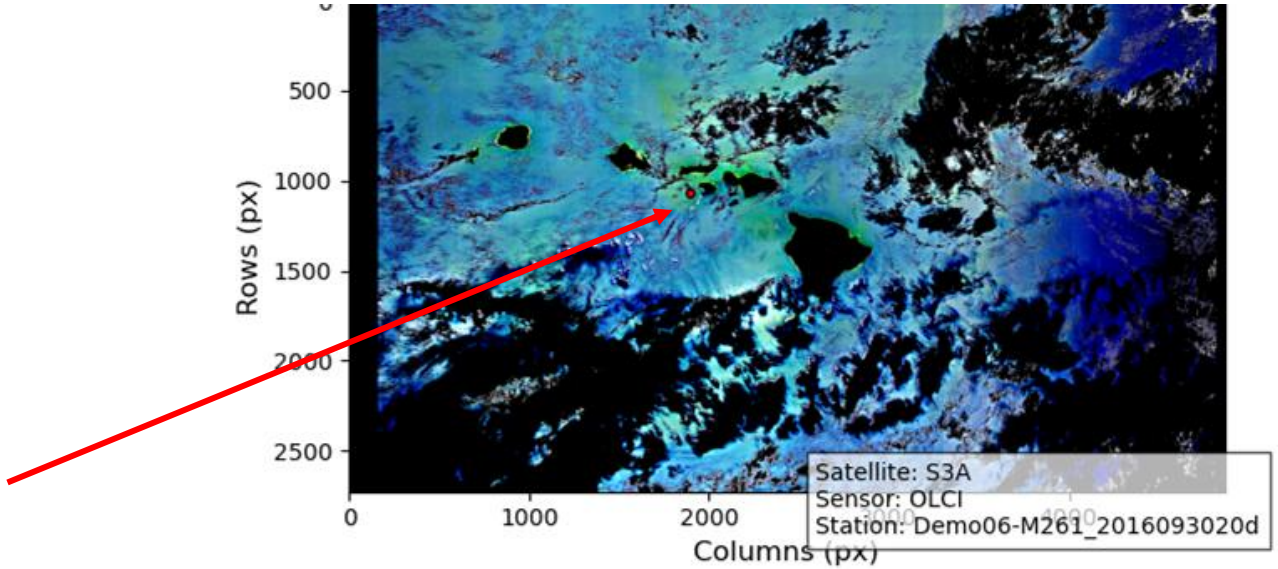
Failed with San Servolo data due to the adjacency effect.

We went to Hawaii instead!

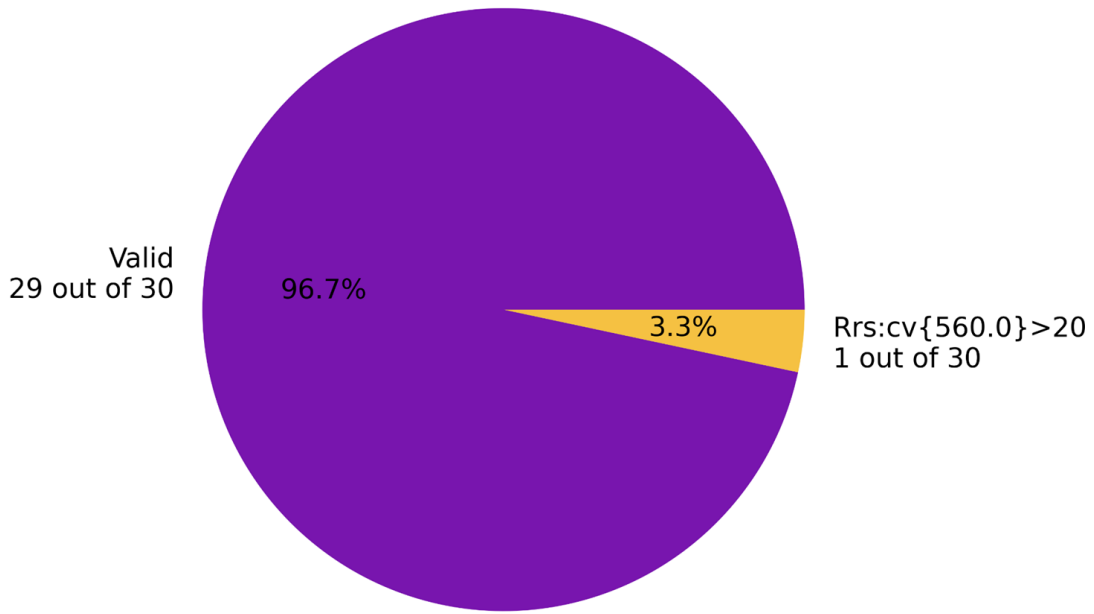
Used MOBY (example 06) data from git with Lw and Ed

In situ, S3A BRDF: M02
Time window: 1 hour
Minifiles: 7x7
EDB: 3x3, 5x5, 7x7
MDB: insitu2satellite

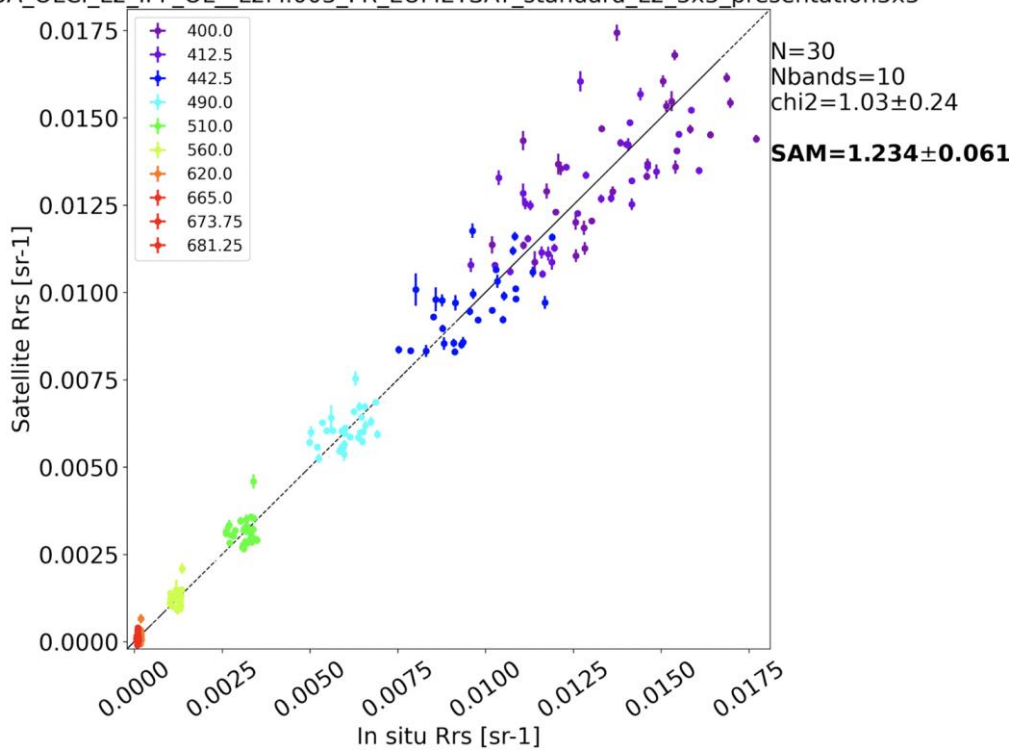




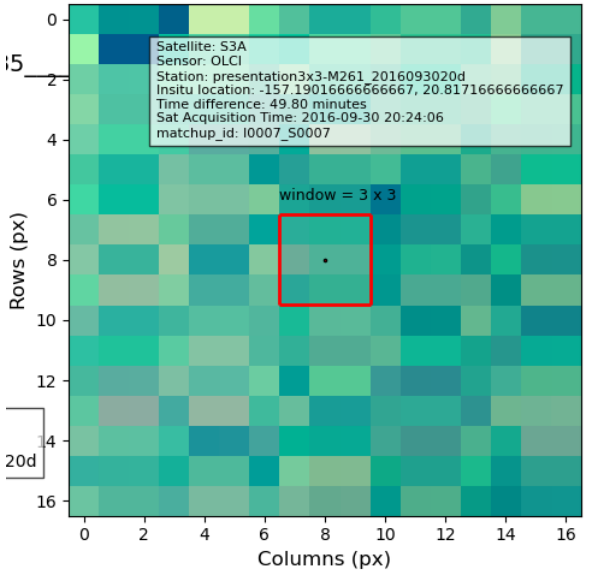
S3A_OLCI_L2_IPF_OL__L2M.003_FR_EUMETSAT_standard_L2_7x7_presentation7x7

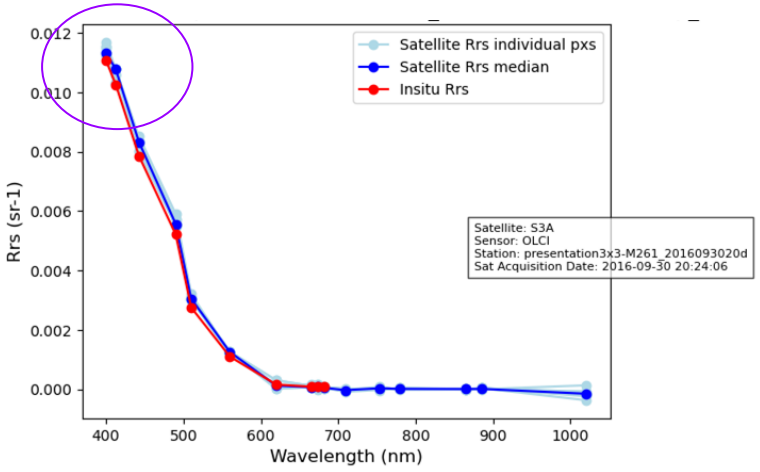


S3A_OLCI_L2_IPF_OL__L2M.003_FR_EUMETSAT_standard_L2_3x3_presentation3x3

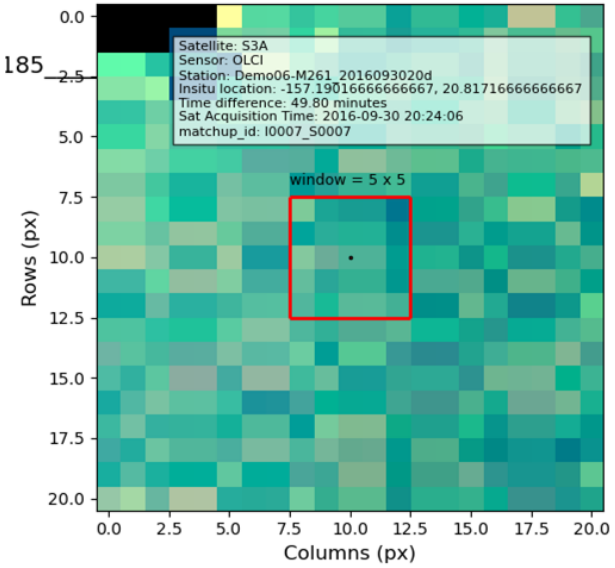


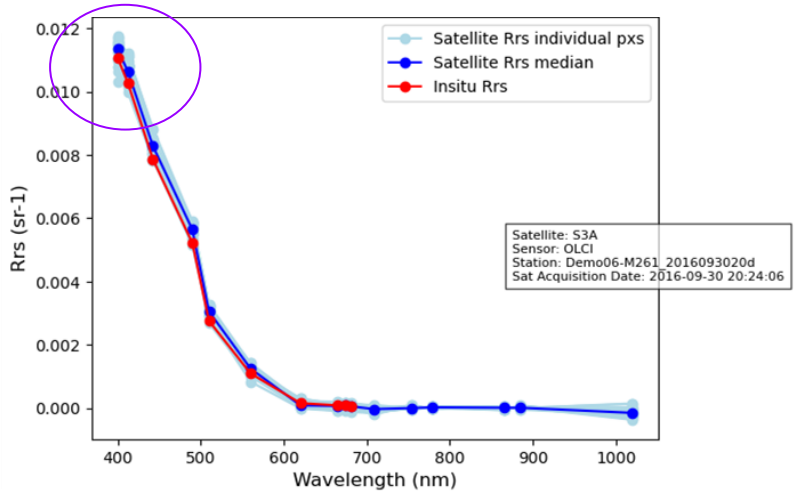
3x3


Satellite: S3A
Sensor: OLCI
Station: presentation3x3-M261_2016093020d
Insitu location: -157.19016666666667, 20.81716666666667
Time difference: 49.80 minutes
Sat Acquisition Time: 2016-09-30 20:24:06
matchup_id: I0007_S0007
window = 3 x 3
Rows (px)
Columns (px)

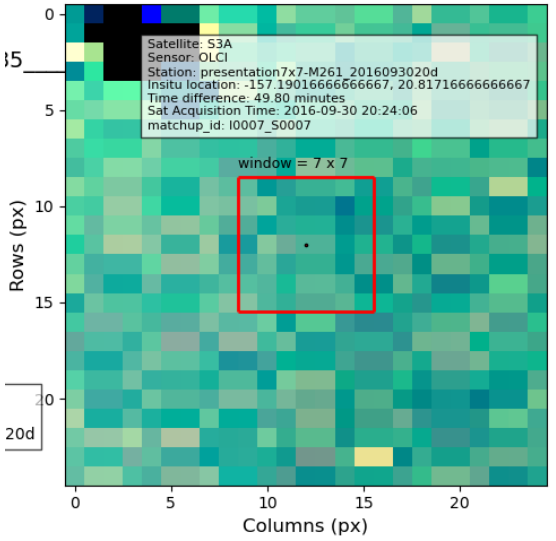

Satellite Rrs individual pxs
Satellite Rrs median
Insitu Rrs
Satellite: S3A
Sensor: OLCI
Station: presentation3x3-M261_2016093020d
Sat Acquisition Date: 2016-09-30 20:24:06
Rrs (sr-1)
Wavelength (nm)

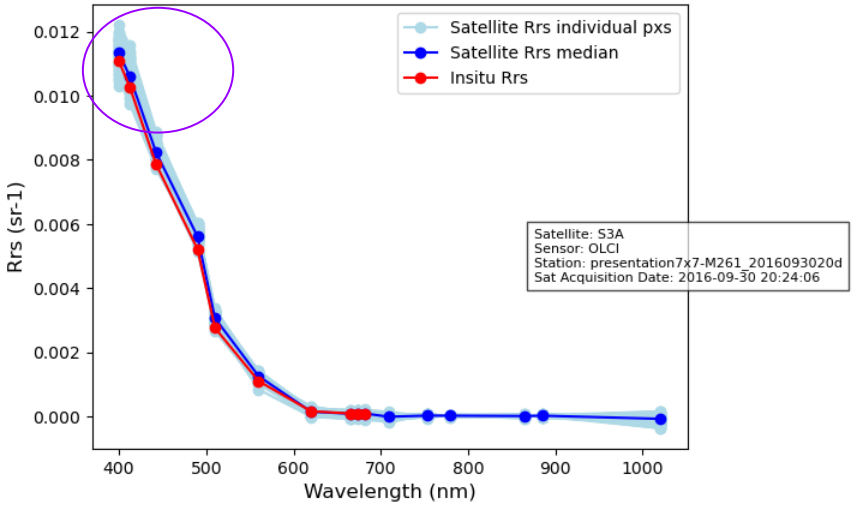
5x5


Satellite: S3A
Sensor: OLCI
Station: Demo06-M261_2016093020d
Insitu location: -157.19016666666667, 20.81716666666667
Time difference: 49.80 minutes
Sat Acquisition Time: 2016-09-30 20:24:06
matchup_id: I0007_S0007
window = 5 x 5
Rows (px)
Columns (px)


Satellite Rrs individual pxs
Satellite Rrs median
Insitu Rrs
Satellite: S3A
Sensor: OLCI
Station: Demo06-M261_2016093020d
Sat Acquisition Date: 2016-09-30 20:24:06
Rrs (sr-1)
Wavelength (nm)

7x7


Satellite: S3A
Sensor: OLCI
Station: presentation7x7-M261_2016093020d
Insitu location: -157.19016666666667, 20.81716666666667
Time difference: 49.80 minutes
Sat Acquisition Time: 2016-09-30 20:24:06
matchup_id: I0007_S0007
window = 7 x 7
Rows (px)
Columns (px)


Satellite Rrs individual pxs
Satellite Rrs median
Insitu Rrs
Satellite: S3A
Sensor: OLCI
Station: presentation7x7-M261_2016093020d
Sat Acquisition Date: 2016-09-30 20:24:06
Rrs (sr-1)
Wavelength (nm)

Achieving “FRM quality” over your future measurements

copernicus.eumetsat.int

Major challenges to acquire in situ optical measurements back at our home locations?

Lack of **stable platforms**

High cost of sensors and calibration

Weather limitations

Past/coming in-situ acquisitions conforming to the FRM principles?

Previous efforts **did not** comply with FRM principles

Well, **Gemma did**

Efforts to **improve acquisition protocols** to get better data in compliance with FRM principles

SDA and SBA methods, more practical on boats. Include **drone-based methods** to avoid non-stable platforms challenges

Cross-comparison workshops considering more instruments

Planning to use hyperCP or ThoMaS with your own data?

1. Process data collected from **other spectroradiometers**
2. Alternate **deployment configurations** for the **TriOS SDA or SBA methods**.

HyperCP

ThoMaS
A TOOLKIT FOR GENERATING OC MATCHUPS

Abort button in HyperCP
Adapted version for **any computer language**

PROGRAMME OF THE EUROPEAN UNION Copernicus IMPLEMENTED BY EUMETSAT

Thank you!