International Ocean Colour Science Meeting 2025

Advancing Global Ocean Colour Observations

Poster Lightning Session 3A

Poster # 125

From ports to pixels: Satellite Monitoring of Coastal Change in the Offshore Energy Era

P. Miguel Amado, Mário Vieira, Tiago Mota

WavEC Offshore Renewables

IOCS-2025 Darmstadt, 1-4 December

Poster # 125

Context & Motivation

The rapid expansion of **offshore renewable energy** is transforming **coastal port areas**, where growing **infrastructure** and **activity** can affect **ecosystems** and **water quality**. This study uses **satellite-based monitoring** to track these changes and support **coastal management**.

Main goals

- Develop and validate methods for monitoring coastal and estuarine environments.
- Detect and track changes linked to port expansion and growing offshore renewable energy activities.
- Support sustainable coastal management through continuous, cost-effective satellite monitoring.

	Spectral indices applied	Spectral Bands				Sensors	
		RGB	NIR	SWIR	Red Edge	SAR	Thermal
Water bodies	NDWI; MNDWI	Essential	Essential	Essential	Added Value / Optional	Not Needed	Not Needed
Seagrass and Saltmarsh	NDVI	Essential	Essential	Added Value / Optional	Added Value / Optional	Not Needed	Not Needed
Chlorophyll-a	NDCI; FAI	Essential	Essential	Essential	Essential	Not Needed	Not Needed
Suspended matter	TSM; NDSMI	Essential	Essential	Added Value / Optional	Added Value / Optional	Not Needed	Not Needed
Oil spills	-	Not Needed	Not Needed	Not Needed	Not Needed	Essential	Not Needed
Thermal anomalies	-	Not Needed	Not Needed	Not Needed	Not Needed	Not Needed	Essential

What we learned

Satellite-based monitoring provides a **scalable** and **cost-effective** way to assess environmental changes driven by expanding **offshore renewable energy activities** in **port areas**. Using established **remote-sensing** methods, key indicators of **ecosystem condition** and **water quality** can be tracked consistently to support effective **environmental management**.

Preliminary Results

Poster # 127

An Iterative Multi-Target Framework for Inland Water Quality Retrieval Using Multispectral and Hyperspectral Satellite Data

Mohsen Ansari[1], Anders Knudby[1]

[1]Department of Geography, Environment and Geomatics, University of Ottawa, 75 Laurier Avenue East, Ottawa, ON K1N 6N5, Canada

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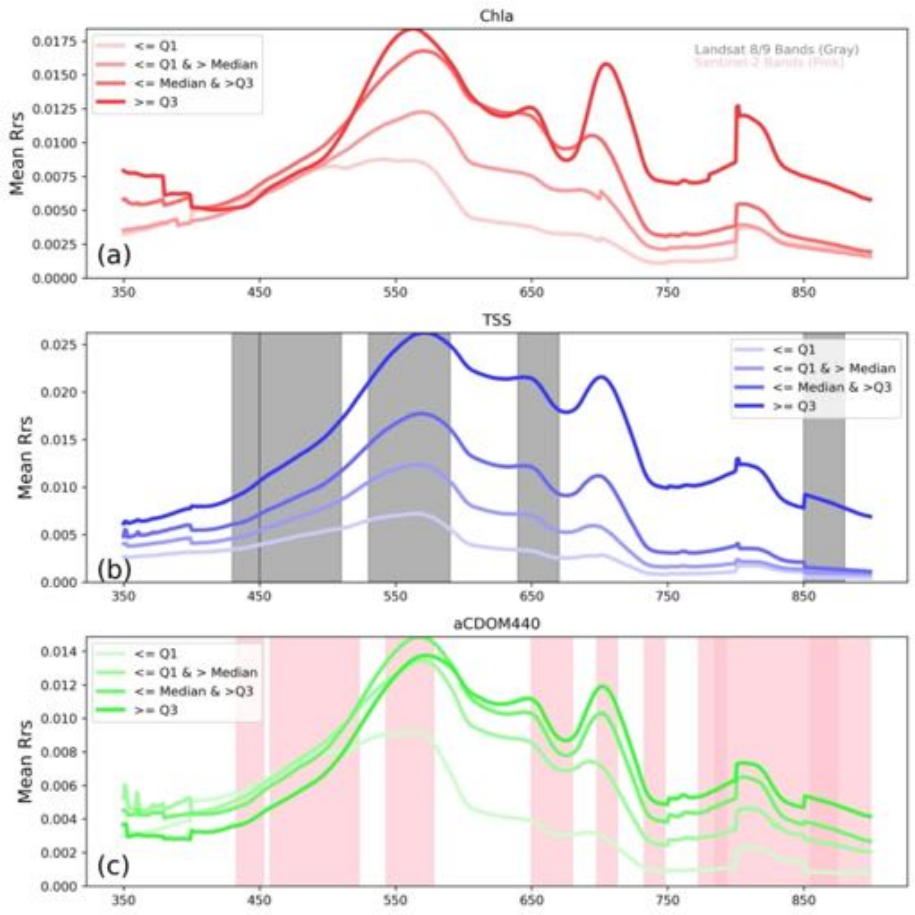
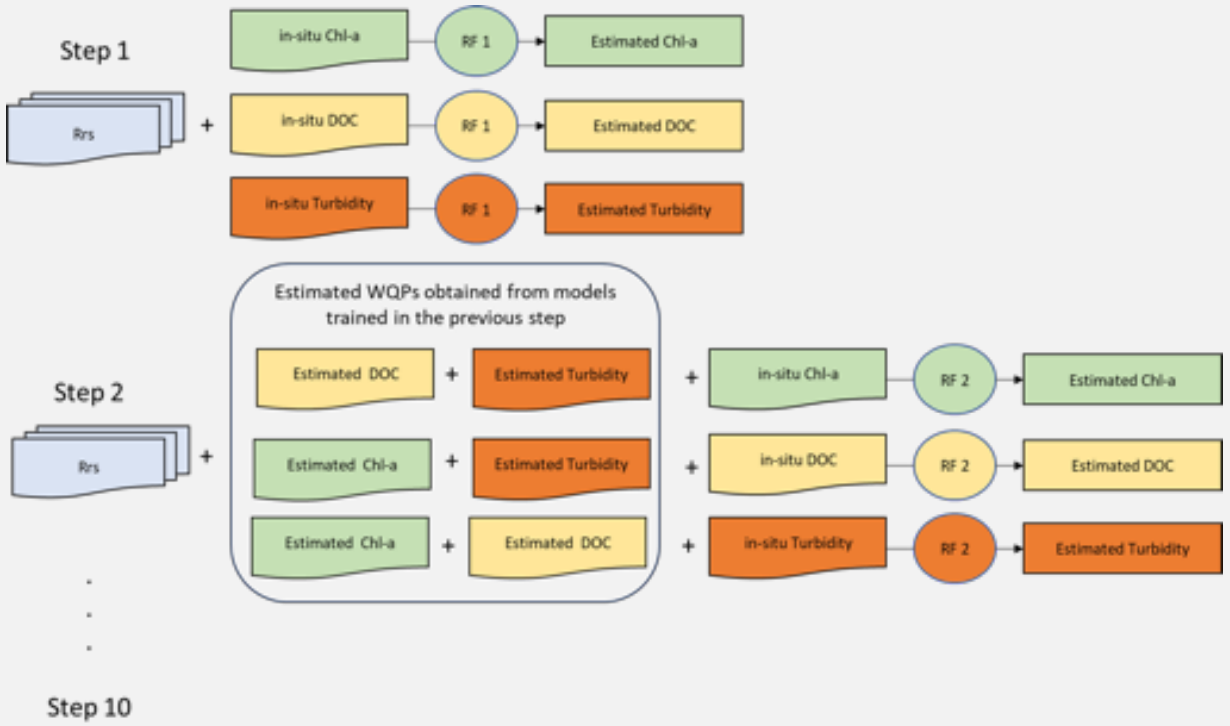
Poster # 127

Which WQP actually causes each spectral feature?





uOttawa

Poster # 129

Drivers of Coral Reef Health in the Florida Keys (2011–2025): A Spatio-Temporal Analysis of Water Quality and Thermal Stress Using Landsat 5/8/9 Imagery

Mariam Ayad[1], Camilla L. Nivison[2], Christine M. Lee[3], James Porter[2], Kelsey M. Vaughn[3], Raphael Kudela[1]

[1]University of California, Santa Cruz, [2]University of Georgia, [3]Jet Propulsion Laboratory

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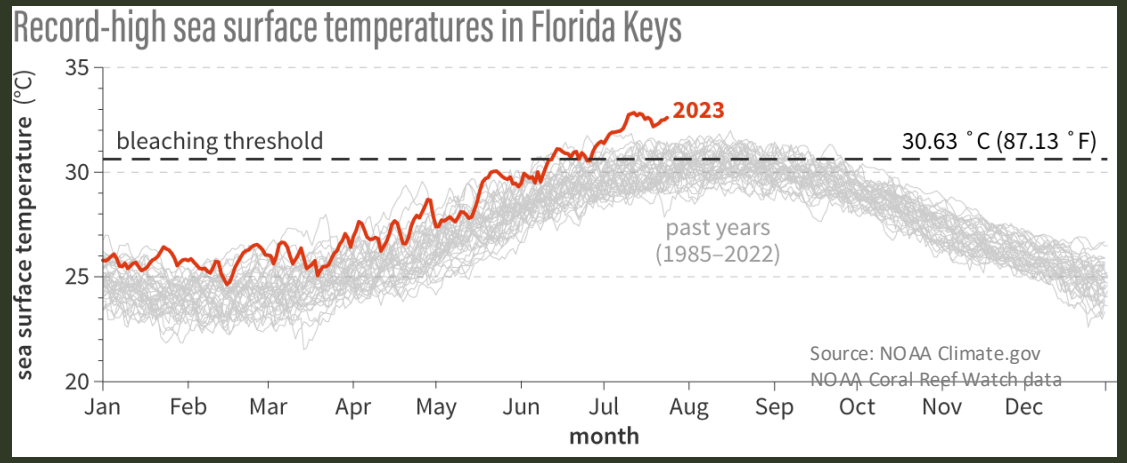
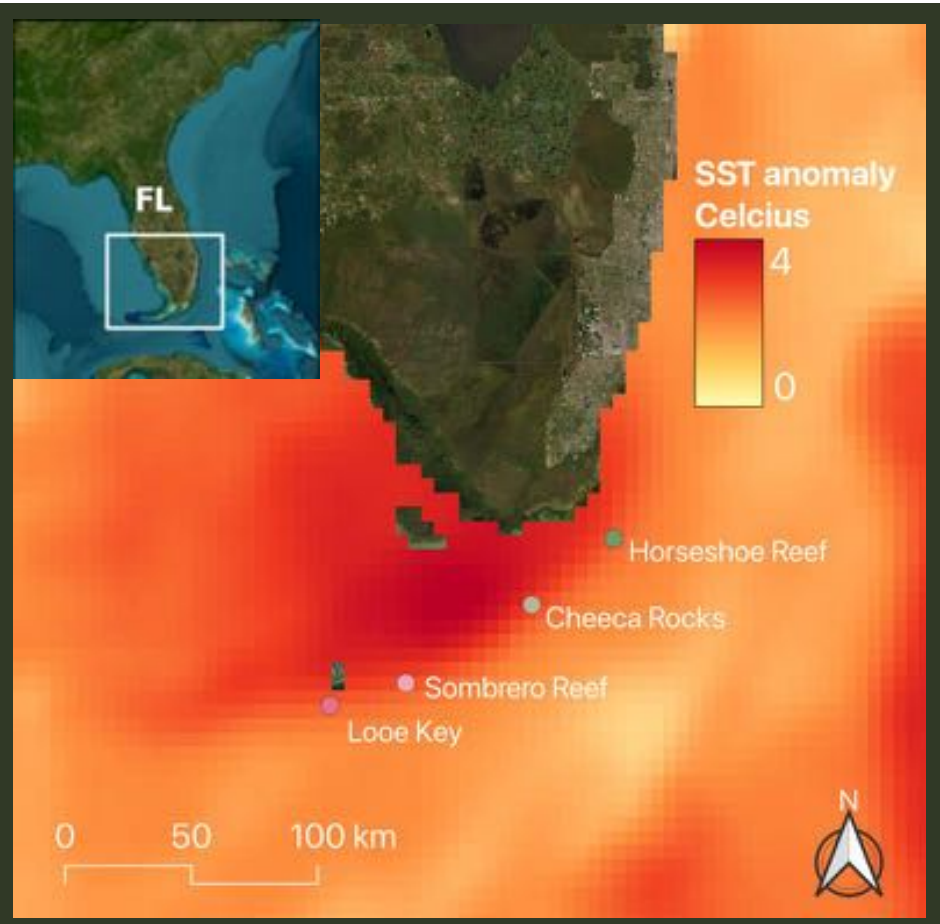
Poster # 129

Investigating how heat stress and local water quality influence coral bleaching in the Florida Keys

Source: Coral Restoration Foundation





SST anomaly maximum on July 13, 2023. Daily Global 5km Satellite Sea Surface Temperature Anomaly from NOAA

Poster 132

Optimising 6S-based atmospheric correction for PRISMA and EnMAP hyperspectral imagery over inland waters

Authors: **Gabriel Rodrigo Caballero**, Xavier Sòria-Perpinyà, Barbara Alvado, Antonio Ruiz-Verdú, Jesús Delegido and José Moreno

Image Processing Laboratory (IPL), University of Valencia, c/Catedrático José Beltrán 2, Paterna, 46980, Valencia, Spain.

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Poster 132

6ABOS: 6S-based Atmospheric Background Offset Subtraction

PRISMA and EnMAP L1 TOA Radiance

Raw hyperspectral data from PRISMA and EnMAP sensors.

Atmospheric Parameters

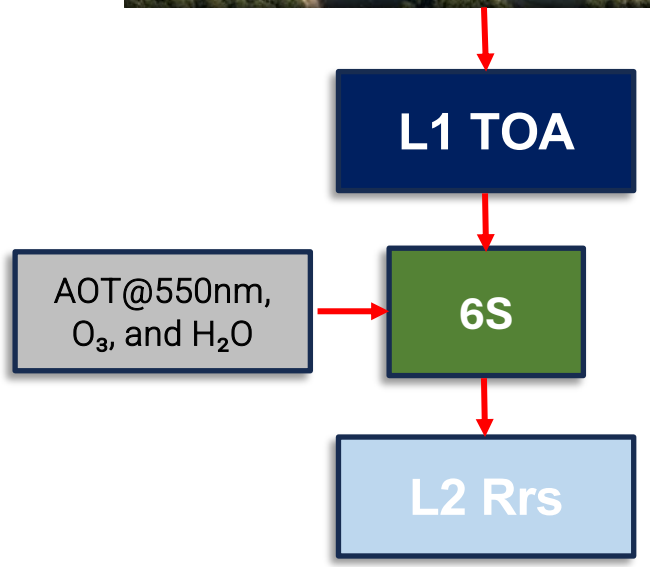
AOT@550nm, O_3, and H_2O retrieved from Google Earth Engine catalogues and also available in L1 products.

6S RTM Processing

Gases' absorbance/transmittance simulation and atmosphere radiative transfer modelling.

Surface Reflectance

Atmospherically corrected Rrs for oligotrophic and hypertrophic inland waters.



Poster 134

Satellite-Derived Monitoring of Faecal Contamination in Coastal Waters Using Sentinel-2: A Novel Approach to Support Recreational Water Safety

Masuma Chowdhury
Data Scientist and EO Expert
Quasar Science Resources, S.L.

IOCS-2025 Darmstadt, 1-4 December

Poster 134

Satellite-Derived Monitoring of Faecal Contamination in Coastal Waters Using Sentinel-2: A Novel Approach to Support Recreational Water Safety

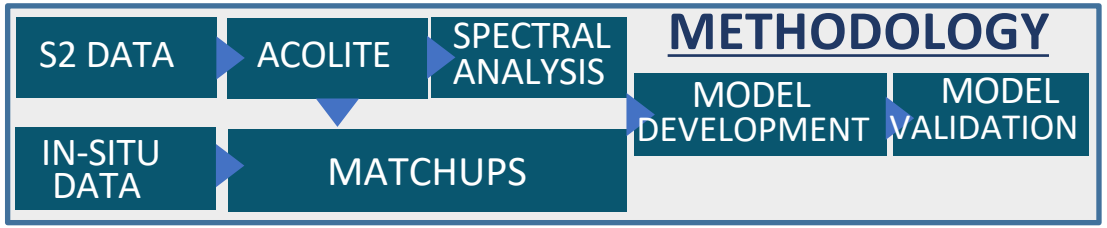
PARAMETERS OF INTEREST

E. coli & *Enterococcus*

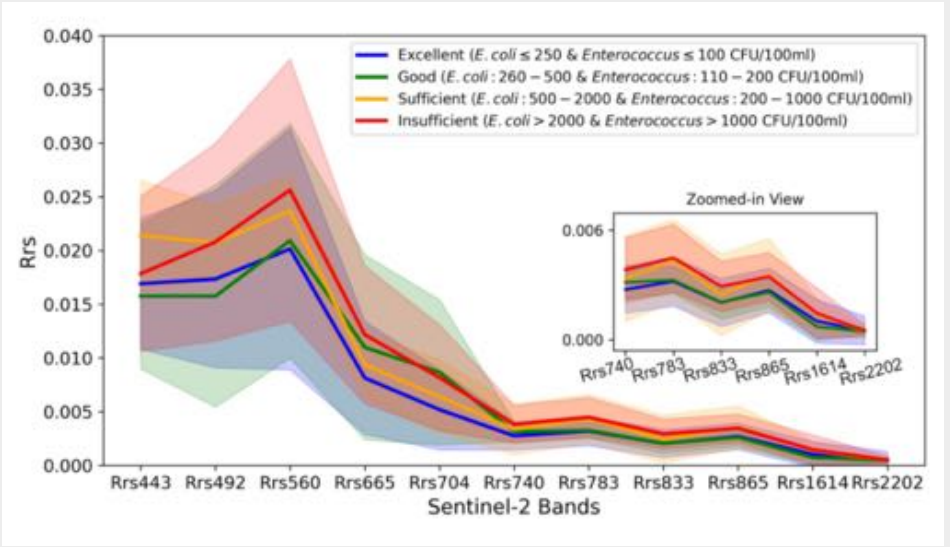
TIMEFRAME

2016 - 2025

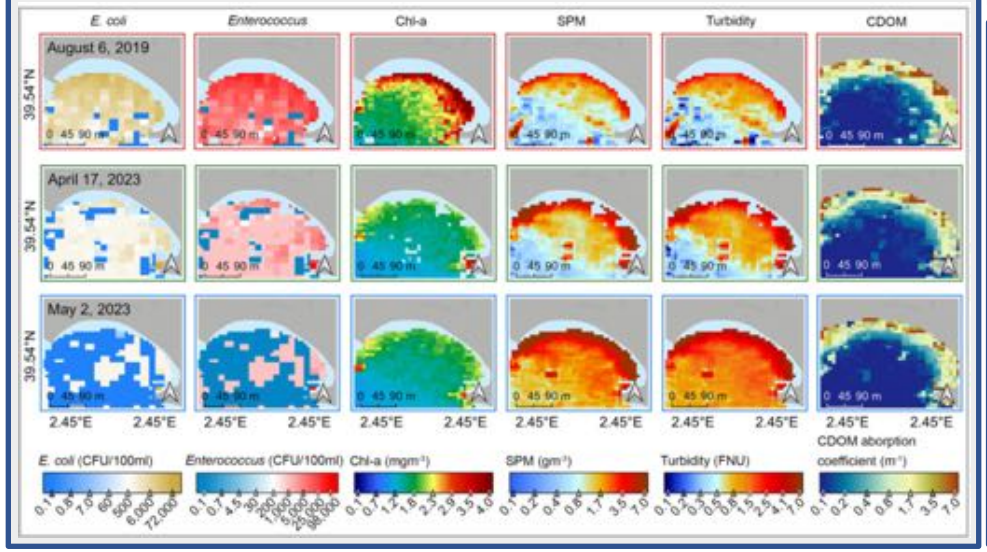
METHODOLOGY



SPECTRAL SIGNATURE



BACTERIA & OTHER WQ MAPS



CONCLUSIONS

- ✓ TWO EMPIRICAL MODELS
- ✓ **INDEPENDENT** OF OTHER **WATER QUALITY INDICATORS**
- ✓ **POLLUTION SOURCE** TRACKING

ACKNOWLEDGEMENTS

This study is was supported by the Industrial Doctorate Program of the Spanish Ministry of Science and Innovation & Quasar Science Resources, S.L. within the SIMBAD project framework. The authors are thankful to the ESA-Copernicus program for freely distributing Sentinel-2 imagery & Calvia 2000 for providing the in-situ time series data

QUASAR SCIENCE RESOURCES, S.L.

UCA

Poster # 136

Field Validation of Satellite-derived Rrs and Chlorophyll-a in a Coastal Setting: A Case Study from Nogas Island

Jeniffer De Maligaya [1], James Cesar Refran [1], Remika Gupana [2], Sheila Mae Santander-De Leon [3], Gency Guirhem-Helican [3]

[1] Space Science Missions Bureau, Philippine Space Agency, Quezon City Philippines
[2] Ocean Color and Coastal Oceanography Laboratory, Marine Science Institute, College of Science, University of the Philippines Diliman;
[3]Marine Ecology Laboratory, Institute of Marine Fisheries and Oceanology, College of Fisheries and Ocean Science, University of the Philippines Visayas
[1] jeniffer.demaligaya@philsa.gov.ph

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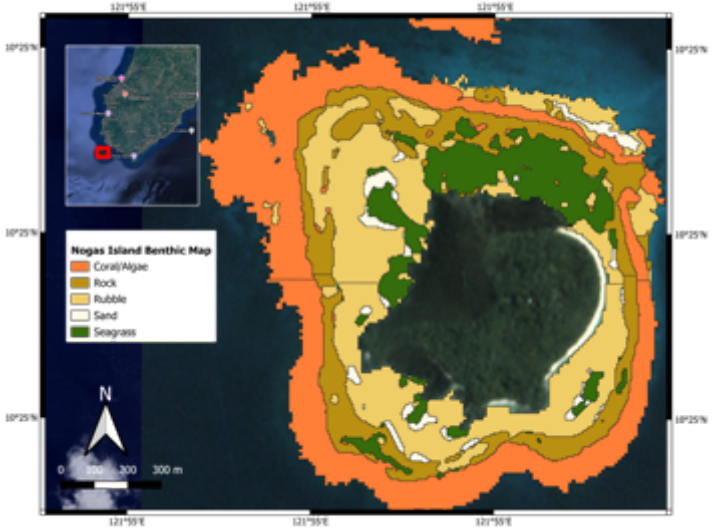
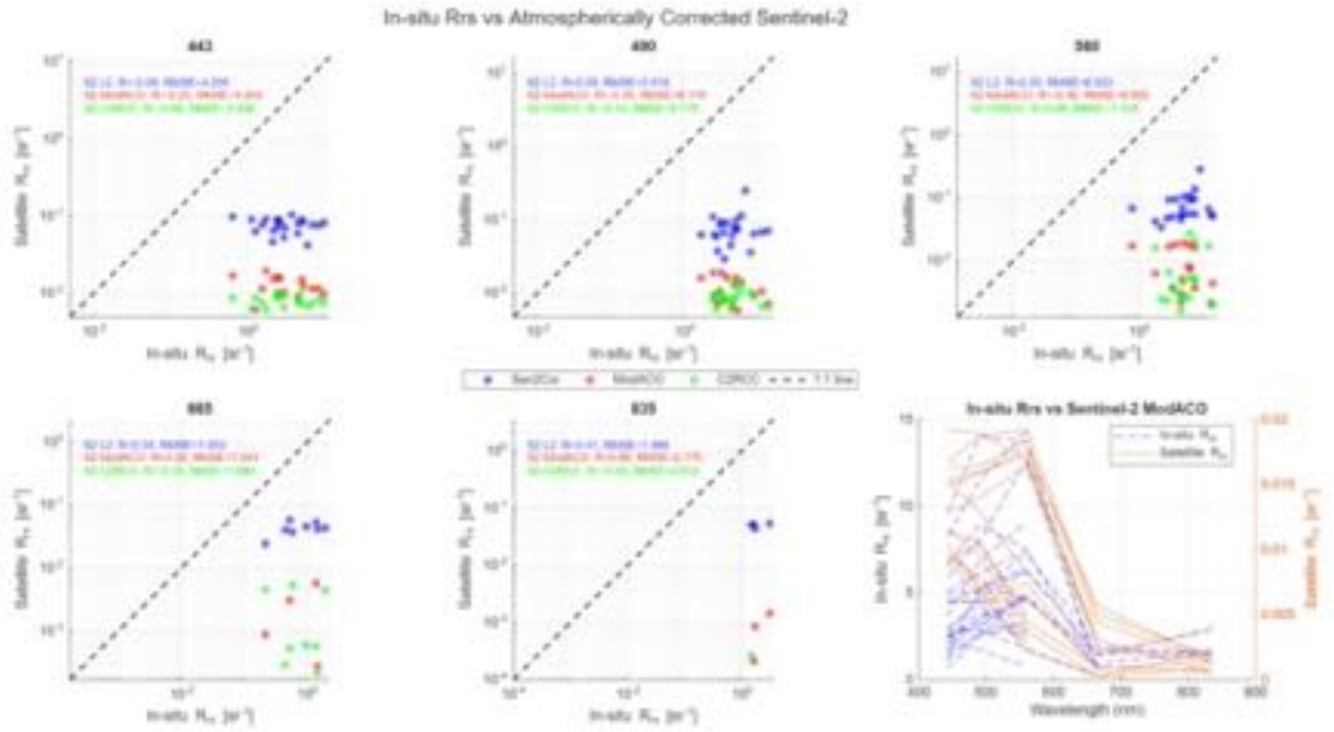
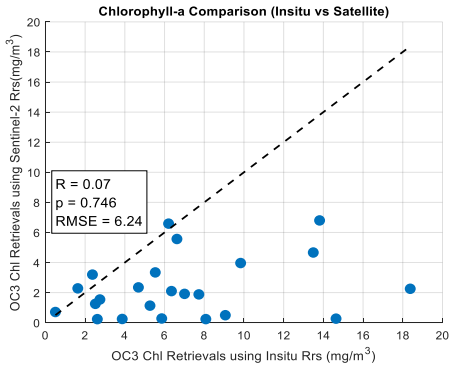
Poster # 136

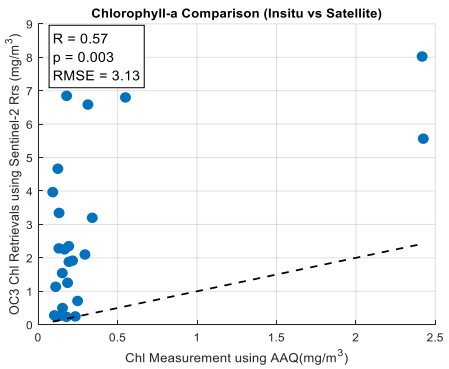
Nogas Island, Antique, Philippines



- Uninhabited island
- diverse beach forest, seagrass, coral, and mangrove ecosystems
- largely free from anthropogenic effluents

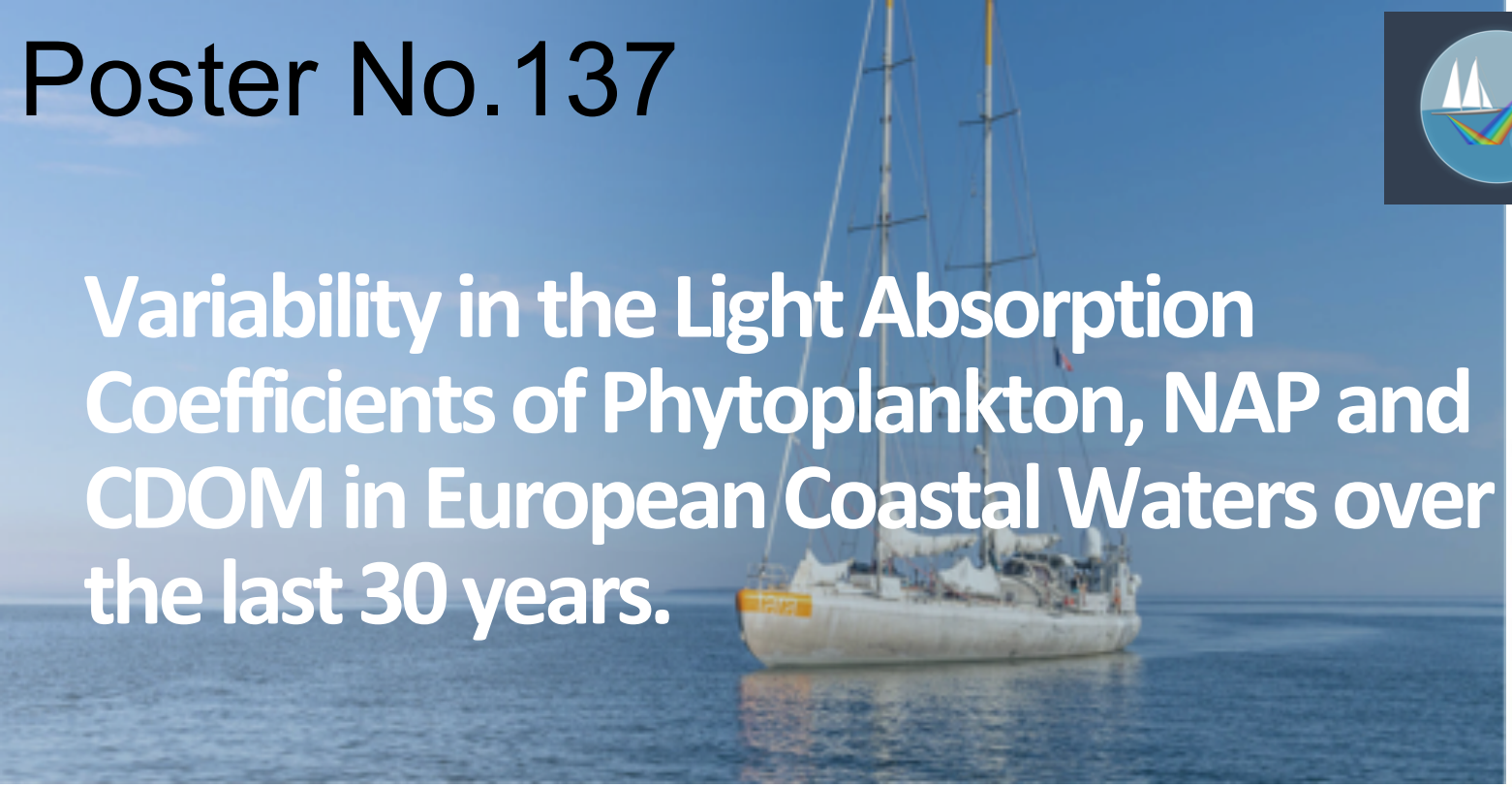






- Weak correlation across atmospheric correction algorithms
- Satellite observation is generally underestimated
- almost no agreement with OC3 applied to in-situ Rrs but better agreement with in-situ chl-a meter

Poster No.137



Variability in the Light Absorption Coefficients of Phytoplankton, NAP and CDOM in European Coastal Waters over the last 30 years.

HyperBOOST
Hyperspectral Bio-Optical Observations Sailing on *Tara*

esa

Paola POTIN, David DOXARAN, Chiara SANTINELLI, Vittorio BRANDO, Victor MARTINEZ VICENTE, Emmanuel BOSS, Isabella MAYOT

LOV LABORATOIRE D'OCÉANOGRAPHIE DE VILLEFRANCHE

SORBONNE UNIVERSITÉ
CRÉATEURS DE FUTURS DEPUIS 1257

cnrs

EMBL

TREC
Traversing European Coastlines

ibf
CNR - Istituto di Biofisica

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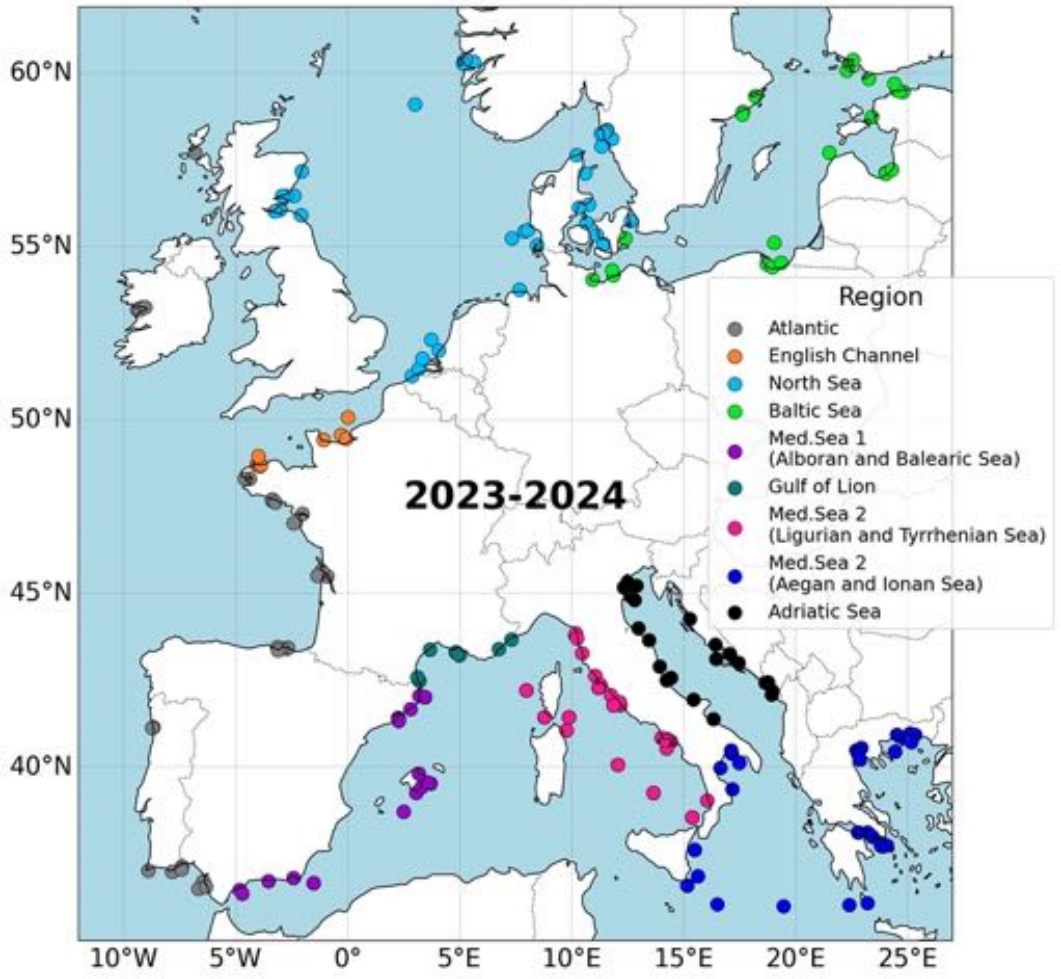
Poster No.137 (TREC / Tara-Europa / HyperBoost)



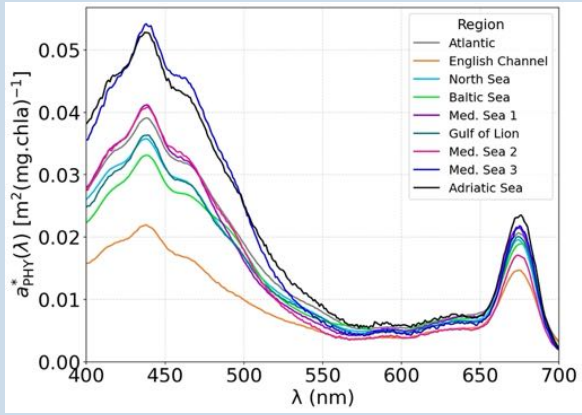
Data

a_P, a_{NAP}, a_{PHY}, a_{CDOM}
HPLC (> Tchla, PFTs)
SPM (PIF, POF)
POC, PIC

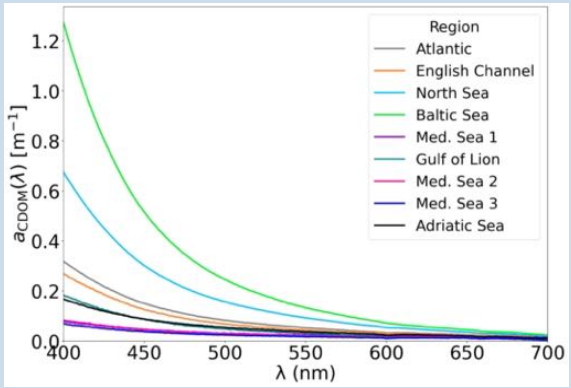
Hyperspectral

202 stations
+ 14 offshore stations

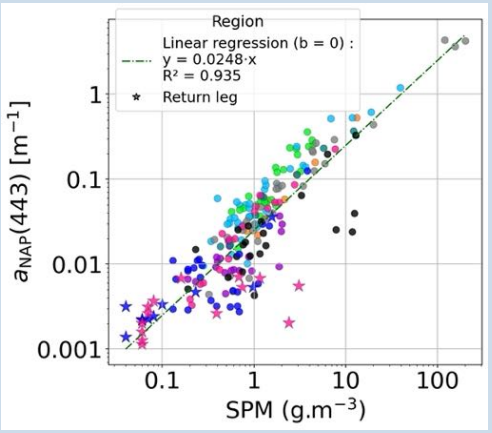
a_{PHY}^*

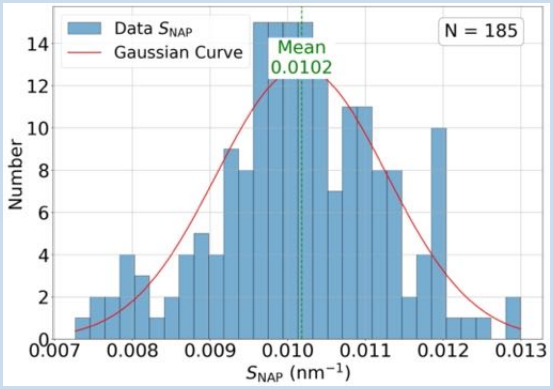


a_{CDOM}

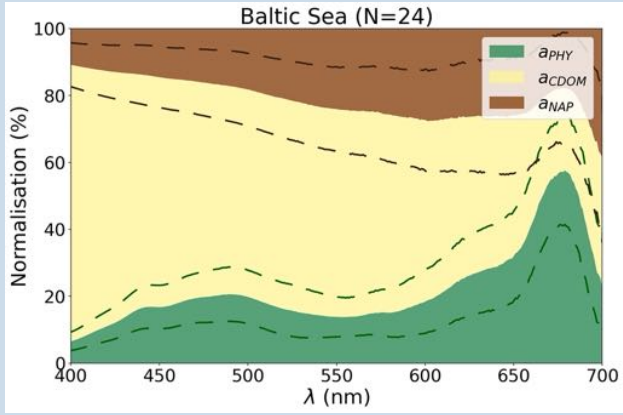


a_{NAP}





Hyperspectral absorption budget



Comparison to historical datasets

Bricaud et al. (1995)
Babin et al.(2003)
Zibordi and Berthon (2024)
Pitarch and Brando (2025)

PML | Plymouth Marine Laboratory

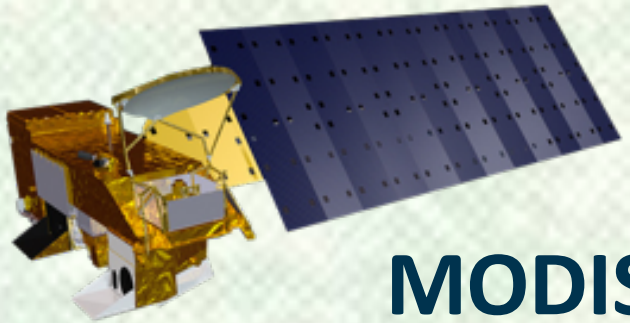
Satellite-derived Chlorophyll in the California Coast

Yanna A Fidai, Bror F Jonsson, Shubha Sathyendranath, Gemma Kulk, Andrei Chuprin

IOCS, 1-4 December 2025, Darmstadt, Germany

Poster # 138

PML | Plymouth Marine Laboratory



MODIS

VIIRS

ocean colour cci

OC-CCI

VS

in situ samples

Poster # 138

Poster # 141

Deep learning-based segmentation of Sargassum rafts for improved coastal monitoring

Meda G.[1], Meunier L.[1], Augot J.[1], Gastal V.[1], Lucas M.[1]

1. CLS Group

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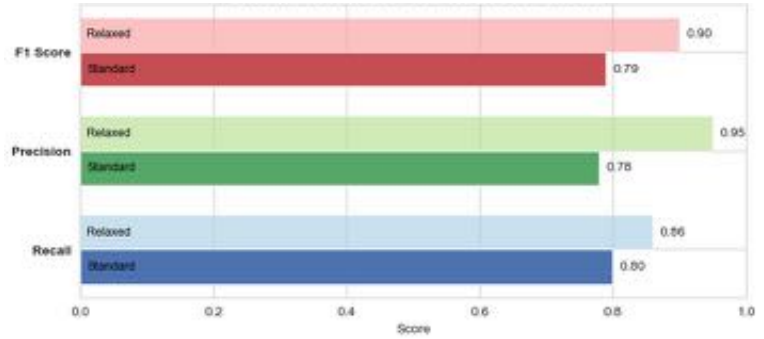
Poster # 141

U-Net segmentation

Preserves spatial details
Leverages limited training data

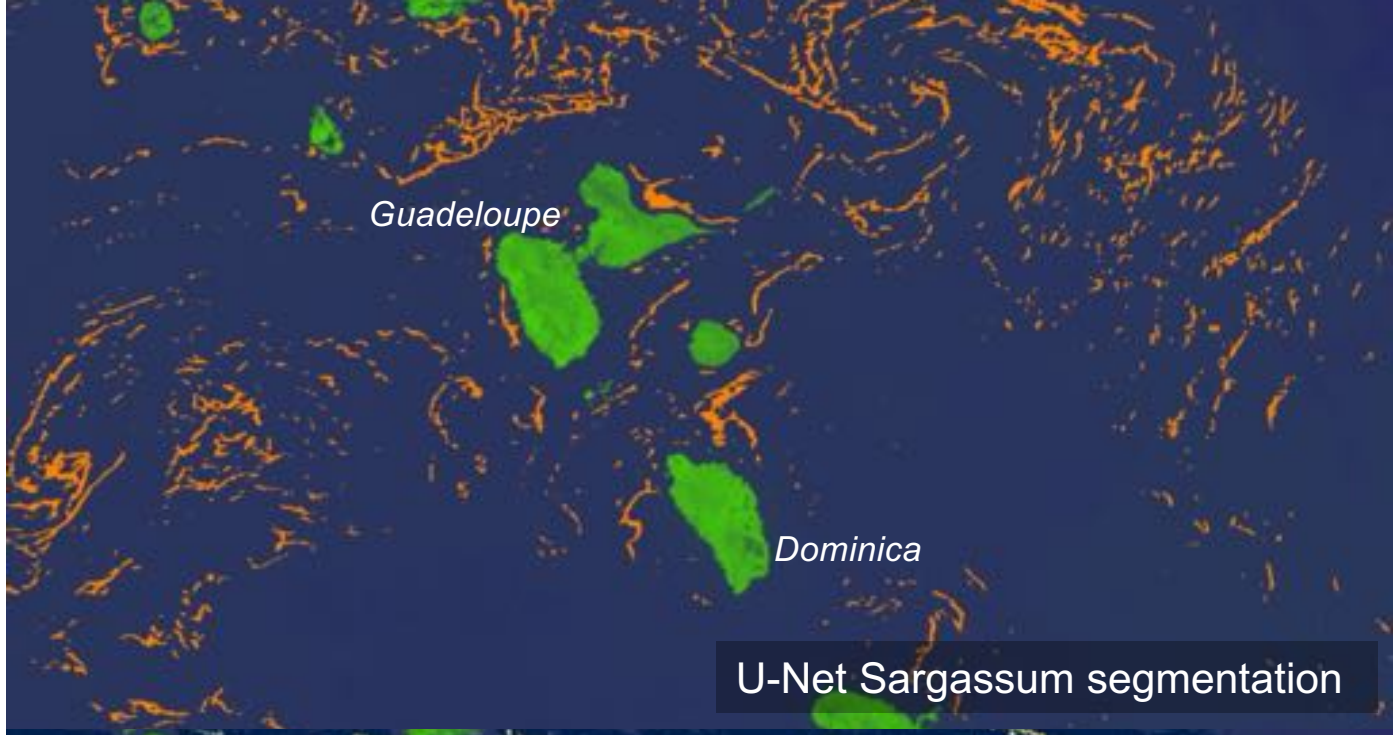


F1 Score ≈ 0.90

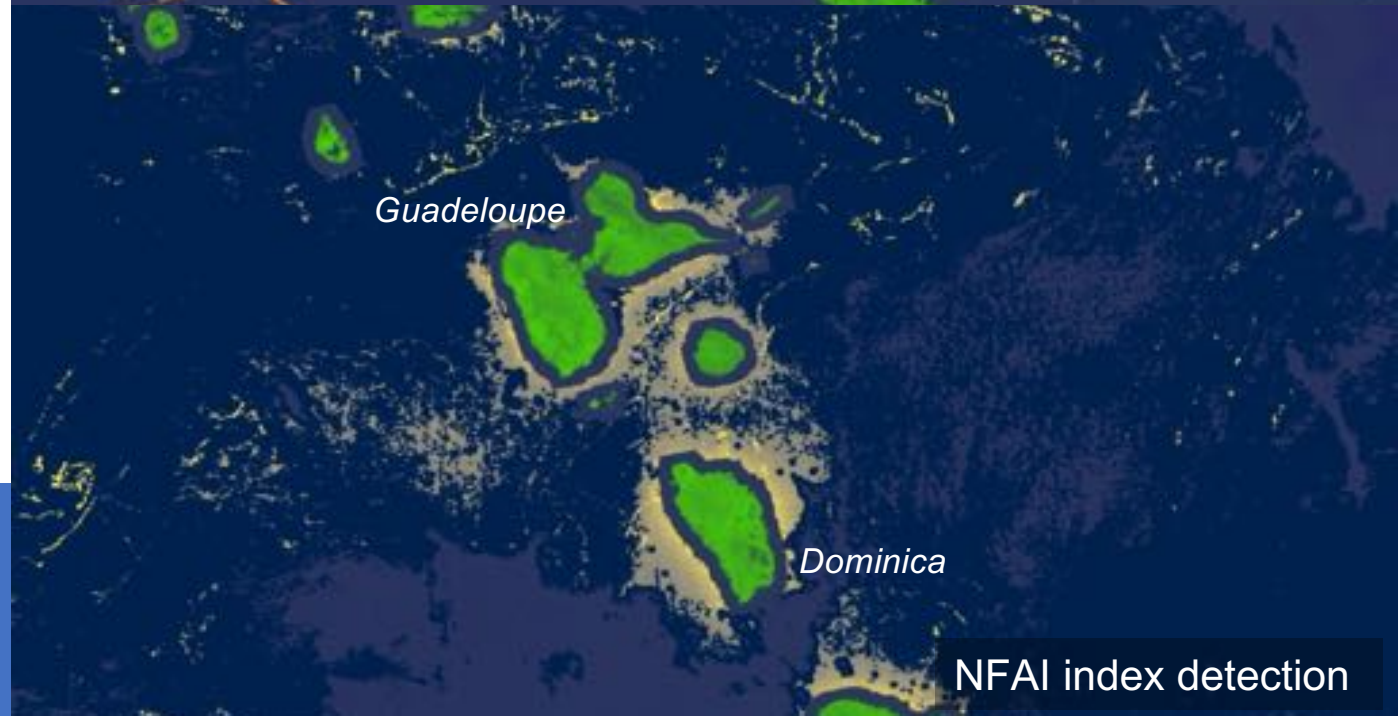
Outcomes

Less sensible to adjacency effects
Finer segmentation & more small rafts
High precision within 3-pixel window

Next Test spatial generalization & real-time performance



U-Net Sargassum segmentation



NFAI index detection

Poster # 142

Assessing biophysical dynamics in Italian lakes using time-series satellite products

Claudia Giardino, Monica Pinardi, Anna Joelle Greife, Marina Amadori, Mariano Bresciani

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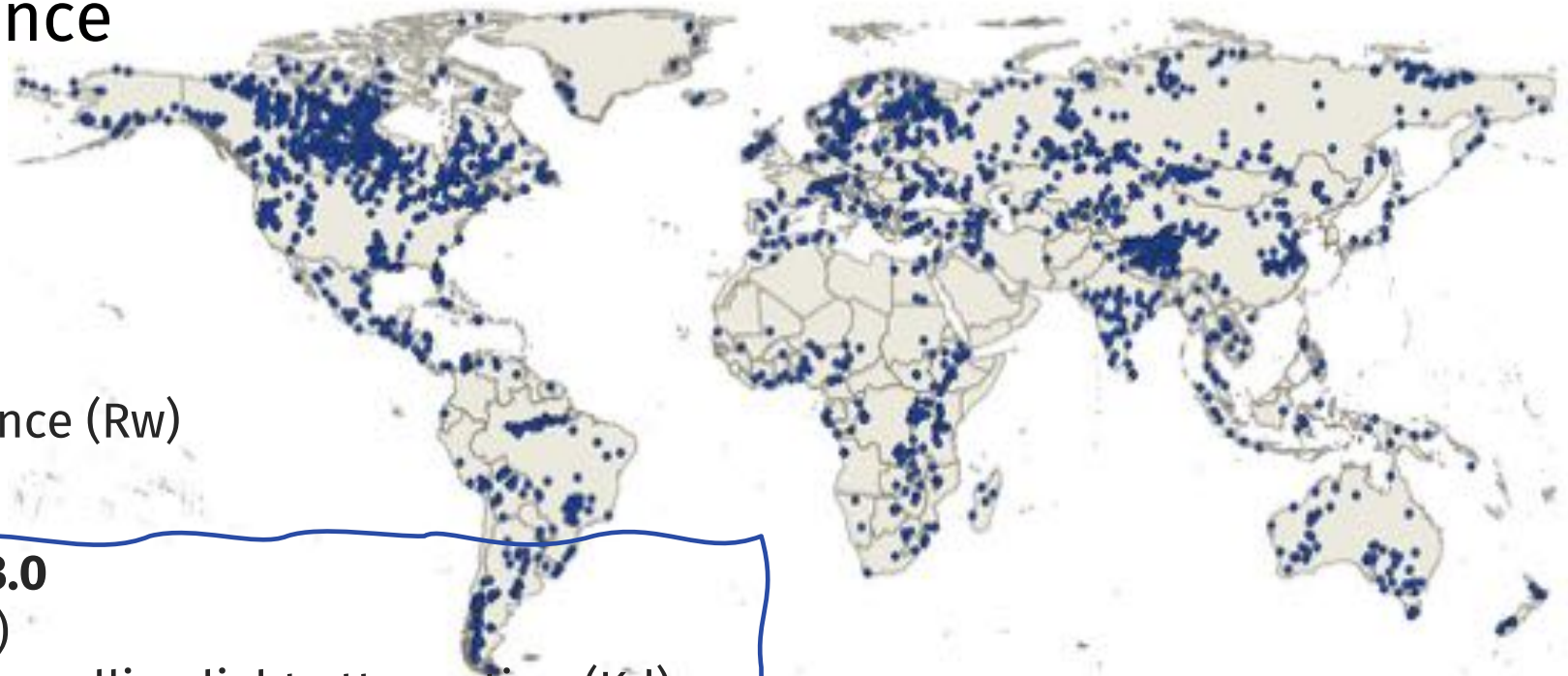
Poster # 142

Lake Water-Leaving Reflectance

Sensors
2002-2012 Envisat MERIS
2012-2016 MODIS-Aqua (selected lakes)
2016-2023 (+2yrs) Sentinel-3 OLCI A/B

Core products
Fully normalised water-leaving reflectance (Rw)
Chlorophyll *a* (Chl-a)
Turbidity/TSM



Added to v3.0
aCDOM(440)
Diffuse downwelling light attenuation (Kd)
Phycocyanin (PC)

Carrea et al. 2023 (*Scientific Data*)

See the poster and discover how global Lake_cci data support research and applications in Italian lakes

Poster # 143

Assessing Drought Impacts on Phytoplankton Dynamics in Lake Kariba Using Remote Sensing and 3D Hydrodynamic Modeling

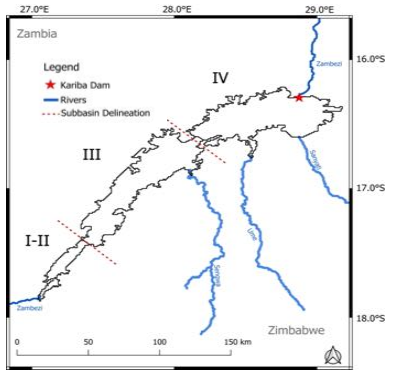
A. Joelle Greife; M. Amadori ; M. Pinardi ; M. Ndebele-Murisa ; F.P. Fava ; E. Calamita

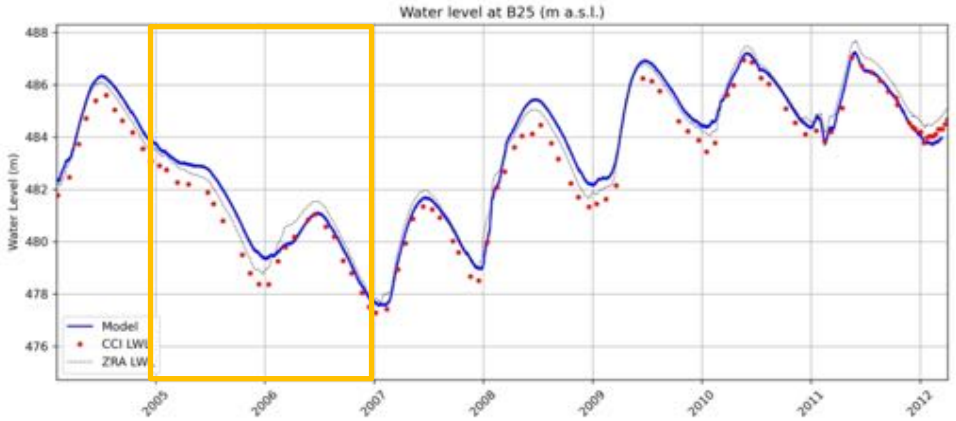
IOCS-2025 Darmstadt, 1-4 December

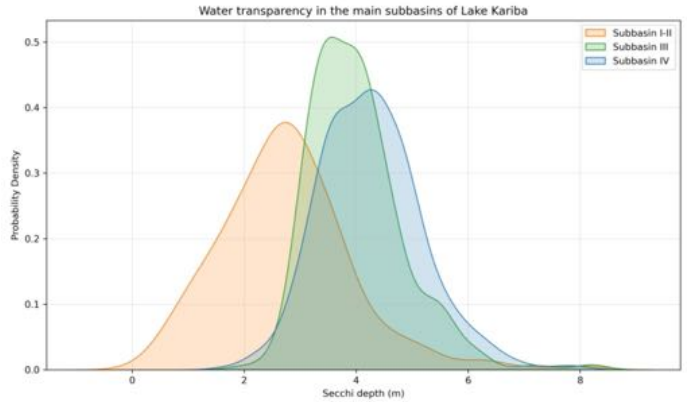
Poster # 143

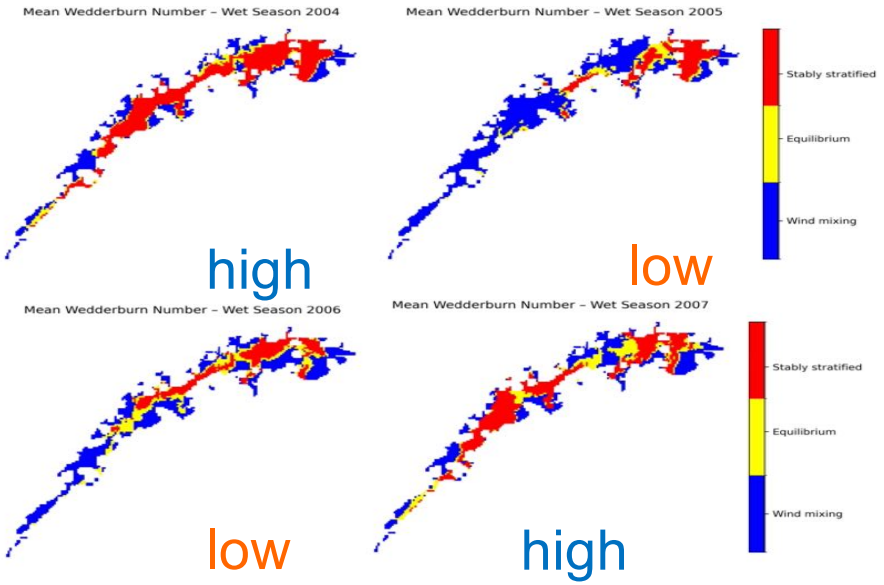
First study on **Lake Kariba** describing the entire lake hydrological and ecological behaviour

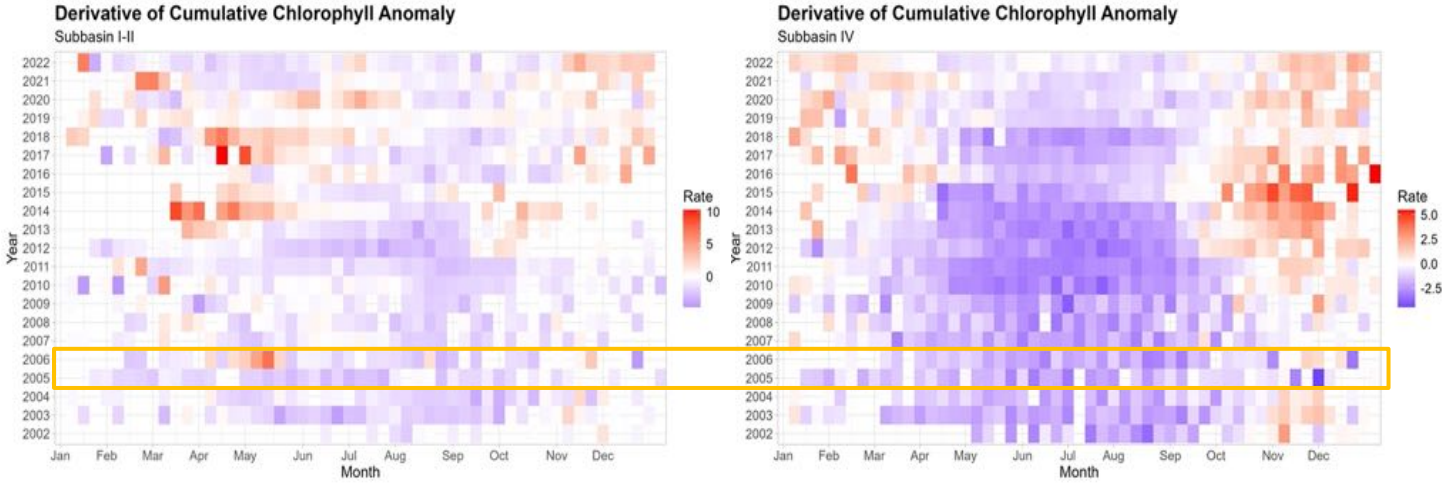
lakes cci Spatial data for: Water Temperature, Level, Reflectance and derived Chl-a, Turbidity, Transparency











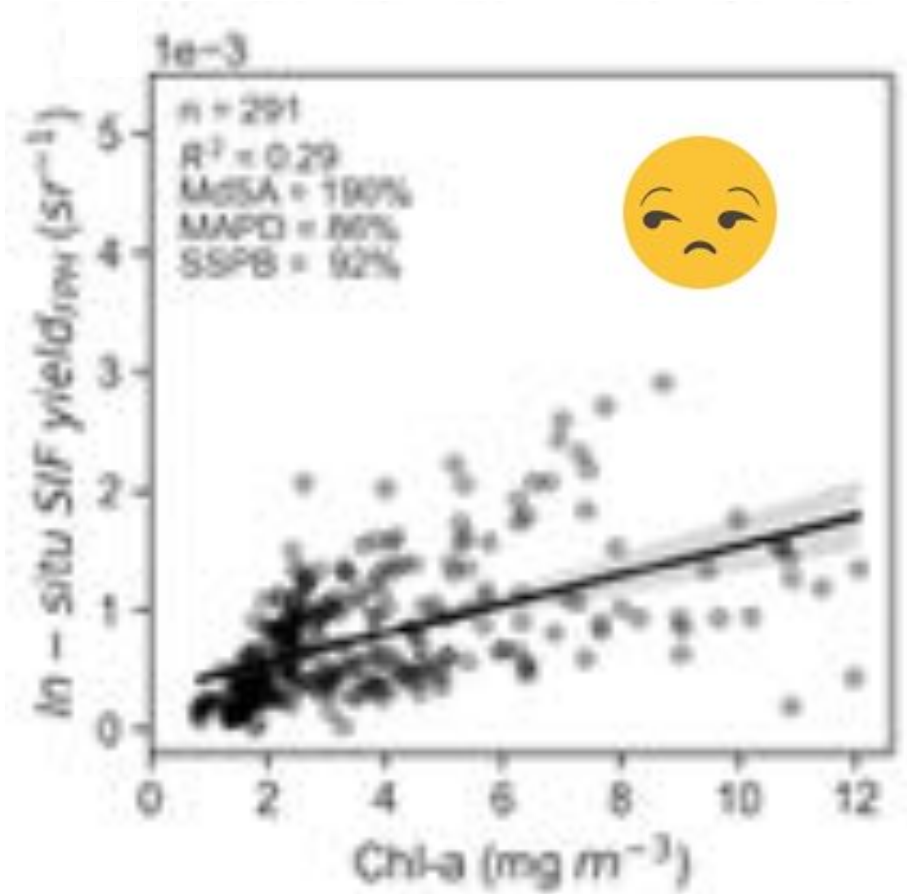
Poster # 145

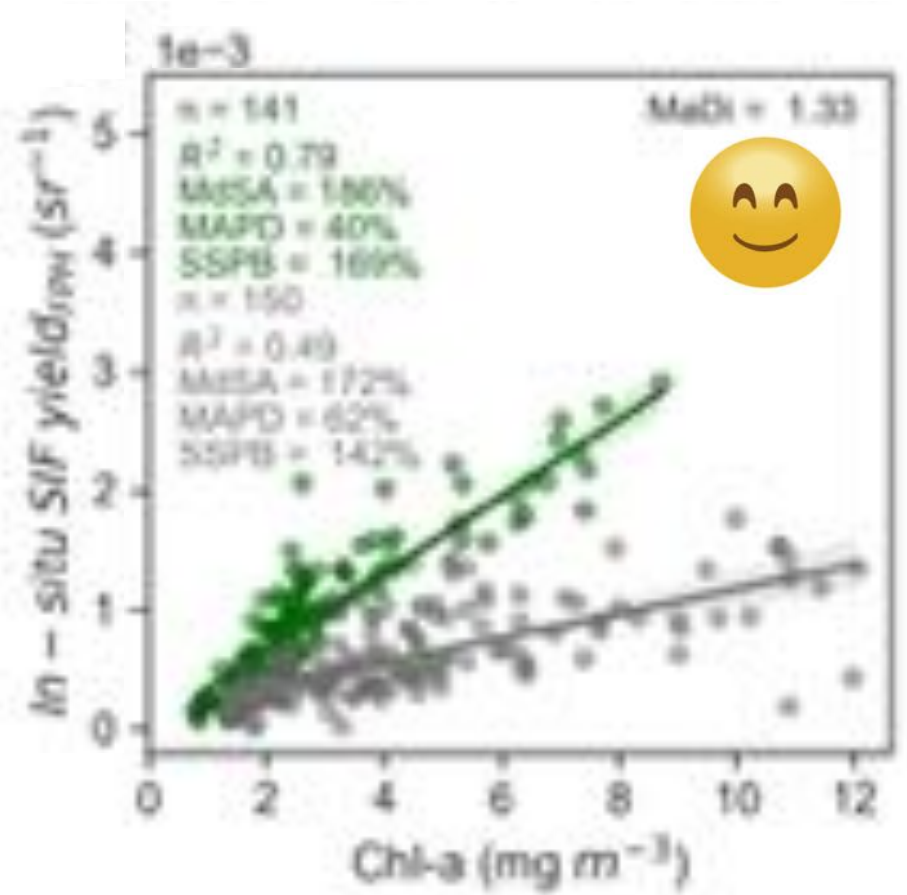
How can we improve the relationship between **phytoplankton sun-induced fluorescence** and **Chl-a RS-based estimates**?

Remika S. Gupana, Daniel Odermatt, Abolfazl Irani Rahaghi[1,2], Camille Minaudo, Mortimer Werther, Claudia Giardino, and Alexander Damm

IOCS-2025 Darmstadt, 1-4 December

Poster # 145





Spoiler:

Poster # 146

Evaluation of Ocean Color Products in the North Atlantic Ocean aboard the One Ocean Expedition 2025

Alba L. Guzmán-Morales[1],
Luz M. Suklje[2], Alejandro Román[3]

[1]Environmental Mapping Consultants LLC, Aguadilla, Puerto Rico
[2]Centro Austral de Investigaciones Científicas (CADIC), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Ushuaia, Argentina. Departamento de Ciencias de la Atmósfera y los Océanos, Universidad de Buenos Aires, Ciudad de Buenos Aires, Argentina
[3]Institute of Marine Sciences of Andalusia (ICMAN), Spanish National Research Council (CSIC), Department of Ecology and Coastal Management, 11510, Puerto Real, Spain

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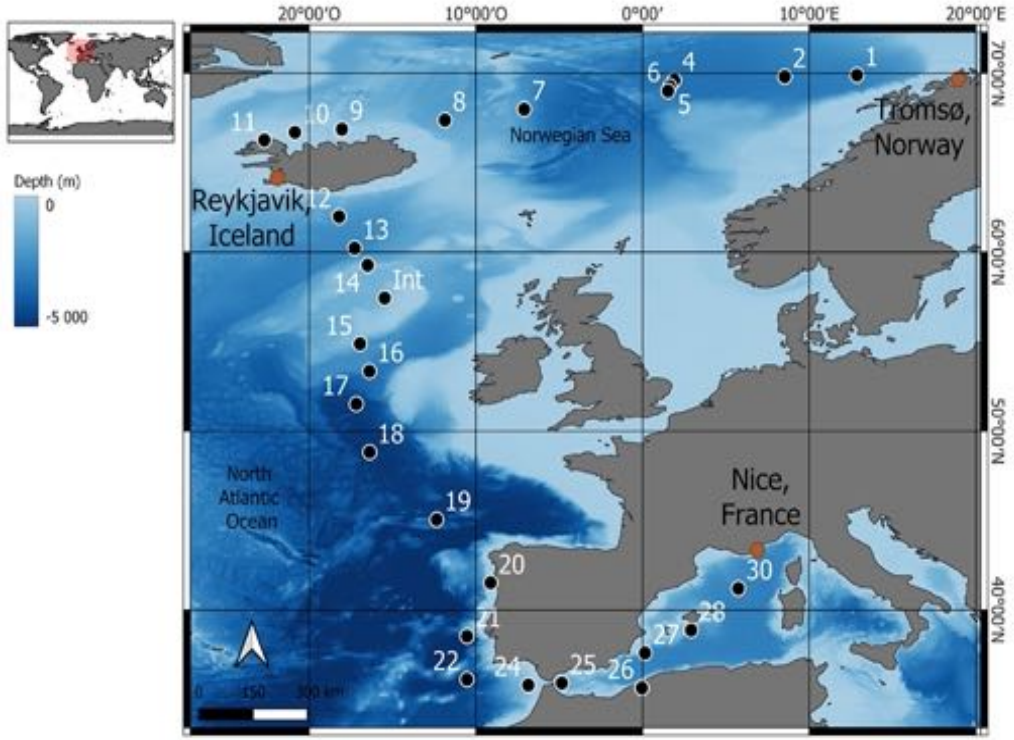
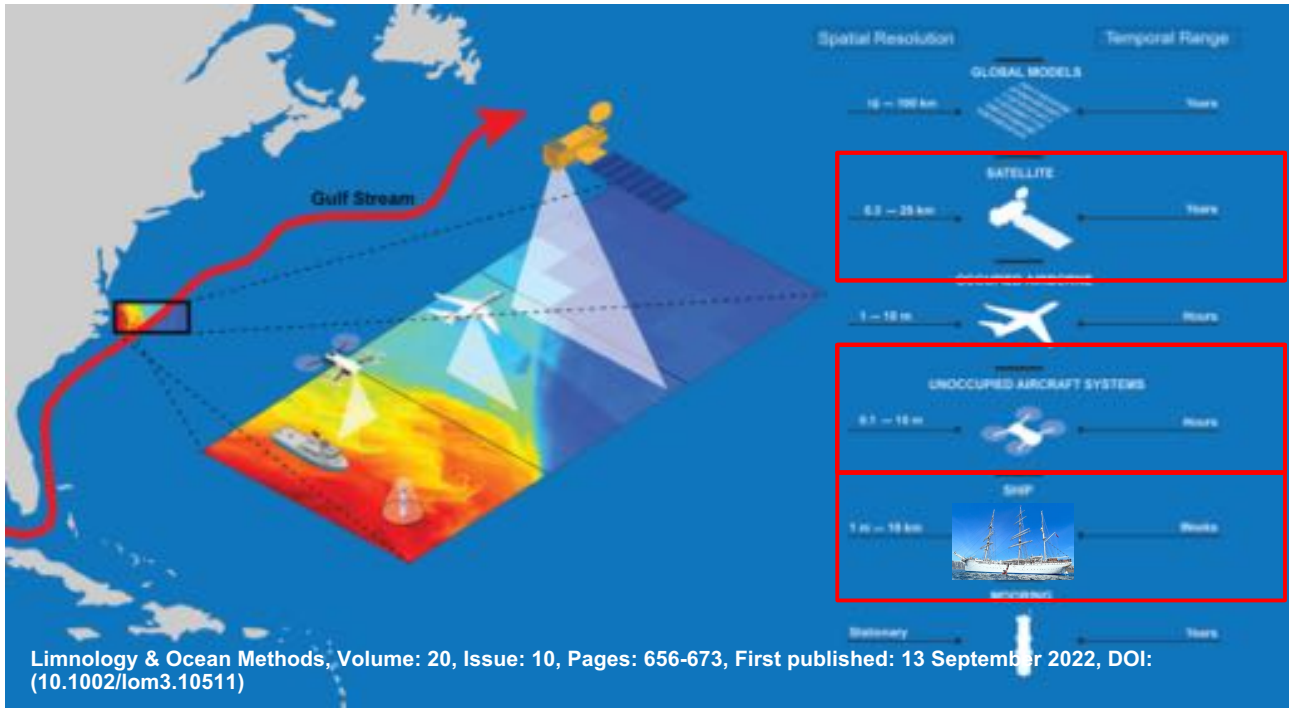
Poster # 146





If you'd like to learn more, feel free to visit the poster. :
Thank you for attending!

Poster # 147

COCOBRAZ: Two decades of chlorophyll-*a* trends and drivers along the Brazilian Margin

Milton Kampel[1], João Felipe Cardoso dos Santos[1], Vinícius Lima[1]
[1]National Institute for Space Research (Brazil)

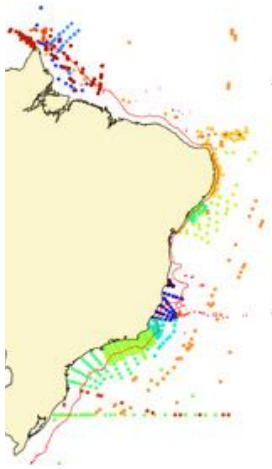
Vincent Vantrepotte[2], Manh Duy Tran[2], Daniel Schaffer Jorge[2], Ikram Salah Salah[2]
[2]Laboratory of Oceanology and Geosciences (France)

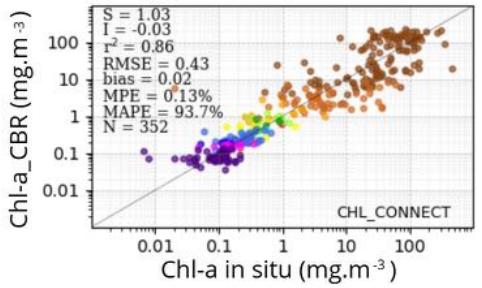
IOCS-2025 Darmstadt, 1-4 December

Poster # 147

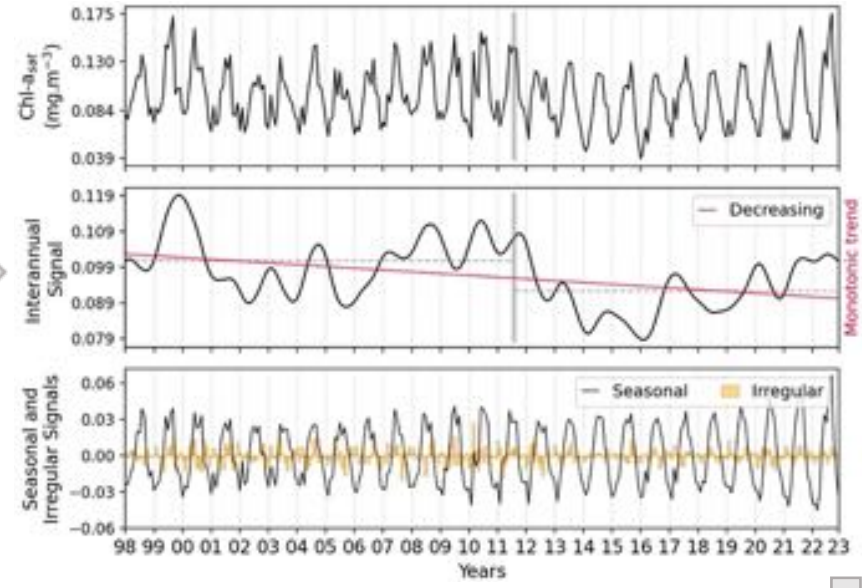
COCOBRAZ

Over 20 years of MODIS-A data processed from L1 to L3, utilizing OC-SMART atmospheric correction and the CONNECT Chl-*a* algorithm.





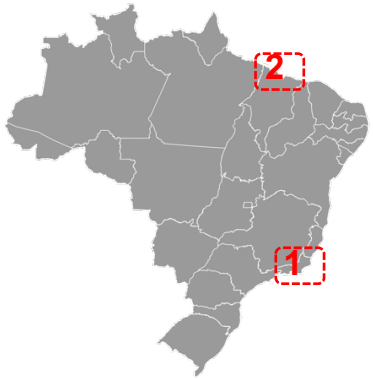
Validation of the L3 daily composite against a large in situ archive.

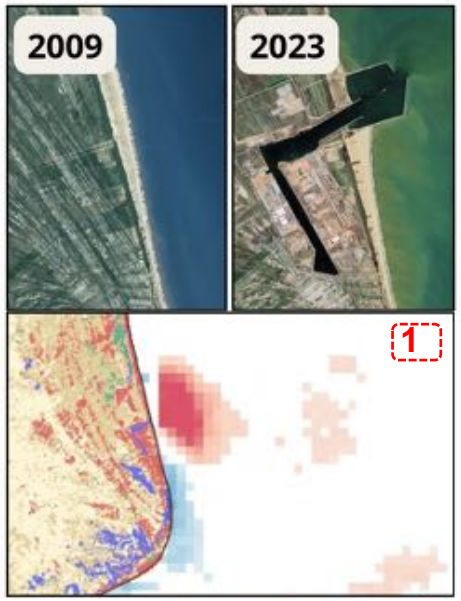


Analysis of the L3 monthly Chl-*a* data, decomposed into interannual, seasonal, and irregular signals.

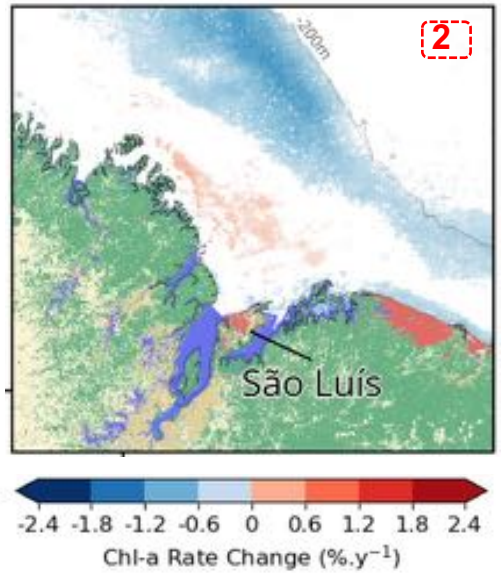
Detection of monotonic trends associated with...

... human pressure.





... environmental (-) & land cover (+) changes.



Poster # 148

Development of **ocean colour products** using Meteosat Second and Third Generation **geostationary** satellites

Carole Lebreton[1], François Steinmetz[2], Héloïse Lavigne[3], Constant Mazeran[4], Ewa Kwiatkowska[5], David Desailly[5], Juan Ignacio Gossn[5], Carsten Brockmann[1], Didier Ramon[2], Kevin Ruddick[3]

[1] Brockmann Consult GmbH (BC), Hamburg, Germany , [2] HYGEOS, Lille, France , [3] Royal Belgium Institute of Natural Sciences (RBINS), Brussels, Belgium, [4] SOLVO, Antibes, France, [5] EUMETSAT, Darmstadt, Germany

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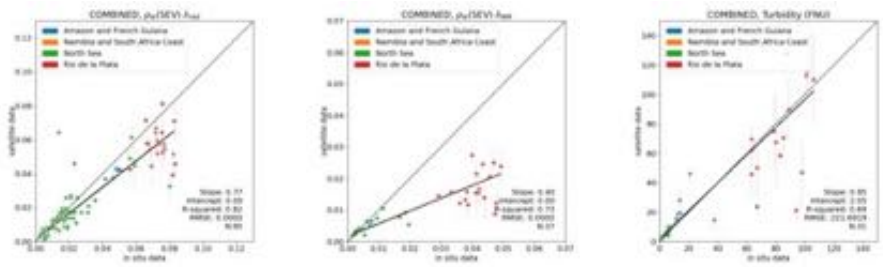
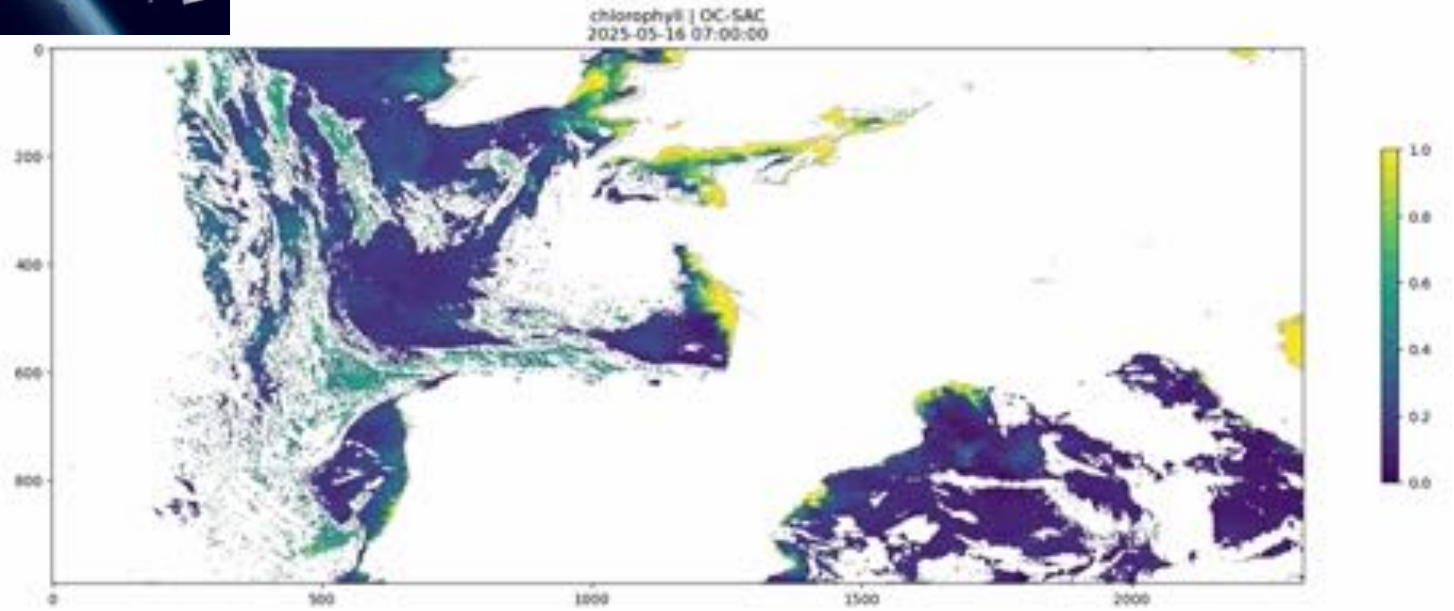
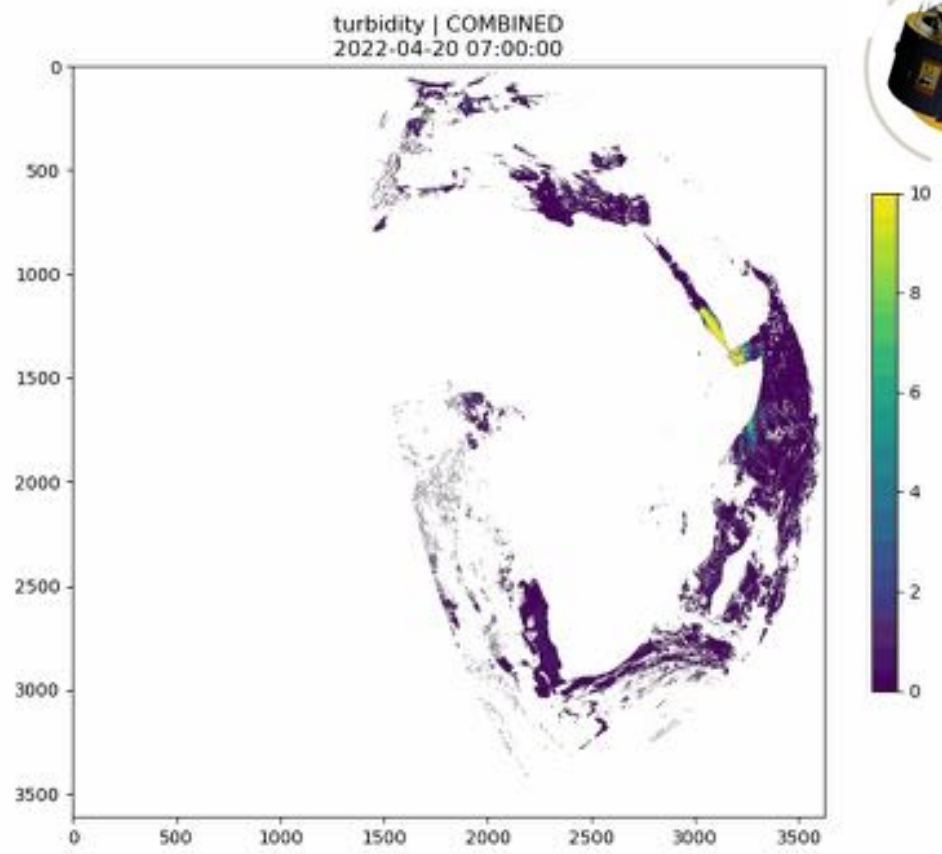
Poster # 148

→ Dedicated pre-operational processor for atmospheric correction and derived water products from MSG (SEVIRI) and MTG (FCI)
→ **multi-mission module** to retrieve the highest quality water products



Geostationary Ocean Colour





Poster No. 151

A Novel Hyperspectral Index for Chlorophyll-a Concentration Quantification in Productive Waters

Junsheng Li[1], Huaxin Yao[1], Dalin Jiang[2],
Fangfang Zhang[1], Shenglei Wang[1], Bing Zhang[1]

1. Aerospace Information Research Institute, Chinese Academy of Sciences, China
2. University of Stirling, Stirling, United Kingdom

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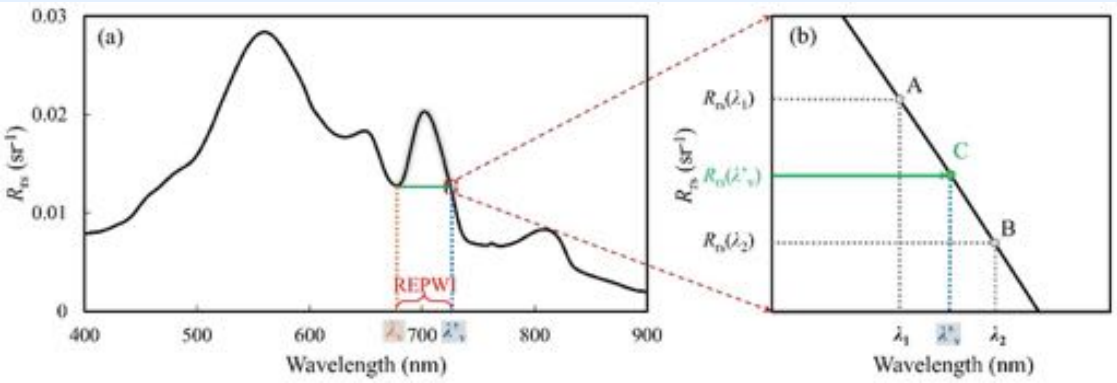
Poster No. 151

1. Definition of REPWI

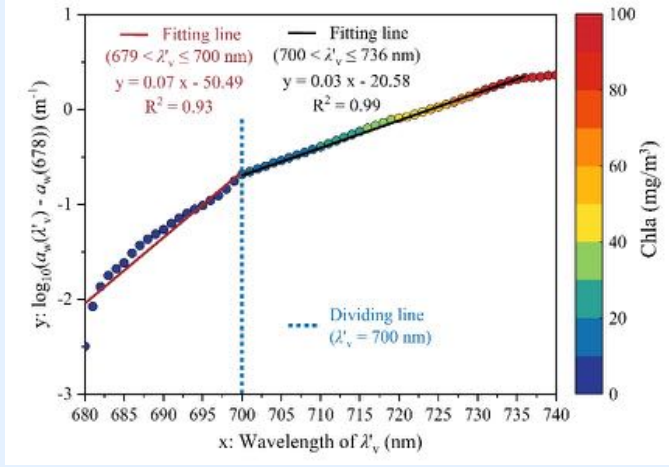


$$\mathbf{REPWI} = \lambda'_v - 678, \quad R_{rs}(678) = R_{rs}(\lambda'_v)$$

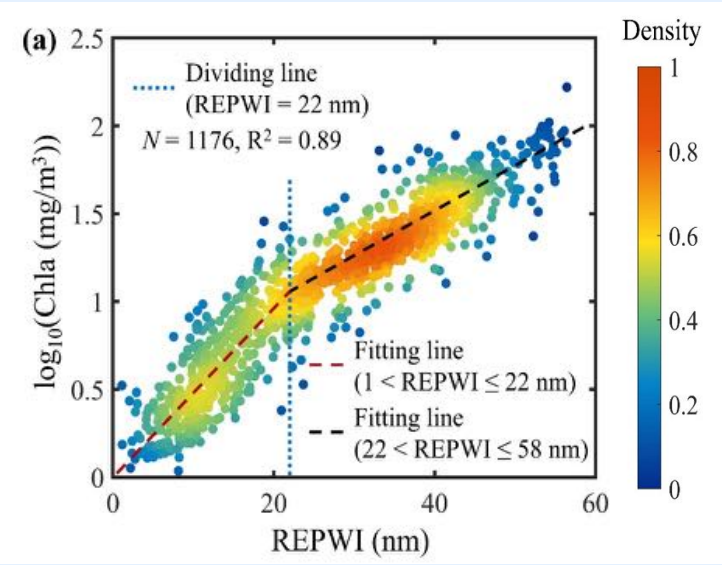
2. Theoretical Foundation and Relationship

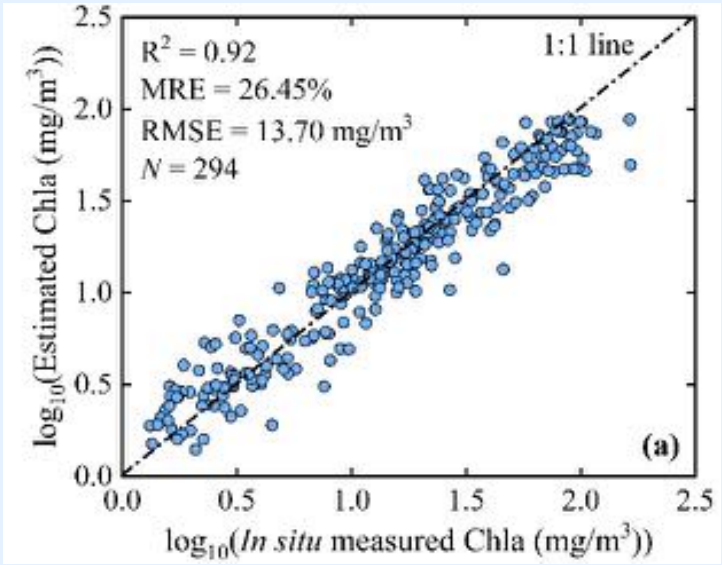
Theoretical foundation:

$$a_{ph}(\lambda_v) \approx a_w(\lambda'_v) - a_w(\lambda_v)$$

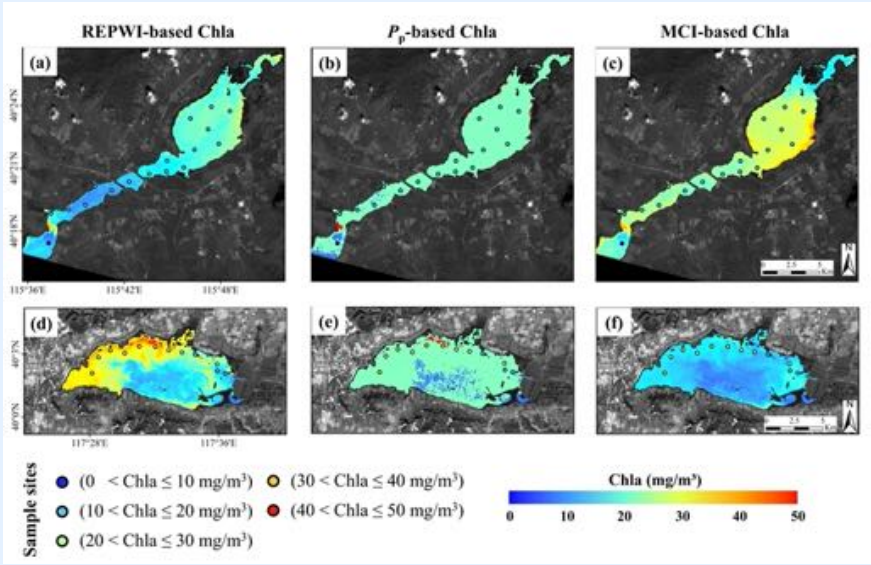


3. Calibration and Validation of the Chla Inversion Model





ZY1-02D AHSI



International Ocean Colour Science Meeting 2025

Advancing Global Ocean Colour Observations

Poster Lightning Session 3A

END OF LIGHTNING TALKS