

→ ATLANTIC FROM SPACE WORKSHOP

23–25 January 2019
National Oceanography Centre
Southampton, UK

Survey of Earth Observation activities
conducted at the University of Lisbon
on the Northeast Atlantic

Vanda Brotas¹

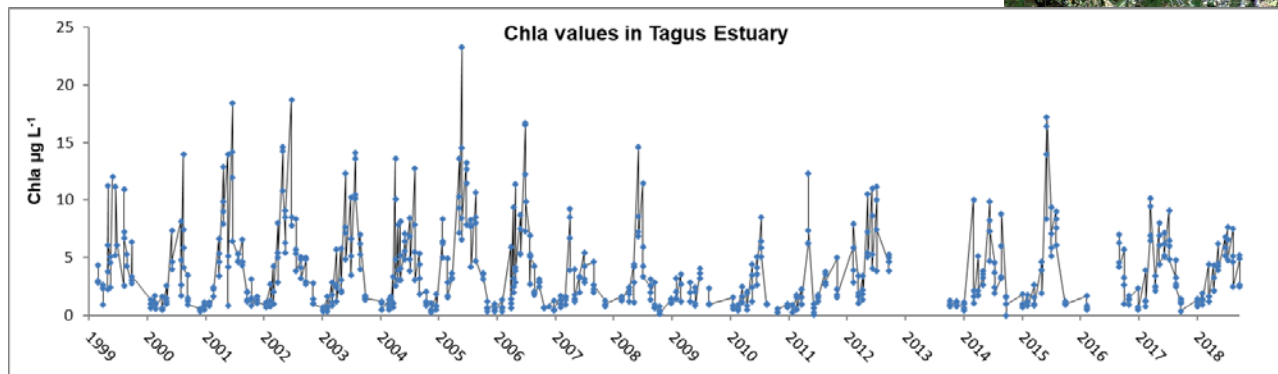
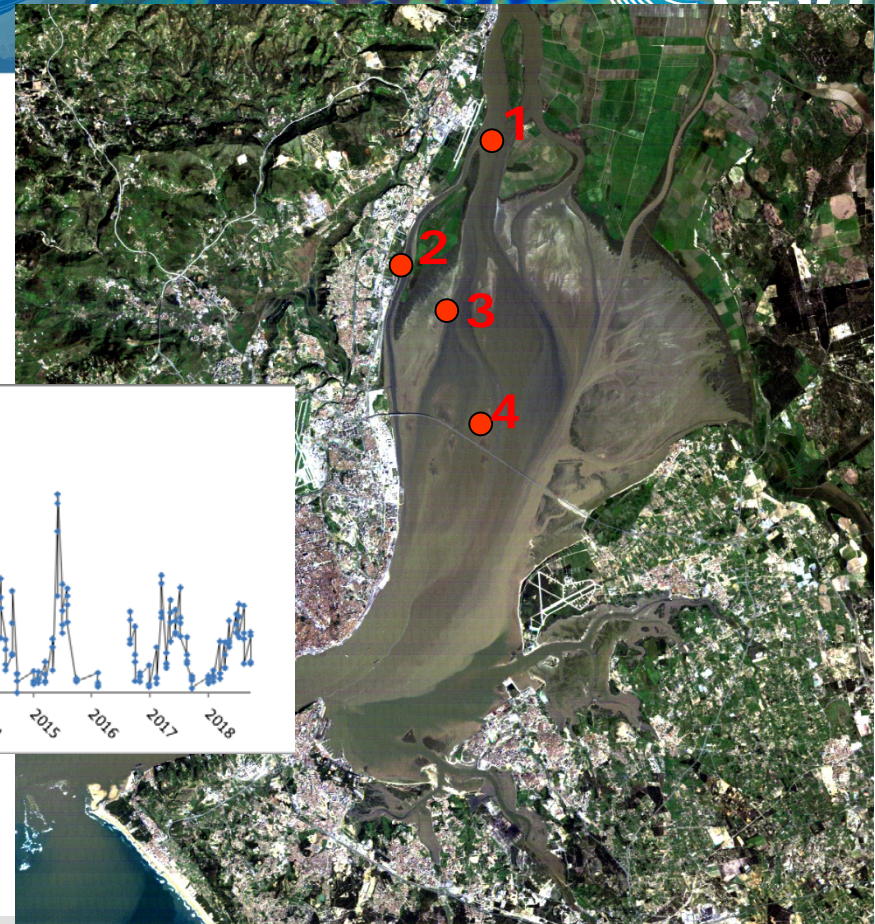
André Valente¹, Catarina Guerreiro¹, Ana C. Brito¹, Mara Gomes¹, Carolina Sá¹, Paulo Oliveira²

¹University of Lisbon, MARE
² IPMA

Estuaries – monitoring water quality



Monitoring programme Tagus Estuary
4 sites~ monthly sampling -1999-2018



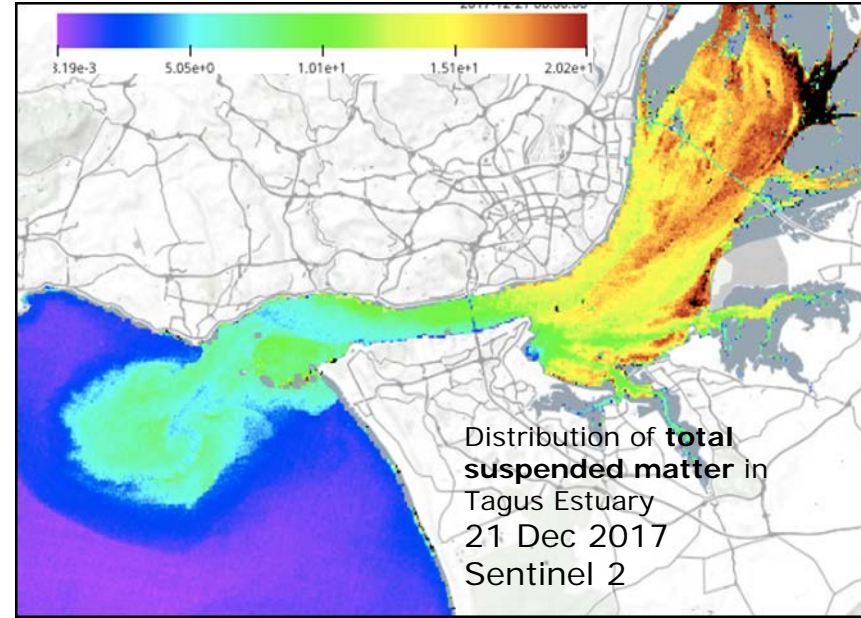
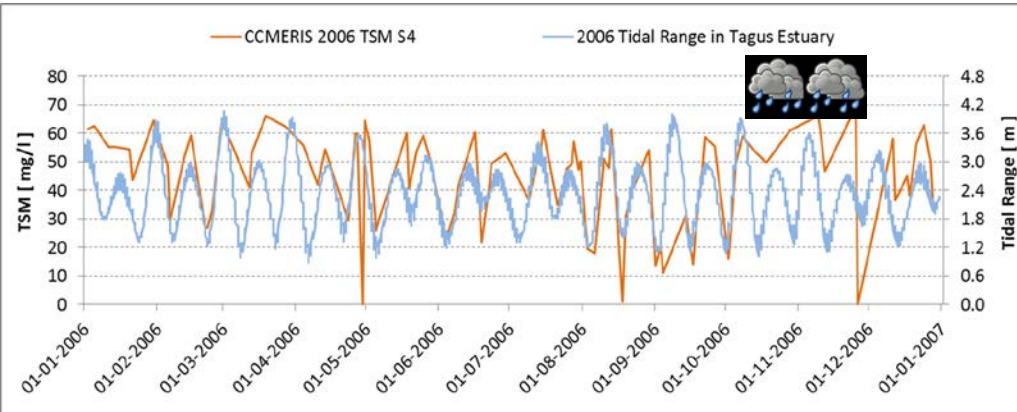
Estuaries – monitoring water quality



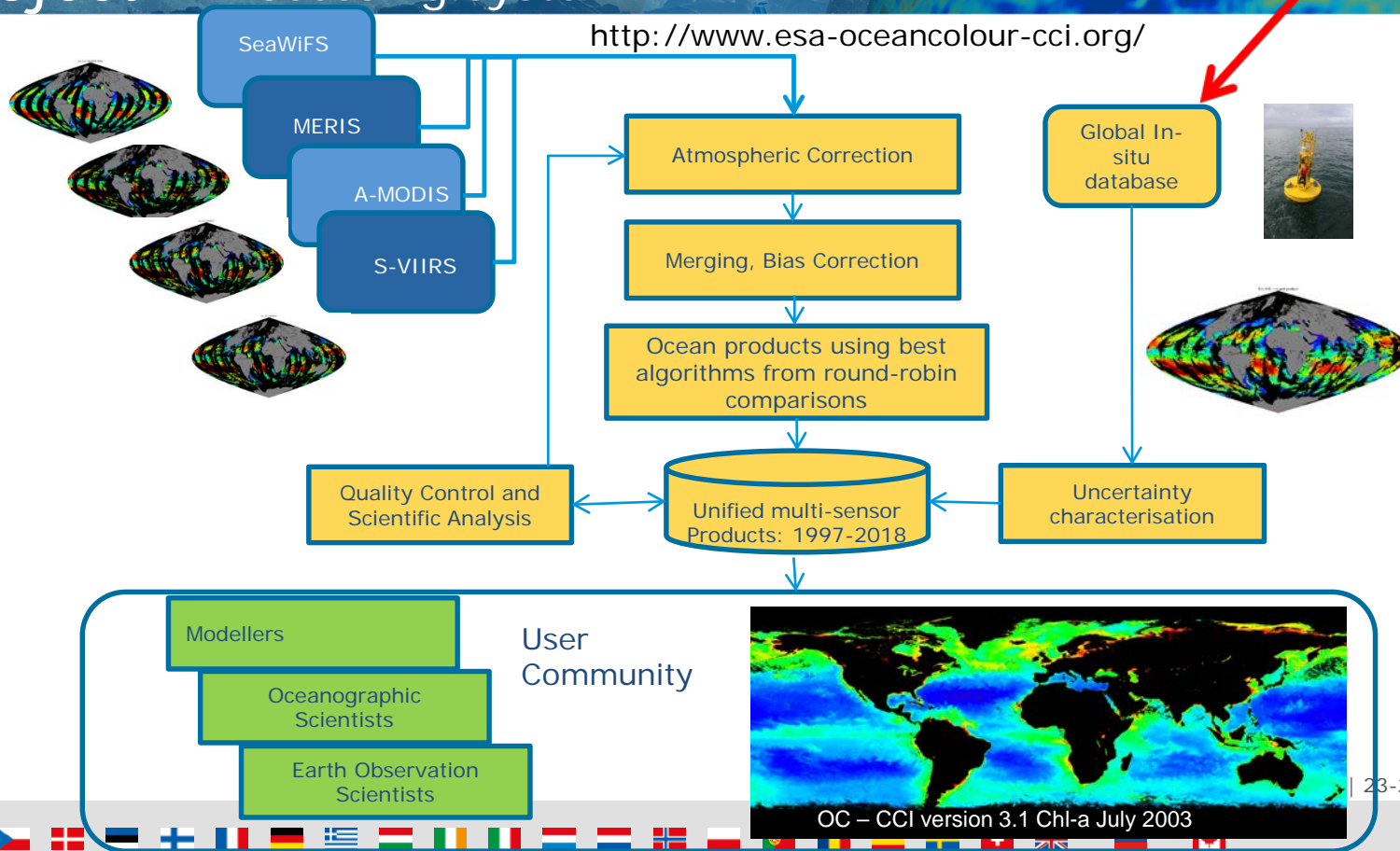
Advanced techniques for monitoring water quality using Earth Observation

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 Telefax: +49 (0)261 71 006-1422
icg@iwgmc.uni-saarland.de | www.waterandchange.org

Results from ESA CoastColour Tagus Estuary



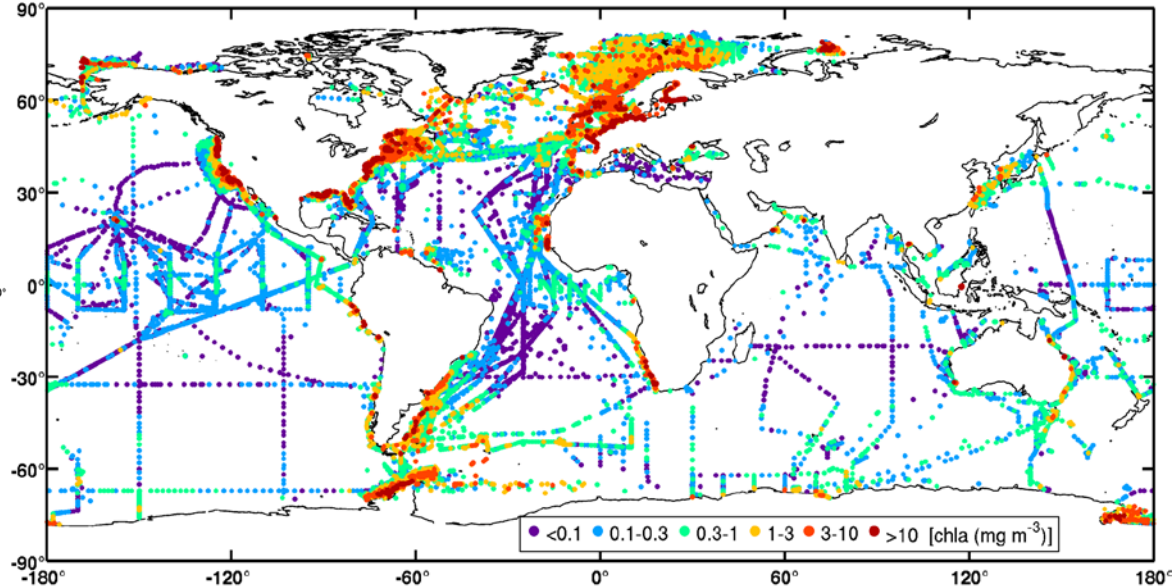
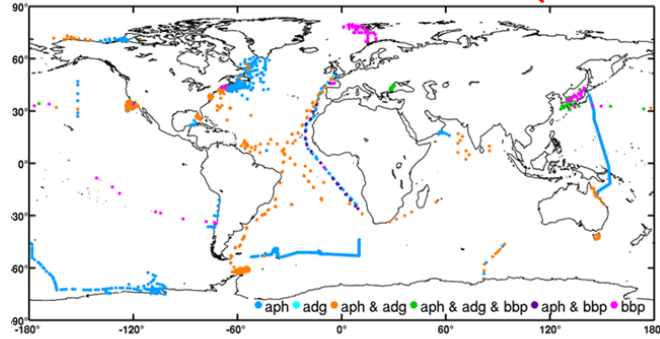
Ocean Colour-Climate Change Initiative, ESA Project - Processing system



Ocean Colour Climate Change Initiative – in situ database



need for more in situ IOPs (Inherent Optical Properties) and Rrs (Remote sensing reflectances)



Earth Syst. Sci. Data, 8, 235–252, 2016
www.earth-syst-sci-data.net/8/235/2016/
doi:10.5194/essd-8-235-2016
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Open Access
Earth System
Science
Data

A compilation of global bio-optical in situ data for ocean-colour satellite applications

André Valente¹, Shubha Sathyendranath², Vanda Brotas¹, Steve Groom², Michael Grant², Malcolm Taberner², David Antoine^{1,3}, Robert Arnone⁴, William M. Balch⁵, Kathryn Barker⁶, Ray Barlow⁷, Simon Belange⁸, Jean-François Berthon⁹, Sükri Besiktepe¹⁰, Vittorio Brandt^{11,12}, Elisabetta Camati¹³, Francisco Chavez¹⁴, Herve Claustre¹⁵, Richard Croall¹⁷, Robert Frouin¹⁶, Carlos Garcia-Soto^{15,20}, Stuart W. Gibb²¹, Richard Gould¹⁷, Stanford Hooker²², Miti Kahru¹⁸, Holger Klein²³, Susanne Kratzer²⁴, Hubert Loisel²⁵, David McKee²⁶, Brian G. Mitchell¹⁸, Tiffany Moisan²⁷, Frank Muller-Karger²⁸, Leonie O'Dowd²⁹, Michael Ondrusch³⁰, Alex J. Poulton³¹, Michel Repecaud³², Timothy Smyth³³, Heidi M. Sosik³³, Michael Twardowski³⁴, Kenneth Voss³⁵, Jeremy Werdell³⁶, Marcel Wernand³⁷, and Giuseppe Zibordi¹¹

Spatial distribution of Chlorophyll *a*

A compilation of global bio-optical in situ data for ocean-colour satellite applications

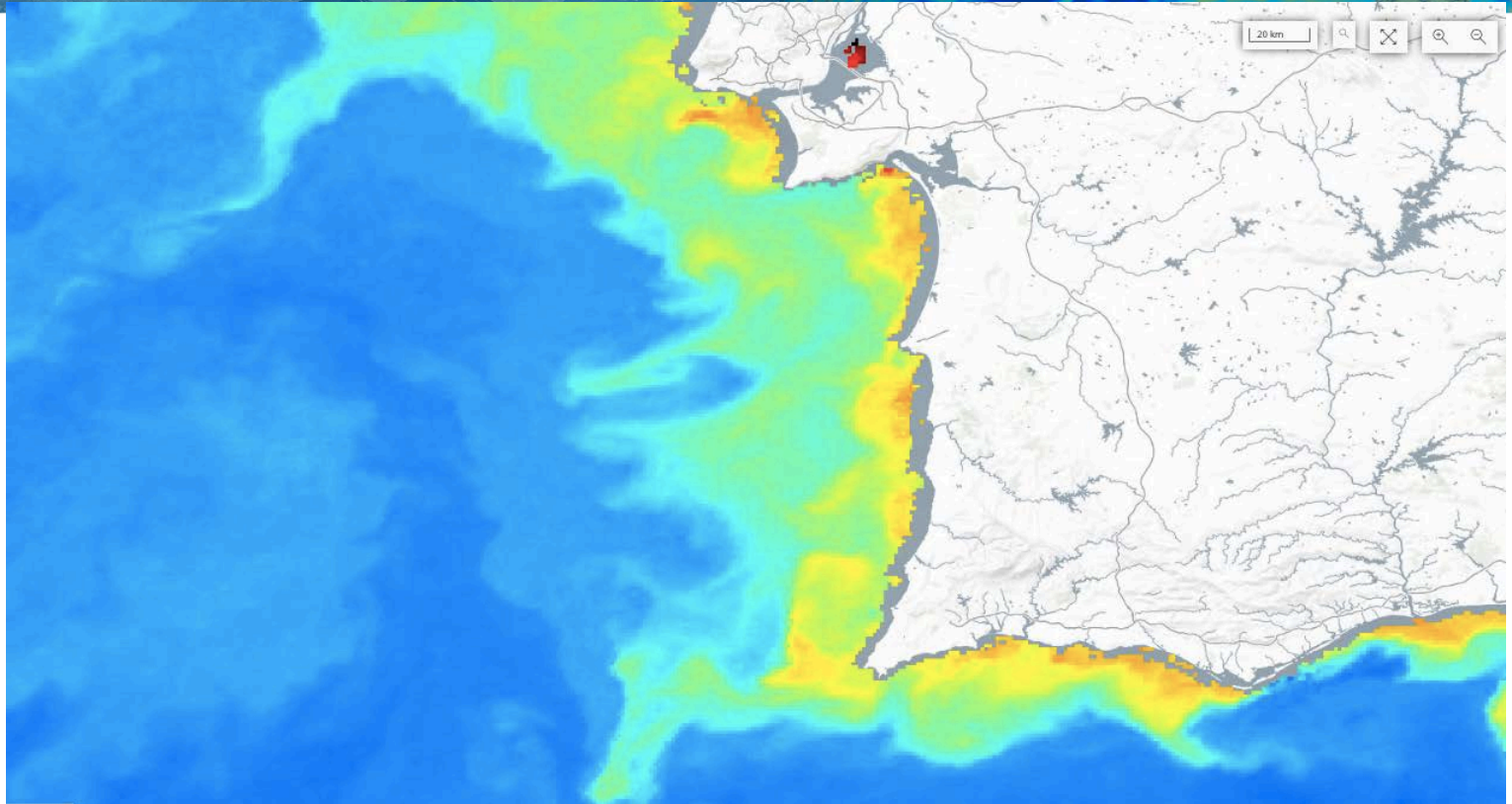
– version two

Valente et al, and ~60 more authors, ESSD in submission, 2019

Author | Atlantic from Space Workshop | 23-25/01/2019 | Slide 5



OC-CCI increasing resolution from 4km to 1km



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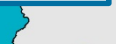
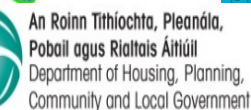
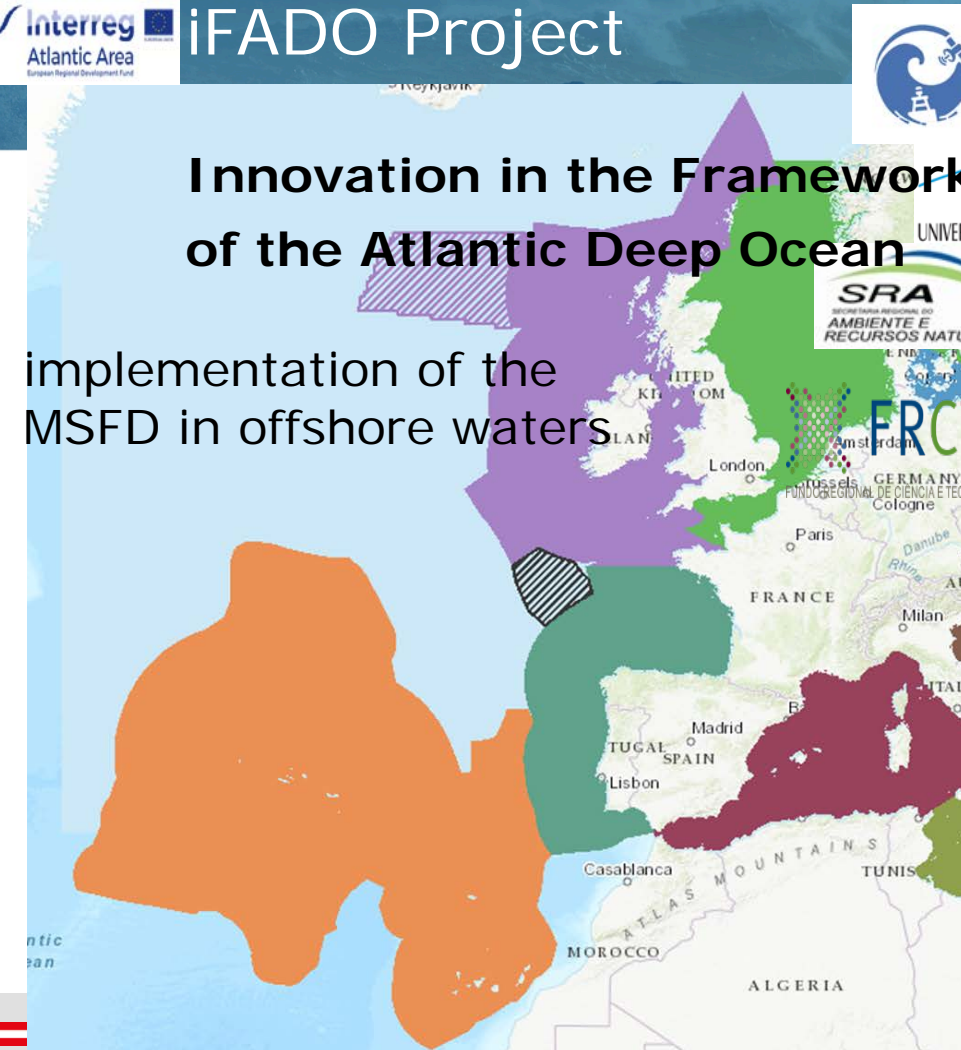




Innovation in the Framework of the Atlantic Deep Ocean

implementation of the MSFD in offshore waters

Atlantic Area

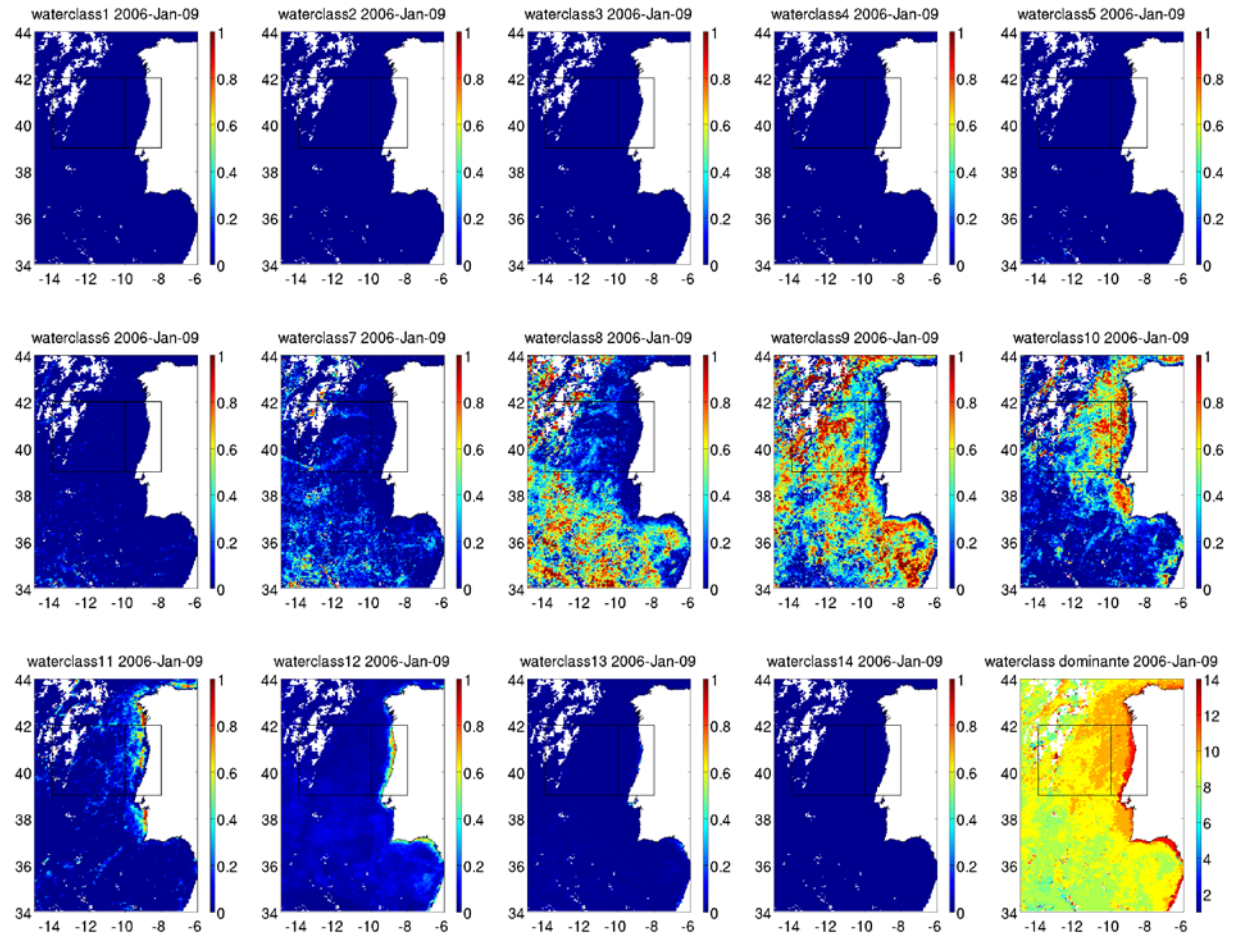


iFADO: Water Classes

Using Products from OC-CCI

Optical classification based on Rrs, 14 classes are defined. The membership of each pixel to each class is computed.

Water classes
1–7 (clearer ocean waters),
8–12 (generally transitional regions between open ocean and near coastal regions)
13–14 (more turbid, coastal waters)

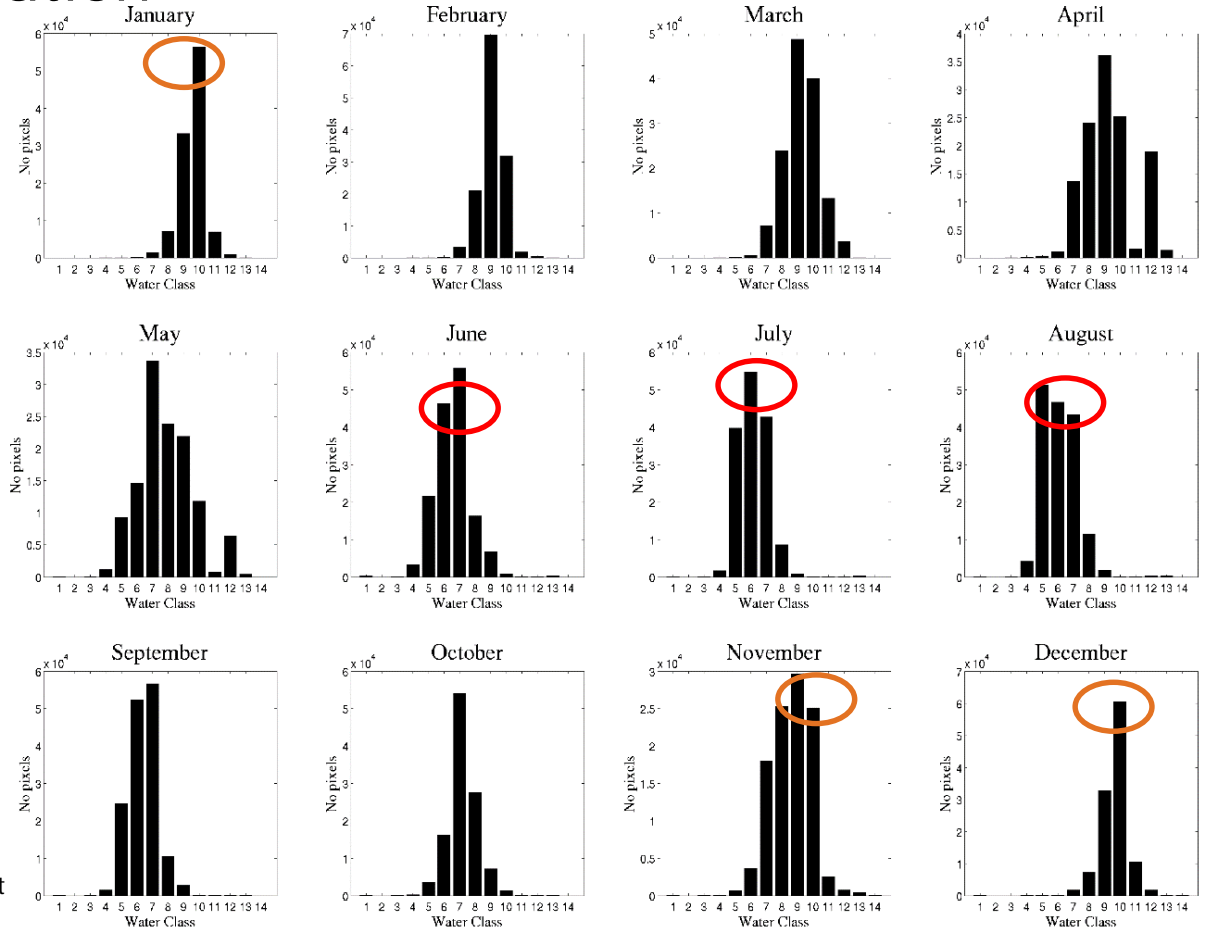


Water Class Classification

Blended algorithms,
avoiding sharp
boundaries,
to improve final product
quality

Histogram of
Class membership
Period 2012-2017
For each month
Note seasonal shift,
From summer 5-7
to winter 9-11

Jackson et al, 2017, Remote Sensing Environment



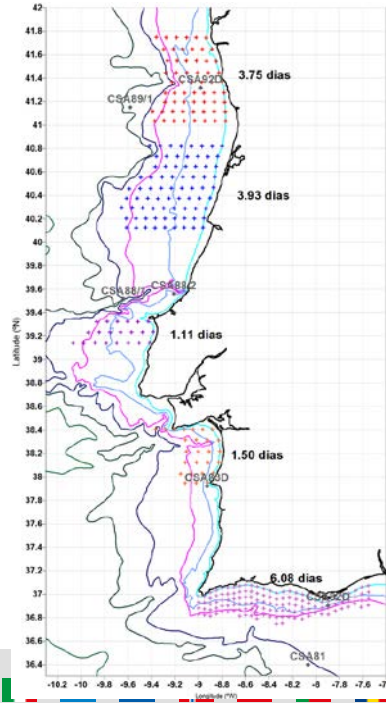
EO applications to Aquaculture

Assessment of oceanographic, physical-chemical and biogeochemical conditions for site selection of offshore aquaculture units

Use of EO to:

- WP4. Phytoplankton production and bloom phenology
- WP5. Site selection

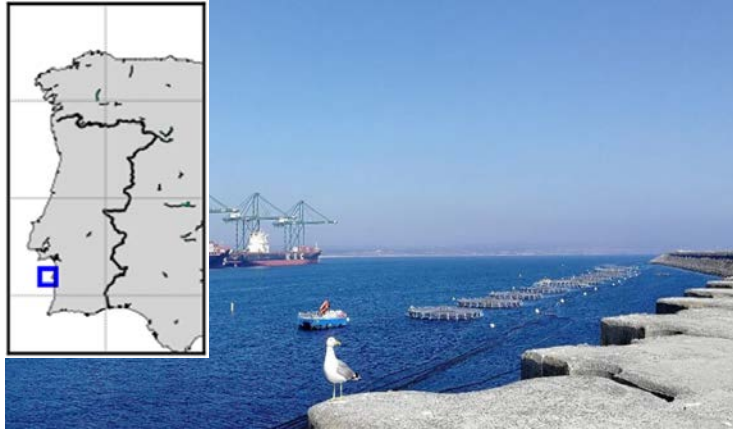
EO and in situ



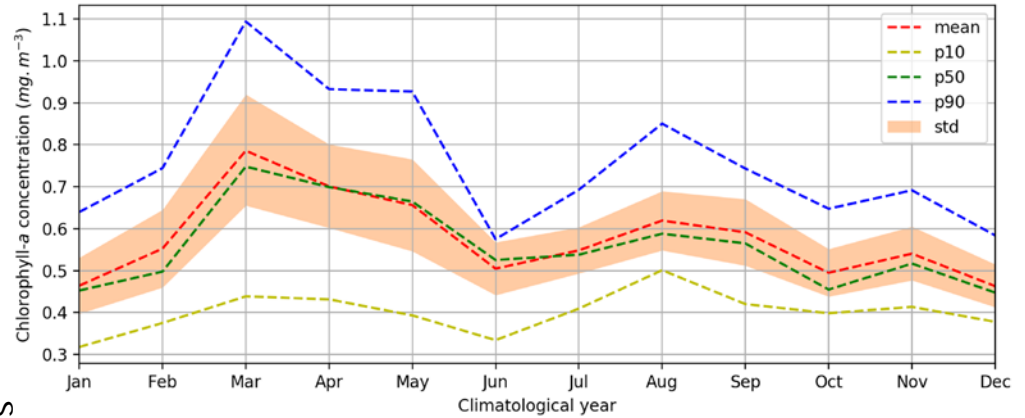
EO applications to Aquaculture PiscisMod



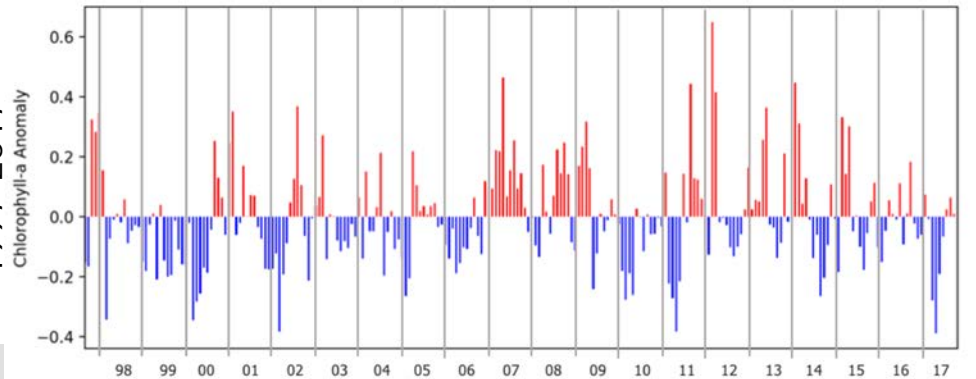
Sines, Seabass aquaculture unit



Climatological yearly chlorophyll-a, std, percentiles 10, 50 and 90



Monthly Chla anomalies 1997-2017



Using OC-CCI data 4km offshore

Tools : Long satellite data record
Needs: Good spatial resolution,
S2 and S3 images will be used here

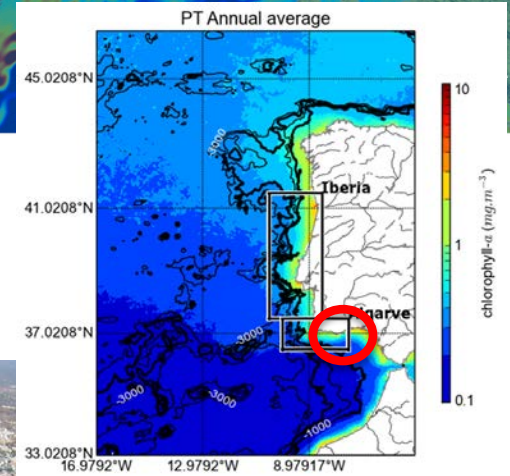


EO applications to Aquaculture

Looking for HABs: Finding Anomalies

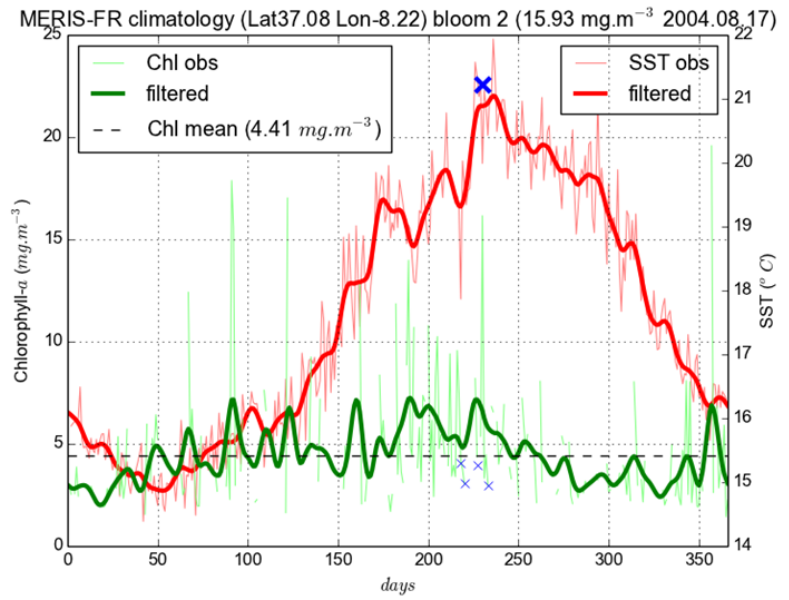
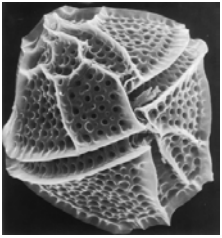
FP7 Aquausers Project

Meris 300m resolution,
2002-2012



South coast of Portugal, Algarve: 17 Aug. 2004
Dinoflagellate Lingulodinium polyedrum

Photo Alexandra Cunha





Targeting staff from governmental organizations

eBook



**OBSERVAÇÃO
DA TERRA**

uso de imagens de temperatura da superfície do mar e cor do oceano para a monitorização de águas costeiras e oceánicas



Portwims H2020 Twinning Project



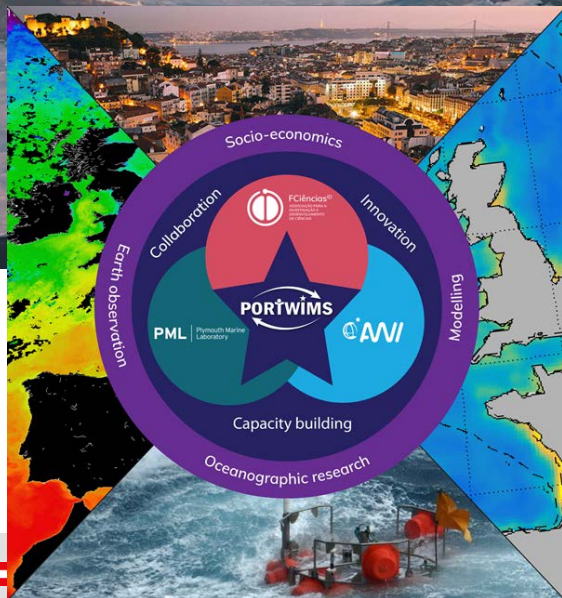
Home About PORTWIMS people Events & Summer Schools Resources News



Contact

Portugal Twinning for Innovation and Excellence in Marine Science and Earth Observation

<http://www.portwims.org>



Navigation

- Home
- About
- PORTWIMS people
- Events & Summer Schools
- Resources
- News
- Contact



Co-funded by the Horizon 2020 programme of the European Union

This project has received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement No 810139.

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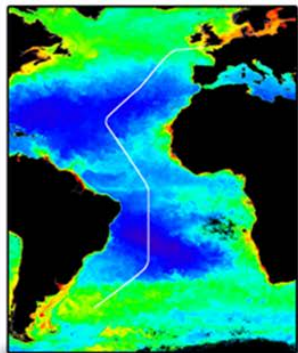
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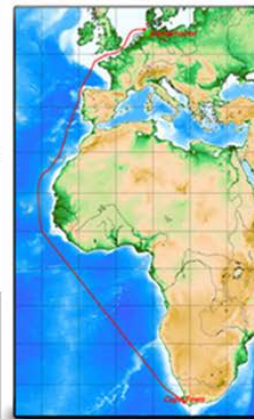
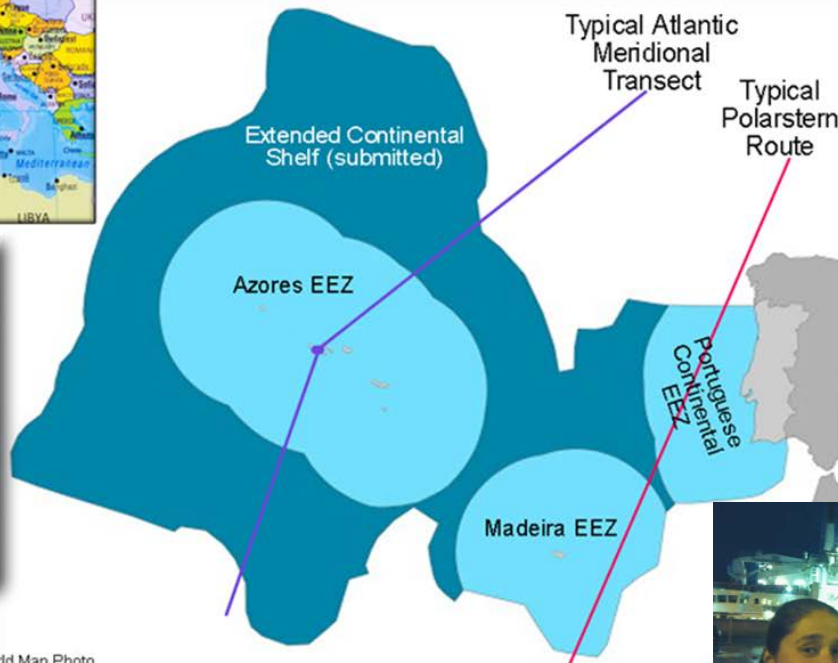


European Space Agency

Participation in Atlantic Oceanographic cruises



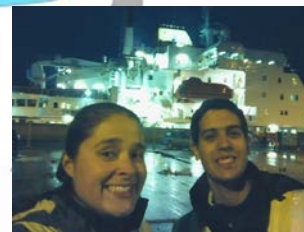
AMT Transect



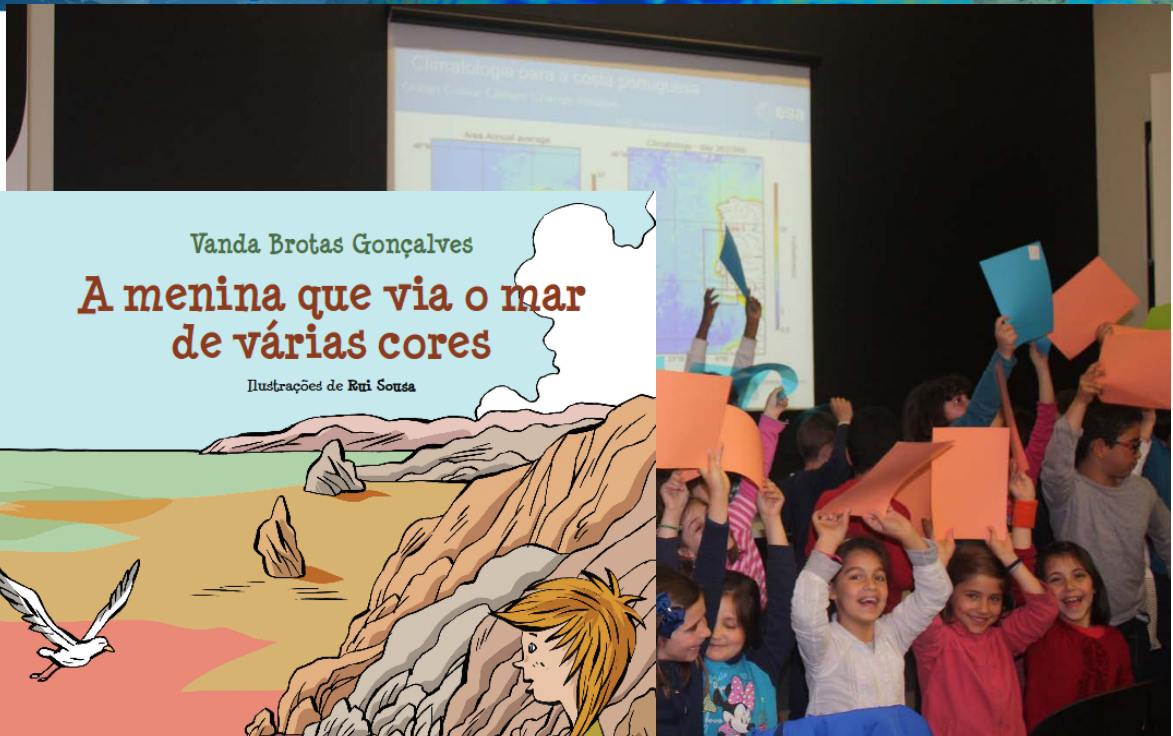
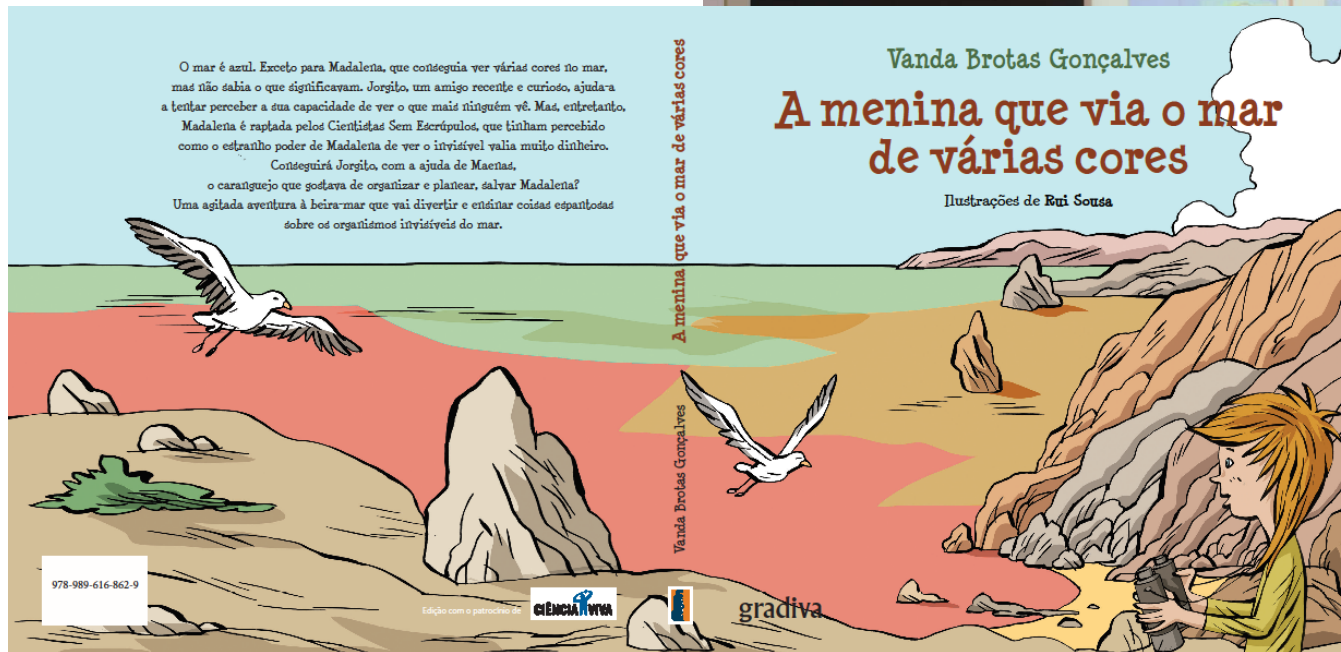
Polarstern Route

Summer
Schools

Eumetsat/
Portwims
EO training in
Lisbon,
Jun2019



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- Need for in situ data or Fiducial Reference Measurements for satellite product validation
- Need for creation and curation of in situ databases
- Knowledge on Atlantic Coastal and Estuarine areas is crucial, EO products with high spatial resolution. Improving algorithms for coastal and estuarine regions.
- Need of long term series (both in situ and EO products)
- Training at graduation and post-graduation level, and also staff from governmental institutes.
- Increasing EO literacy, specially to the younger generations
 - *Need to “better understand what is happening on Earth”*

Thank you

Author

/2019 | Slide 17