Co-funded by the Erasmus+ Programme of the European Union

Local and regional education: new developments on the training material based on needs of the future EO / GI workforce

"EO4GEO - Skills development in Earth Observation and Copernicus User Uptake: the present and future of Coastal and Maritime sector - "The Azorean case"

Ana Martins – Oceanography - DOP/FCT-UAc
"Working Group for the Promotion of Space Science"
(ana.mp.martins@uac.pt)

CONTENTS

- History
- EO Infrastructures & Platforms / Systems
- EO Research Areas
- EO Education & Outreach
- EO Topics for Collaboration / Development

HISTORY (HORTA campus)

- Department of Oceanography and Fisheries at the University of the Azores (DOP/UAç) - Foundation: 1976 (~ 45 years)
- IMAR – Instituto do Mar - Foundation: 1991 (~ 30 years)
- Okeanos Centre for R&D - Foundation: 2015 (~6 years)
- Faculty of Sciences and Technology - Foundation: 2016 (~5 years)

EO INFRASTRUCTURES & PLATFORMS / SYSTEMS (since 2000: 21 years)

- HRPT - satellite receiving station "HAZO" (~12 years)
- DETRA - satellite processing system and web platform (~16 years)
- CANOPUS - satellite processing system and web platform (last 5 years)


DA HORTA

N.º 20331 • DIÁRIO • Preço 50$00 - 0,25 Euros (IVA incl.) Sábado/Domingo, 15/16

FIM DE SEMANA

cartaz

Exposição de Postais de Natal

Estará patente ao público, a partir do dia 17 de Dezembro, de 2.ª a 6.ª feira, das 17 horas às 19 horas e no dia 22 das 16 horas às 19 horas, no módulo pré-fabricado da Avenida 25 de Abril, uma exposição de Postais de Natal.

Nesta exposição, promovida pela Área Escolar da Horta e que conta com a colaboração da Secretaria Regional da Economia, poderão ser apreciados trabalhos feitos pelos alunos da educação pré-escolar e do 1.º ciclo do Ensino Básico das escolas do Faial, Pico e Flores ao longo dos últimos anos.

quipa de Detecção Demota ("Team Espacial") do Departamento de Oceanografia e Pescas.

cima, da esquerda para a direita: Miguel Figueiredo, Ana Martins e edo. Em baixo, da esquerda para a direita: Ana Mendonça, Paos e Margarida Rodrigues.

Página 4/5

Bonecas Patuscas € 9,97 1999$ whisky

Correio da Horta, 15/16 December 2001

The beginning...

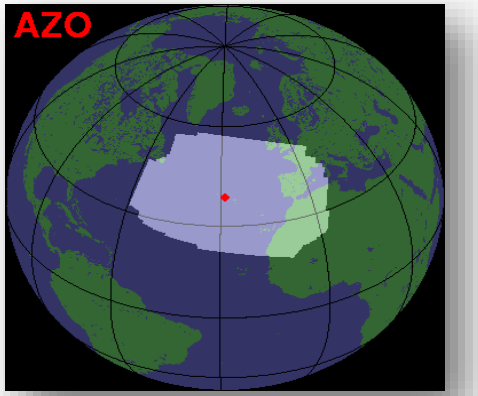
The *Motorbike* Detection team ("Space Team") from the Department of Oceanography and Fisheries

HAZO installation in the "Príncipe Alberto de Mónaco" Observatory (Faial) - April 2001

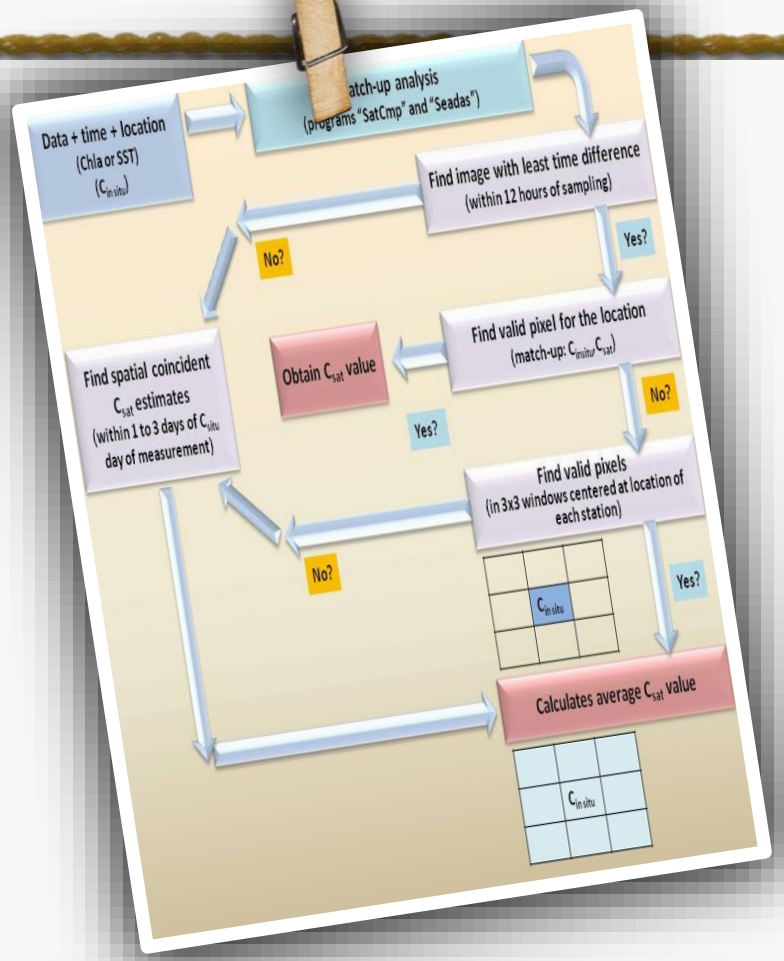
DETRA

HAZO = HRPT station of the AZOres

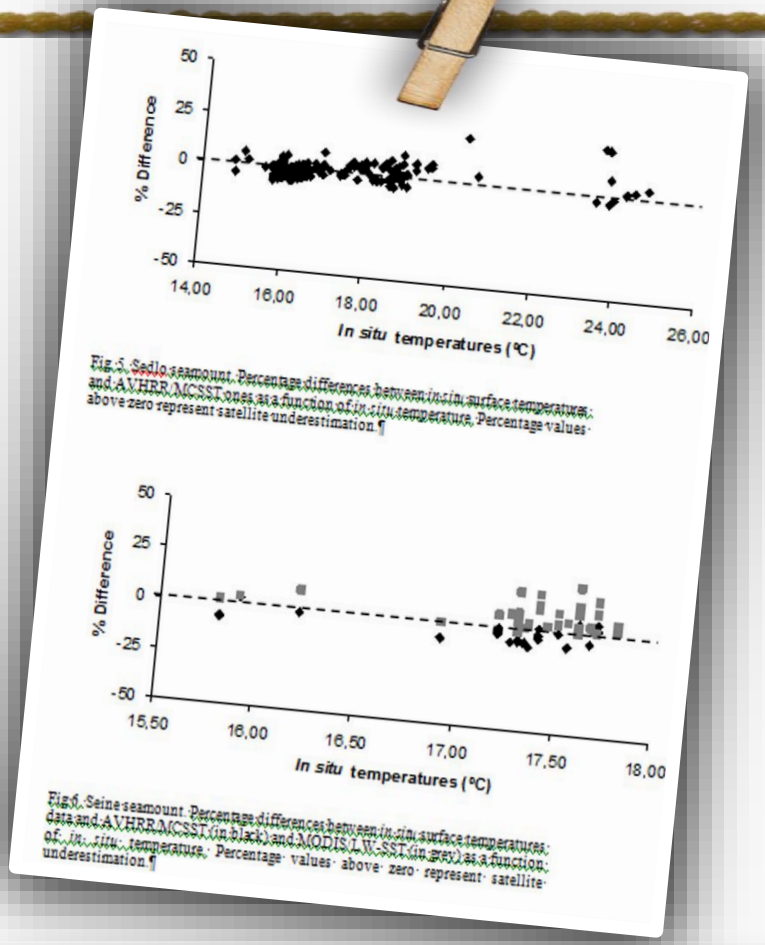
First HRPT SeaWiFS station in Portugal and in Central North Atlantic

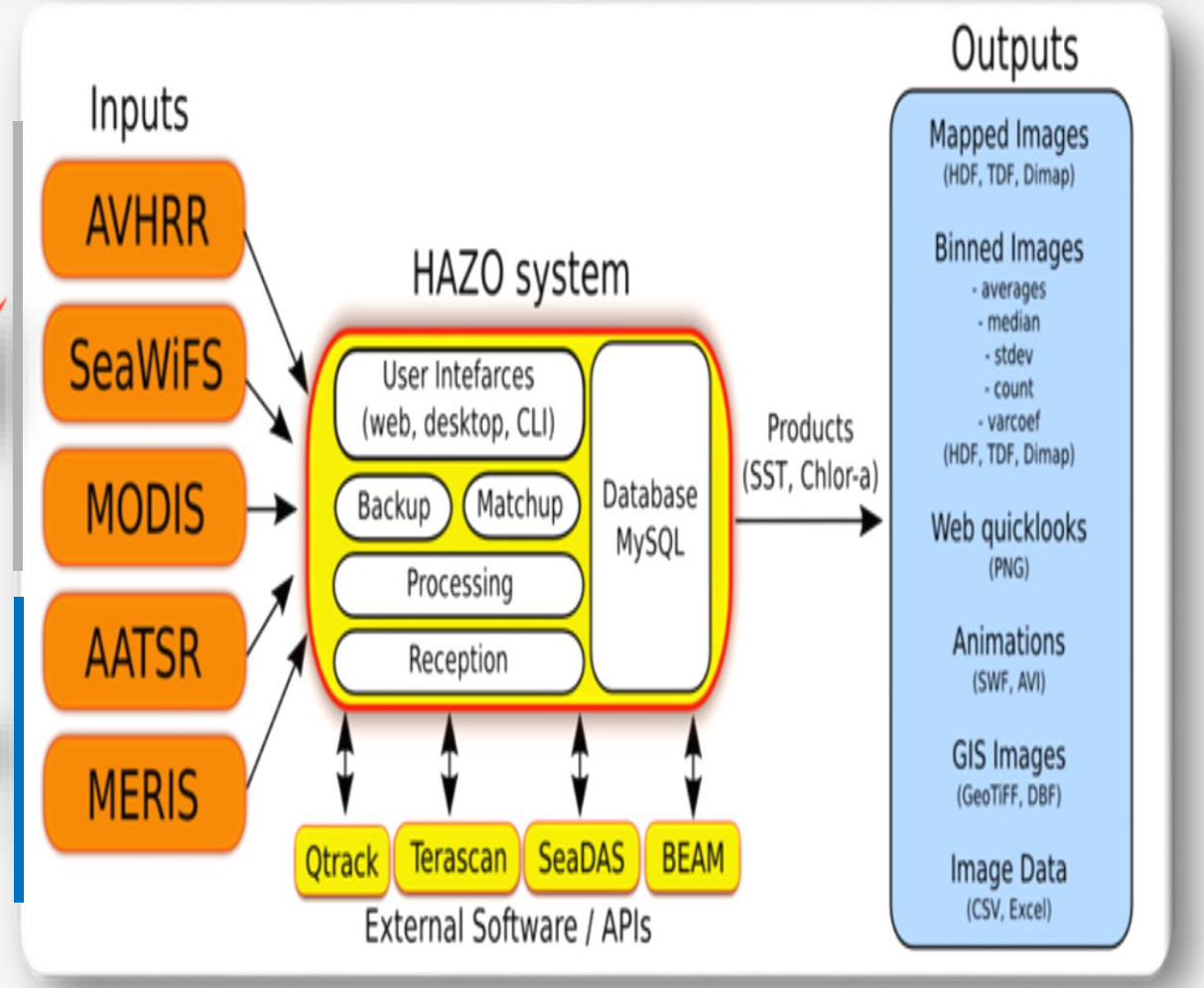


EO **Match-up analyses –** in situ data



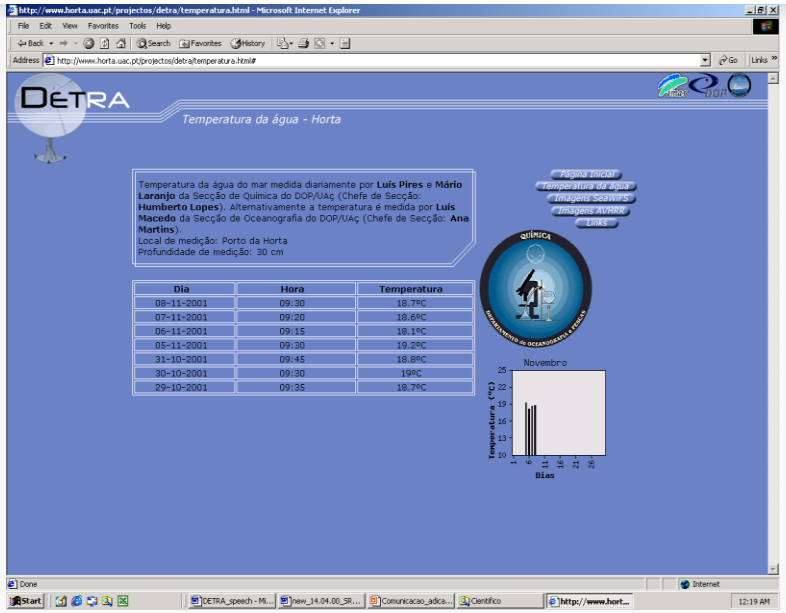
(Mendonça et al., JARS, 2010)

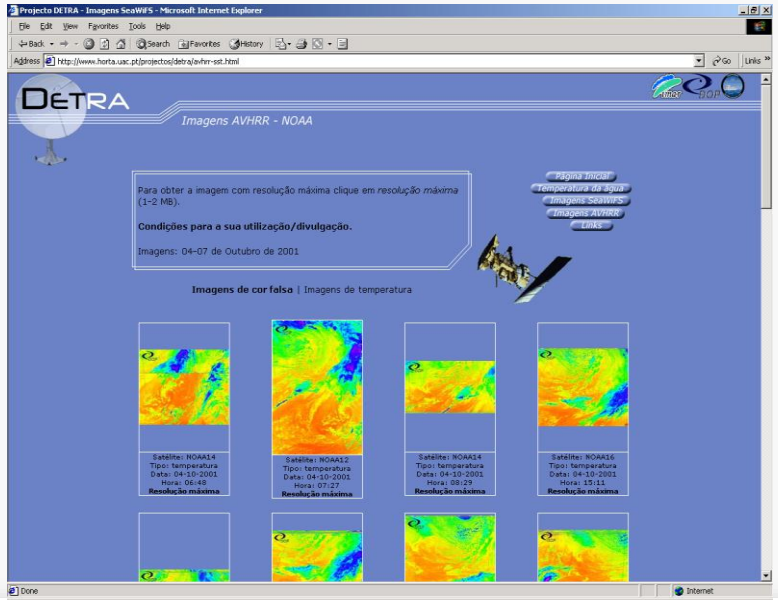




HAZO = HRPT station of the AZOres

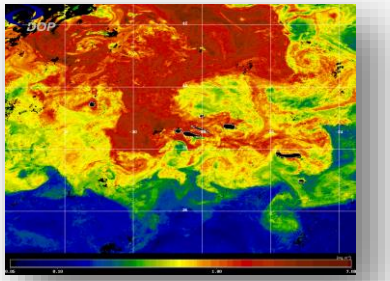
Satellite images were automatically processed by integrating standard source programs. A database containing image meta-info was formed and statistical products was generated. GIS integration and backup tools were also provided.

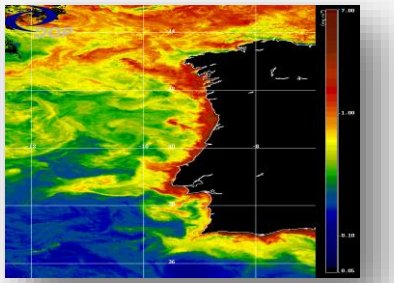




- HAZO = HRPT station of the AZOres:

- IMAGE DISTRIBUTION
  &
- PROCESSING ROUTINES





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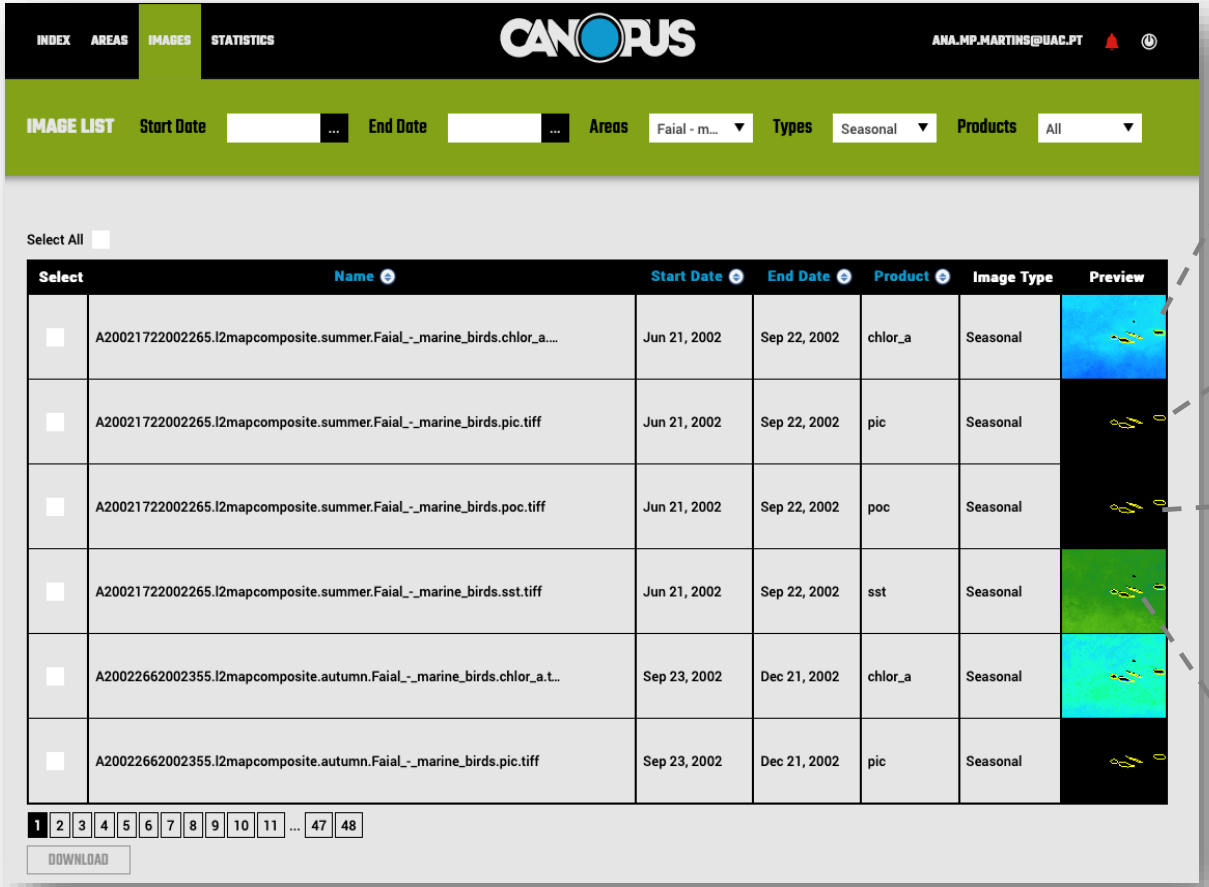
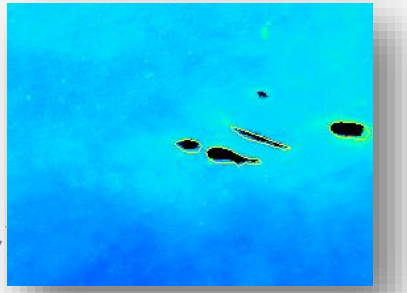
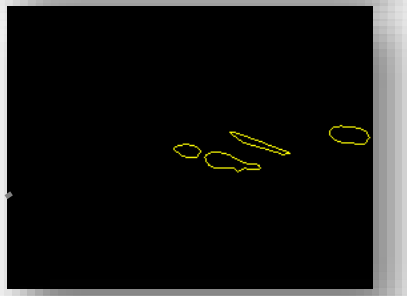
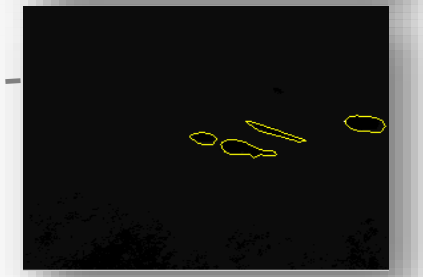
CANOPUS processing system

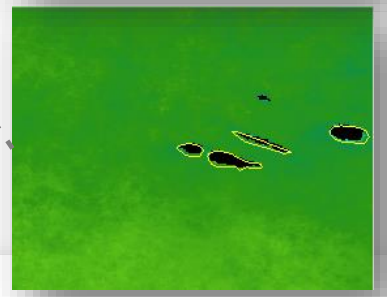


Image's



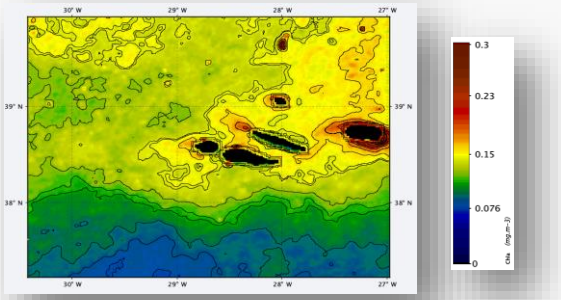




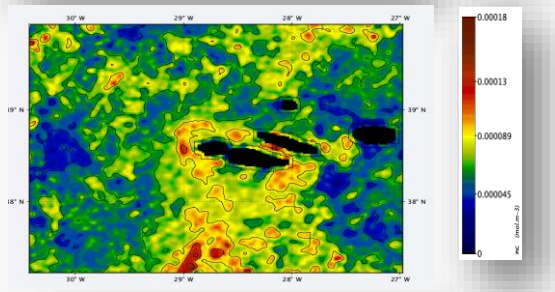


Images quick processing

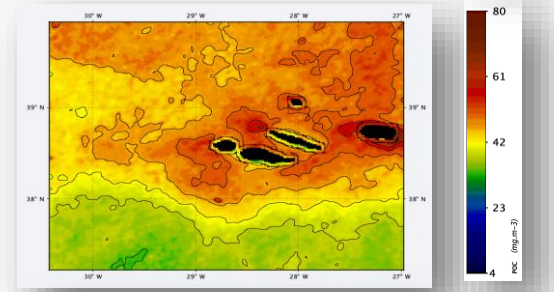
Chla



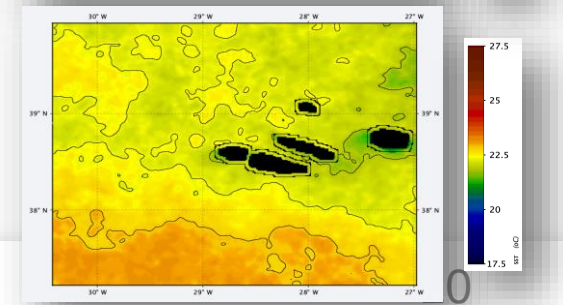
PIC



POC



SST



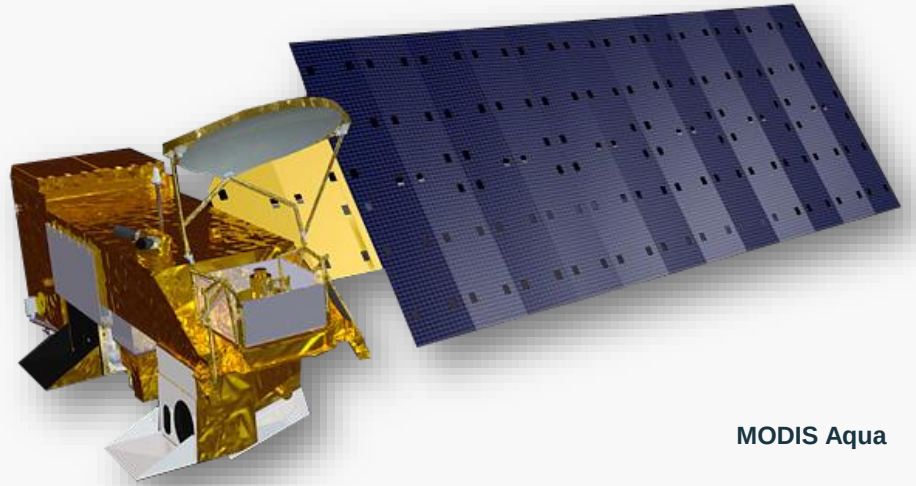
CANOPUS processing system

19 years of satellite imagery timeline

+ 30 Areas Spatial coverage

Incorporation of other sensors in the system (ongoing)

2022 / 2023: CANOPUS publicly available online



MODIS Aqua

Sentinel 3

EO RESEARCH AREAS

(since 2000: 21 years)

- NE Atlantic near-surface ocean mesoscale and large scales space and time variability
- Climate studies
- Ocean productivity
- Ocean and Atmosphere phenomena (Teleconnections)
- Coupled Ocean biogeochemical and physical processes
- Marine Pollution
- Satellite calibration / validation studies
- …

DOP´s **Courses** (Education/Training Skills)

PhD program

Ocean Sciences

Master program

Integrated Studies of the Ocean (MEIO)

(RS course since 2007)

License degree

Ocean Sciences (LCMAR)

Technical degree

Resources and Maritime Activities (TesP)

(new)

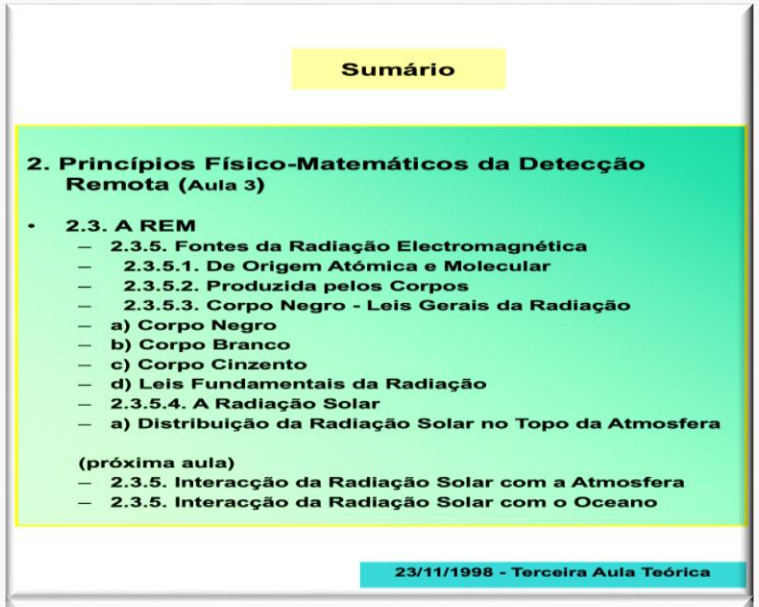
Other **Courses**

Erasmus Mundus

Master course:
Marine Spatial Planning
(Dept. Biology coordination)

ERASMUS Summer School
Master Program

FORmation of Multi-disciplinary Approaches to Training in Earth Observation (FORMAT-EO)

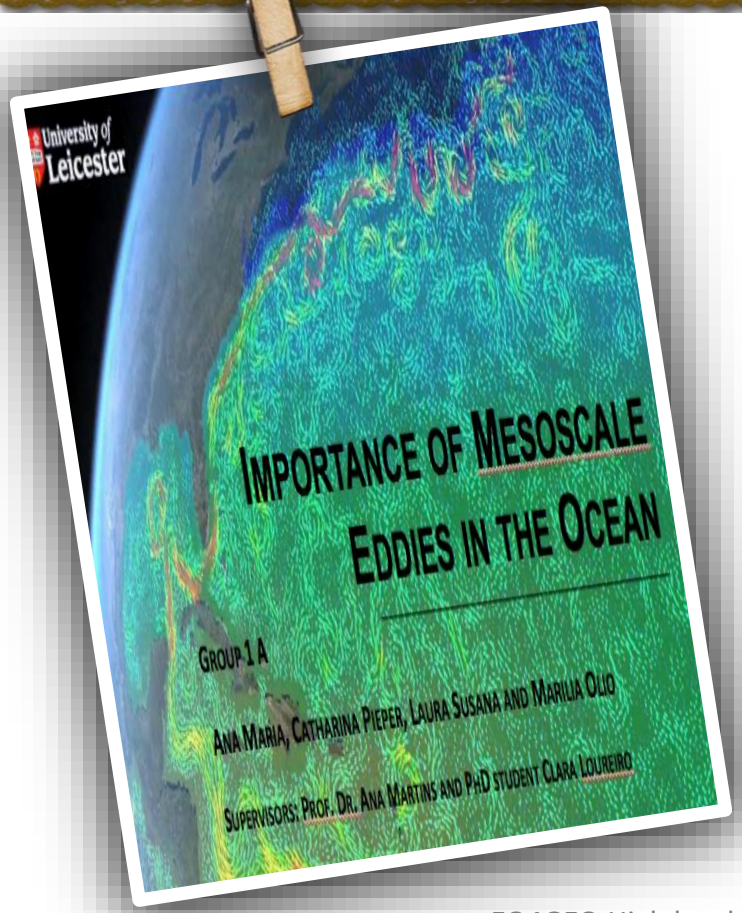


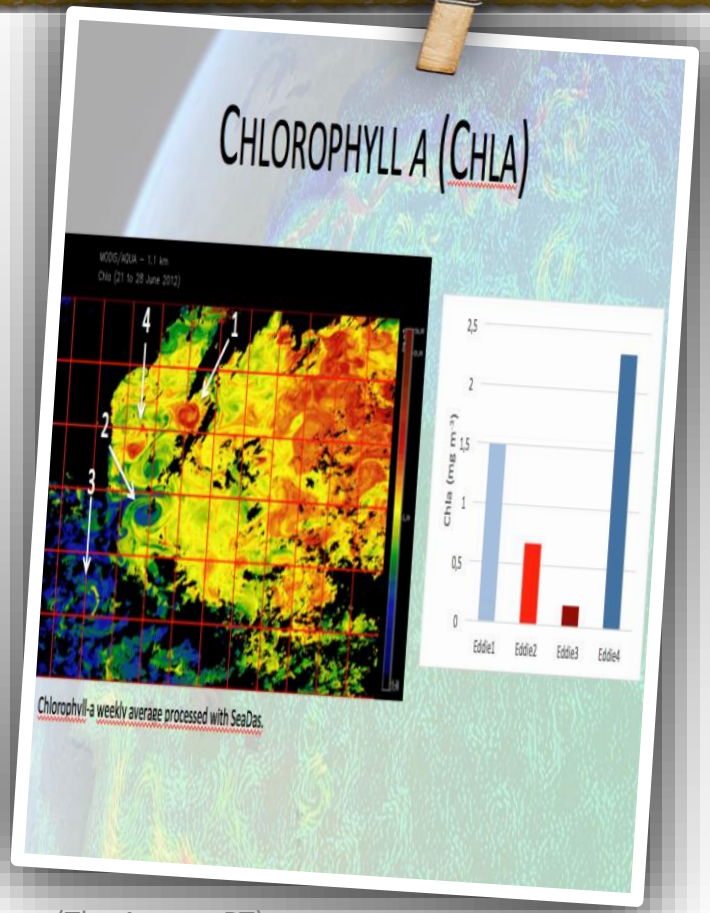
Marine Biology

License course: Marine Biology (Dept. Biology coordination)
Oldest course in RS: (1998 – 2002)

EO Female Aeronautical Engineers + EO Female Oceanographers

Master **Students** - 1st Prize



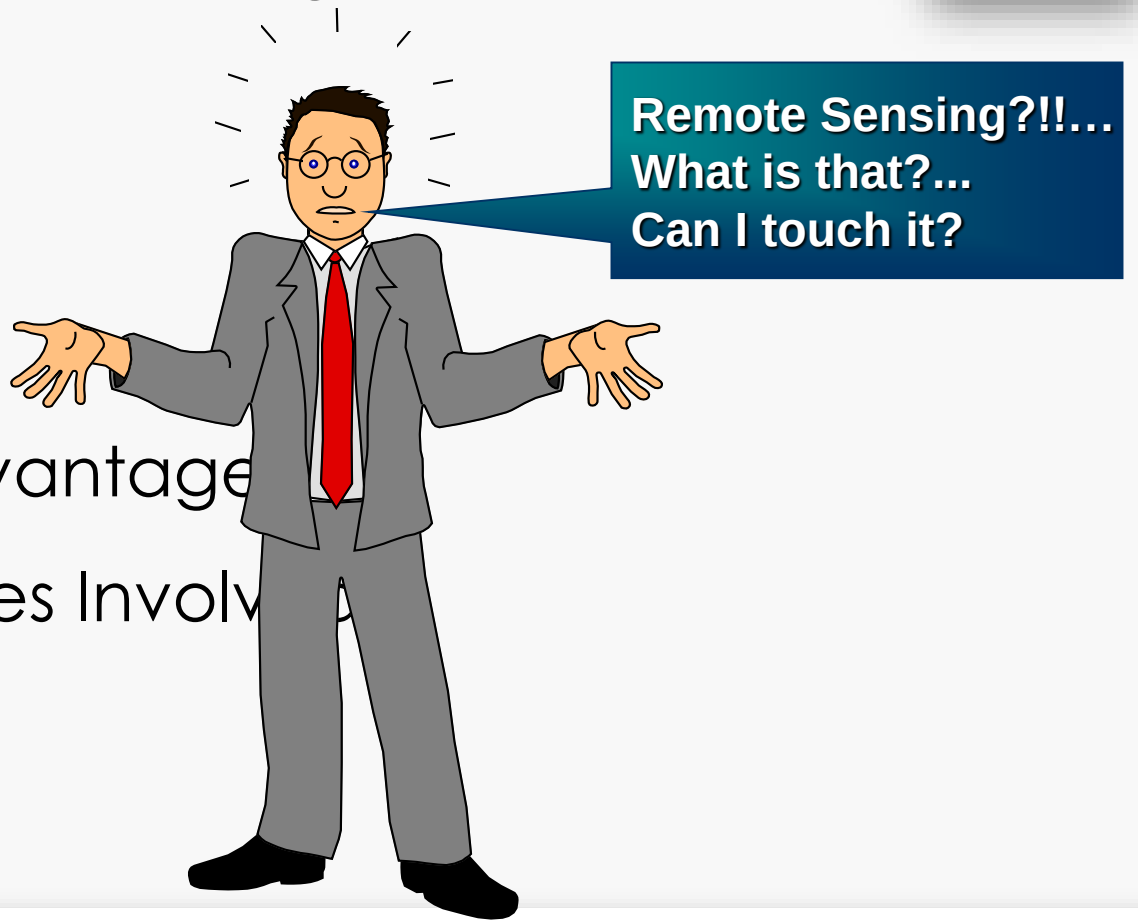


Satellite Oceanography master course

- Course -1 semester – 4 ECTS (T: 16; TP: 12, S:2)
- Weekly classes provide basic concepts in RS and cement these through practical classes where students process different types of ocean satellite imagery (particularly applied for meso to large scale ocean variability)

Satellite Oceanography – main master course topics

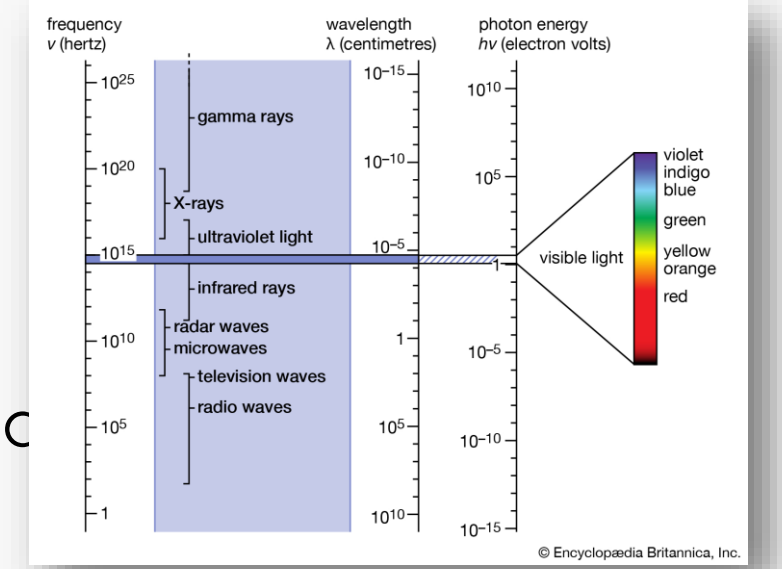
- Section A - Introduction to Remote Sensing Techniques



- 1.1. Introduction to RS
- 1.1.1. Applications
- 1.1.2. Definitions, Concepts and Advantage
- 1.1.3. Brief History and Basic Processes Involv

Satellite Oceanography – main master course topics

- Section A - Introduction to Remote Sensing Techniques (cont.)
- 1.2. Nature of the Electromagnetic Radiation
- 1.2.1. Definitions and Concepts
- 1.2.2. Fundamental laws
- 1.2.3. General behaviour in the Atmosphere and
- 1.3. Basics of Remote Sensing
- 1.4. Satellites and Sensors
- 1.5. Image Processing and Image Interpretation



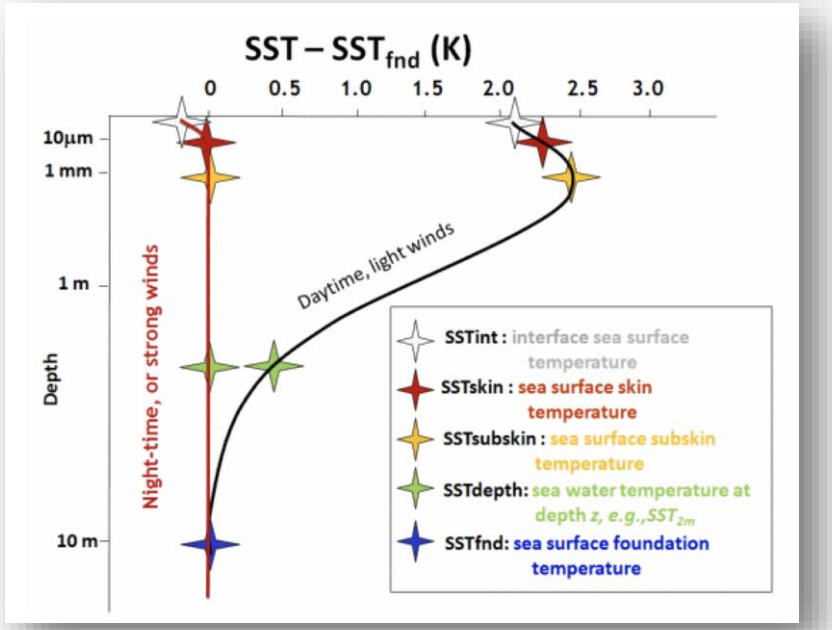
Satellite Oceanography – main master course topics

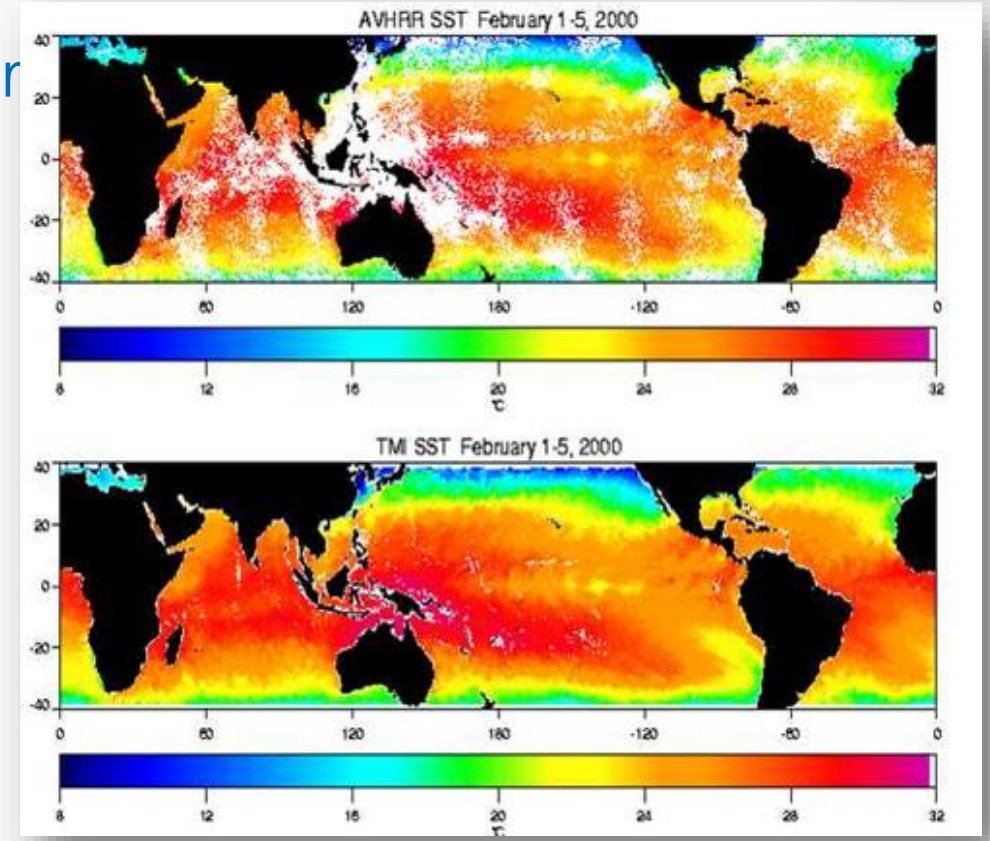
- Section B - Application to Oceanography
- 2.1. Introduction
- 2.2. RS in the Visible range
- 2.2.1. Examples
- 2.2.1.1. Types of sensors (CZCS, SeaWiFS, MODIS, MERIS, IRS-P4, Sentinel-3, etc.)
- 2.2.1.2. Geophysical parameters obtained and their applications to the Oceanographic Study
- 2.2.1.3. Problems in calibration and application of these techniques to the study of Ocean Colour

https://pace.oceansciences.org/docs/werdell_and_mcclain_2019_eos3.pdf

Satellite Oceanography – main master course topics

- Section B - Application to Oceanography
- 2.3. RS in the Thermal Infrared range
- 2.4. RS in the Microwave and Radiowave r





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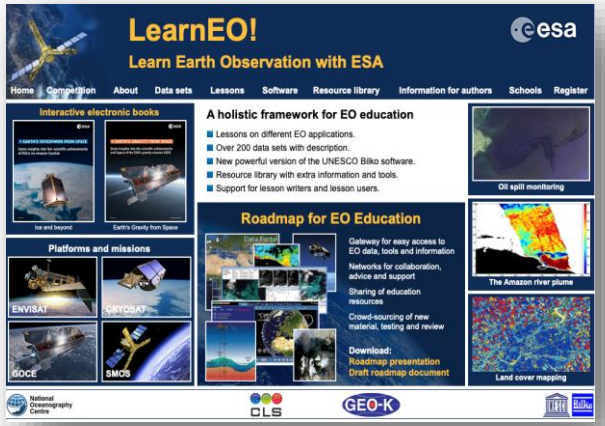
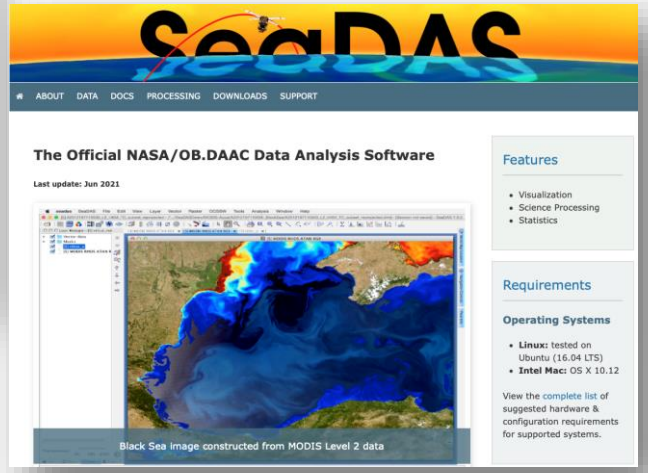
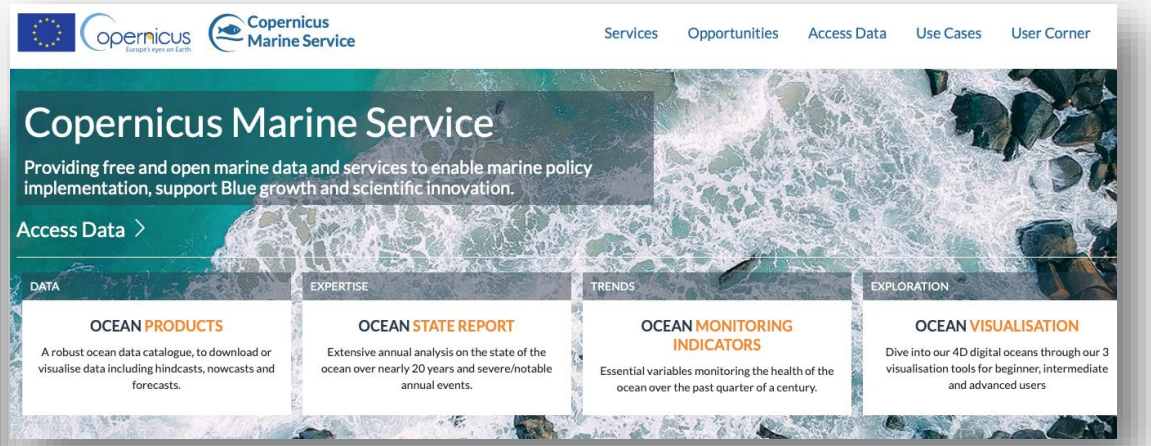
Satellite Oceanography – main master course topics

- Section B - Application to Oceanography
- 2.5. Types of Software for processing RS data
- 2.6. Current Satellite Oceanography development and operational programs



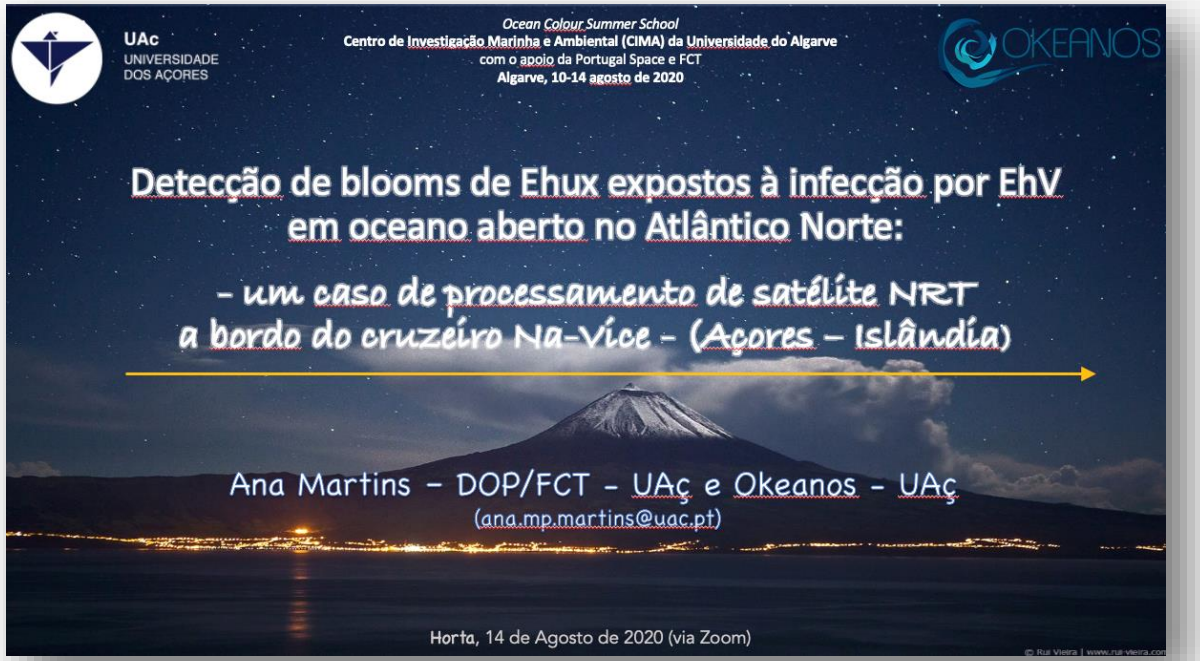




EO TOPICS FOR COLLABORATION / DEVELOPMENT

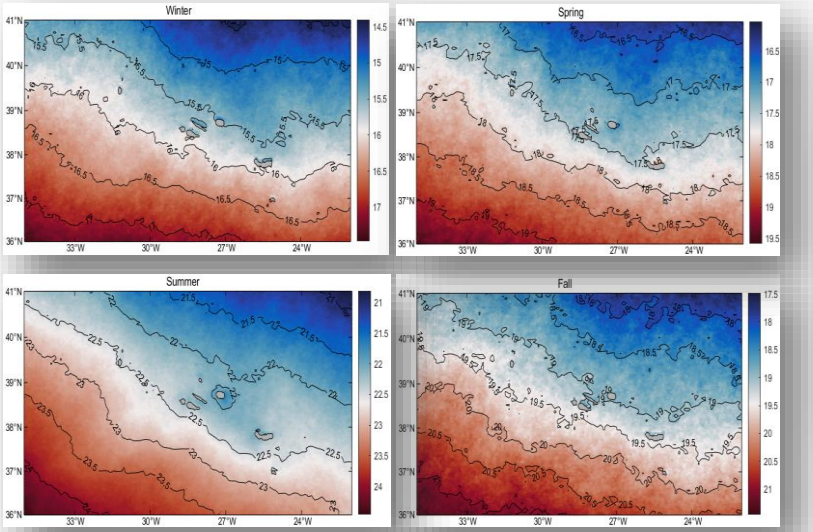
- Education: collaboration in summer courses and/or license / master / PhD national / international programs and/or students (co-)supervision

https://www.facebook.com/CIMA.UAlg/photos/pcb.3075979185784077/3075971042451558/?type=3&theater

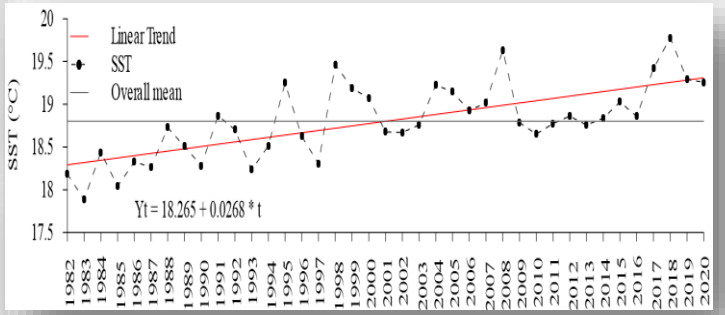


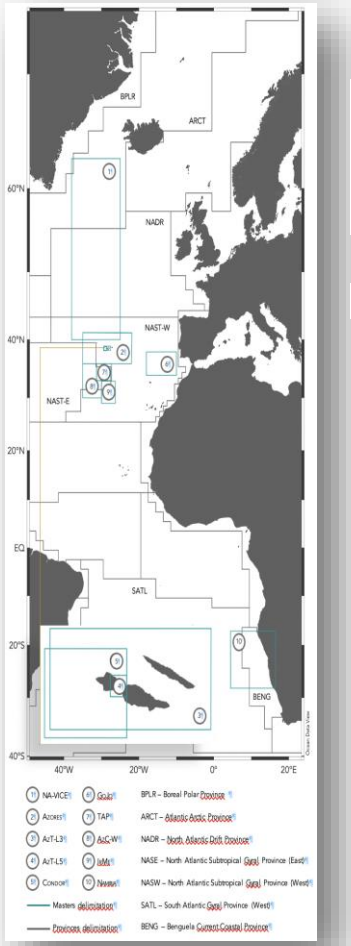
EO TOPICS FOR COLLABORATION / DEVELOPMENT

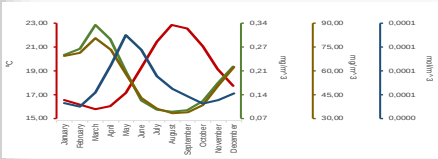
- **Science:** Ocean productivity and space-time variability, relations to climate change and variability, marine pollution, development of new algorithms (e.g., HABs, PFTs, jellyfish, tracking marine litter, etc).

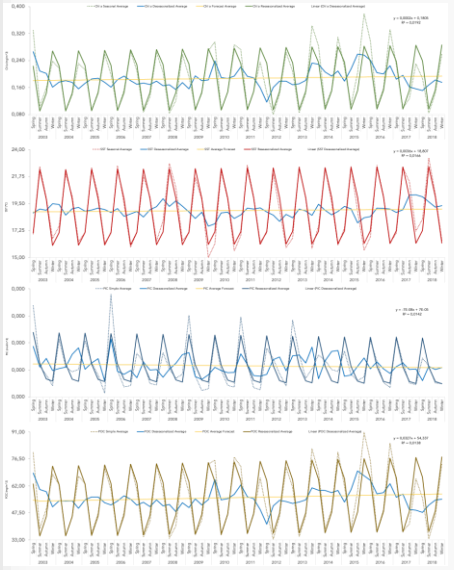


(Tokat et al., 2021) - *in prep*





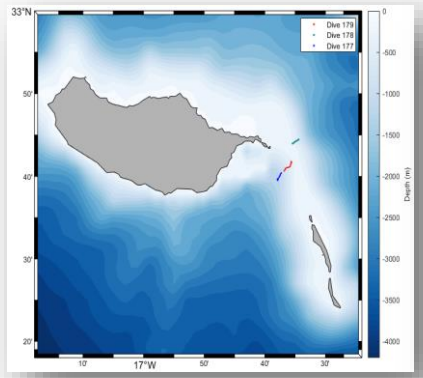


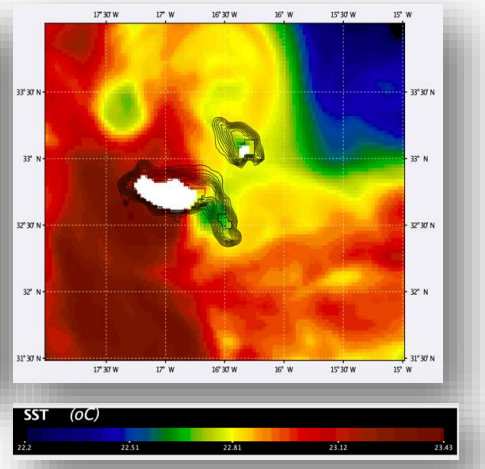


(Loureiro et al, 2021) – *in prep*

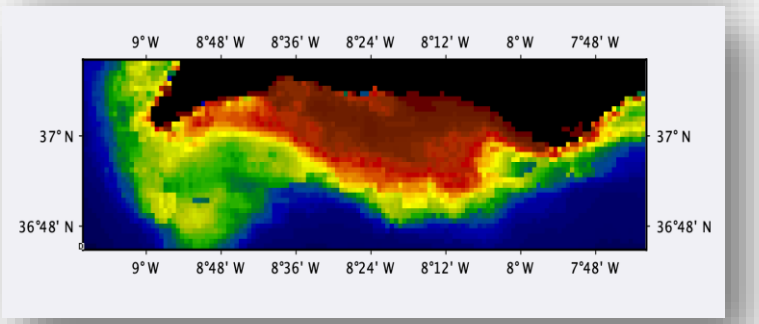
EO TOPICS FOR COLLABORATION / DEVELOPMENT

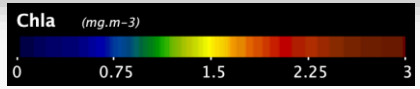
- Science (with private sector): Ocean productivity and space-time variability, relations to climate change and variability, marine pollution, development of new algorithms (e.g., HABs, PFTs, jellyfish, tracking marine litter, etc).





(Braga-Henriques et al., 2021) - *in prep*





(Suleiman et al, 2021) – *in prep*

EO TOPICS FOR COLLABORATION / DEVELOPMENT

- Outreach: Contribution to EO dissemination to public authorities and general public

EO public talks

Thank you very much!

Which direction **NOW?!...**

www.eo4geo.eu

@EO4GEOtalks

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