TÉCNICO LISBOA

Observatory for the Atlantic

Modelling for sustainable development

Ramiro.Neves@tecnico.ulisboa.pt

www.maretec.org

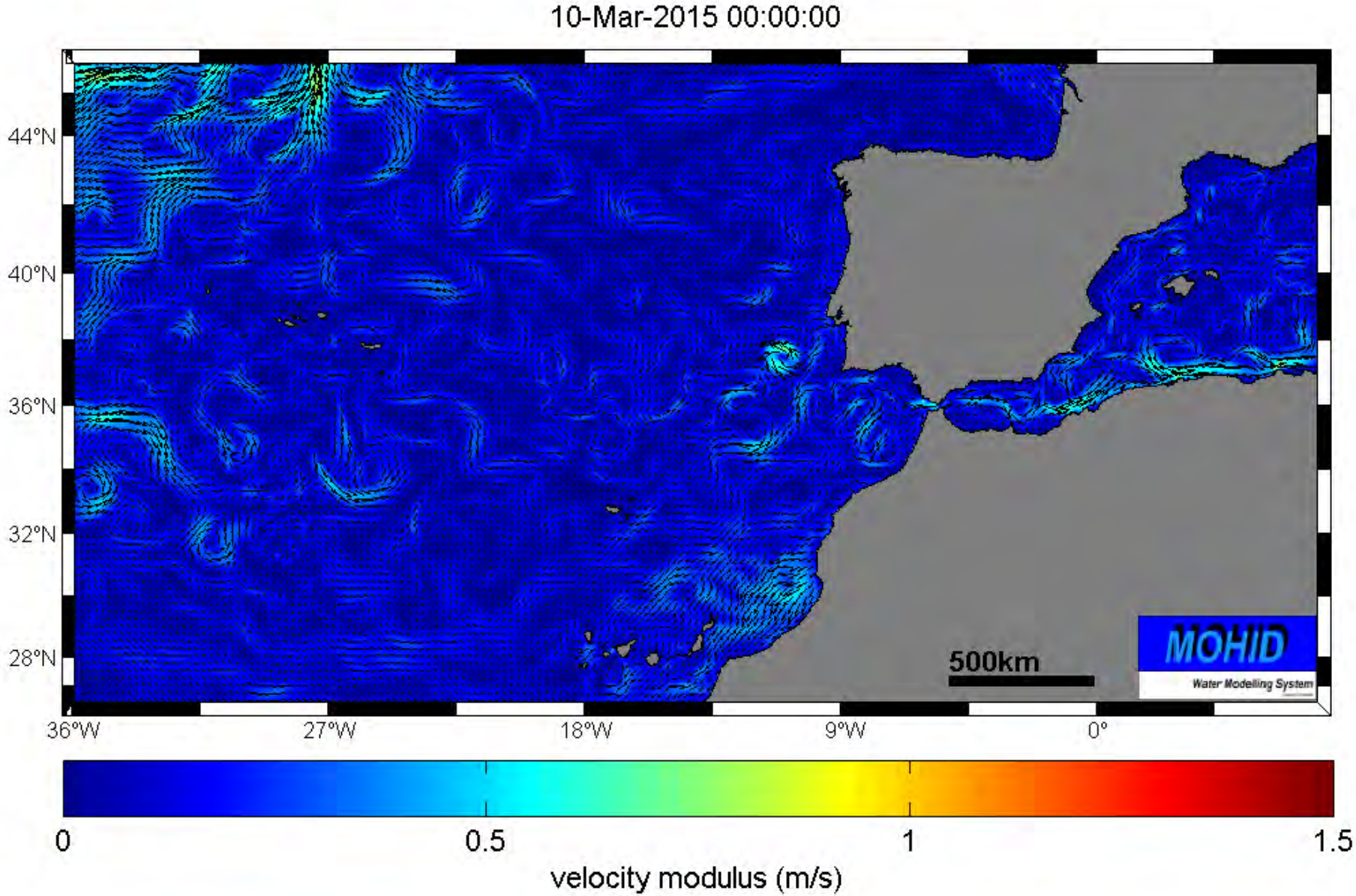
www.tecnico.ulisboa.pt

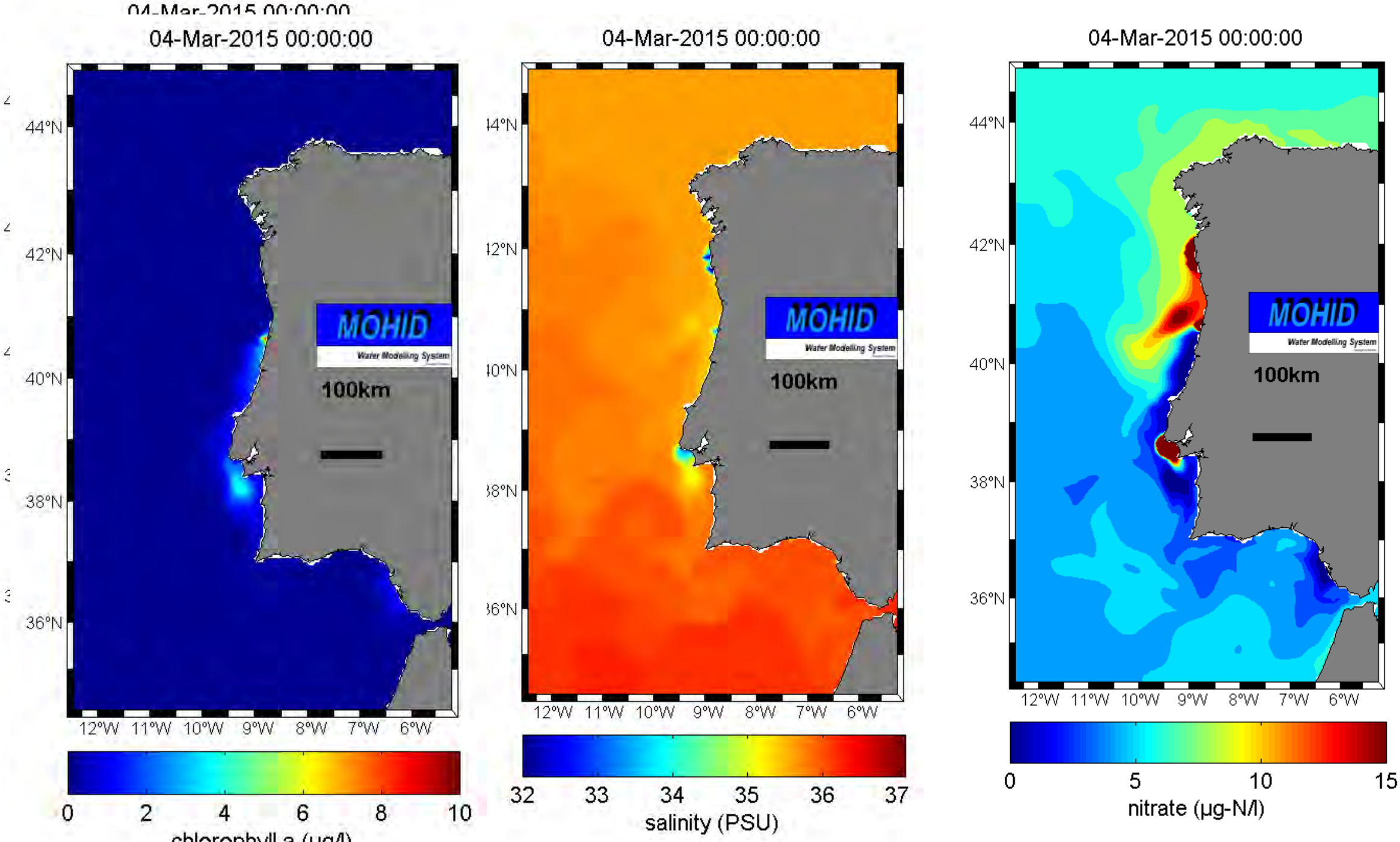
Why Modelling?

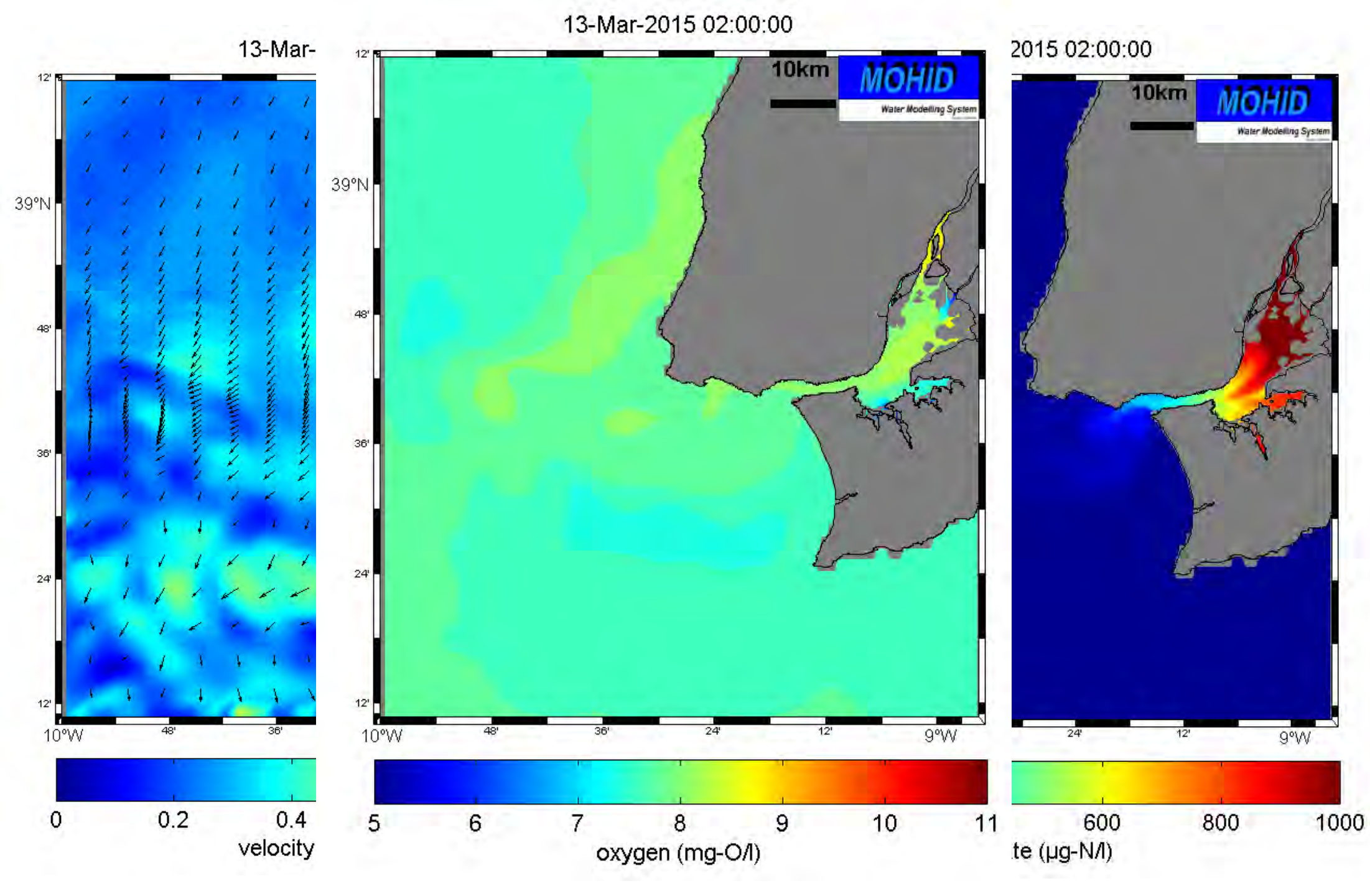
- An Observatory has to combine existing knowledge and data:
  - To generate comprehensive assessments,
  - To generate solutions,
  - To support training and education,
  - To identify gaps and generate new knowledge.

- Modelling combines process knowledge with point source data in order to provide solutions continuous in space and time, contributing to all the requisites of an Observatory.

Regional Scale Model



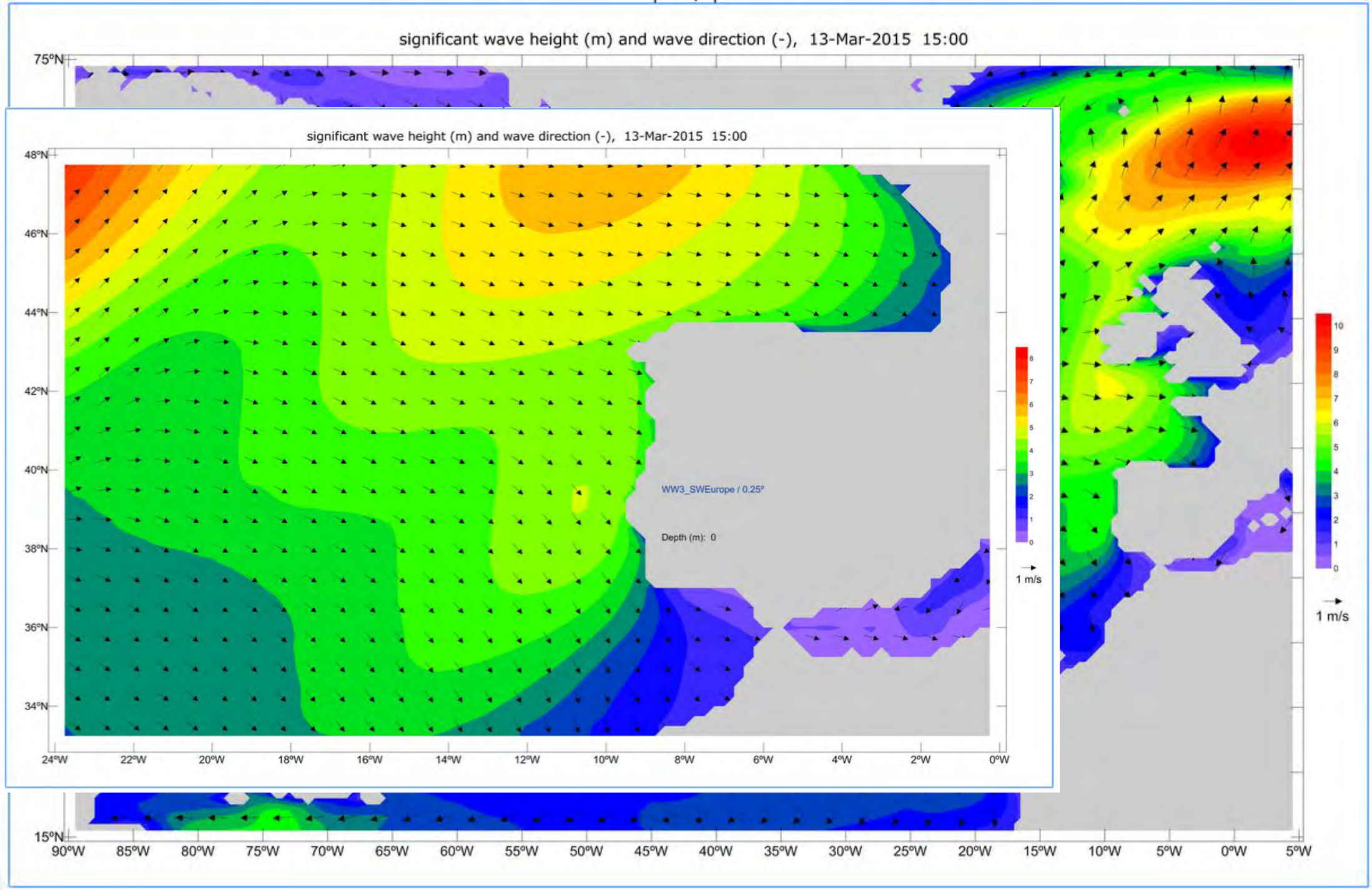

04-Mar-2015 00:00:00
44°N
42°N
40°N
38°N
36°N
12°W 11°W 10°W 9°W 8°W 7°W 6°W
MOHID
Water Modelling System
100km
0 2 4 6 8 10
chlorophyll a (µg/l)
04-Mar-2015 00:00:00
12°W 11°W 10°W 9°W 8°W 7°W 6°W
MOHID
Water Modelling System
100km
32 33 34 35 36 37
salinity (PSU)
04-Mar-2015 00:00:00
44°N
42°N
40°N
38°N
36°N
12°W 11°W 10°W 9°W 8°W 7°W 6°W
MOHID
Water Modelling System
100km
0 5 10 15
nitrate (µg-N/l)


13-Mar-
13-Mar-2015 02:00:00
2015 02:00:00
12'
39°N
48'
36'
24'
12'
10°W
48'
36'
24'
12'
9°W
10km
MOHID
Water Modelling System
0
0.2
0.4
velocity
5
6
7
8
9
10
11
oxygen (mg-O/l)
600
800
1000
te (µg-N/l)

Domains:

- (•) **Hydrodynamic**
- ( ) **Waves**
- ( ) **Watersheds**

Operational Modelling Charts
click here


significant wave height (m) and wave direction (-), 13-Mar-2015 15:00
75°N
48°N
46°N
44°N
42°N
40°N
38°N
36°N
34°N
24°W
22°W
20°W
18°W
16°W
14°W
12°W
10°W
8°W
6°W
4°W
2°W
0°W
WW3_SWEurope / 0.25°
Depth (m): 0
1 m/s
1 m/s
15°N
90°W
85°W
80°W
75°W
70°W
65°W
60°W
55°W
50°W
45°W
40°W
35°W
30°W
25°W
20°W
15°W
10°W
5°W
0°W
5°W

Maretec Operational | WebGIS|MARETEC | Operational Model of | WebGIS|MARETEC | Modelling Data|MARE | AquaSafe Web GIS

Ramiro

brasilocean.maretec.org/webgis/

Apps | Google+ | Scopus - Author det... | CloudPT | Scopus - Document ... | ORCID | Outlook - neves.ram... | Seagate Remote Acc... | Plataforma Lattes | Other bookmarks

Navigate | Zoom In | Zoom Out | Distance | Area | Create Point Spill | Max Extent | Help

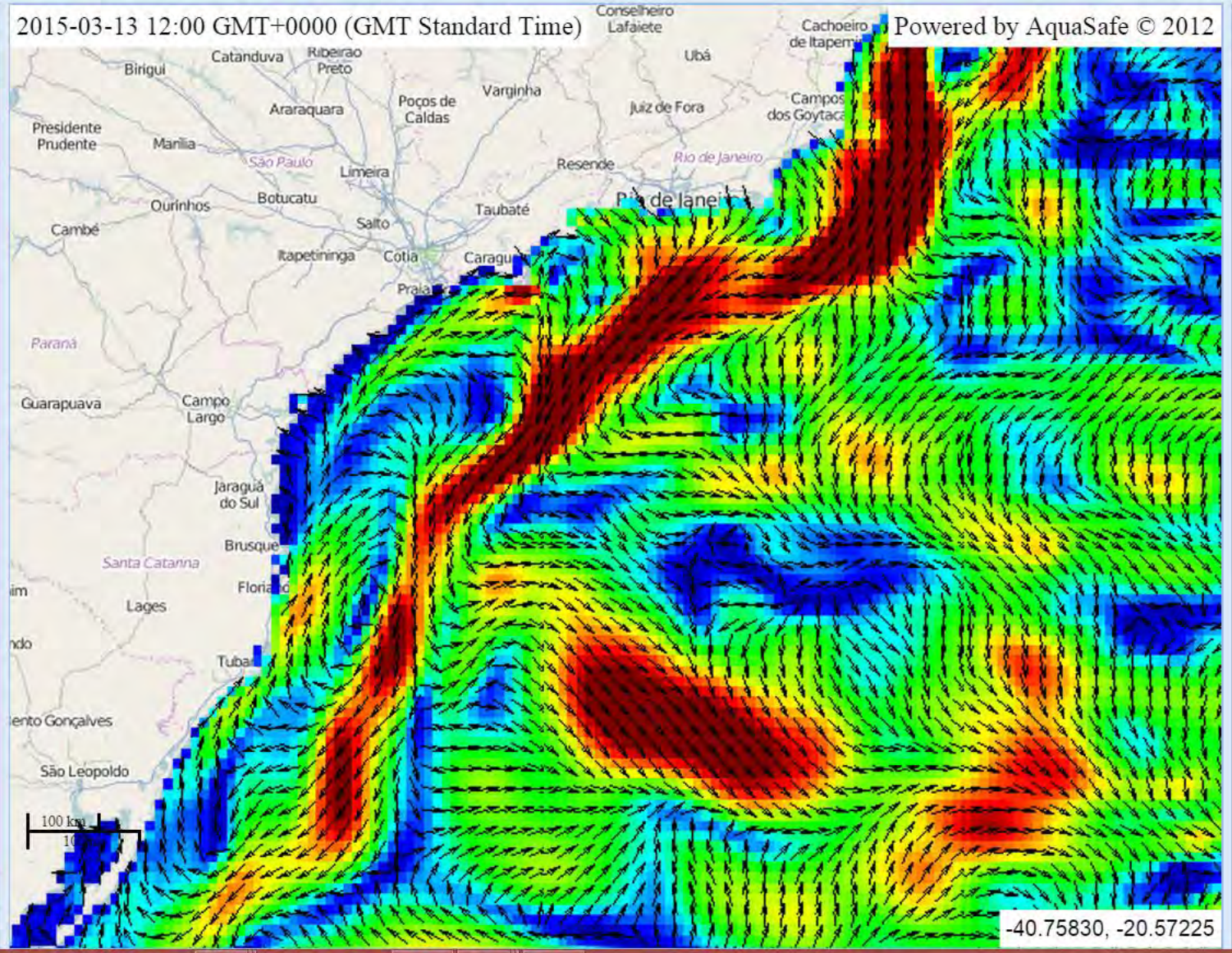
Navigation

Layers

- Currents
  - MyOcean Intensity
    - 0 m/s — 0.5 m/s
  - Mohid Level 2 Intensity
    - 0 m/s — 0.5 m/s
  - Mohid Level 3 Intensity
    - 0 m/s — 0.5 m/s
  - MyOcean Direction
  - Mohid Level 2 Direction
  - Mohid Level 3 Direction
- Water Temperature
- Salinity
- Water Level
- Wind
- Air Temperature

Runs

Maps



Info

Mohid Level 2 Direction

Property:

Currents Direction

Owner:

IST, Universidade dos Açores and Hidromod

Time:

Under 2015-03-06 23:00 — 2015-03-15 00:00 Over

Step: 1H

Opacity:

POR 05:23

Aulas Rio - MOHID Studio - Professional

Home | Project | Map | XY Graph | Tools | File Conversion | Environmental Monitoring | Administration

Local Raster | Web WMS | Web Tiles — Background

XYZ Points | Grid Data | Grid | Network | Polygon — ASCII

HDF Map | Vector Field | Drainage Network | Particle Field — HDF

SHP | XML | HGT — Vector Data

Remove | Move Up | Move Down | Style Manager — Manage Layers

Save Image | Save Animation — Images

Map | Explorer

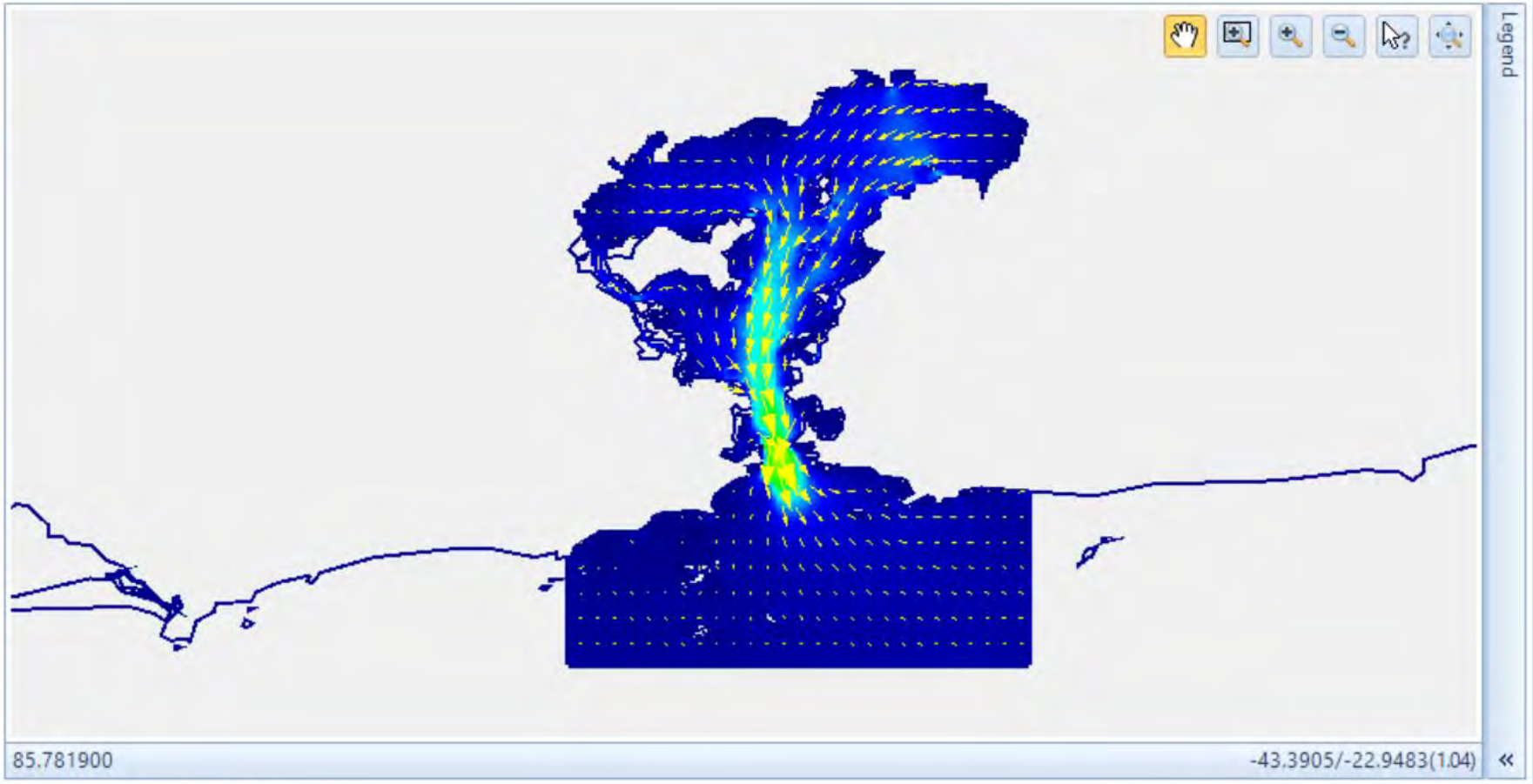
Layers

Visible	Name
☑	Hydrodynamic_12 [velocity]
☑	Hydrodynamic_12 [velocity modulus]
☑	america_sul_e_antartico_coastline

Date & Time

2014-07-10 00:00:00

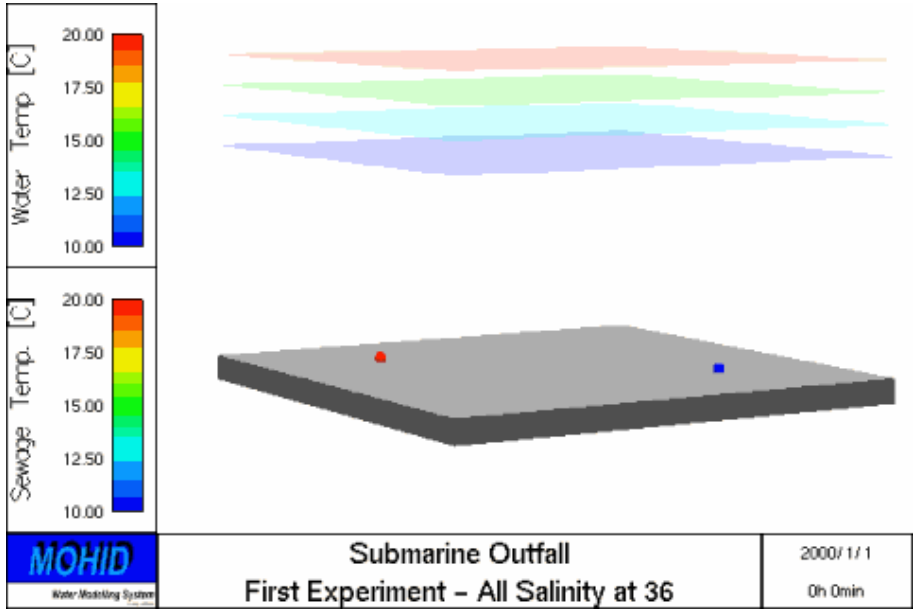
Map

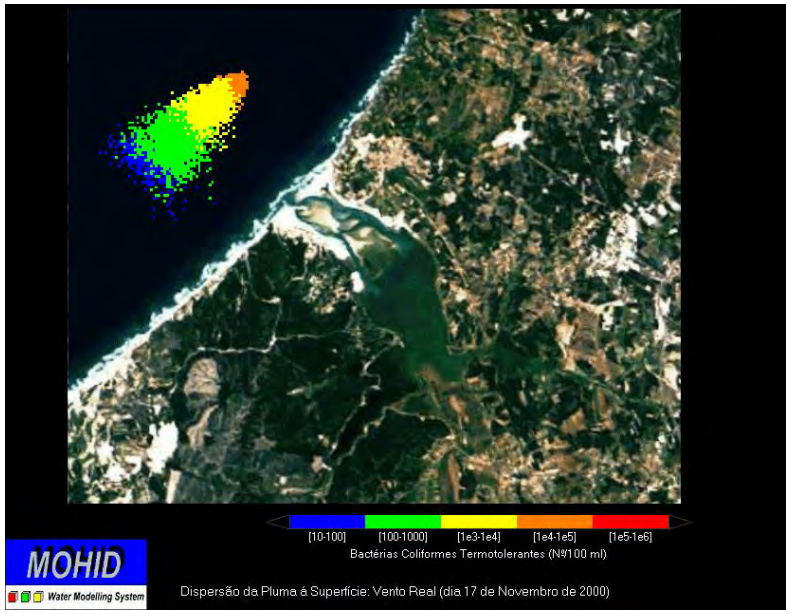


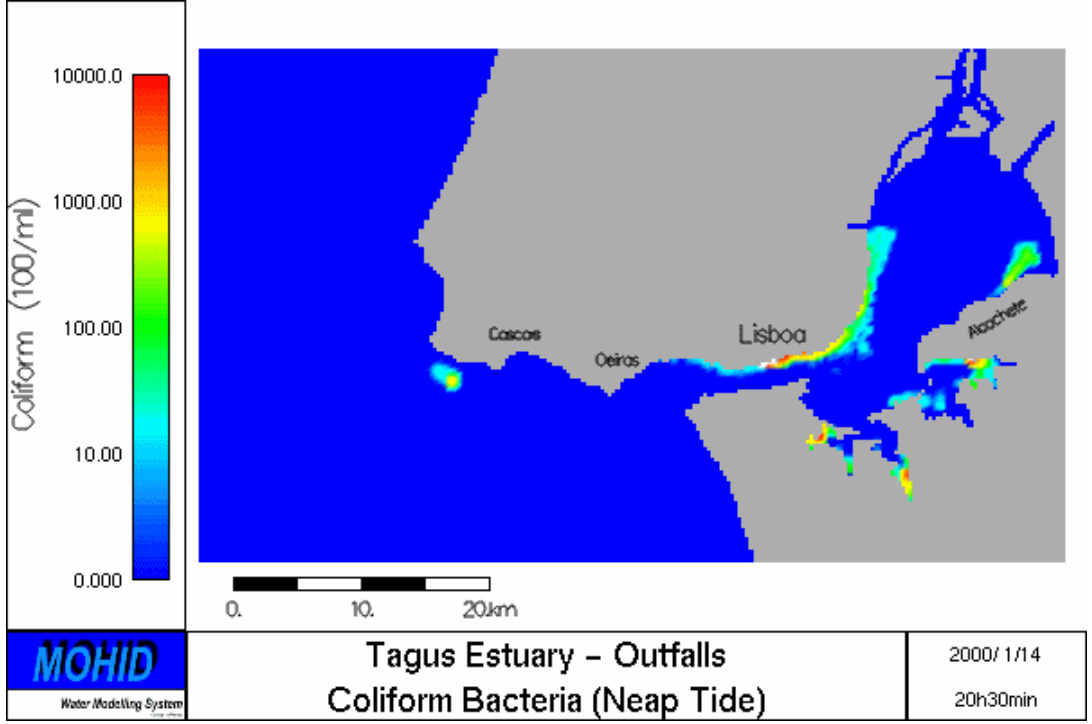
POR 22:27

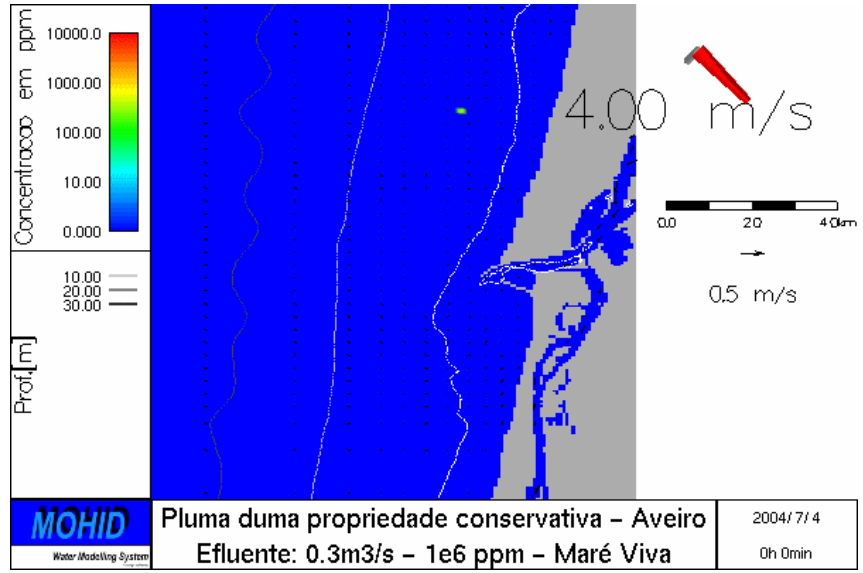
3D lagrangian model

MOHID
Water Modelling System

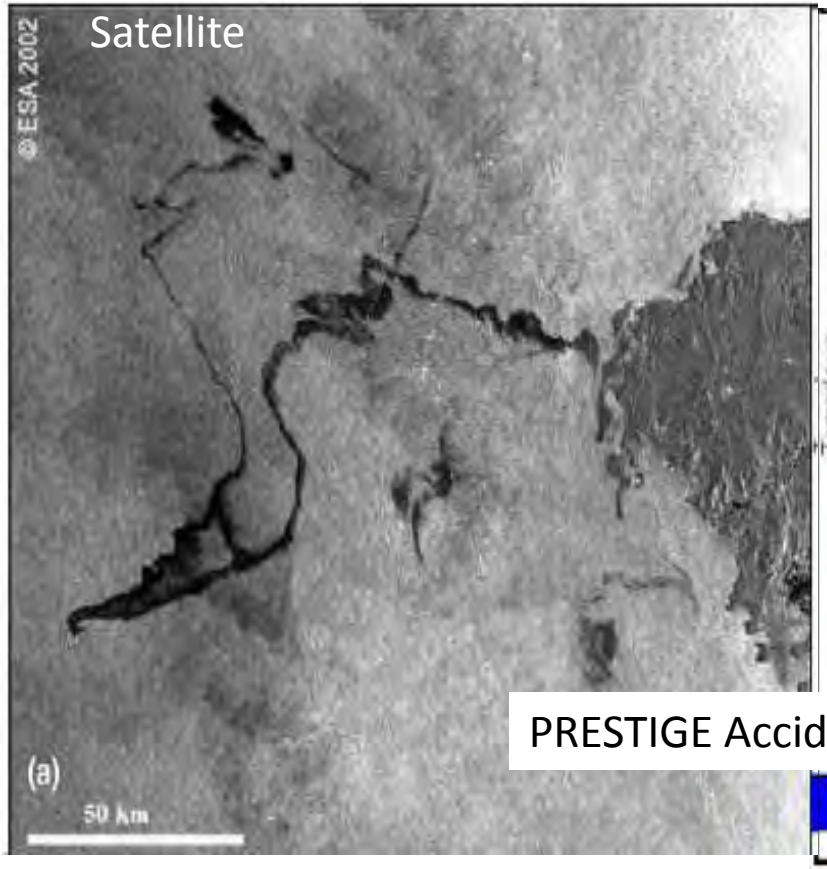





Coliform (100/ml)
10000.0
1000.00
100.00
10.00
0.000
Cascais
Oeiras
Lisboa
Alcochete
0.
10.
20km
MOHID
Water Modelling System
Tagus Estuary - Outfalls
Coliform Bacteria (Neap Tide)
2000/ 1/14
20h30min

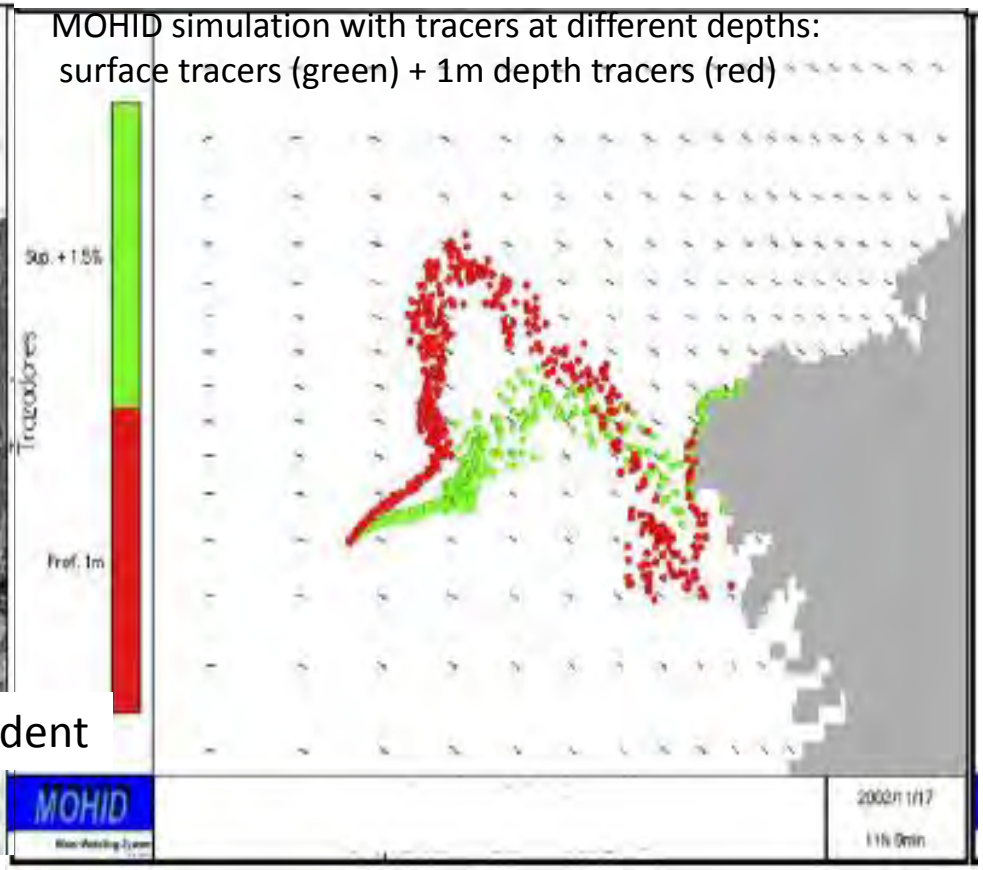

Concentracao em ppm
10000.0
1000.00
100.00
10.00
0.000
Prof.[m]
10.00
20.00
30.00
4.00 m/s
0.0
2.0
4.0km
0.5 m/s
MOHID
Water Modelling System
Pluma duma propriedade conservativa - Aveiro
Efluente: 0.3m3/s - 1e6 ppm - Maré Viva
2004/ 7/ 4
0h 0min

Examples of Model Applications



PRESTIGE Accident

MOHID simulation with tracers at different depths:
surface tracers (green) + 1m depth tracers (red)



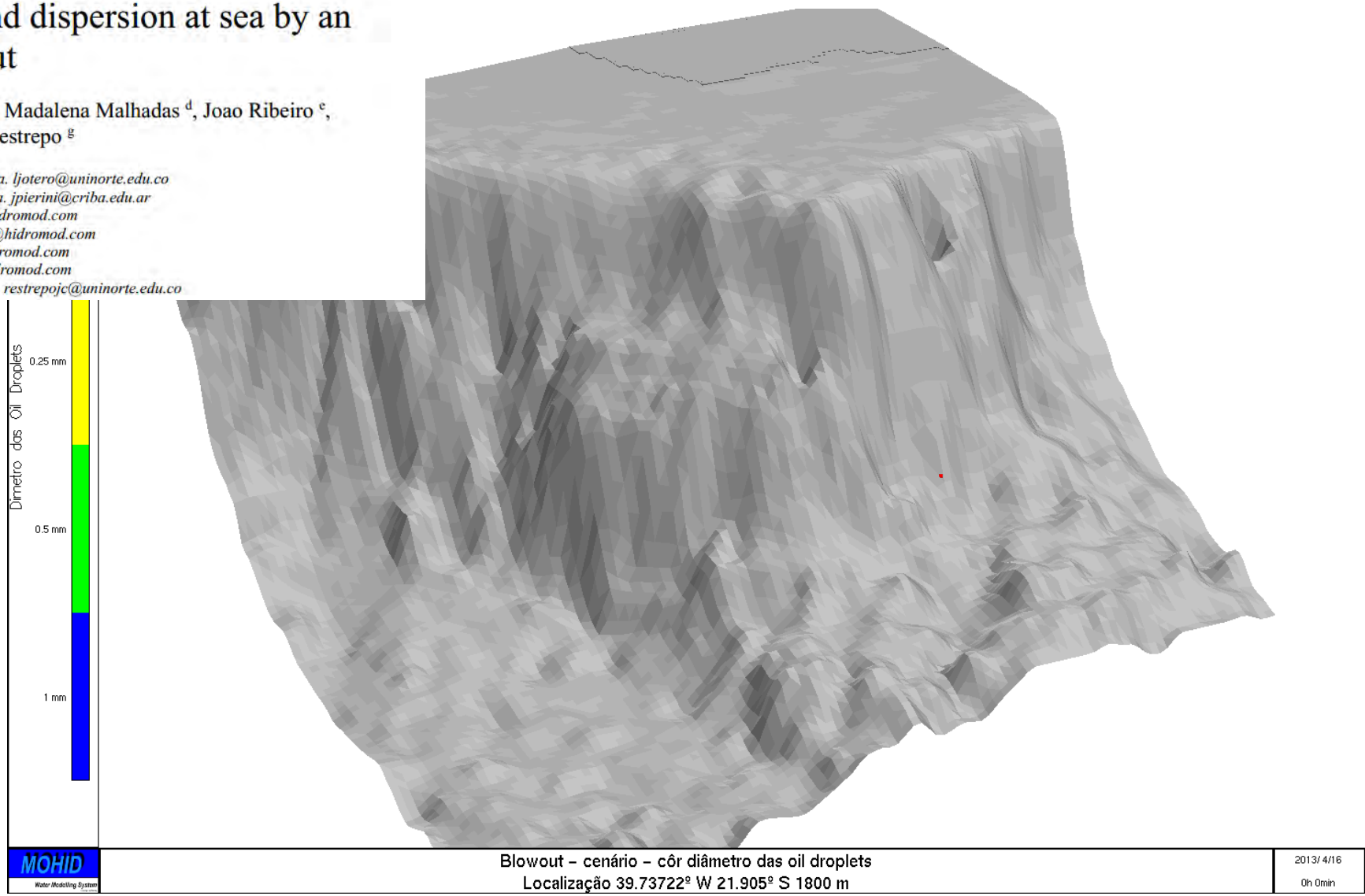
UNIVERSIDAD NACIONAL DE COLOMBIA
SEDE MEDELLÍN
FACULTAD DE MINAS

DYNA
http://dyna.medellin.unal.edu.co/

Three-dimensional oil spill transport and dispersion at sea by an event of blowout

Luis Otero-Díaz [a], Jorge O. Pierini [b], Paulo Chambel-Leitao [c], Madalena Malhadas [d], Joao Ribeiro [e], Jose Chambel-Leitao [f] & Juan Restrepo [g]

[a] *Departamento de Física, Universidad del Norte, Colombia. ljotero@uninorte.edu.co*
[b] *CIC-CCT BB, Universidad Nacional del Sur, Argentina. jpierini@criba.edu.ar*
[c] *HIDROMOD, Portugal. paulo.chambel@hidromod.com*
[d] *HIDROMOD, Portugal. madalena.malhadas@hidromod.com*
[e] *HIDROMOD, Portugal. joao.ribeiro@hidromod.com*
[f] *HIDROMOD, Portugal. jose.chambel@hidromod.com*
[g] *Departamento de Física, Universidad del Norte, Colombia. restrepojc@uninorte.edu.co*

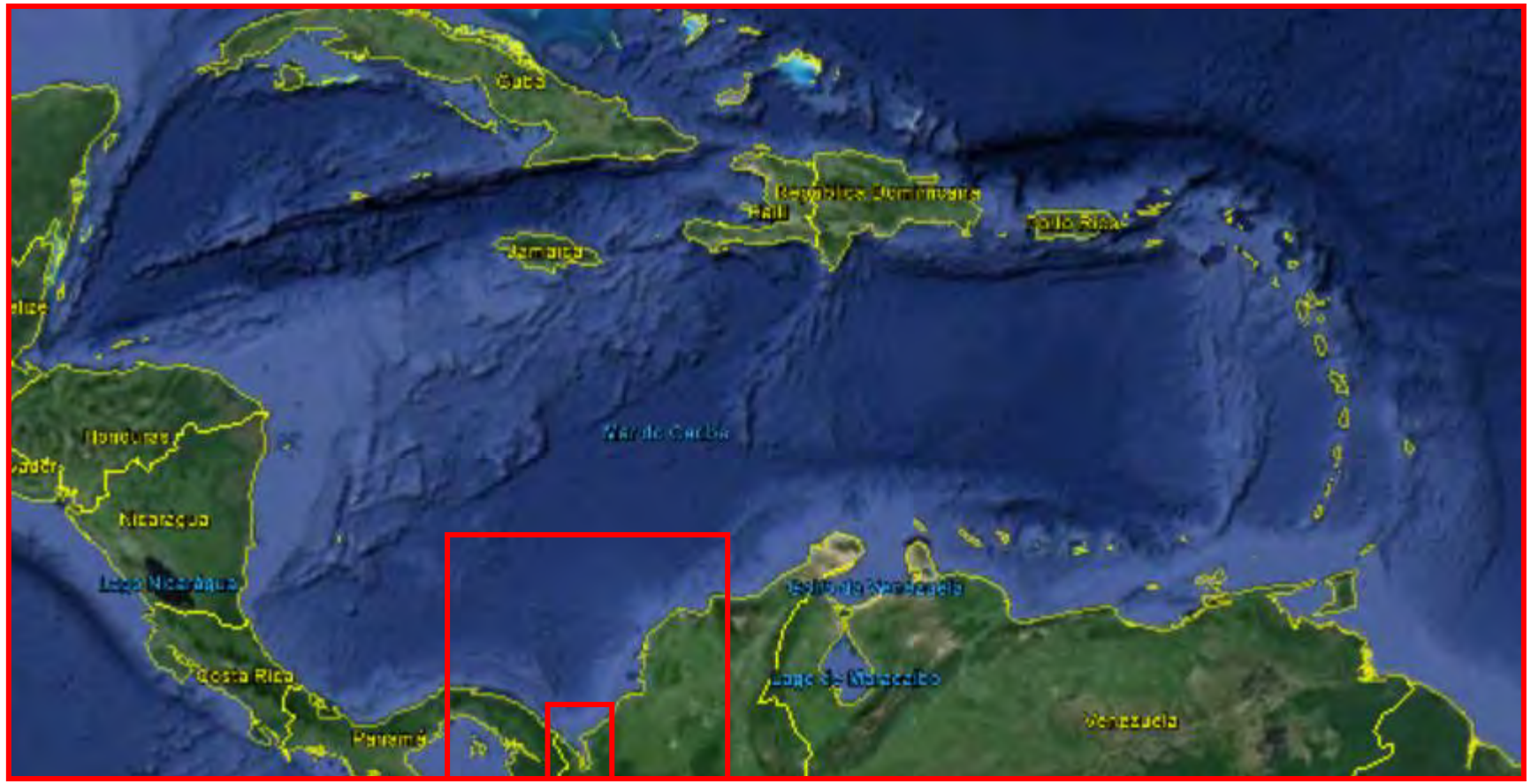


Dynamic Risk Tool: risks + surface currents

Summary

Modelling is a powerful tool to:

- Integrate scales,
- Integrate disciplines,
- Build solutions
- Provide services
- Transfer knowledge
- Support Training.

- It has to be part of the Atlantic Observatory!

Model for Caribe