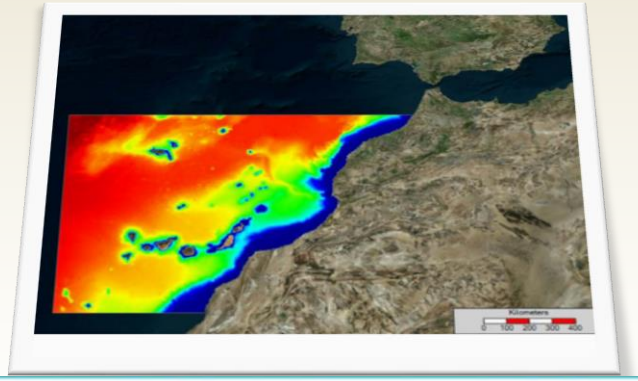
Multinational Response and Preparedness to Oil and Chemical Spills



Consortium: MARETEC-IST (coordination; Portugal)- www.maretec.org ; Action Modulers (Portugal) – www.actionmodulers.com ; CEDRE (France) wwz.cedre.fr ; PLOCAN – Plataforma Oceanica de Canarias (Spain)- www.plocan.eu; Univ. Las Palmas de Gran Canaria (Spain) - www.pct.ulpgc.es; INRH – Institut National de Recherche Halieutique (Morocco) - http://www.inrh.ma/ ; OOM- ARDITI – Observatório Oceânico da Madeira (Portugal) - http://oom.arditi.pt/

Support / Advisory Board: APRAM / Portos da Madeira (Portugal); Proteção Civil da Madeira (Portugal); Directorate General of Security and Emergency of Canarias Government, Spain (Spain); SASEMAR (Spain); DCPM-DGAM (Portugal); African Maritime Safety and Security Agency (AMSSA); Secretary General for Marine Fisheries at the Moroccan Ministry of Agriculture and Marine Fisheries of Morocco; Ministry of Energy, Mining, Water and Environment of Morocco; Marine Traffic (UK); MARINER project (coordination: CETMAR); HNS-MS project (coordination: RBINS)

Rodrigo Fernandes

Acronym: MARPOCS
Grant Agreement no: ECHO/SUB/2015/713854/PREP08

European Commission
HUMANITARIAN AID AND CIVIL PROTECTION

1. Background | The region of application

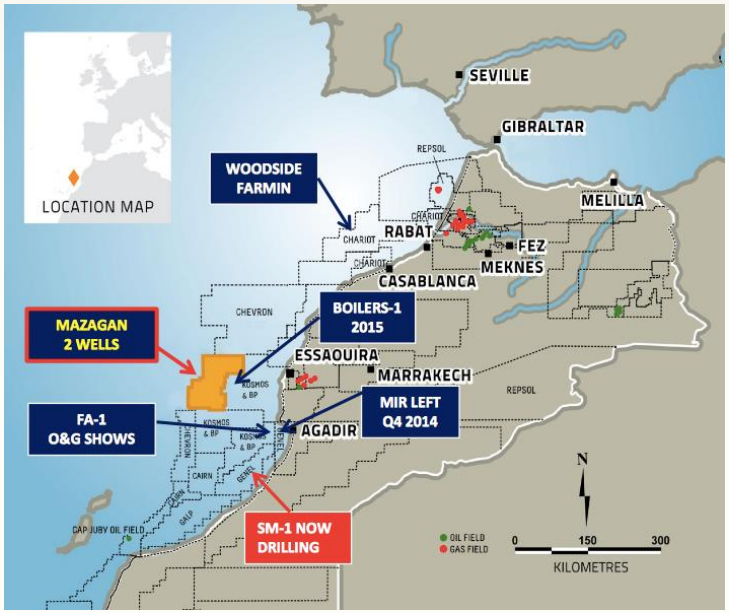
Lisbon Agreement (CILPAN):

- Active since 1 February 2014
- Main goal: a mechanism to ensure cooperation between the Contracting Parties in the case of pollution incidents
- Geographical boundaries with Bonn Agreement (North Sea) and Barcelona Convention (Mediterranean Sea)

1. Background | Oil spills

Risk of oil spills threatening cross-border region:

- Area with high socio-economic dependence on marine coastal resources (e.g. fisheries, tourism)
- Accidents: Oleg Naydenov (2015, Gran Canaria)
- Oil and gas exploration in Morocco



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HUMANITARIAN AID AND CIVIL PROTECTION

2. Objectives and expected results

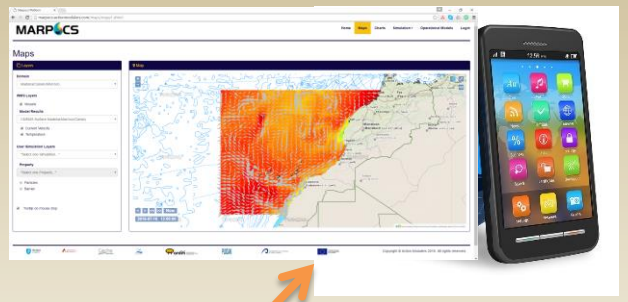
Main Objective:

- Common operational framework for preparedness and response to oil and HNS spills in the Atlantic sub-region involving Morocco, Madeira and Canary Islands in the context of Lisbon Agreement
  - Built on present and previous EU efforts (e.g. EMSA / CLEANSEANET; MAR-ICE), international strategies (OPRC-HNS) and R&D projects (e.g. ARCOPOL platform; HNS-MS; MARINER)

Expected results:

- Operational and tactical **model-based DSS**'s supported by 3D **oil & HNS spill modelling system** (MOHID), using new and/or improved **high resolution metocean forecasting systems**
- **Automatic early warning spill forecasting** connected to existing maritime surveillance automatic services (EMSA's CLEANSEANET service: satellite-based oil spill detection)
- **Training sessions, courses, exercises and hands-on demonstrations**, with special focus on emergency preparedness or response scenarios involving multiple nations
- Characterization of typical and dynamic **shoreline holistic risk from spills** in the area of interest (in order to identify "hot spots", to improve management of the distribution of response resources, and to allow real time risk shoreline monitorization)

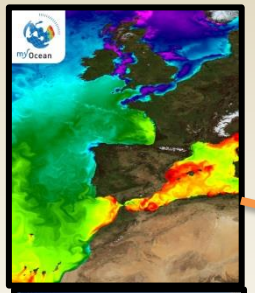
Framework

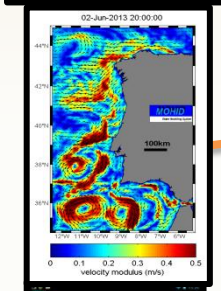


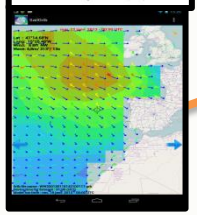
MARPOCS platform
(website, mobile-friendly)

WMS

REST API







Metocean data

OPeNDAP

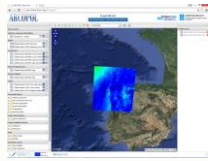
ftp

Action Server

Export to image (png)

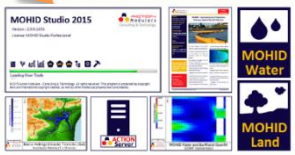
Export to KML (Google Earth)

Google earth



GeoServer

Other WMS clients (e.g. Geoserver) or RESTful API clients



MOHID Studio (PC)

AIS

(demo – to discuss with MarineTrafffic)

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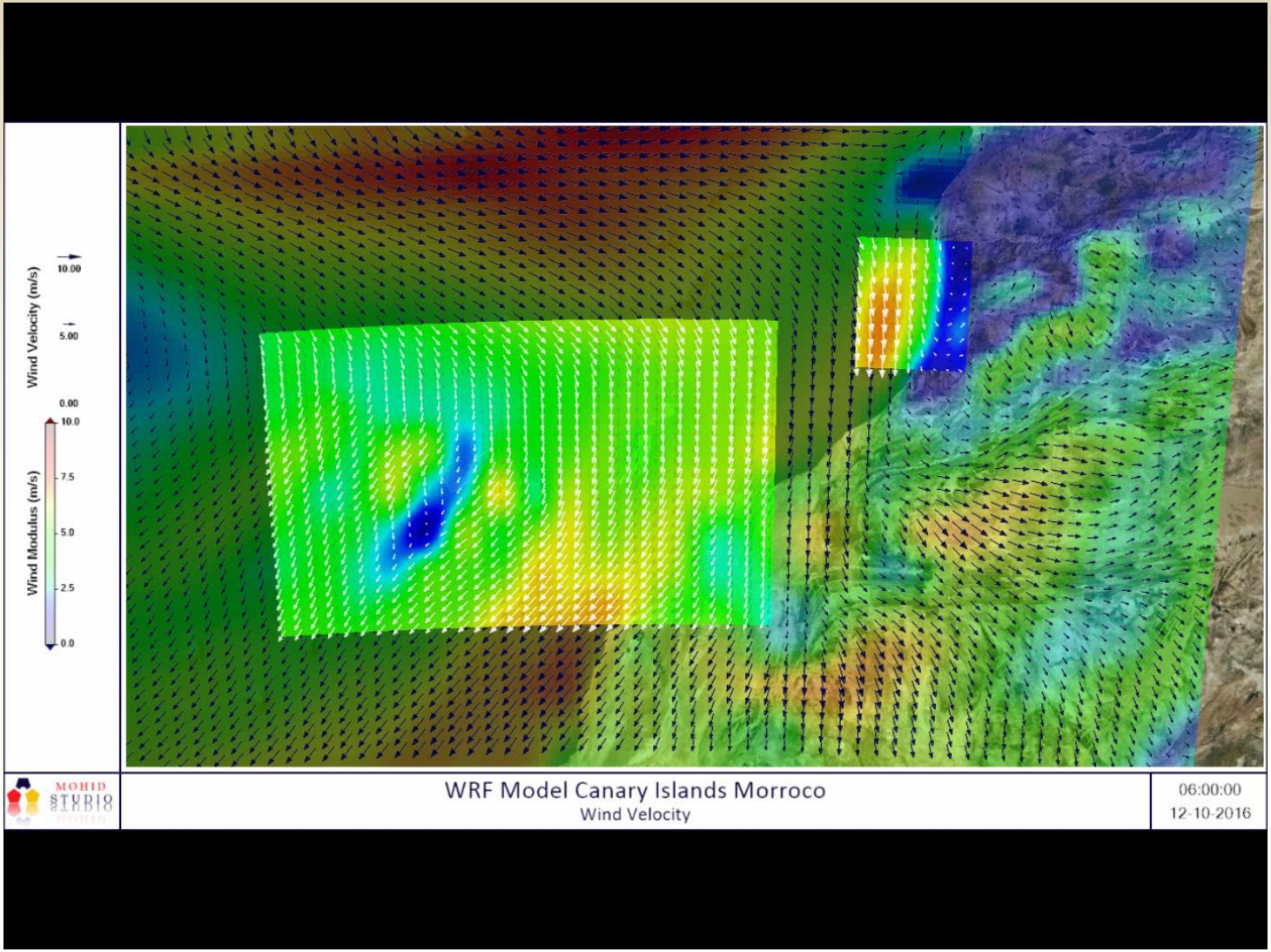
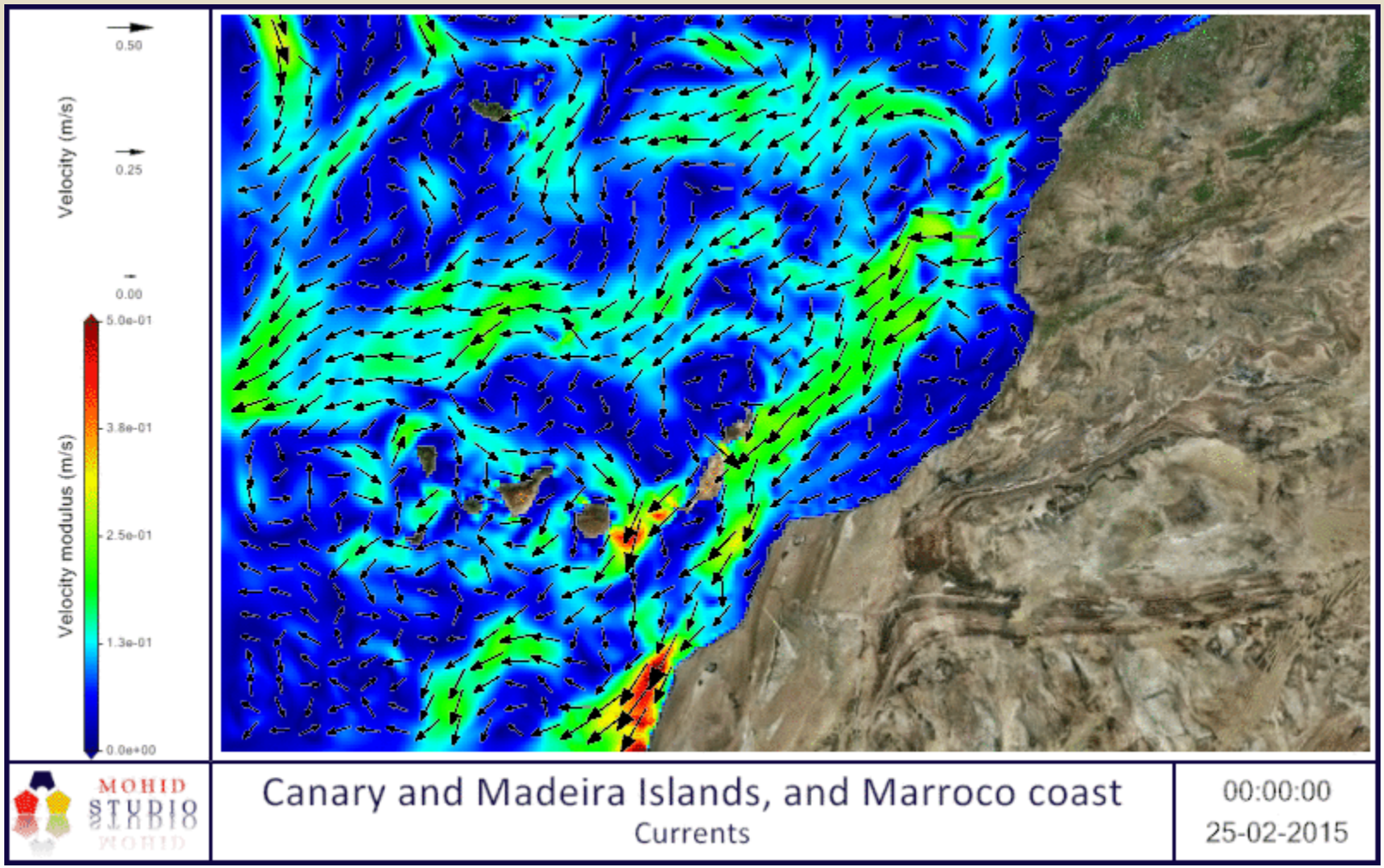
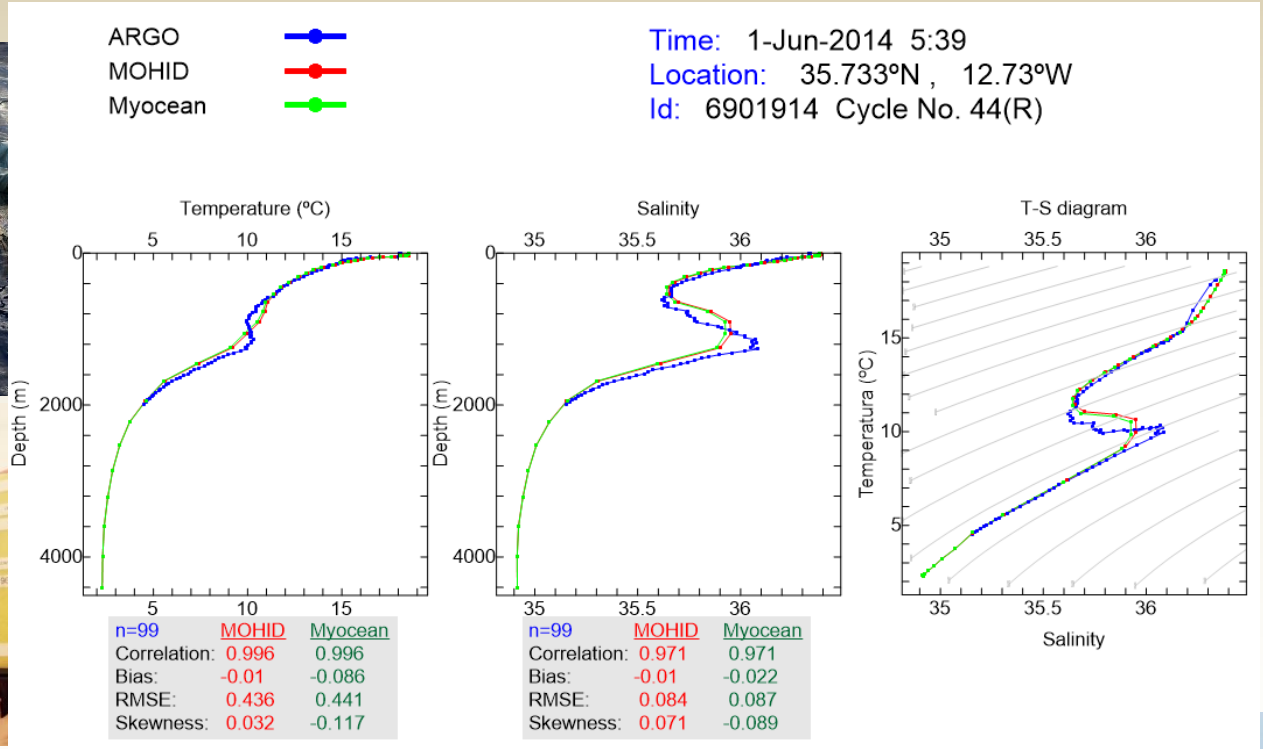
Metocean forecasts | model development

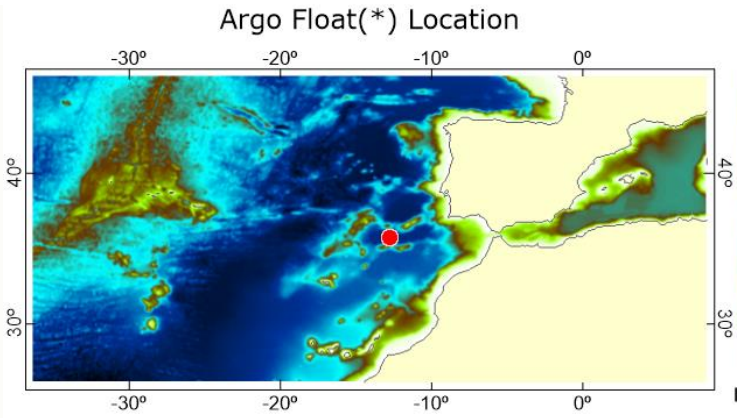


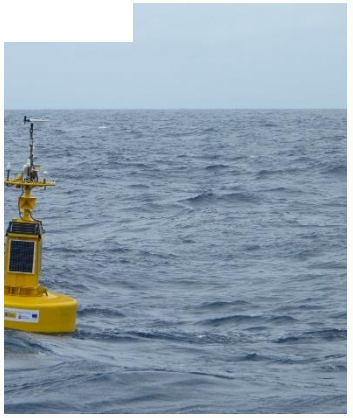
Metocean forecasts | model development



Metocean forecasts | model validation







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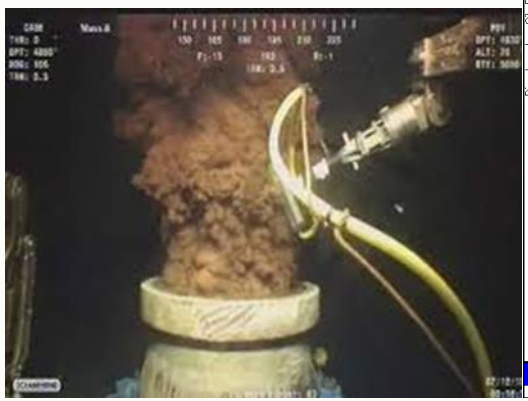
Oil spill model

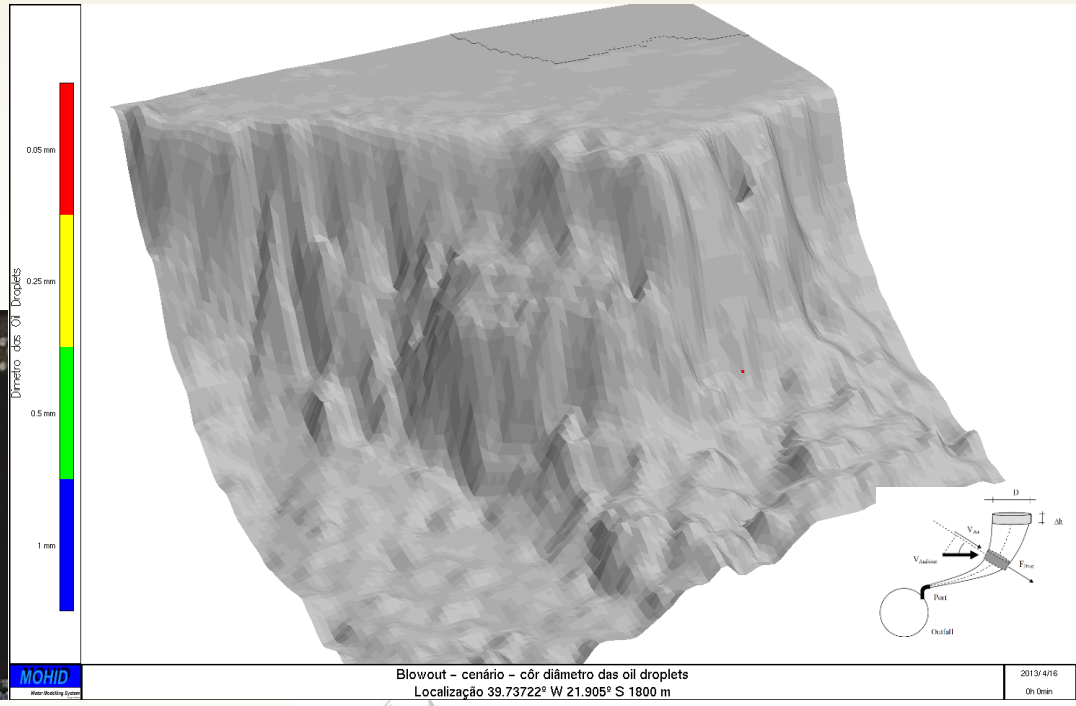
- Deep sea / Blowout spills
- Intercomparison exercises
- Probabilistic maps based in uncertainties
- Biological exposure and effects model
- Dispersion of evaporated oil components

Oil spill model | blowouts

DALHOUSIE UNIVERSITY

- Cooperation with Dalhousie University / MEOPAR project (Canada)
  - Oil-gas interaction
  - Integration of near-field with farfield
  - Coupling advanced models (recent work by SINTEF and TAMOC from Texas University)





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Oil spill model | intercomparison

➢ OSCAR vs MOHID | Trajectory intercomparison

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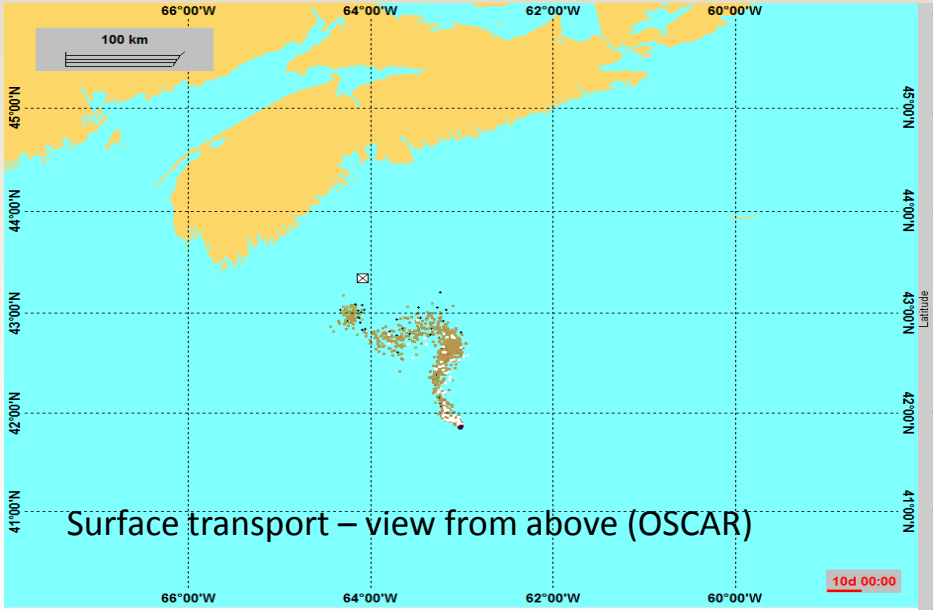
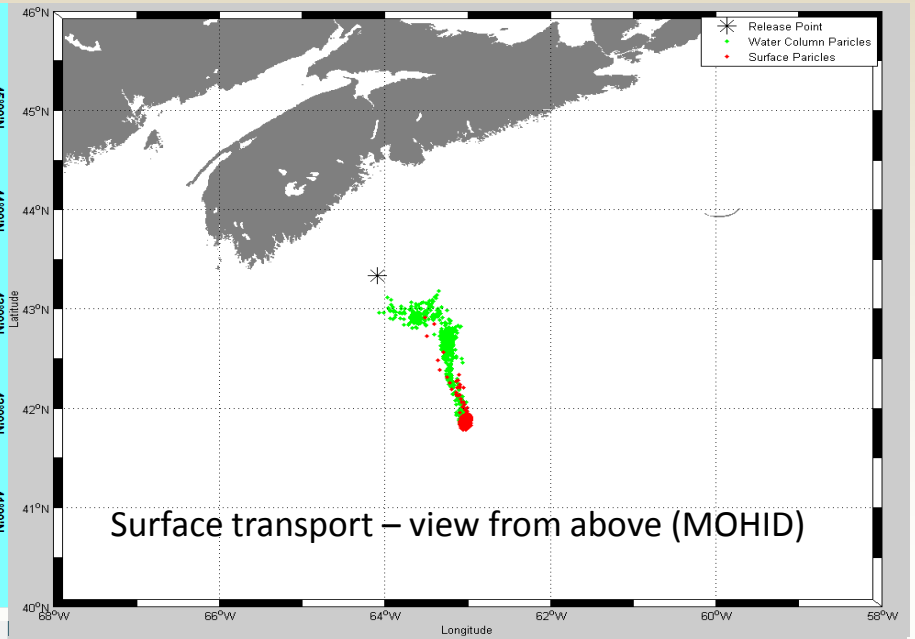
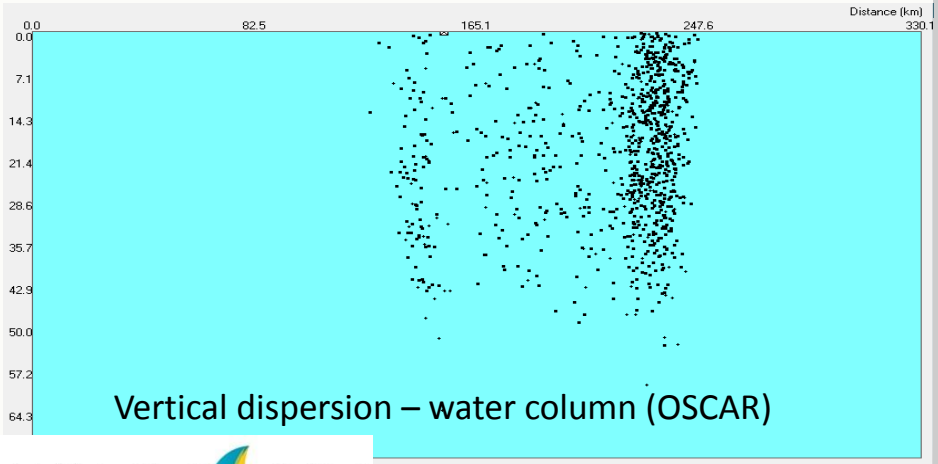


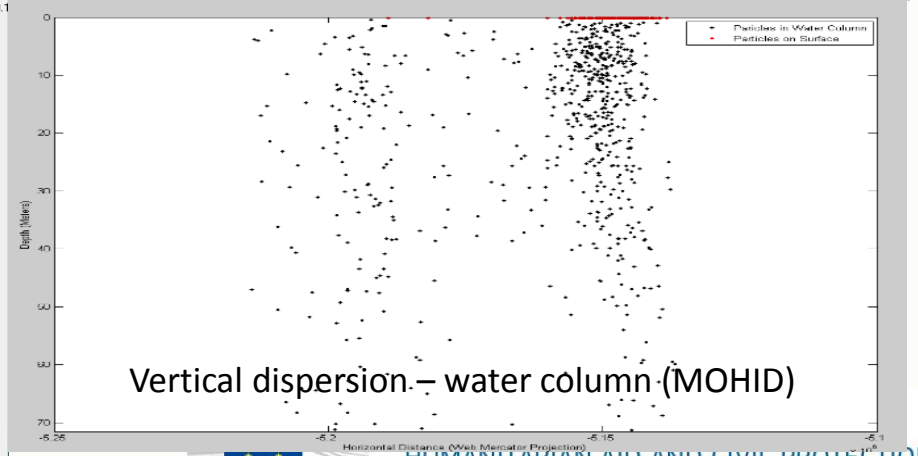
Surface transport – view from above (OSCAR)



Surface transport – view from above (MOHID)



Vertical dispersion – water column (OSCAR)



Vertical dispersion – water column (MOHID)

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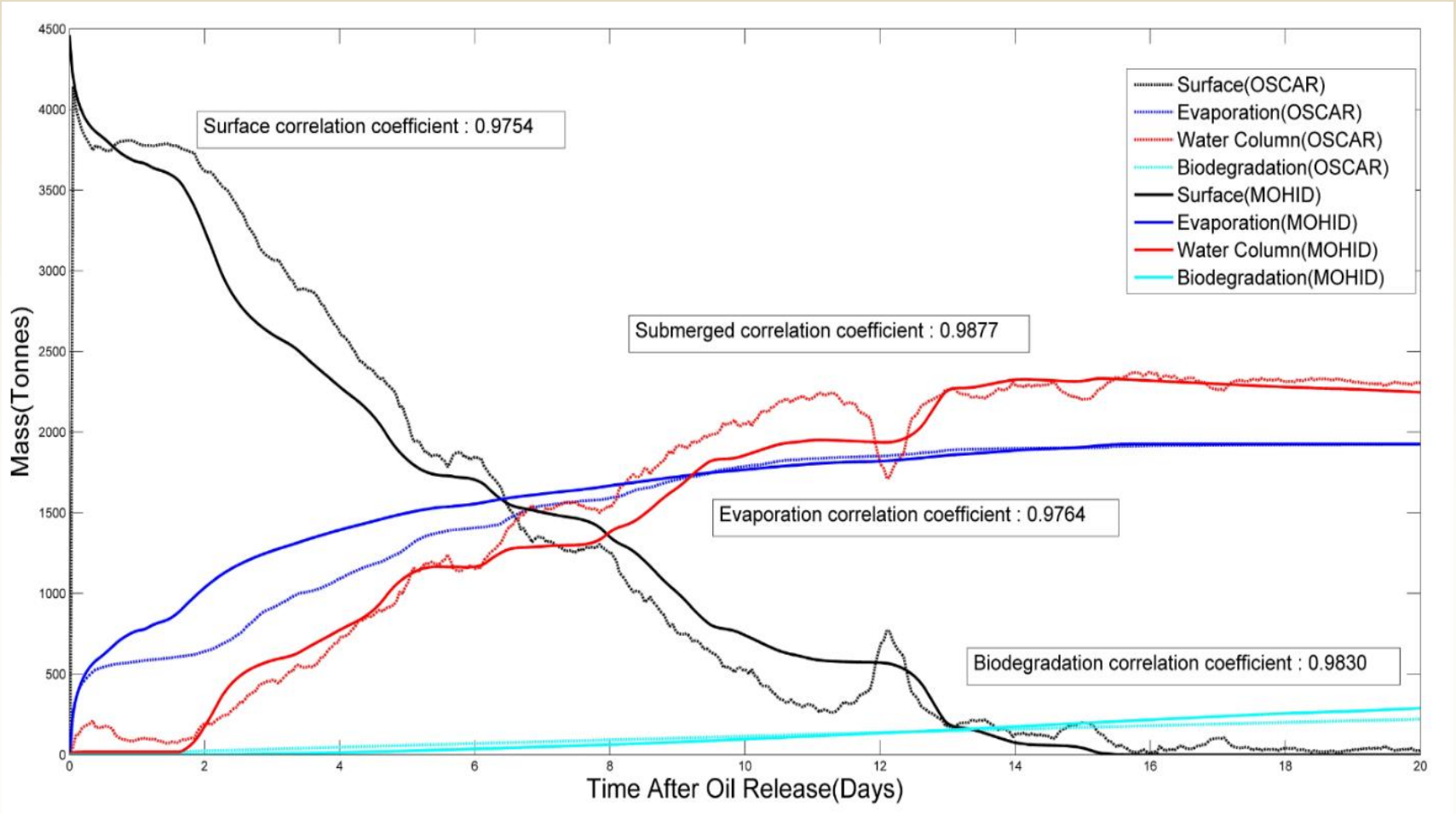
Oil spill model | intercomparison

- **OSCAR vs. MOHID | Mass balance comparison**

DALHOUSIE UNIVERSITY



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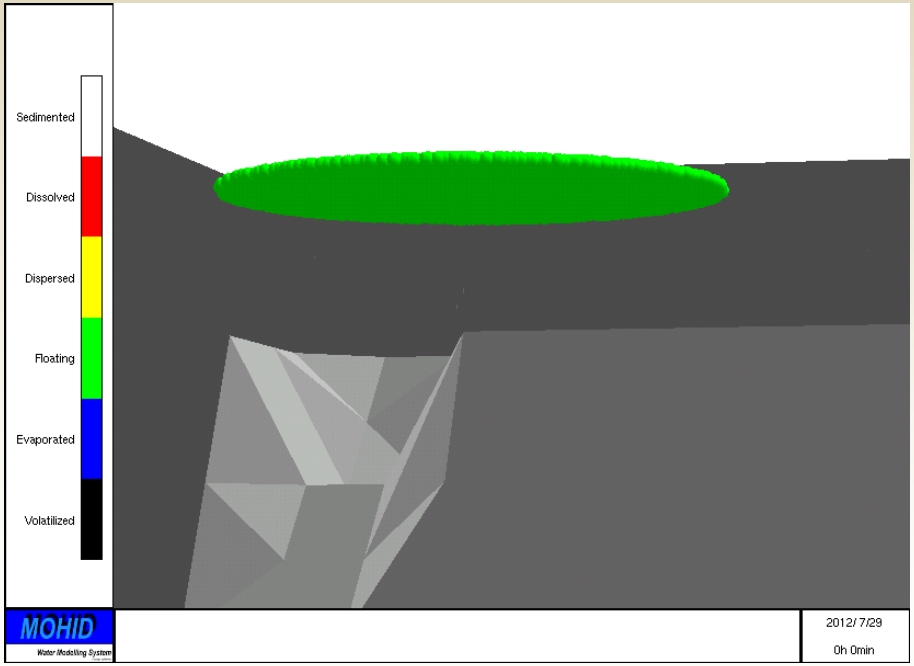
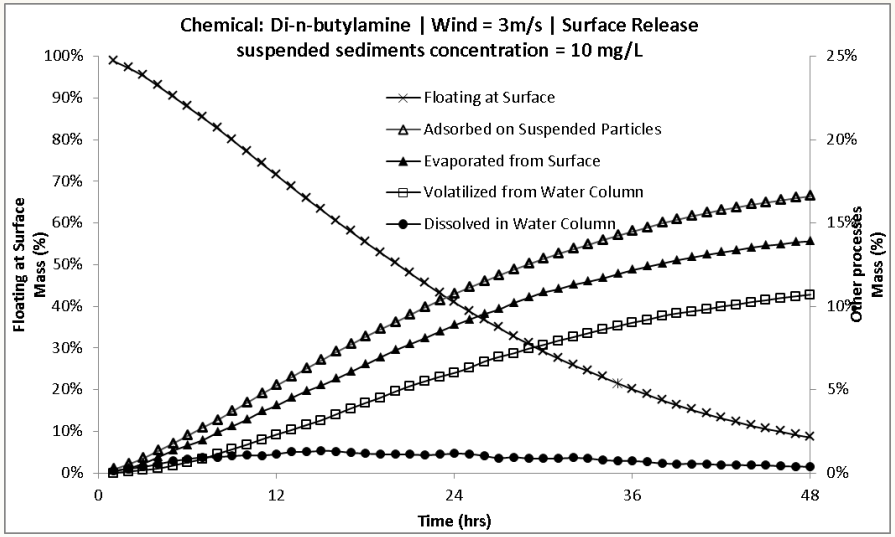
Chemical spill model



- Interaction with benthic layer (bibliographic review, revision of algorithms)
- Calibration based on laboratory measurements (CEDRE; HNS-MS)
- Intercomparison with other models (CHEMMAP; HNS-MS?)



CEDRE

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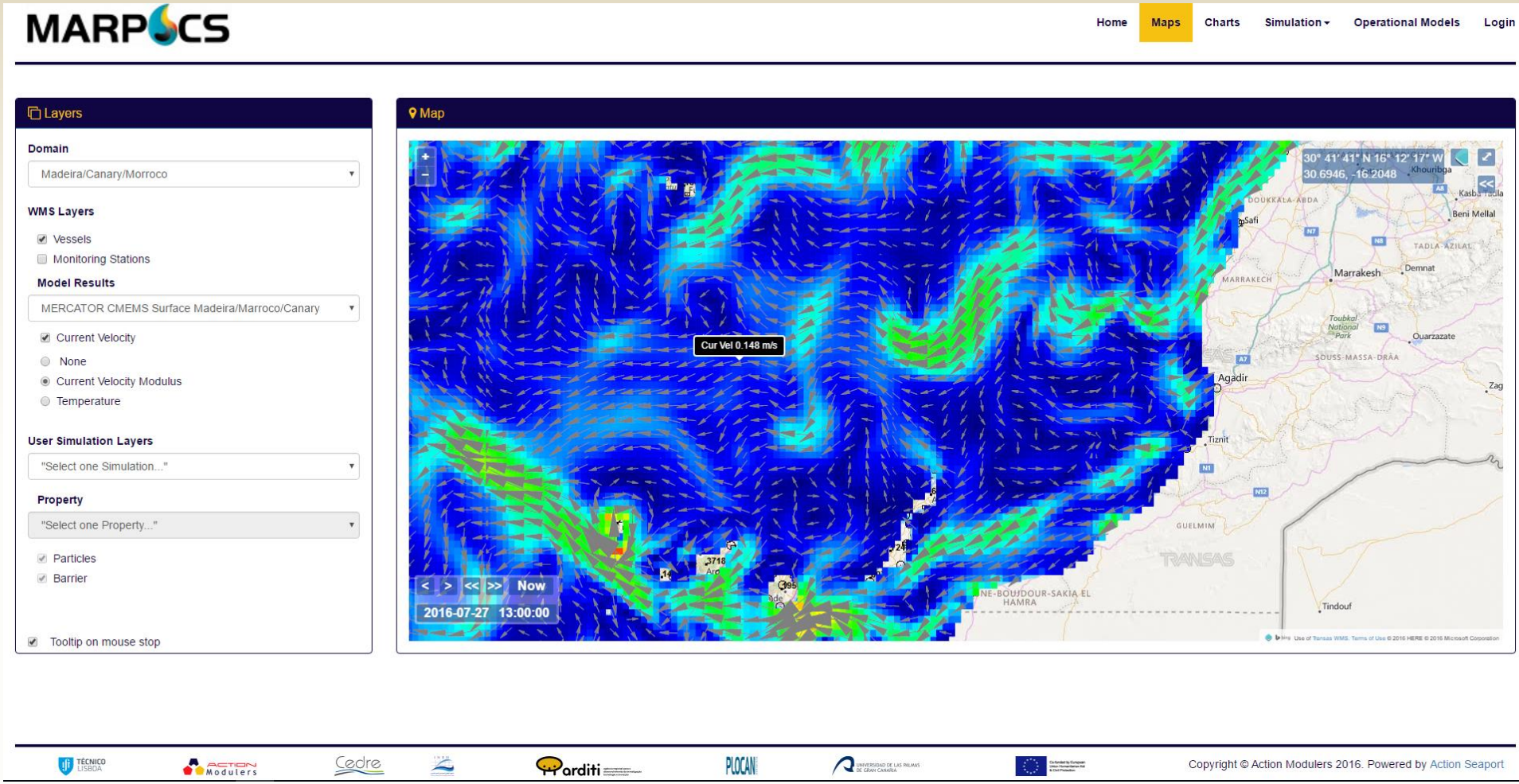
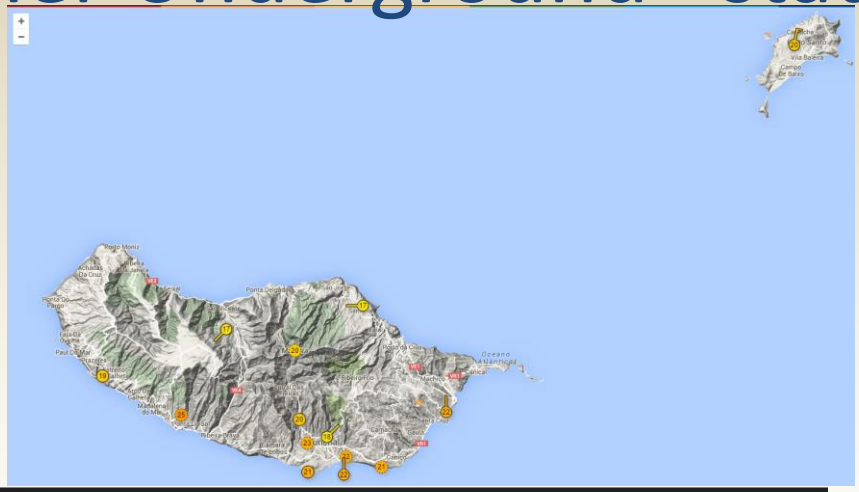
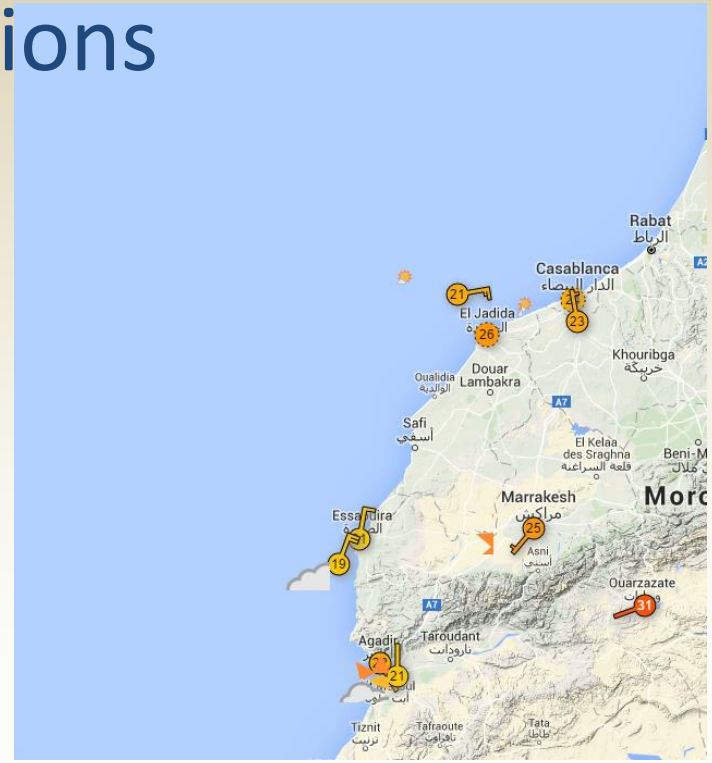
Decision Support Systems | web tool



Decision Support Systems | web tool

Weather Underground - stations





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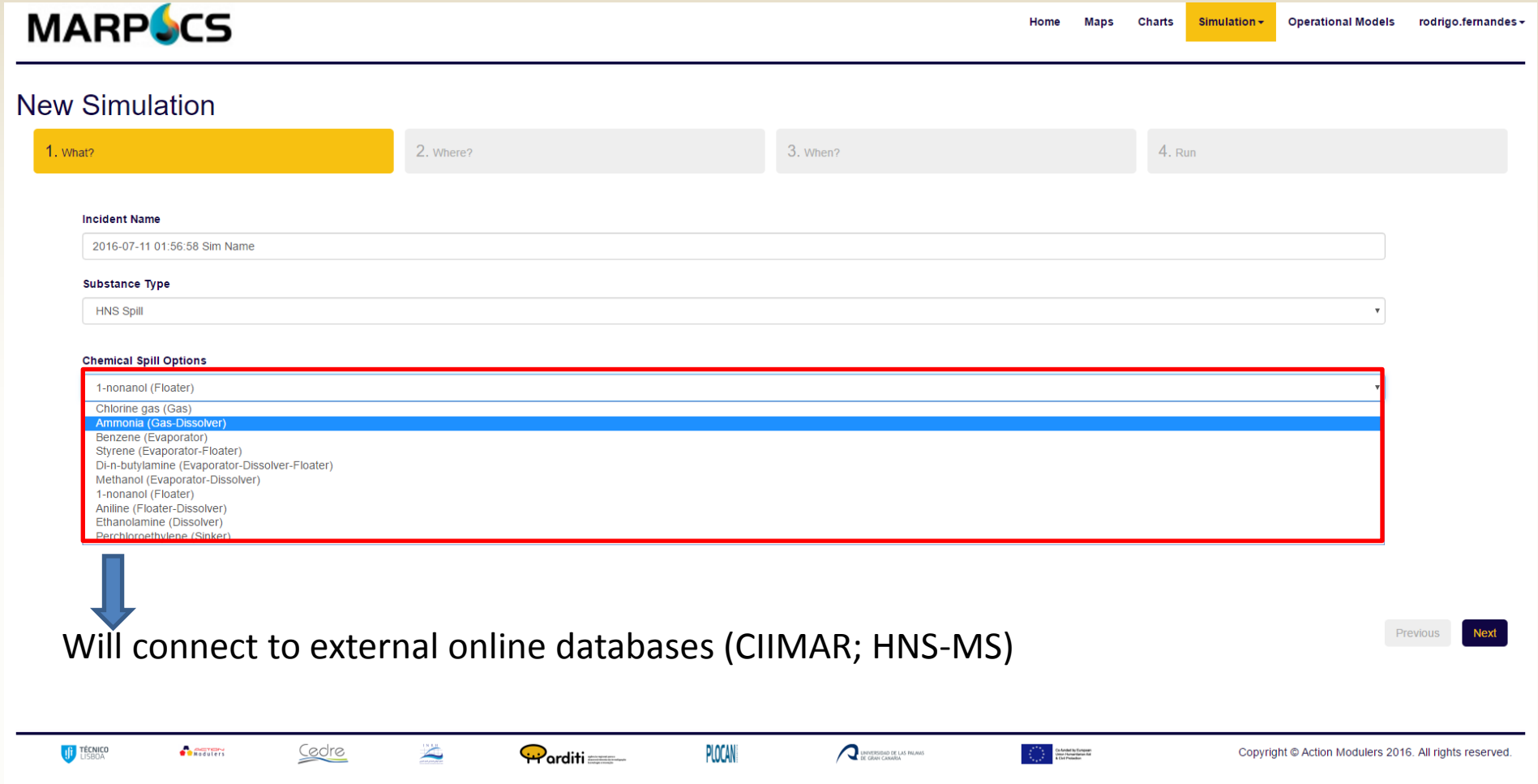
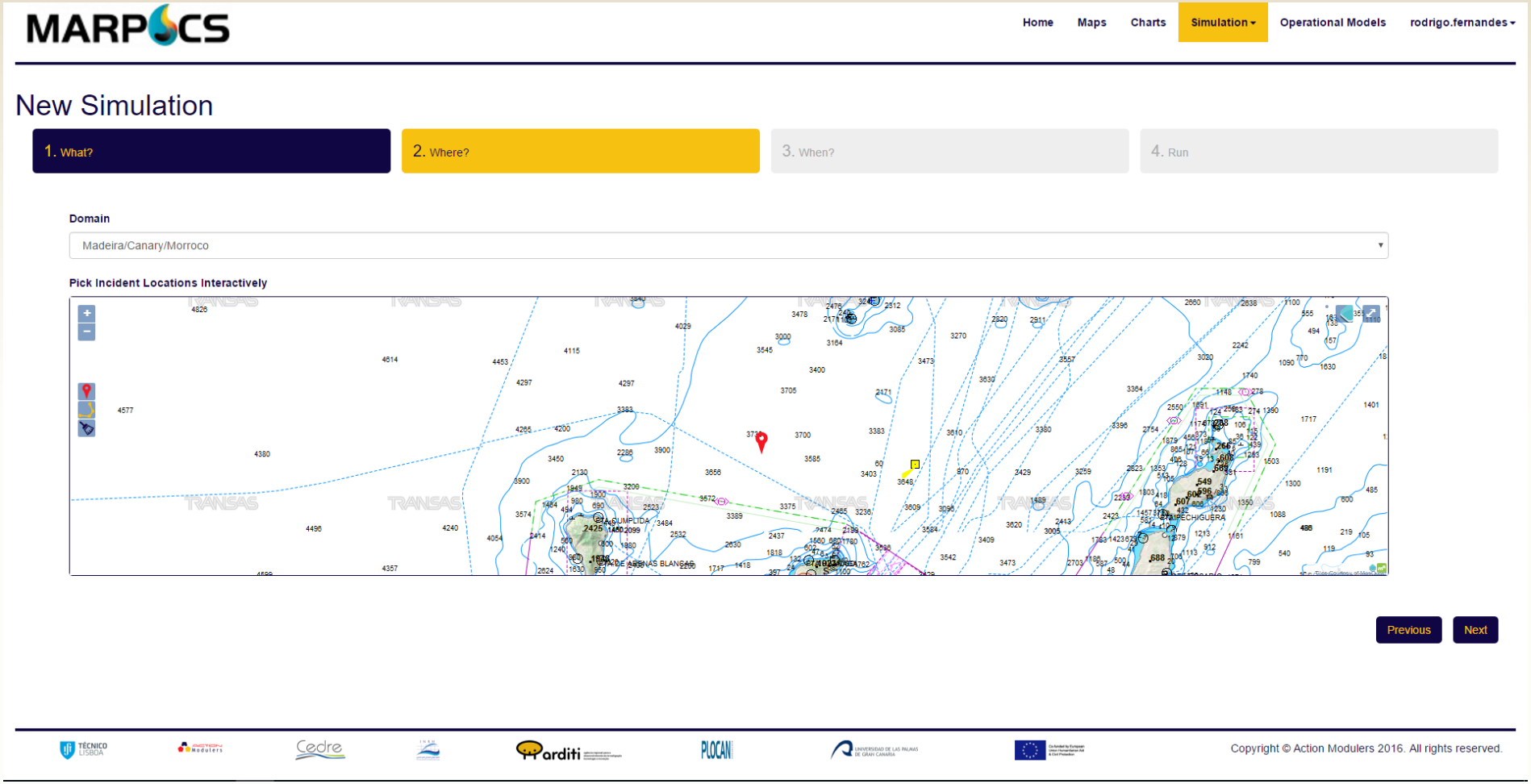
Decision Support Systems | web tool



Will connect to external online databases (CIIMAR; HNS-MS)

Decision Support Systems | web tool



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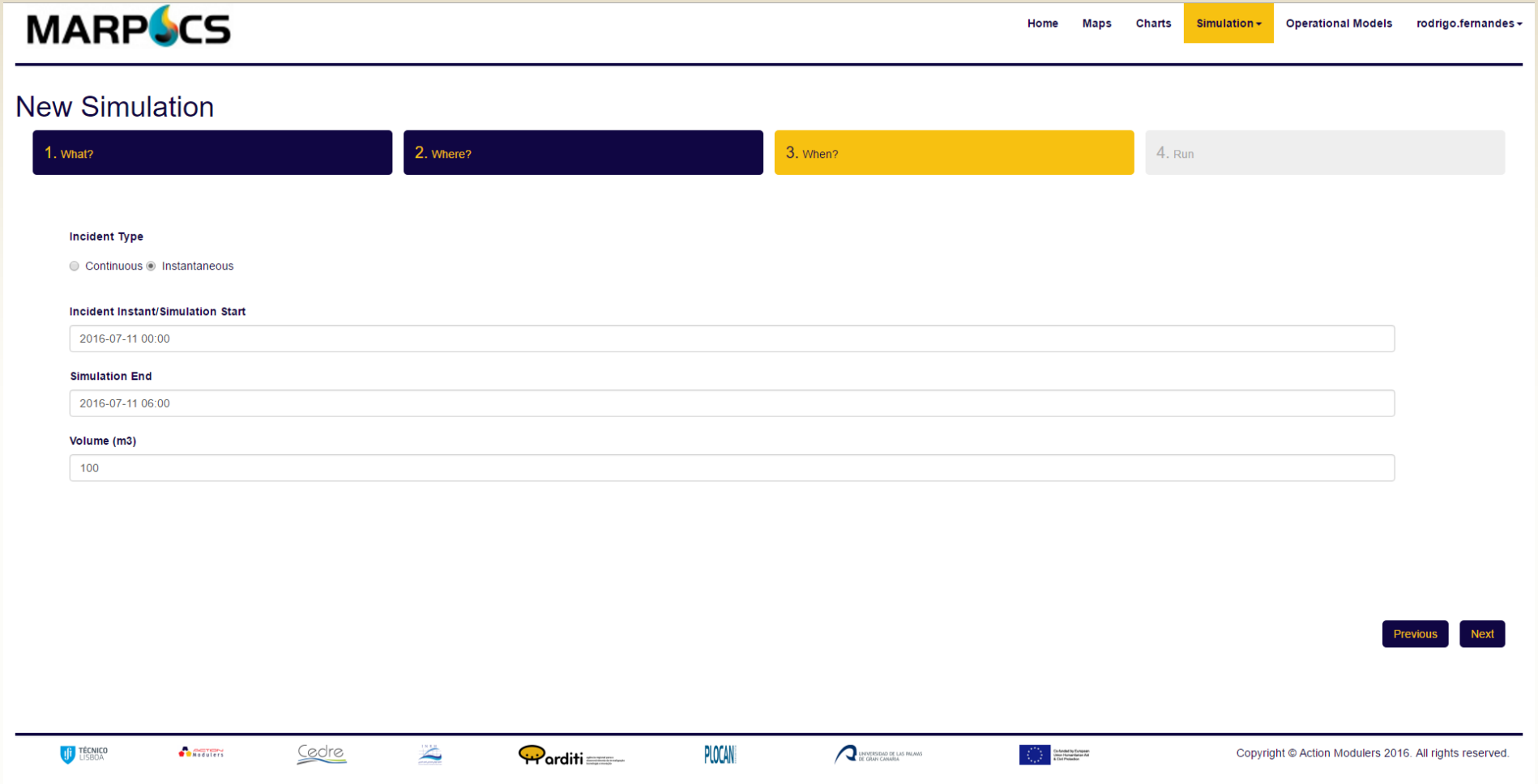
Decision Support Systems | web tool



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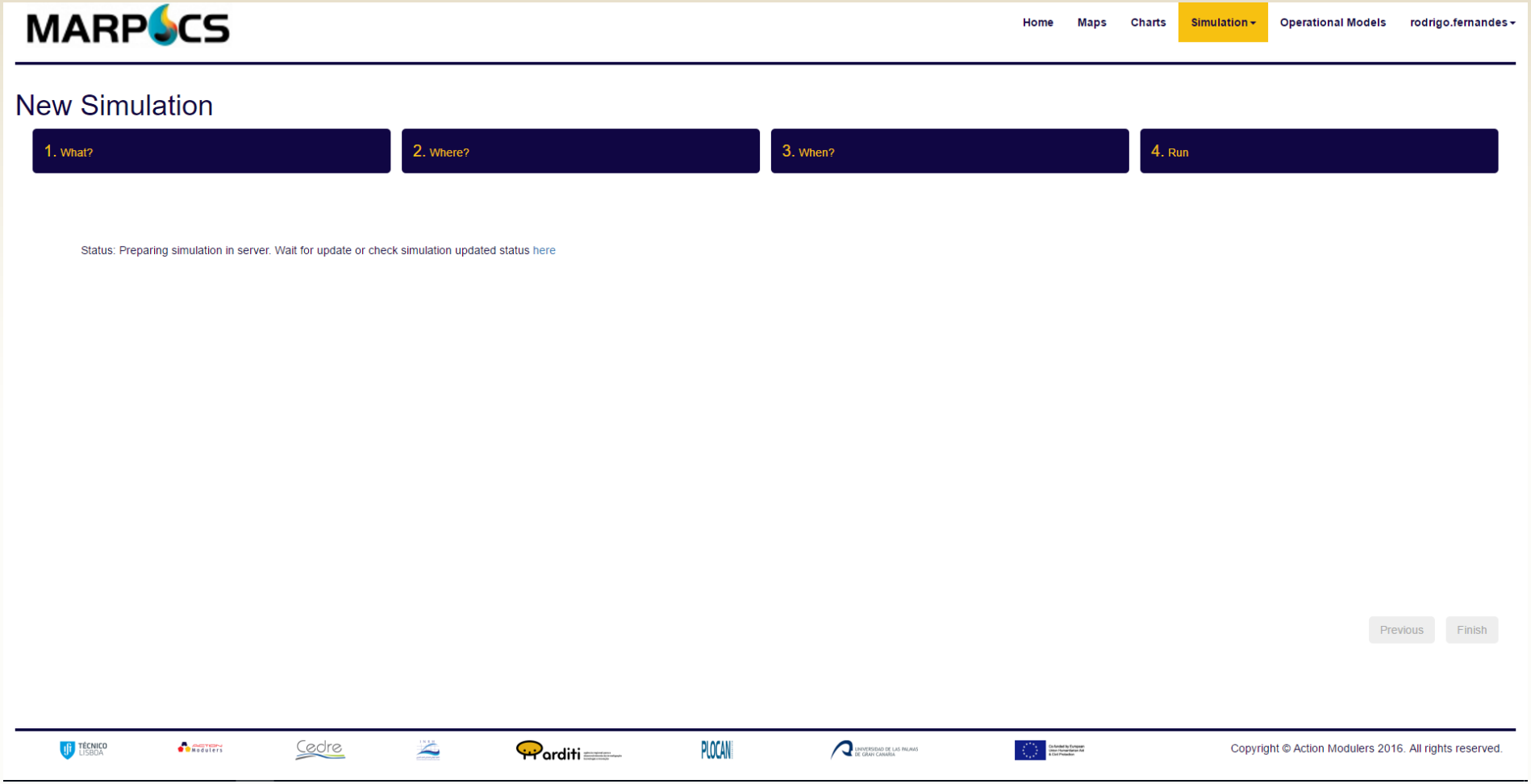

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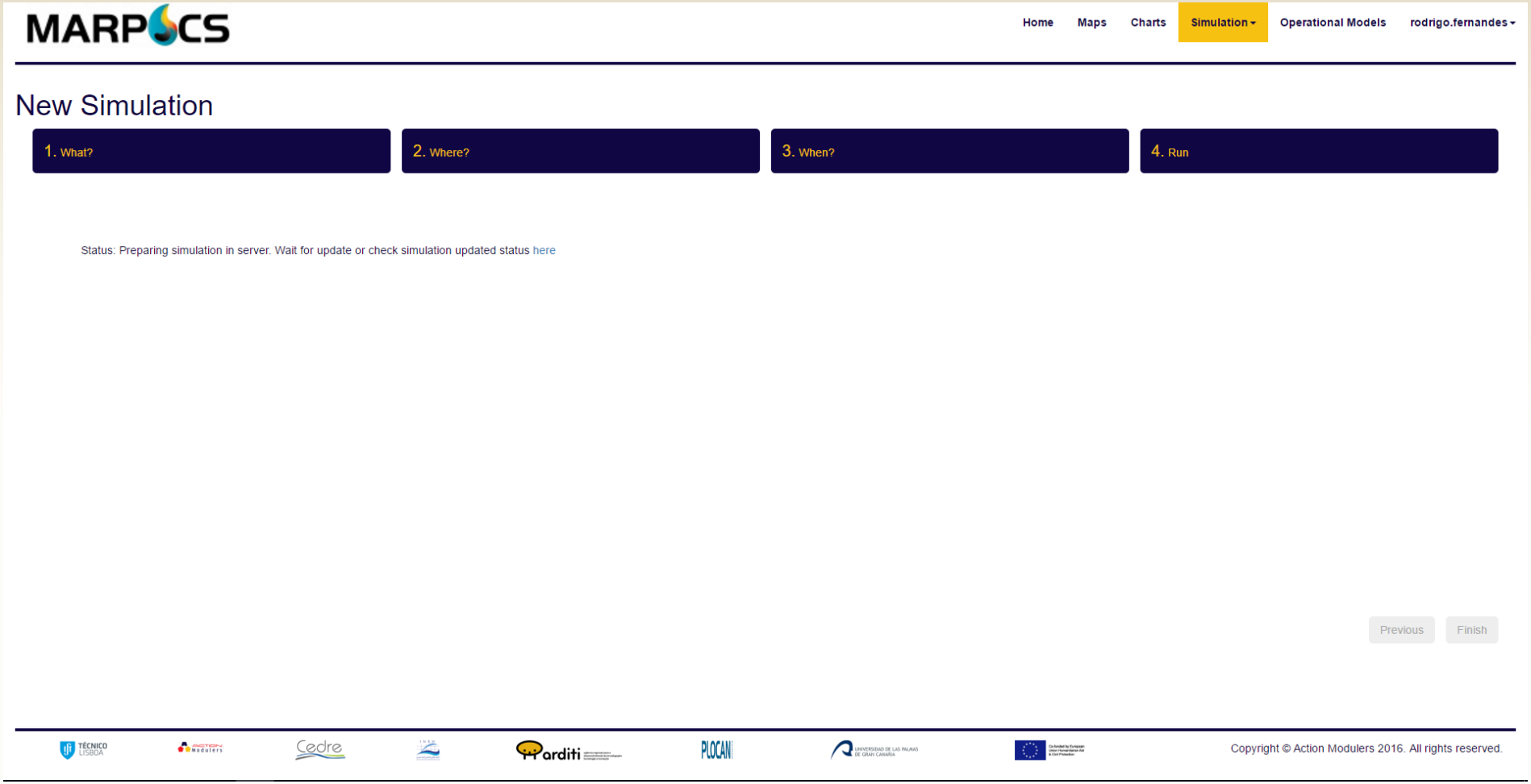

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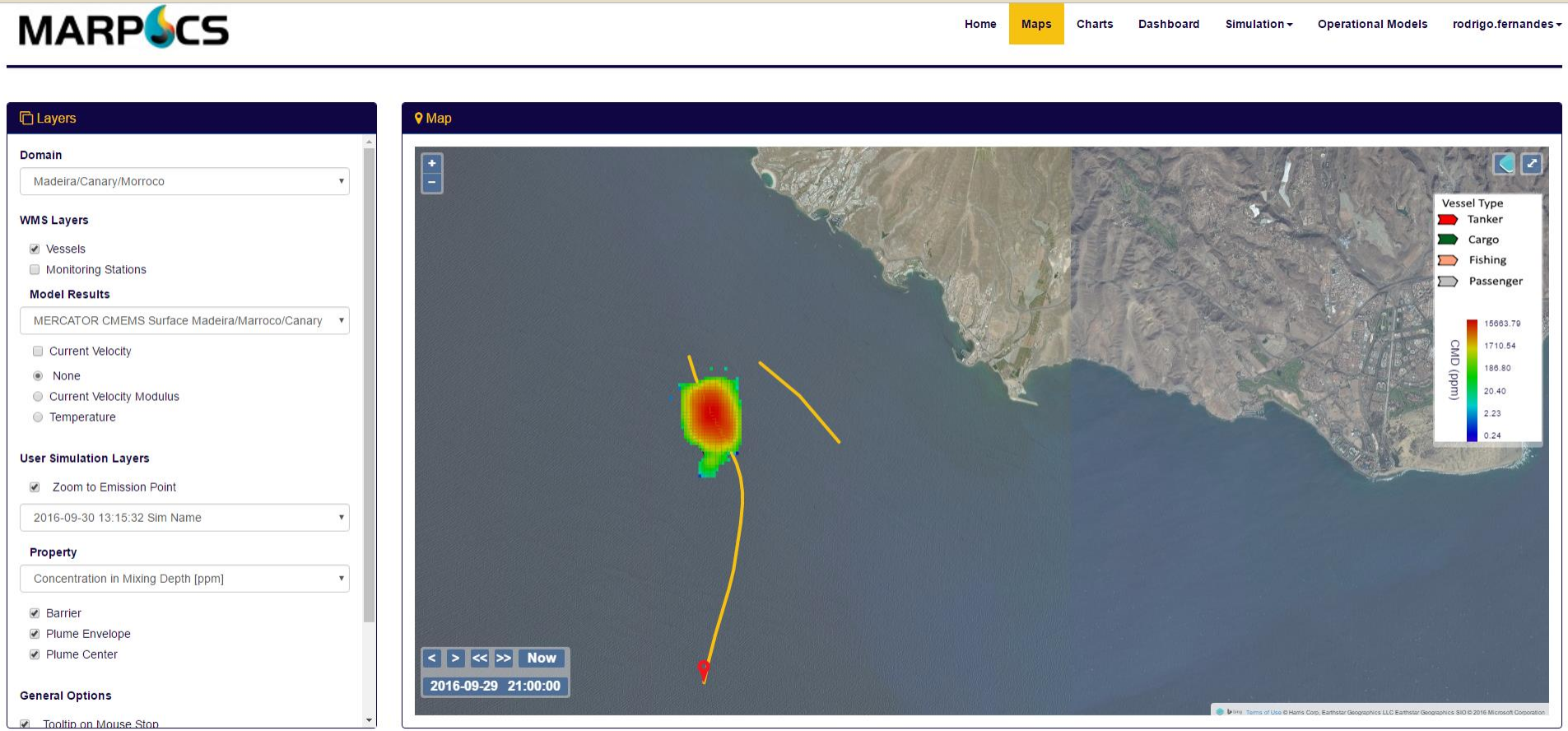

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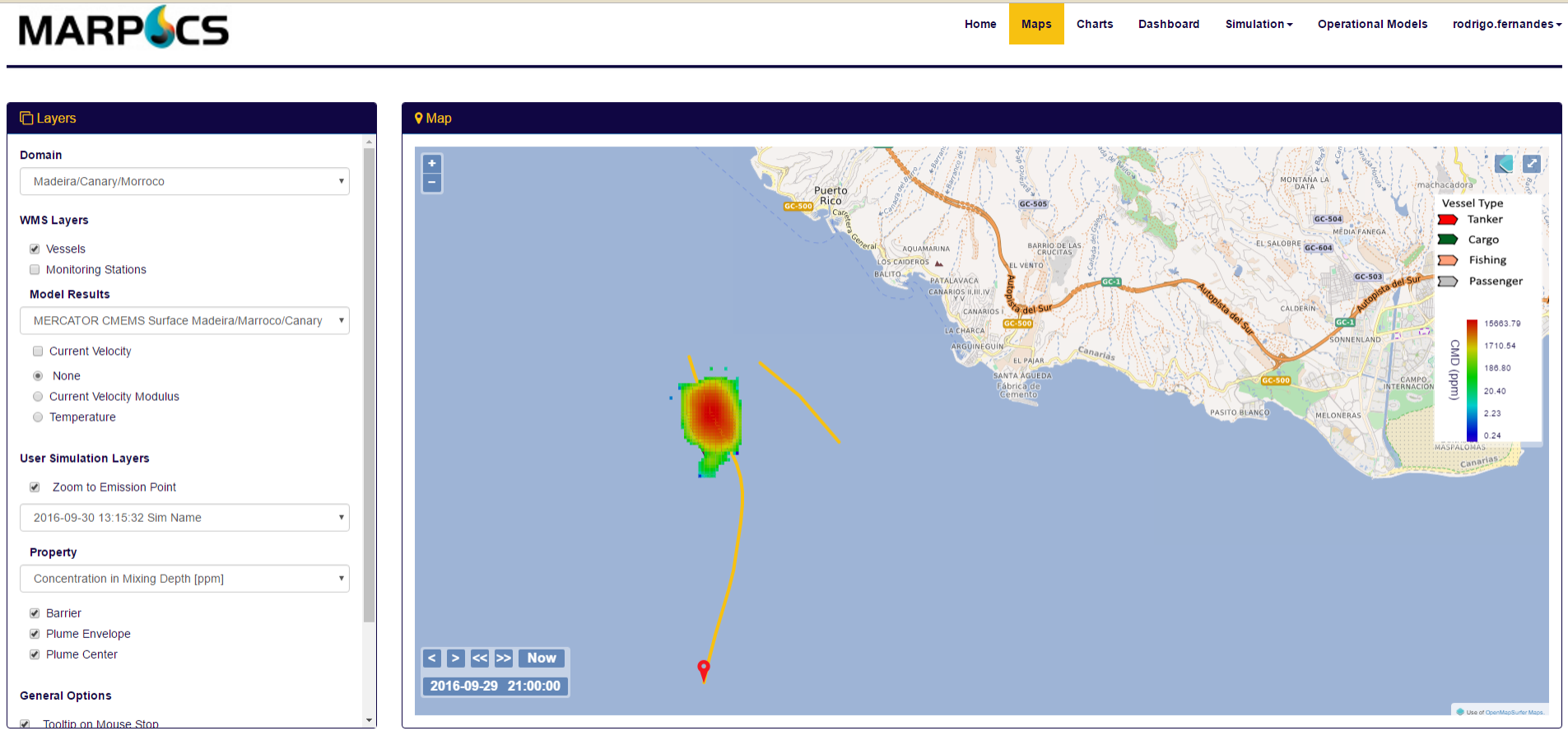

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Home | Maps | Charts | Dashboard | Simulation | Operational Models | rodrigo.fernandes

Layers

Domain

Madeira/Canary/Morroco

WMS Layers

- [x] Vessels
- [ ] Monitoring Stations

Model Results

MERCATOR CMEMS Surface Madeira/Marroco/Canary

- [ ] Current Velocity
- (•) None
- ( ) Current Velocity Modulus
- ( ) Temperature

User Simulation Layers

- [x] Zoom to Emission Point

2016-09-30 13:15:32 Sim Name

Property

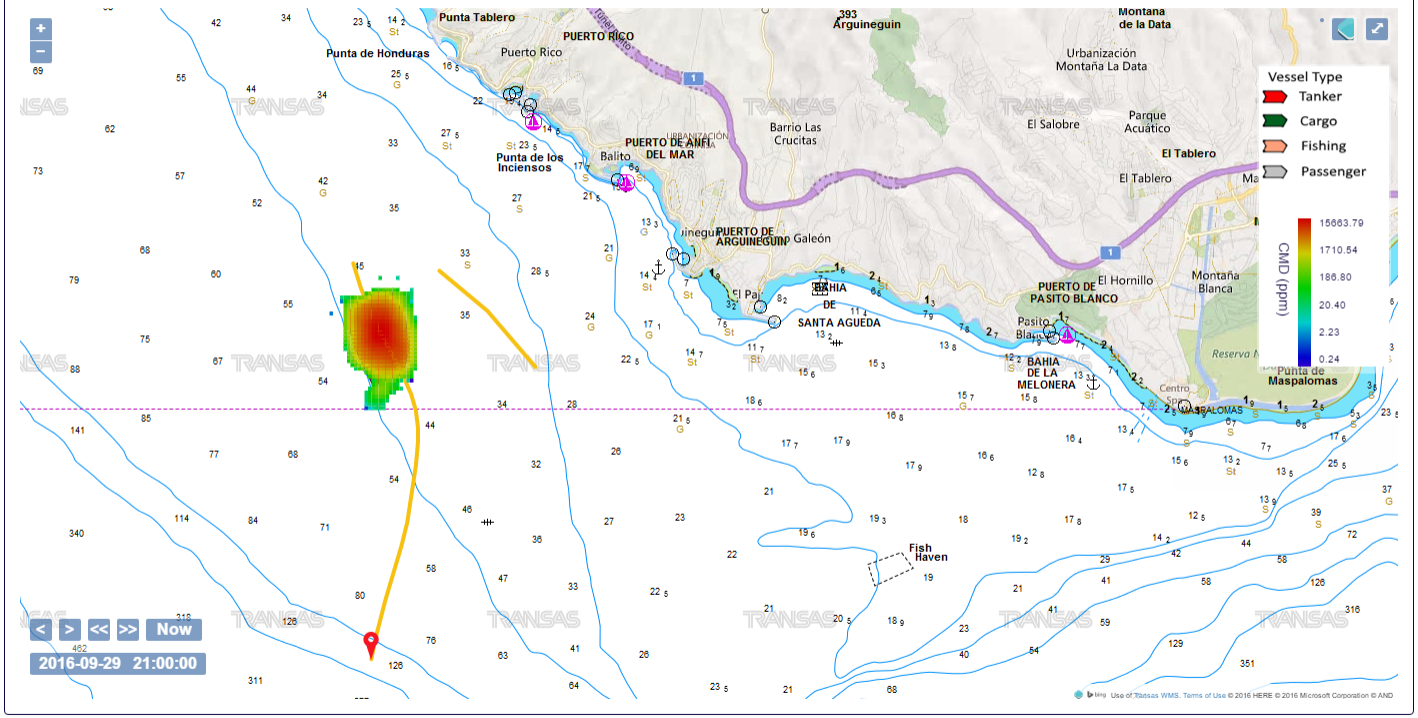
Concentration in Mixing Depth [ppm]

- [x] Barrier
- [x] Plume Envelope
- [x] Plume Center

General Options

- [x] Tooltip on Mouse Stop

Map



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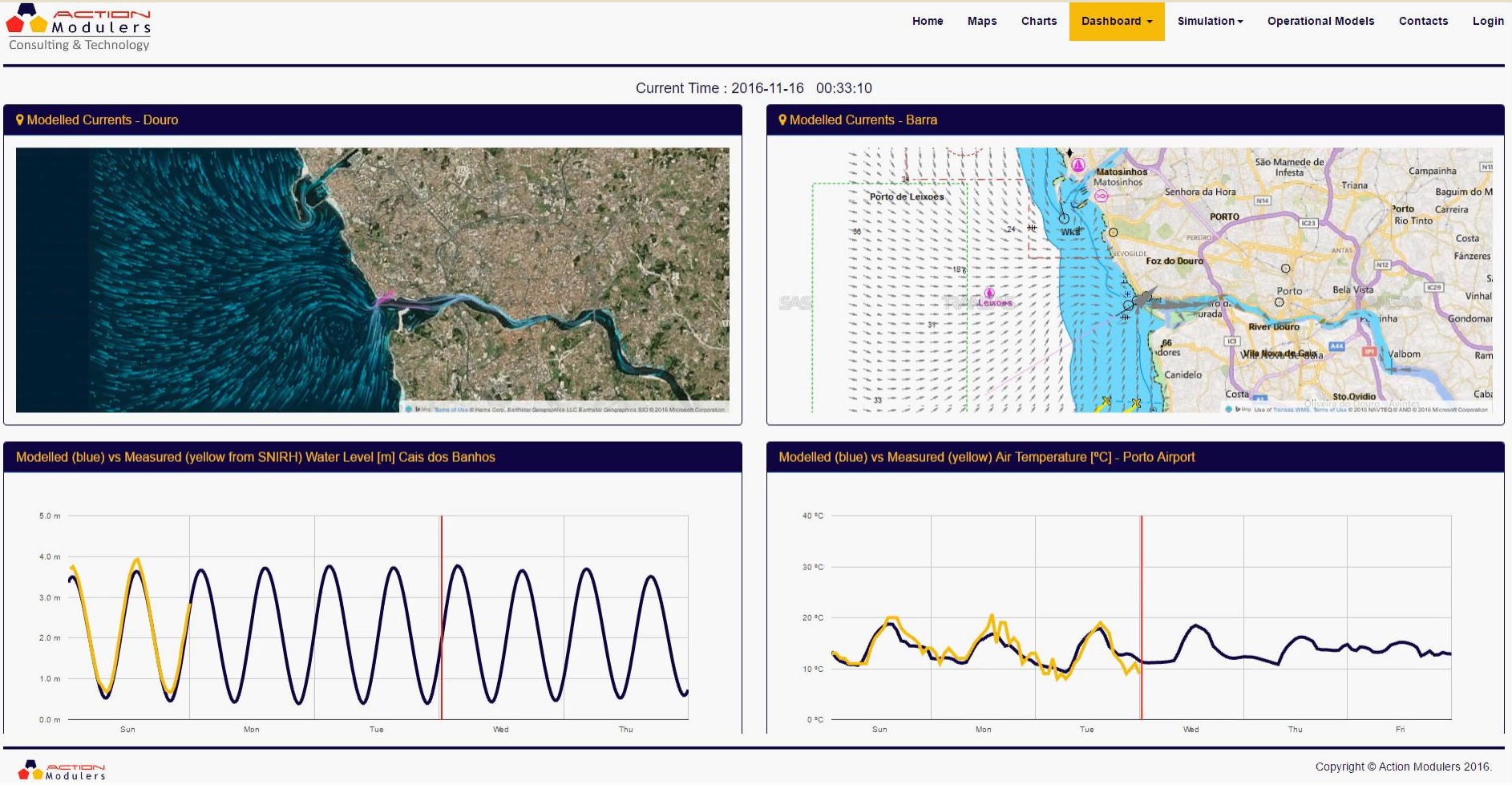

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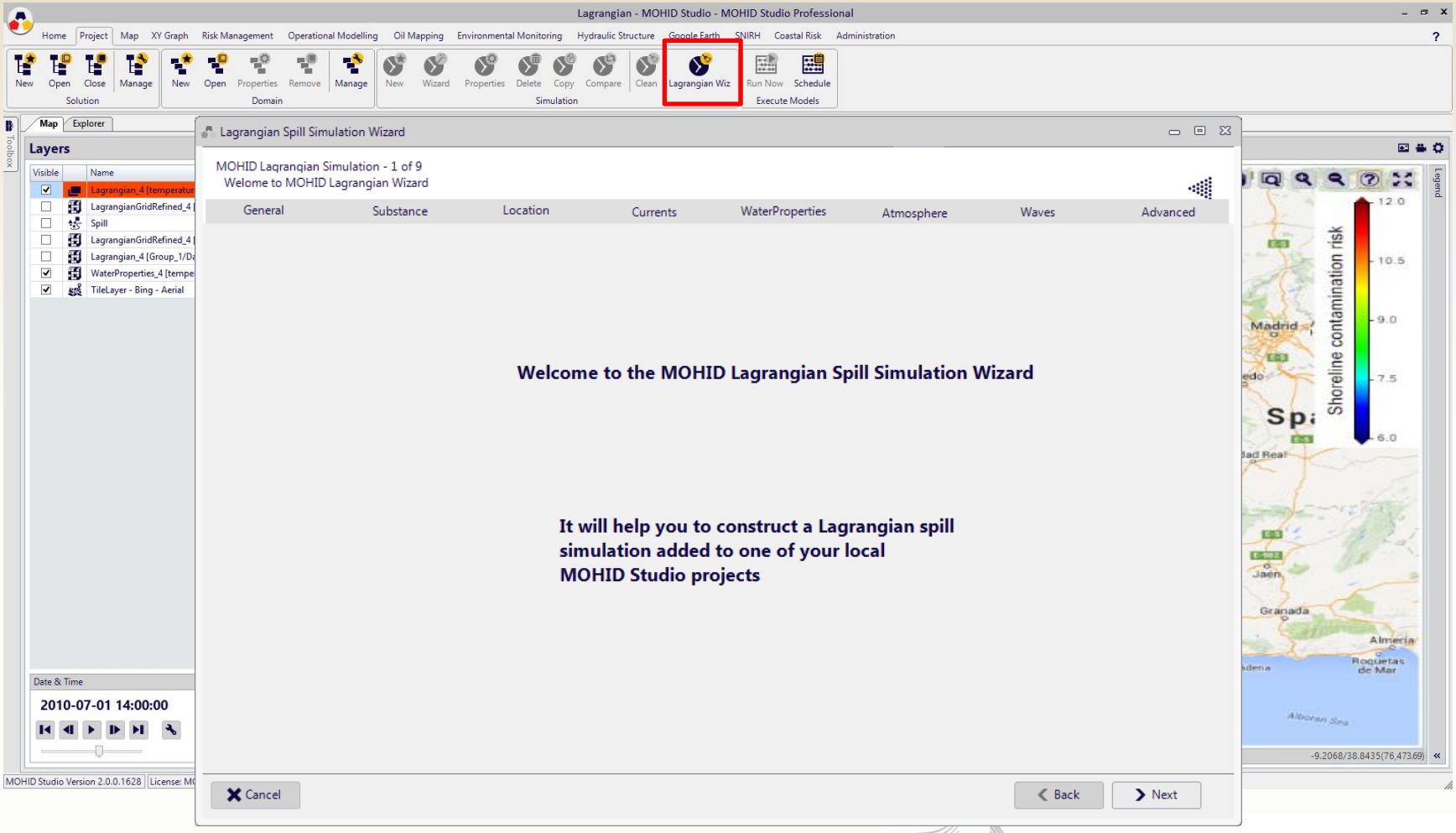
Decision Support Systems | desktop tool



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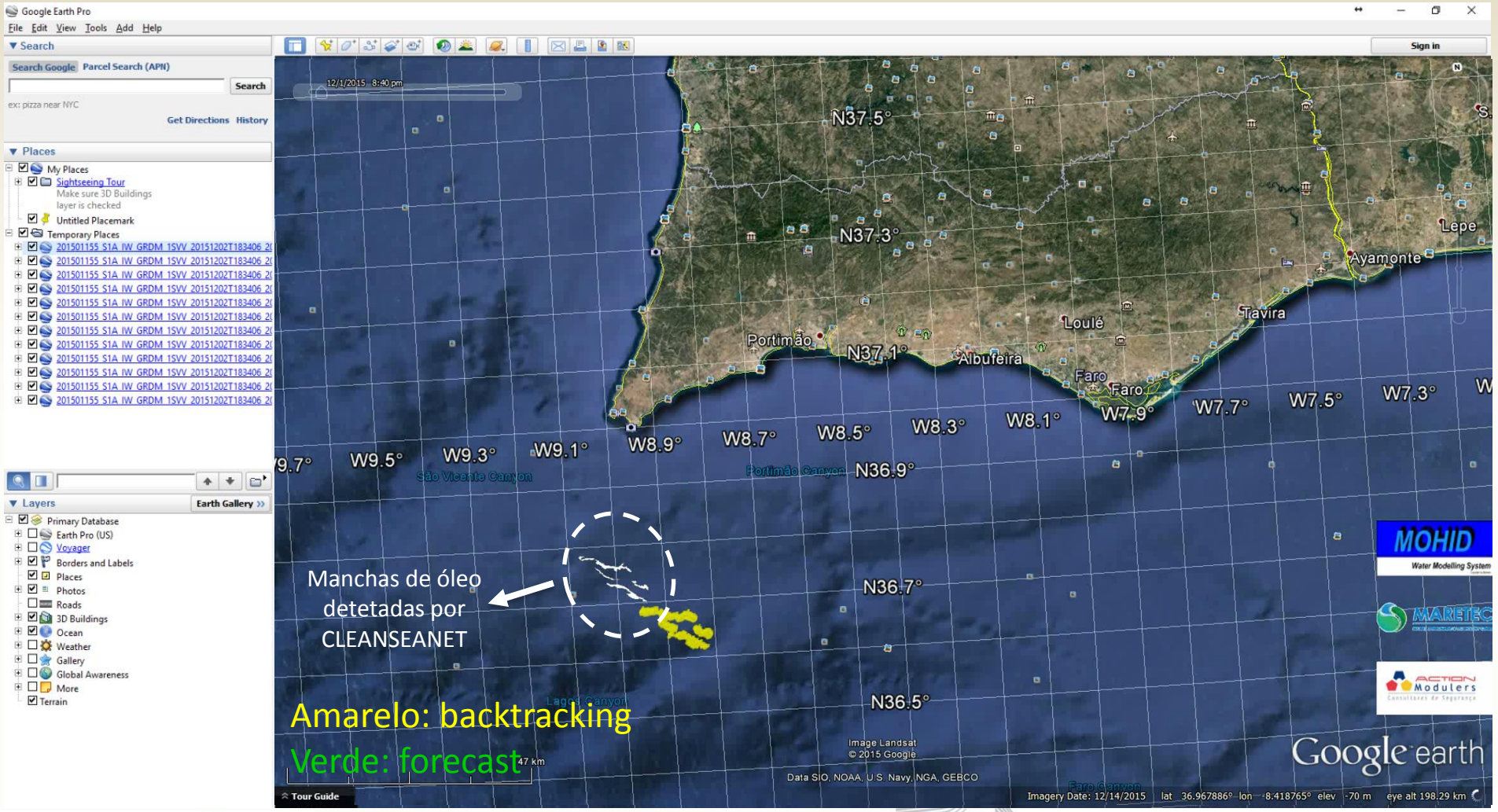
Decision Support Systems | desktop tool

Coastal Risk & Lagrangian Spill Wizard

(image from mobile situation room from Portuguese Maritime Authority)

Decision Support Systems | Automatic oil spill early warning system



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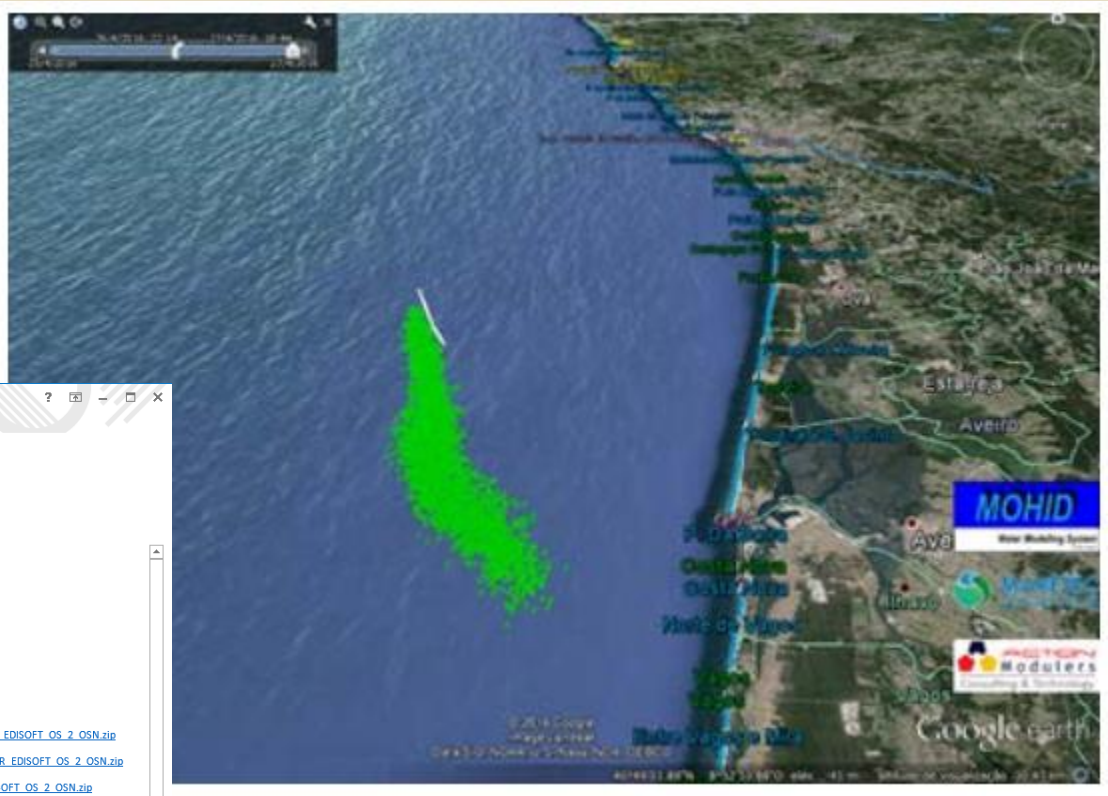
Decision Support Systems | Automatic oil spill early warning system



New oil spill forecast: 124348_RS1_20130124182706.048.SCN8 - Message (Plain Text)

FILE MESSAGE

Sat 14/11/2015 17:53

MOHID-CSN oil spill alert service <mailing.maretec@gmail.com>

New oil spill forecast: 124348_RS1_20130124182706.048.SCN8

To rodrigo.maretec@ist.utl.pt

Dear MOHID-CSN user,
This email reports the automatic predicted trajectories of detected oil spill event(s) from a specific CLEANSEANET notification package in the target region of Portugal.
Please check further details below:

CSN Notification ID: 124348_RS1_20130124182706.048.SCN8
Date of the spill: 2015-11-05 18:27:30

Oil spills identified in the target area from the mentioned CSN notification:
1. 124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_2:
- Spill center: 39.6425,-9.67807
- Direct link to spill center (in google maps):
https://www.google.com/maps/place/39.6425,-9.67807/@39.6425,-9.67807,7z
- Direct link to forward (forecast) EMSA-CSN data package:
http://forecast.maretec.org/mohid-csn/124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_2_OSN/forward_124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_2_OSN.zip
- Direct link to backtrack (hindcast) EMSA-CSN data package:
http://forecast.maretec.org/mohid-csn/124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_2_OSN/backward_124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_2_OSN.zip
- Google Earth zip package (include forward and backward simulations):
http://forecast.maretec.org/mohid-csn/124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_2_OSN/GE_124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_2_OSN.zip
- Complete results (include oil spill model results in time series – sro) available for download in:
http://forecast.maretec.org/mohid-csn/124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_2_OSN
2. 124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_3:
- Spill center: 39.5079,-9.40598
- Direct link to spill center (in google maps):
https://www.google.com/maps/place/39.5079,-9.40598/@39.5079,-9.40598,7z
- Direct link to forward (forecast) EMSA-CSN data package:
http://forecast.maretec.org/mohid-csn/124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_3_OSN/forward_124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_3_OSN.zip
- Direct link to backtrack (hindcast) EMSA-CSN data package:
http://forecast.maretec.org/mohid-csn/124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_3_OSN/backward_124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_3_OSN.zip
- Google Earth zip package (include forward and backward simulations):
http://forecast.maretec.org/mohid-csn/124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_3_OSN/GE_124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_3_OSN.zip
- Complete results (include oil spill model results in time series – sro) available for download in:
http://forecast.maretec.org/mohid-csn/124348_RS1_20130124182706.048.SCN8.NEAR_EDISOFT_OS_3_OSN

In case you need any further details, please use the following email:
csn@mohid.com

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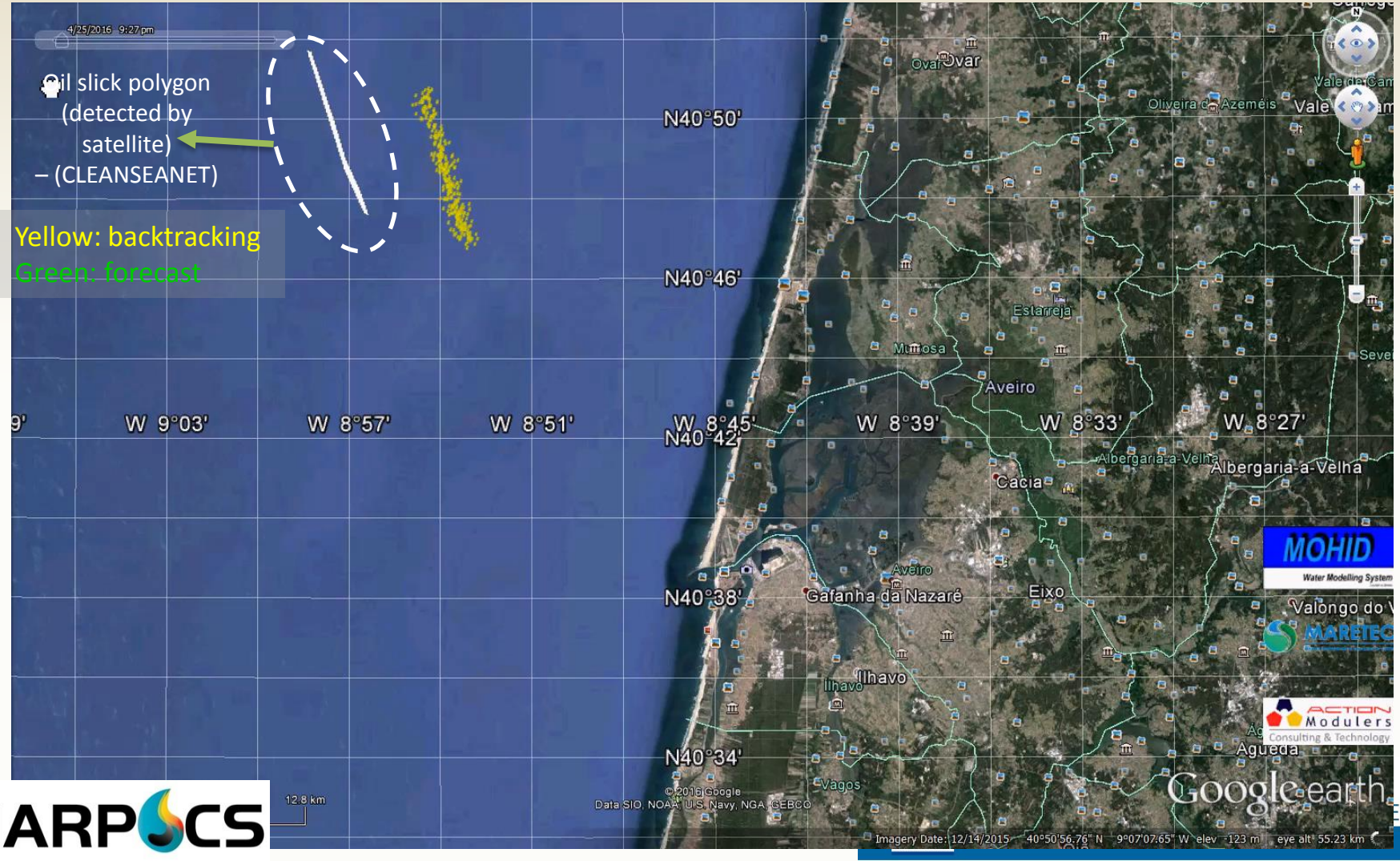
HUMANITARIAN AID AND CIVIL PROTECTION

MOHID-CSN service: spill detected at 26-4-2016



- MOHID-CSN service:
  - System to be implemented in MARPOCS region
  - It is being presently tested (in operational mode) in cooperation with Portuguese and Spanish Maritime Authorities

Decision Support Systems | Documentation, Training & Exercising

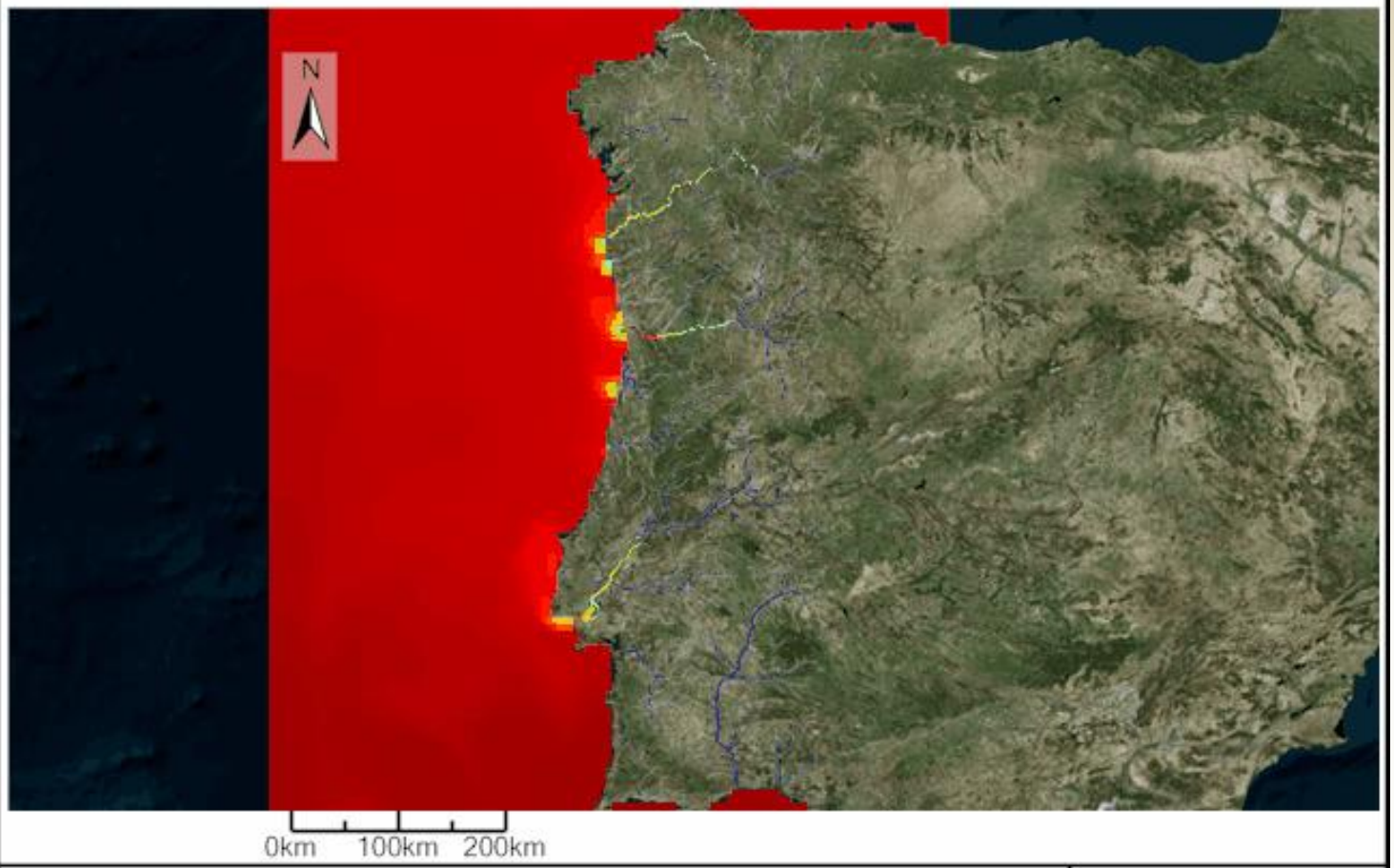
- Documentation, training & Exercising in Canary Islands, Madeira, and Morocco
  - Videos
  - Online forum to support DSS
  - Local Roadshows
  - Hands-on training sessions
  - Tabletop exercises

Project events and places

Dates	Project events and places
January 2016	Program kick-off: DG-ECHO, Brussels, Belgium
February 2016	Coordination meeting I: IST, Lisbon, Portugal
July 2016	Coordination meeting II: CEDRE, Brest, France
March 2017	Coordination meeting III + Workshop I + 1 day training course I: Casablanca, Morocco
June 2017	Coordination meeting IV: Funchal – Madeira Island, Portugal
October 2017	Roadshow I + tabletop exercise I: Funchal – Madeira Island, Portugal
November 2017	Roadshow II + tabletop exercise II + 1 day training course II: Agadir, Morocco
December 2017	Workshop II + Roadshow III+ tabletop exercise III: Las Palmas - Canary Islands, Spain

Opportunities for future collaborations

- Model development:
  - Multi-model ensemble forecasts
  - Pollution in riverine areas (MOHID Land)
- Model application:
  - Intercomparison exercises
- Software development:
  - Interoperability, web services and common API's
  - Visualization tools and mobile interfaces
  - Integration with remote sensing technologies



MOHID STUDIO

Mohid Integral Water Cycle

River Catchments, estuaries, open ocean

00:00:00

31-12-2011

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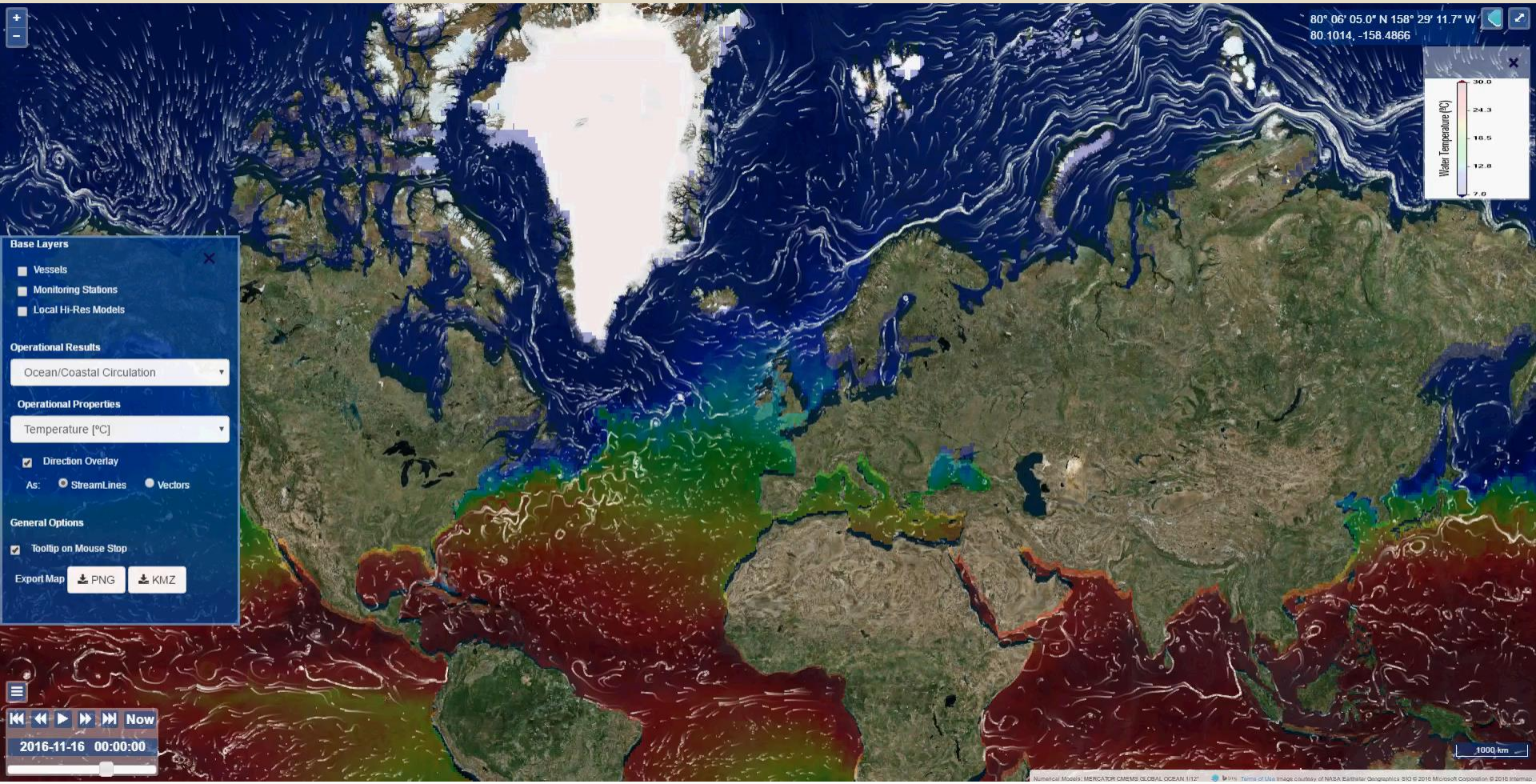

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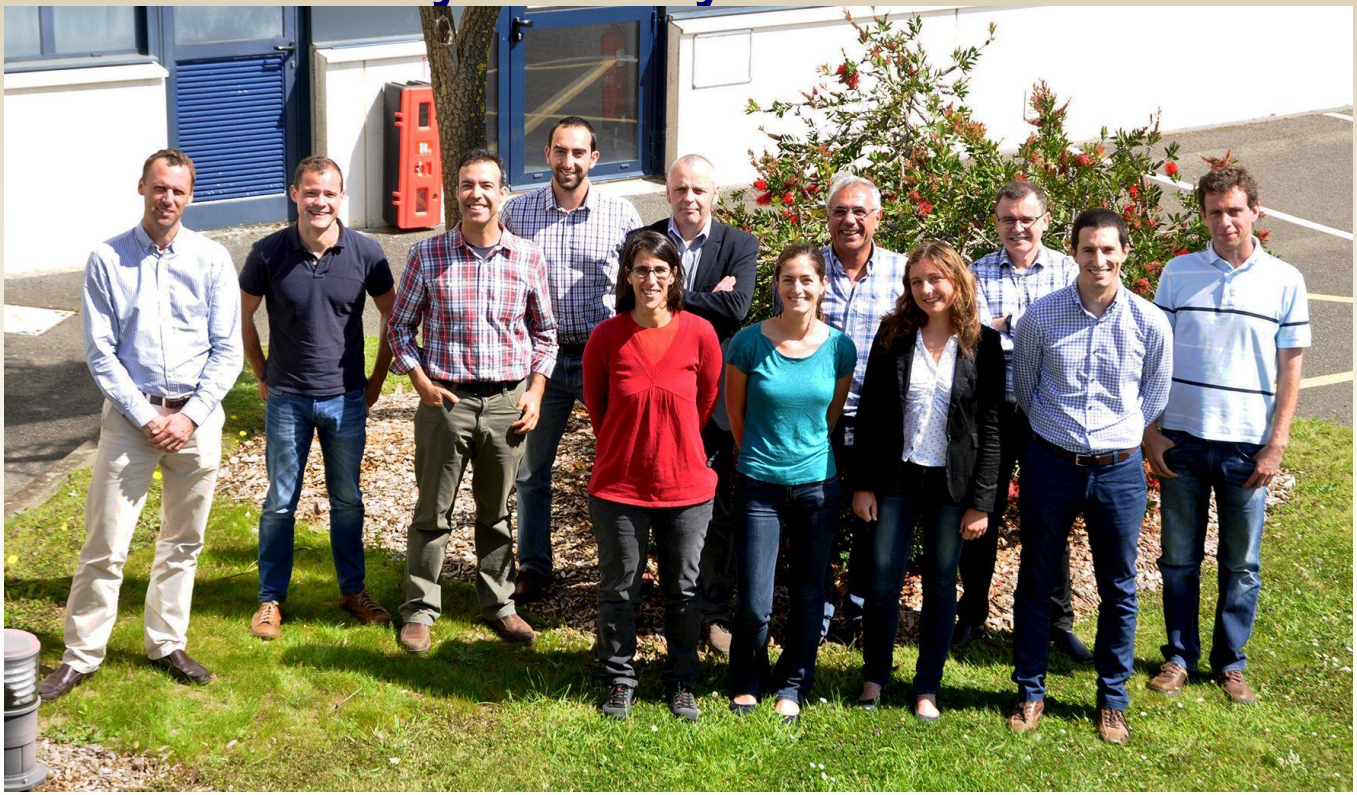
Thank you for your attention



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