EMODNET PHYSICS AND RIVER RUNOFF DATA MANAGEMENT.

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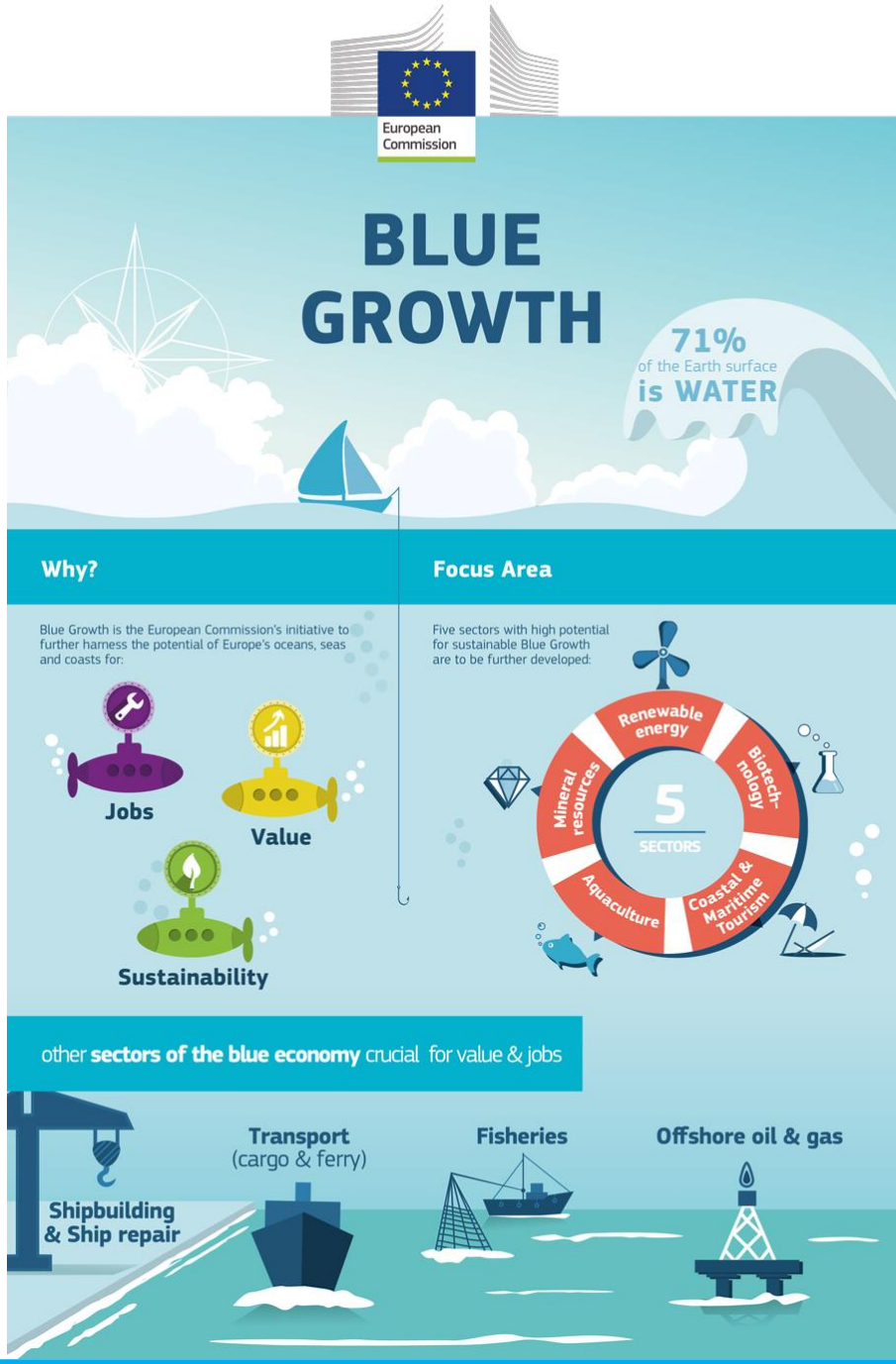
IMDIS 2018 - Barcelona, 5-7 November
International Conference on Marine Data and Information Systems

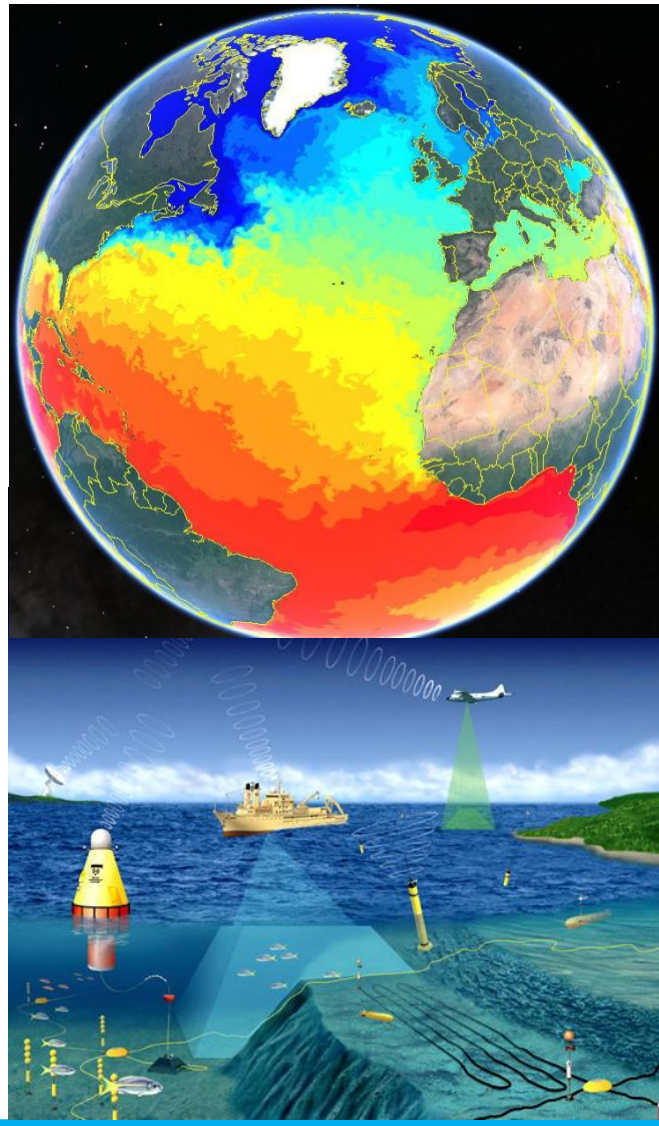
BLUE ECONOMY

- Many economic activities take place in the near ocean i.e. marine renewable energy production, fisheries and aquaculture, coastal and maritime tourism, ship transport, oil and gas exploration, etc.
- These activities are subjected to risks and need to be sustainable.
- Numerical operational models are capable to analyse and forecast the environmental suitability of those activities.
- Other services such as oil spill forecast, HABs propagation and search and rescue operations may also rely in the accuracy of numerical models forecasts near the coastal area.



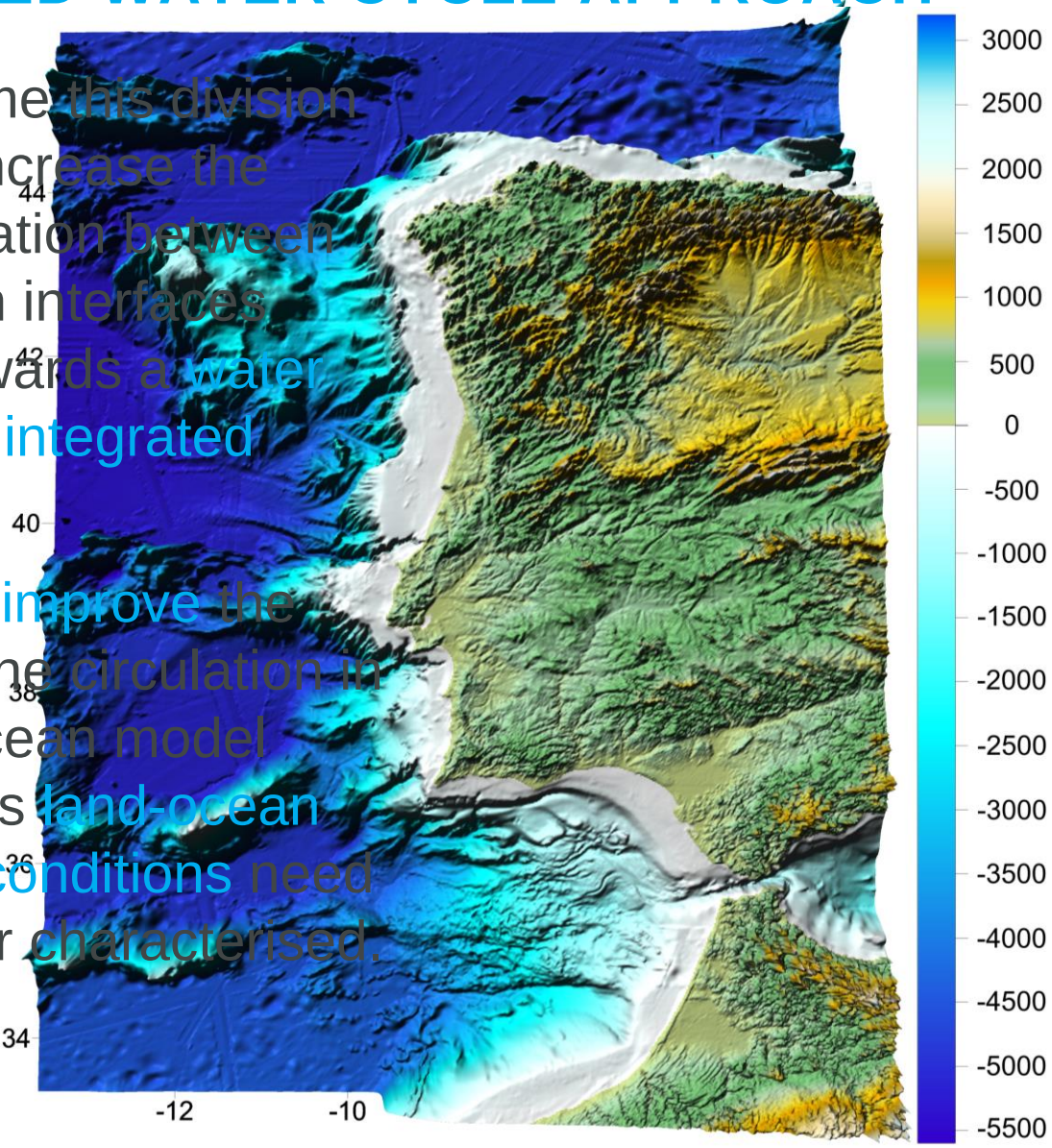
TRADITIONAL OCEAN VISION

- Traditionally, land and ocean management have been monitored and managed separately (i.e. EU WFD and MSFD directives).
- Ocean observations and numerical modelling have focused in observing the global ocean and using assimilation techniques to improve ocean properties forecasts.
- However, the incorporation of river and estuarine fluxes into regional and global ocean numerical models has been traditionally disregarded.
- Two recent analysis of regional operational model applications from the EU Copernicus Marine Environment Monitoring Services (CMEMS MFC) detected that the salinity field was inaccurate due to the large uncertainties regarding the river runoff and discharge forcing.



A PARADIGM SHIFT: INTEGRATED WATER CYCLE APPROACH

- To overcome this division efforts to increase the communication between land-ocean interfaces moving towards a water continuum integrated approach.
- In order to improve the thermohaline circulation in regional ocean model applications land-ocean boundary conditions need to be better characterised.



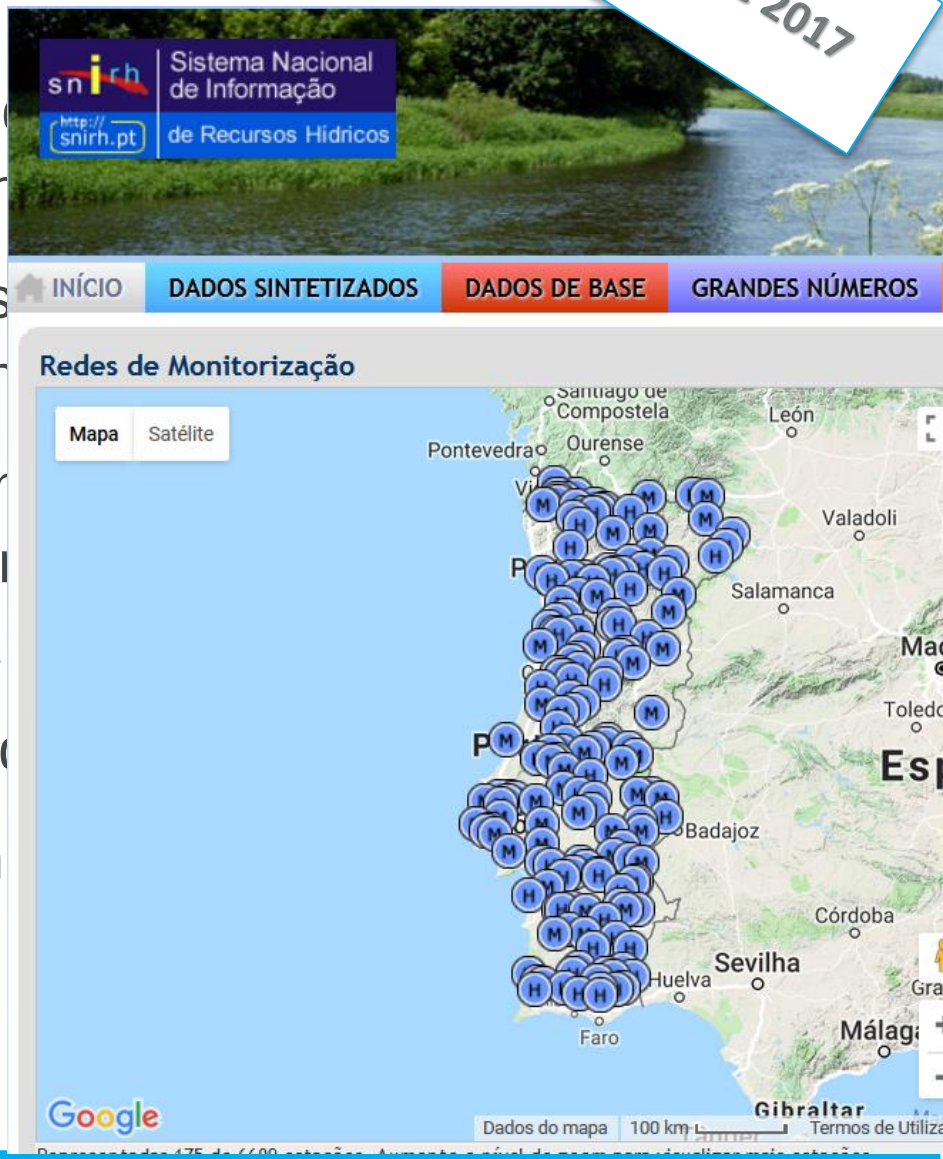
OPERATIONAL RIVER DATA CONSTRAINTS

- Sparse data in national/regional webpages sometimes only in local language;
- Multiple data sources with GIS portals that eventually may offer access to the actual data;
- Global databases that provide historic data flows but lack of near real time data;
- Water level data without flow curve for conversion into river flow;
- River runoff reaching the coastal area is unavailable or unmonitored for many rivers. This is an increasing problem in the current context of a global decline of the hydrometric networks (Mishra and Coulibaly, 2009).

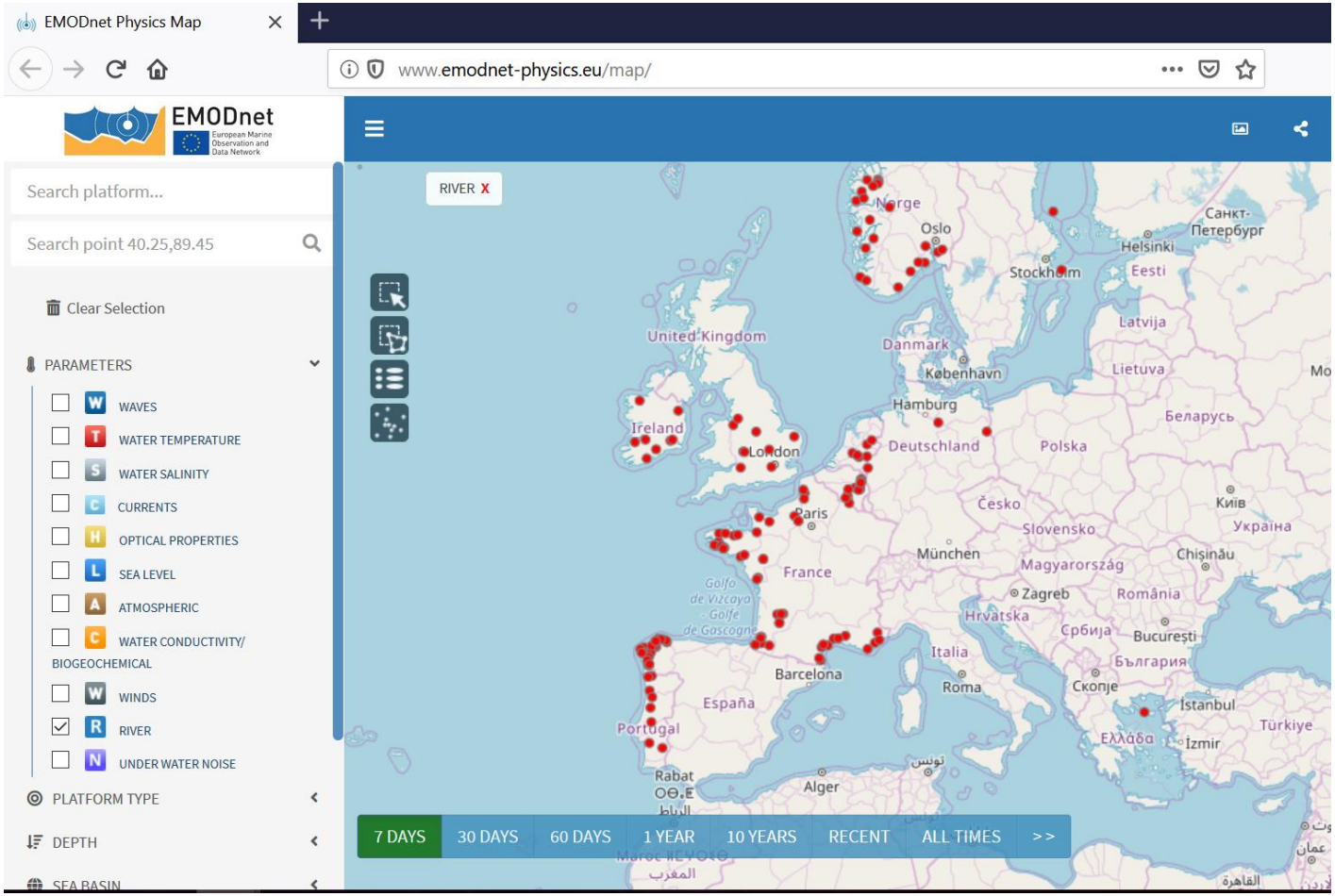
EMODNET RIVERS OBJECTIVES

Since June 2017

- Identify the main river inputs an
  for setting up and maintaining th
- Select the most reliable stations
  Coastal/ocean local experts cor
- Provide the river observations ir
  common format and metadata i
- River data is provided in a daily
  commonly done in other *in situ*
- Complete the observations with
  models and provide forecasts.



EMODNET RIVERS INITIATIVE - CURRENT STATUS



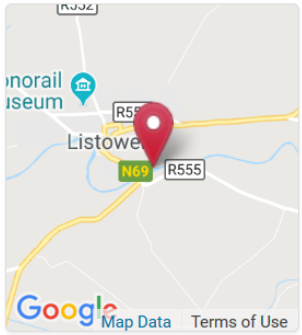
Assembly centers:

TÉCNICO LISBOA

Coriolis OPERATIONAL OCEANOGRAPHY

NOOS
North West European Shelf Operational Oceanographic System

ACKNOWLEDGING THE SOURCES



PLATFORM CODE

Listowel23002FEALE

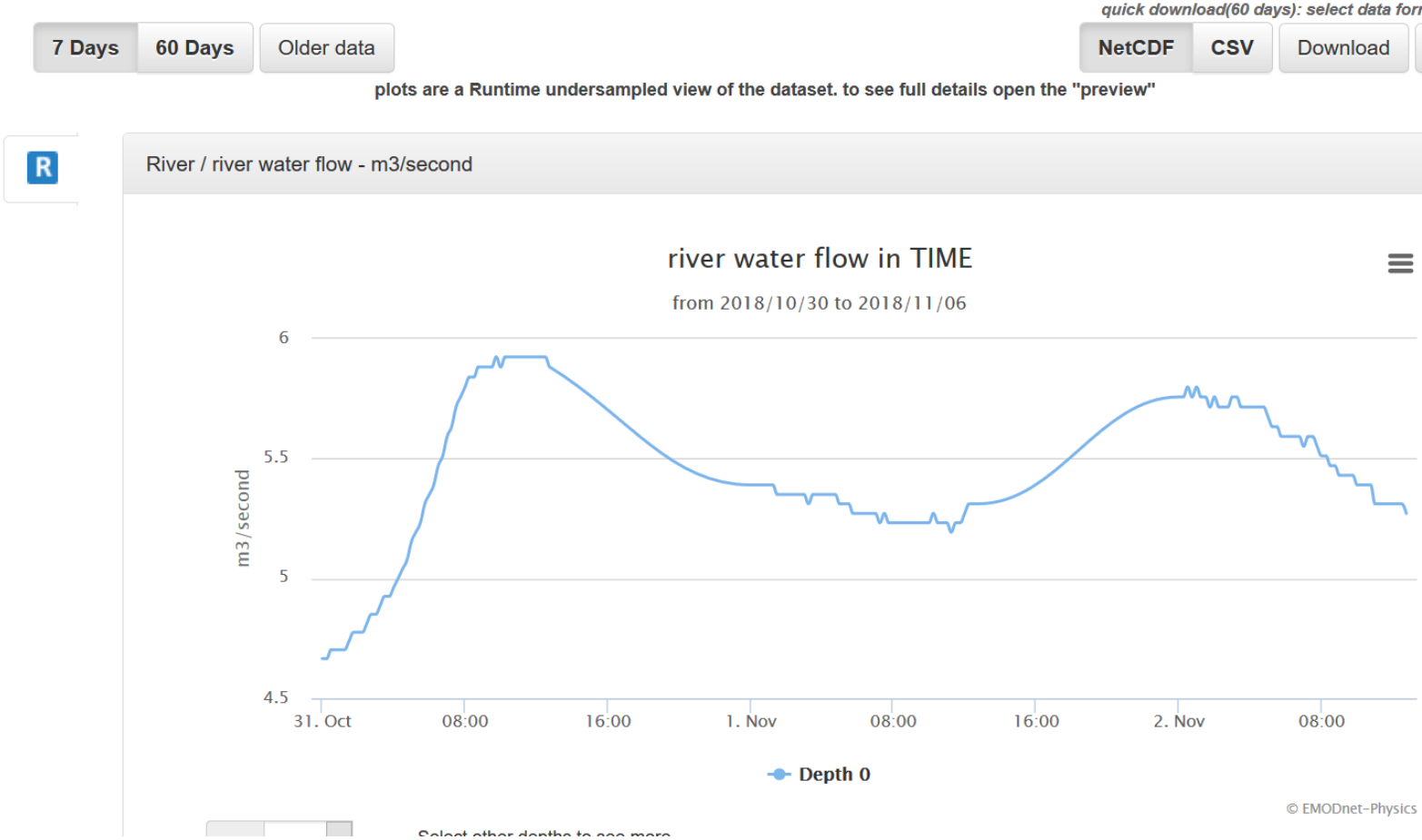
PLATFORM NAME

Listowel23002FEALE

INSTITUTION

OPW - Office of Public Works of Ireland

ASSEMBLY CENTER



EUROGOOS COASTAL WG
HTTP://EUROGOOS.EU/COASTAL-WG/

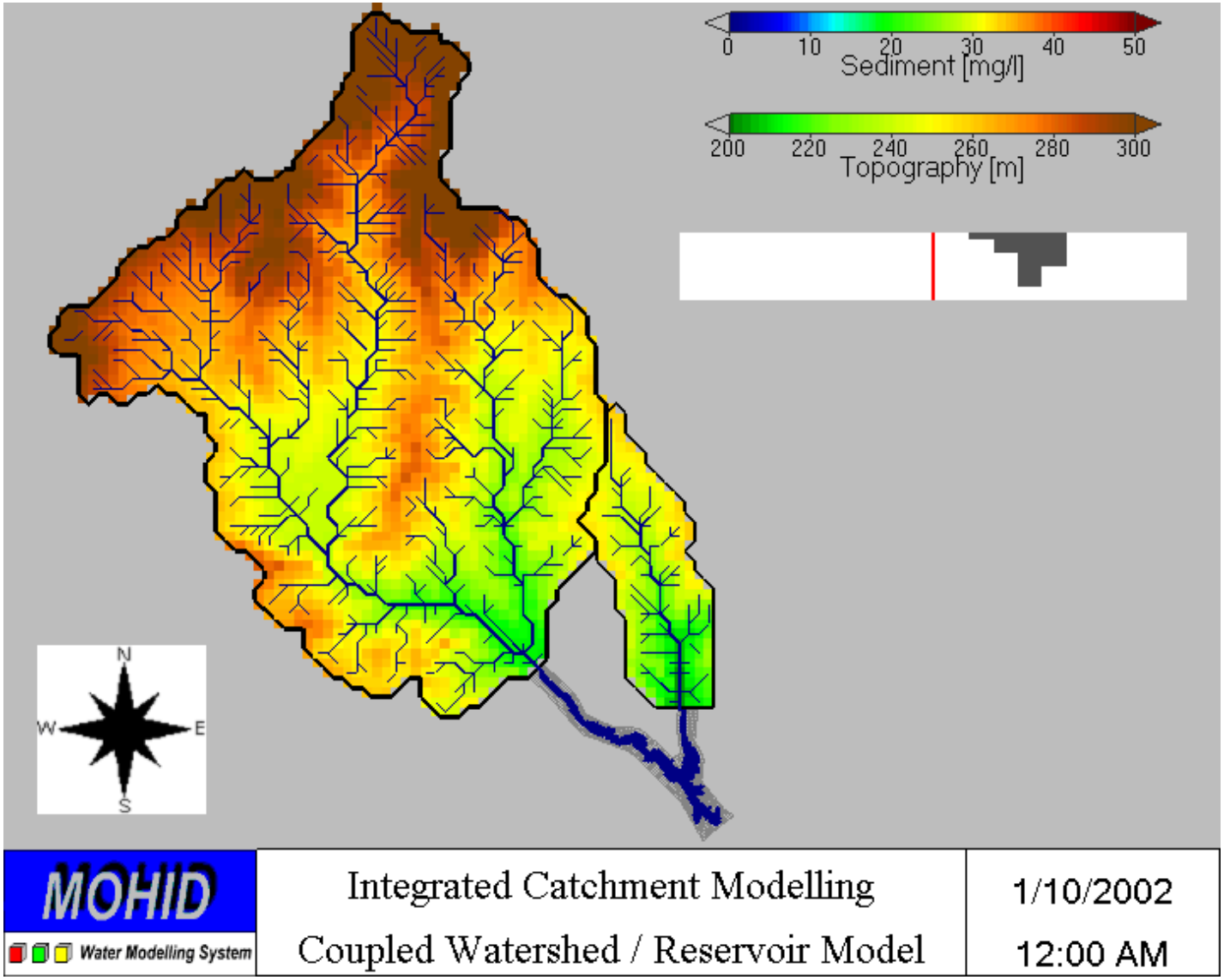
Coastal Working Group Members

Coastal WG Kick Off Meeting, 9th May 2018, Brussels

Chair: Ghada El Serafy (Deltares, Netherlands)
Co-chair: Anna Rubio (AZTI, Spain)

Members
Joaquin Tintore (SOCIB, Spain)
Laura Ursella (OGS, Italy)
Federico Falcini (CNR, Italy)
Arthur Capet (Uni Liege, Belgium)
Joanna Staneva (HZG, Germany)
Eleanor O'Rourke (Marine Institute, Ireland)
Francisco Campuzano (IST, Portugal)
Jun She (DMI, Denmark)
Paloma de la Valee and Sebastien Legrand (RBINS, BE)
Bruce Hackett & Oyvind Saetra (Met Norway)
Veronique Creach (Cefas, UK)
Ivane Pairaud (Ifremer, France)
Marina Tonani (UK MetOffice)
Angelique Melet (Mercator Ocean, FR)
Sonja Wanke (Deltares, Netherlands)
EuroGOOS Office

MOHID WATERSHED MODELLING

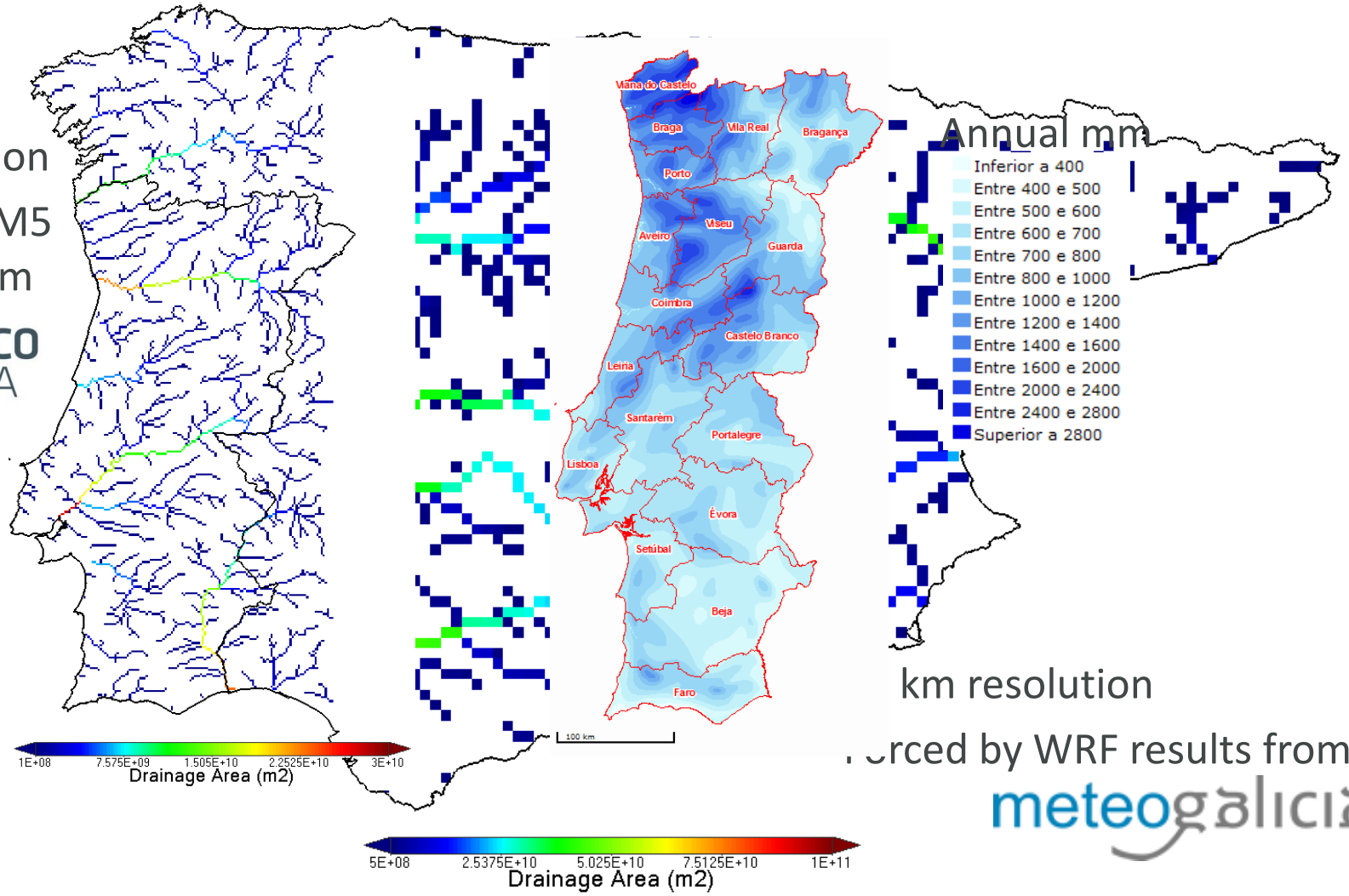


WATERSHEDS MODELLING SETUP

2 km resolution

Forced by MM5 results from

TÉCNICO LISBOA

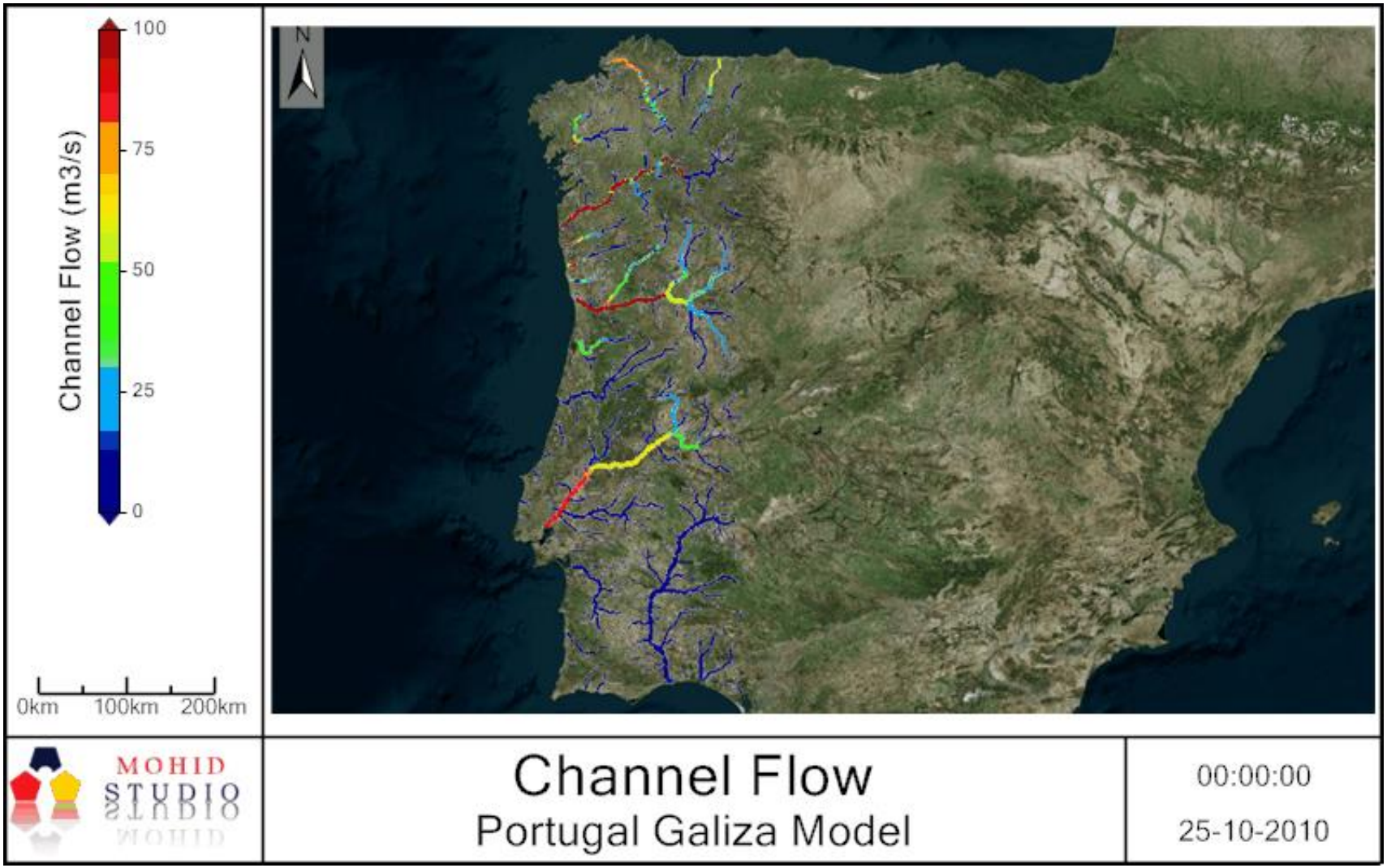


km resolution

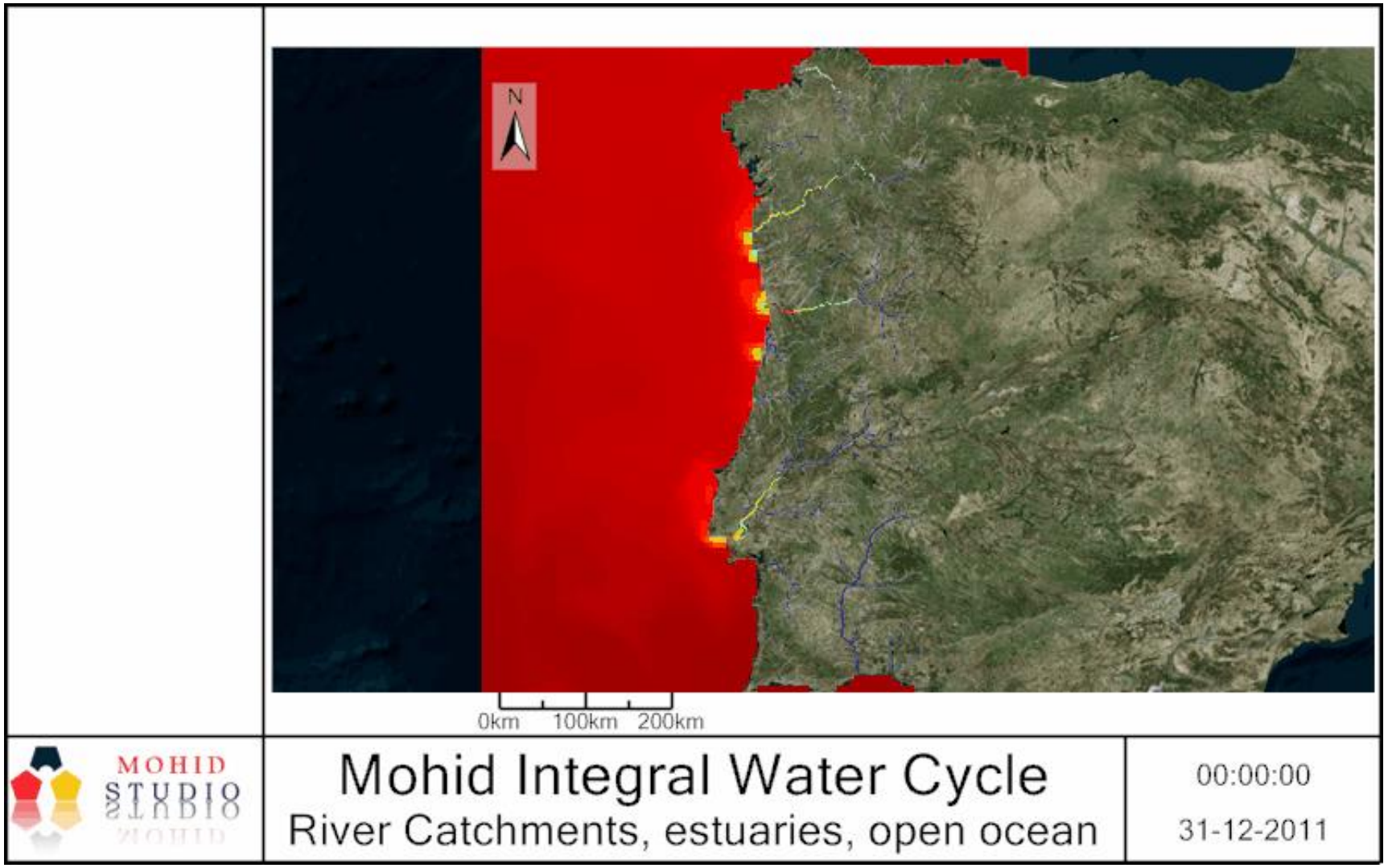
Forced by WRF results from

meteogalicia

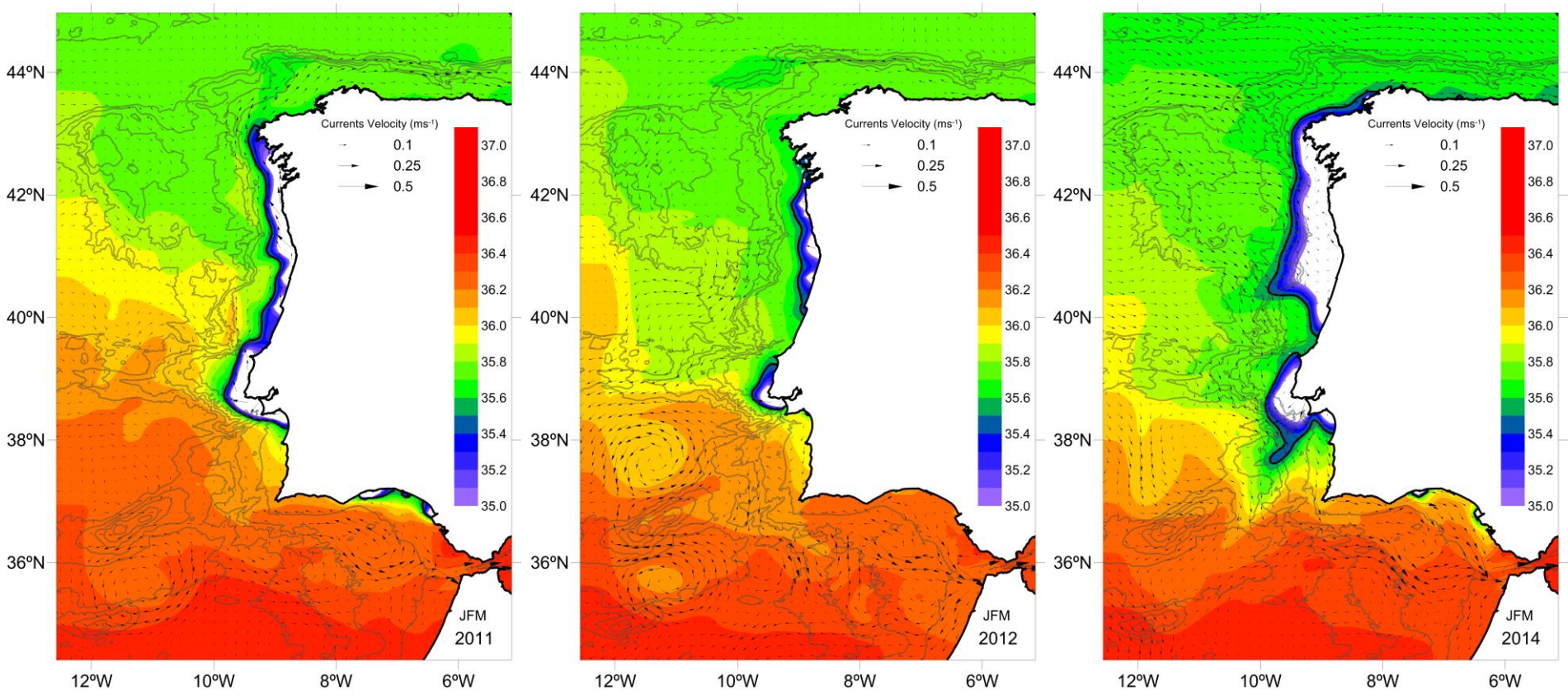
WATERSHEDS MODELLING SETUP



MOHID INTEGRAL WATER CYCLE IN THE PORTUGUESE CONTINENTAL COAST



MEAN SEA SURFACE SALINITY
WET SEASON (JFM)



- Salinity values under 35 are represented in white

EXTREME EVENT: APRIL 2013 FLOODS

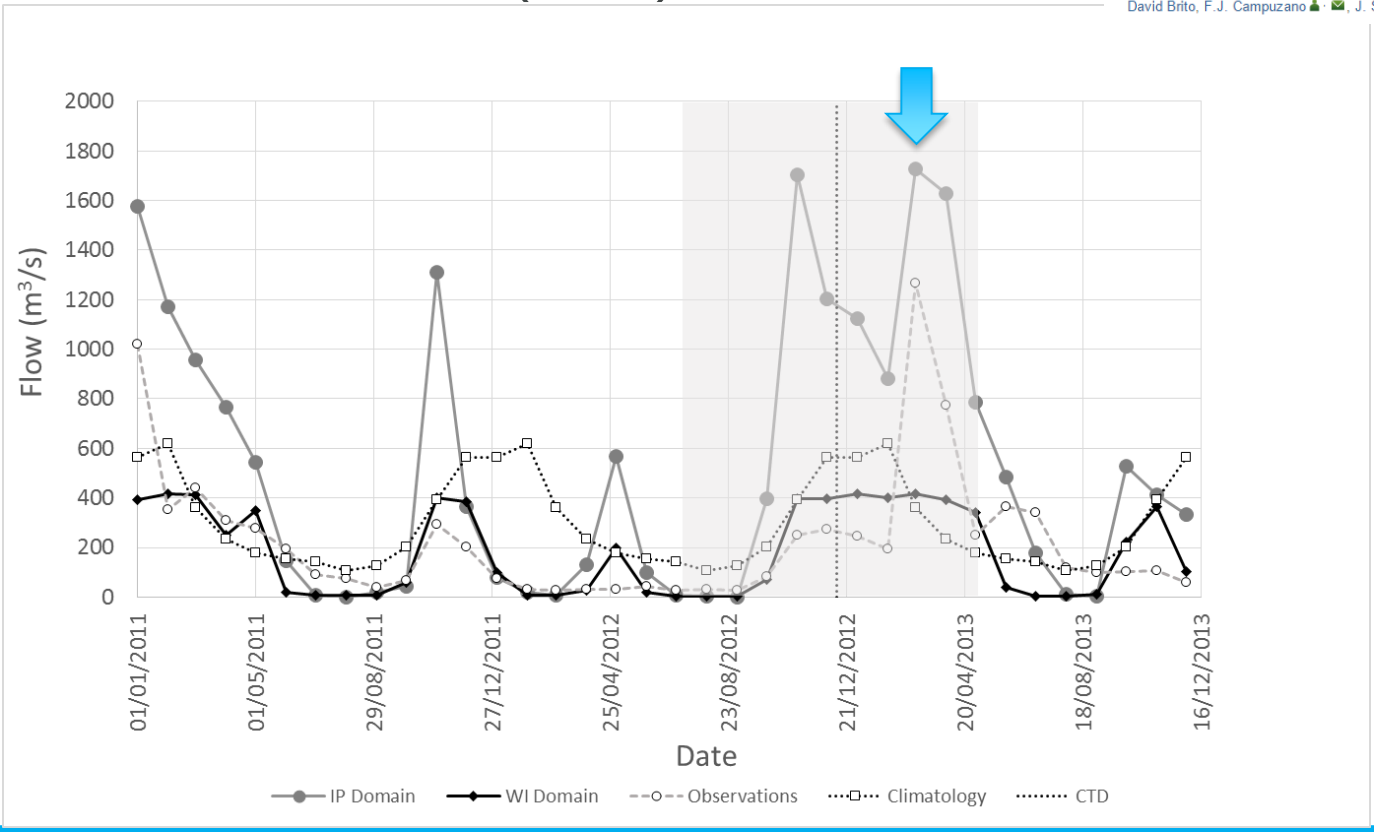
TAGUS ESTUARY MODELLING SCENARIOS

- River Hydrometric Observations (Almourol) (Source: SNIRH-APA)
- River Climatology
- MOHID Land IP (10 km)
- MOHID Land WI (2 km)

Estuarine, Coastal and Shelf Science
Volume 167, Part A, 20 December 2015, Pages 138–146
Coastal systems under change: tuning assessment and management tools

Integrating operational watershed and coastal models for the Iberian Coast: Watershed model implementation – A first approach

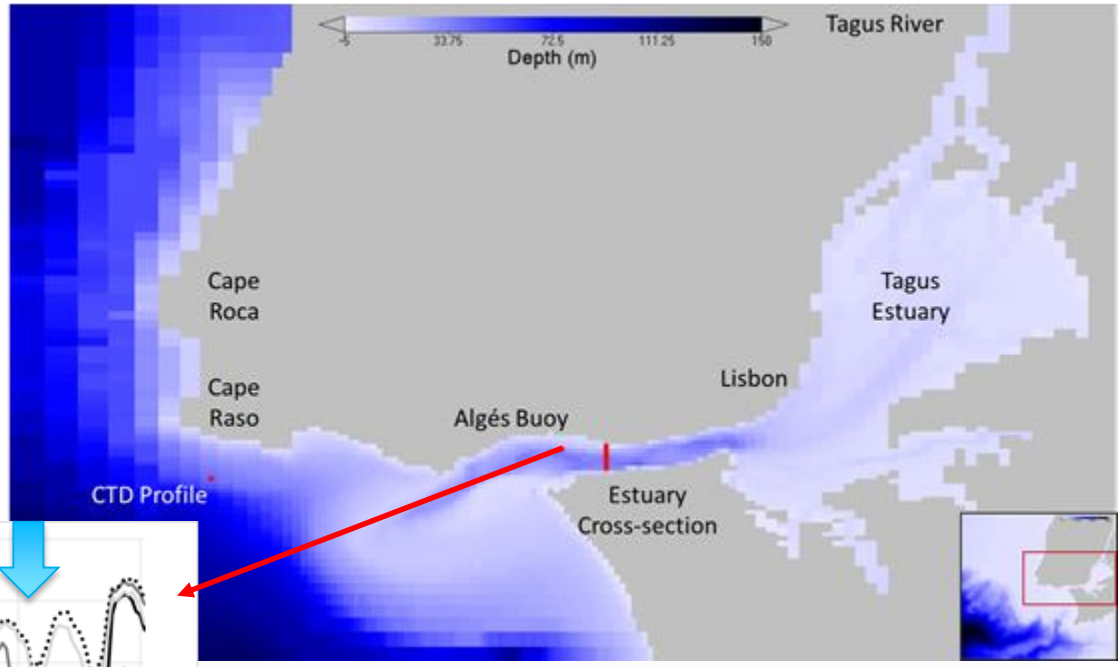
David Brito, F.J. Campuzano, J. Sobrinho, R. Fernandes, R. Neves

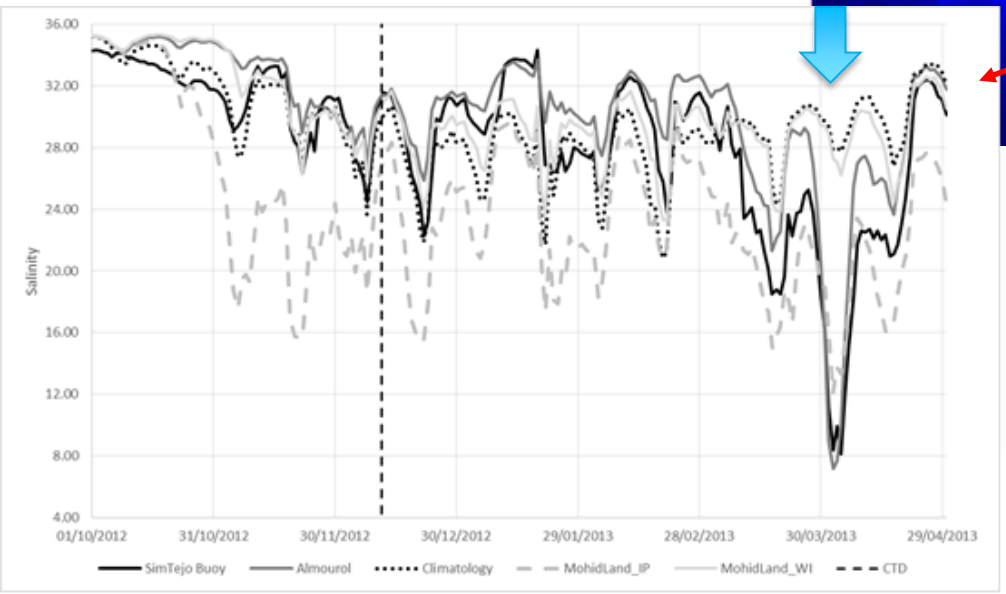


EXTREME EVENT – ALGES BUOY

- October 2012-April 2013

	R^2	RMSE
Algés Buoy vs Almourol	0.89	2.55
Algés Buoy vs Climatology	0.20	4.71
Algés Buoy vs MohildLand_IP	0.58	5.67
Algés Buoy vs MohildLand_WI	0.40	4.31





Ocean Dynamics
December 2016, Volume 66, Issue 12, pp 1745–1756

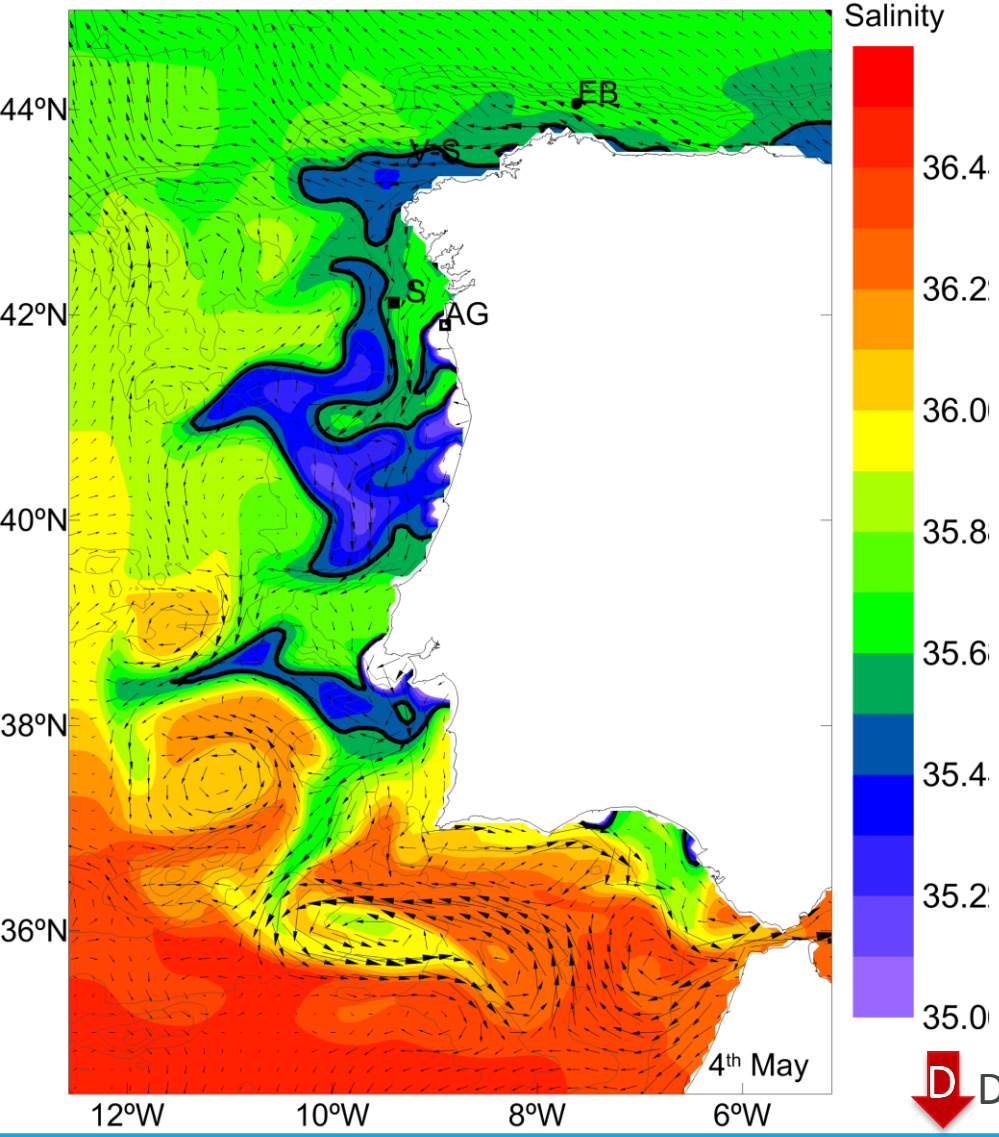
Coupling watersheds, estuaries and regional ocean through numerical modelling for Western Iberia: a novel methodology

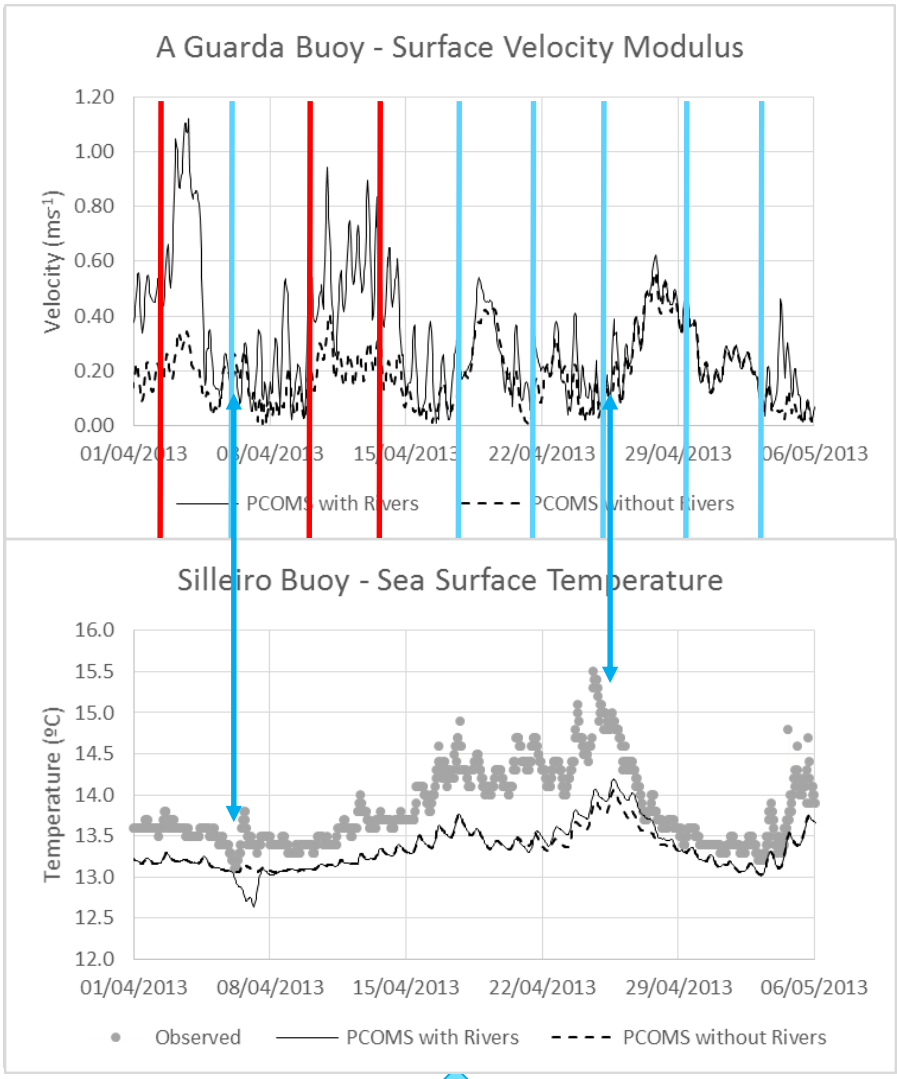
Authors | Authors and affiliations

Francisco Campuzano, David Brito, Manuela Juliano, Rodrigo Fernandes, Hilda de Pablo, Ramiro Neves

Algés Buoy Data provided by SIMTEJO Grupo Águas de Portugal

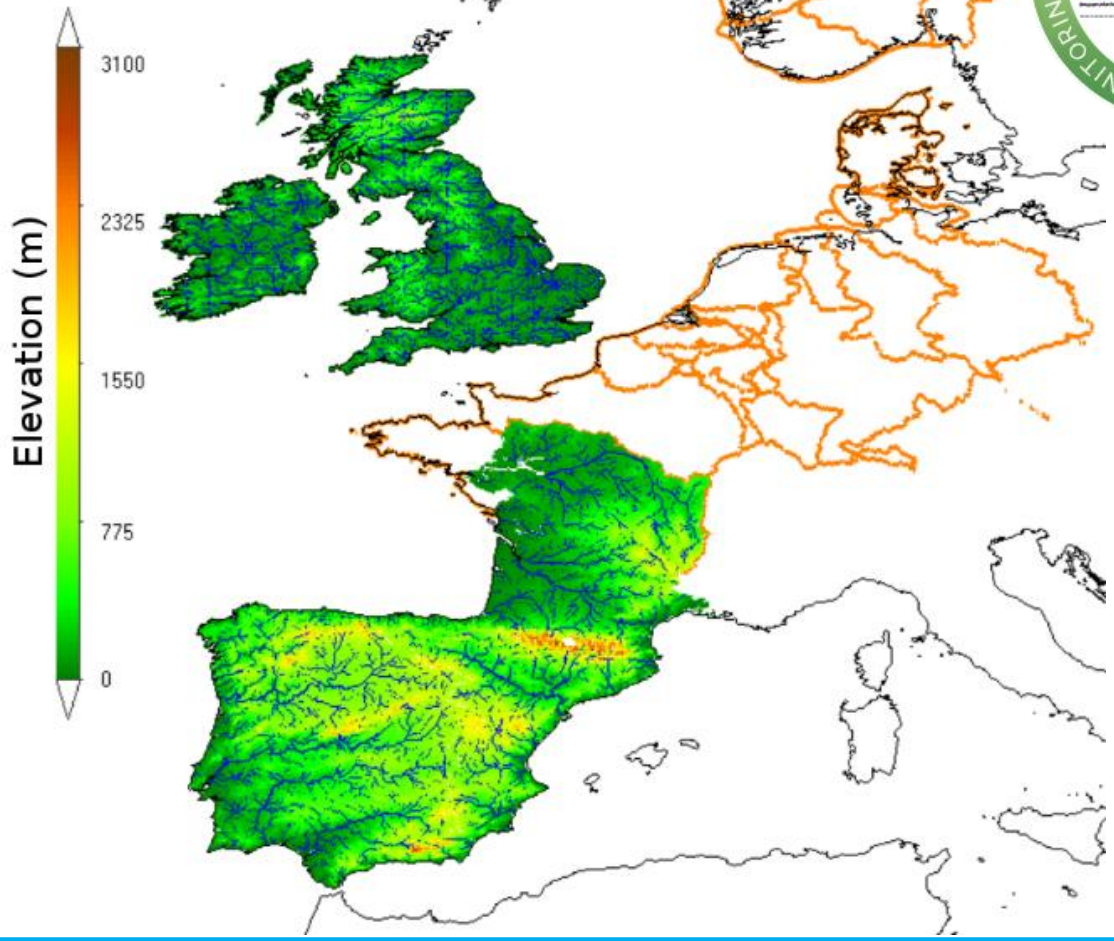
PCOMS - EXTREME EVENT SIMULATION





D Downwelling Conditions U Upwelling Conditions

WATERSHED COVERAGE
CMEMS SE LAMBDA PROJECT (2018-2020)



COPERNICUS MARINE ENVIRONMENT MONITORING SERVICE
CMEMS Service Evolution

Full partners

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Bentley Advancing Infrastructure

BEC Barcelona Expert Center

ETT PEOPLE AND TECHNOLOGY

Associated partners

Met Office

Puertos del Estado

Marine Institute Foras na Mara

Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung

CONCLUSIONS:

- Harmonised database of relevant and reliable river flow and water properties;
- One stop shop for river data at the European level;
- Standardised common data formats;
- Observations completed by modelling results in terms of properties;
- River forecasts to be included in the next future;
- Looking for contributions/data sources. Can you help?

- Moltes gràcies per la seva atenció!!
- Muchas gracias por su atención!!
- Thank you very much for your attention!!

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www.mohid.com

www.maretec.org

Historical flood in Coimbra (Portugal)