



1st MOHIDing, IST, Lisbon

Running MOHID in forecast mode for the Thracian Sea using the AquaSafe platform

João G. Rodrigues, Paulo Chambel Leitão, Pedro Galvão, Adélio Silva,
José Chambel Leitão, Hélio Santos, João Ribeiro, Sofia Bartolomeu

INTRODUCTION

MOHID Implementation

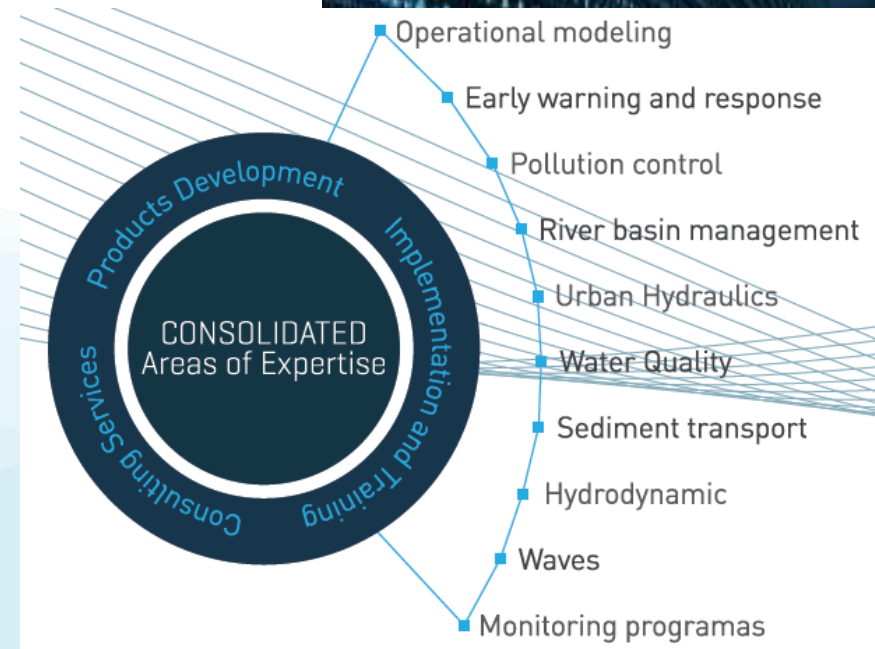
Forcing
Discretization
Results

AQUASAFE | OPERATIONAL SYSTEM

CONCLUSIONS

Introduction

- HIDROMOD is an international company acting in the areas of:
 - ✓ Consultancy: Whole water cycle and information technologies
 - ✓ Products: Real time data and modeling integration
 - ✓ Services: Forecast systems, Early warning systems, Professional support (e.g. Portugal, Spain, France, Brazil, Argentina, Colombia, Malaysia, Oman)
- Main characteristics:
 - ✓ High qualified staff with several Ph.D. and Ms.C.
 - ✓ Over 450 projects in the last 25 years
 - ✓ 1/3 – R&D Projects



Target end users – HIDROMOD forecast services (with sign contracts) - 2018





Thracian sea implementation

Thracian sea implementation

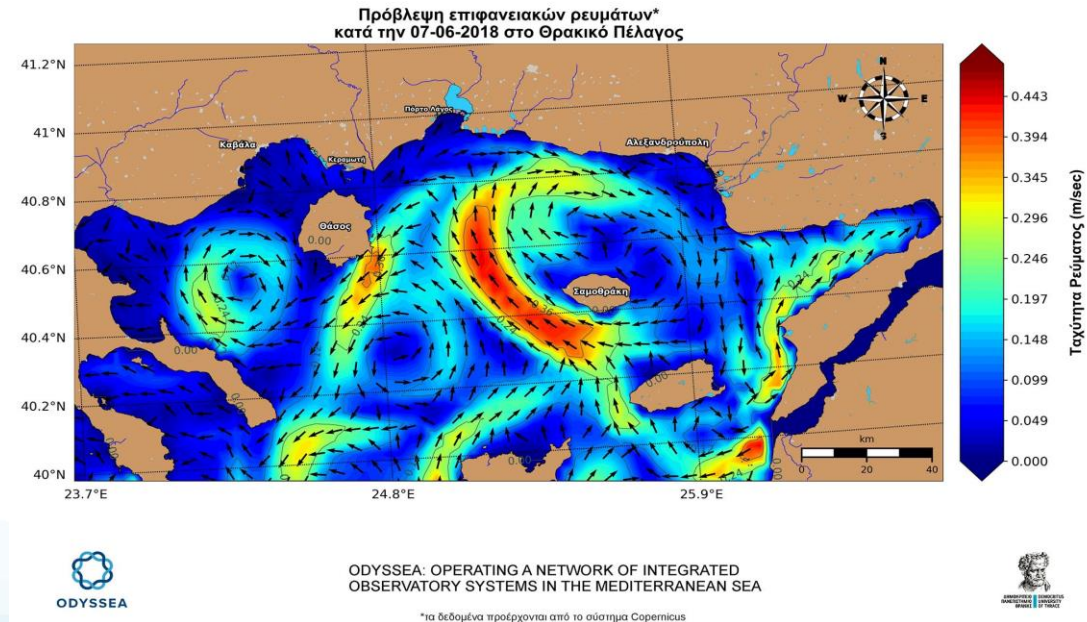
Overview:

1. Why
2. Forcing
3. Discretization
4. Results
 1. Maps
 2. Time series



1. Why

Why Thracian Sea:



Objective:

- Downscaling of Marine Copernicus MEDSea Solution (2km)
- Improve results quality near shore (end-users such as fisherman)

2. Forcing

Atmospheric Forcing

External Data

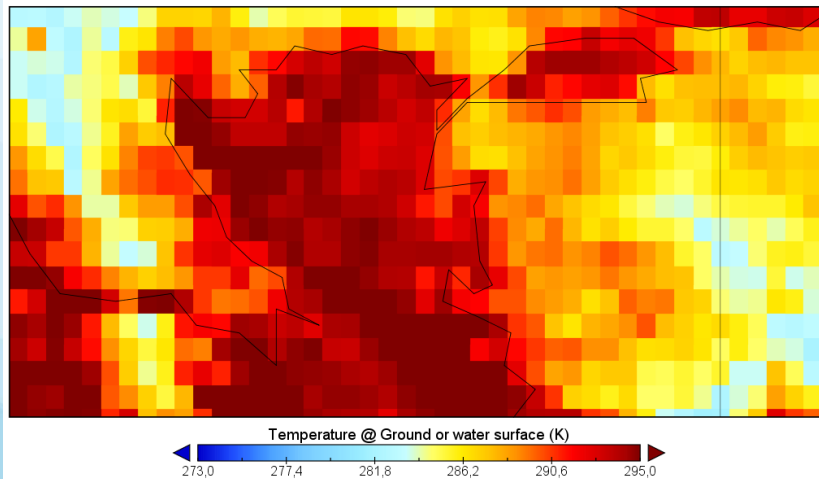
NOAA GFS

0.25°

DT 1 Hour

10 Days Forecast

NOAA GFS



Dedicated Internal WRF

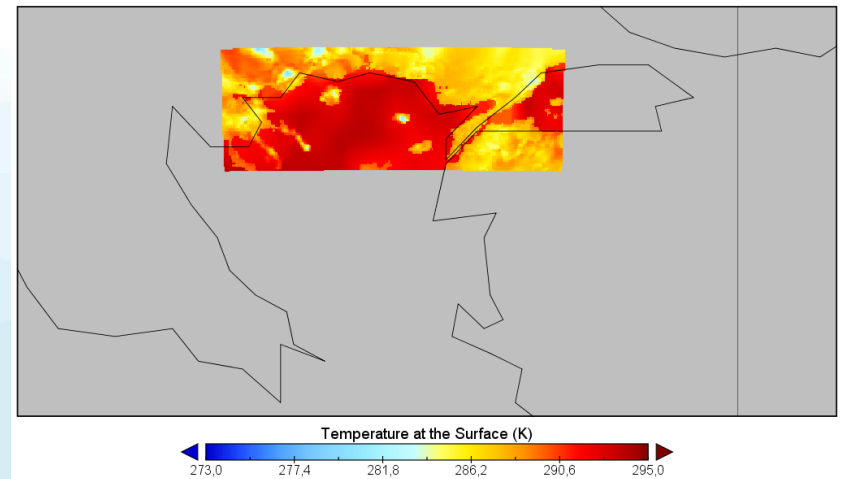
Based on GFS Data

0.02° (~2km)

DT 1Hour

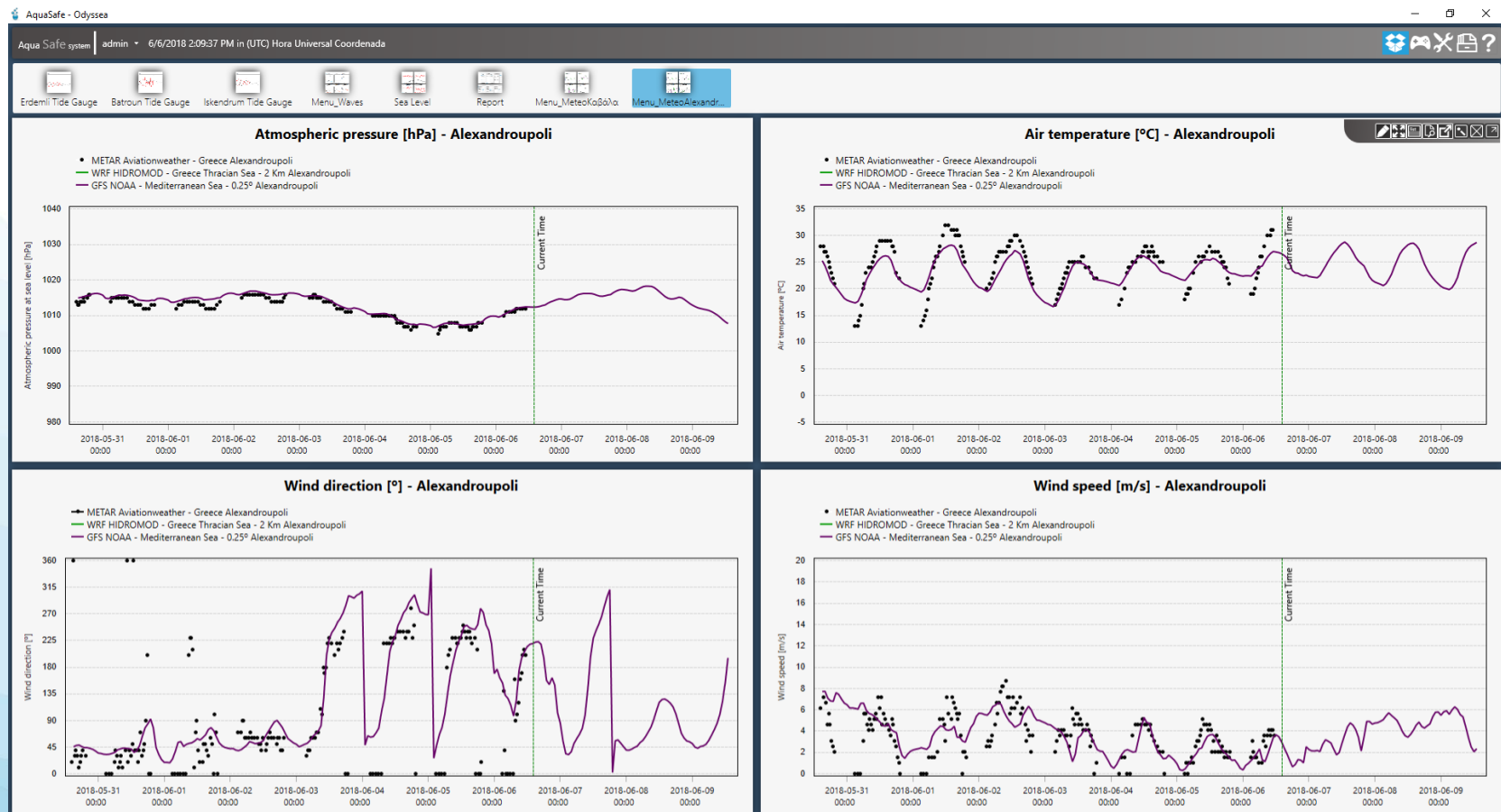
6 Days Forecast

WRF 2Km



2. Forcing

Atmospheric Forcing Validation



2. Forcing

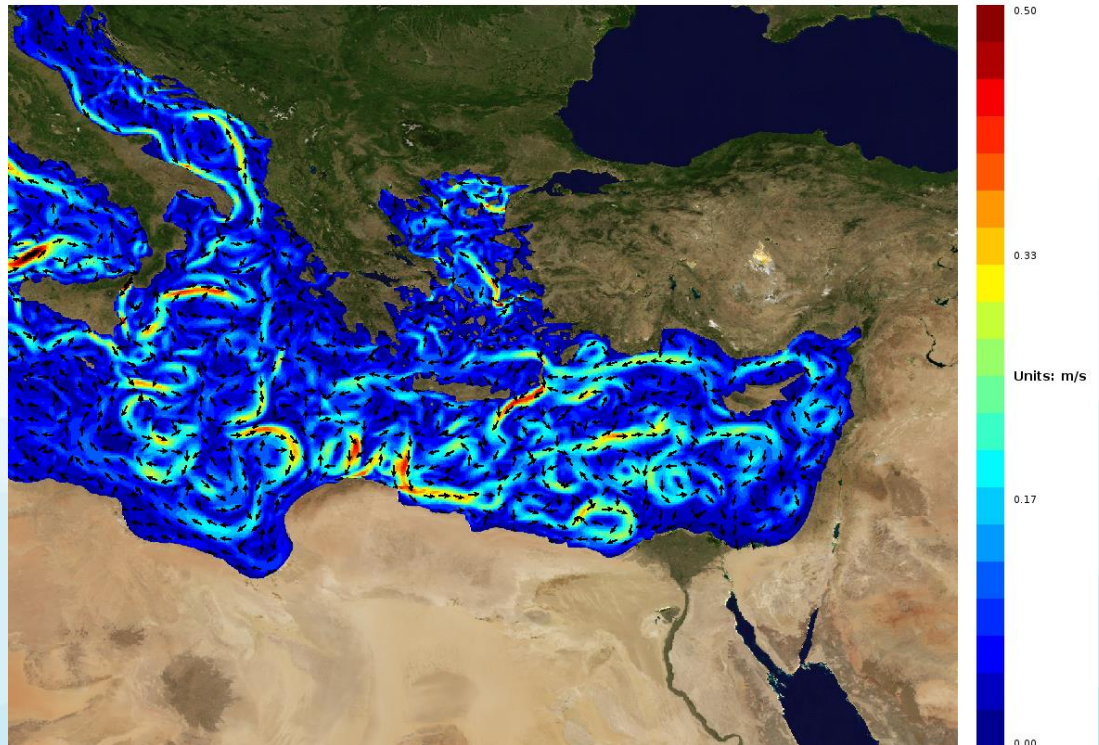
Initial and open boundary Forcing

External Data

Marine Copernicus
1/24° (~4km)
141 Z-levels
DT 1 Hour
5 Days Forecast



Horizontal Velocity (3D) - Daily Mean
sea water velocity
Date: 2018-04-15 12:00 UTC
Depth: 1.02m



2. Forcing

Open Boundary Conditions

External Data

Marine Copernicus
 1/24° (~4km)
 141 Z-levels
 DT 1 Hour
 5 Days Forecast

Fes2012

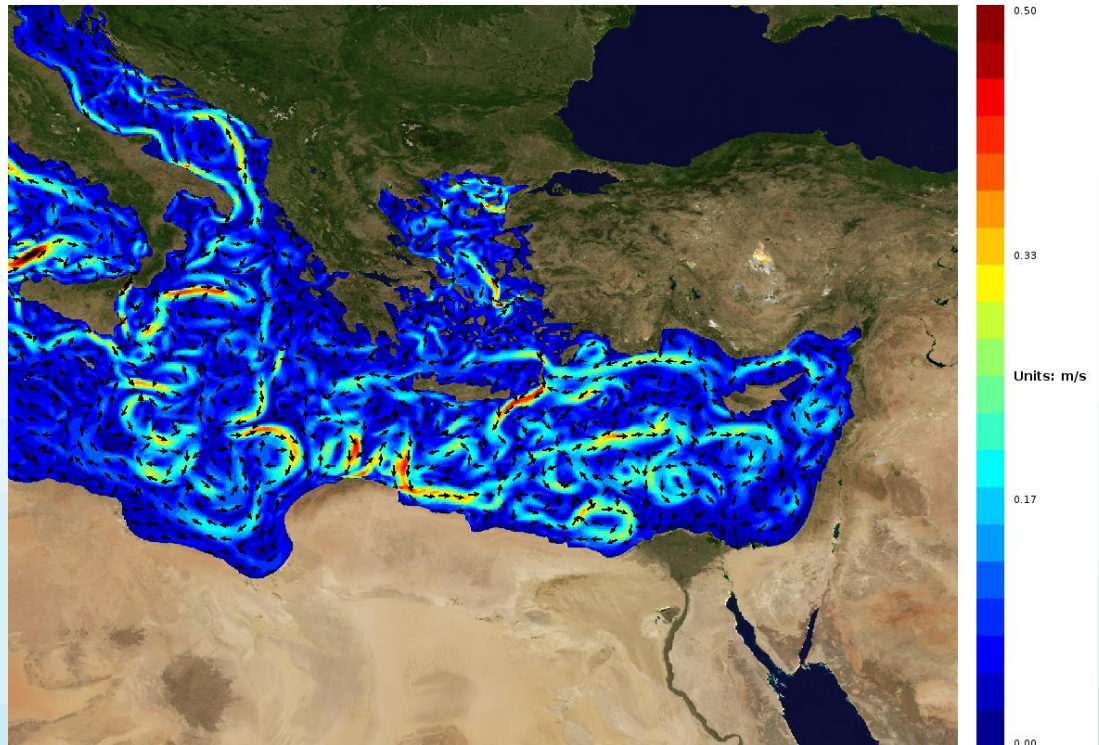
astronomic tide

Land Boundary

River Discharge
 Nestos
 Strymon
 Evros



Horizontal Velocity (3D) - Daily Mean
 sea water velocity
 Date: 2018-04-15 12:00 UTC
 Depth: 1.02m



3. Discretization

- Level 1 (Thracian sea):

$DT = 60 \text{ s}$

$DX = 0.01^\circ$

62 z-layers (same z-level discretization of the CMEMS MedSea solution)

- Nesting - Level 2 (Thassos Strait):

$DT = 60 \text{ s};$

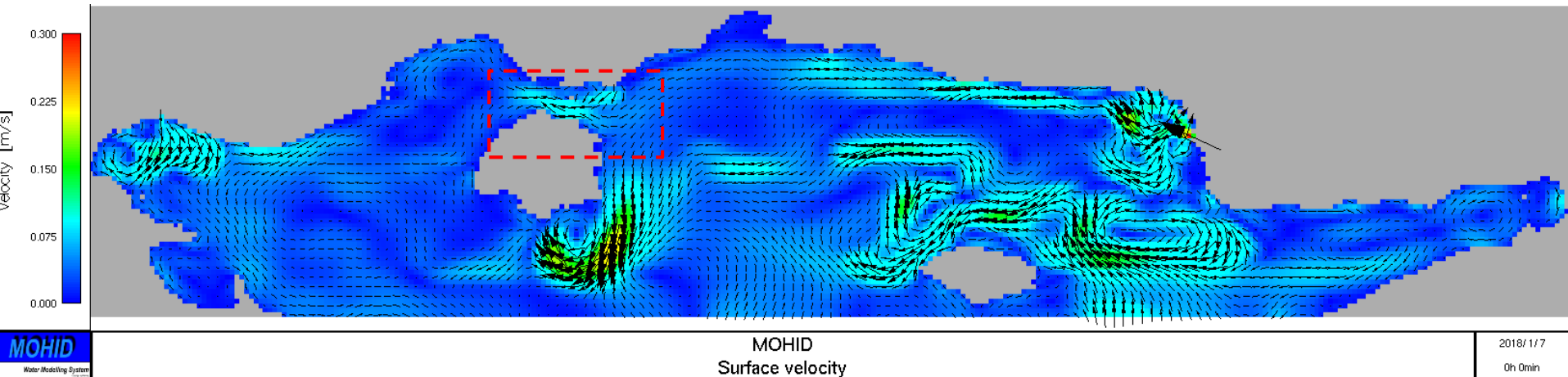
$DX = 0.002^\circ$

17 z-layers (same z-level discretization of the CMEMS MedSea solution)

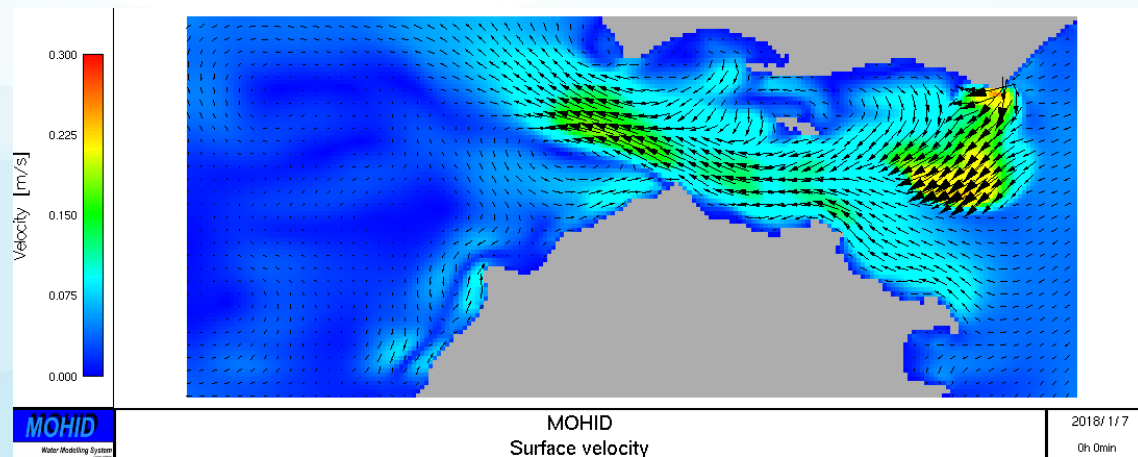


3. Results

Level 1 – Surface velocity

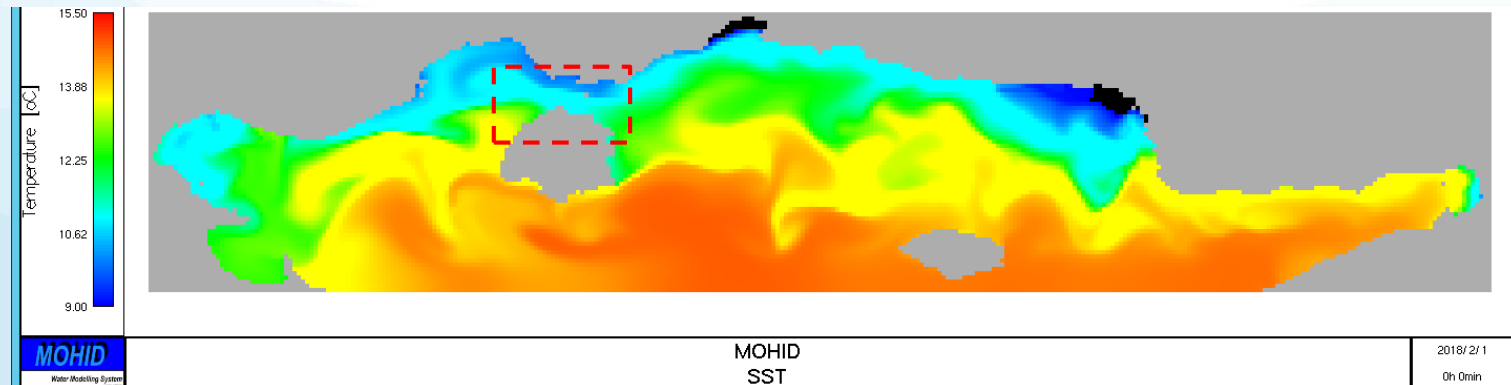
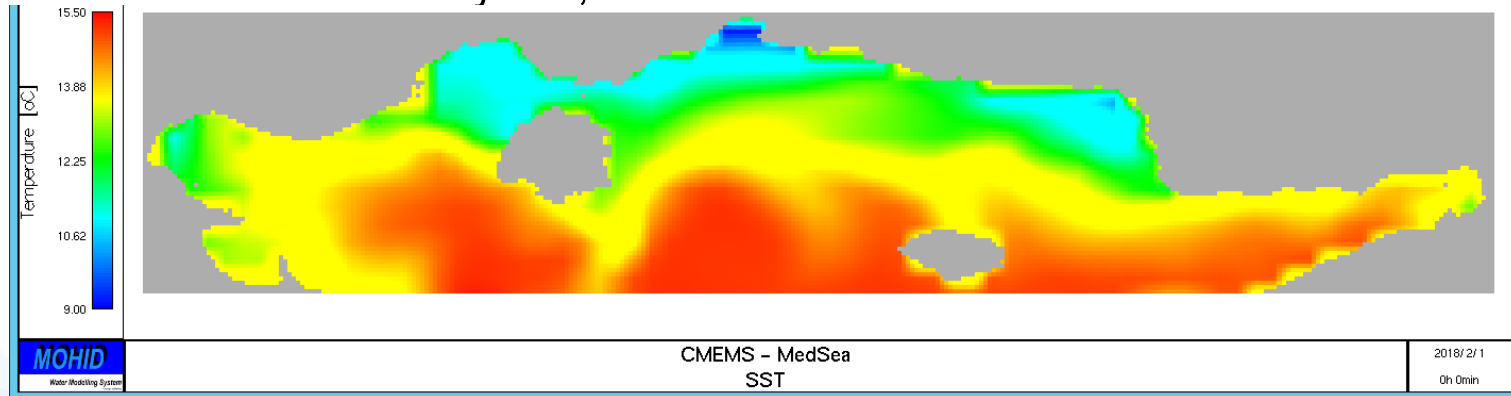


Level 2 – Surface velocity



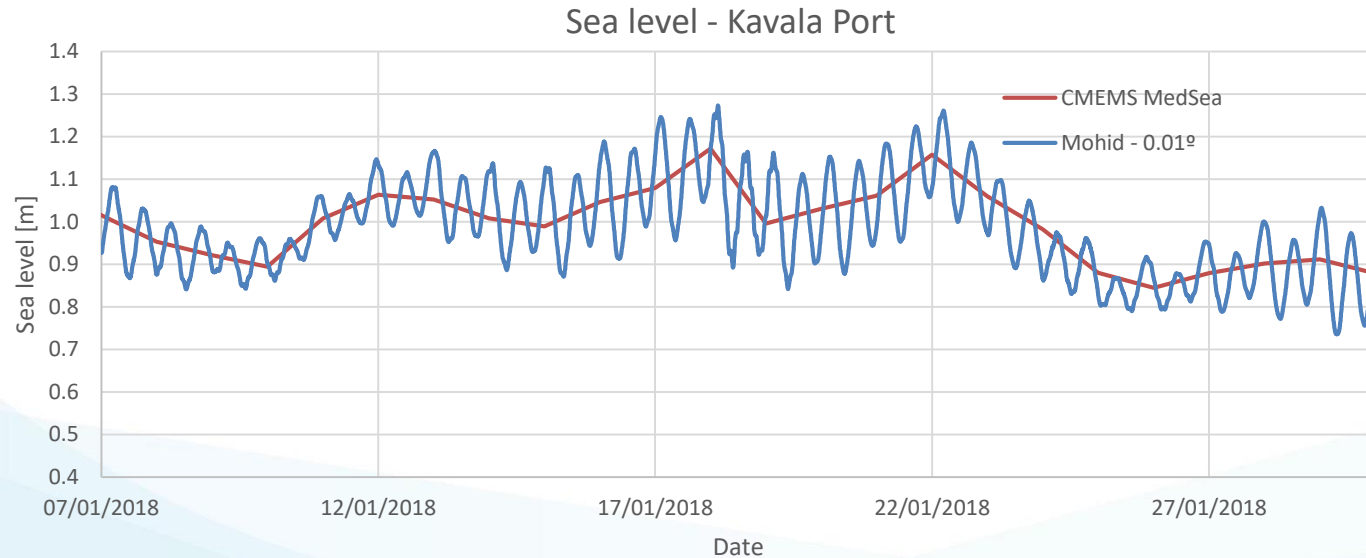
3. Results

Level 1 – SST - February 1st , 2018



3. Results

Level 1 – 1 month



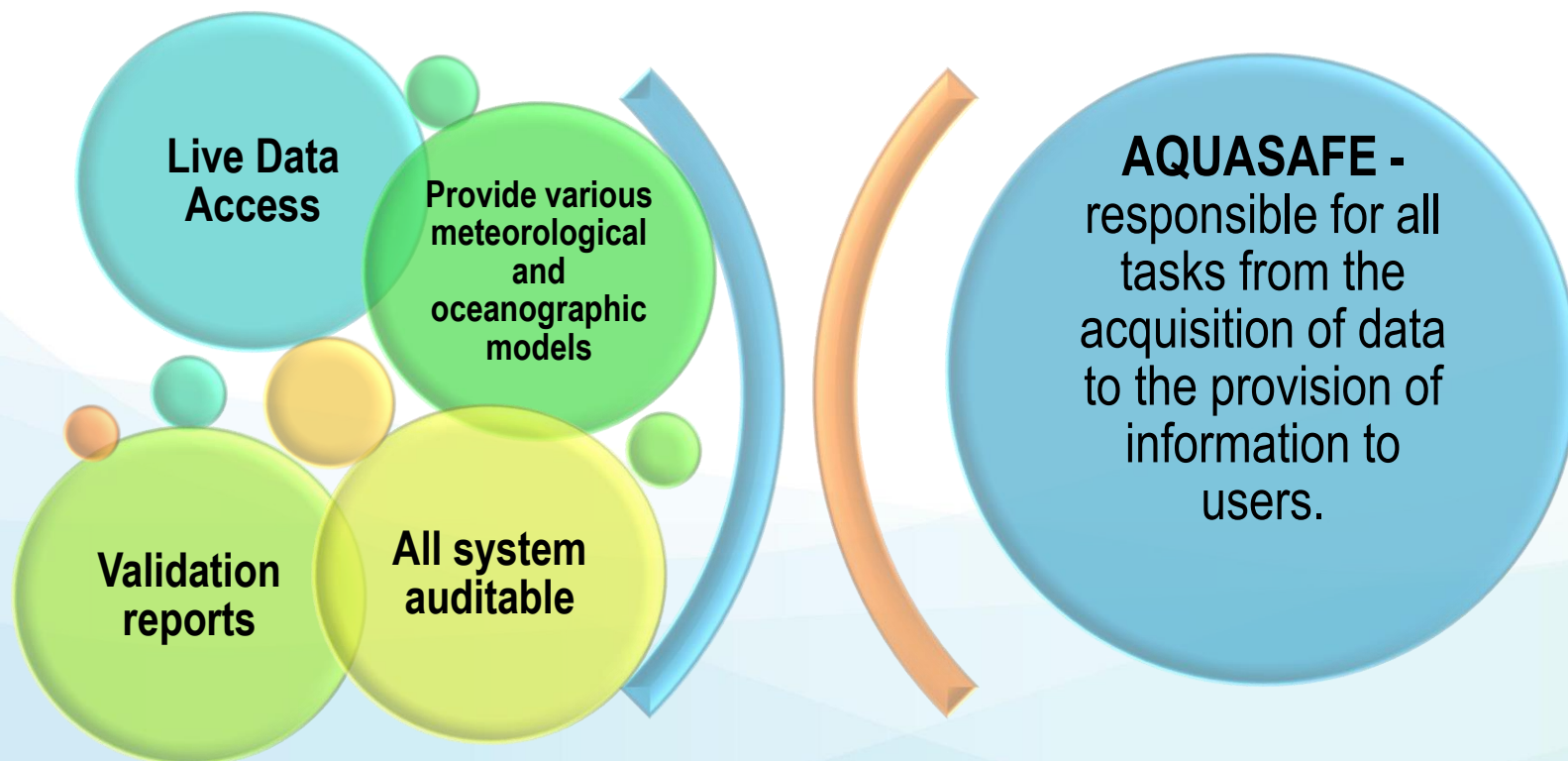
So, we have a MOHID implementation that produces good results, and now?
Let's make scripts to operationalize everything with thousands of code lines...

OR

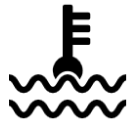
AquaSafe



Operacional Service AquaSafe



External data



Data in real time

Large scale



Hydrodynamics forecast
CMEMS



Meteorological forecast
NOAA



Waves forecast
NOAA



MOTU



THREDDS



OPERATIONAL SYSTEM



Data management



Cross Platform Data
Acquisition



Configurable Reports
/ Alerts



High resolution
forecast models

High resolution models



MOHID & Delft3D



WRF



WWIII & SWAN

Products



Desktop Client



Mobile App



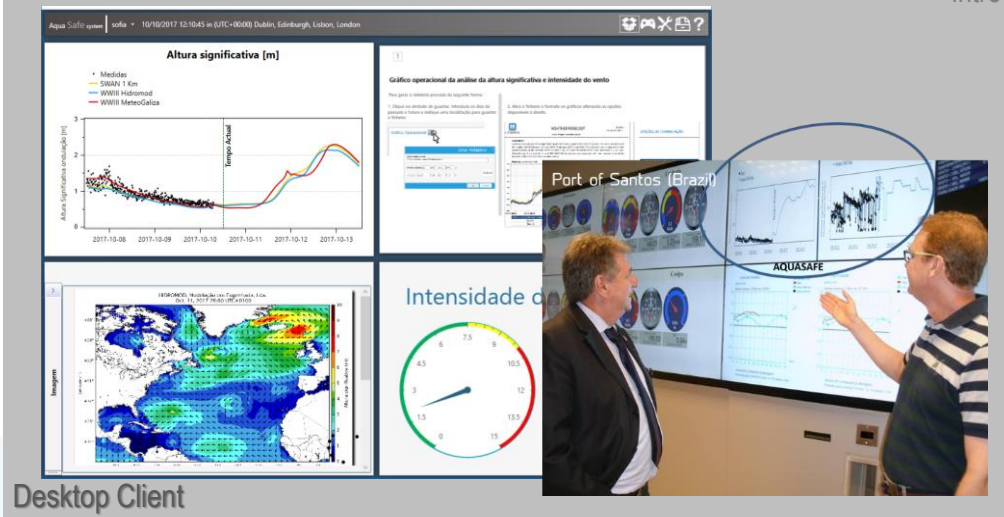
Search and Rescue



Email



Webpage services



Produtos finais



Desktop Client



Mobile App



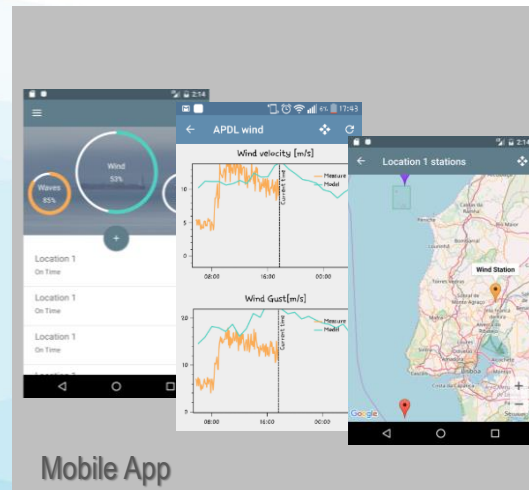
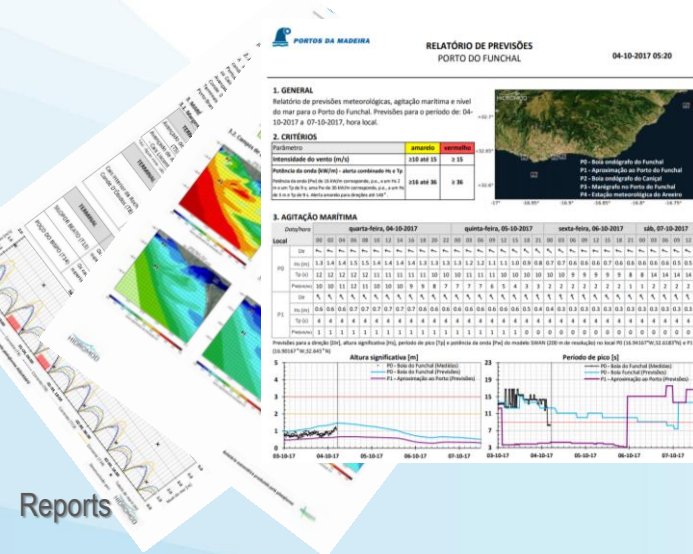
Search and Rescue



Email



Webpage services



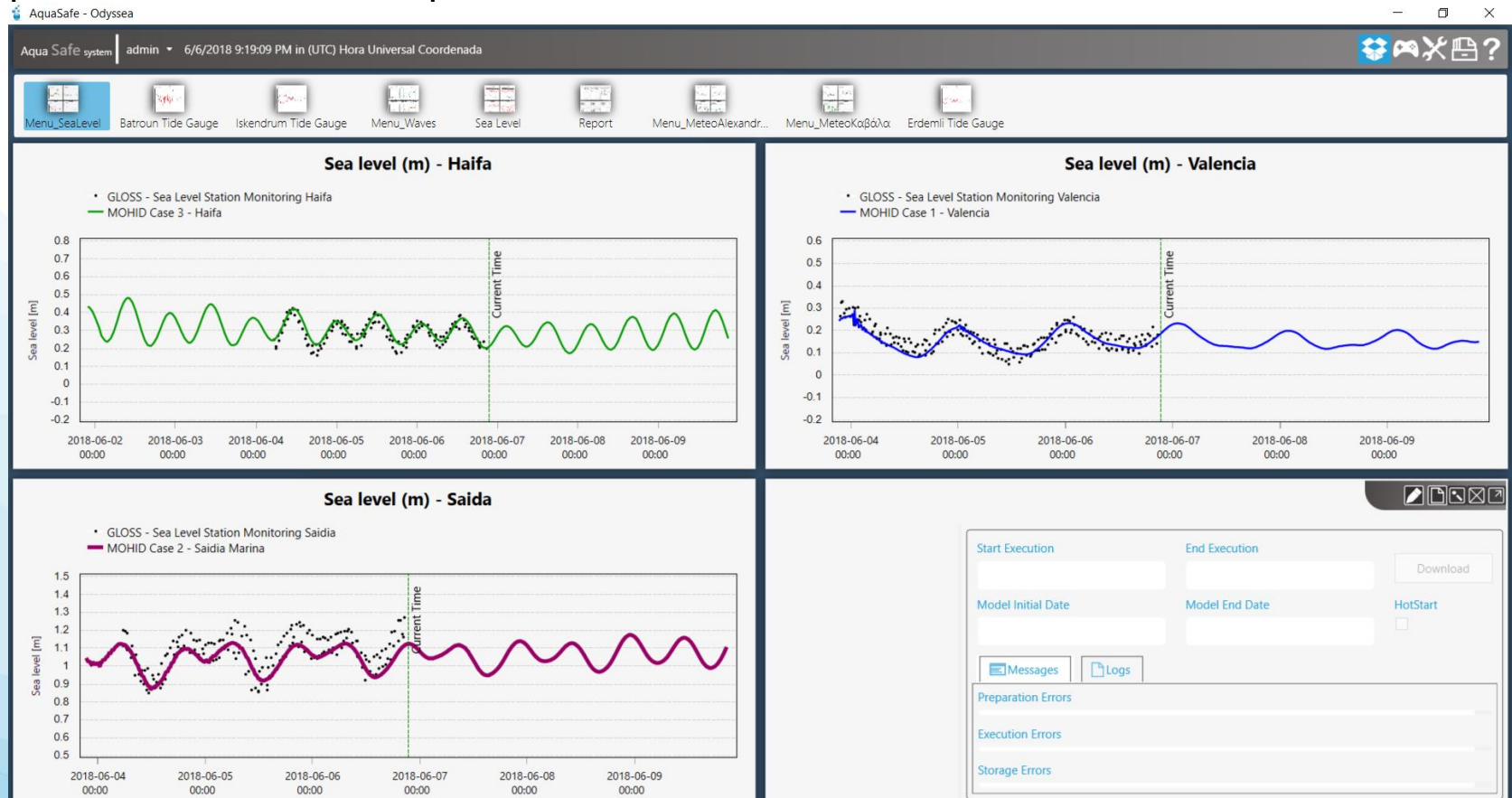
AquaSafe

After the Thracian Sea Mohid implementation, with all data already available in the platform was possible to quickly enable 3 new region of work for the ODYSSEA Monitoring Observatories.



AquaSafe

Using available data from GLOSS Tide Gauge Network was possible to quickly allow the operational validation of produced results.



Conclusion


Conclusion

- HIDROMOD is working with MOHID:
 - ✓ Consultancy: allow to develop new functionalities
 - ✓ Operacional Services: Almost all hydrodynamic solutions created by HIDROMOD are generated using MOHID. The stability of the numerical model allowed us to achieve more then 1 year of non-coldstart in models.
- AquaSafe and MOHID
 - ✓ One of the most configurated model
 - ✓ Any MOHID user can implemente a model in AquaSafe

We consider MOHID and AquaSafe as a Winning Team

OBRIGADO!

 joao.rodriques@hidromod.com

 paulo.chambel@hidromod.com



1st MOHIDing, IST, Lisbon

Running MOHID in forecast mode for the Thracian Sea using the AquaSafe platform

João G. Rodrigues, Paulo Chambel Leitão, Pedro Galvão, Adélio Silva,
José Chambel Leitão, Hélio Santos, João Ribeiro, Sofia Bartolomeu