HERMES-3rd Open Workshop

COASTAL ZONE MANAGEMENT AND CLIMATE CHANGE AT LOCAL SCALE: THE HERMES PROJECT APPROACH

ORION contribution to the HERMES monitoring and forecasting and the role of ZENOVIA s/w

George Zodiatis

Wednesday, July 3, 2019
IGEWE Main Building, Don Bosko nr.60, Tirana

The project is co-funded by the European Union and National Funds of the participating countries

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Natural processes causing Coastal Erosion

- Waves
- Coastal currents
- Storm surges
- Tides
- Sea level rise

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outlines

Copernicus marine environmental and monitoring service - CMEMS

Contribution to the Modeling Toolbox (D. 4.3.3. and D. 5.3.3)

Contributing to the joint Monitoring System Deployment and Operation (D5.3.2)

Coastal Web GIS Implementation software for on-line visualization (D 5.3.1)

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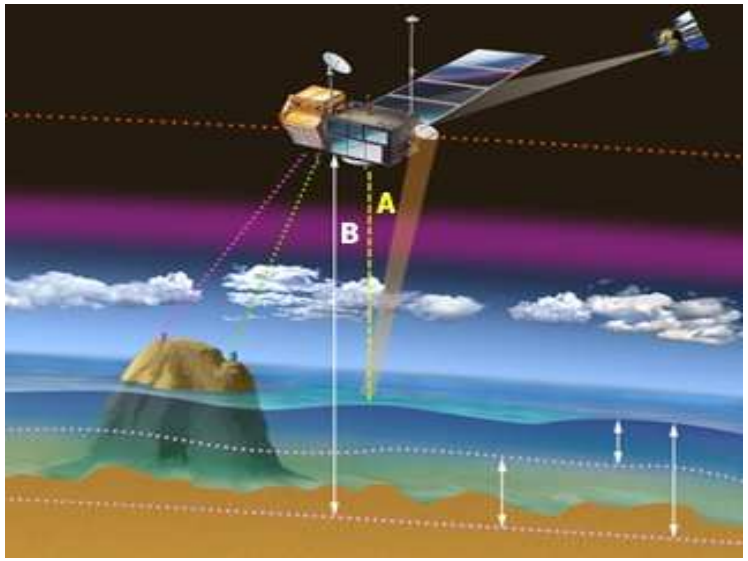
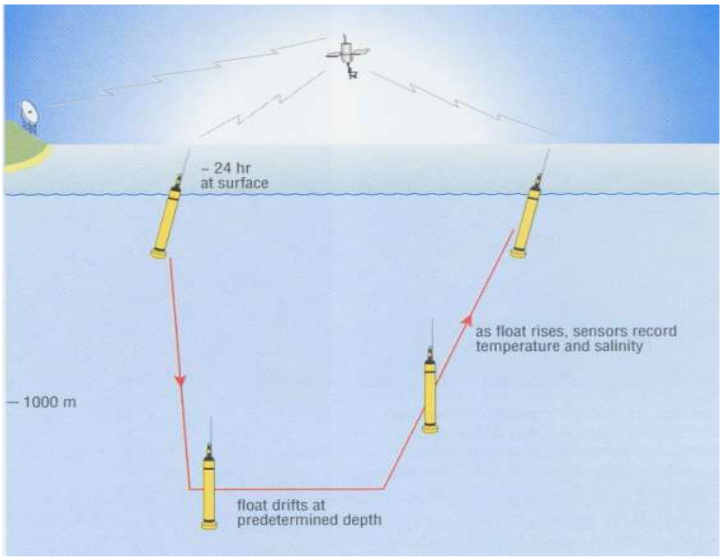


The last 2 decades
3 revolutions were occurred
in oceanography
(Le Traon, EGU 2012)



Remote sensing
satellite altimetry

OO forecasts

myOcean

COPERNICUS · MARINE ENVIRONMENT MONITORING SERVICE
CMEMS
MEDITERRANEAN SEA
MFC
Contract MED-MFC
Until April 30 2018

In-situ monitoring :
Profiling floats

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OPERATIONAL OCEANOGRAPHY

can be defined as the activity of systematic and long-term **routine measurements** of the seas and oceans and atmosphere, and their **rapid interpretation and dissemination** (EuroGOOS).

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Major products derived from operational oceanography

* Nowcasts: providing the most usefully accurate description of the present state of the sea.
* Forecasts: providing daily predictions of the future condition of the sea for as far ahead as possible.
* Hindcasts: providing long term data for the description of past states, and time series showing trends and changes of the modeled parameters.

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Operational Oceanography based on:

* the real time transmission of the **monitoring data** to the data assimilation centers to be **used by the forecasting models** .
* the implementation of advanced methods to enhance the capacity of numerical models to simulate and **forecast the dynamics** of the **marine environment,**
* the **downscaling applications** in different geographical areas with and different spatial / temporal scales,
* the **down streaming applications** to support a number of services, such as search and rescue, assessment and mitigation of risks, maritime safety, **coastal erosion**, climate change, ocean governance, marine industries and emergencies situations at sea, etc.

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Copernicus
The European Earth Observation Programme

One of the ongoing major EU Space program is :

- **Copernicus, former GMES**-global monitoring for environment and security:
  - is based on **Earth monitoring data**, collected from space (satellites), air (airborne instruments, etc.), **in-situ monitoring of seas** (floats, gliders, shipboard instruments, etc.) or land (measuring stations, seismographs, etc.)
  - produce **output information** in the form of **maps,** datasets, reports, targeted alerts, etc.

6 thematic areas are developed by Copernicus: land, atmosphere, emergency, security, climate change and … **Marine**

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Copernicus The European Earth Observation Programme

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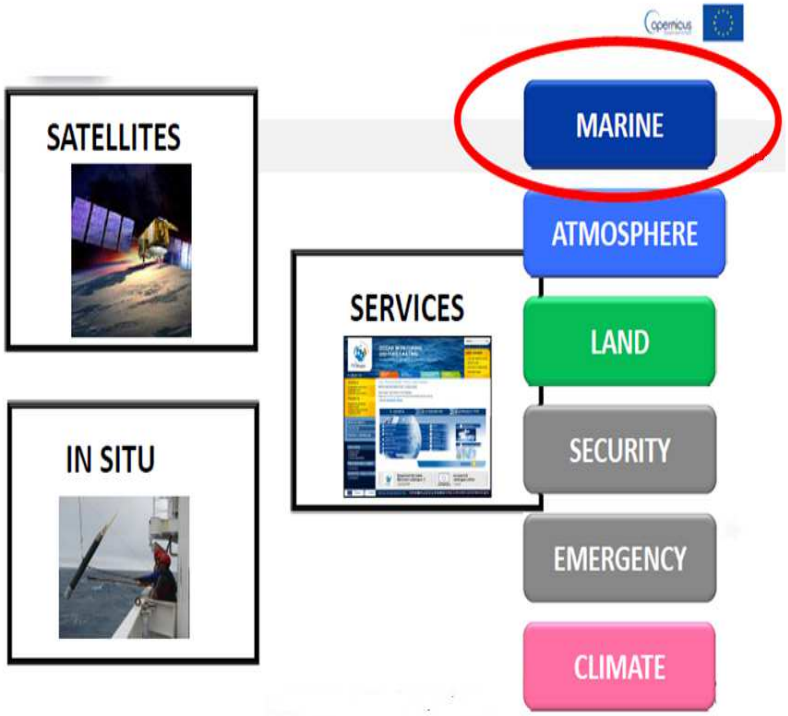
The Copernicus **services**:

- Aims to setup operational services related to:



To provide access to monitoring and forecasting information at regional and global levels, based on **Earth monitoring data**, collected from **satellites and other multi platforms**.

- Assist Policy-makers and public authorities in the preparation of environmental legislation and policies, for example the EU Directives on Marine Safety, climate change, etc.

- Support the citizen's protection in **emergency, search and rescue operations**, civil protection authorities, **response in pollution**, **coastal erosion**, etc.

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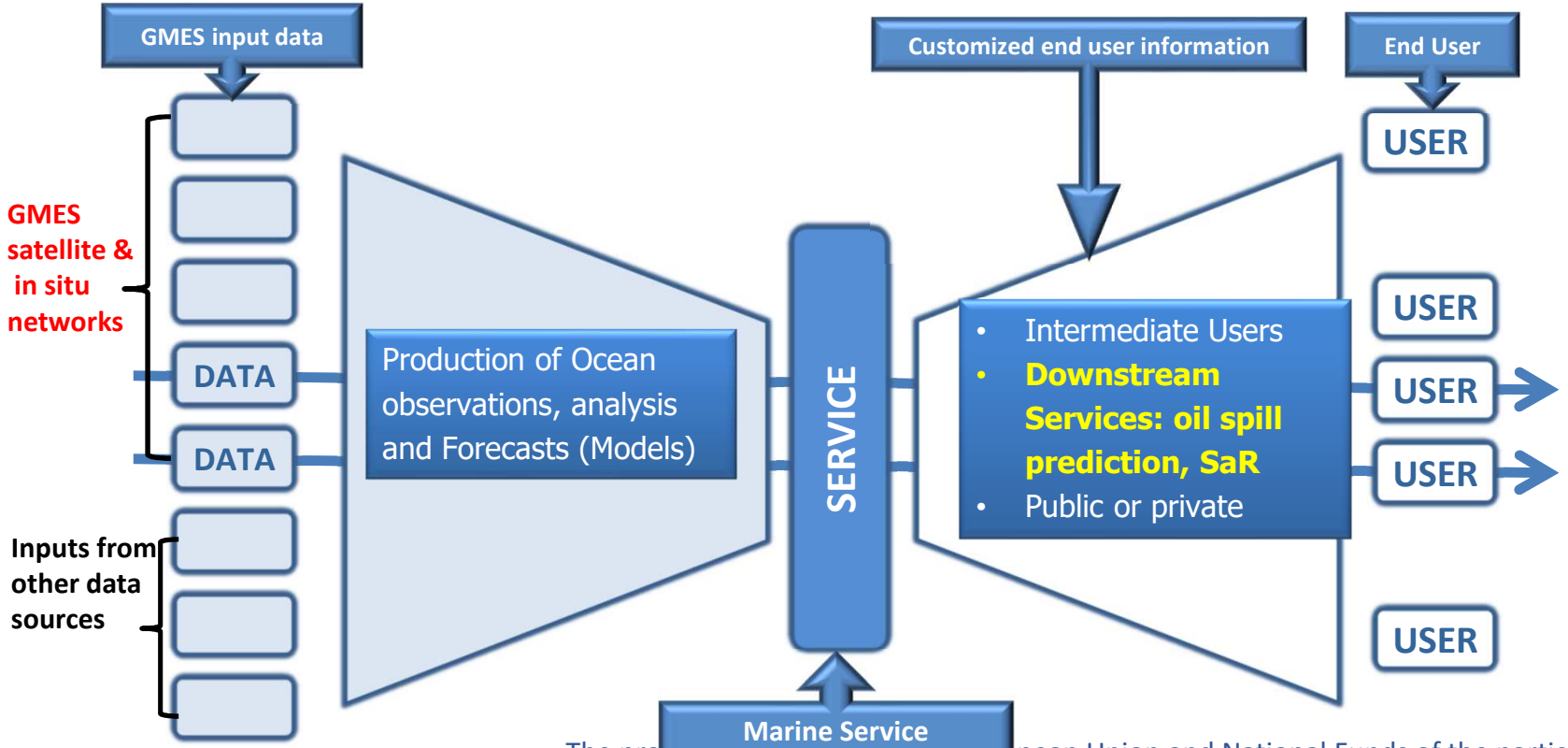
General aims of the MARINE component of Copernicus CMEMS:

a) Produce regular and systematic information on the state of the oceans-analyses and forecasts, on global and for regional seas.

b) The data products should be OBSERVATIONAL and FORECASTING data, available in NRT

Copernicus
The European Earth Observation Programme



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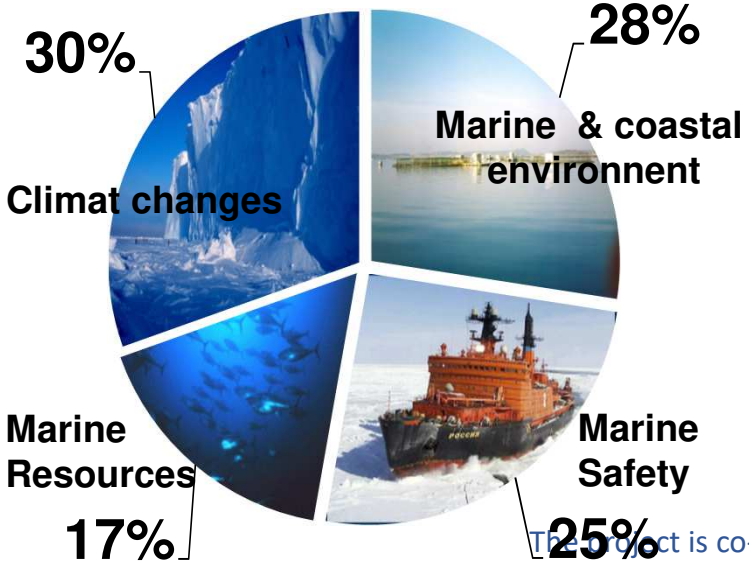
The European Earth Observation Programme

- to support the MS decision makers in marine environment and security
- to foster **applications** and **basic research** related to:



CMEMS products are useful for:

- reinforcing safety at sea: offshore operations, search & rescue
- **responding to oil spills**
- monitoring water quality
- assessing environmental impact
- climate change scenarios
- **predicting coastal erosion**, etc

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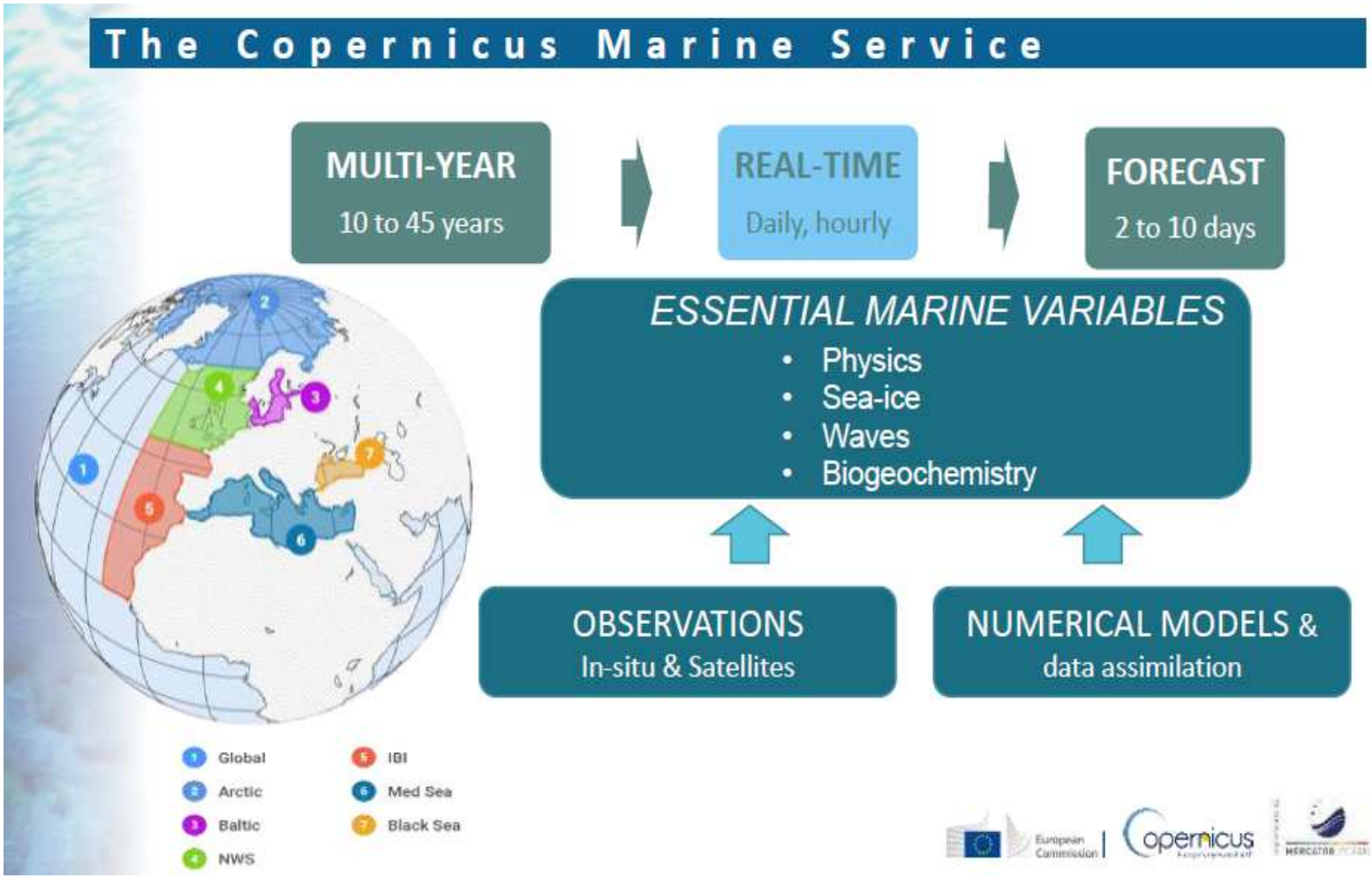
The European Earth Observation Programme



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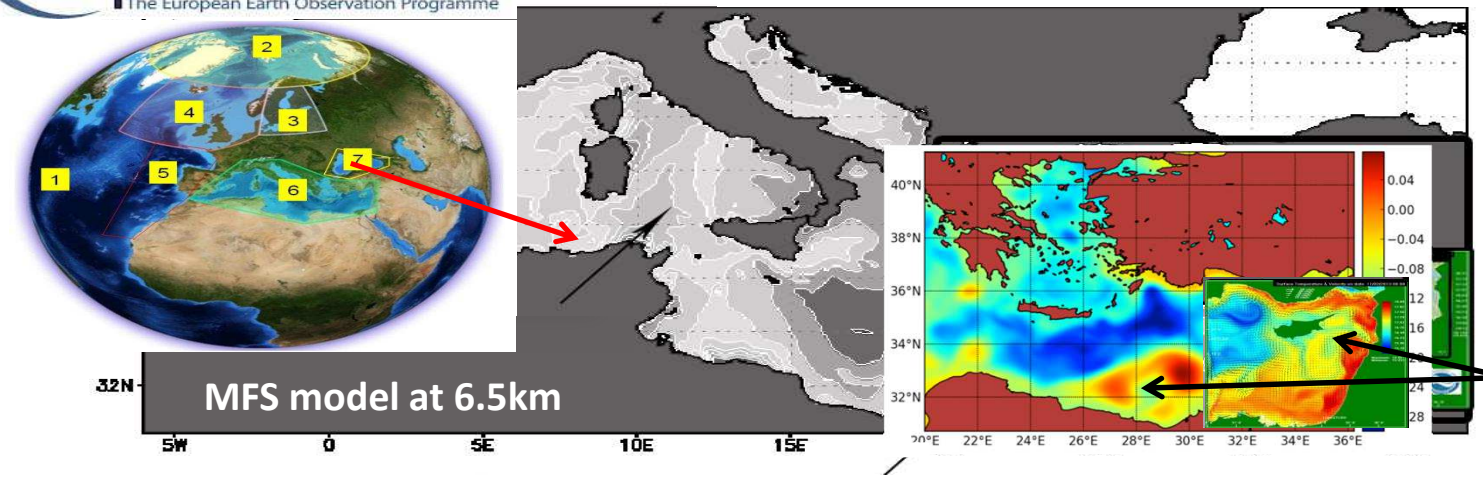
CYCOFOS hydro-dynamical models

Cyprus Coastal Ocean Forecasting and Observing System



CYCOFOS provides: hourly fields forecasts, produced daily

CYCOFOS runs 3 flow model domains:

Levantine Basin: 1.8 km grid in horizontal and 30 sigma layers in vertical (CYCOM)

Eastern Med : 2 km grid in horizontal and 30 sigma layers in vertical (pCycom)

Levantine Basin: 500 m in horizontal and 30 sigma layers (pCycom)

NEW!

The CYCOFOS models are nested with :

1) Copernicus Med MFC using ECMWF forcing : produce 10 days forecasts
2) Copernicus Med MFC using SKIRON : produce 5 days forecasts

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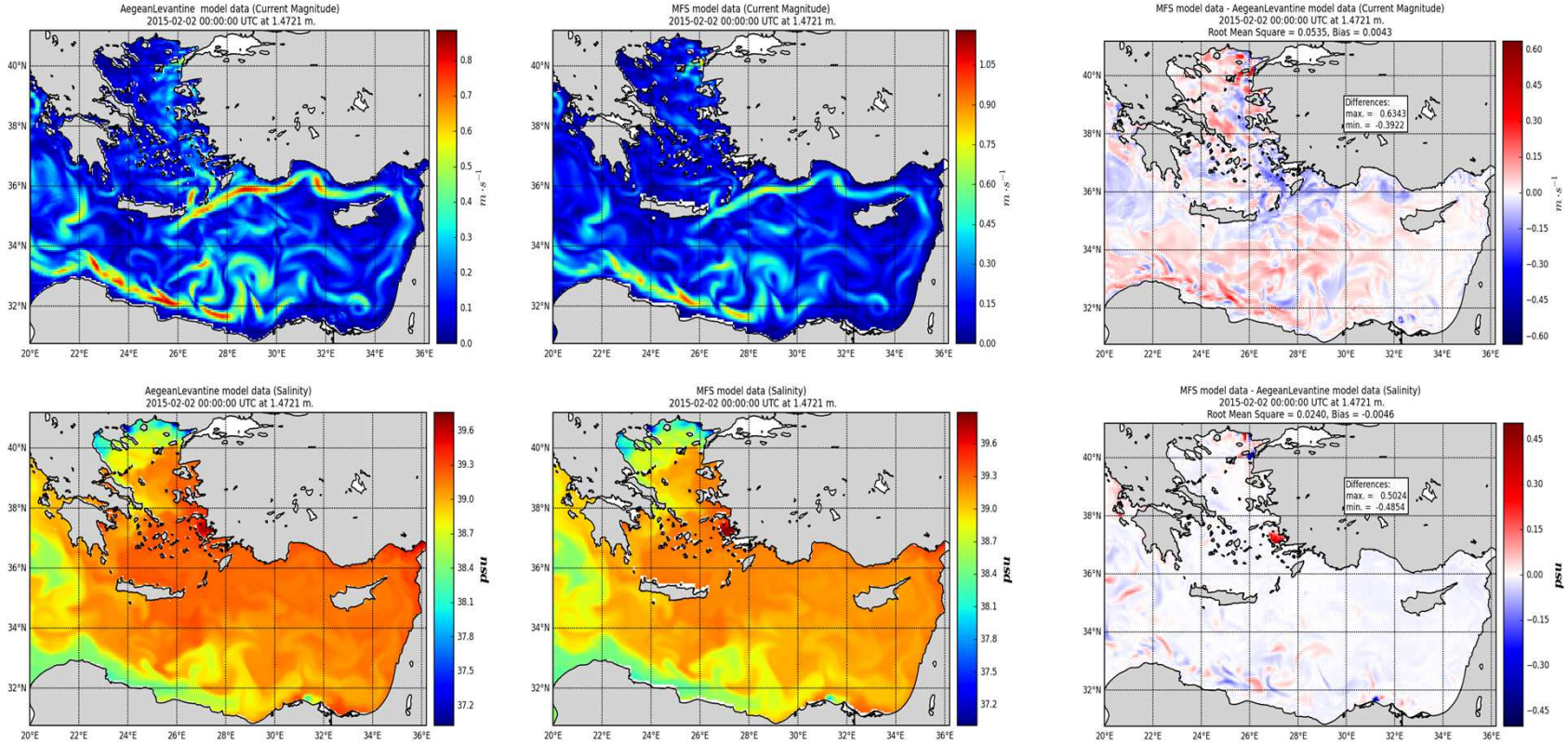

CYCOFOS Aegean-Levantine model (left) against the Copernicus CMEMS Med MFC (middle), daily averaged magnitude of sea surface currents in m/s (top row), surface salinity (middle row) for the 2nd February 2015.

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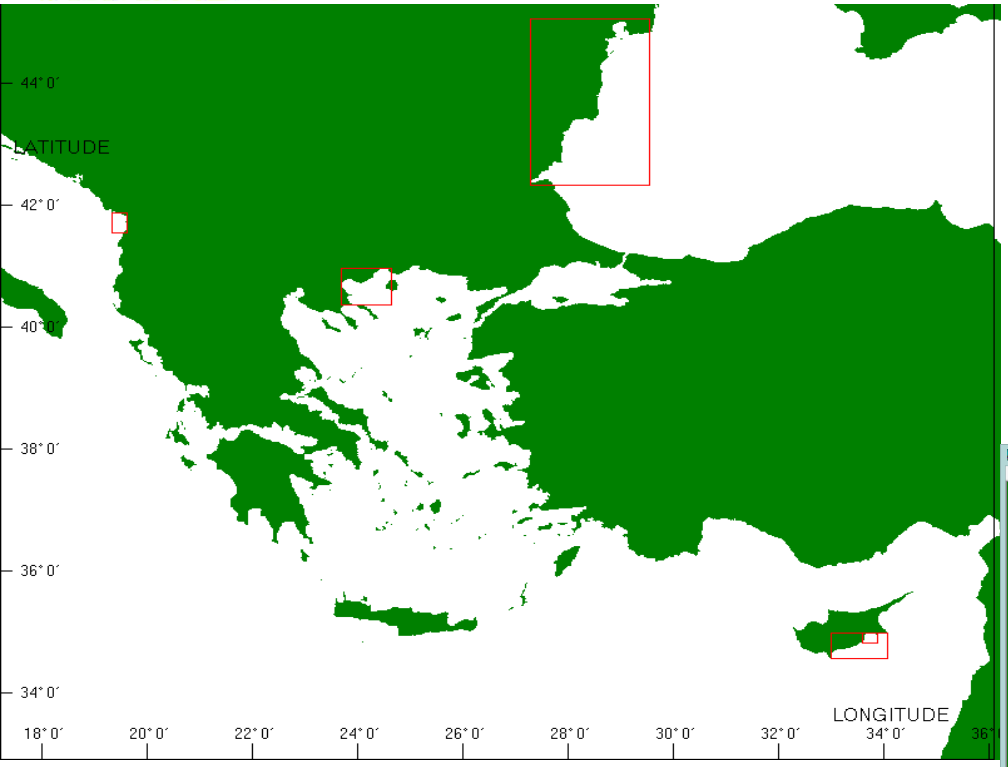

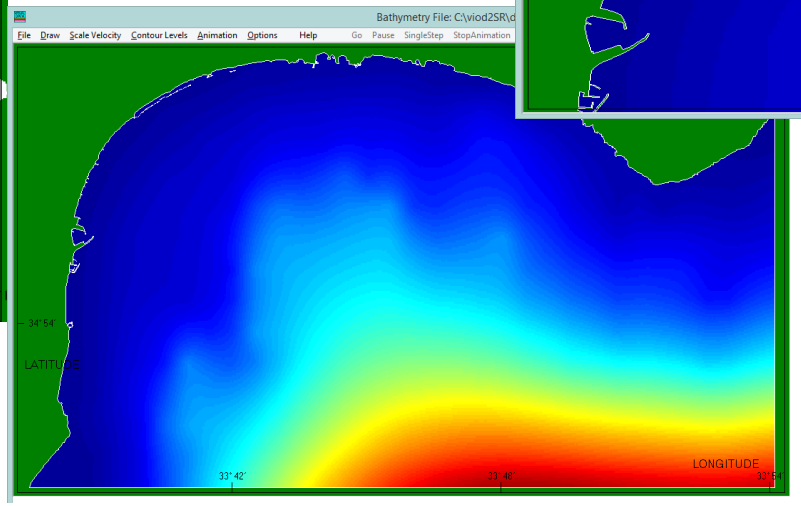

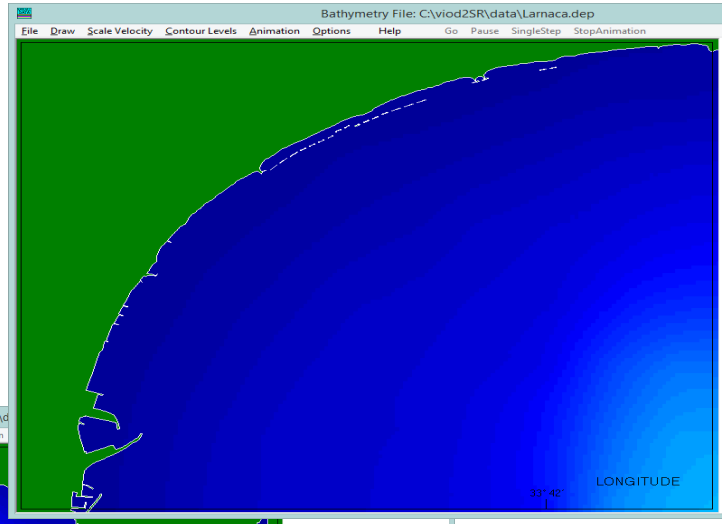

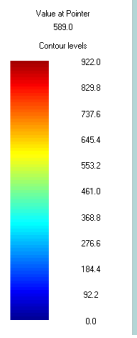

D. 4.3.3. and D. 5.3.3 : Contribution to the Modeling Toolbox Coastline details and bathymetry of the northwest part of the Larnaca bay (Oroklini coastal area).

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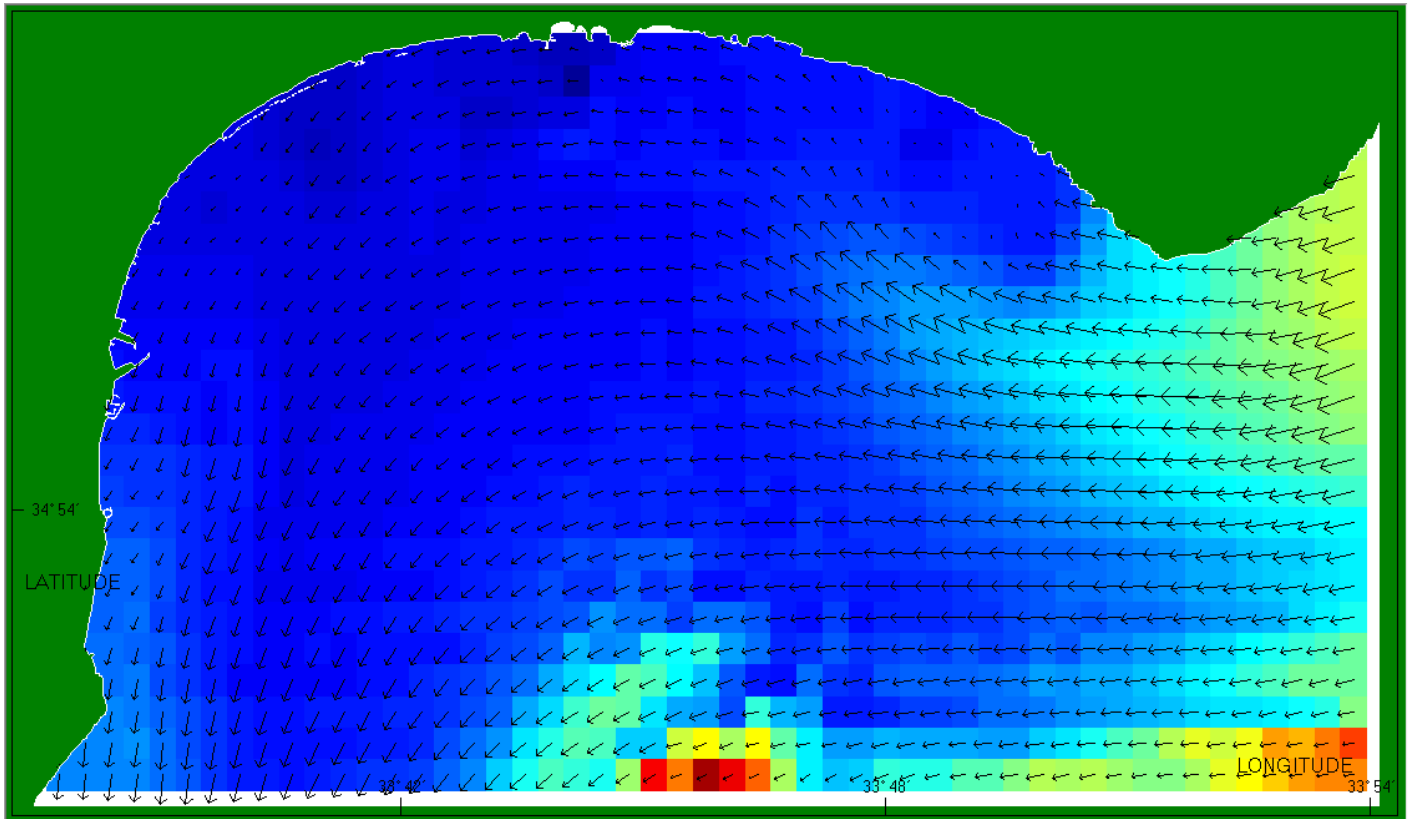
D. 4.3.3. and D. 5.3.3 : Contribution to the Modeling Toolbox Application: The high resolution (~600 m) hydrodymanical data for the Larnaca bay, derived from the new CYCOFOS Levantine model, downscalirg from the Copernicus CMEMS



Pointer Coordinates

Latitude	Longitude
34°57.40′	33°45.52′

Velocity at Pointer

Speed (m/s)	0.082
Direction E/N	276.3

Value at Pointer
27.7187

Contour levels

28.3316
28.2616
28.1916
28.1216
28.0515
27.9815
27.9115
27.8415
27.7714
27.7014
27.6314

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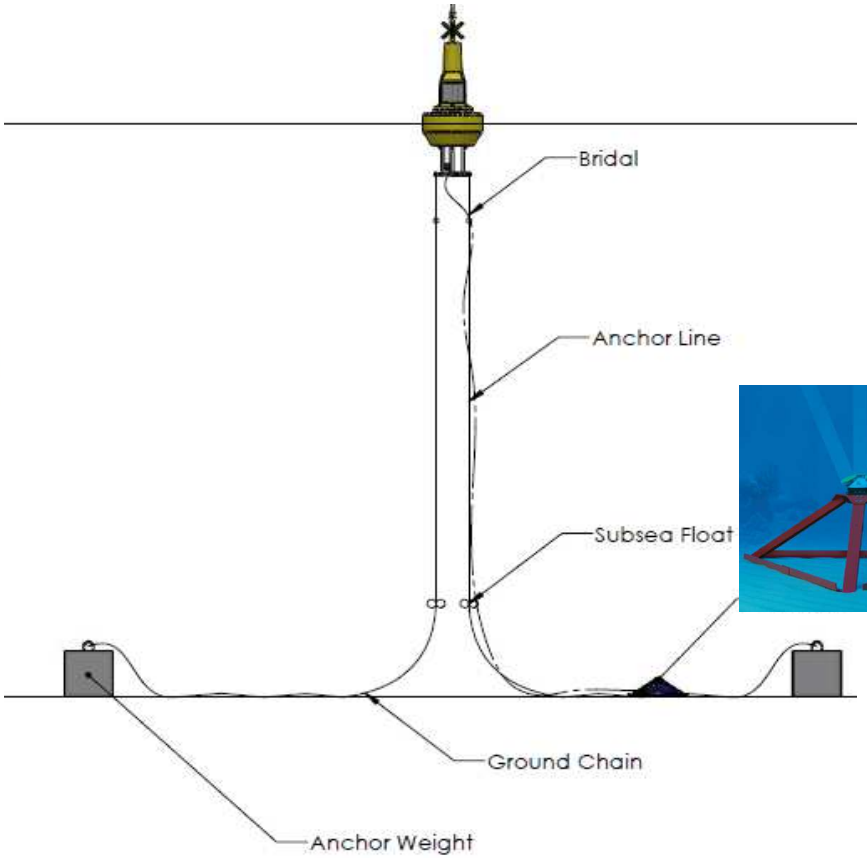
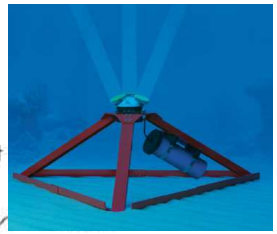
D5.3.2 Contributing to the joint Monitoring System Deployment and Operation

HERMES buoy network for coastal monitoring

RT data for:
currents, waves, sea level variations and suspended particles at 4 coastal locations (~30m depth) in Albania, Cyprus, Greece and Bulgaria.





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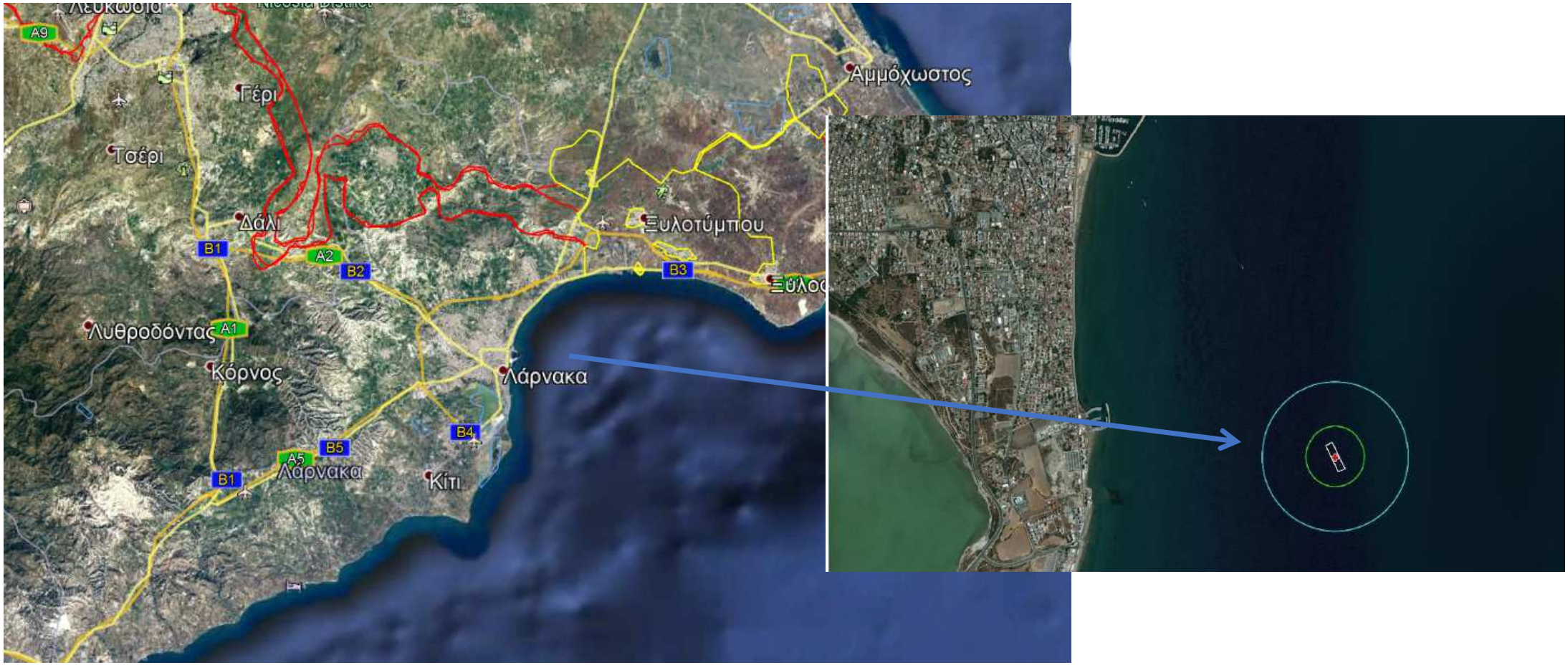

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MS *Zenobia*

From Wikipedia, the free encyclopedia

Coordinates: 34.8894°N 33.6508°E

For other ships with the same name, see Zenobia (ship).

MS *Zenobia* was a Swedish built *Challenger*-class RO-RO ferry launched in 1979 that capsized and sank in the Mediterranean sea, close to Larnaca, Cyprus, in June 1980 on her maiden voyage.[1][4] She now rests on her port side in approximately 42 meters (138 ft) of water and was named by *The Times*, and many others, as one of the top ten wreck diving sites in the world.[4]

Contents [hide]
1 History
2 Wreck diving
3 Diving Gallery
4 References
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History [edit]

Zenobia was built at the Kockums Varv AB shipyard in Sweden and was delivered to her owners Rederi AB Nordö in late 1979.[1] She left Malmö, Sweden on her maiden voyage, bound for Tartous, Syria on 4 May 1980, loaded with 104 tractor-trailers with cargo destined for Mediterranean and the Middle East.[2] She passed through the Strait of Gibraltar on 22 May 1980, stopping first at Heraklion, Crete and then to Piraeus, Athens, Greece.[2] On the way to Athens the captain noticed steering problems and *Zenobia* began listing to port.[2] Following checks, it was determined the list was caused by excess water that had been pumped into the ballast tanks; this water was pumped out and she then departed for her second to last

Zenobia listing in June 1980

History	
Name:	*Zenobia*
Owner:	Rederi AB Nordö [1]
Port of registry:	Sweden [2]
Builder:	Kockums Varv AB, Sweden [1]
Acquired:	Late 1979 [1]
Maiden voyage:	May/June 1980
Identification:	IMO number: 7806087 [3]
Fate:	Sank close to Larnaca on 7 June 1980

countries

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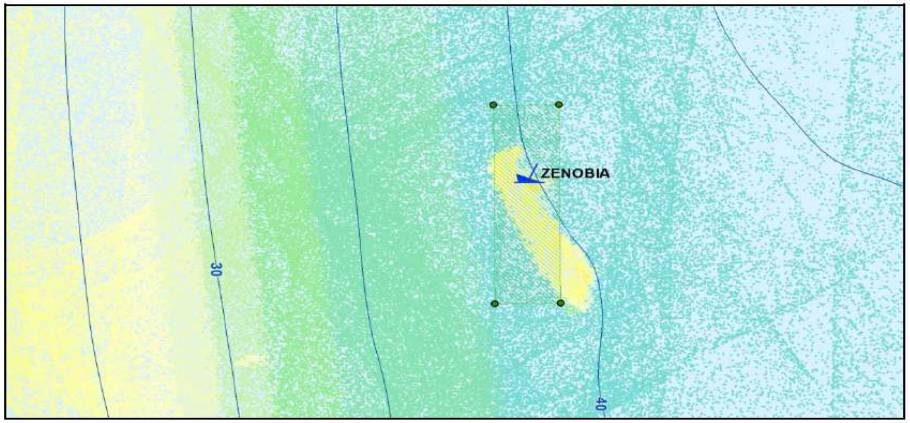
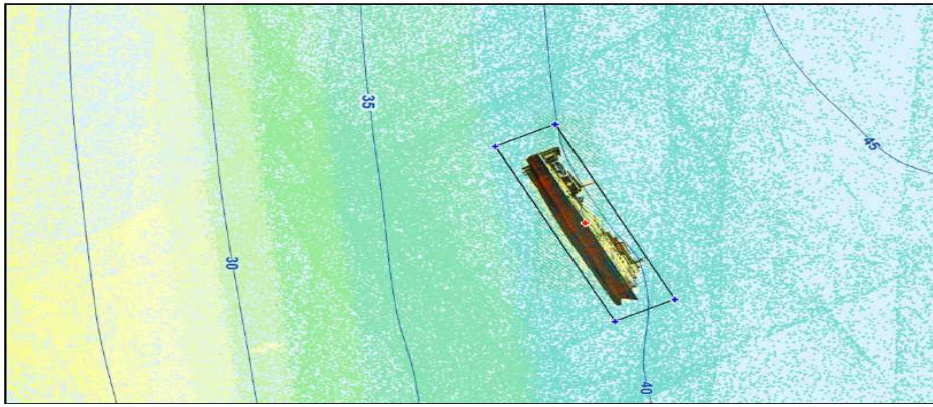
Zenobia S/W





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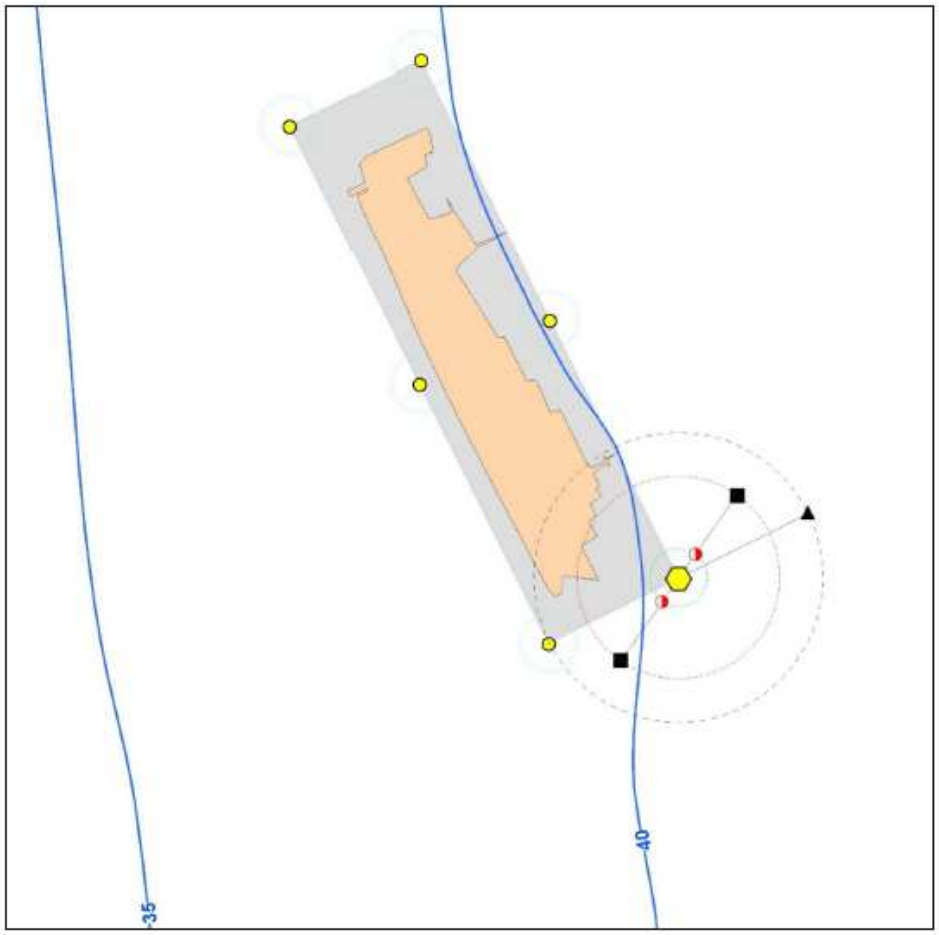

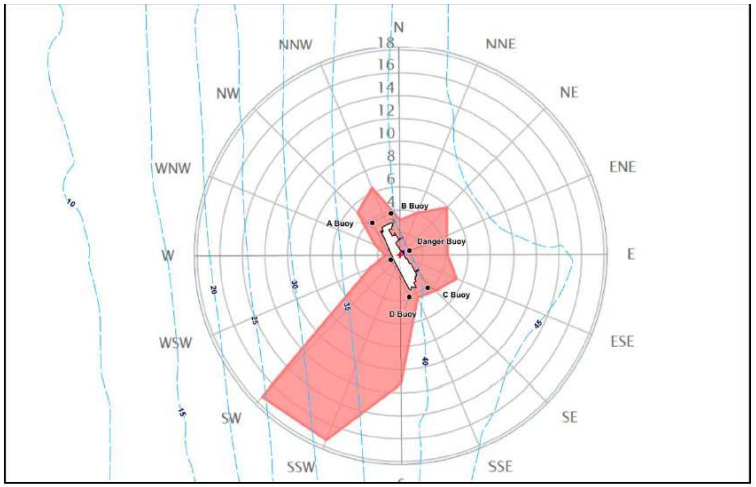

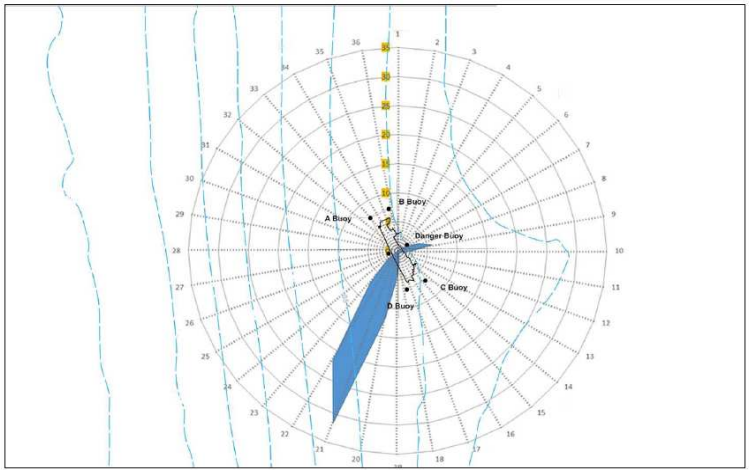

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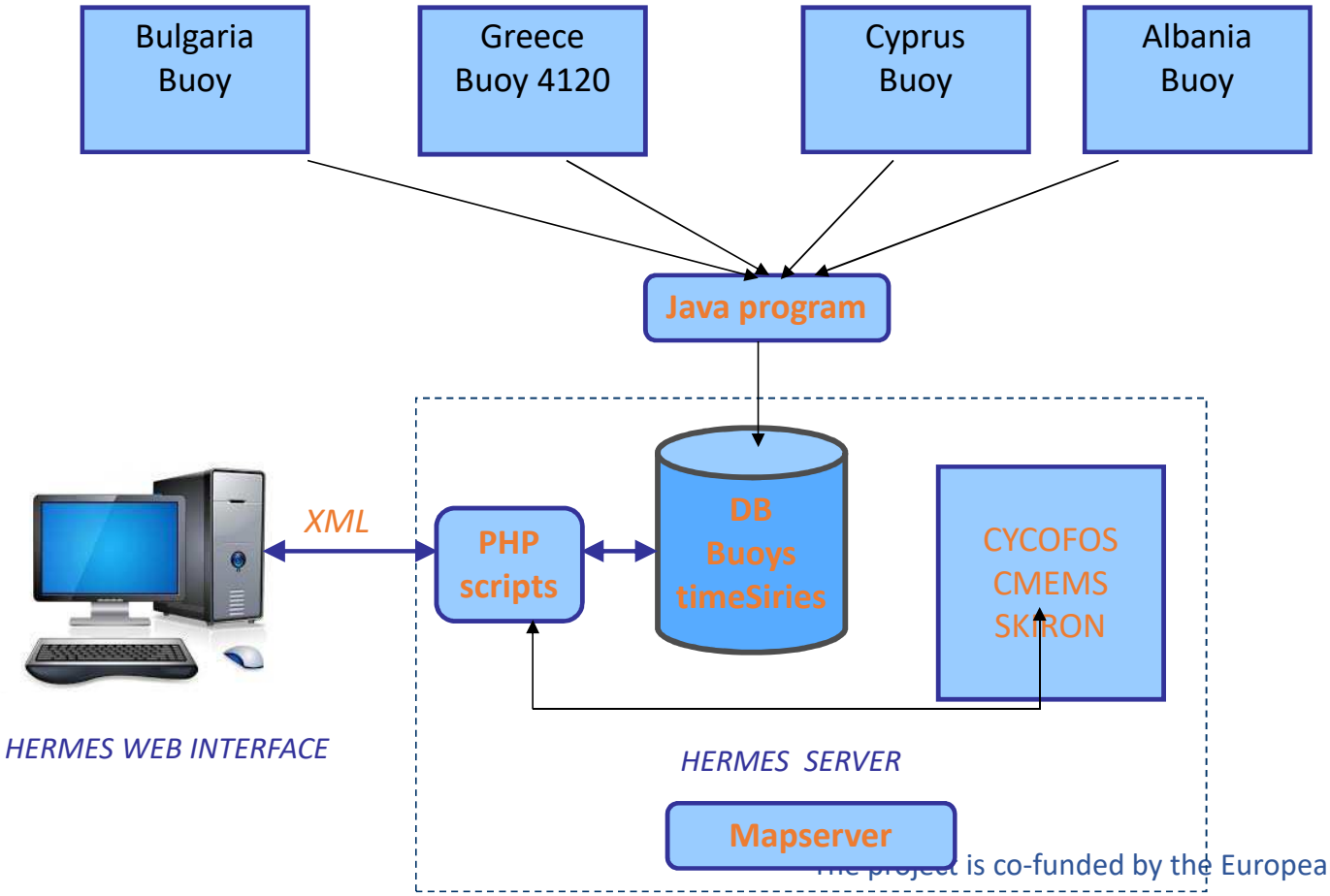

D 5.3.1: Structure of the WebGIS Implementation software for on-line visualization of the monitoring and forecasting data

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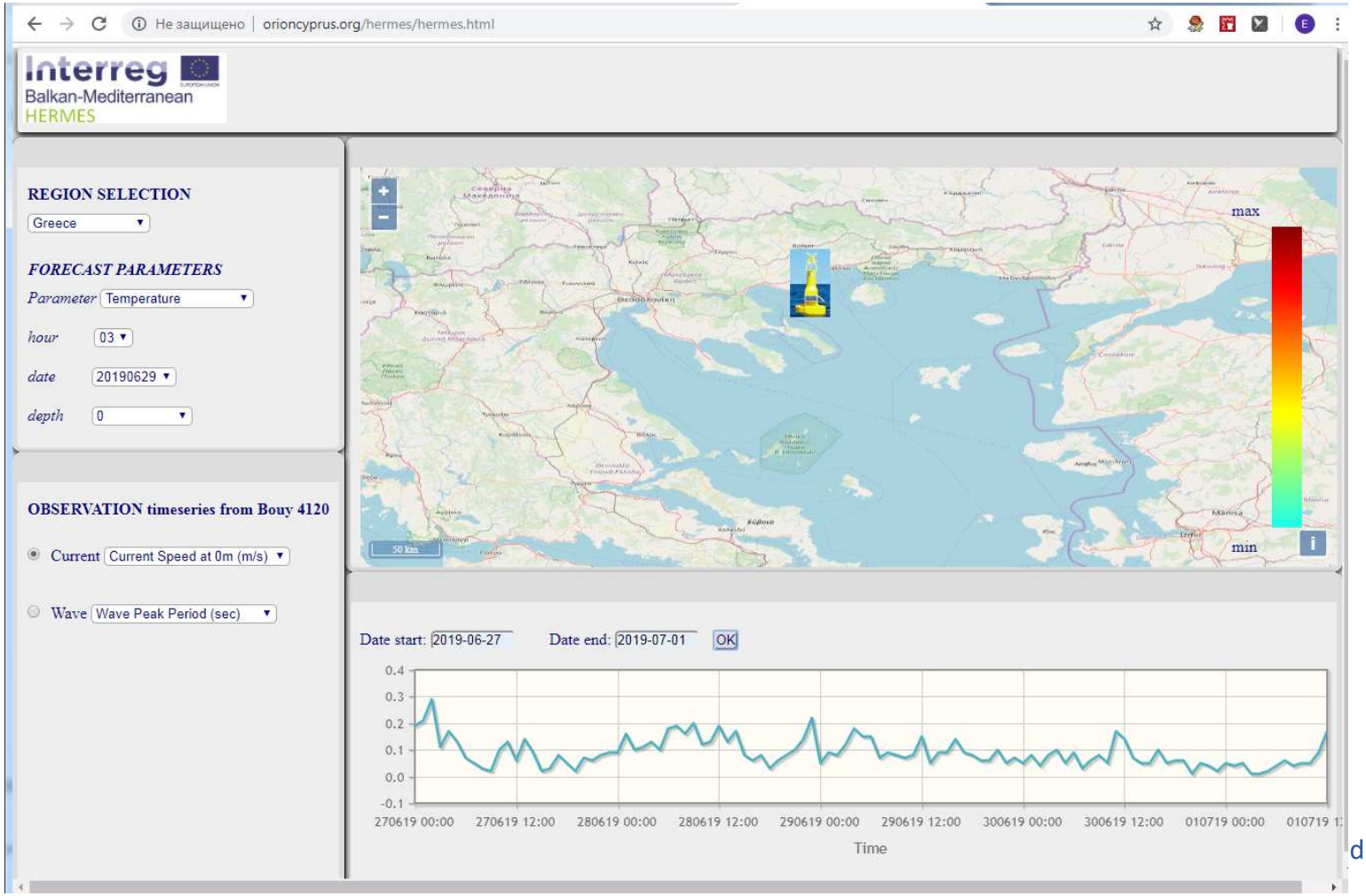

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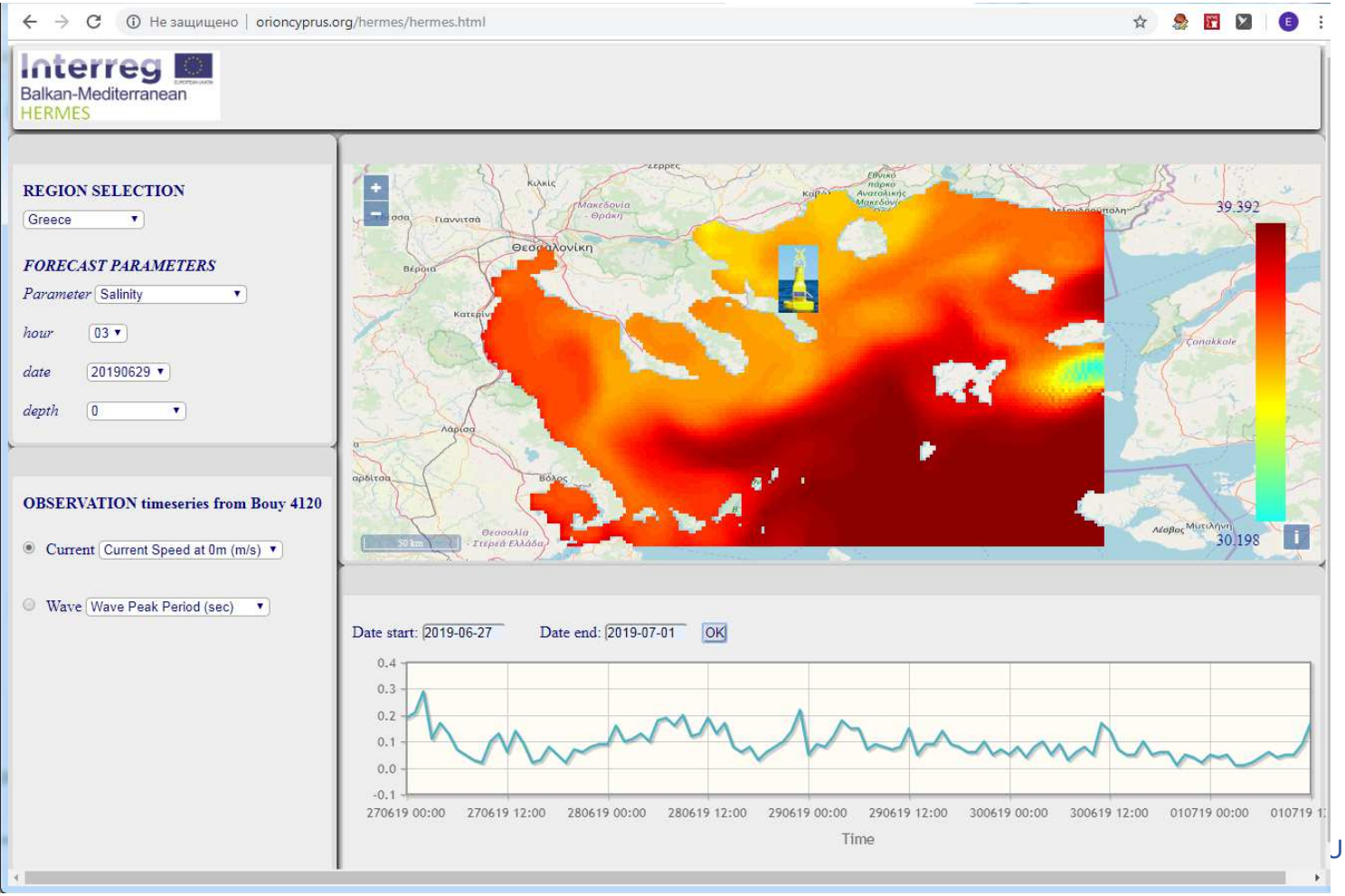

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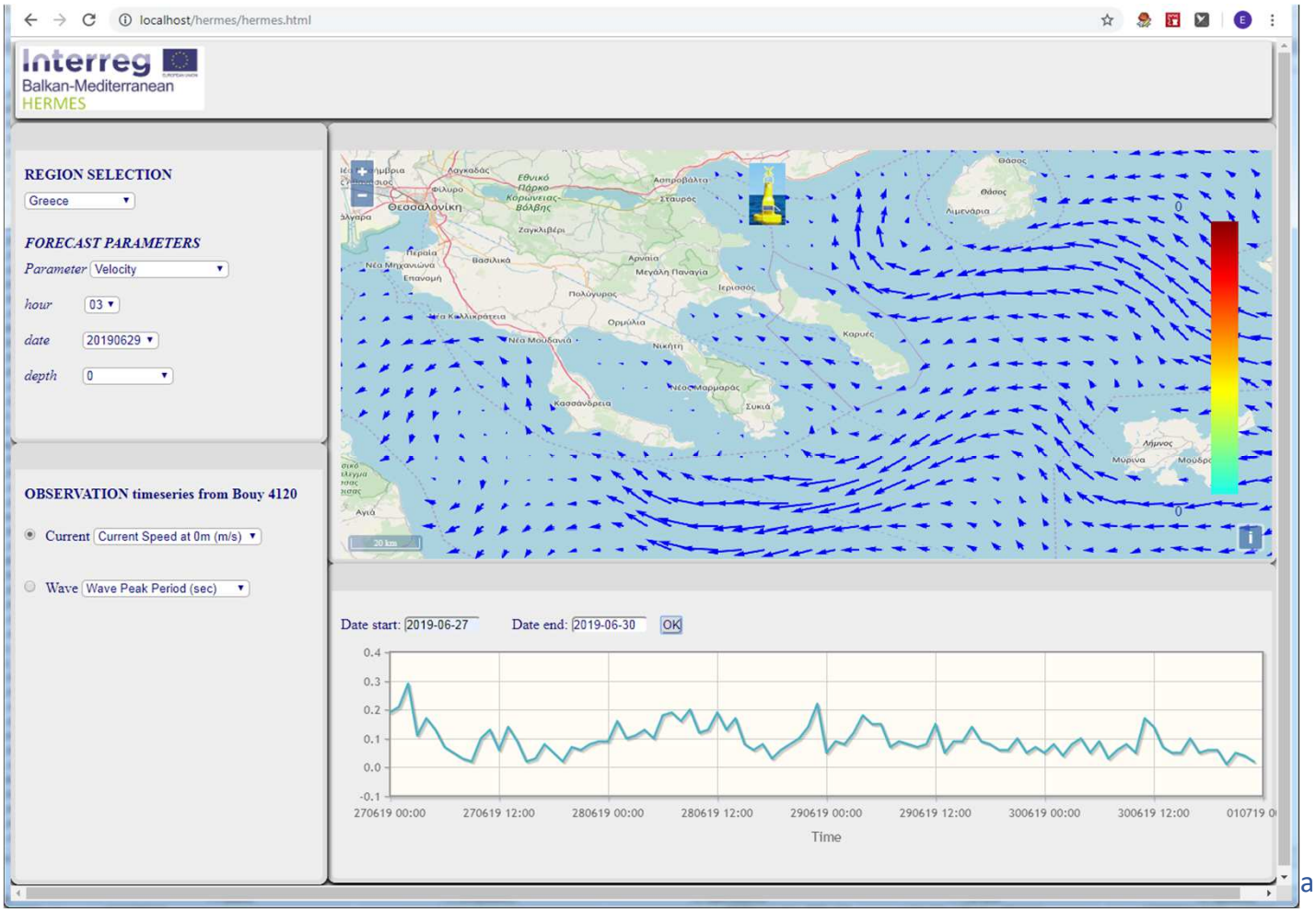

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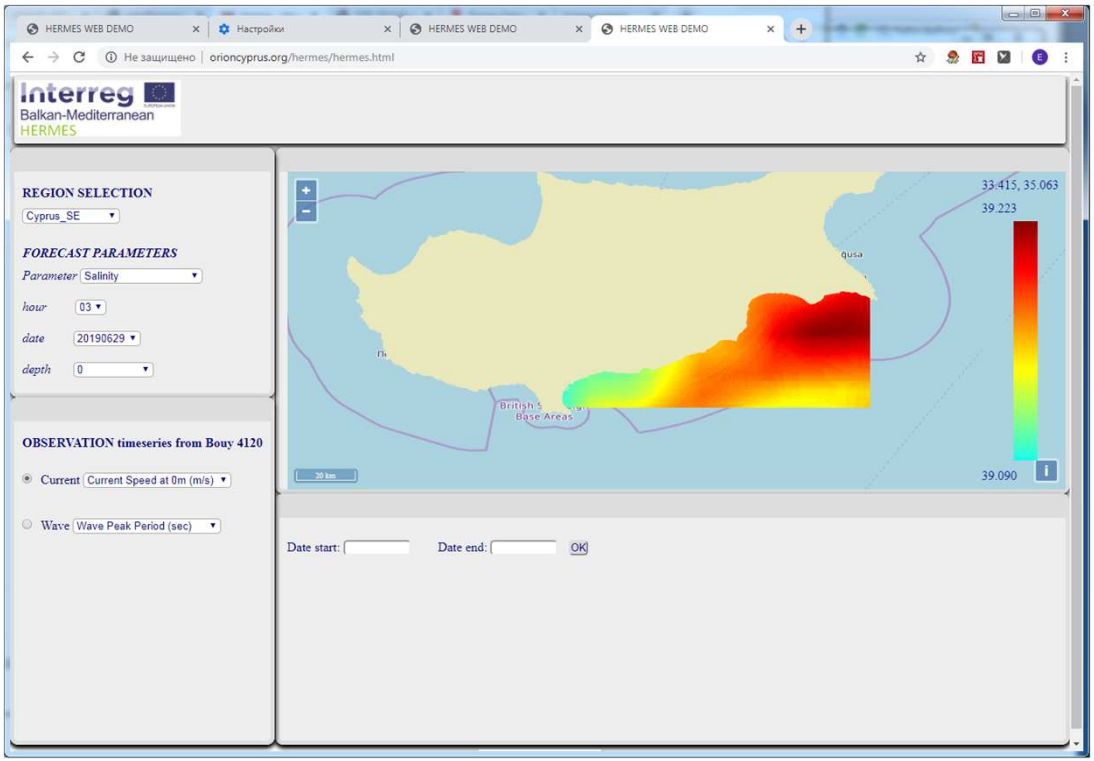

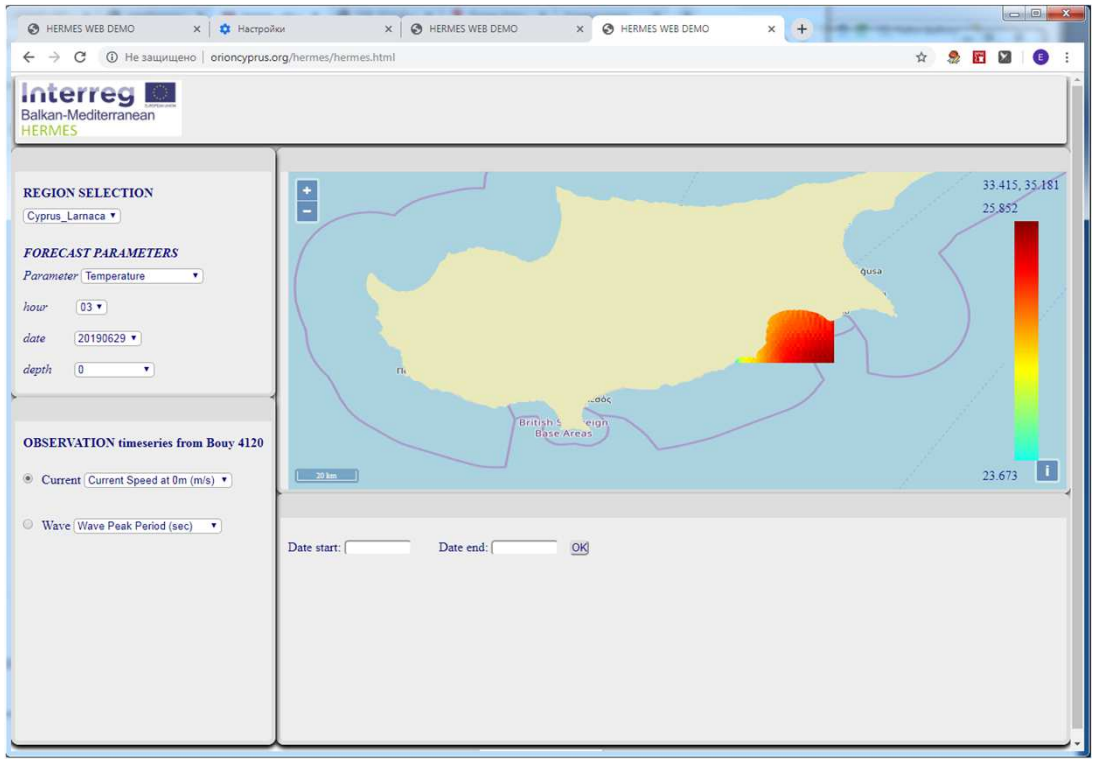

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Thanks for your attention

The link to HERMES BETA version Web GIS visualizing the monitoring and forecasting data is:
http://orioncyprus.org/hermes/hermes.html

http://www.interreg-balkanmed.eu/approved-project/18/

https://www.facebook.com/HermesBalkanMedProject/

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