

BlueMed in Croatia - marine infrastructure and observations

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Institute of Oceanography and Fisheries, Split,
Croatia



- ▶ National players and framework
- ▶ Present status, activities and projects – an example of operational ocean monitoring
- ▶ Strategic planning

Institute of Oceanography and Fisheries (Split):

From physics through chemistry/biology to fisheries/aquaculture, 120 staff



National players (research)

Institute Ruđer Bošković (Zagreb, Rovinj):

From physics to chemistry/biology, 50 staff
Rovinj, plus Zagreb



Faculty of Science (Zagreb):

Physics/biology,
10 staff



Hydrographic Institute (Split):

Physics, 10 staff in
Oceanological Dept.

Institute for Marine and Coastal Research, University of Dubrovnik:

Biology/ecology, 30 staff

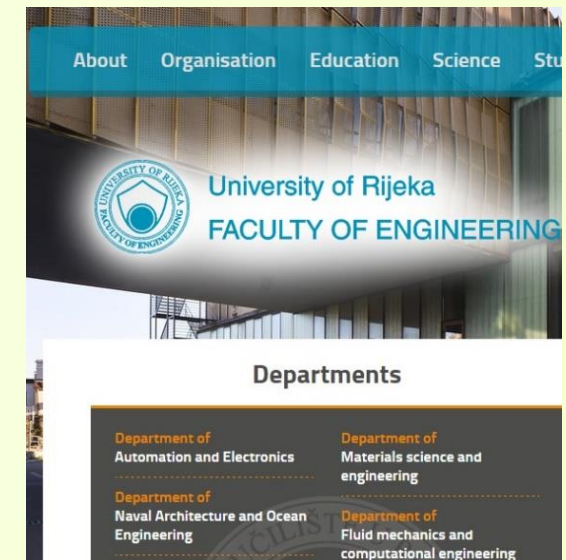


National players (technology)

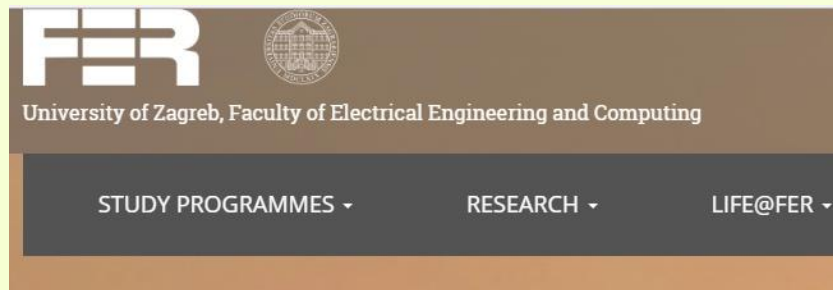
Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split



Faculty of Engineering, University of Rijeka



Faculty of Electrical Engineering and Computing, University of Zagreb



Članovi

PRIVATNI SEKTOR I POSLOVNI KLASTERI

Končar – montažni inženjering d.d.	http://www.koncar-kmi.hr/
Brodograđevna industrija Split d.d.	http://www.brodosplit.hr/
Brodograđevni klaster SDŽ	
Uljanik Shipbuilding Computer Systems d.o.o.	http://www.uscs.hr/
iCat d.o.o.	http://www.icat.hr/
Brodogradilište Viktor Lenac d.d.	http://www.lenac.hr/
ACI d.d.	http://www.aci-marinas.com/
Uljanik brodogradilište d.d.	http://www.uljanik.hr/
Leda d.o.o.	http://www.shipyard-leda.hr/
Havyard Design&Engineering Rijeka d.o.o.	http://www.havyard.com/
ALVEUS d.o.o.	http://www.as2con.eu/
Mack d.o.o.	http://www.mack-project.com/
Brodocentar Sisak d.o.o.	http://www.brodocentar.hr/
Končar – inženjering za energetiku i transport d.d.	http://www.koncar-ket.hr/
Jadrolinija, društvo za linijski pomorski prijevoz putnika i tereta	http://www.jadrolinija.hr/

JAVNI SEKTOR

Razvojna agencija Šibensko-kninske županije	http://www.rra-sibenik.hr/
RERA S.D. za koordinaciju i razvoj Splitsko-dalmatinske županije	http://www.rera.hr/
Zadarska županija	http://www.zadarska-zupanija.hr/
Grad Rijeka	http://www.rijeka.hr/
Grad Šibenik	http://www.sibenik.hr/



Hrvatski klaster konkurentnosti
pomorske industrije

HRVATSKI KLASTER KONKURENTNOSTI POMORSKE INDUSTRIJE

Zagreb Tower, Radnička cesta 80
10 000 Zagreb, Croatia ☐
T: +385 1 6286 800, 6286 801
F: +385 1 6286 829
info@marc.hr, www.marc.hr

**National players
(technology)**

**MarC Cluster of
Maritime Industries**

PROFESIONALNE ORGANIZACIJE I UDRUGE

Hrvatska udruga poslodavaca – Udruga metalne industrije	http://www.hup.hr/hup-udruga-metalne-industrije.aspx
Hrvatska udruga poslodavaca- Udruga nautičkog sektora	http://www.hup.hr/hup-udruga-nautickog-sektora.aspx
Hrvatska gospodarska komora	http://web.hgk.hr/

ZNANSTVENO-ISTRAŽIVAČKI SEKTOR

Brodarski institut d.o.o.	http://www.hrbi.hr/
Fakultet strojarstva i brodogradnje	https://www.fsb.unizg.hr
Pomorski fakultet u Splitu	http://www.pfst.hr/
Tehnički fakultet u Rijeci	http://www.riteh.uniri.hr/
Končar – Institut za elektrotehniku d.d.	http://www.koncar-institut.hr/
Ustanova Centar za istraživanje materijala Istarske županije METRIS	http://www.centarmetris.hr/

Klaster Marikultura:

Shellfish, fish and tuna farming

The screenshot shows the homepage of the Klaster Marikultura website. The header features a logo of a stylized fish, social media icons for RSS, Facebook, and Twitter, a search bar with the text "Traži...", and links for "Sitemap" and "Admin". The main content area is divided into three sections, each with a circular icon and text describing a farming sector:

- Uzgajivači Tuna**: 3.500 t proizvodnje godišnje, izvoz tune u Japan, 160 ribarskih brodova
- Uzgajivači Školjka**: 2.000 t proizvodnje godišnje, 1950 t dagnji + 50 t kamenica, 150 direktno zaposlenih
- Uzgajivači Bijele ribe**: 5.000 t proizvodnje godišnje, izvoz u Italiju, 600 direktno zaposlenih

Below the main content is a navigation bar with the following menu items: "Novosti", "O nama", "Grupacije", "Kontakt", and "Korisne poveznice". At the bottom, there is a gallery of eight images showing various aquaculture activities, with a "galerija" button and a camera icon on the right.



National players (policy)

Ministry of Science and Education



Ministry of Agriculture

Ministry of Tourism



**Ministry of Environmental Protection
and Energetics**

**Ministry of the Sea, Transport and
Infrastructure**



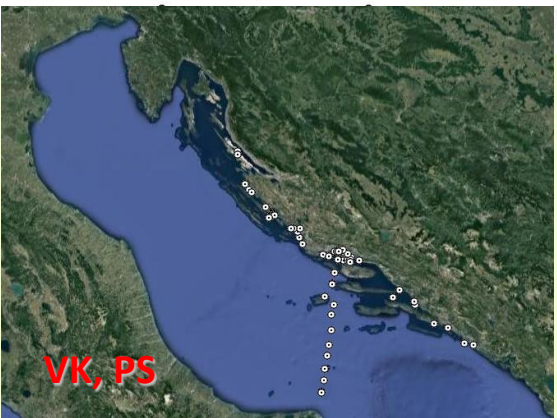
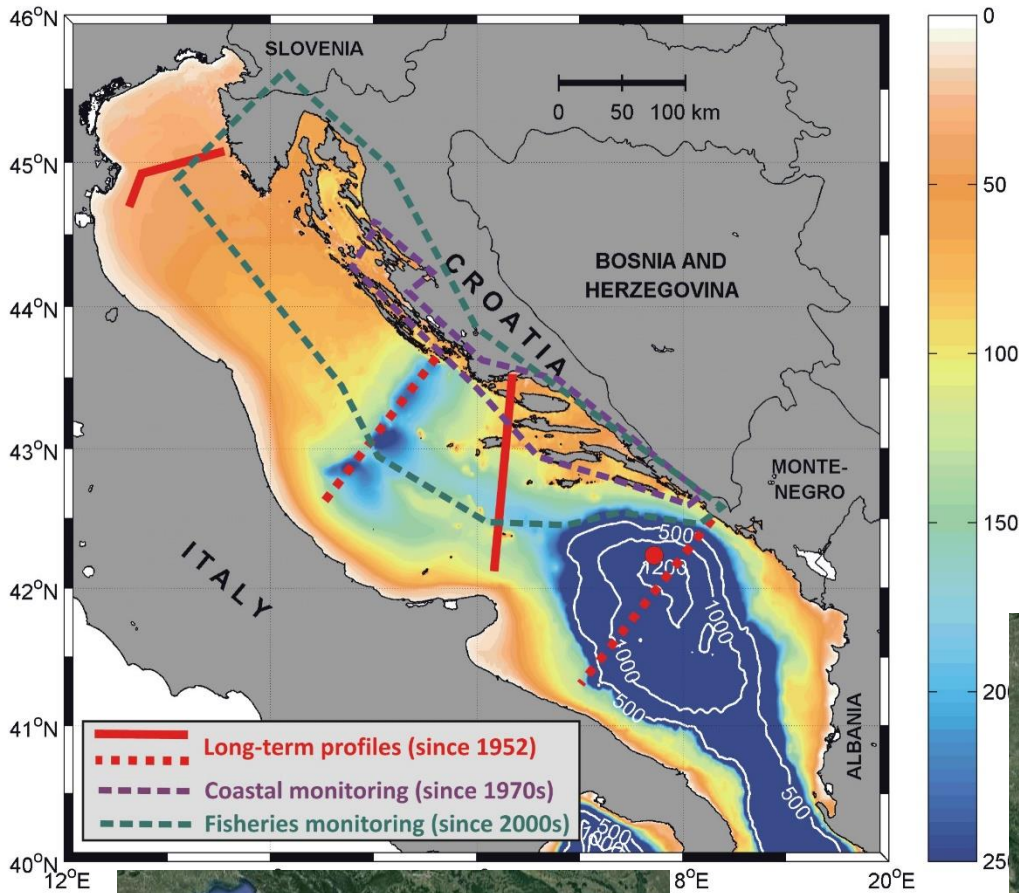
An example: operational ocean monitoring (observing systems) in Croatia:

- There are no national strategies covering this issue
- Long-term monitoring is performed on the voluntary basis, through projects or contract-oriented monitoring
- No long-term sustained resources for ocean monitoring
- A use of novel and innovative approaches is done through R&I project only
- As Croatian RTD is highly uncompetitive – only one research-funding agency – long-term monitoring is highly unsustainable



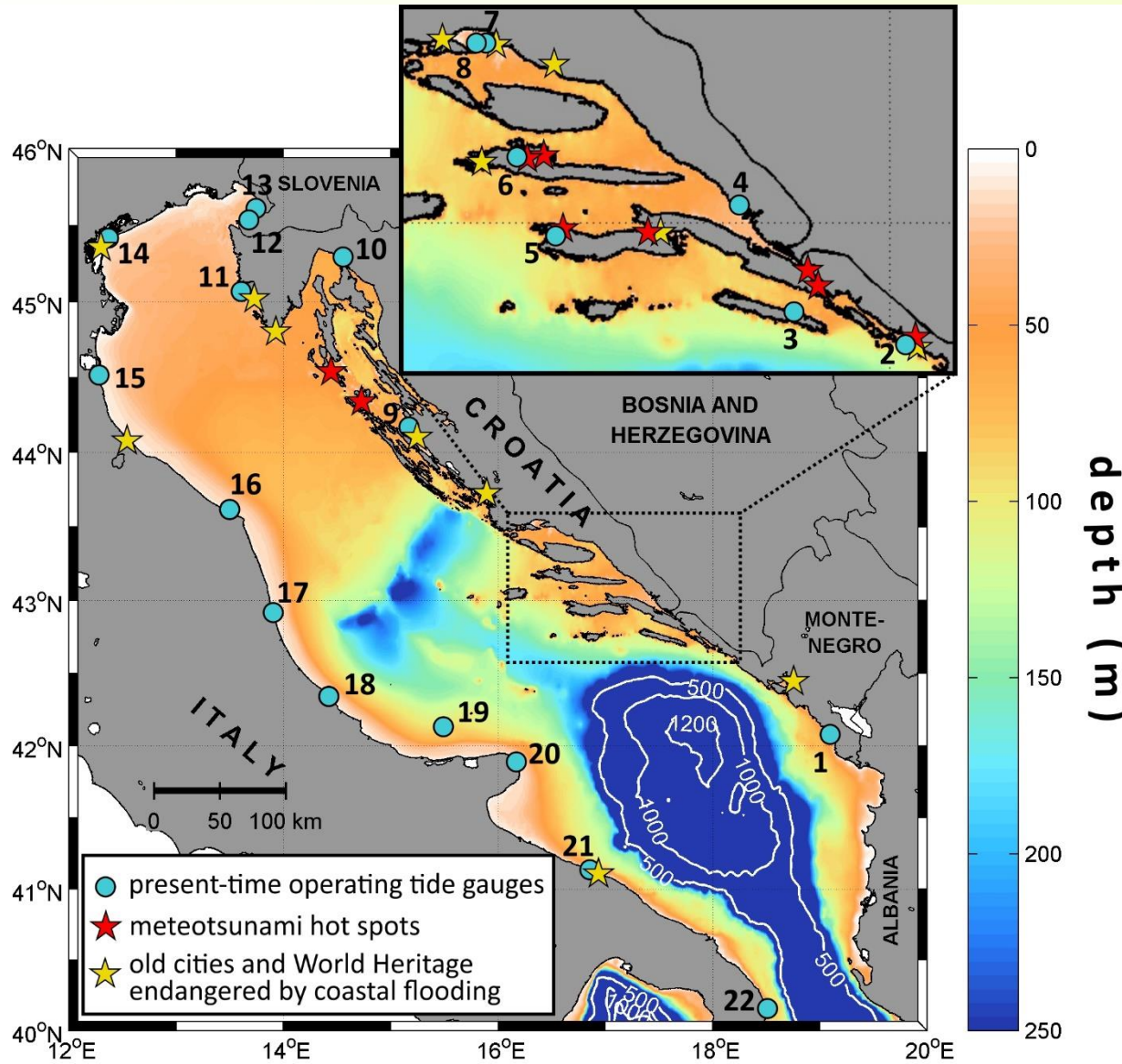
CTD +

Present status, activities and projects



Tide gauges +

Present status, activities and projects



Real-time systems (HF radars)

Present status, activities and projects



HAZADR Hrvatska verzija

Map Satellite

Marine surface currents map measured by HF radars

Time axis for current month

Surface currents as GIS layer

Time axis for current month daily averages

Time axis 6hrs averages

About HAZADR project

About HF radars

Involved institutions

Croatian team

Picture galleries

Data download

Main project page

Radio Wave Oceanography

Project NASCUM

Hour - Hour +

26.11.2016. 04:00

26.11.2016 03:00 UTC

- Marine surface currents map (last data)
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HAZADR Hrvatska verzija

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Project NASCUM

Hour - Hour +

08.03.2016. 18:00

08.03.2016 17:00 UTC

For all data (flags 0-5)
Data rate: 99.1%

Last 24 hours

Trajectories

quality control flags

- 0 none (0)
- 1 best (283)
- 2 medium (152)
- 3 deficient (17)
- 4 outliers (14)
- 5 >100 cm/s (2)

[cm/s]

- 0-5
- 5-10
- 10-15
- 15-20
- 20-25
- 25-30
- 30-35
- 35-40
- 40-50
- >50

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Real-time systems (other)

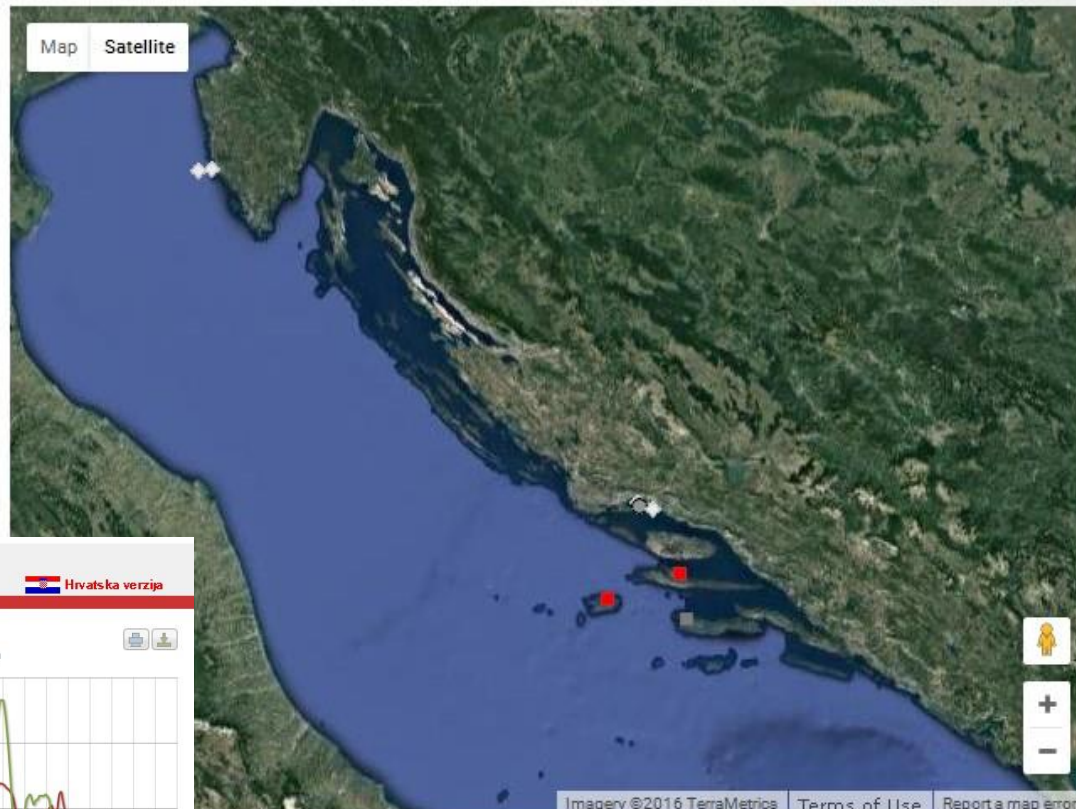
Present status, activities and projects

On-line

• Real-time measurement systems

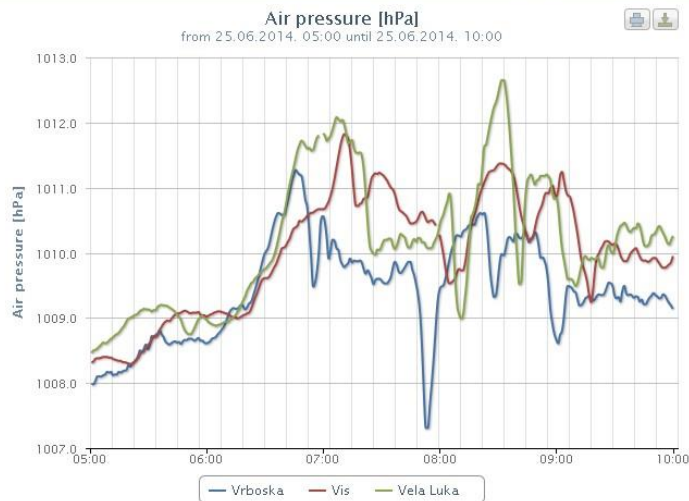
- INSTITUTE Oceanographic station
 - Oceanographic buoys system
 - HF radar systems for surface currents measurement
 - Microbarograph measurements
- Network camera
 - High and low water

Real-time measurement systems



Microbarograph measurements

Hrvatska verzija



Air pressure tendency

Air pressure is reduced to the mean sea level.

- About the project
- Stations map

Data

All stations graph

- Last 24 hours
- Last hour

○ Daily averages

Vis

- Time axis

Hvar - Vrboška

- Time axis

Vela Luka

- Time axis

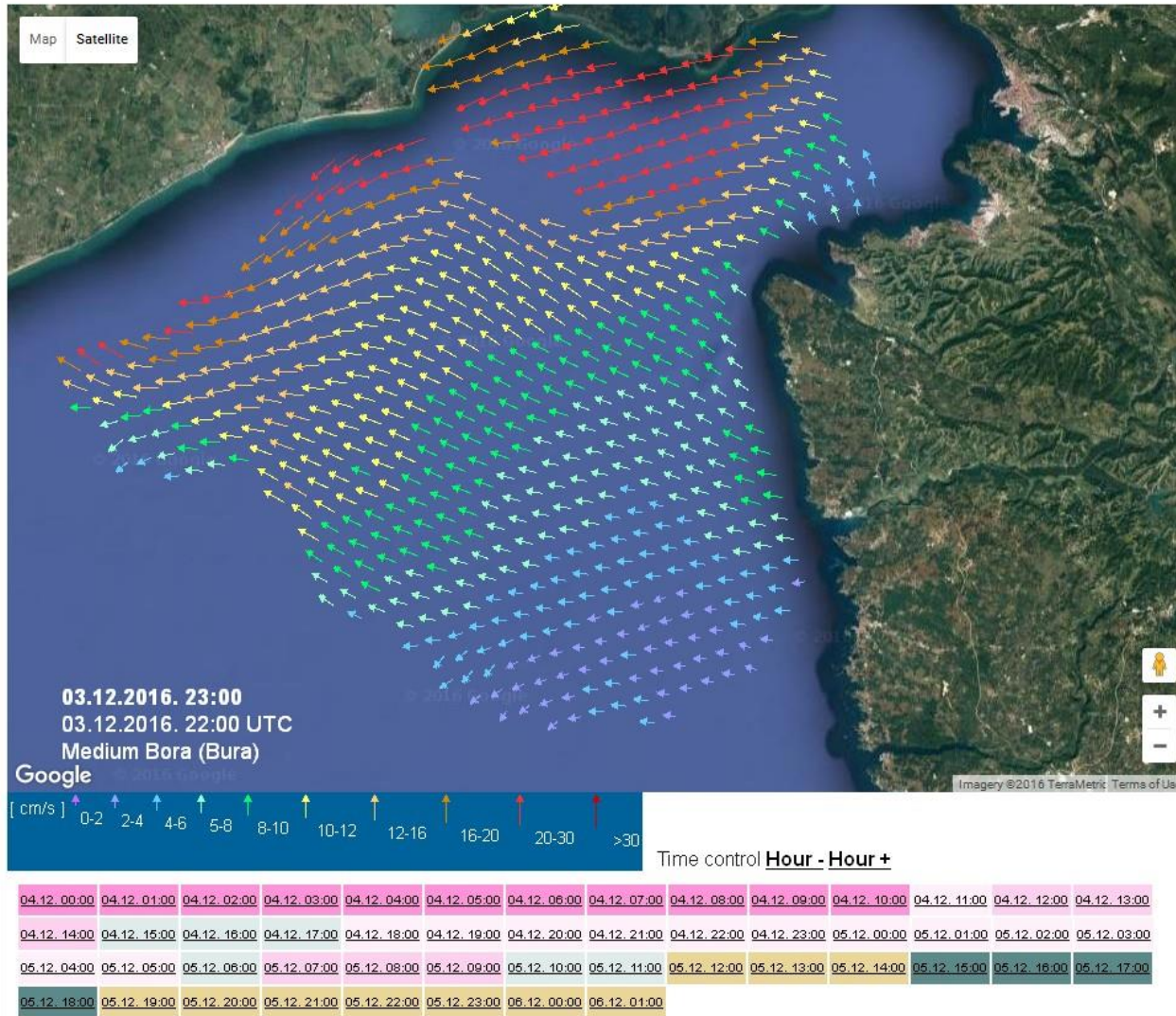
Sponsored by: Ministry of Science, Education and Sports of the Republic of Croatia
Research Project Grant 001-0013077-1122
IT Project Grant 2008-012



SOM-based forecast

Present status, activities and projects

Surface currents forecast



NEURAL



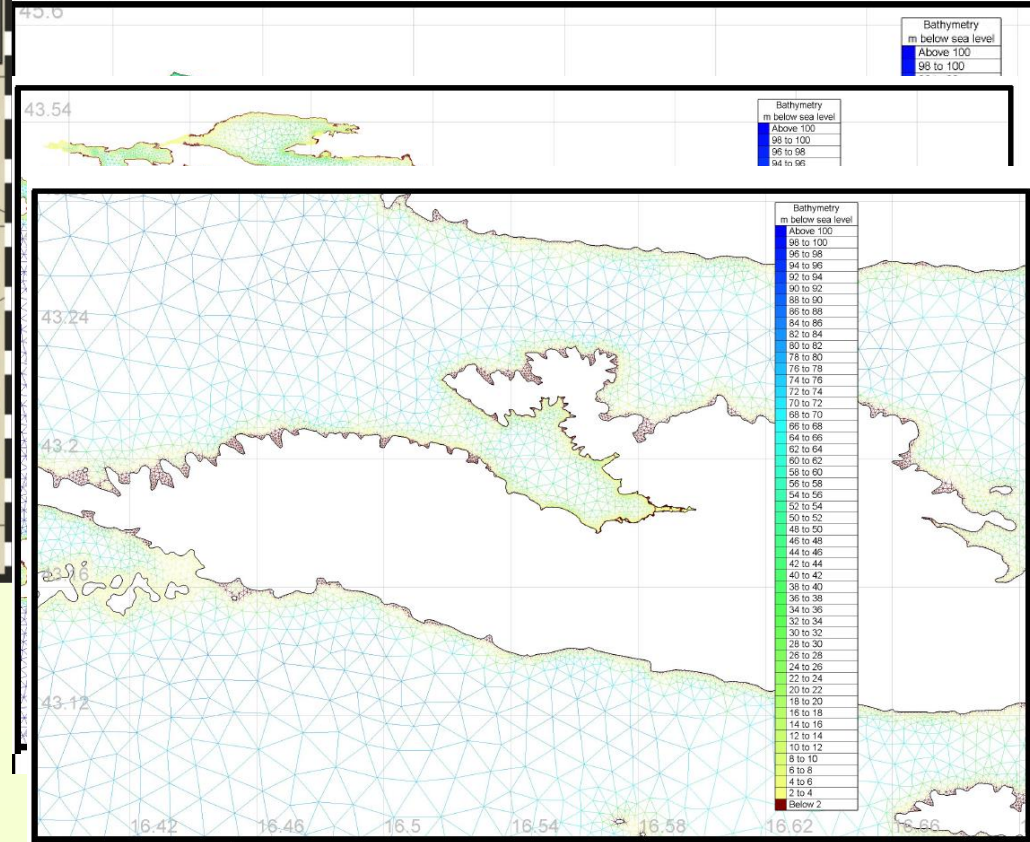
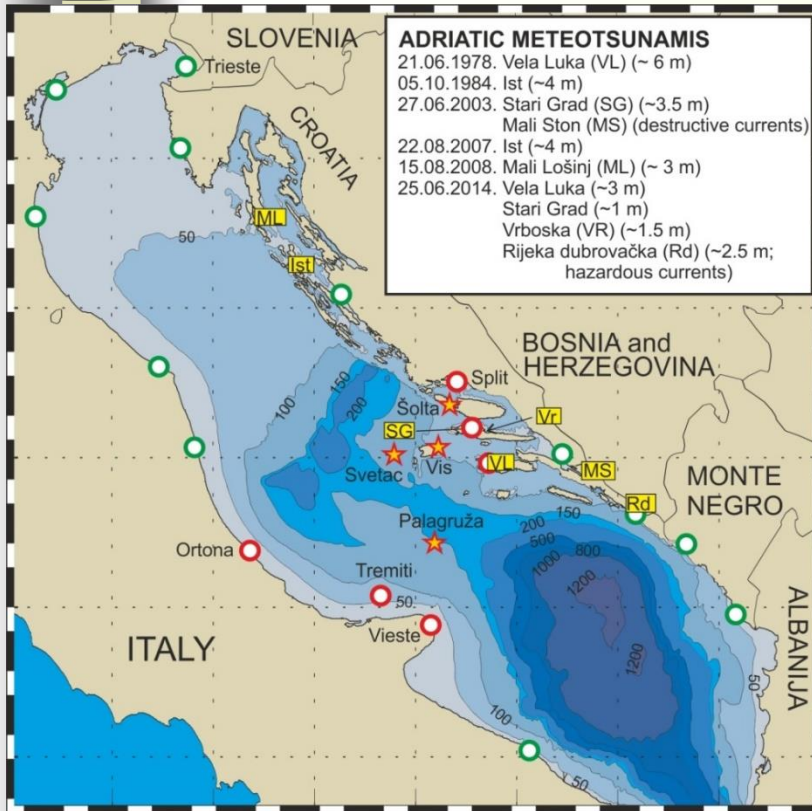
Project MESSI



Near-future realisation

Operational MTWS:

- 6 microbarographs
- 3 tide gauges
- COAMPS (ROMS/WRF)+ADCIRC operational modelling systems



Structural and Cohesion Funds

- Project MetMonic – 6 meteo/ocean buoys

Interreg HR-IT

- Another pair of HF radars

To continue with:

- Long-term monitoring at the Palagruža Sill, northern Adriatic and coastal eastern Adriatic
- HF radar measurements
- Tide gauges/microbarographs



National planning:

- Marine issues marginalised in the Smart Specialisation Strategy of the Republic of Croatia 2016-2020 – S3 has been mostly developed by people from electrical engineering and computing.

Institutional planning:

- To use European Directives (MFSD, WFD, MSD) for establishing sustainable and long-term monitoring of the Croatian Adriatic
- To use EuroGOOS, MonGOOS, European Marine Board, JPI-Oceans, ..., BlueMED, towards national authorities
- To increase international funds – for that we need to strengthen HR-SLO-IT collaborations with an aim of promotion of mutual benefits ...

