JOINT EUROPEAN RESEARCH INFRASTRUCTURE NETWORK FOR COASTAL OBSERVATORIES

User Engagement Panel

Introductory Video Conference Session

Research activities

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17th October 2016

Research and technology in JERICO-NEXT

- 6 science areas:
  - Area-1 on pelagic biodiversity
  - Area-2 on benthic biodiversity
  - Area-3 on chemical contaminant occurrence and related biological responses
  - Area-4 on hydrography and transport
  - Area-5 on carbon fluxes and carbonate system
  - Area-6 on operational oceanography

WP3 : Innovations in Technology and Methodology

George Petihakis (HCMR)
Laurent Delauney (IFREMER)

Expected effort: 150 Men months, 19 partners, 1.5M€

Objective
To enhance the capability and the quality of measurements in the coastal infrastructures

- Experience gained from JERICO
- Multi-disciplinary approach
- Emphasis to the biological components of the ecosystem

WP4 : *Valorisation through applied joint research*

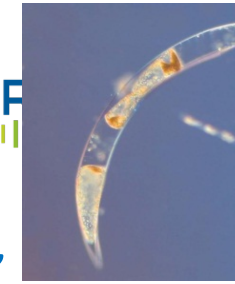
I. Puillat (Ifremer)
A. Grémare (CNRS-EPOC)

Expected effort: 162 Men months, 19 partners, 1.6M€

Objectives

- **a synthesis of the project**
  built upon activities in other WPs,
- **gathering the consortium**
  around applied **J**oint **R**esearch **A**ctivity **P**rojects (**JRAPs**) according to the 6 JERICO scientific areas
- **to put forward the added value of JERICO-NEXT**
  to the biological components of the ecosystem

Area 1: Pelagic biodiversity



Task 3.1. & JRAP1 : Pelagic biodiversity, Biodiversity of phyplankton, harmful algal blooms and eutrophication (B. Karlson, SMHI, Sweden & F. Artigas, CNRS, France)

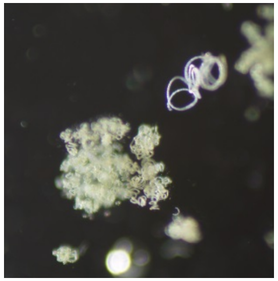
Analysis of past/ongoing work on **innovative optical techniques for assessing phytoplankton** abundance and/or biomass equivalents, per size/functional groups, photosynthetic activity/physiological status:

- **image acquisition and analysis** (in flow/*in situ*)
- **single-cell optical analysis** (pulse-shape recording FCM)
- **a combination of optical bulk multispectral techniques**

JRAP1

- To get closer to resolve natural variability in the sea with regard to plankton
- To improve the understanding of the development of certain algal blooms
- To exemplify how JERICO-NEXT can help address MSFD requirements (D1-Marine biodiversity for the pelagic realm, D5 Eutrophication is addressed)
- To use JERICO-NEXT observation platforms and other infrastructure

Area 1: Pelagic biodiversity



JERICO Phytolankton workshop, Gothenburg 27-30 sept. 2016

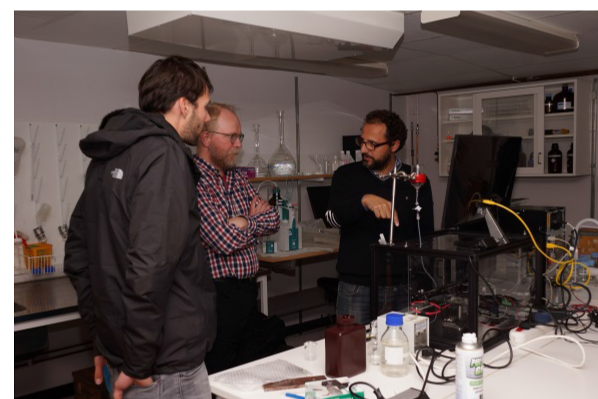
18 participants

Objectives:

• To improve the understanding of phytoplankton diversity, spatial and temporal distribution and the development of algal blooms in the sea (Harmful algae)

• To exchange experiences of using devices aimed at automated observations of phytoplankton including harmful algae:

- Imaging flow cytometers,
- multispectral fluorometers,
- Spectrophotometers,
- a Fast repetition Rate Fluorometer (FRRF),
- Phytoplankton imagery devices.



By B. Karlson, SMHI

• To compare the performance of instruments on common natural and culture samples.

Area 2: Benthic biodiversity

***Task 3.6 & Task 4.2 (JRAP#2): Monitoring changes in macrobenthic biodiversity. Assessing potential environmental controls and functional consequences** (A. Grémare, CNRS, France)*

- **Integrated multi-sensors video array towed fish (led by IFREMER)**

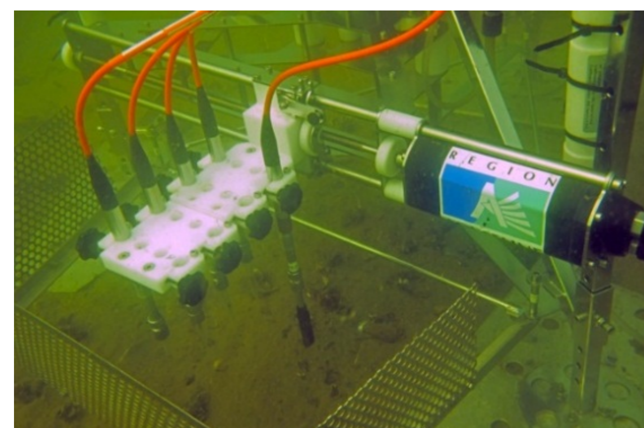
Based on existing 'Pagure' video system.

The new array is designed with removable skates and specific floats, offering a 'towed flying array' option.

- **Organic Matter mineralisation (led by CNRS)**

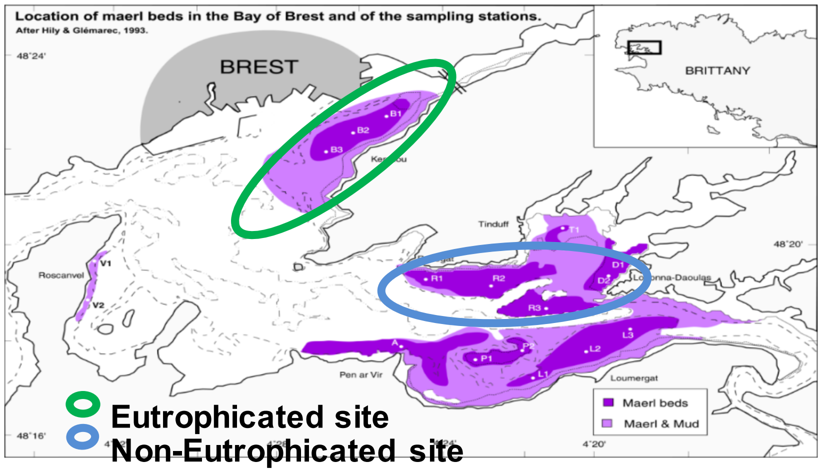
- Sediment Oxygen Microprofiler and Eddy Covariance System.
- Implementation of a longer life power supplies (battery)

=> long observation periods deployment.

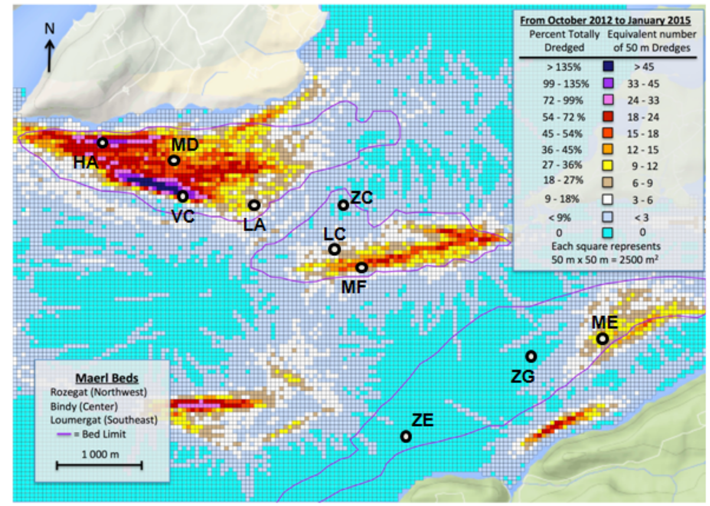


Area 2: Benthic biodiversity

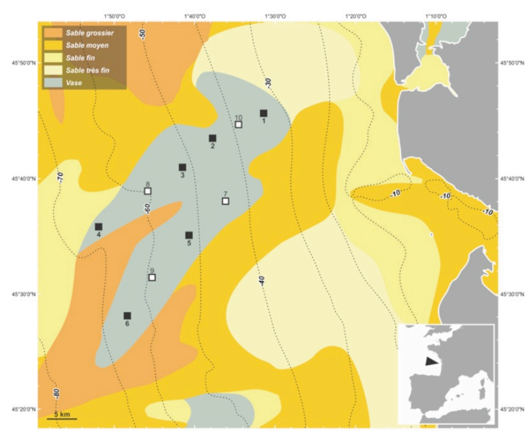
a) Example 1: Eutrophication in the Bay of Brest

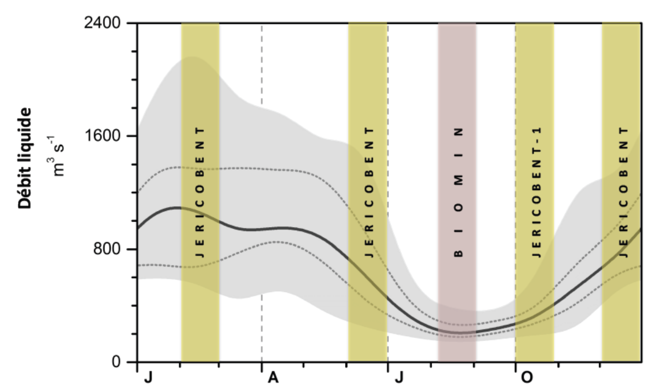


b) Example 2: Fishing in the Bay of Brest



c) Example 3: Effects of the inputs from the Gironde River on the West Gironde Mud Patch





Débit liquide de la Gironde sur la période 2005-2014

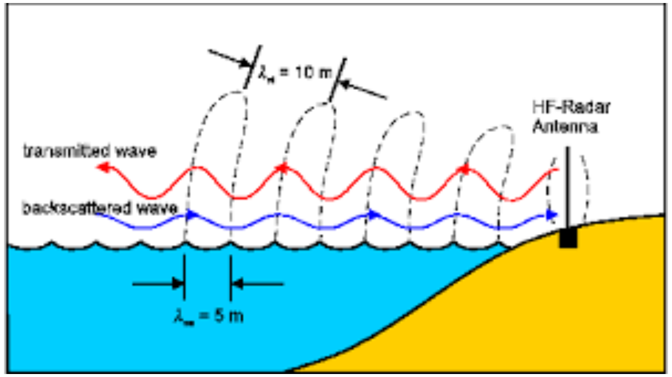
Area 4: Hydrography and Transport

Task 4.4: 3D characterization of shelf/slope transports in three trans-boundary areas (A. Rubio, AZTI, Spain)

Quantifying transport by ocean currents and its potential impact on the distribution of floating matter (plankton or other pelagic organism, marine litter…) in line with MFSD descriptors (7, 10 and 2).

Task 3.2: Developments on current observations from HF radars (A Griffa, CNR, Italy)

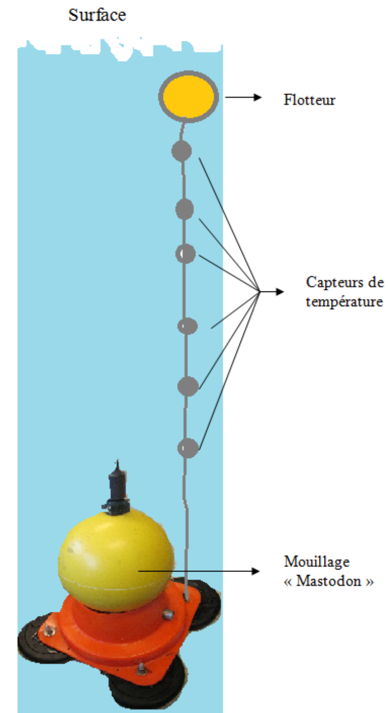
- New HF radar procedures for current retrievals and data quality control
- HF radar network developments
- New products for 4D characterization of shelf/slope hydrodynamics and transport



Area 4: Hydrography and Transport

Task 3.3 PROFILING COASTAL WATERS (M. Ntoumas, HCMR, Greece)

3 different coastal profiling technologies are being improved and developed of which:

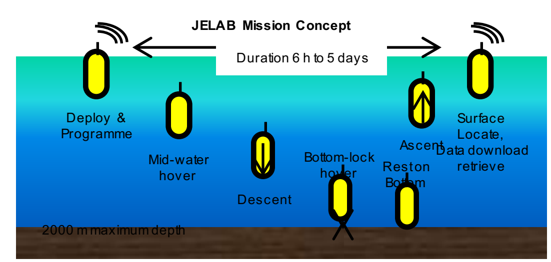


MASTODON2D: A low cost temperature profiler

- ☑ New housing of the temperature and pressure loggers have been tested to reduce time response from 9 min. down to 2 min.

JELAB: a new version of float able to trigger measurements according to the shape of the fluorescence profile

- ☑ Two different optic module technologies have been tested, evaluated and now are being developed. Several lenses configurations and sampling schemes are being tested.



Other Developments

Task 3.4 : Microbial and Molecular sensors (C. Boccadoro, IRIS, Norway)

Science Area 3, Task 4.3

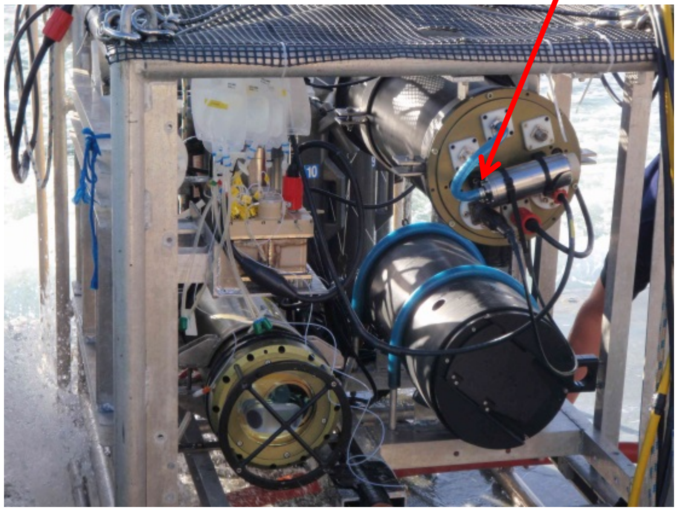
➢ **Detection of hydrocarbon exposure through their impact on microbial communities.**

➢ **Biosensors for the detection of toxic algae**

- Testing of a new cost effective configuration with a low cost spectrometer
- Development of another configuration to perform multi-detection at the same time.

➢ **Automated sampling of rDNA adapted to the Ferrybox**

Development of the current Automatic Flow Injection Sampler to monitor microbially driven biogeochemical processes in the Baltic Sea water

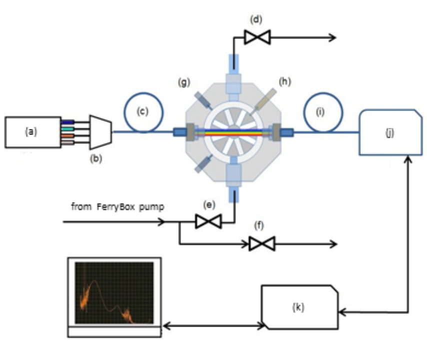


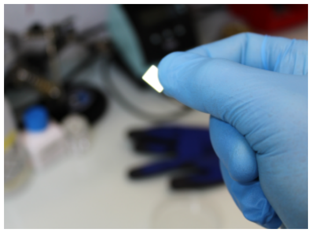
Other Developments

Task 3.5 Combine carbonate sensors (A. King, NIVA, Norway)

Science Area 5, Task 4.5

- Combined spectrophotometric pH and CO_3 determination (NIVA – E. Reggiani)
- Combined spectrophotometric pH and alkalinity determination (HZG – W. Petersen)
- Combined electrode and spectrophotometric technology for high-accuracy, high-resolution pH determination (Ifremer/Fluidion – L. Delauney, A. Hausot, D. Angelescu)





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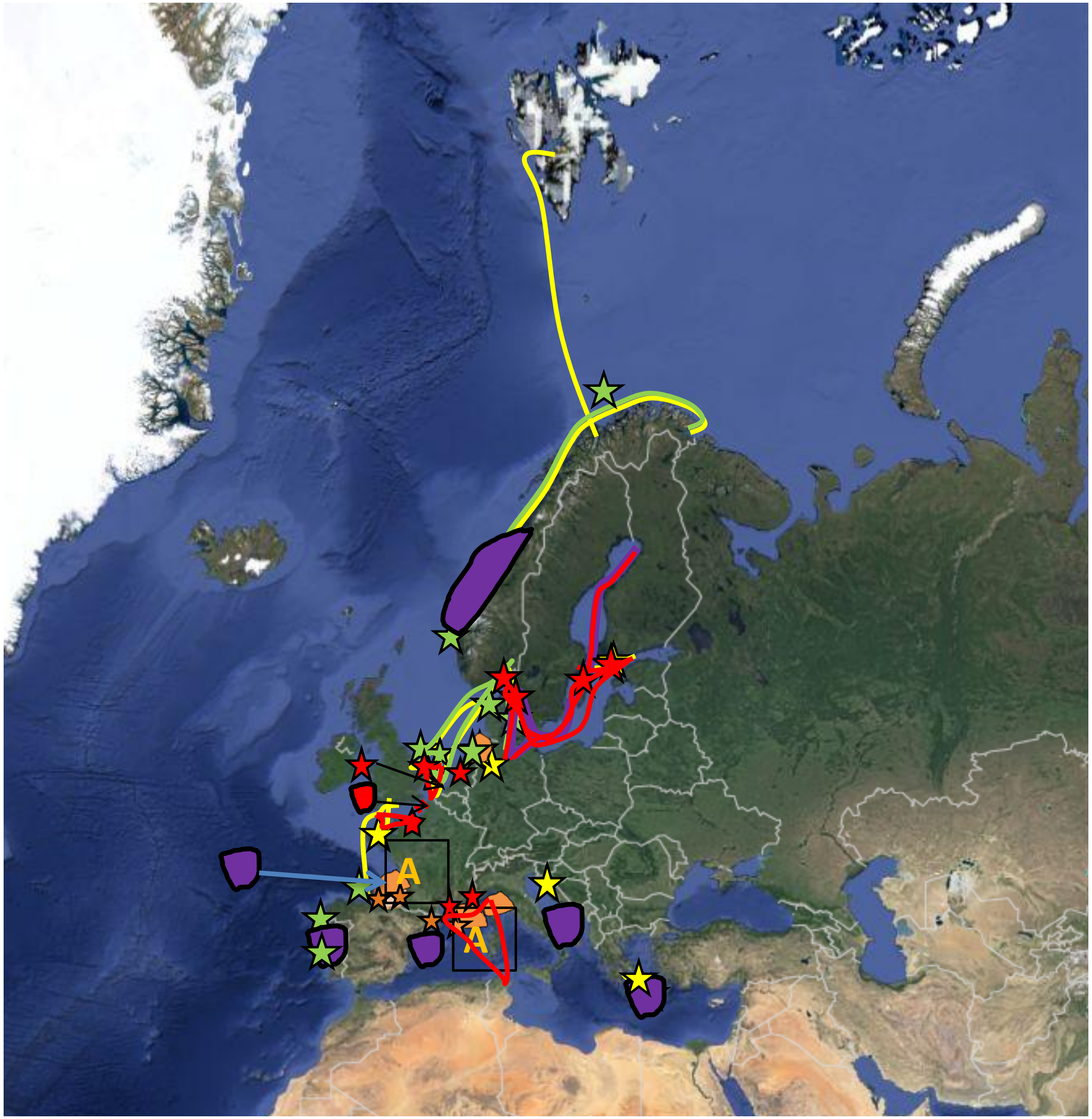


JRAP#1
JRAP#2
JRAP#3
JRAP#4
JRAP#5
JRAP#6

To discuss…

- What are the most interesting items?
- Added values that can be promoted according to you?
- What products and downstream services?

Thank you.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 654410.

BONUS

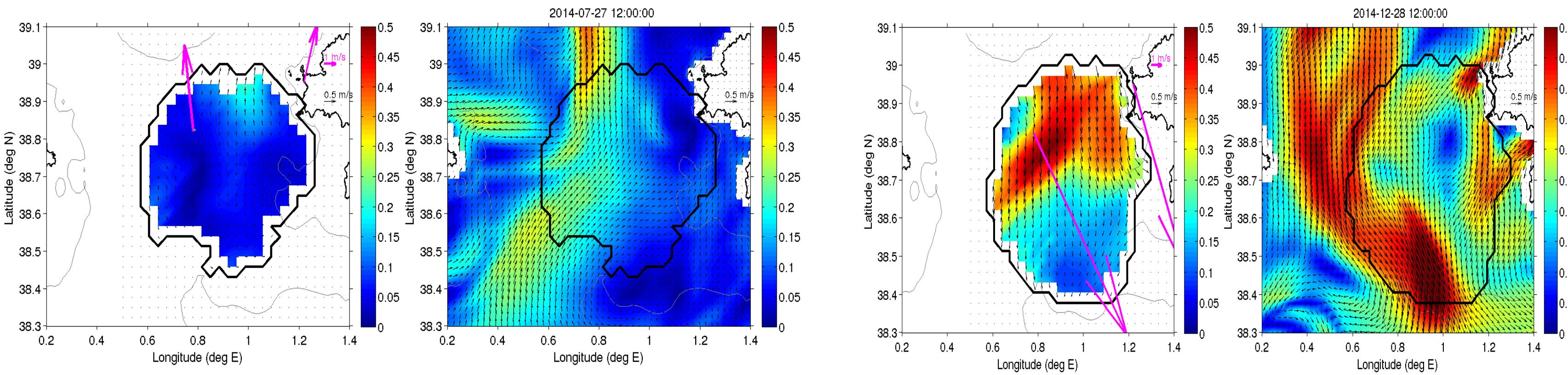
Task 3.7: OSE/OSSE technology

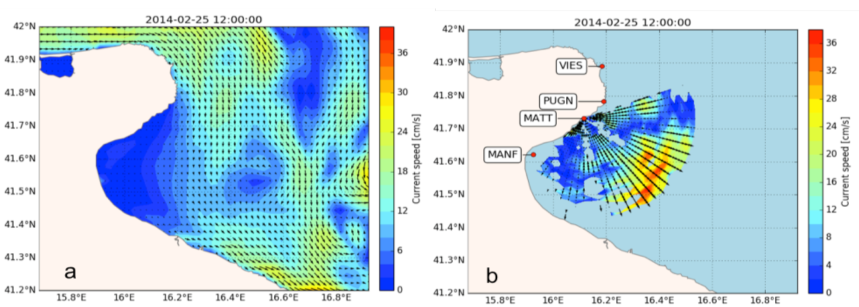
Task leader: Stefania Ciliberti; Giovanni Coppini

3.7.1 Transport in high-resolution DA systems (CMCC, HZG, CNR-ISMAR)

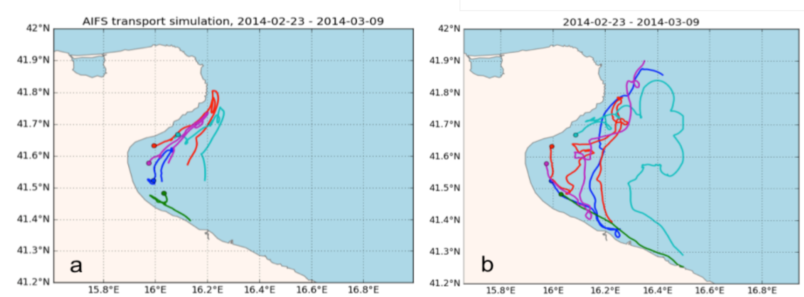
3.7.2 OSE/OSSE infrastructure (CMCC, HZG, Ifremer, CNR-ISMAR)

3.7.3 Optimization of HF-radar DA for the tracer transport (HZG, CMCC/CNR-ISMAR, Ifremer/CNRS and SOCIB)





a) AIFS simulated daily mean surface currents on Feb 25 2014, and
b) Radial velocity observed by HF radar for the same day



Example of Lagrangian drifter diagnostic comparison between model and observations. a) trajectories using AIFS simulated hourly mean surface b) observed drifter trajectories for the same period

Task 3.7: OSE/OSSE technology

Task leader: Stefania Ciliberti; Giovanni Coppini

For JRAP-4

- ❑ WP3.7 will provide improved OSE/OSSE methodology for sampling strategy improvements with emphasis on analysis of transport
- ❑ OSEs will be performed to assess value added of the existing/deployed HF radars
- ❑ OSSEs will be performed to evaluate sampling strategies of HF radar observations

For JRAP-6

- ❑ WP3.7 will provide improved data-assimilation technology for OSEs to quantify the impact of existing coastal observations on model performances
- ❑ OSSEs will be performed to evaluate sampling strategies of coastal observations

WP3 Main objectives & organisation

- Coord.: G.Petihakis (HCMR), L.Delauney (Ifremer)
- Expected effort: 150 Men months, 19 partners, 1.5M€
- 7 Tasks connected to the JERICO scientific areas and JRAPs:
  - Task3.1 Automated platform for the observation of phytoplankton diversity in relation to ecosystem services (F. Artigas, CNRS)
  - Task 3.2: Developments on current observations from HF radars (A.L. Griffa, CNR-ISMAR)
  - Task 3.2: Profiling coastal waters (M. Ntoumas, HCMR)
  - Task 3.4: Microbial & molecular sensors (C. Boccadoro, IRIS)
  - Task 3.5: Combined sensors for carbonate systems (A. King, Niva)
  - Task 3.6: Benthic compartment and process (A. Grémare, CNRS)
  - Task 3.7: Observing system experiments (OSEs) & observing system simulation experiments (OSSEs) technology (S. Ciliberti & G. Coppini, CMCC)