

EPIGRAM



Joint Validation in IBI



EPIGRAM Meeting 30 May 2011, île de Ré

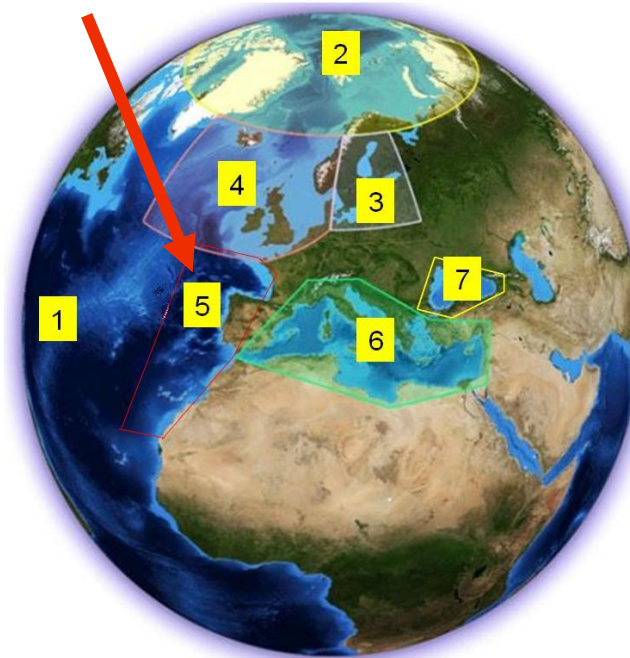


Objectives

To take part in the validation of MyOcean V1 stream2 (June 2011) in a coordinated way in IBI area with *Intermediate Users* perspectives

Based on:

- Available Observing Systems
- The main known processes along the IBI *shelf/slope*
- An integrated point of view (instead of studying the processes locally)



- 1. Global
- 2. Arctic
- 3. Baltic
- 4. NWS
- 5. IBI
- 6. Med Sea
- 7. Black Sea



Previous works

Atlantic- Iberian Biscay Irish- Ocean

BI_ANALYSIS_FORECAST_PHYS_005_001

Atlantic- Iberian Biscay Irish- Ocean
Physics Analysis and Forecast

The Operational ESECO analysis and forecast - eddy resolving 1/20°- forecasting system is running every day providing 3 days of 3D physical Ocean forecast. It is the operational nominal product for the Iberian Biscay Irish Seas.

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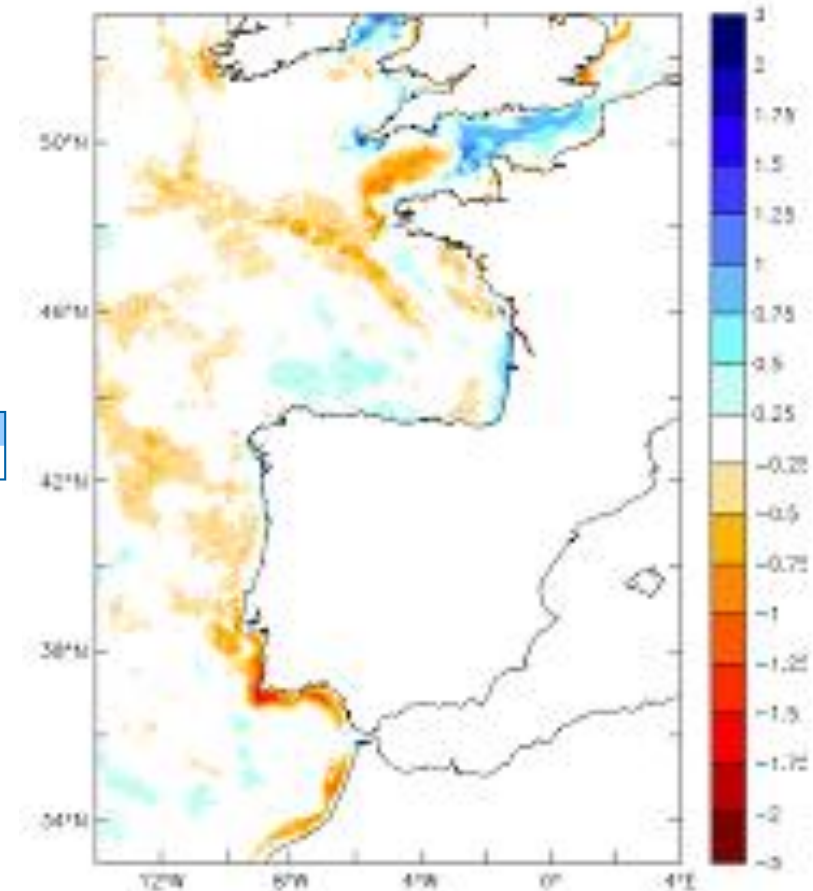
The new regional generation of Mercator Ocean system in the Iberian Biscay Irish (IBI) area

By Sylvain Cailleau¹, Jérôme Chanut¹, Bruno Levier¹, Claire Marald², Guillaume Refray¹

¹ Mercator Ocean, Toulouse, France

² LEGOS, Toulouse, France

RMS (obs-model) SST difference (°C) May-June 2009. IBI simulation



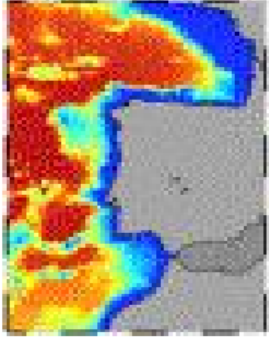


Previous works

Atlantic- Iberian Biscay Irish- Ocean

BI_ANALYSIS_FORECAST_PHYS_005_001

Atlantic-Iberian Biscay Irish- Ocean
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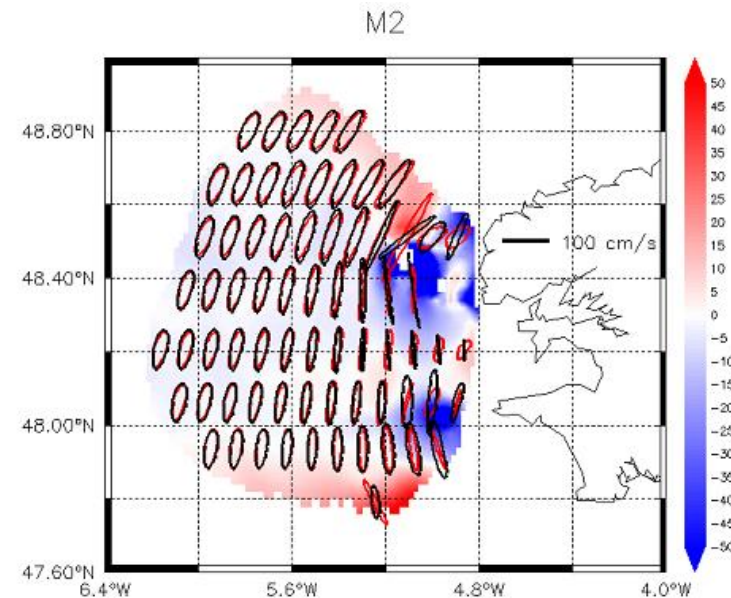
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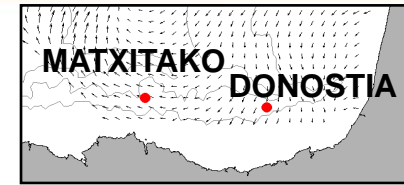
RMS OBS-MODEL (cm/s) zonal/meridional currents at 3 m. May-June 2009.

	IBI
Cabo Penas	7/7
Cabo Silleiro	5/9
Estaca bares	9/5
Villano Sisargas	11/9

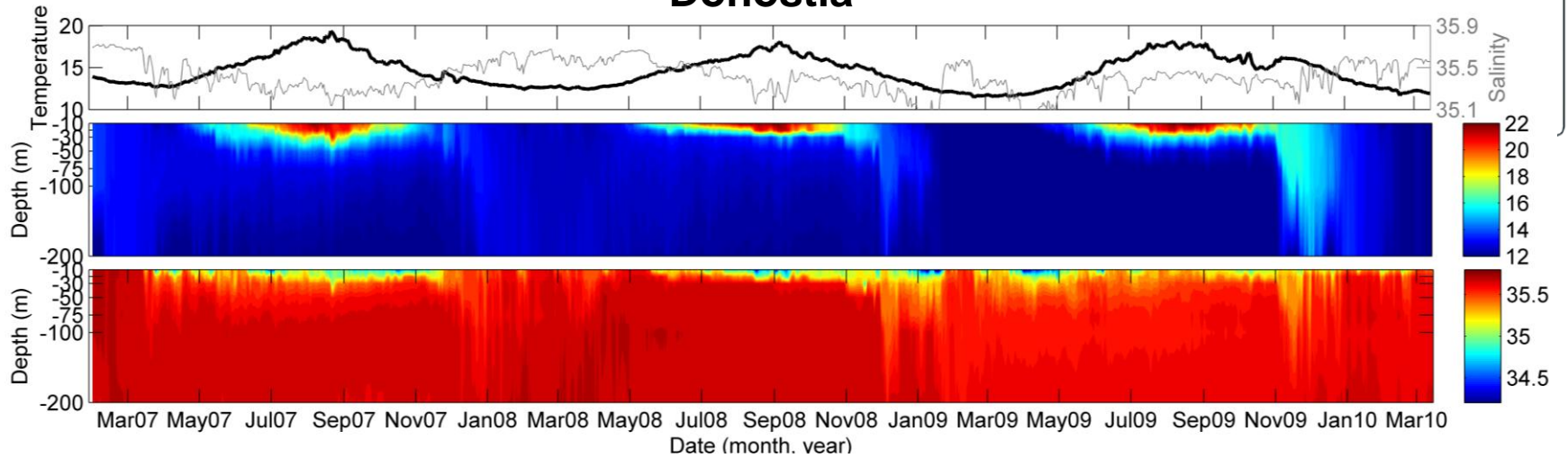
Modeled (black) observed (red ellipses) M2 tidal ellipses



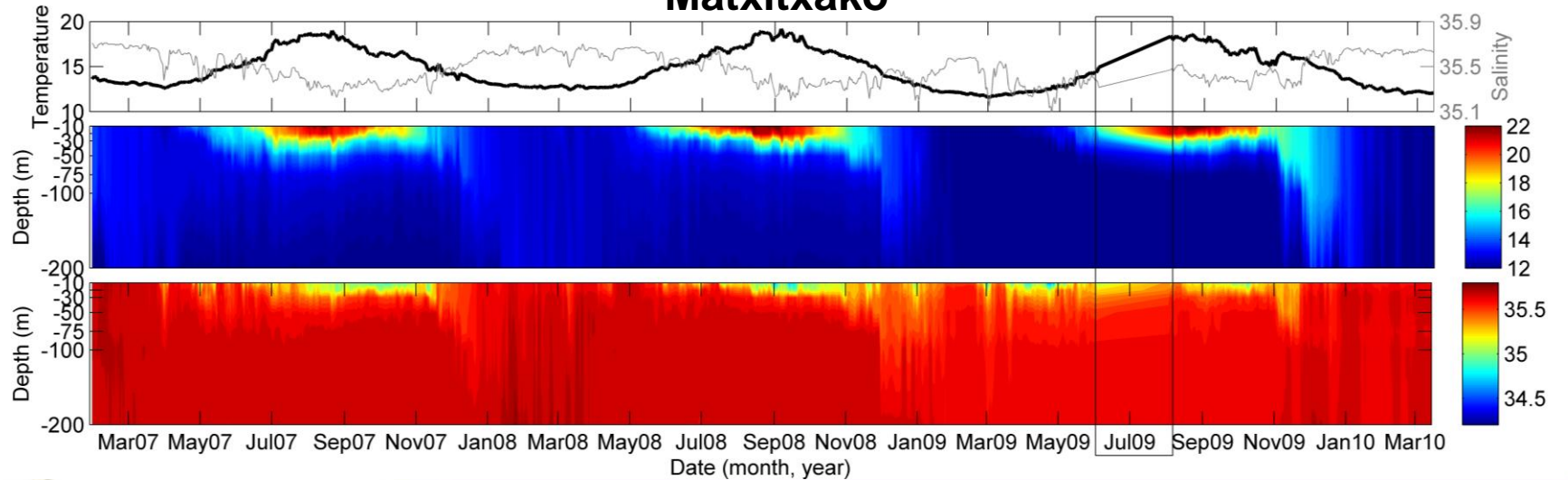
EPIGRAM



Donostia



Matxitxako



Process- oriented validation

Answer state-of-the-art questions from an integrated point of view:

- ✓ Spatial and temporal variability of shelf/slope surface currents and wind-current interactions (scientific and operational interests)
- ✓ Contribution of the IPC to the surface transport, spatial and temporal variability
- ✓ Contribution of processes as tides and vertical motions and other (local forcings/processes) to the shelf/slope circulation

Main Processes:

Wind induced current

Slope current

Tides, internal waves, upwelling

Other (local) processes

River plumes dynamics, ...



Observing Systems



HF radars (operational/
soon operational)

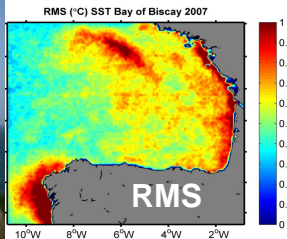


Offshore buoys (currents
and local winds).

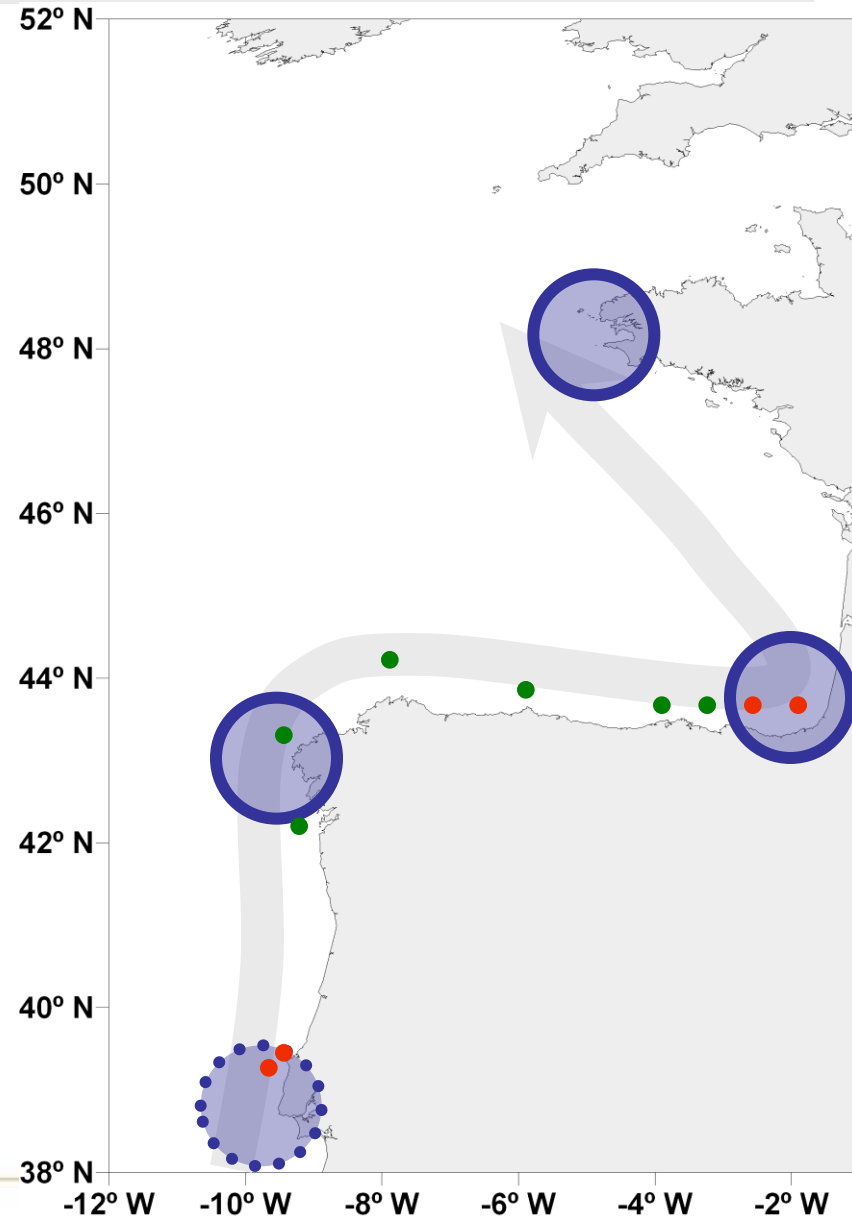


Offshore buoys (currents and
local winds) + vertical
information

And also: Repeat CTD transects,
SST, ocean color, wind data from
reanalysis...



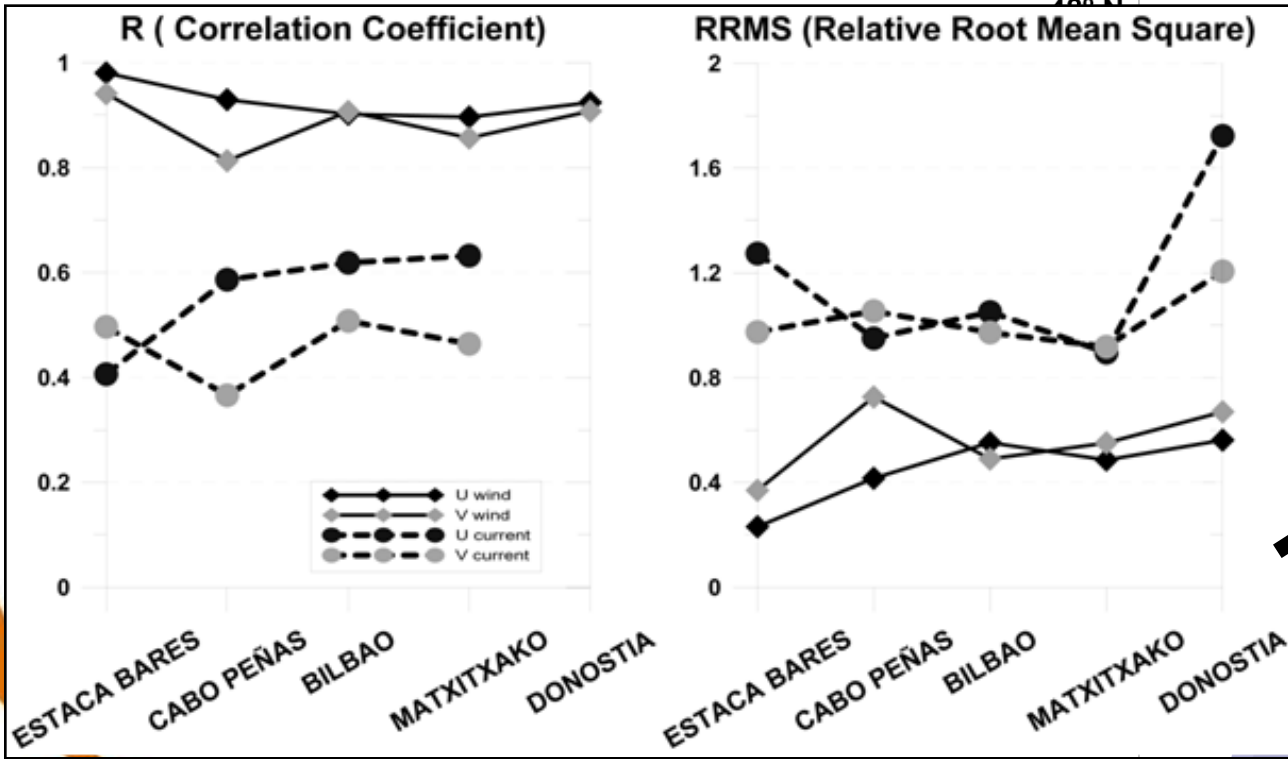
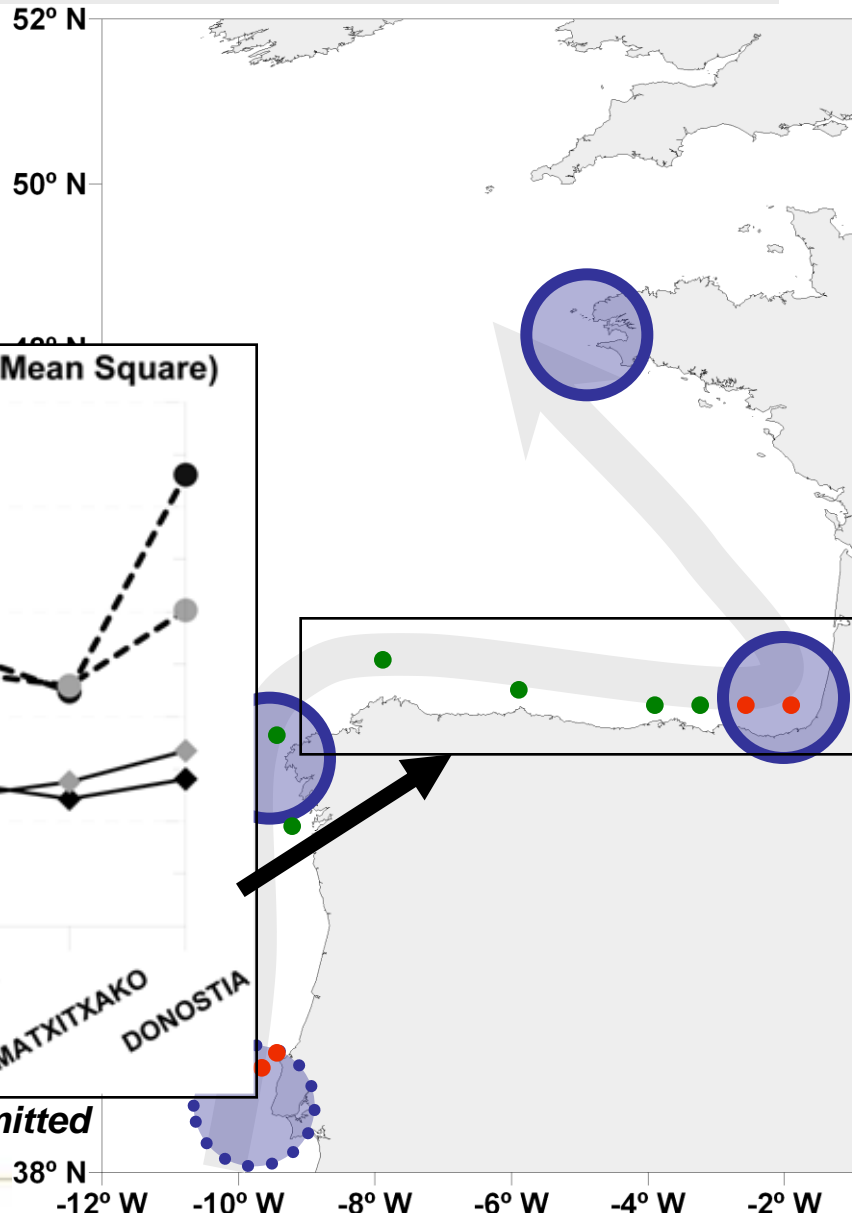
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Surface currents and wind-current interactions

Main questions:

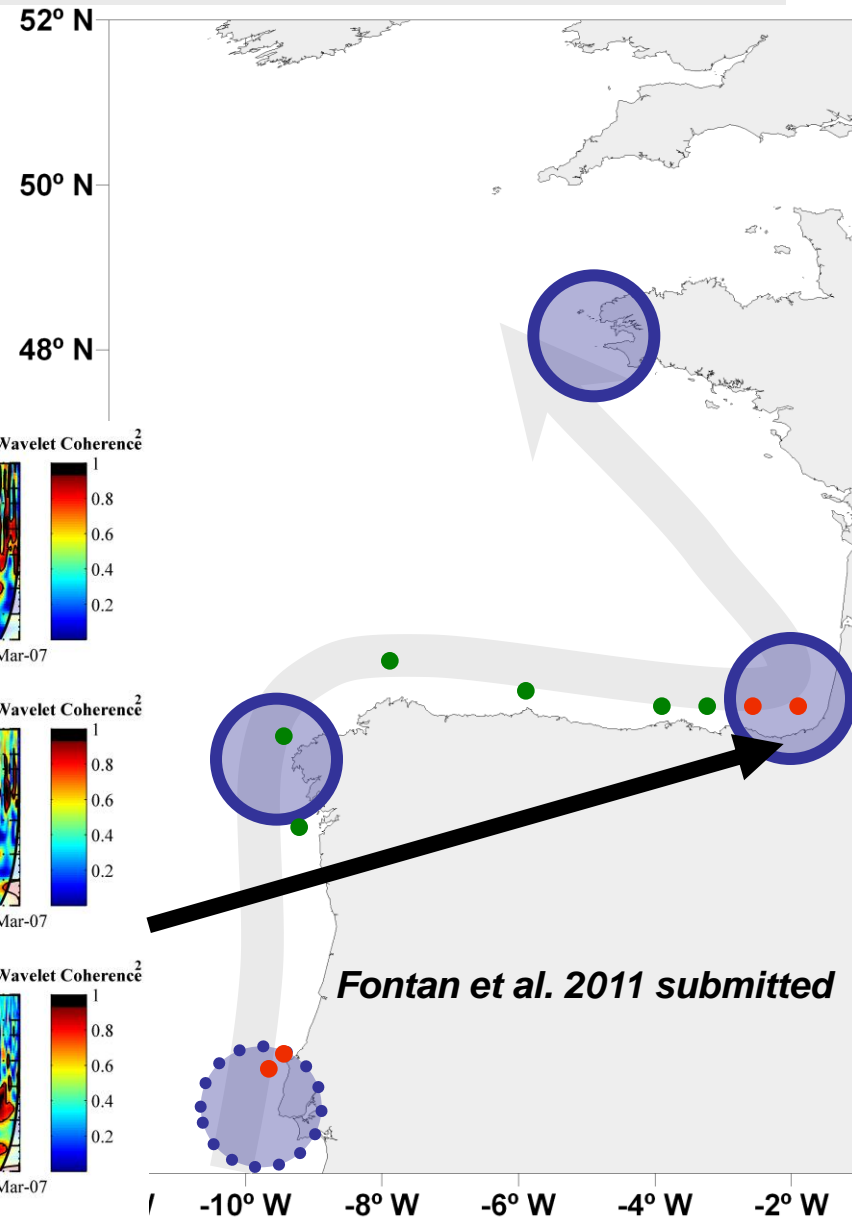
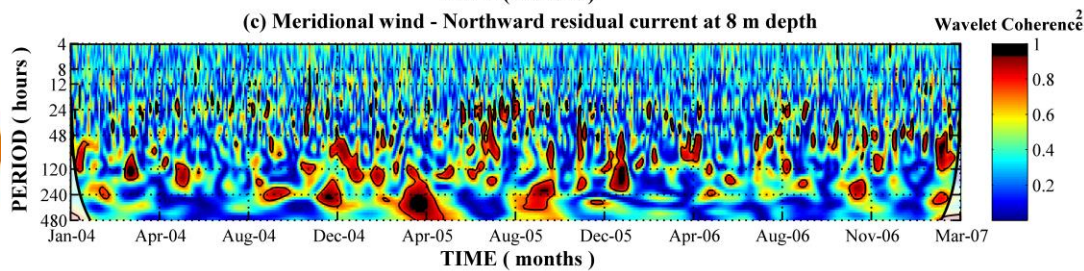
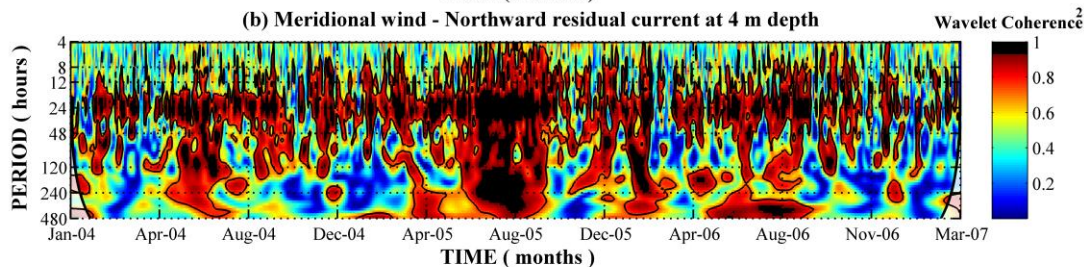
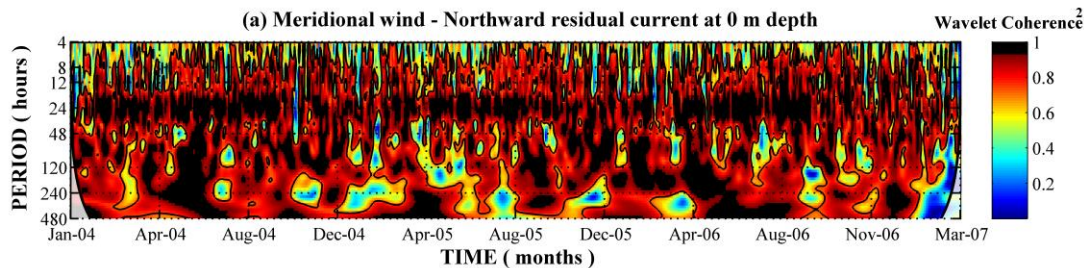
➤ Winds and surface currents



Surface currents and wind-current interactions

Main questions:

- Winds and surface currents
- **Wind-current interactions at different scales (and depths)**



Surface currents and wind-current interactions

Main questions:

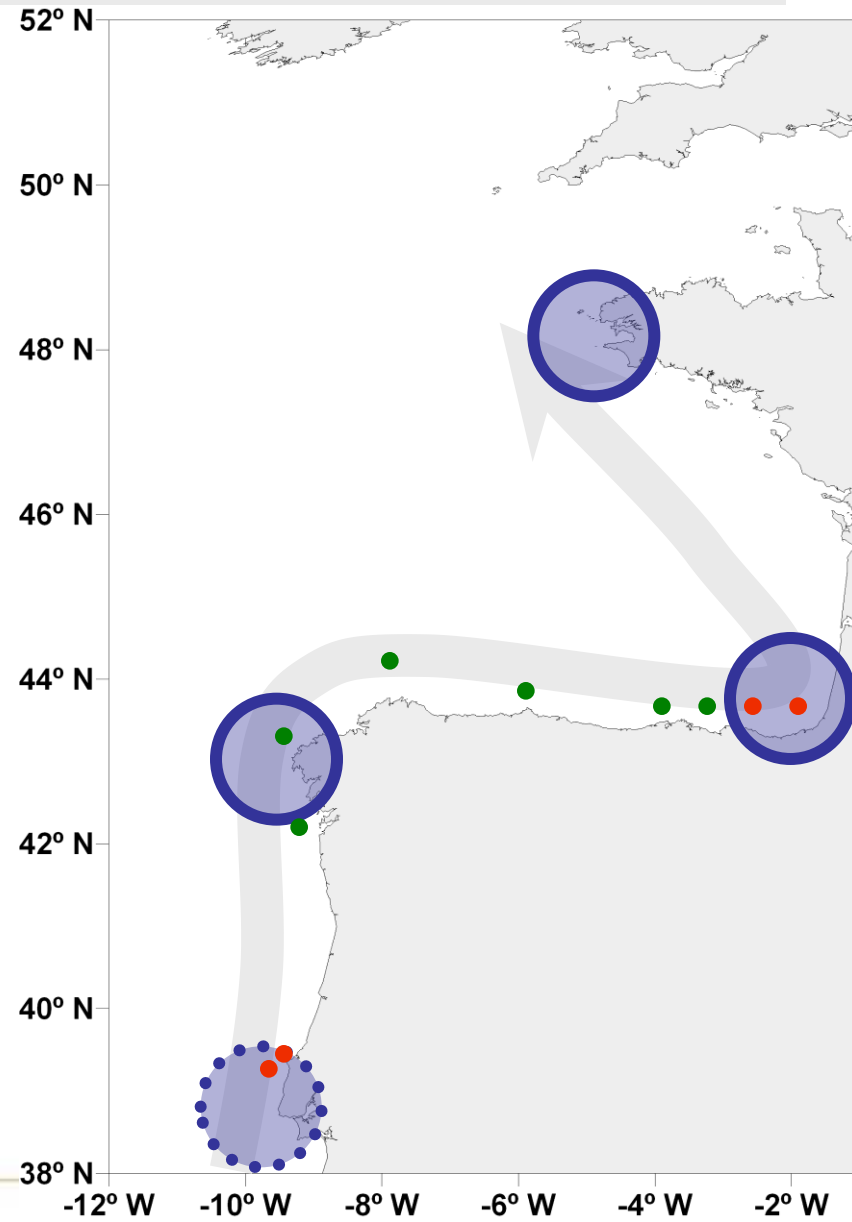
- Winds and surface currents
- Wind-current interactions at different scales (and depths)

What is the spatial variability of these processes along the IBI coast?

Does the IBI model reproduce them properly? At a local scale? At a regional scale?

METHODOLOGY

- *Wind and current point to point comparisons, analytical models of wind-current interactions*
- *Spectra and coherence spectra (or wavelets or CCA or others)*

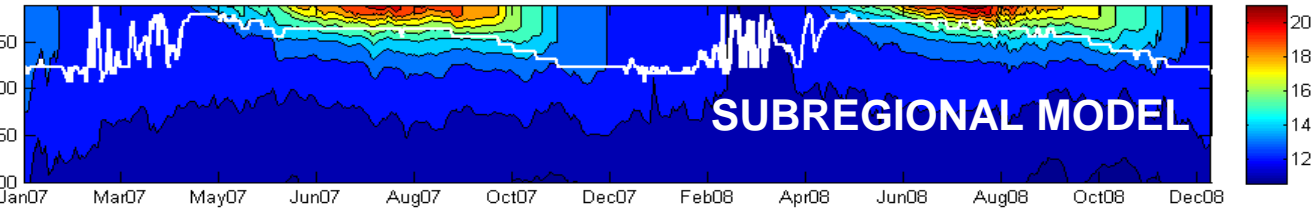


Slope current and surface transport

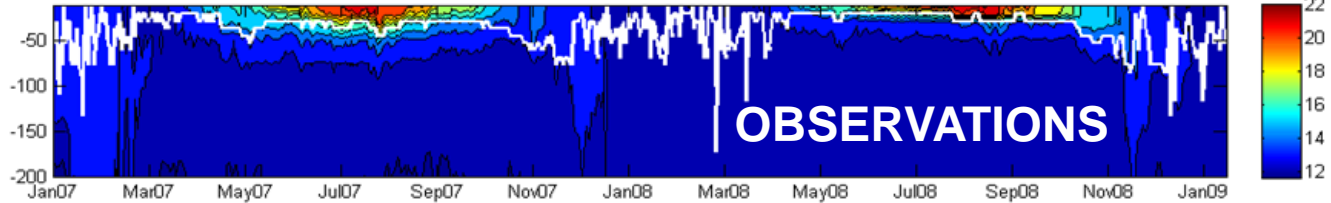
Main questions:

➤ Stratification conditions, vertical mixing

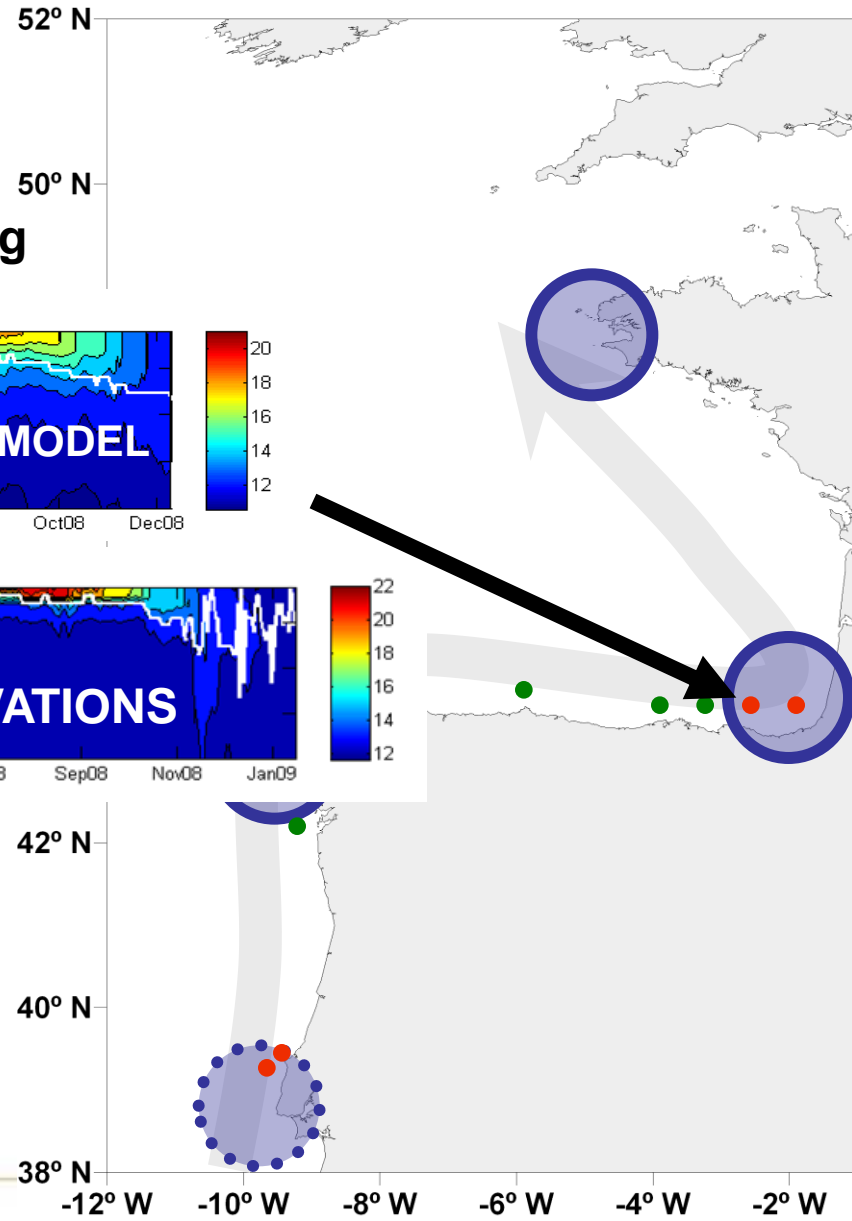
MODEL PROFILES at 10,20,30,50,75,100,200



DATA PROFILES at 10,20,30,50,75,100,200



Rubio et al. 2010



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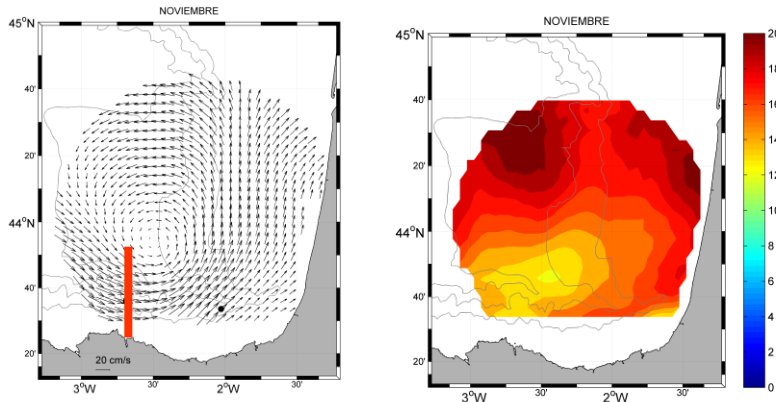


Slope current and surface transport

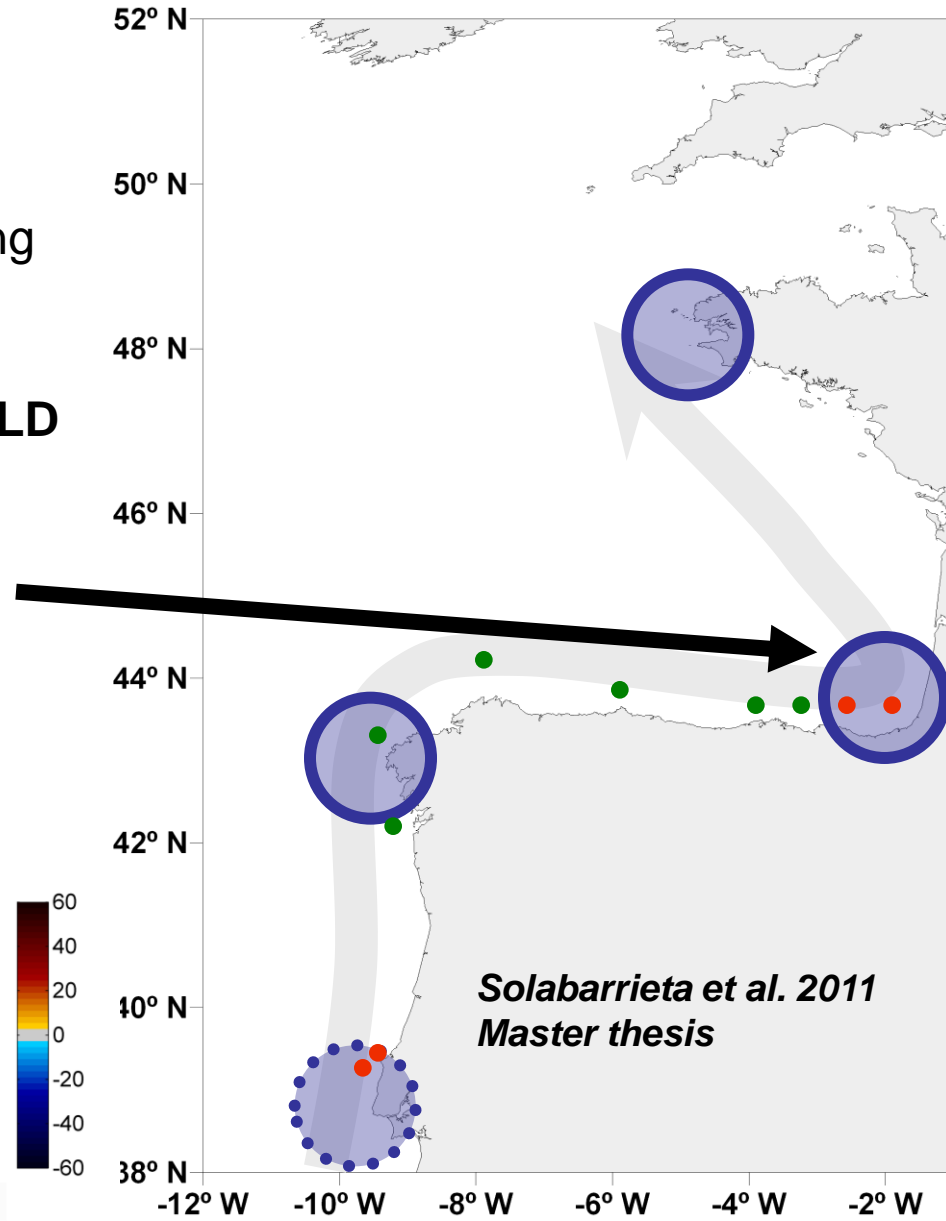
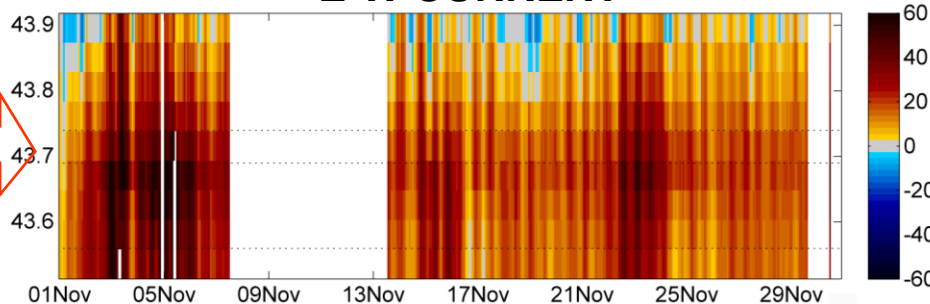
Main questions:

- Stratification conditions, vertical mixing
- **Surface signal of the slope current (time and space variability)**

NOVEMBER 2009 MEAN SURFACE FIELD



E-W CURRENT

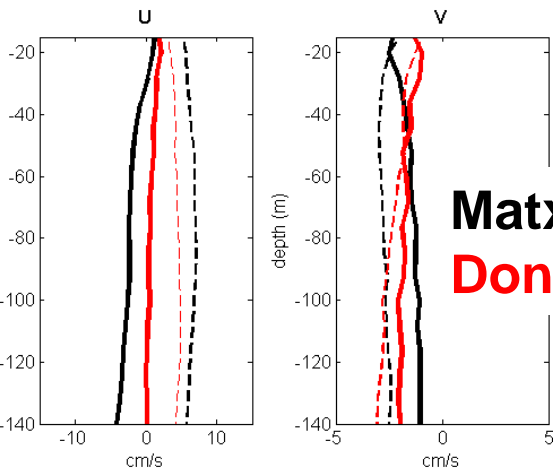


Slope current and surface transport

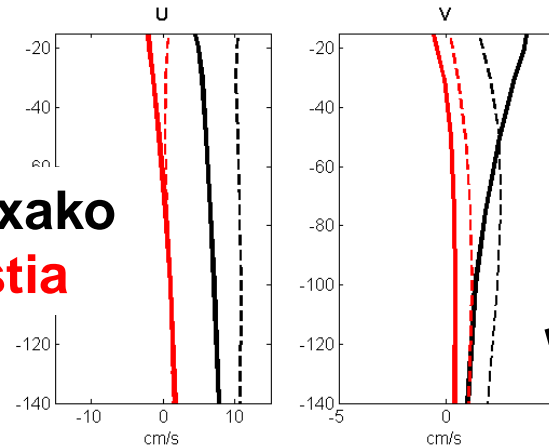
Main questions:

- Stratification conditions, vertical mixing
- Surface signal of the slope current (time and space variability)
- **Vertical structure of the slope current**

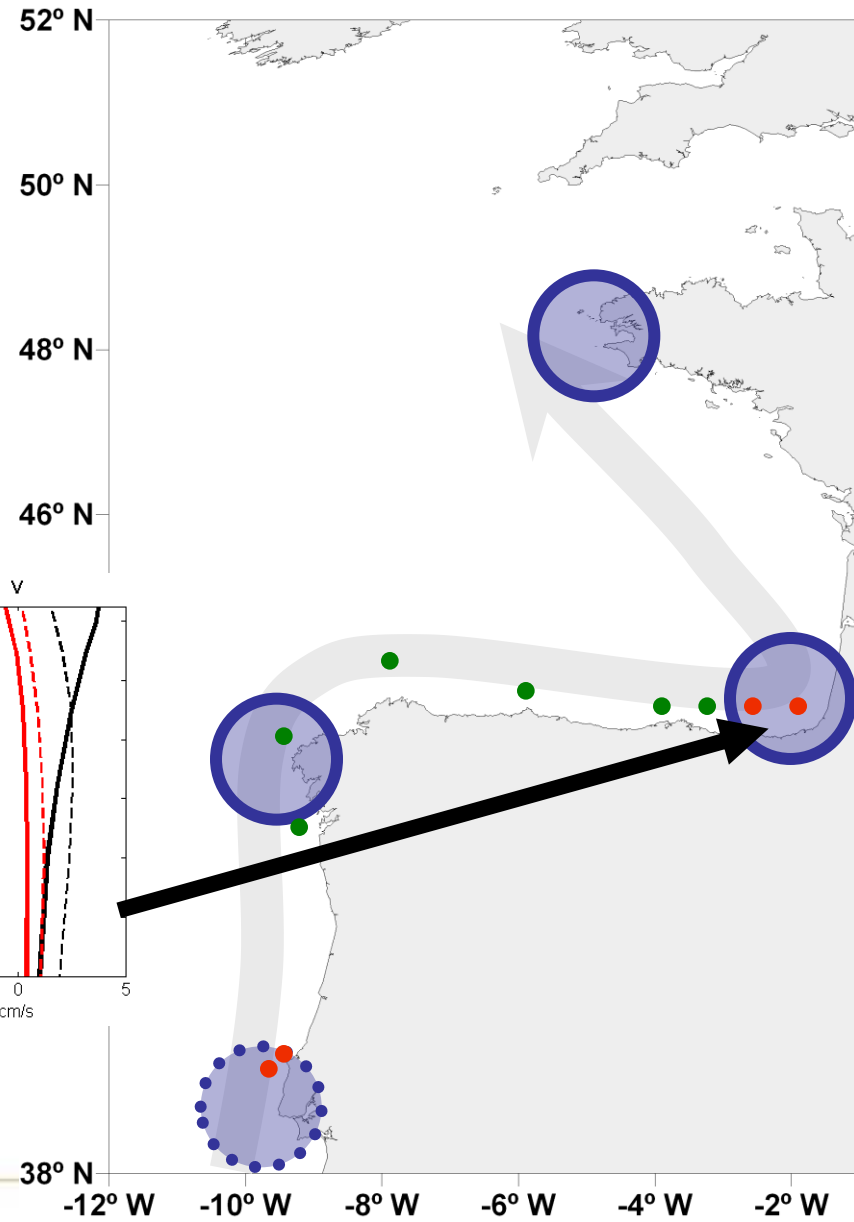
OBSERVATIONS



MODEL



Rubio et al. 2010



Slope current and surface transport

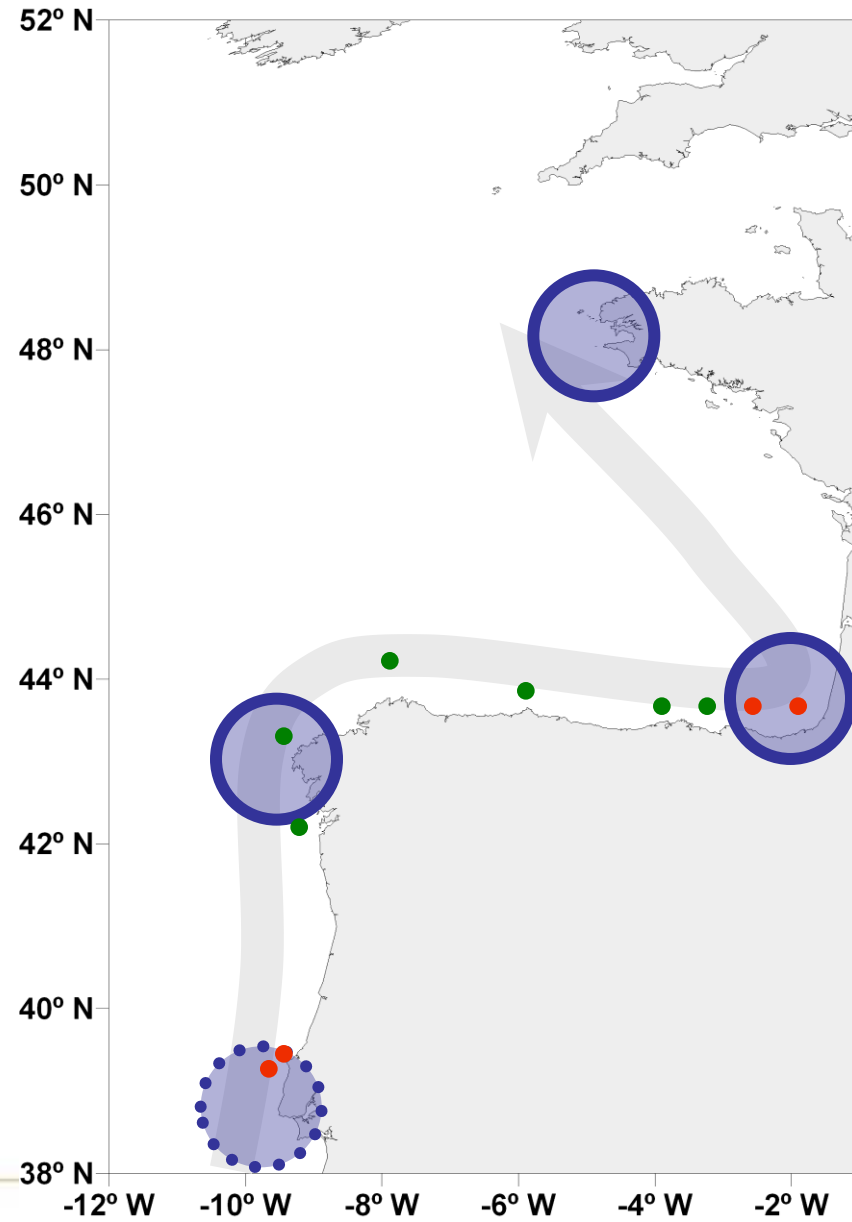
Main questions:

- Stratification conditions, vertical mixing
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- **What is the spatial variability of these processes along the IBI coast?**
- **Does the IBI model reproduce them properly? At a local scale? At a regional scale?**

METHODOLOGY

- *Current point to point comparisons focusinf at different time scales*
- *Joint analysis of in-situ + satellite information*



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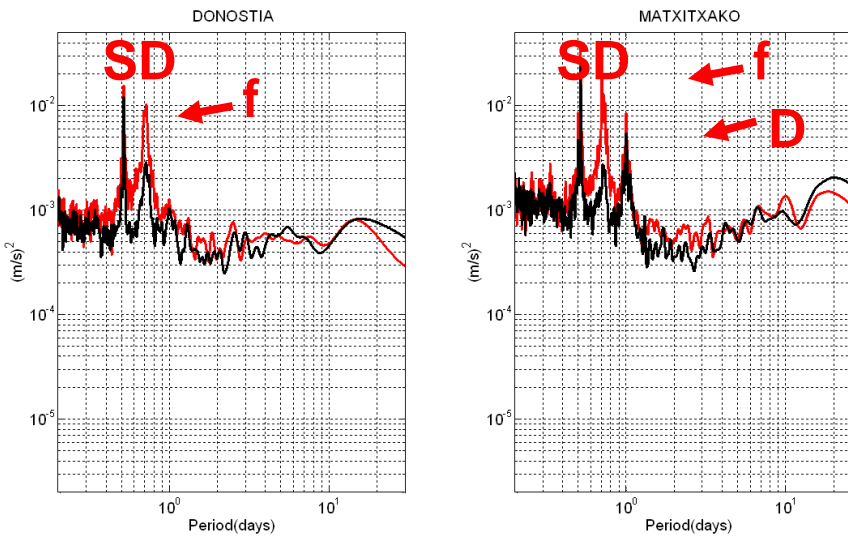
Contribution of other processes to the surface circulation

Main questions:

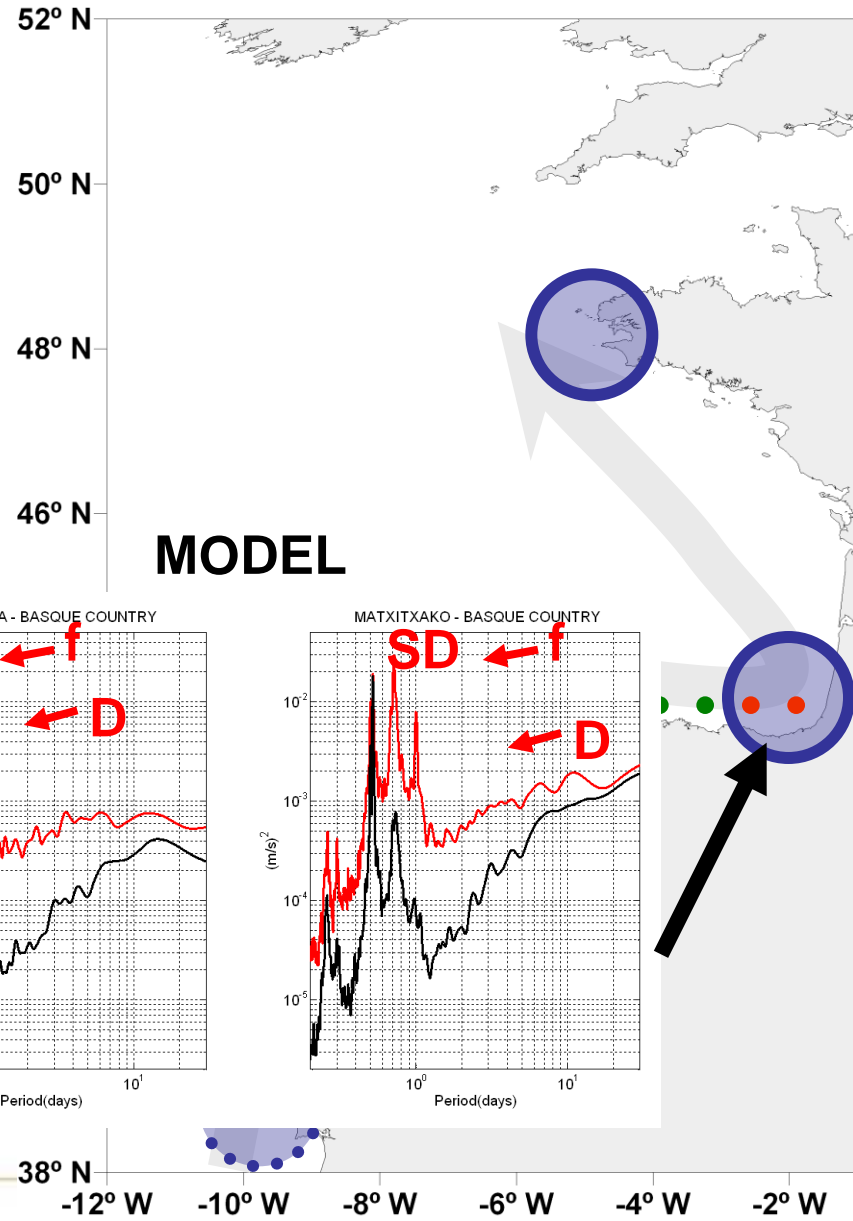
➤ Tides, inertial waves

- 10-40 m
- 100-140 m

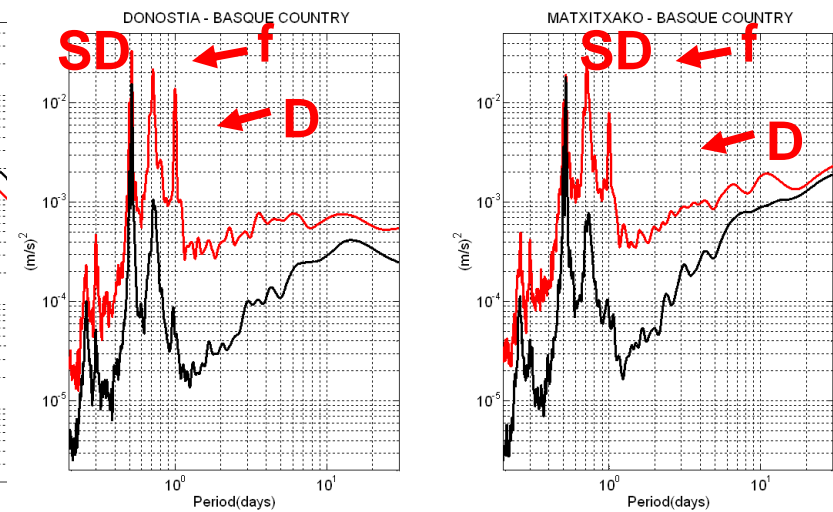
OBSERVATIONS



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MODEL



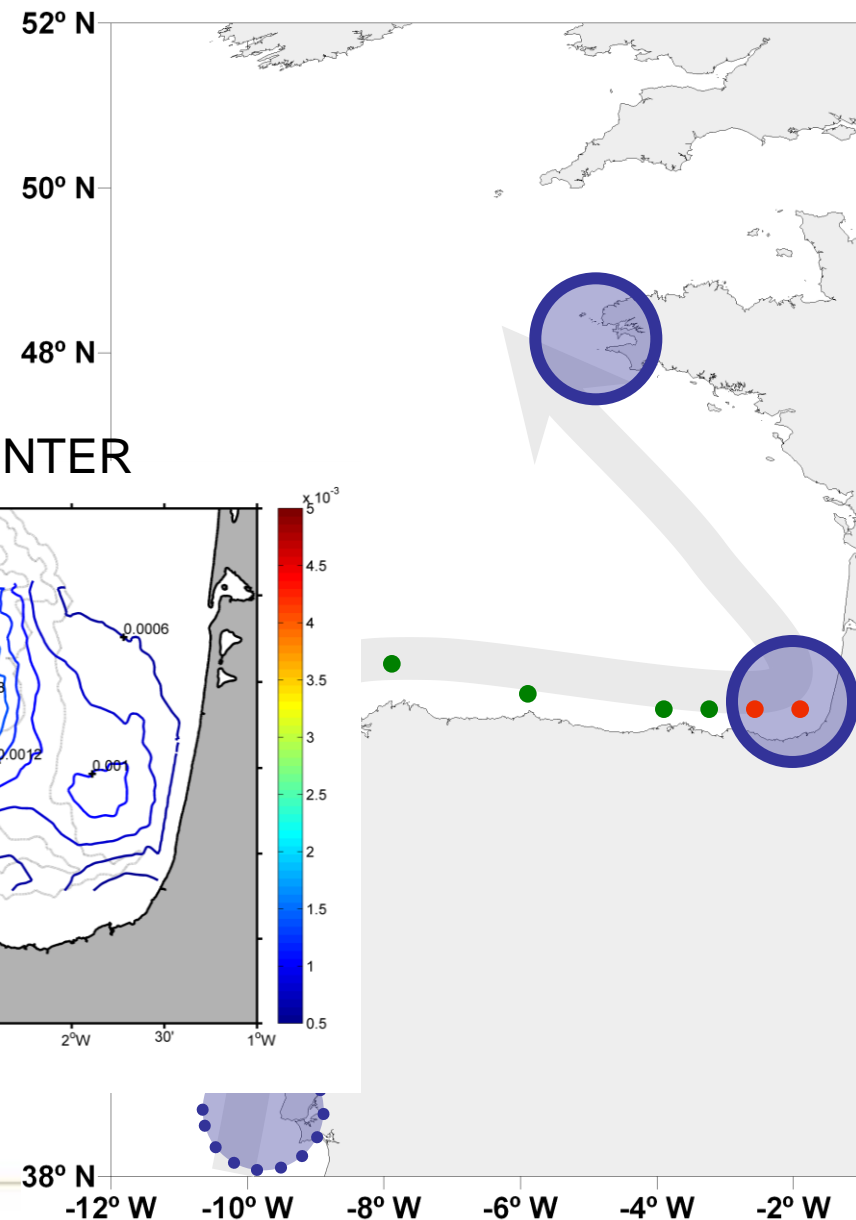
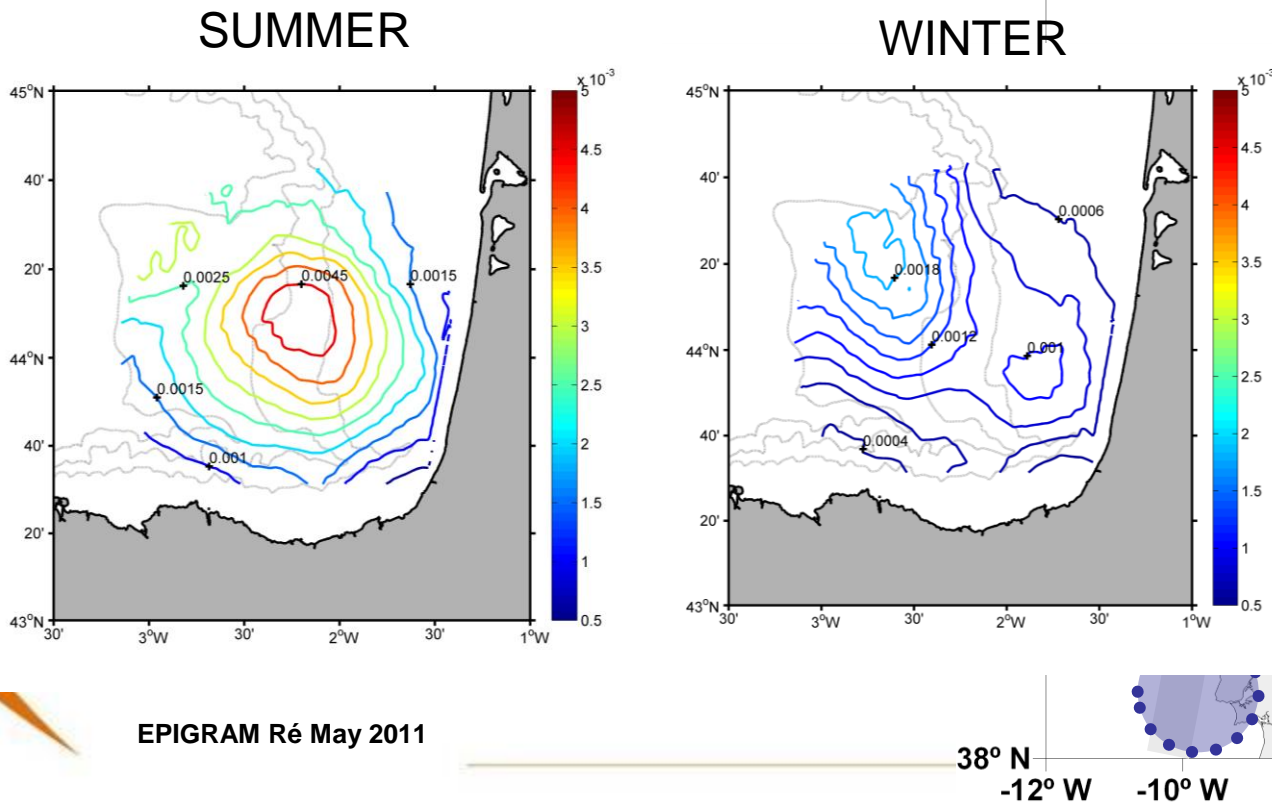
$38^\circ N$
 $-12^\circ W$ $-10^\circ W$ $-8^\circ W$ $-6^\circ W$ $-4^\circ W$ $-2^\circ W$

Contribution of other processes to the surface circulation

Main questions:

- Tides, inertial waves

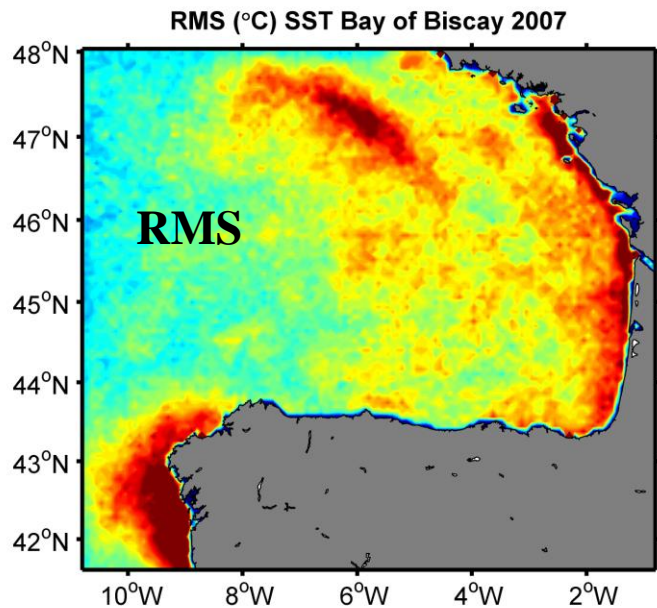
Distribution of near-inertial KE (cm²/s²)



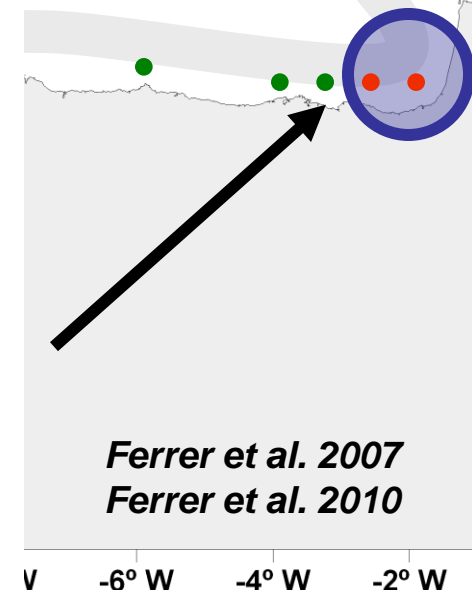
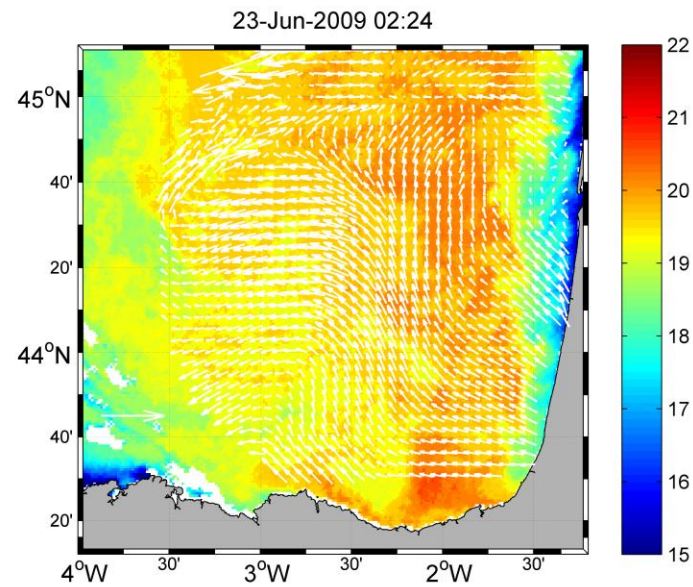
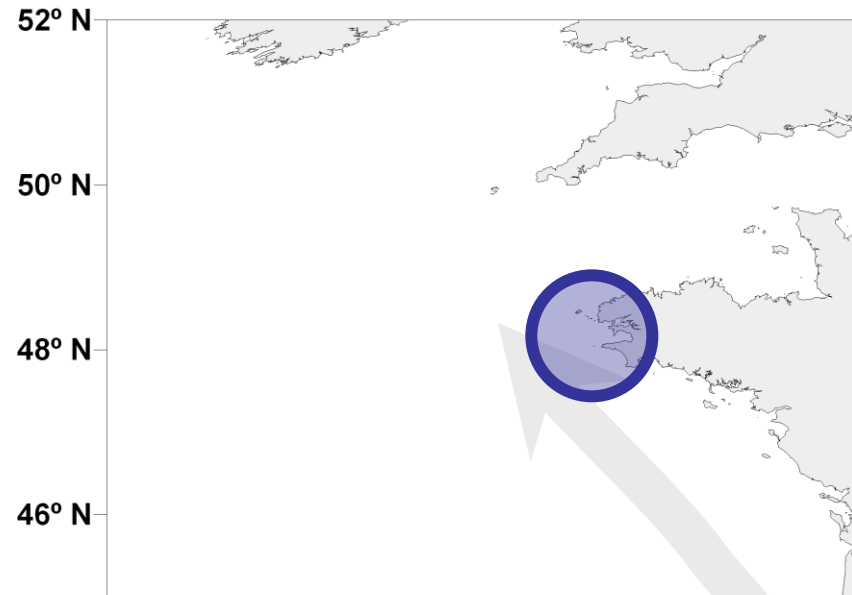
Contribution of other processes to the surface circulation

Main questions:

- Tides, inertial waves
- Upwelling processes
-



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Contribution of other processes to the surface circulation

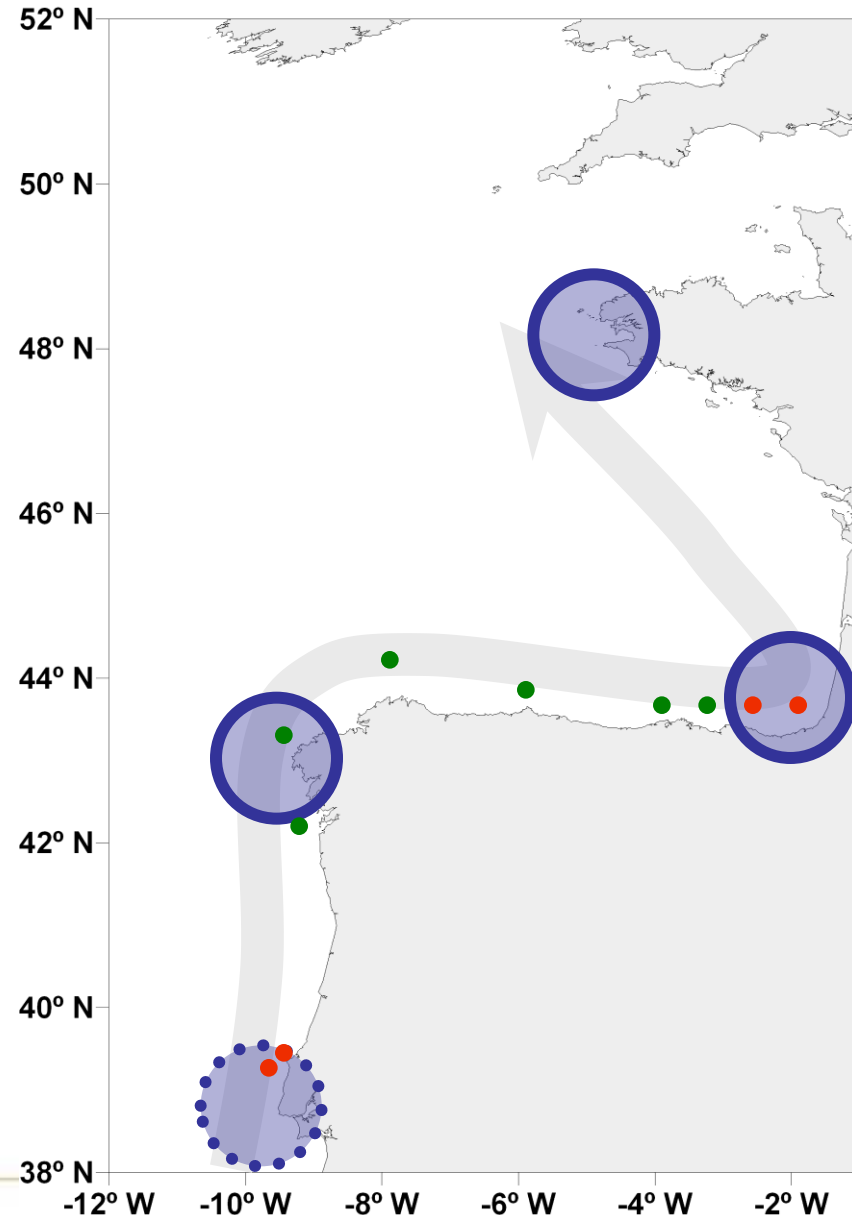
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Summary / next steps

Main ideas

- Process oriented validation
- Focus on surface circulation
- IBI area integrated approach

Potential benefits

- Scientific <-> Operational
- Feedback for observing systems developments

Next steps

- Define key actors / systems
- Framework for progress

