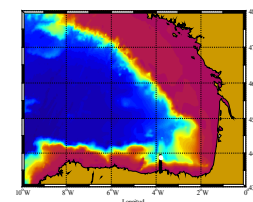
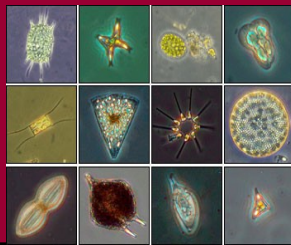


## High frequency subsurface and air-sea interface experiment in the southern Bay of Biscay

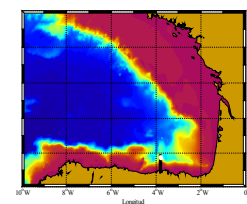
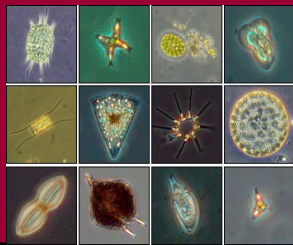
**R. Somavilla, R. Moran, C. Rodriguez, A. Lorenzo, A. Merino, A. Lavin and C. Barrera**





## High frequency subsurface and air-sea interface **experiment** in the southern Bay of Biscay

**R. Somavilla, R. Moran, C. Rodriguez, A. Lorenzo, A. Merino, A. Lavin and C. Barrera**

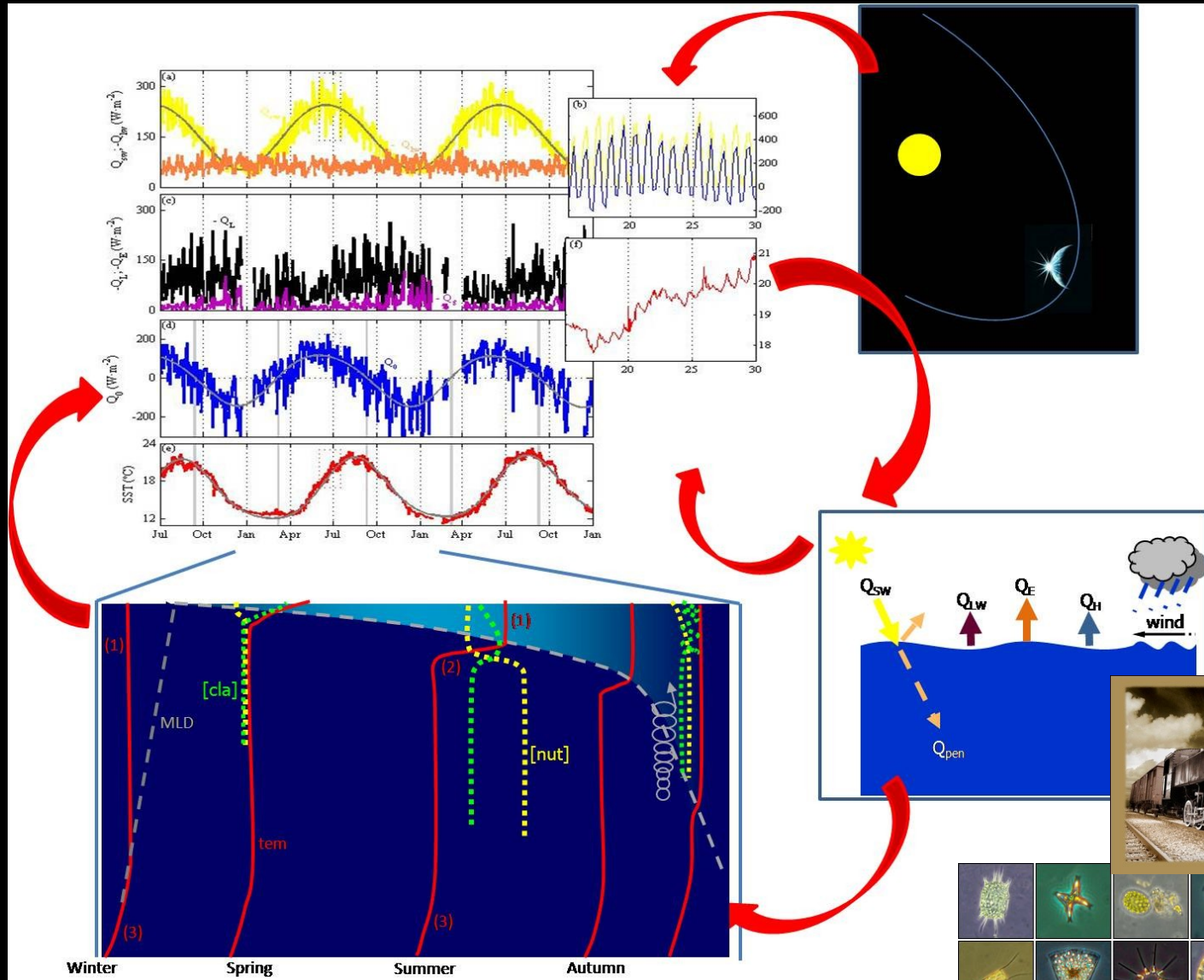


# Introduction

Atmosphere

Upper layers

Ocean Interior



Marine ecosystem and  
Global biogeochemical cycles

# Introduction

**This talk will present:**

**I. What we know.**

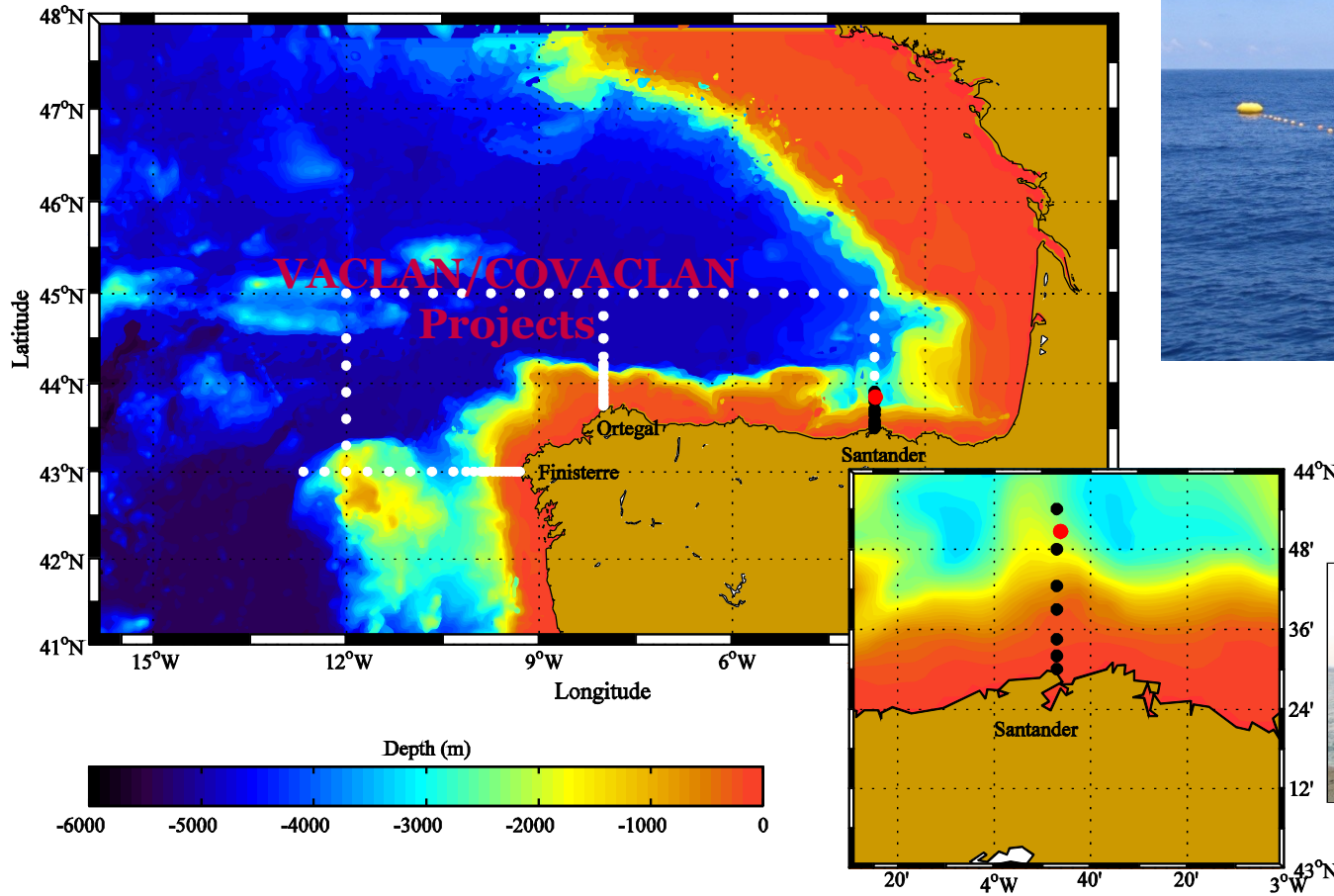
**II. Possible improvement of knowledge gaps.**

**About...**

- 1. Upper ocean dynamics and its forcing**
- 2. Some specific mesoscales features**



# IEO Monitoring Programs in the southern Bay of Biscay.



## AGL Buoy

[www.boya\\_agl.st.ieo.es/](http://www.boya_agl.st.ieo.es/)

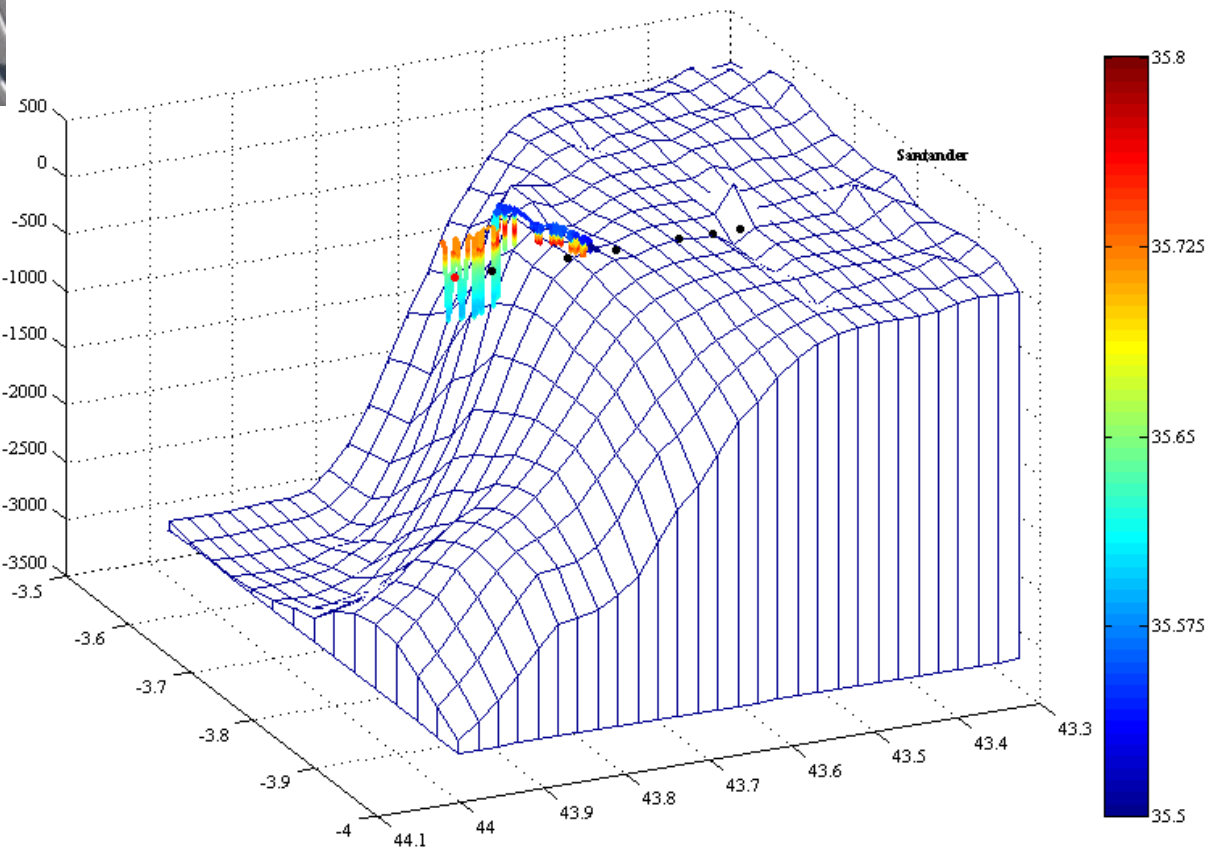
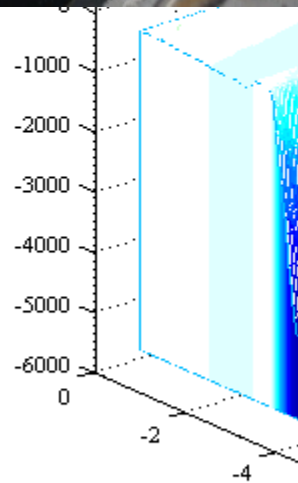
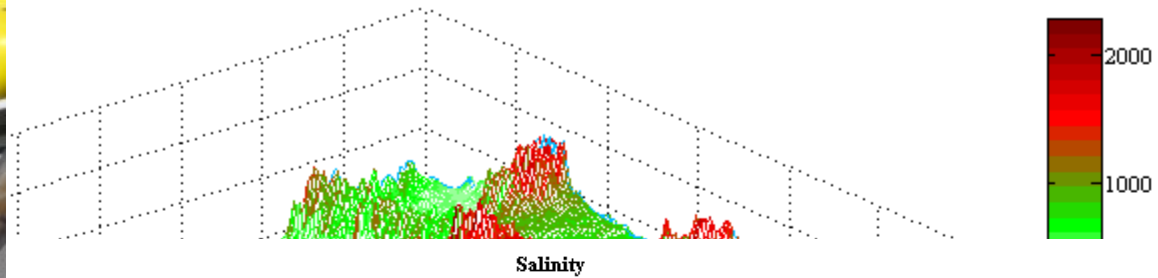


## Radiales Program

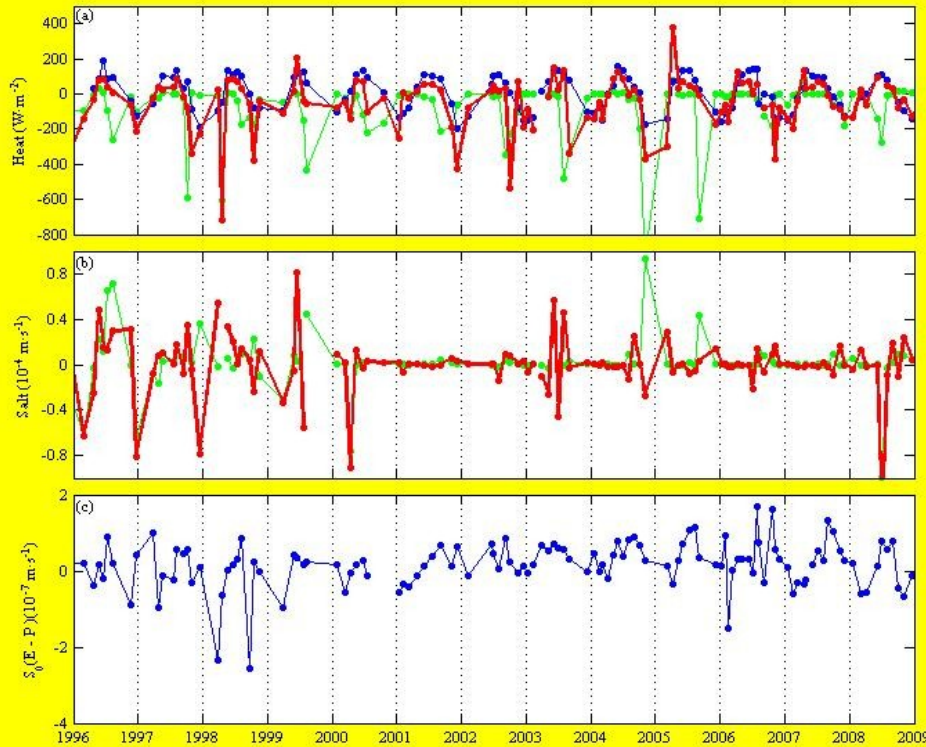


Position of the VACLAN/COVACLAN projects sections (white dots); Santander standard section (black dots); and AGL buoy (red dot) in the Bay of Biscay and Eastern Atlantic margin.

# Experimental deployment of Slocum glider. 14 to 16 December.



# I. Upper ocean dynamics and its forcing. What we know.



Clear seasonal cycle on heat balance terms not observed in salt balance terms

$$Q_{strg} \approx Q_o + Q_{mix}$$

Correspondence between  $S_{strg}$  and  $S_{mix}$

$$S_{strg} > 10 \cdot S_{air-sea}$$

(a) Heat storage ( $Q_{strg}$ ), net heat flux ( $Q_o$ ) and entrainment term ( $Q_{mix}$ ) calculated at the Santander section from 1996 to 2009. (b) Salt storage ( $S_{strg}$ ) and entrainment term ( $S_{mix}$ ). (c) Idem for fresh water flux ( $S_{air-sea}$ ).

# I. Upper ocean dynamics and its forcing. What we know.

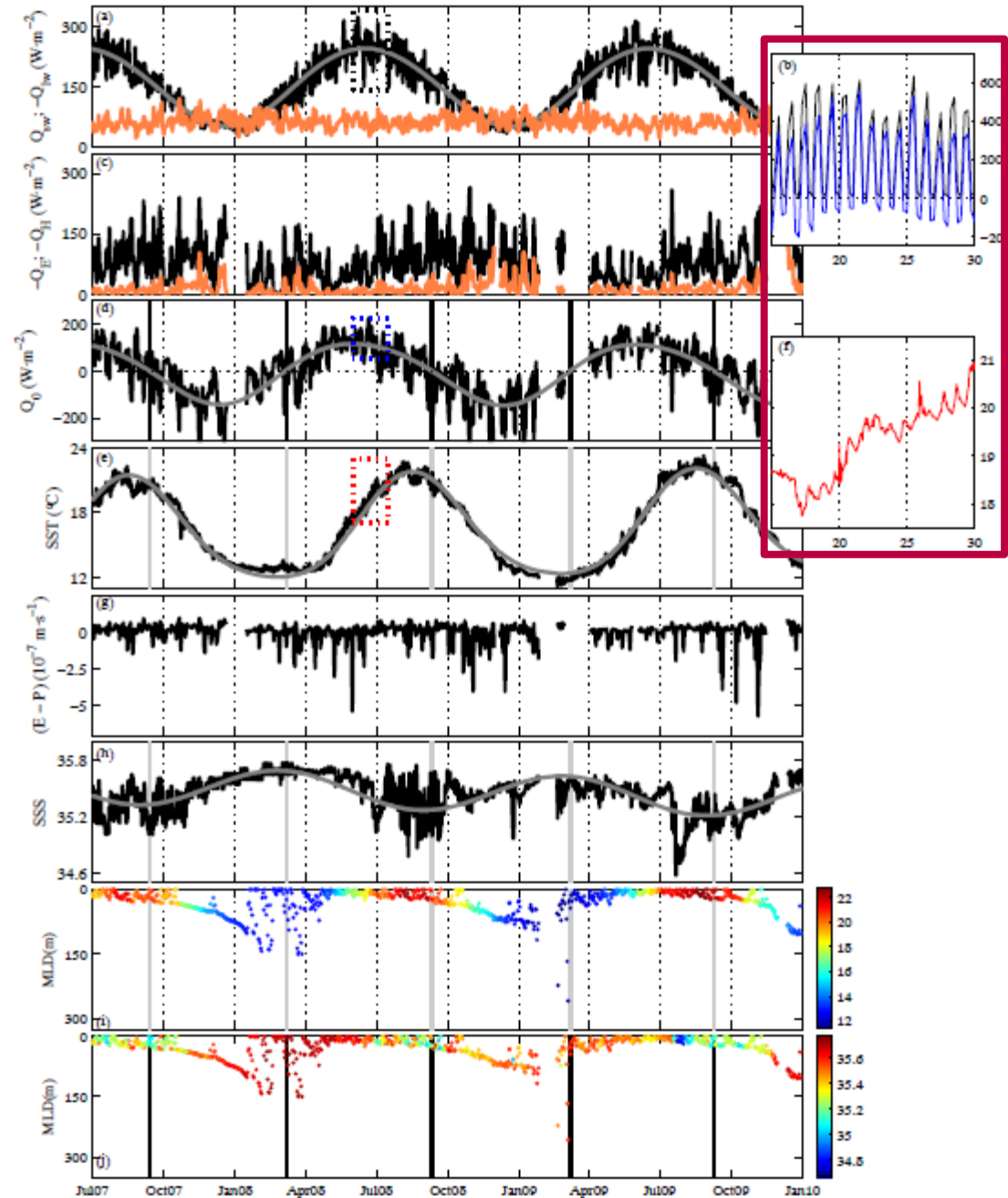
$Q_0$  governs SST  
and MLD variability



Through this control on mixing, indirectly  
 $Q_0$  also governs SSS seasonal cycle



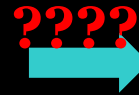
Sair-sea and  $S_{mix}$  responsible for  
seasonal cycle SSS variability





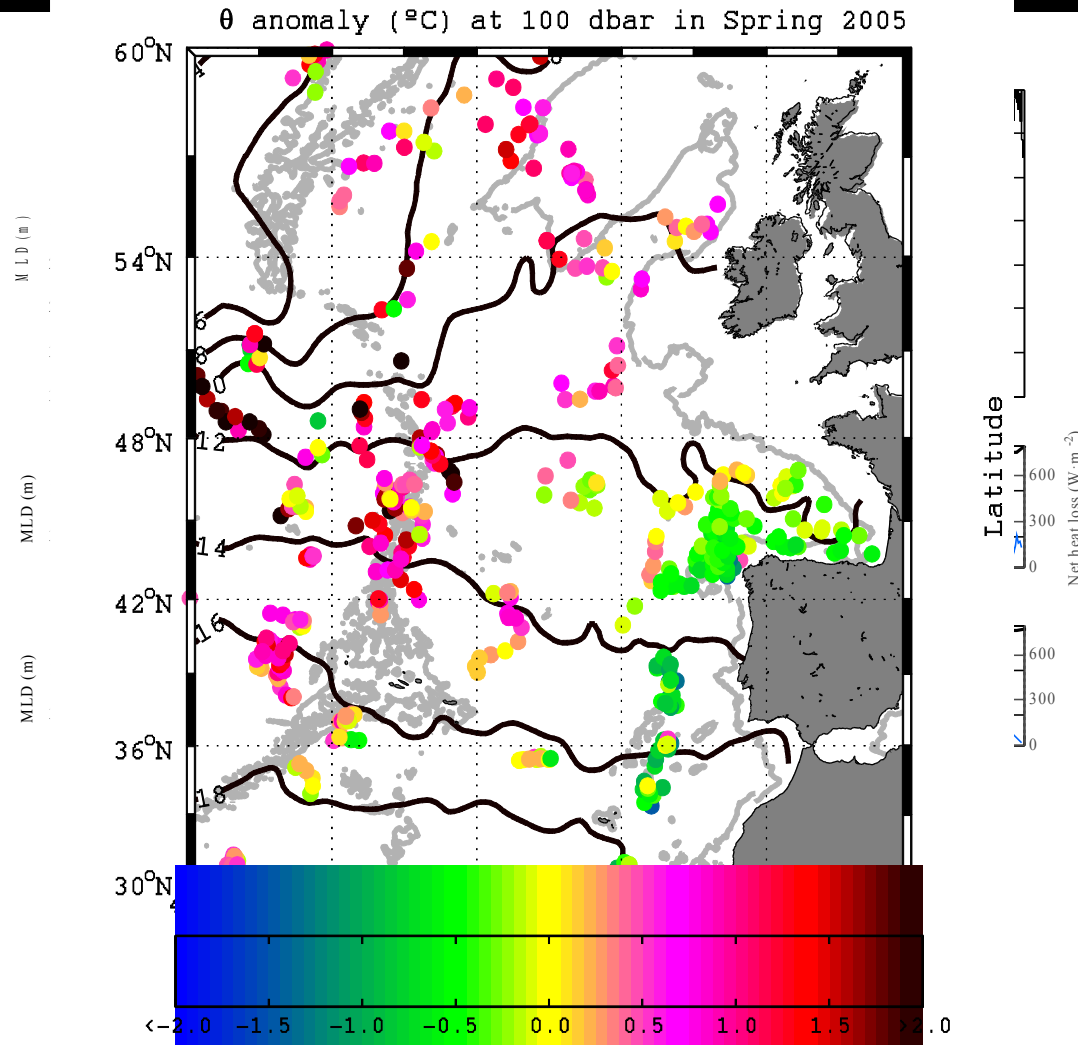
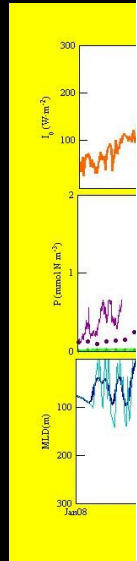
# I. Upper ocean dynamics and its forcing. Improvement of knowledge gaps.

Shorter scales of variability  
account for a large portion of  
sea surface variability



What about  
subsurface variability?

The missing of these  
of variability can lead to  
errors when the  
upper ocean processes  
climate system is  
global scale

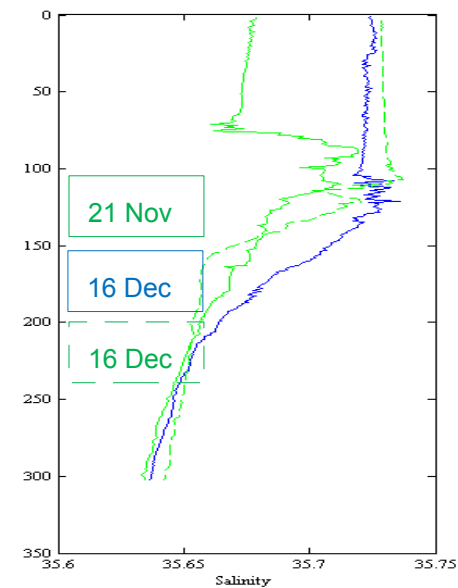
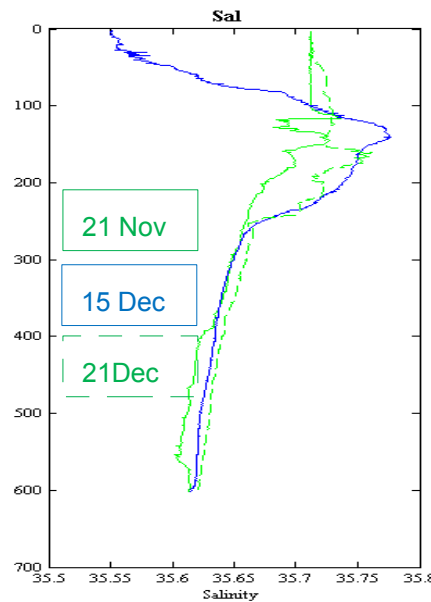
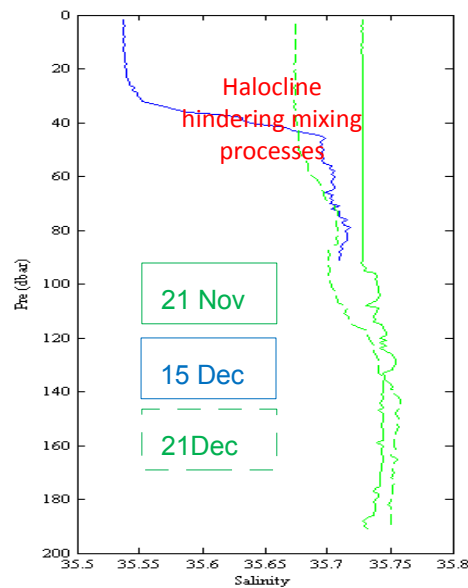
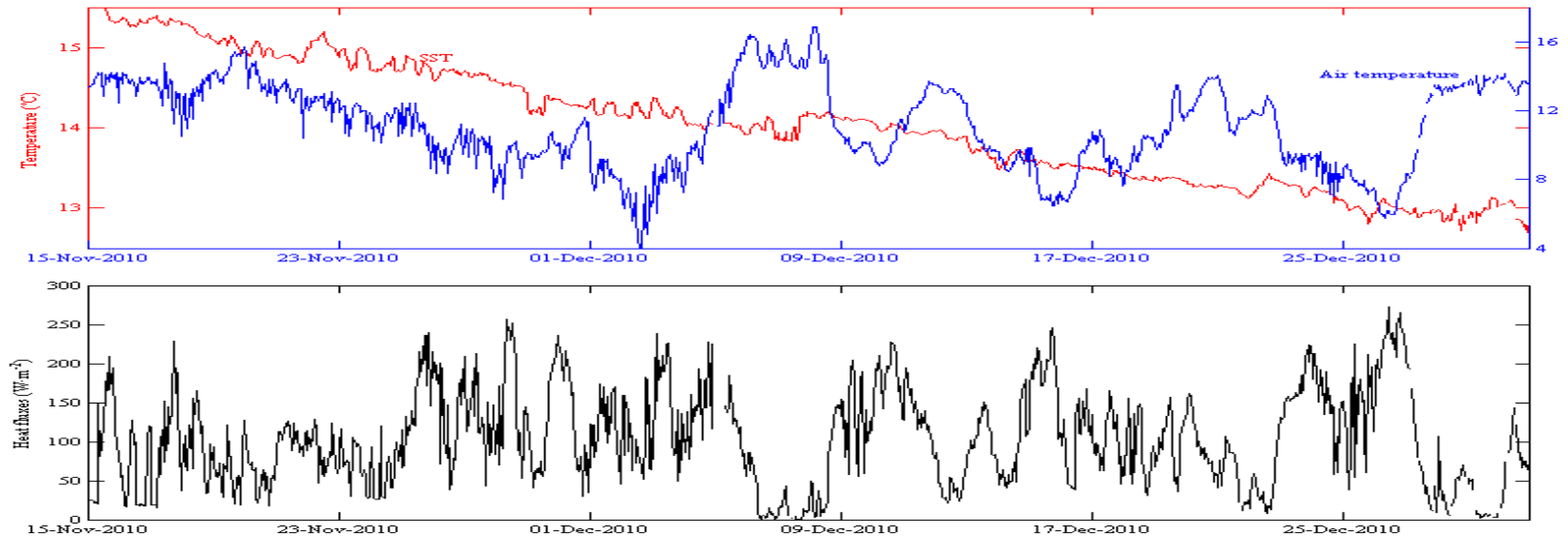


...city to reproduce  
...nkton variability at  
...l timescales



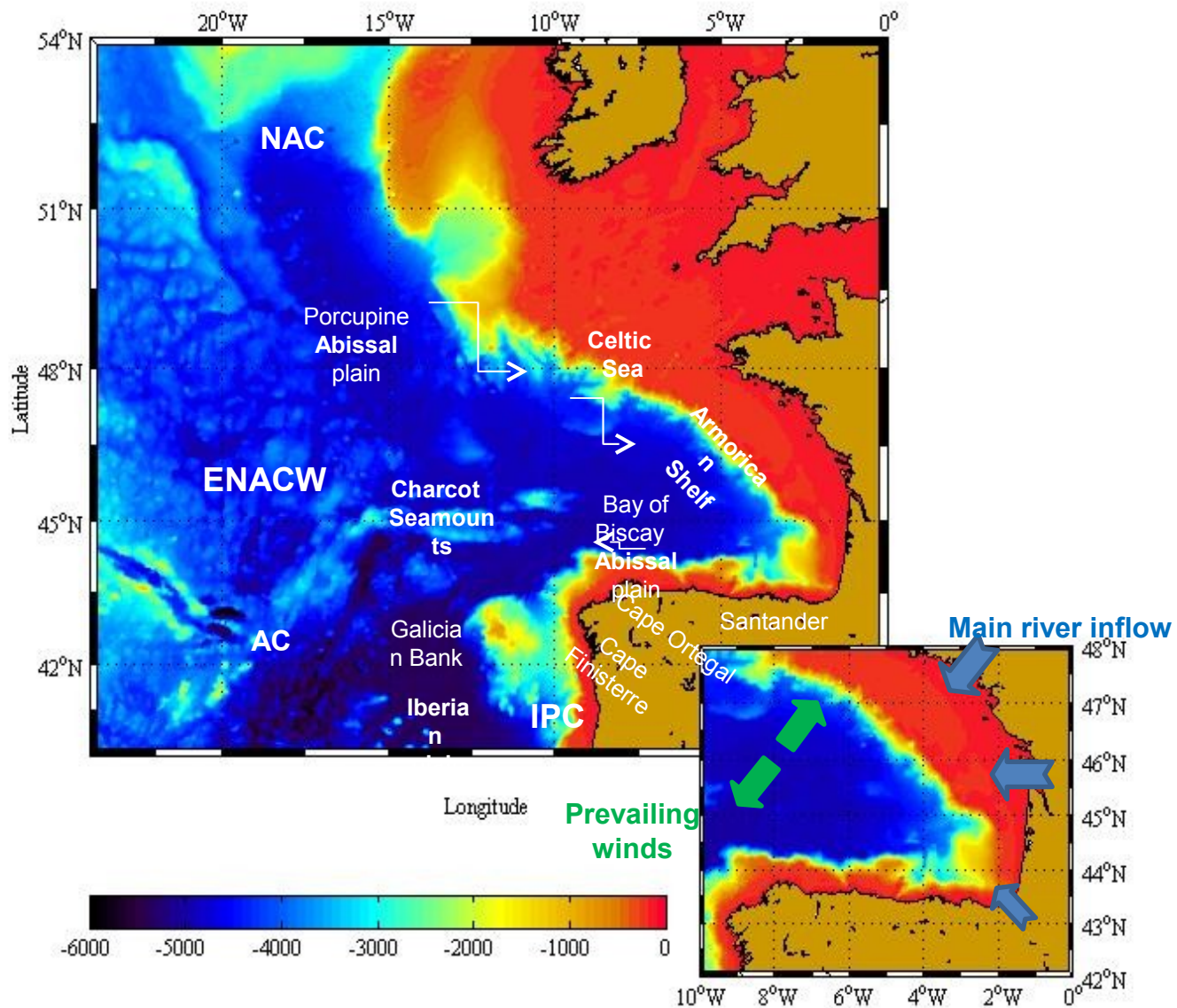
reduction of the  
... of the whole  
phytoplankton

# I. Upper ocean dynamics and its forcing. Improvement of knowledge gaps.



## II. Mesoscale features in the southern Bay of Biscay. What we know.

### The poleward current

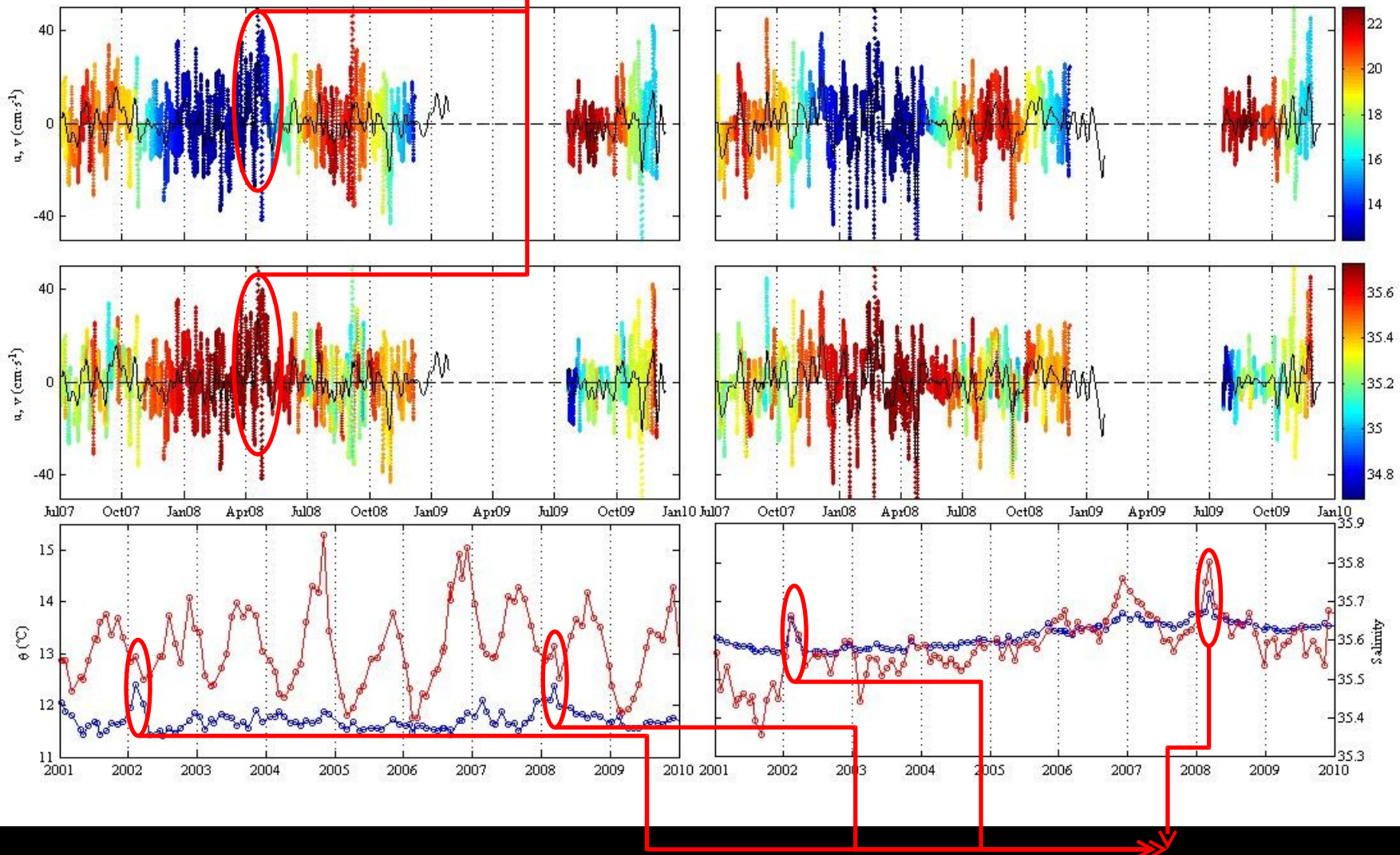




## II. Mesoscale features in the southern Bay of Biscay. What we know.

### The poleward current

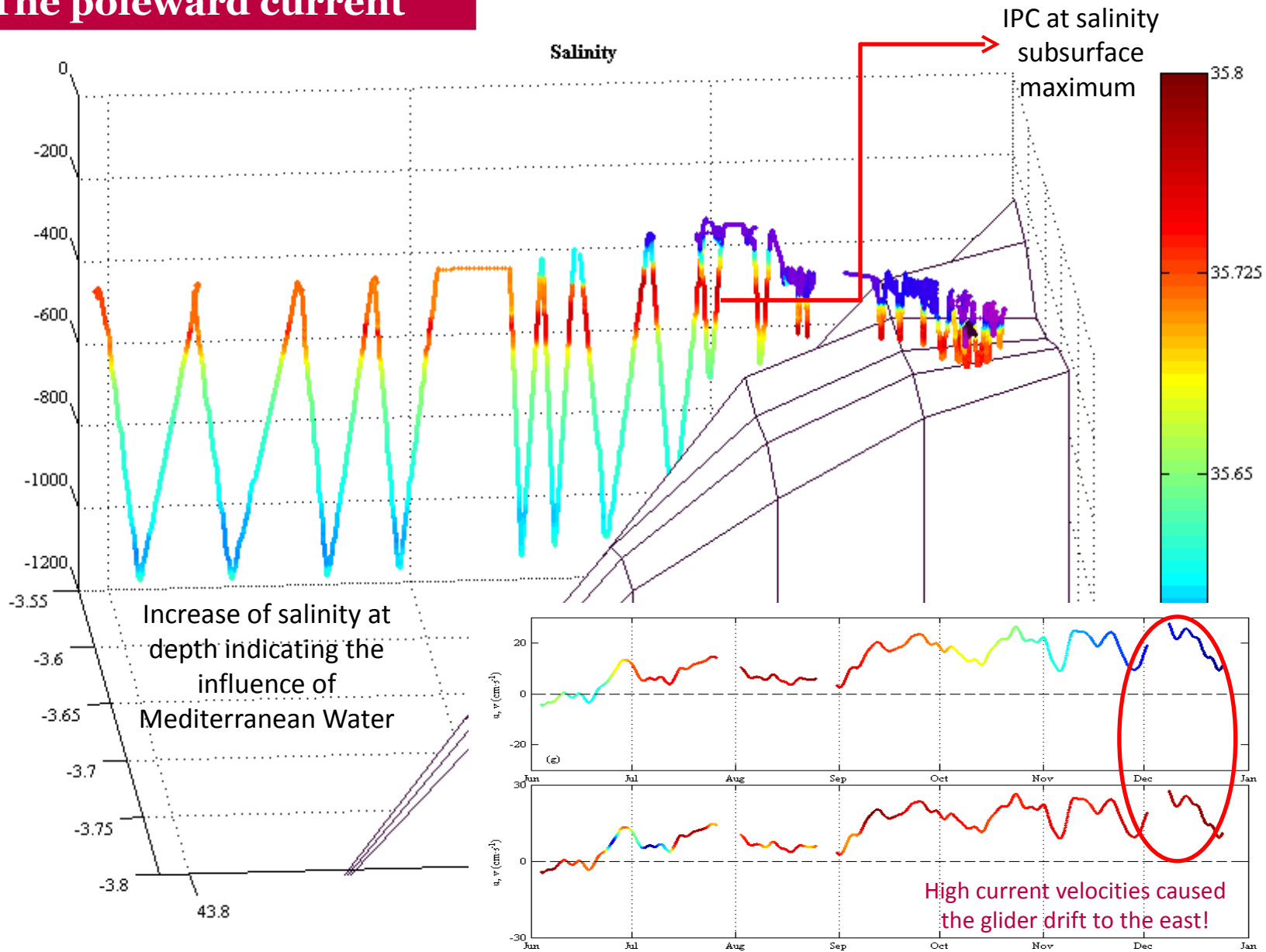
Also observed with lower signal in sea surface at AGL position



Signals of IPC intrusions on upper water temperature and salinity over the slope (anomalies of  $0.2^{\circ}\text{C}$  and  $0.15$  respectively)

## II. Mesoscale features in the southern Bay of Biscay. Improvement of knowledge gaps.

### The poleward current



## II. Mesoscale features in the southern Bay of Biscay. Improvement of knowledge gaps.

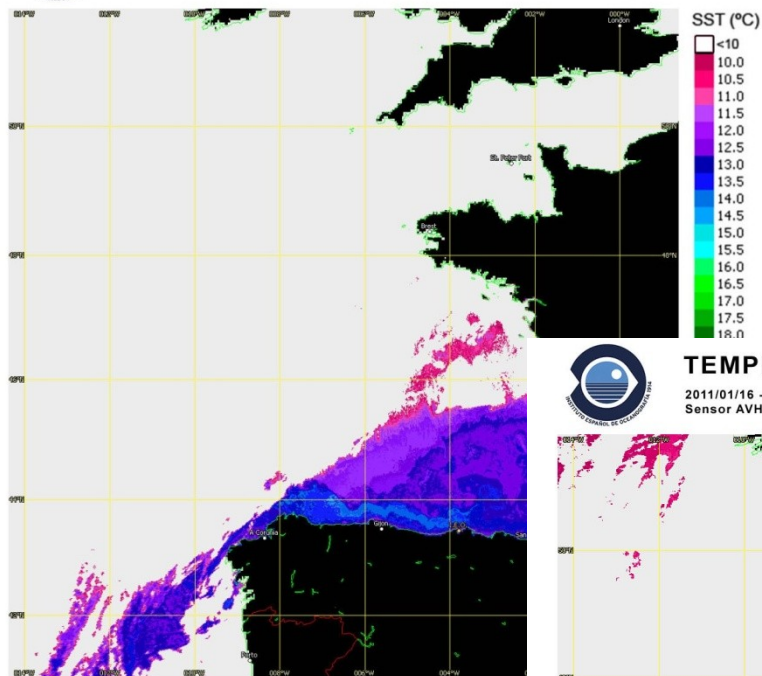
### The poleward current



#### TEMPERATURA SUPERFICIAL DEL MAR

2011/01/15 - 13:16h (GMT +00).  
Sensor AVHRR (NOAA-18)

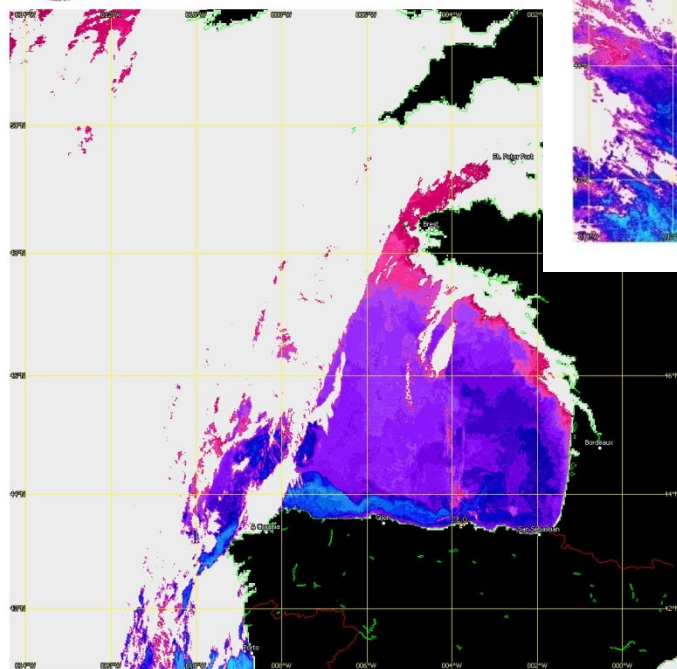
IEO-Centro Oceanográfico de Santander  
Departamento de Teledetección Espacial



#### TEMPERATURA SUPERFICIAL

2011/01/16 - 02:25h (GMT +00).  
Sensor AVHRR (NOAA-19)

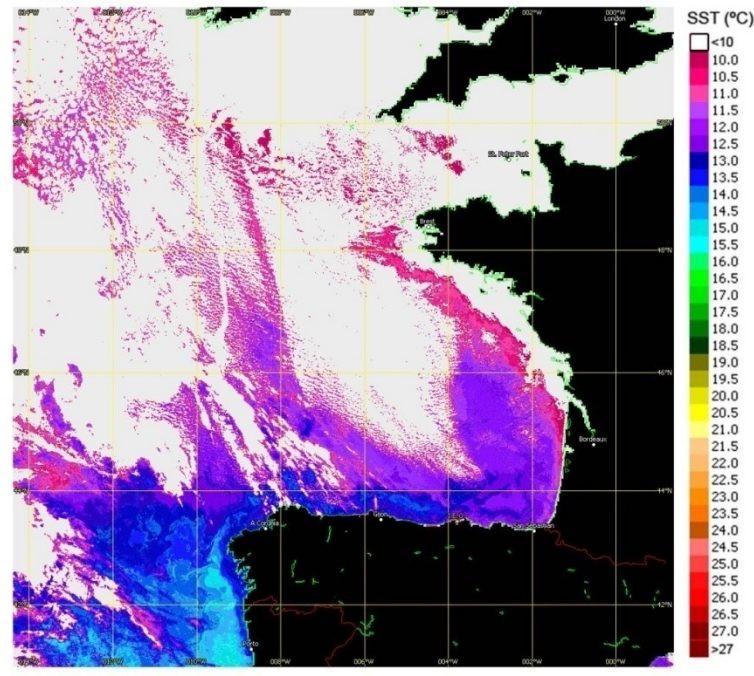
IEO-Centro Oceanog  
Departamento de Teli



#### TEMPERATURA SUPERFICIAL DEL MAR

2011/01/20 - 14:03h (GMT +00).  
Sensor AVHRR (NOAA-18)

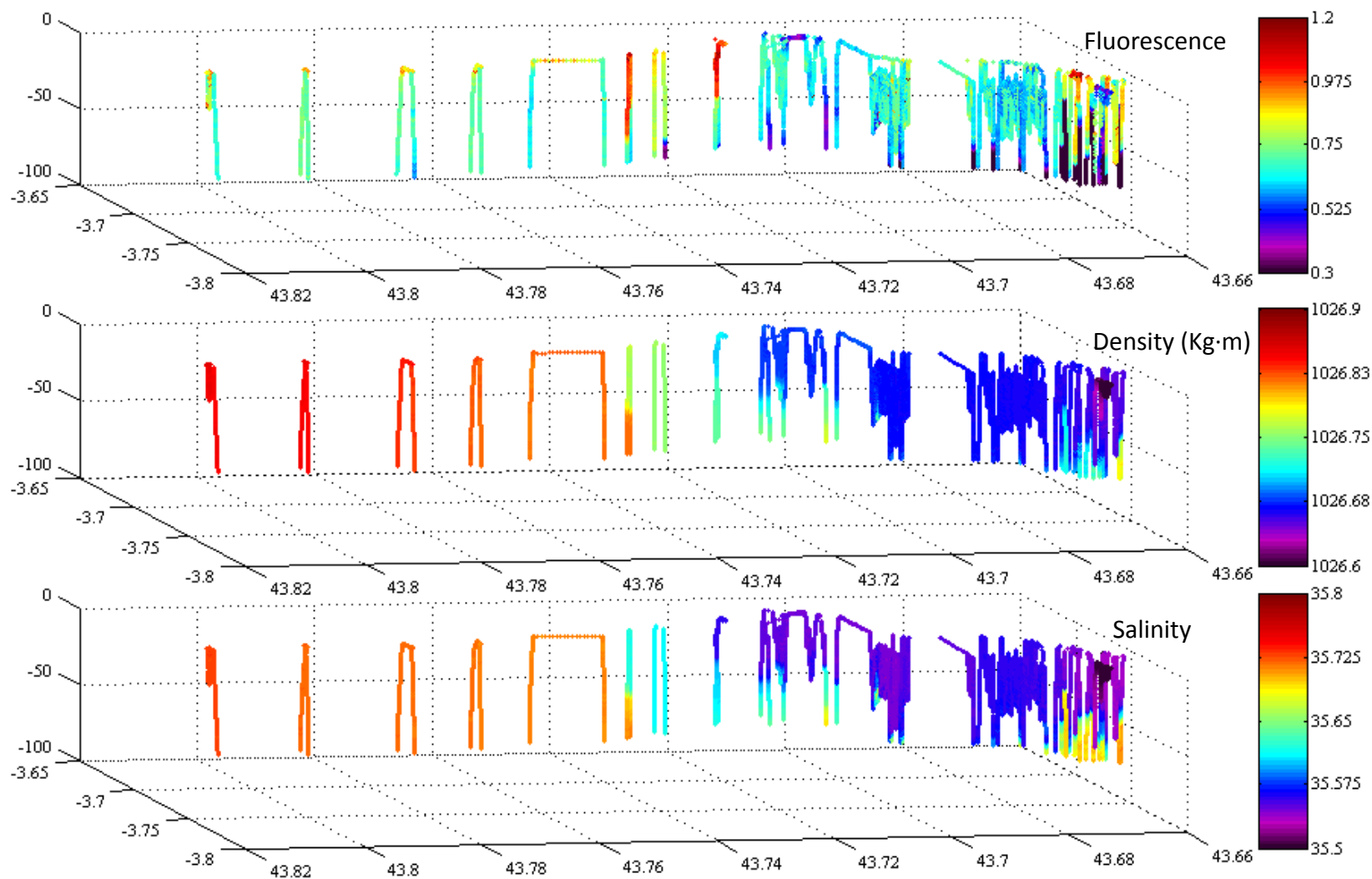
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## II. Mesoscale features in the southern Bay of Biscay. Improvement of knowledge gaps.

### Frontal structures



Many thanks for your attention