GESSEB MISSION
Preliminary results

EPIGRAM WORKSHOP

16-18 OCTOBER 2013 (ÎLE DE RÉ)

MARINE RESEARCH DIVISION

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Introduction

- Funded by the First call of the JERICO TNA (TRANS NATIONAL ACCESS)
- Stationary SWODDY : During winter, an anticyclonic eddy is generated in the SE Bay of Biscay that instead of migrate, remains between 3°W and 4°W for several months (Pingree and Le Cann,1992).
- A recent analysis of a time series of satellite altimetry maps, Sea Surface Temperature and chlorophyll maps, a drifter and outputs from ROMS simulations, in the framework of the ESTIBB project, suggests that these stationary eddies could be generated in the bathymetric and discontinuities of the CapBreton canyon system, or further to the east, between this canyon and the Ajo and Mayor Capes (Caballero et al., in press).
- Besides this, there are evidences that indicate that these eddies retain plankton, including differentiated densities of ichthyoplankton (early development stages of different fish species spawning in this area).

Objectives

- Analyzing a 3D characteristics of a mesoscale eddy.
- To know in detail the vertical structure of the eddy and its evolution during the two months of the campaign.
- If the stationary eddy is not sampled (not been developed or not able to see it in remote sensing maps), the campaign will permit:
    - to sample in detail the vertical structures of the water column (stratification, thermocline…) over the shelf-slope area in a period which is especially interesting regarding the biological cycle of some of the key species for the fishery activity.

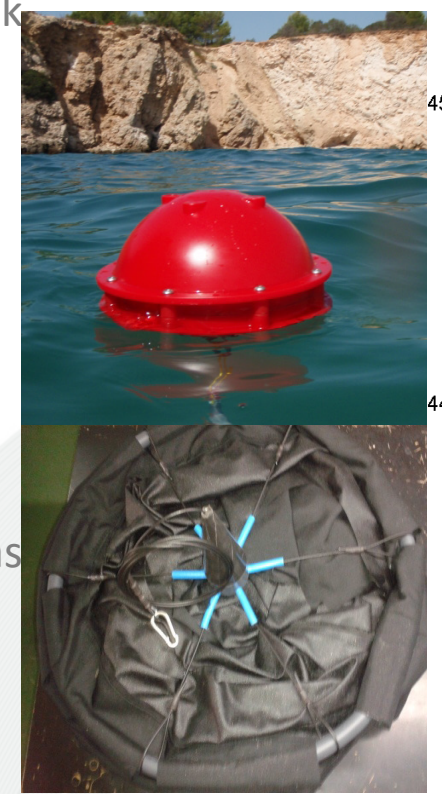
Data and Methods

Glider

- Campe: Slocum-1000 type glider; from the INSU-CNRS; CTD, dissolved oxygen, and fluorescence-turbidity sensors.
- Real time data transmission every surfacing event (~4h)
- Deployment position: Around 43.64ºN 2.69ºW (Matxitxako B.)
- Mission period: 23 July-23 September

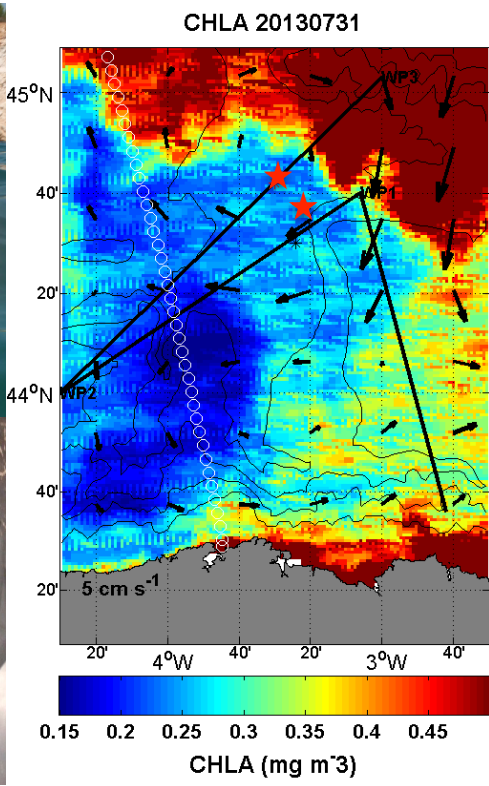
Drifters

- 2 Ocean drifter Iridium (Albatros) drifters with a holey sock drogue centred at 50 m depth.
- Deployment position: 44º42'N 3º30'W and 44º36'N 3º27'W
- Mission period: 5 August -27 August and 2 September



Satellite data/images (NRT)

- SST (AVHRR 1 km)
- Chlorophyll-a concentration (MODIS 1 km)
- Altimetry (geostrophic currents, merged): the NRT are not as reliable than delayed products (not available yet)



Sensor configuration of the Glider

Sensor configuration

CTD

- Sampling state: diving and climbing
- Sampling frequency: 1/8 Hz
- Sampling depths: 0-1000 m

OD

- Sampling state: diving and climbing
- Sampling frequency: 1/8 Hz
- Sampling depths: 0-500 m

FLNTU

- Sampling state: diving and climbing
- Sampling frequency: 1/8 Hz
- Sampling depths: 0-200 m

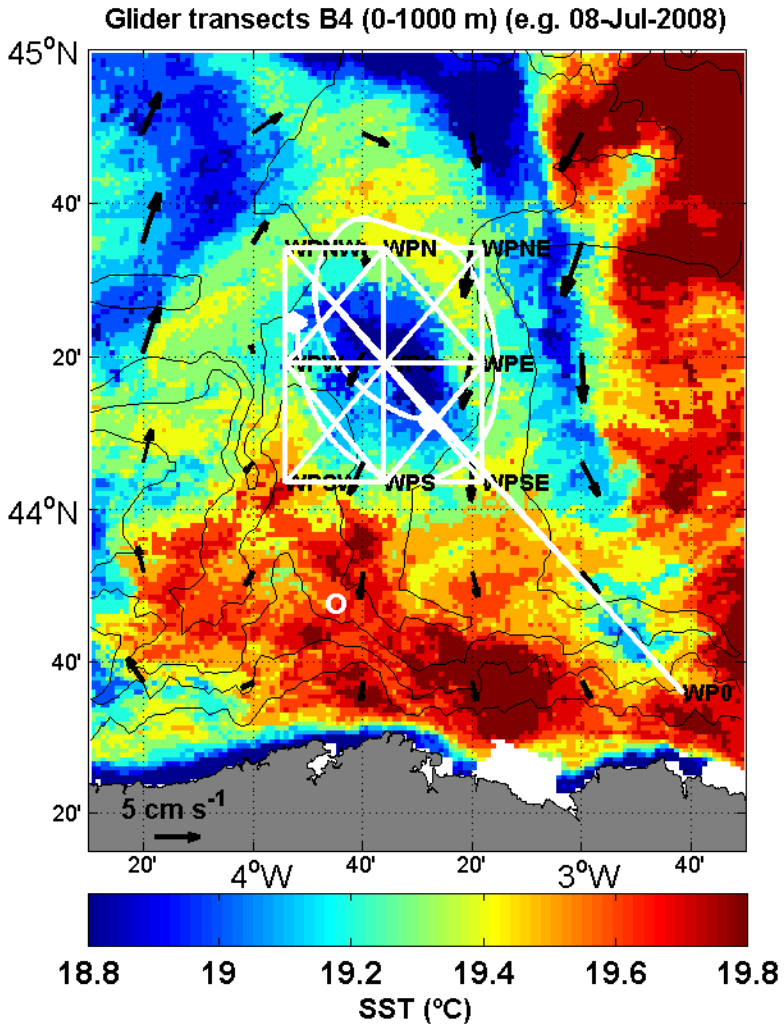
MISSION DESIGN

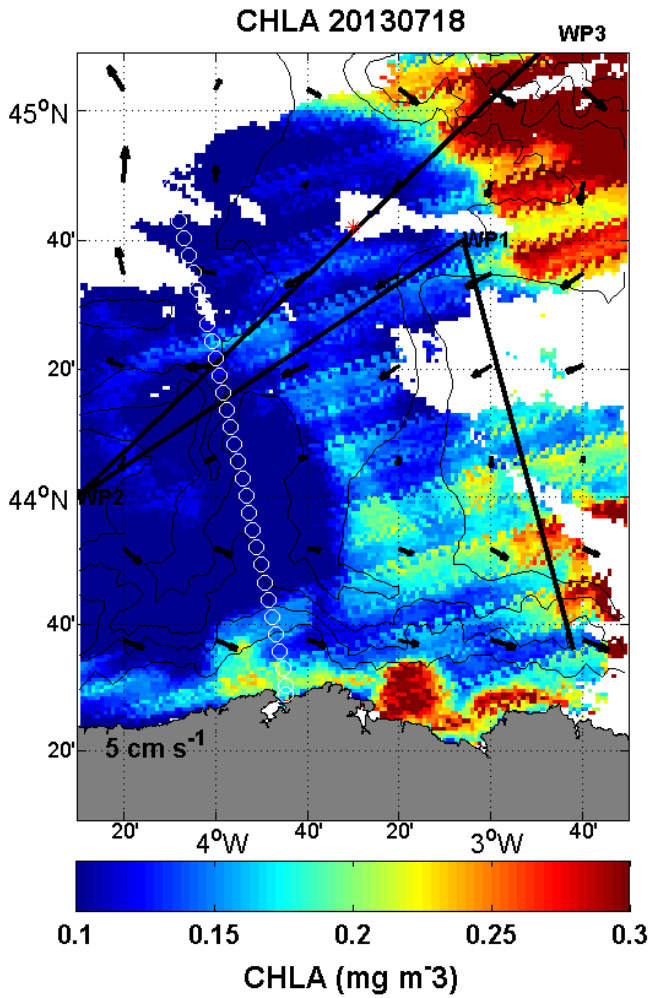
First design

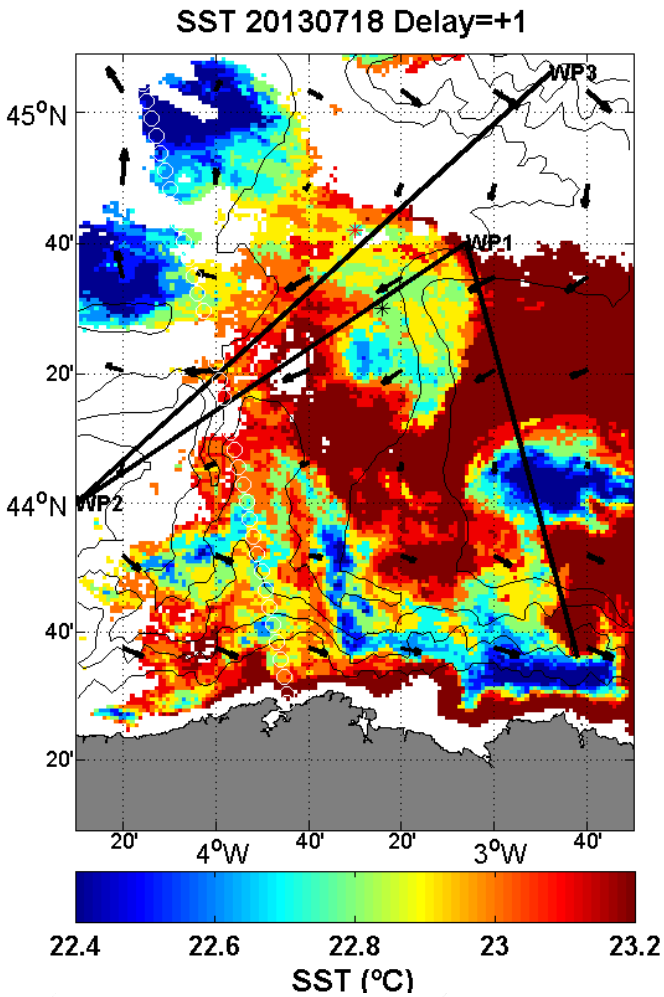
- 4 Rotating butterflies
- Inconveniences:
    - **Cloud coverage** during the weeks previous to the beginning of the campaign didn't allow to locate **the eddy**

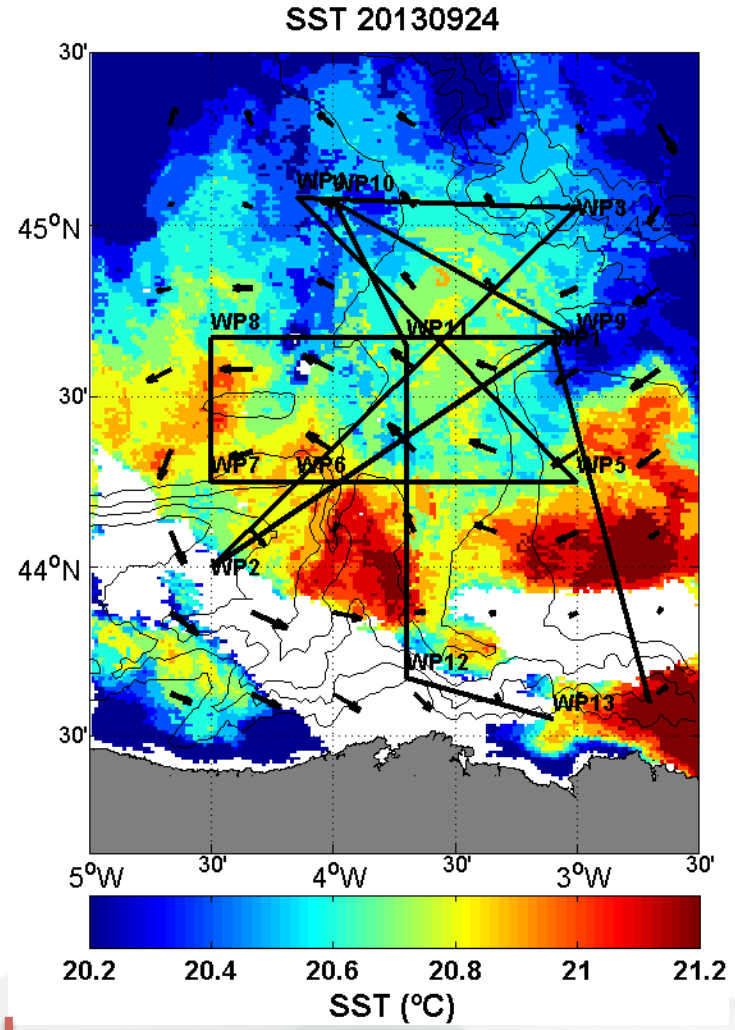
Final design

- Based on the first images
- Trying go cross 3 structures observed in chl-a and sst images
- During all the campaign the definition of the following WP was decided based on the information of:
    - Last glider measurements
    - Last satellite images
    - Drifters drift









First Images

Last Image

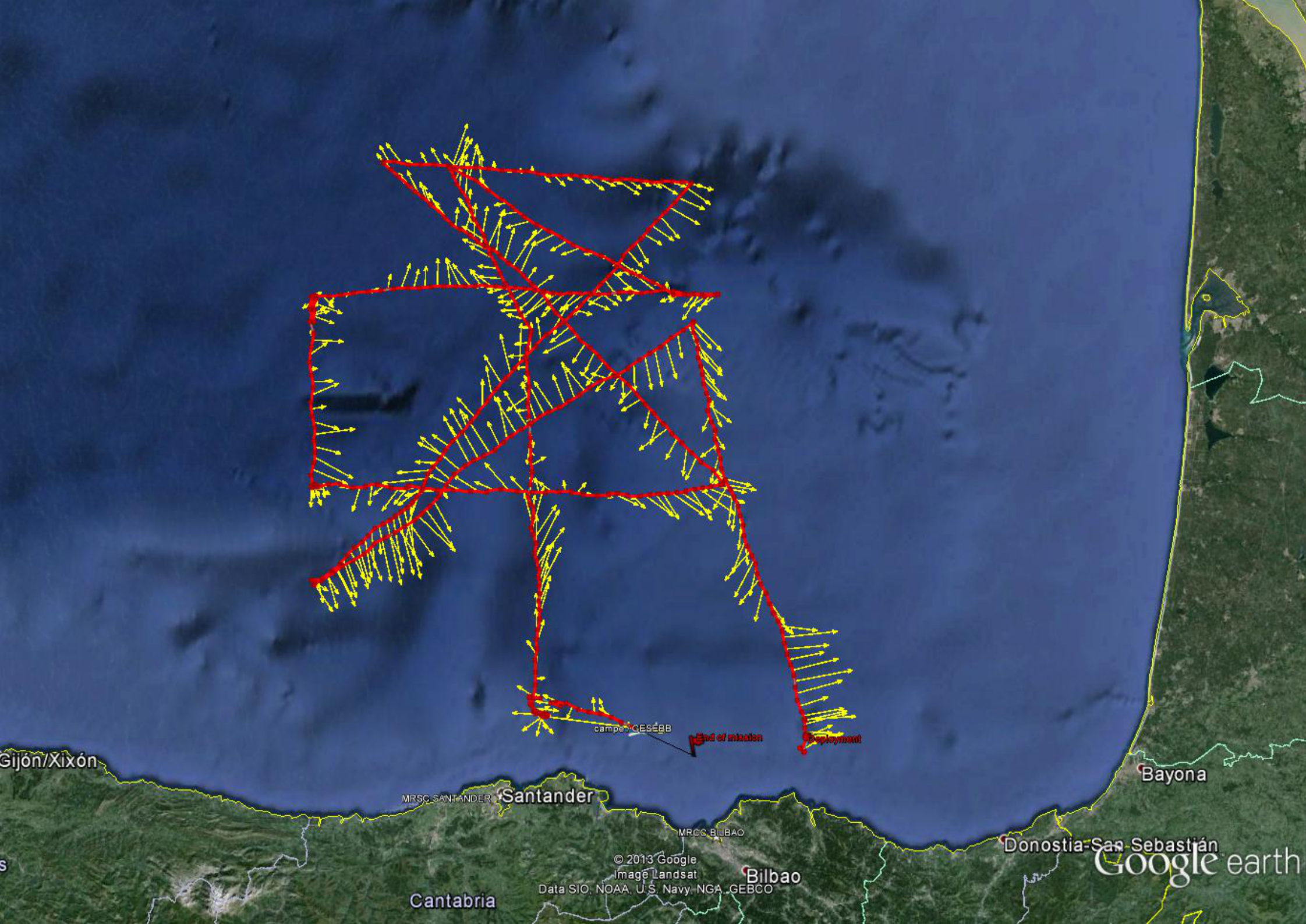

campaña CESEBB
End of mission
Deployment
Gijón/Xixón
MRSC SANTANDER
Santander
MRCC BILBAO
Bilbao
Cantabria
Bayona
Donostia-San Sebastián
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Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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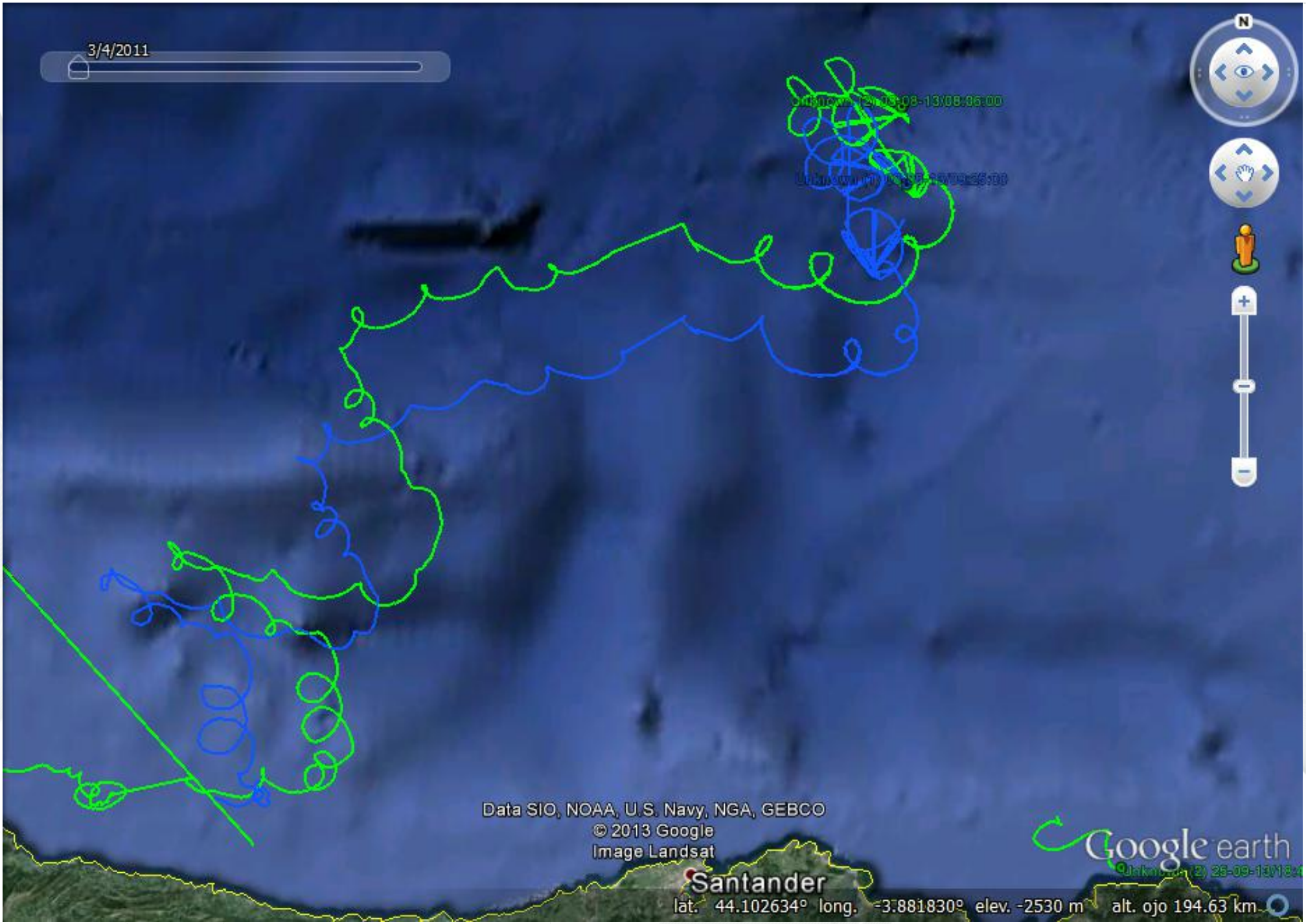
Drifters

5 AUGUST -27 AUGUST AND 2 SEPTEMBER

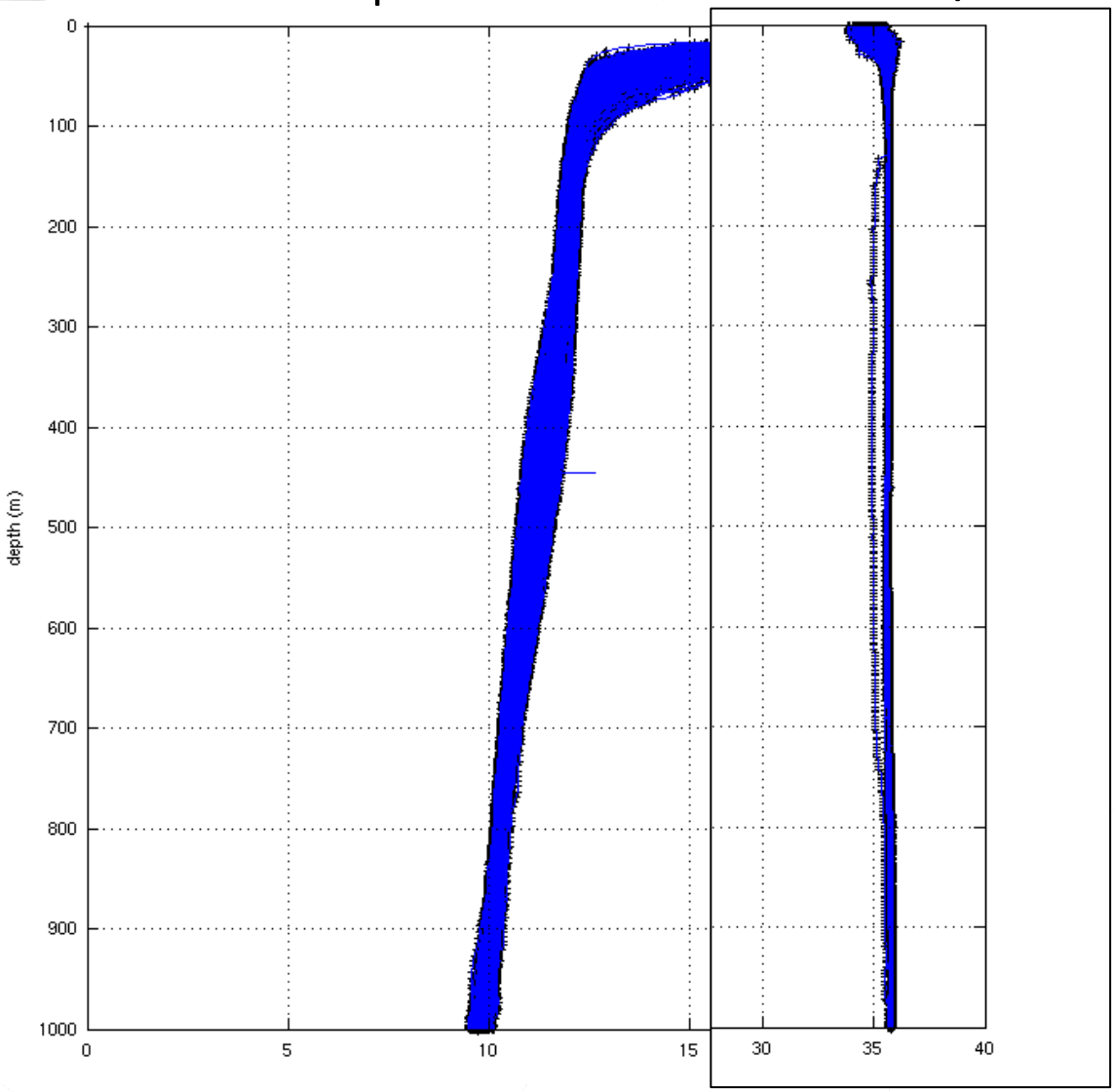


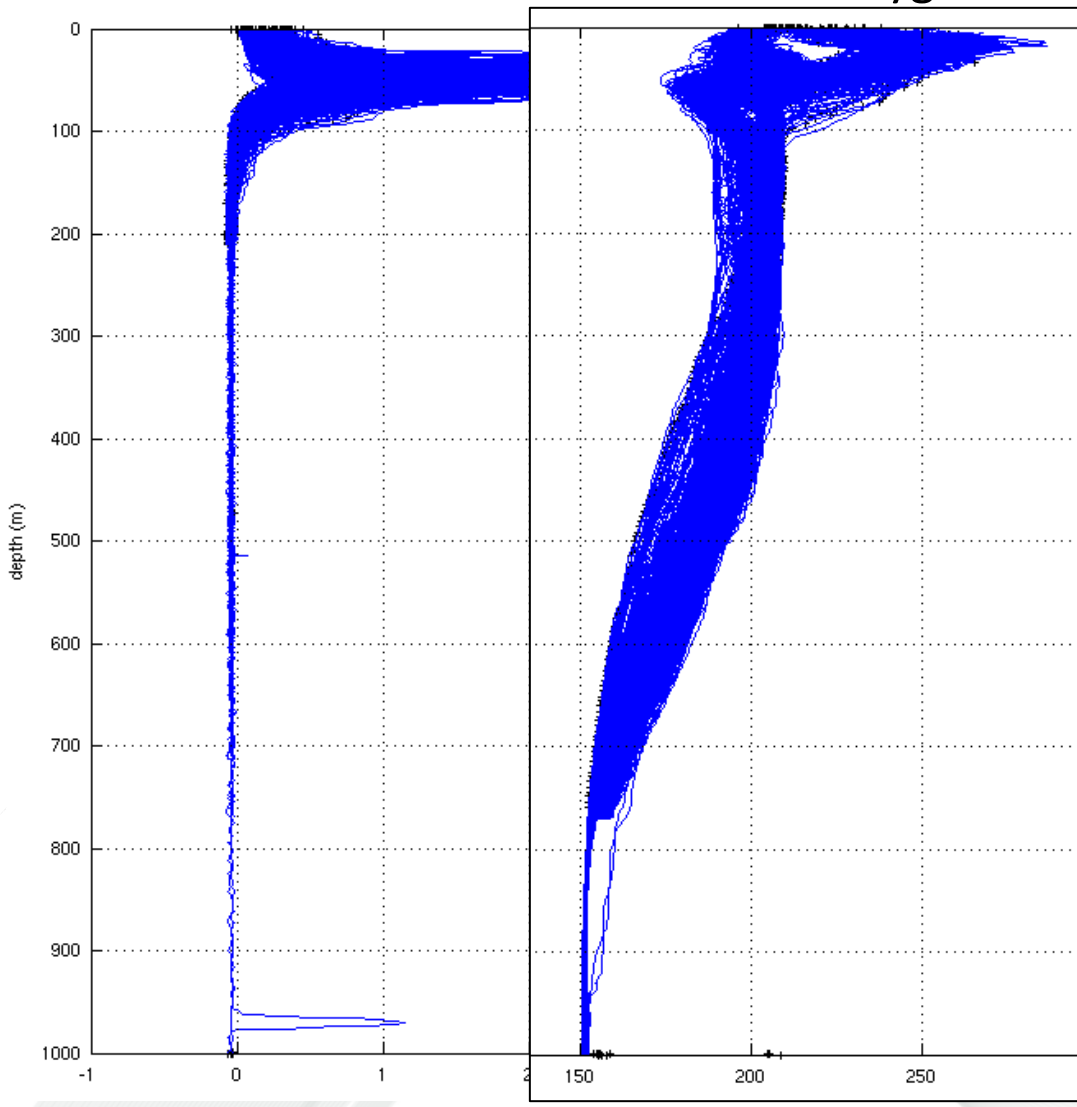
Potential temperature

Salinity

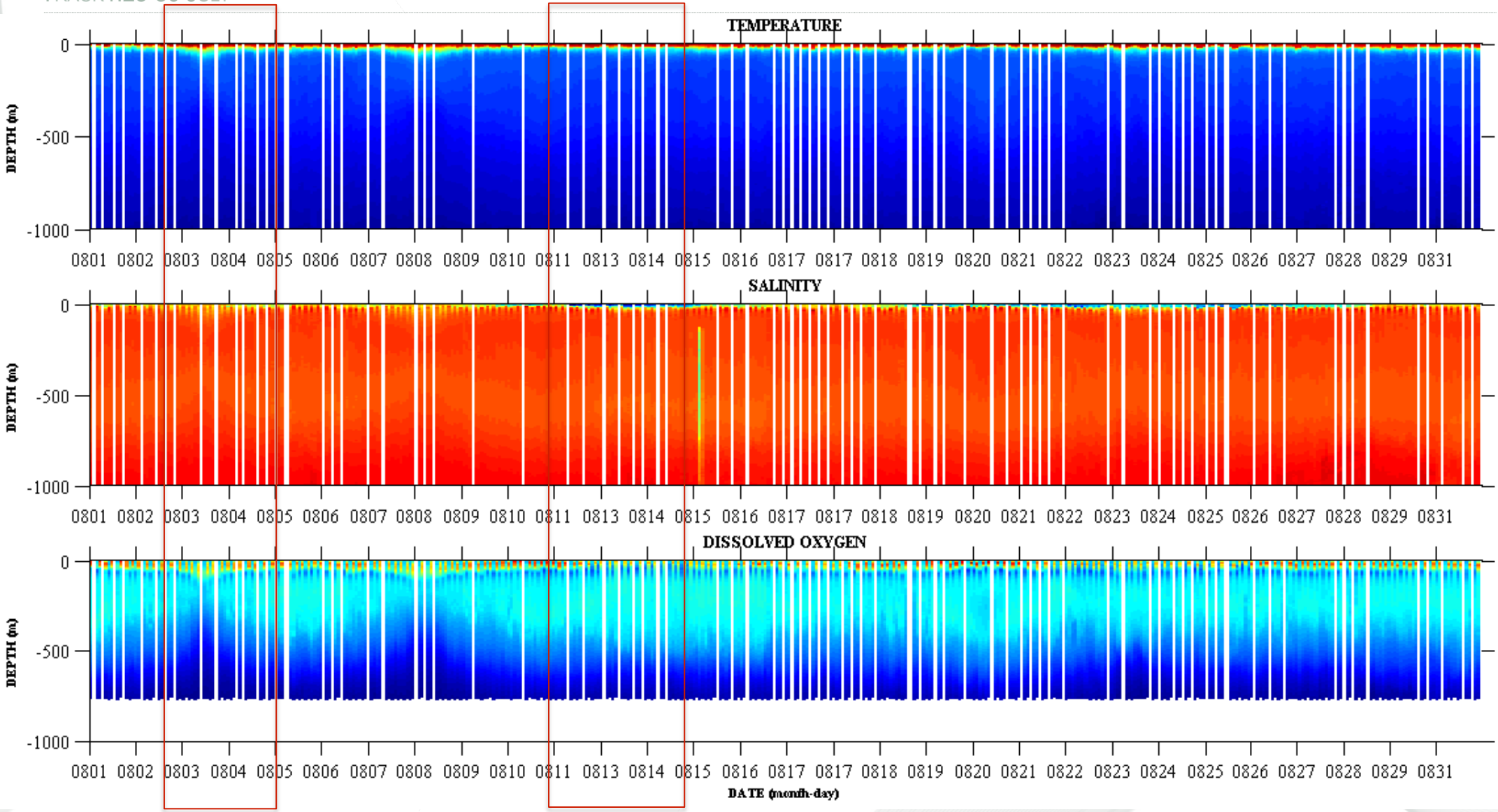
Fluorescence

Dissolved Oxygen





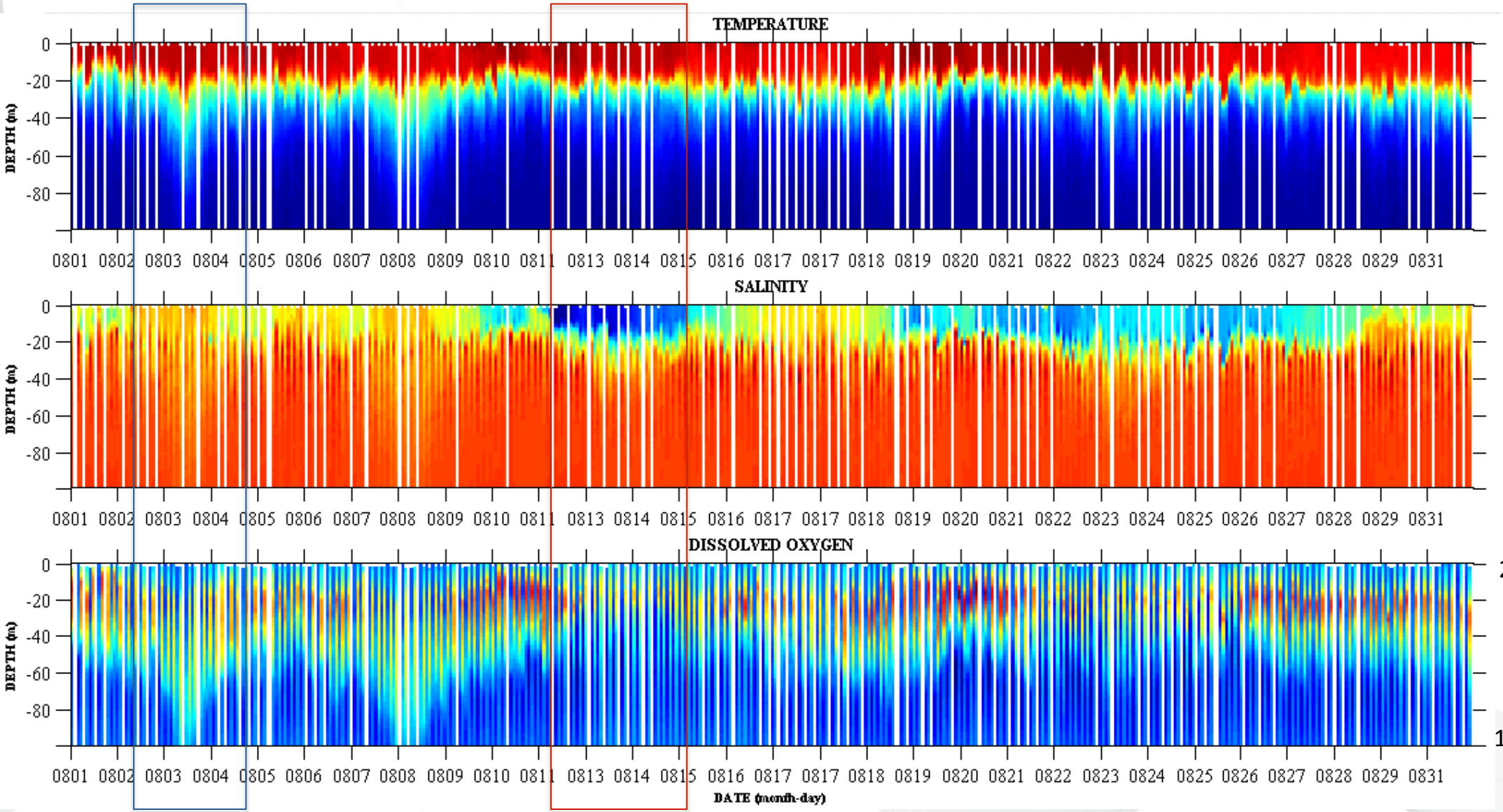
August 0-1000 m depth



Cyclone

Anticyclone

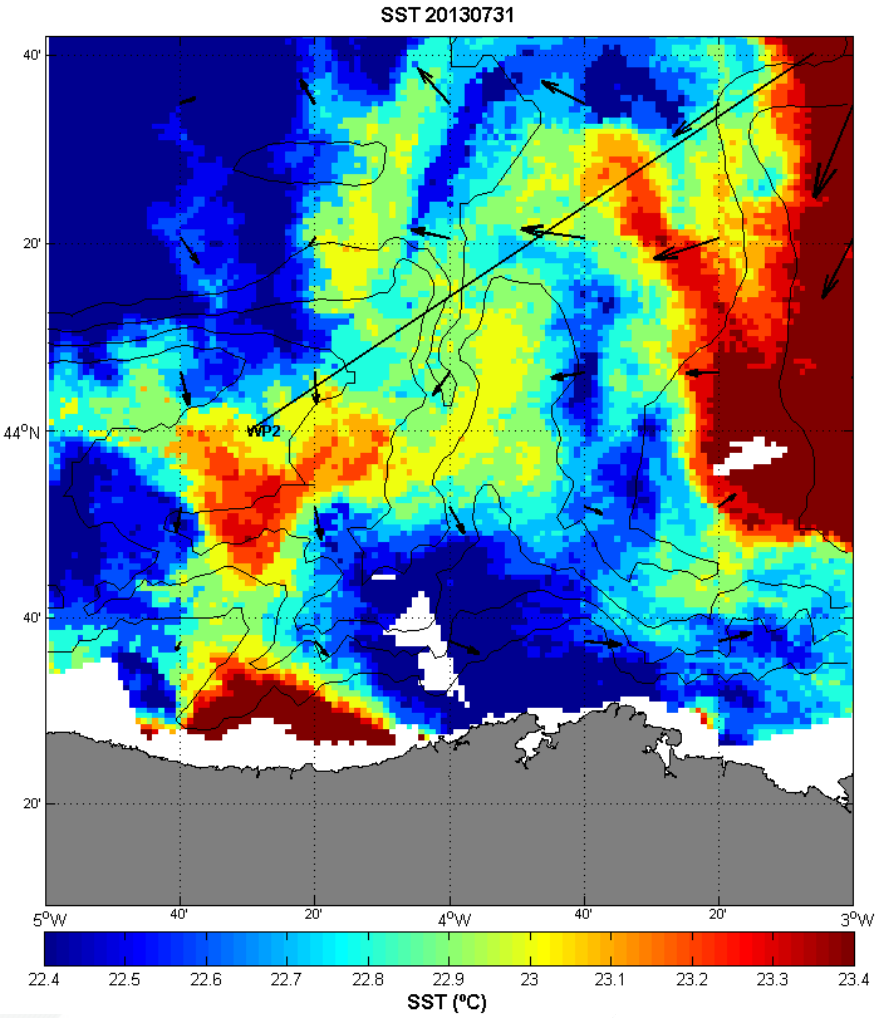
August 0-100 m depth

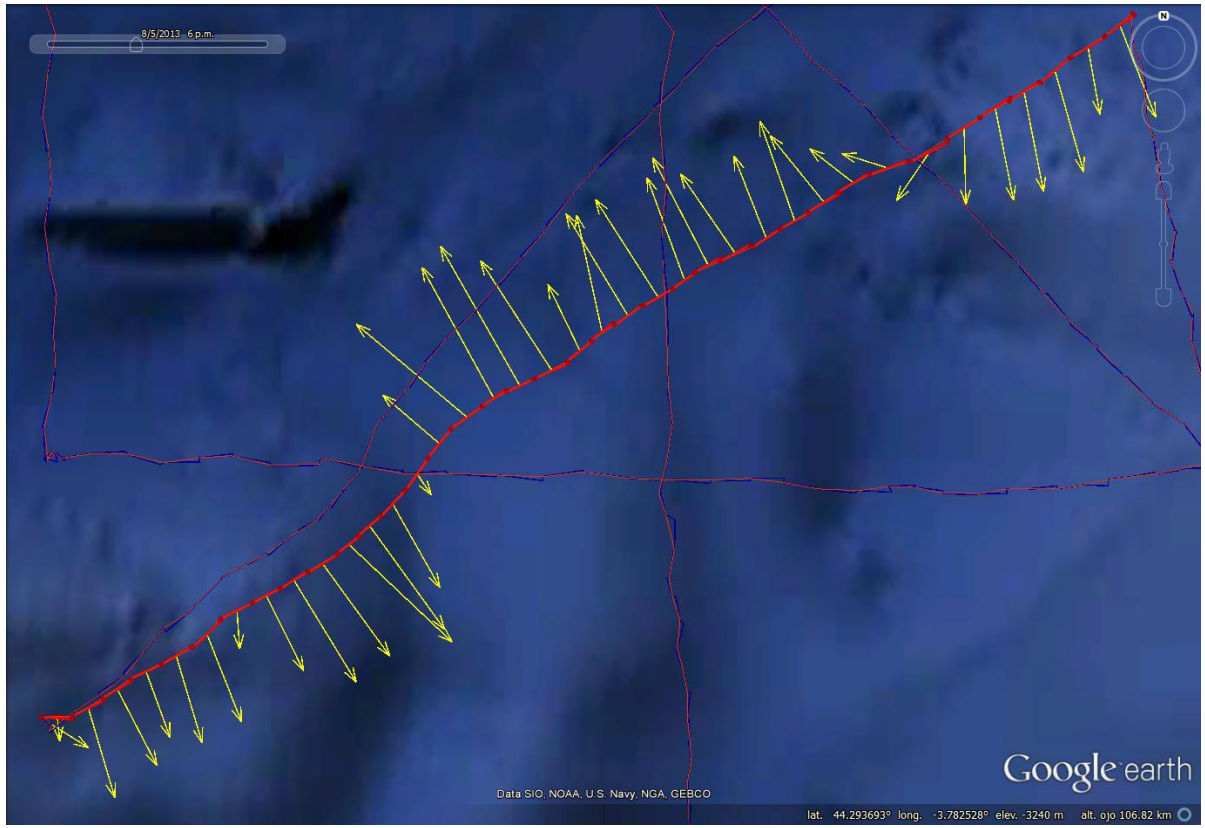


Cyclone

Anticyclone

TRACK2:30 JULY-5 AUGUST





Conclusions

- The glider crossed several times cyclonic and anticyclonic eddies.
- In the case of the crossed cyclones In the first part of the column (0-100 m) the isopicnals go up, whilst from 500 to 1000 m depth the isopicnals go down. The inverse pattern occurred in anticyclones.
- The eddies not only modify the horizontal distribution of chlorophyll but also in the vertical.
- The chlorophyll signal at depth is higher in anticyclones.
- The Dissolved Oxygen below the maximum chlorophyll.
- The drifters followed the anticyclone for several days, but in some point they left the structure and possible follow a cyclone…
- Maybe we must put the drogue centred at more than 50 m depth

Perspective

- When all the recorded data is available (vertically integrated velocity, turbidity…) a more rigorous and complete
- Analyze if the structures are always the same or we have measured different structures.
- Stationary or migratory
- Introduce more accurate altimetry data
- Look for cloud free visible and IR images
- Study the IPC extension the last winter

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