



atlas

UNDERSTANDING DEEP ATLANTIC ECOSYSTEMS



Circulation Pattern over North Atlantic Seamounts: Ormonde and Formigas

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Outline

1. Introduction

2. Methodology

3. Results

▪ **Overview**

▪ **Dynamics**

▪ **Hydrography**

4. Summary and discussion



1. Introduction

Seamounts

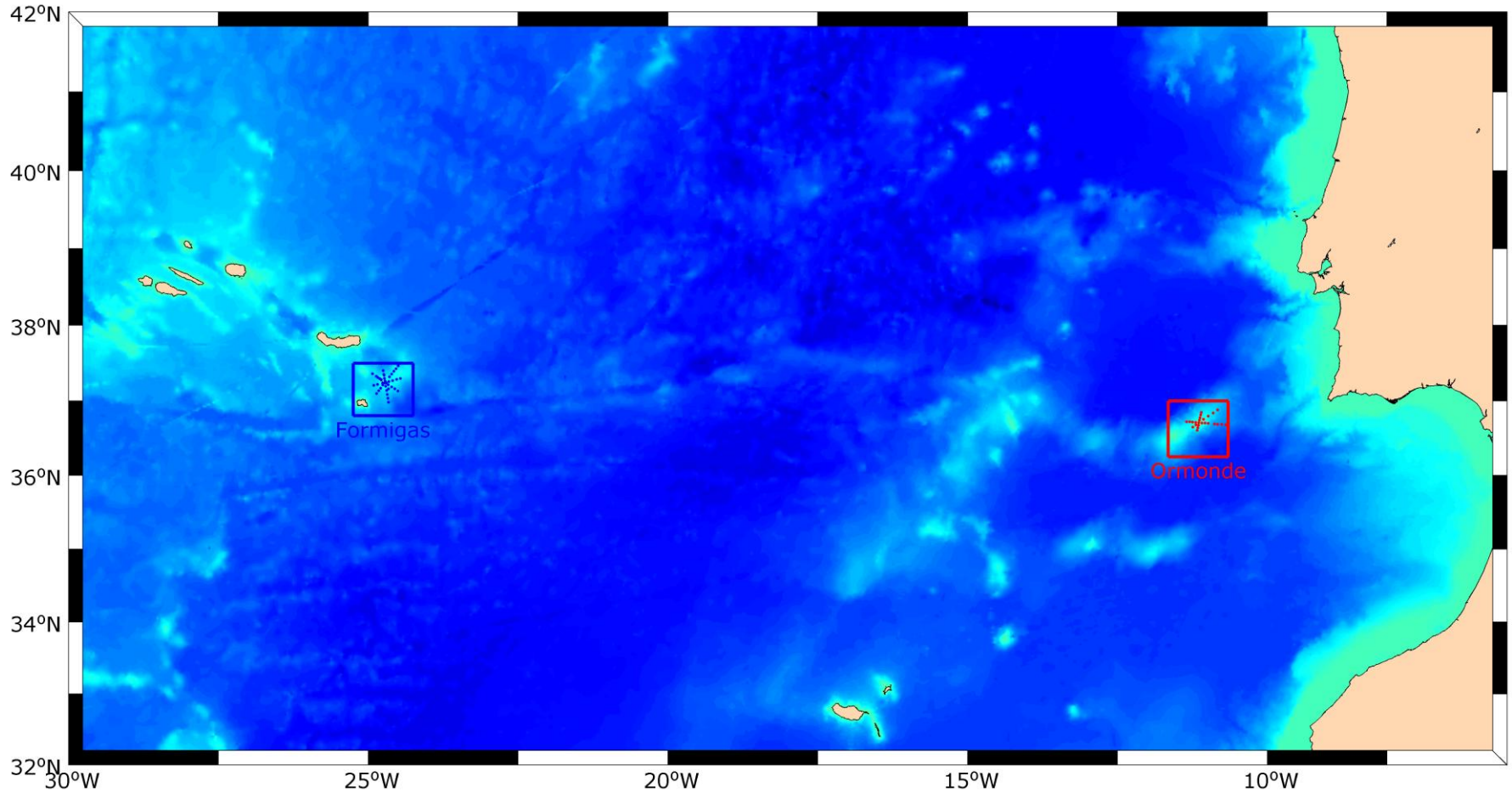
Obstacle to the ocean flow

Good conditions for the settle of corals

Cold-water corals of Mediterranean origin in the Atlantic

Objective: determine the oceanographic conditions influencing the settlement of cold-water corals over seamounts

1. Introduction



Stations location

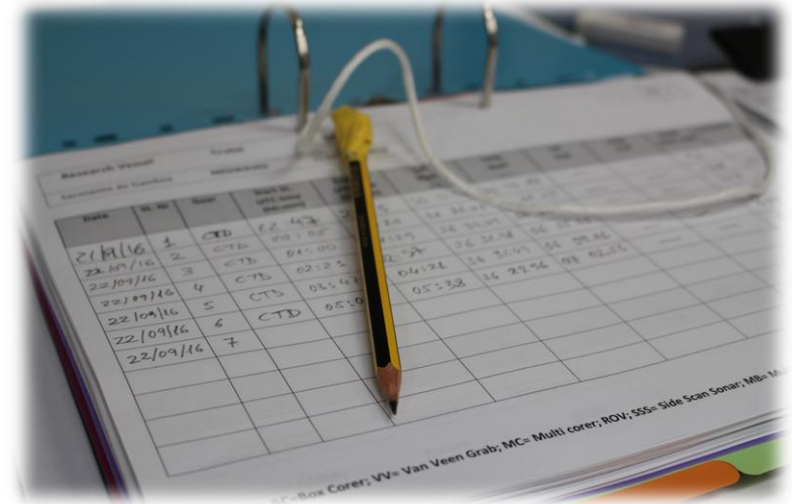
2. Methodology

Historical Data

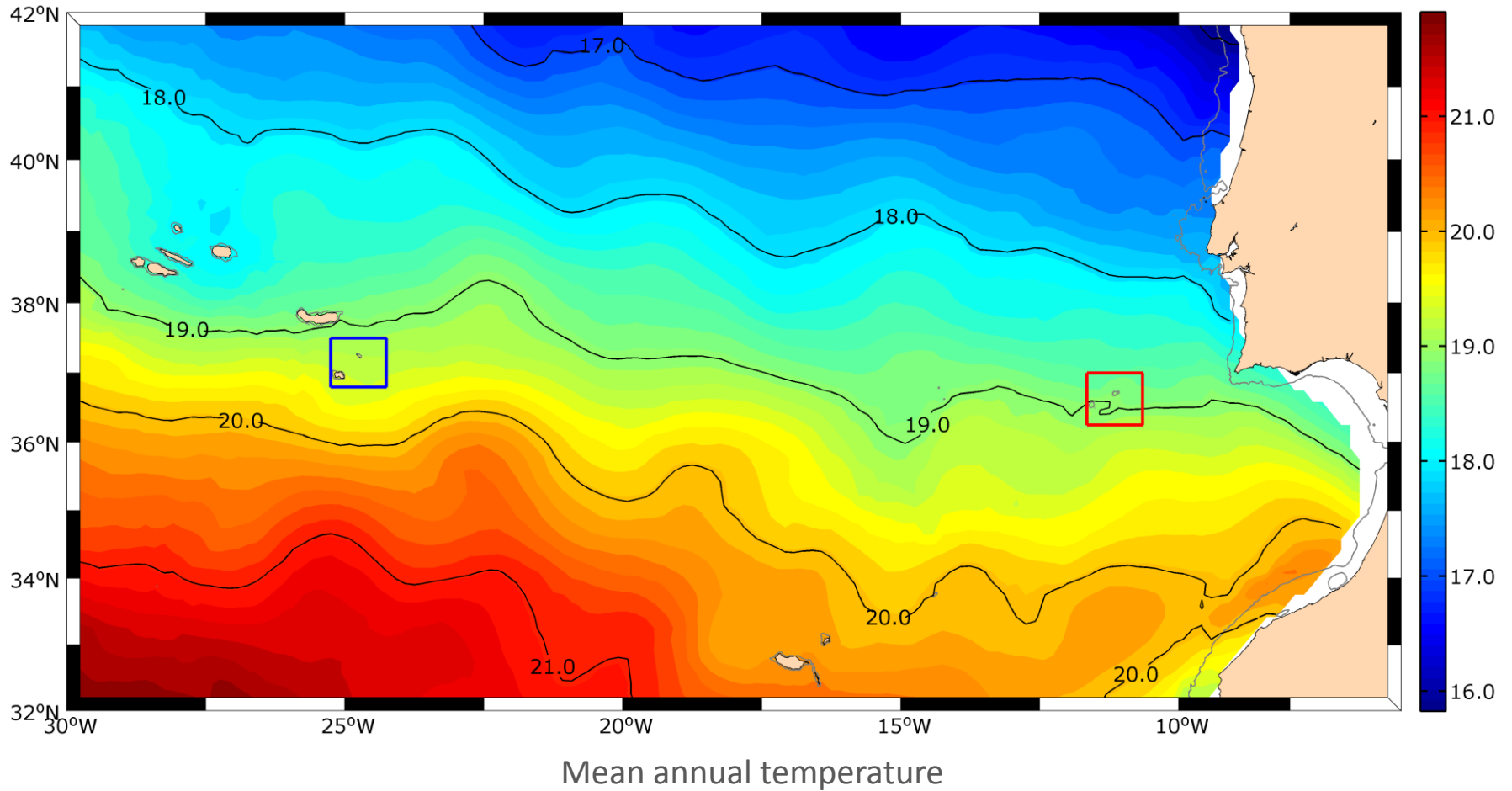
- Argo Temperature Climatology
- Annual Means of Drifter Data
- Climatological Monthly Means Drifter Data
- ICOADS 1-Degree Enhanced

Field Data

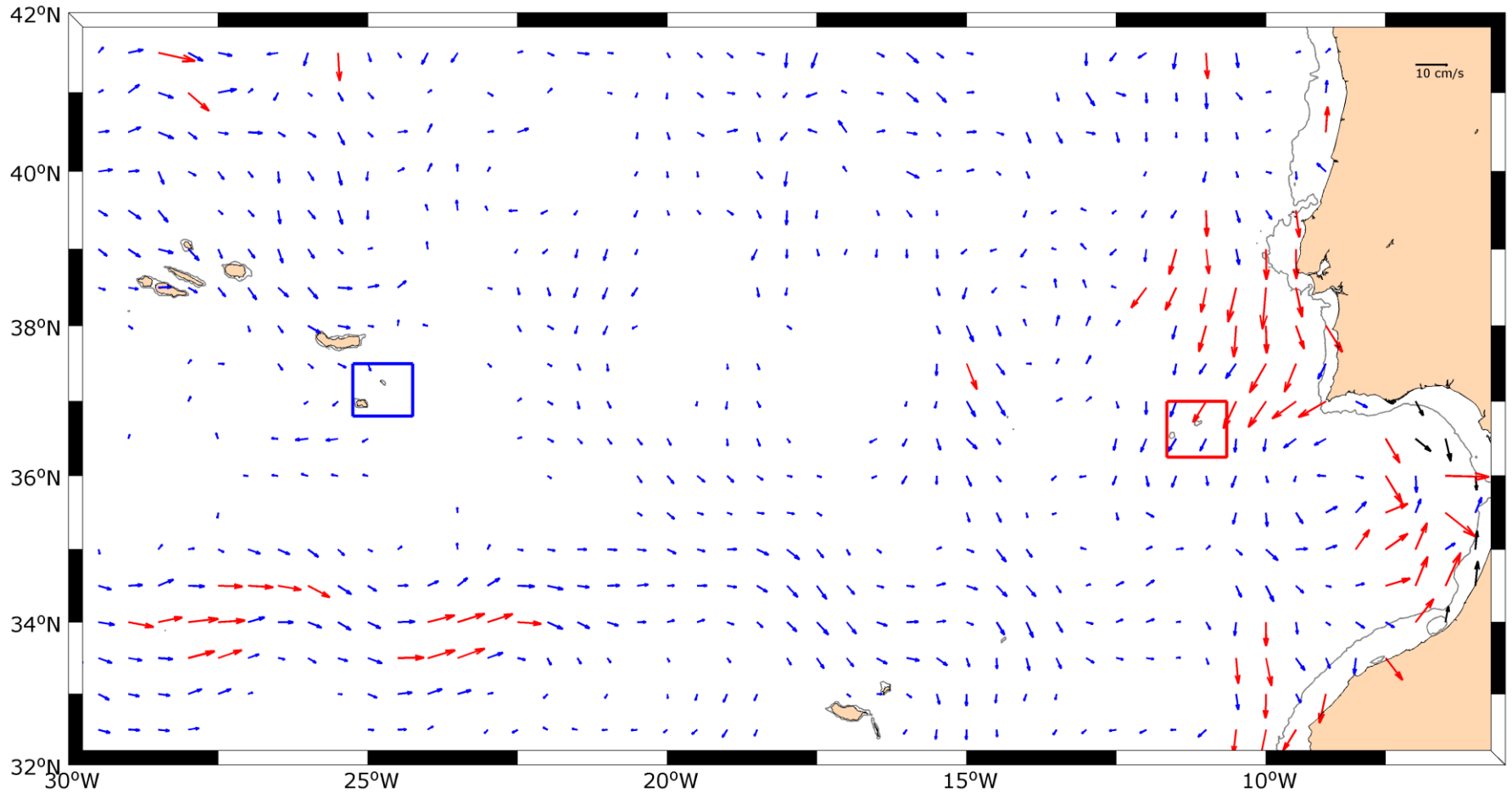
- CTD
- LADPC
- Biochemical



3. Results: Overview

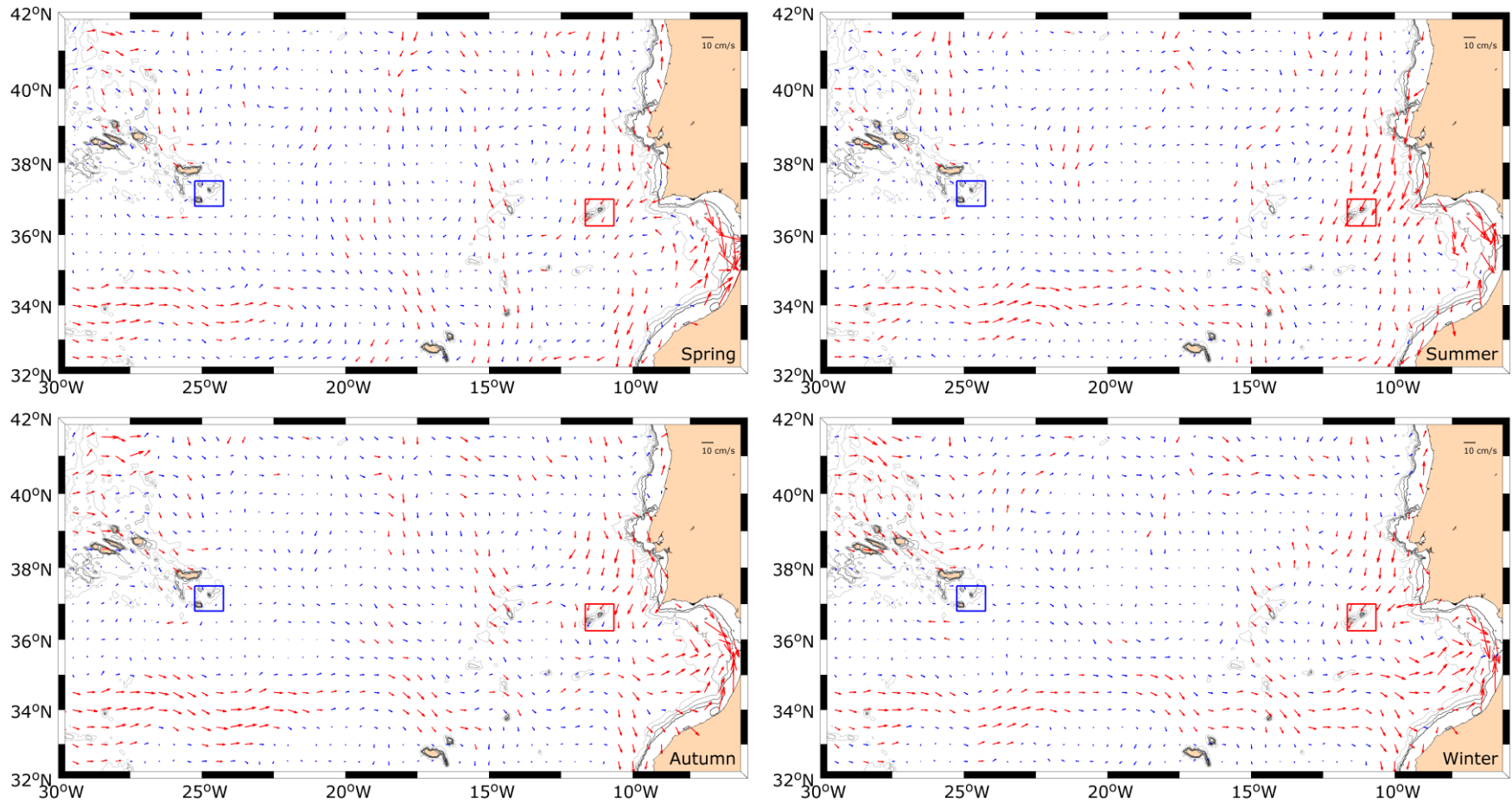


3. Results: Overview



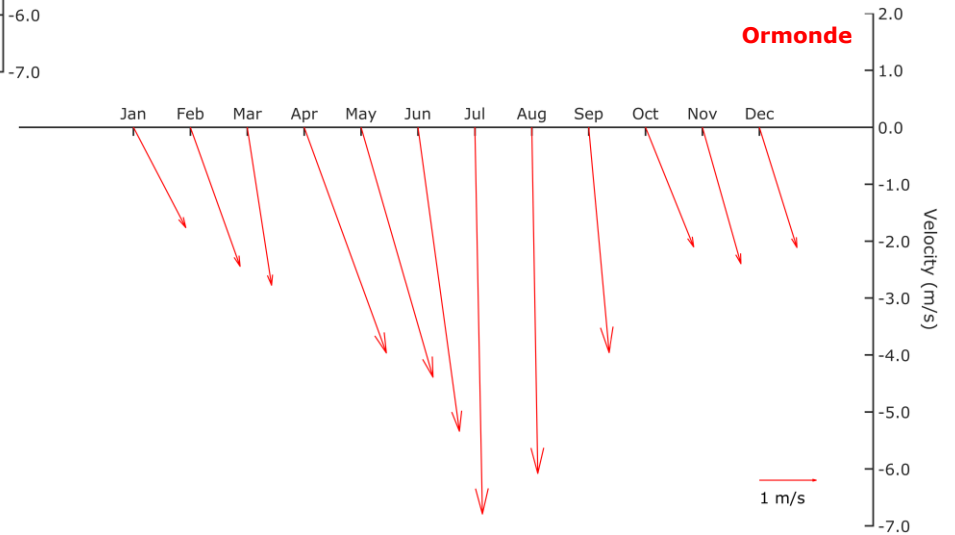
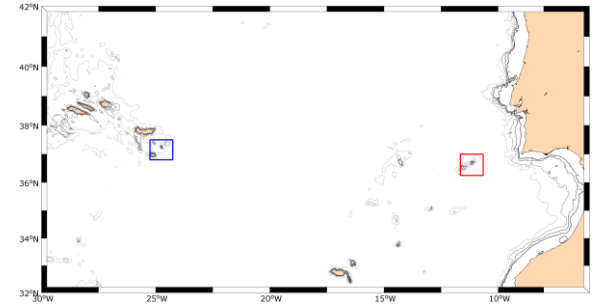
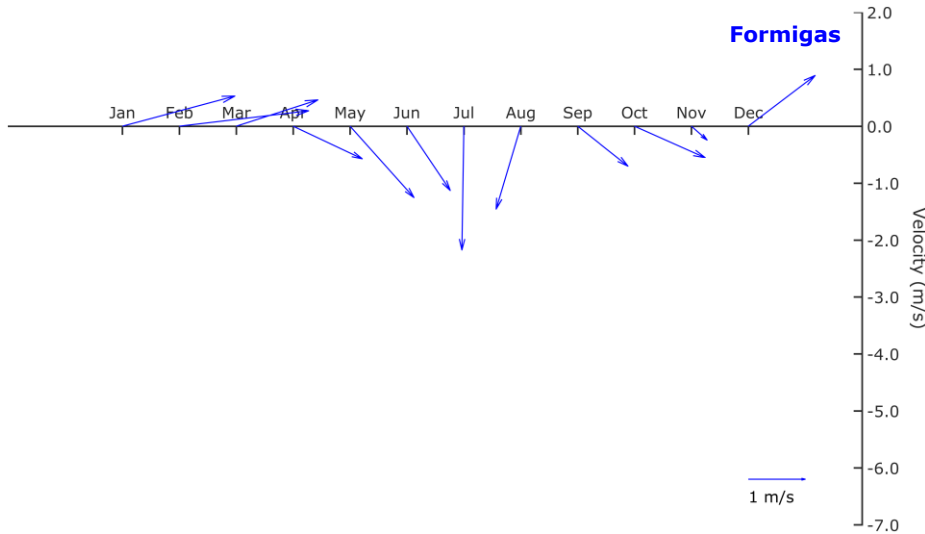
Near-surface current velocities

3. Results: Overview



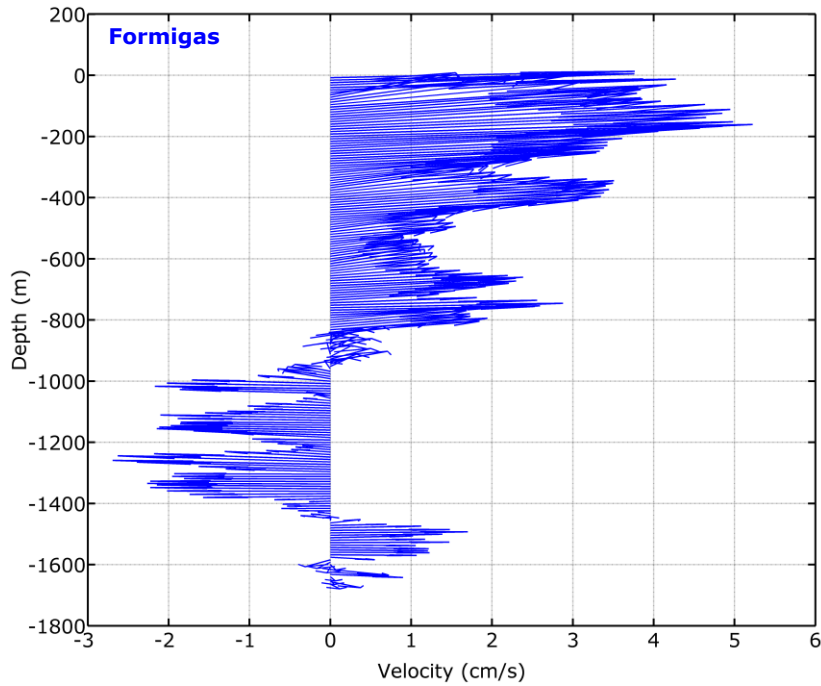
Seasonal near-surface current velocities

3. Results: Overview

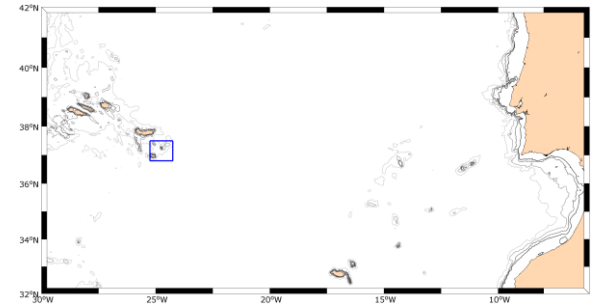


Mean winds

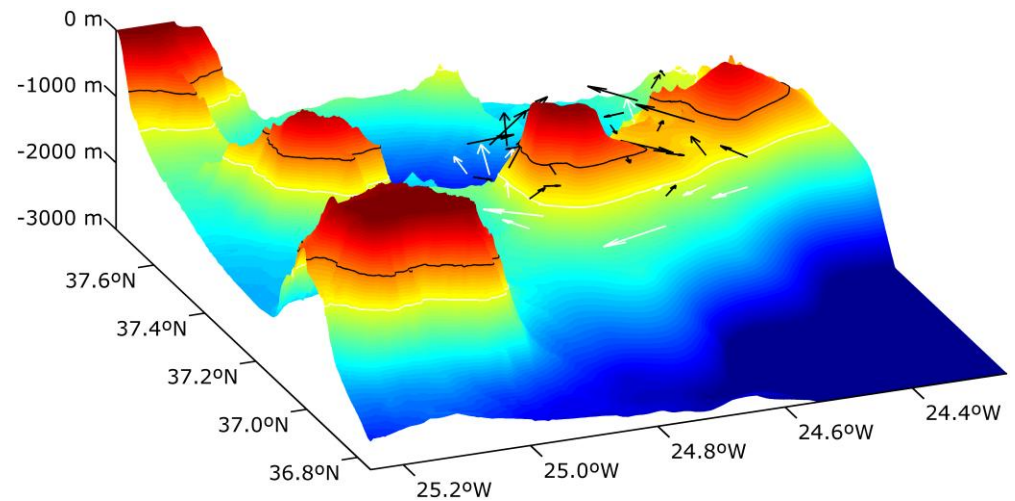
3. Results: Dynamics



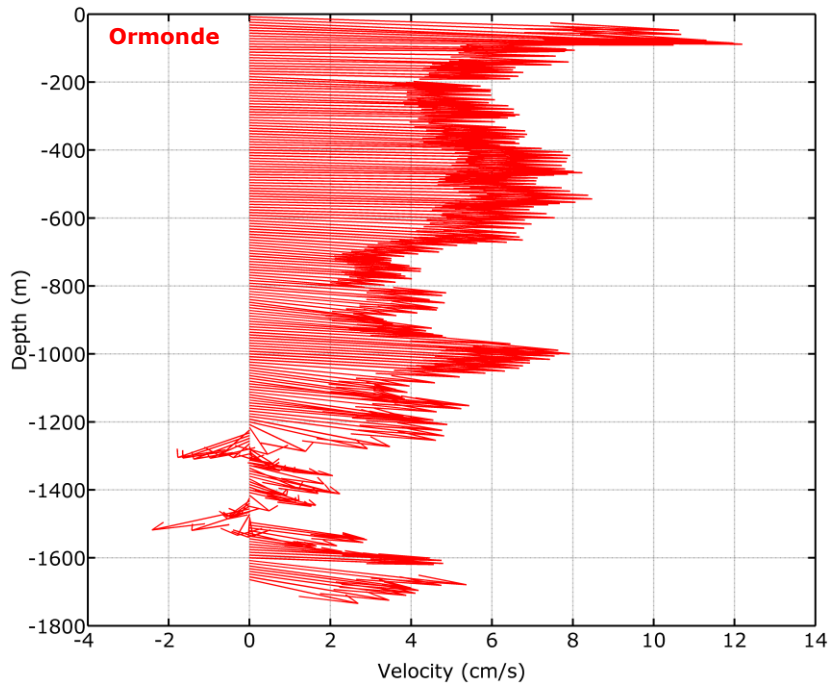
Vertical profile of LADCP velocities



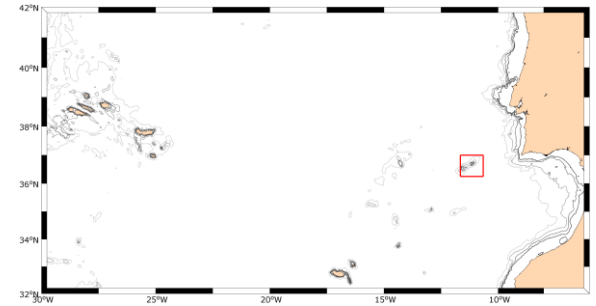
Horizontal distribution of LADCP velocities



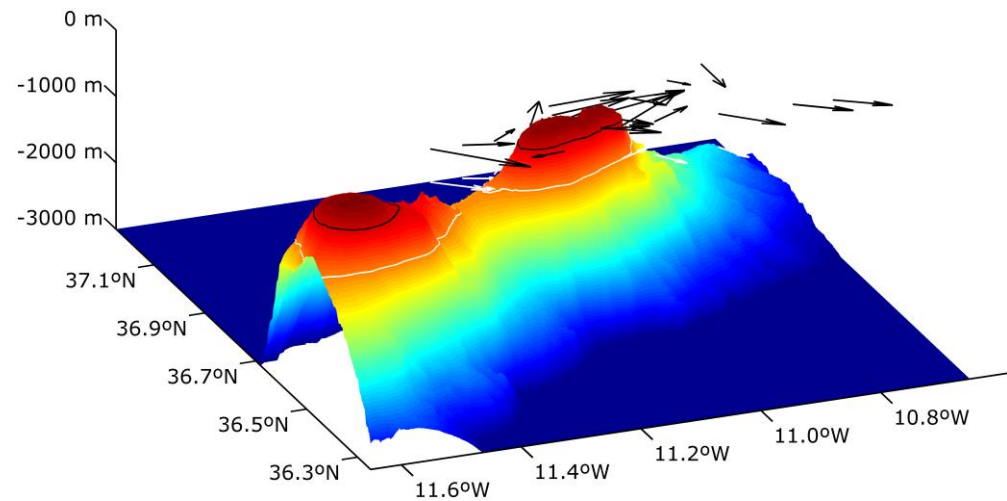
3. Results: Dynamics



Vertical profile of LADCP velocities



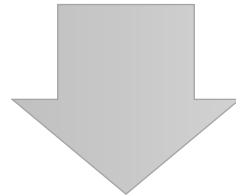
Horizontal distribution of LADCP velocities



3. Results: Dynamics

To sum up:

- These conditions are not appropriate for the development of Taylor columns.



Our hypothesis:

- Cold-water corals in those areas may be mainly affected by:
 - The vertical distribution of the water masses.
 - The variation of the biochemical properties.
 - **The effects of internal waves.**

3. Results: Hydrography



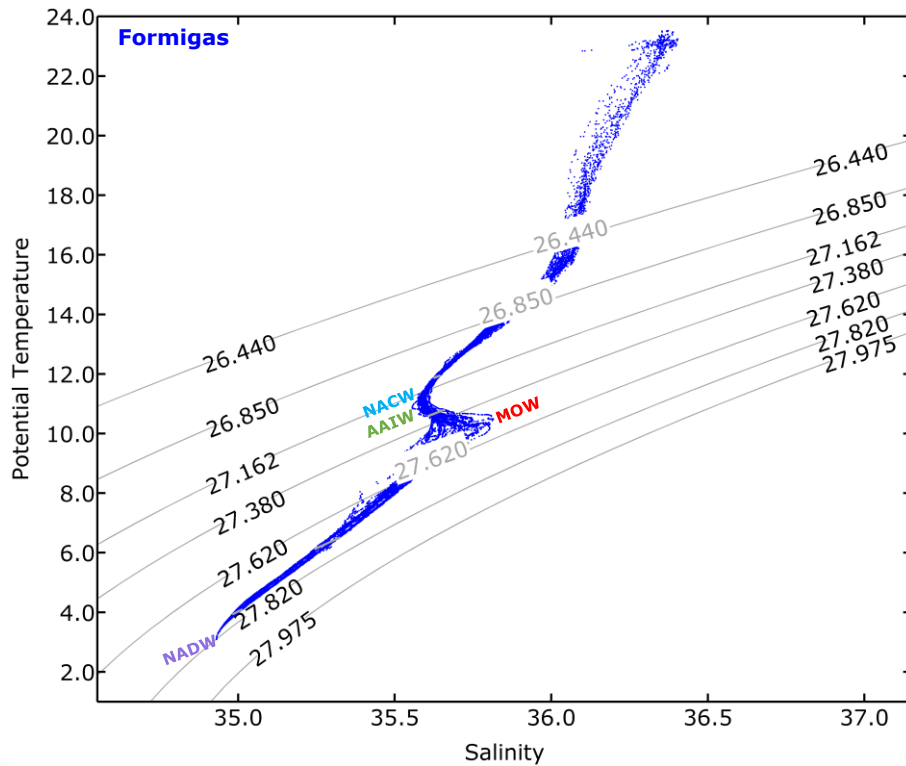
Formigas

NACW

AAIW

MOW

NADW

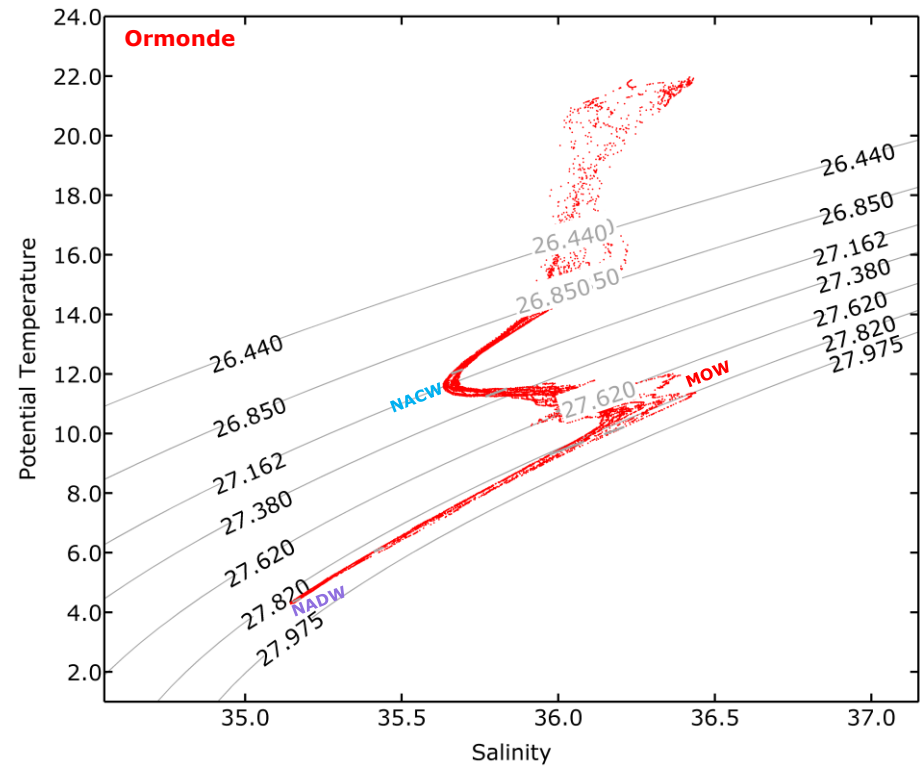


Ormonde

NACW

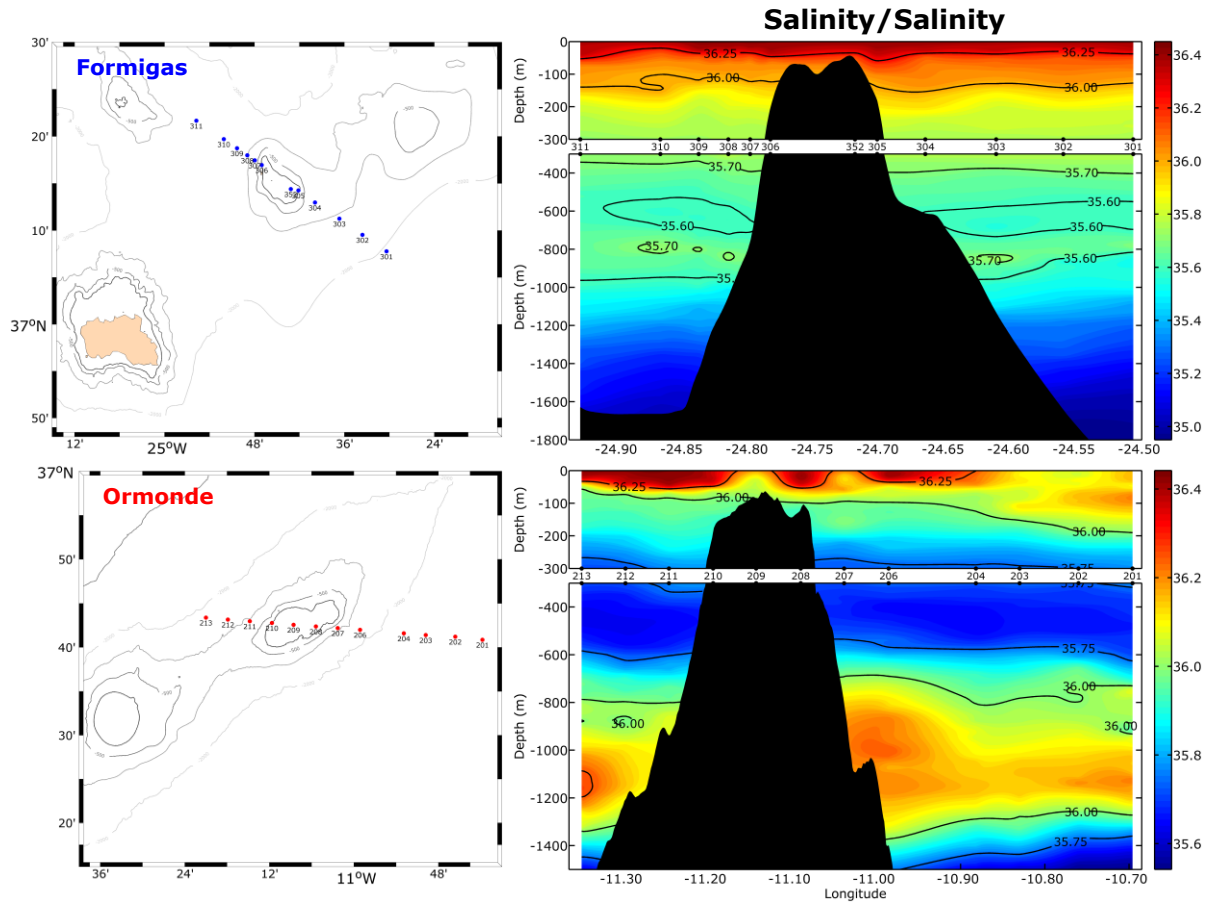
MOW

NADW



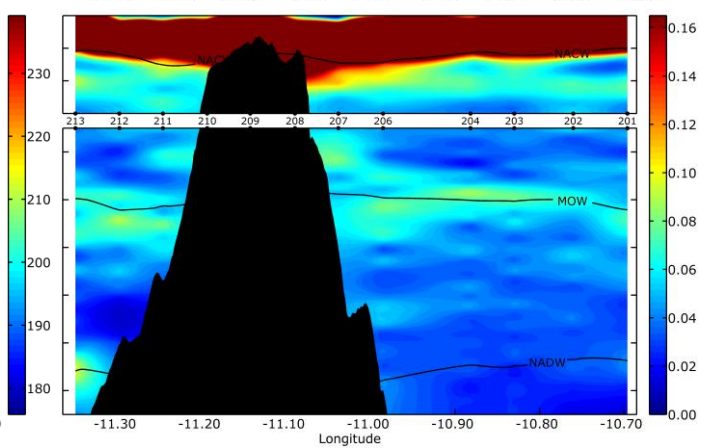
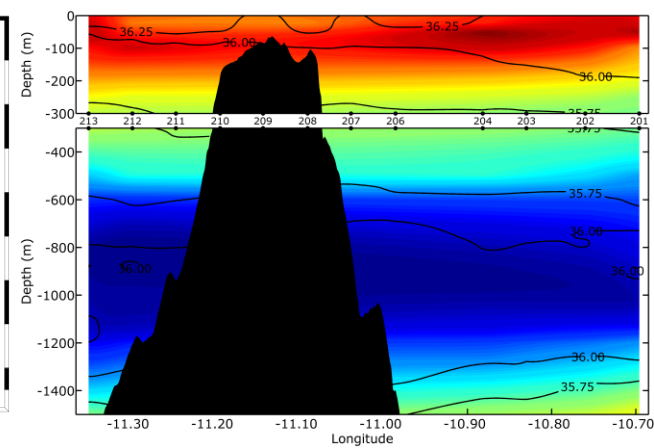
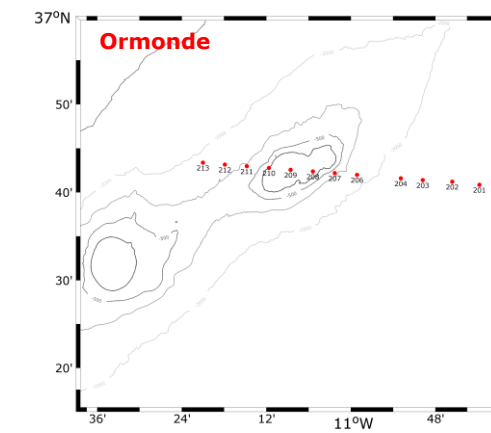
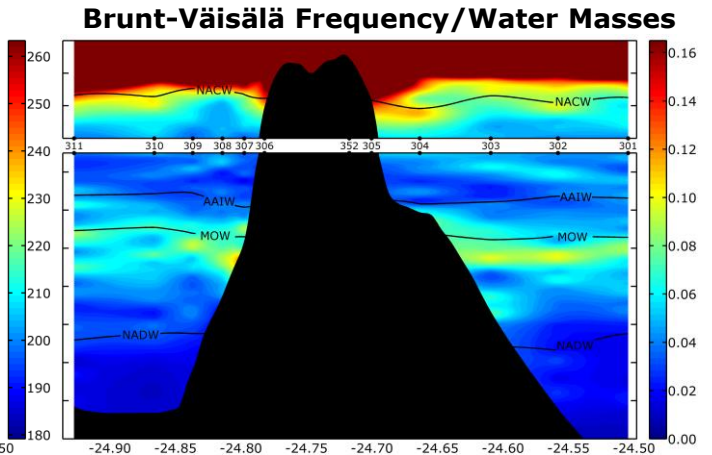
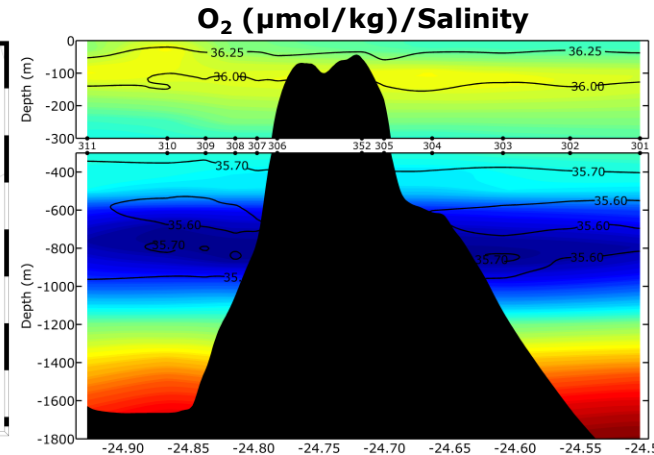
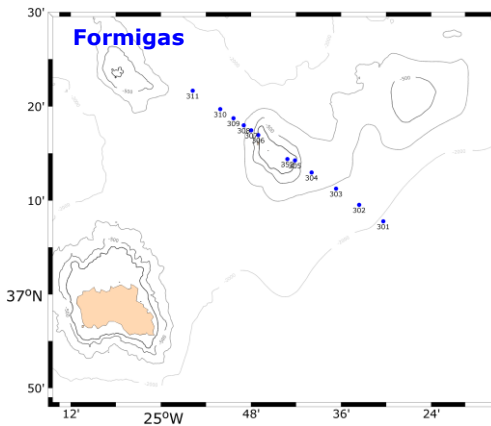
θ/S diagrams

3. Results: Hydrography



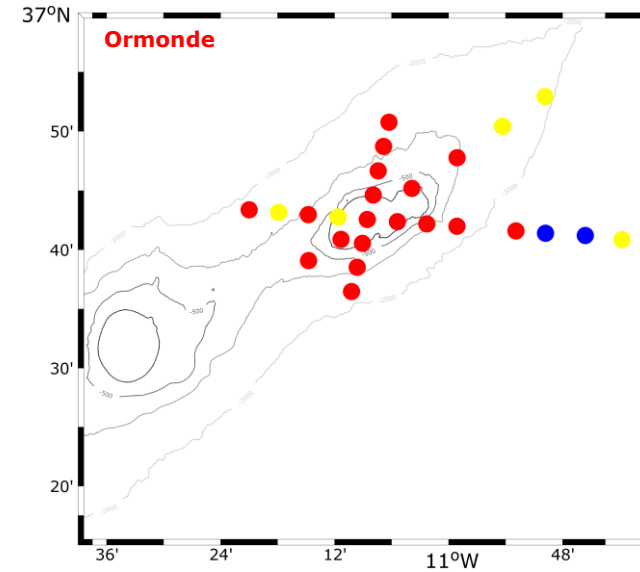
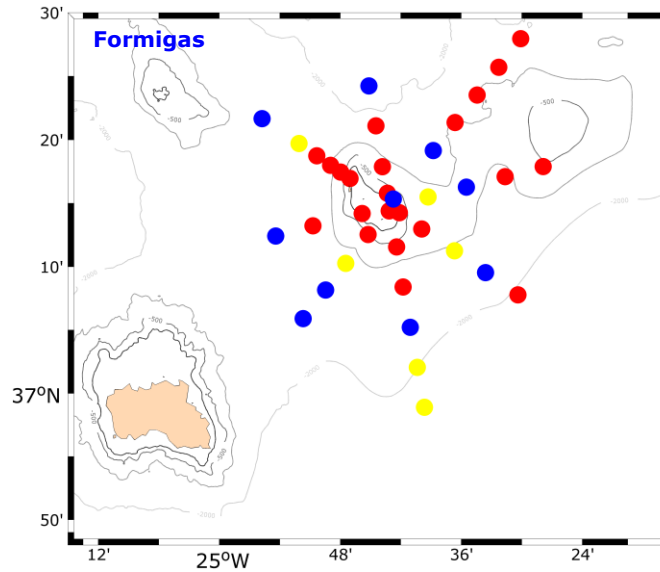
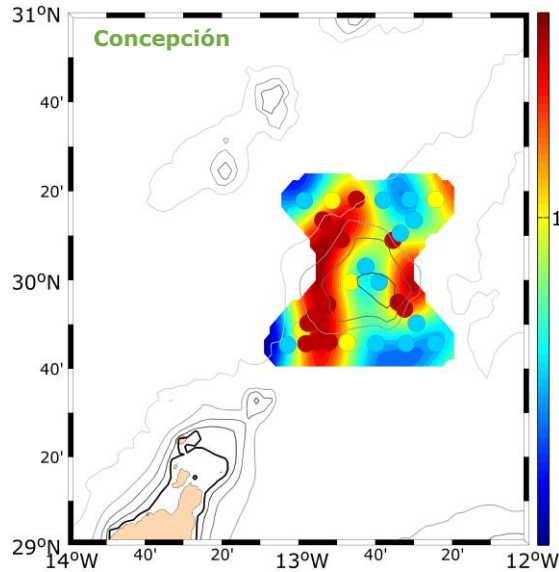
Vertical sections

3. Results: Hydrography



Vertical sections

3. Results: Hydrography



- Subcritical topography (transmission)
- Critical topography (amplification)
- Supercritical topography (reflection)

Bottom slope vs. slope of the characteristic lines

4. Summary and discussion

The circulation pattern is barely affected by the seamounts.

Taylor columns were not observed in any of the sampled areas.

The vertical distribution of water masses is quite similar in the two regions.

There is a strong gradient between the Atlantic and Mediterranean water properties.

The relatively high values of the Brunt-Väisälä frequency found in the MOW halocline and the steep bottom slope can induce the breaking of internal waves.

Thank You



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