

A glider network to study the physical-biogeochemical coupling in the Atlantic ocean

More info: <http://ego-network.org/dokuwiki/doku.php?id=private:atlantos>

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Abstract

We present here how gliders can be used to study and monitor the physical-biogeochemical coupling in different areas. In the framework of EU H2020 AtlantOS project, gliders are deployed often on a sustained basis with a scientific payload that can address this kind of issues. Because of the spatio-temporal coverage of the glider measurements, new features about how the physics can influence the development of phytoplankton communities can now be characterized. Focus here is on different time and space scales at which this coupling is particularly important. Examples of glider measurements in the Norwegian Sea, between Scotland and Iceland, in the Macaronesian area and in the tropical Atlantic are analyzed to address the diversity of the processes. We show that very high space and time resolution measurements in key areas are necessary to better understand processes responsible for the evolution of physical and biogeochemical properties in the open ocean, the continental slope area and the shelf. Knowledge on this variability, from the diel and local/meso/submeso scales to climate on the global scale, is necessary to reduce uncertainties in biogeochemical stocks and fluxes and detect changes in underlying processes in a climate change context. We propose here a coordinated approach all over the Atlantic Ocean to address such issues.

EU H2020 AtlantOS project

The vision of AtlantOS is to improve and innovate Atlantic observing by using the **Framework of Ocean Observing** to obtain an international, more sustainable, more efficient, more integrated, and fit-for-purpose system. The WP3 "Enhancement of autonomous observing networks" has a glider component and intends to build on existing capacities for autonomous observing networks on both sides of the Atlantic. In line with EGO and GROOM projects, the "glider" partners have developed a coordinated approach and present some highlights.

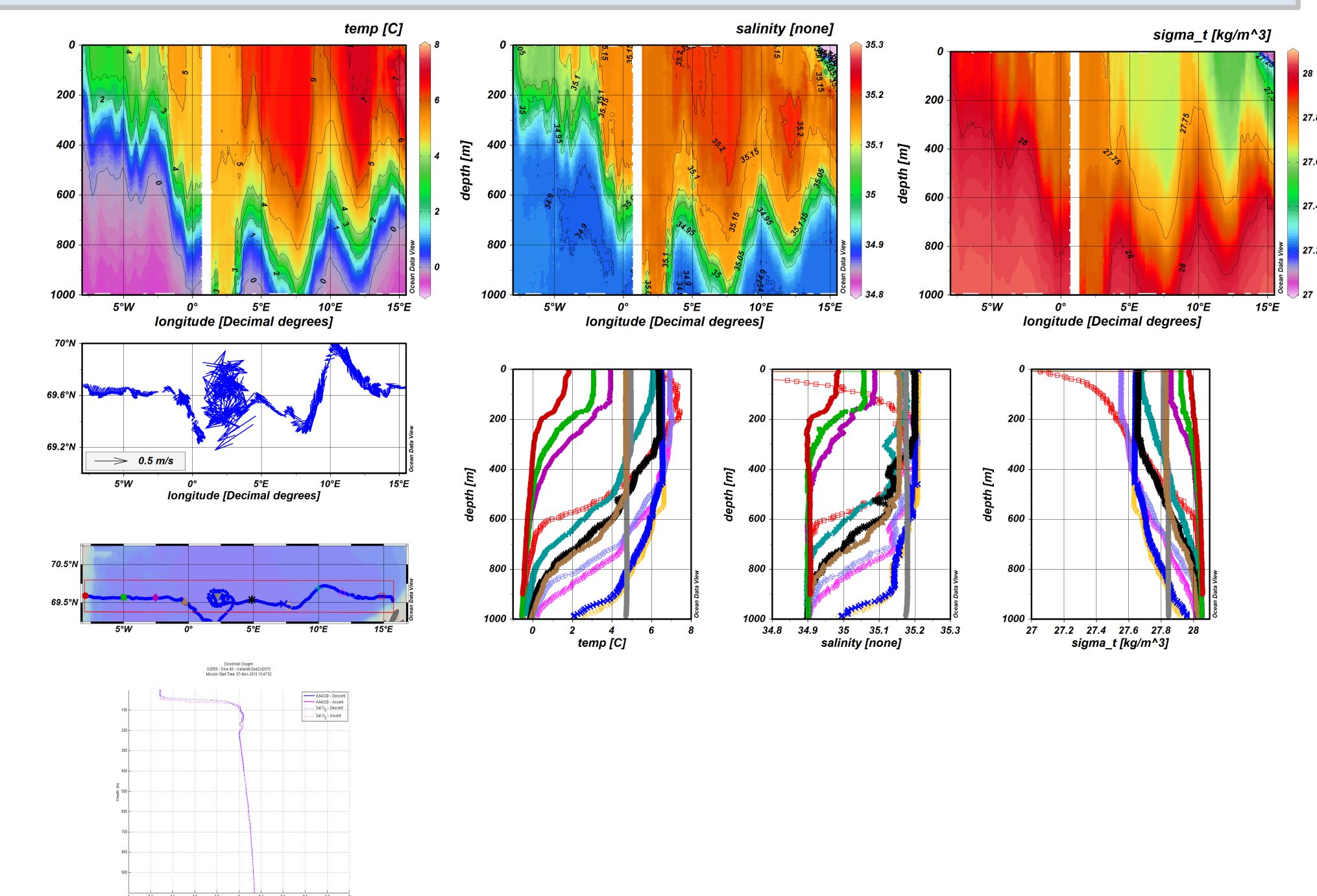


Google Earth

Monitoring key sections across the "Atlantic inflow"

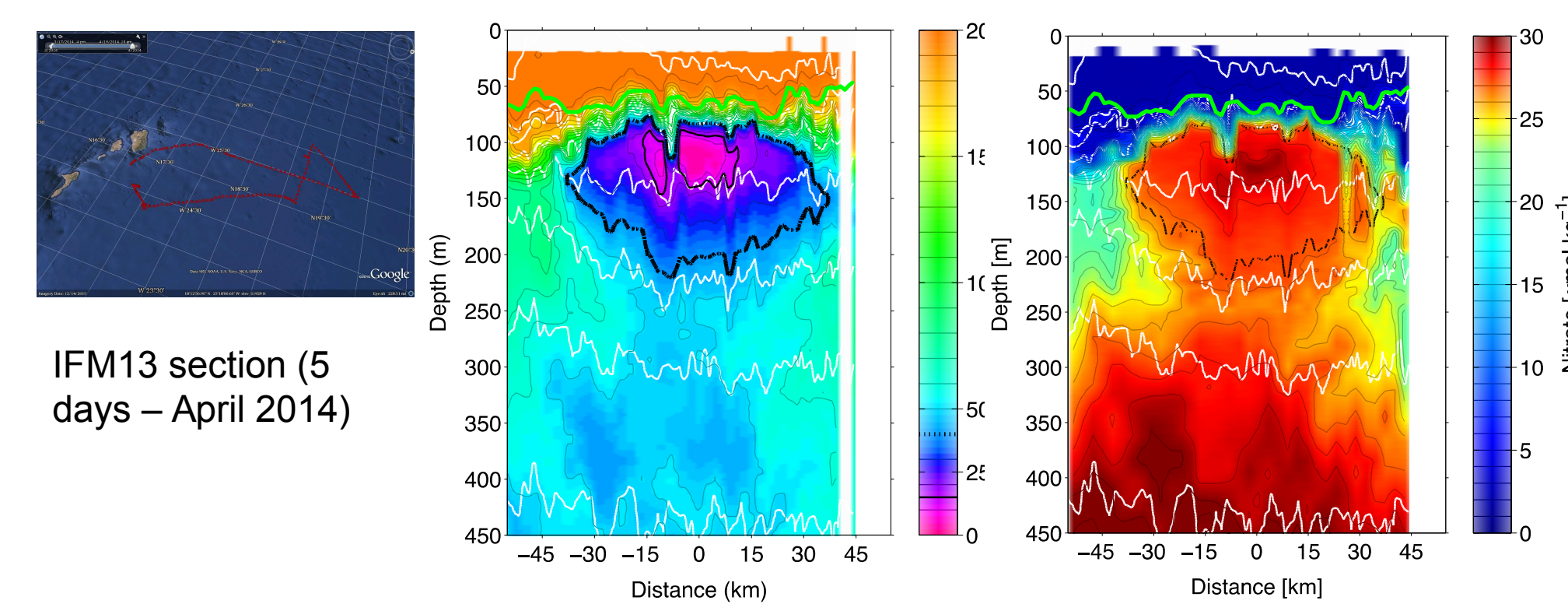
- Ellet Line
- Lofot
- Svinøy

Transposts, seasonal cycle
The importance of mesoscale eddies...



Hunting for "Dead-zone" eddies in the eastern tropical North Atlantic

The physical (T,S, velocity) and biogeochemical (oxygen, nitrate, chlorophyll fluorescence, turbidity) structure of an oxygen depleted baroclinic, nonlinear anticyclonic mode-water eddy (ACME) is investigated using high-resolution observational data.
→ *Near inertial waves as a driver for productivity in "Dead zone" eddies*

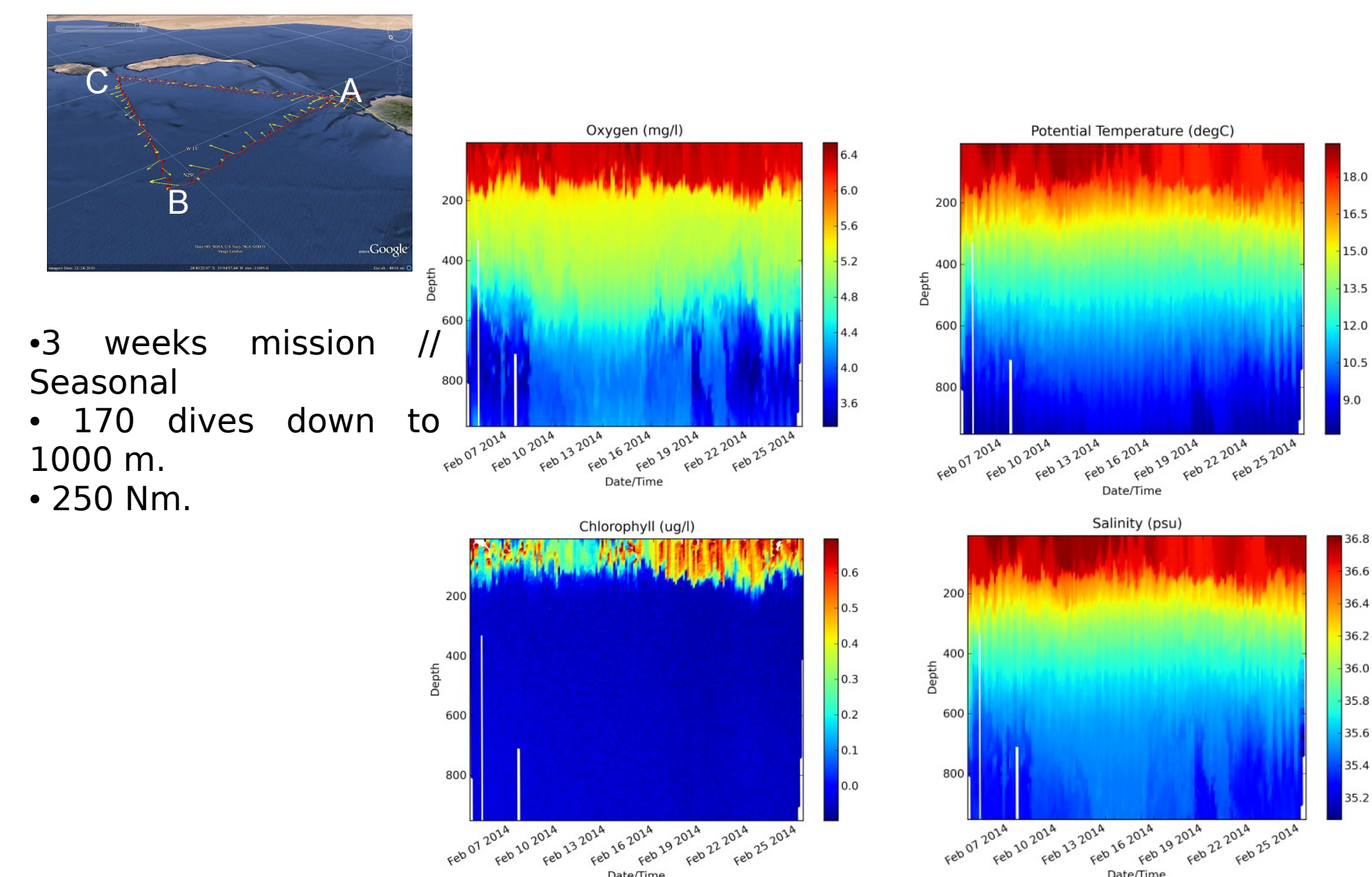


IFM13 section (5 days – April 2014)

An isolated core is found in the eddy, extending from about 60 to 200 m depth and with a diameter of about 70km. The core is occupied by fresh/cold water with low oxygen and high nitrate concentrations, and bounded by local maxima in stratification. Velocity and property gradient sections show vertical layering at the flanks and underneath the eddy that indicate the vertical propagation (to several hundred-meter depth) of near internal waves. The appearances of weakly unstable layers in density, that align with property gradients but not with isopycnals, indicate diapycnal mixing at the eddy periphery, possibly caused by wave/mean flow interaction.

Exploring the variability around the multidisciplinary mooring ESTOC (29° 10' N - 015° 30' W)

Since 2012, a glider flies along triangle ABC every season, the ESTOC mooring being located at B. The objective is to reach better spatio-temporal sampling capacities exploring the physical/biogeochemical covariance at different time and space scales.



- 3 weeks mission // Seasonal
- 170 dives down to 1000 m.
- 250 Nm.

Seasonal Scale

Mesoscale

Submesoscale

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AtlantOS

Project Partners
Project partners directly engaged in the AtlantOS project in receipt of funds.

Project Associates
Project partners that, although not funded directly by the project, have an interest in collaborating with the project.

<https://www.atlantos-h2020.eu/>

