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

Testor, Pierre; Turpin, Victor; Gourcuff, Claire; Karstensen, Johannes; Dumont, Estelle; Houpert, Loic; Inall, Mark; Palmer, Matthew R.; Smeed, David; Barrera, C; Haugan, Peter; Valcic, Lovro

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EU H2020 AtlantOS project
The vision of AtlantOSis 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.

Monitoring key sections across the “Atlantic inflow”
- Eliet Line
- Lofot
- Svinøy
Transports, 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

Exploring the variability around the multidisciplinary mooring ESTOC (29º 10’N - 015º 30’ W)
Since 2012, a glider flies along triangle ABC every 3 weeks mission // 170 dives down to 250 Nm.

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 spatiotemporal 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/mesosubmesoscale 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.