

## **GYROSCOPE Objectives.**

- 1.- To deploy an initial array providing real-time data to users
- 2.- To estimate the information content of the array.
- 3.- To develop procedures for real time ocean state estimation.
- 4.- To estimate time varying ocean transports and structure
- 5.- To develop a cost effective sampling strategy to observe ocean variability in the North Atlantic.

The **GYROSCOPE** project will deliver data in real time to users in the national weather and oceanographic services, to fisheries managers, and to the scientific community.



*A float ready to be launched*

Front cover : Map of sea-level variability (from Topex-Poseidon satellite), which is an indication of the most vigorous currents.

## **Partners, Contacts**

GyroScope is funded by the participating agencies and by the European Commission 5th Framework Programme Key Action 2 "Global Change, Climate and Biodiversity":

European component of the global observing systems

## **Participating laboratories :**

Laboratoire de Physique des Océans (CNRS Ifremer UBO)  
Institut Français de Recherche pour l'Exploitation de la Mer (Ifremer)  
Service Hydrographique et Oceanographique de la Marine (SHOM)  
Collecte Localisation Satellites (CLS)  
Southampton Oceanography Centre (SOC, NERC)  
UK Meteorological Office  
Institut für Meereskunde (Kiel)  
Instituto Español de Oceanografía  
Instituto de Ciencias del Mar (Barcelona)  
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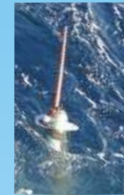
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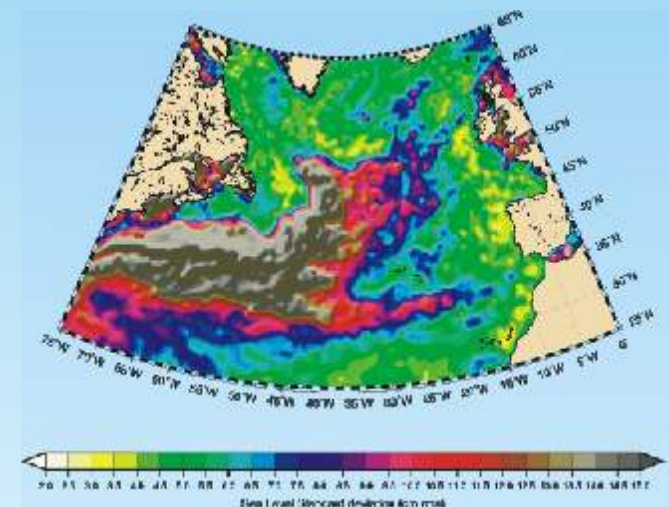
The data can be obtained at the Coriolis data centre  
<http://www.coriolis.eu.org>

# **GYROSCOPE**



Development of a real time in situ observing system in the North Atlantic ocean, by an array of Lagrangian profiling floats

European Commission project  
EVK2-CT-2000-00087



GyroScope aims to develop an ocean observing system component in support of

- Ocean research
- Operational oceanography
- Climate monitoring
- Policy making

## Objectives

The objective of the **GYROSCOPE** project is to develop a European component of a global in situ observing system of ocean variability in the North Atlantic, based on autonomous, freely drifting profiling floats. The project is a contribution to the international **Argo** programme, with which it is coordinated. The initial design of **Argo** calls for a total of 3000 floats to be deployed worldwide by 2005.

**GYROSCOPE** will contribute a pilot array of 80 floats in the North East and sub-polar Atlantic Ocean.

The research and development plan of the project cover the technical and engineering aspects, the investigation of the information content of the array and the study of ocean processes.

## Why observe the ocean's interior ?

- To better understand the Ocean's role in the Earth's climate
- To monitor the state of the ocean and the impact of human activities on the global environment
- To improve predictions of global climate change
- To make possible and improve seasonal climate forecasts
- In support of commercial and other activities : fisheries, deep sea oil exploration, shipping, near-shore protection, national defence.

## How do the floats work ?

Each float is programmed to drift freely at a preset depth; every 10 days, it dives to a depth of 2000 m, and then rises to the surface while measuring temperature and salinity as a function of depth. After the data are transmitted by satellite to a land station, a new cycle begins. The life-time of the floats should be 3 to 4 yrs.

## How are the data used ?

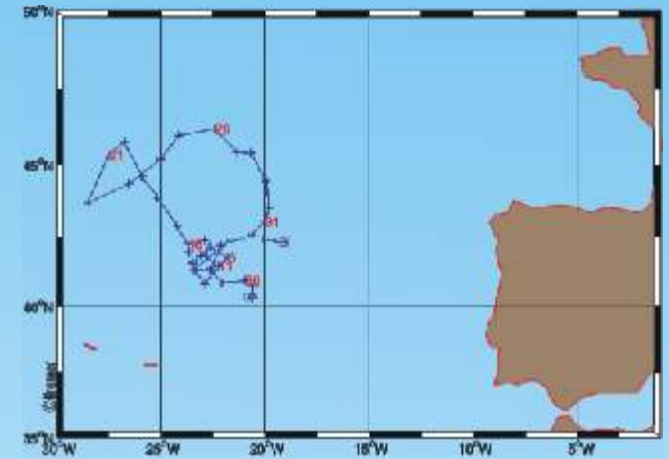
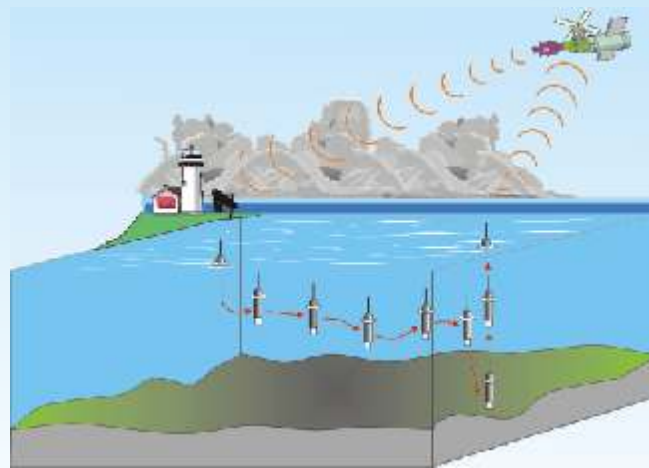
•After quality control the data are distributed to National Weather Services, to operational agencies with responsibilities for ocean monitoring, and to ocean scientists.

•The data are examined by oceanographers to identify different water masses, which have originated from such distant regions as the Labrador Sea, the Mediterranean, the Western Atlantic, and to compare their characteristics (temperature, salinity, depth, thickness) to older measurements. This is one way to learn about ocean circulation and climate change;

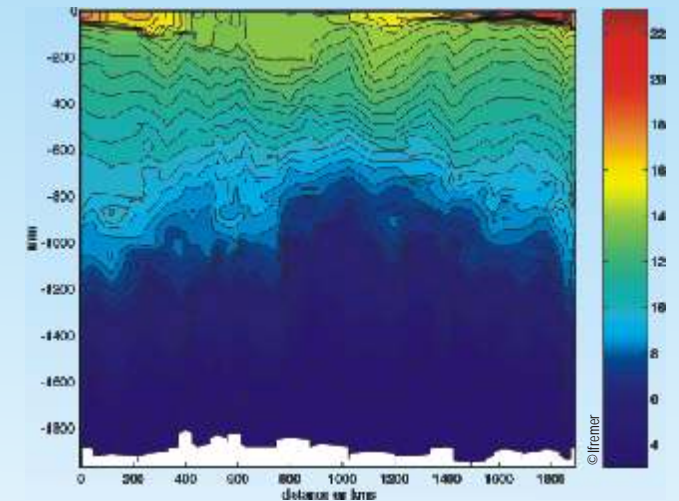
•The displacement of a float between the times it comes back to the surface is a valuable indication of ocean currents at depth;

•Maps of ocean temperature, salinity and currents can be produced at regular intervals

•Together with data from other observational platforms (ships, buoys, satellites), the data are assimilated into numerical ocean models to make analyses and forecasts of the ocean conditions (circulation, temperature), similar to the way in which weather forecasts are made by National Weather Services.



Exemple of a one year trajectory of a float, as it drifts freely at a depth of 400 m.



Temperature, as a function of depth, along the 1800 km, 1 year, trajectory.

The changes are largest near the surface (the seasonal cycle), and quite significant from 800 to 1200 m (influence of Mediterranean water). This figure reflects both time and space variability.