

THE EURO-ARGO ERIC OFFICIALLY SET UP

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Abstract

In May 2014, the Euro-Argo research infrastructure became a new European legal entity (Euro-Argo ERIC). The objective of the Euro-Argo ERIC is to organize a long term European contribution to the international Argo array of profiling floats. Argo is now the most important global in-situ observing system required to observe and understand the role of the ocean on the earth climate. Euro-Argo is also an essential component of the in-situ infrastructure required for the Copernicus Marine Environmental Monitoring Service (operational oceanography). Euro-Argo will thus develop European contribution to the Global Ocean Observing System (GOOS) and the Global Climate Observing System (GCOS).

INTRODUCTION

The Argo system (Freeland et al. 2010) is based on an array of profiling floats which measure every 10 days temperature and salinity throughout the deep global oceans, down to 2,000 meters and deliver data both in real time for operational users and, after careful scientific quality control, for climate change research and monitoring. Argo data policy is fully open and guarantees a free access of the data to all interested users. Argo is now the major, and only systematic, source of information and data over the ocean's interior. Argo aims to establish a global array of in-situ measurements integrated with other elements of the climate observing system (in particular satellite observations) to:

- detect climate variability from seasonal to decadal scales and provide long-term observations of climate change in the oceans.
- provide data to constrain global and regional ocean analysis and forecasting models
- provide data to initialize seasonal and decadal forecasting ocean/atmosphere coupled models and to validate climate models.
- provide information necessary for the calibration and validation of satellite data.

The EURO-ARGO ERIC

The Euro-Argo research infrastructure organizes and federates European contribution to Argo (www.euro-argo.eu); it is part of the European ESFRI roadmap on large research infrastructures. Euro-Argo carried out from January 2008 to June 2011 a preparatory phase project, funded through the EU 7th Framework Research Program, whose main outcome was to agree on the legal and governance framework (Euro-Argo ERIC) under which to establish the research infrastructure. Ministries from 9 European countries (Finland, France, Germany, Italy, Netherlands, Greece, UK, Norway, Poland) have agreed to form this new legal European entity to organize a long-term European contribution to Argo. It was set up by the Commission Implementing Decision (2014/261/EU) of May 5, 2014.

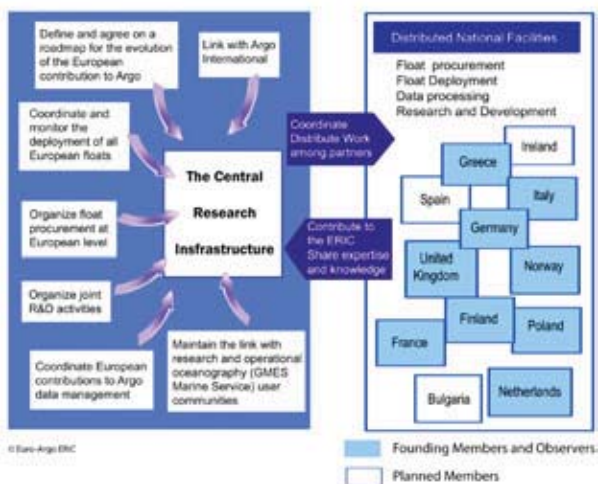


Figure 1: The EURO-ARGO distributed Research Infrastructure

The distributed national facilities operate with direct national resources. As part of the Euro-Argo research infrastructure, they agree to a multi-annual commitment of resources (in particular in terms of floats to be deployed and for the data system), and to coordinate their activities through the Euro-Argo ERIC. The Euro Argo ERIC may subcontract some of its activities to the national facilities who have the relevant expertise (e.g. data management and quality control, float deployment), and according to their areas of responsibility.

The Euro-Argo Research Infrastructure (RI) is a distributed facility (see <http://www.euro-argo.eu>). The Euro-Argo infrastructure is made up of a central infrastructure (C-RI) based in France (Ifremer, Brest) which is owned and controlled by the Euro-Argo ERIC and distributed national facilities. The Euro-Argo ERIC and its governance structure (Council, Management Board and Science and Technological Advisory Group) was set up at the creation of the ERIC. It was inaugurated on the 17th July in Brussels, hosted by the French Permanent Representation in Brussels, in presence of representatives of the European Commission and the Ministries of the signatory nations as well as the European institutes involved in Argo.



Figure 2: Inauguration

EURO-ARGO ERIC role and development

The Euro-Argo ERIC priorities are first to maintain and consolidate the global array and regional coverage for European seas by increasing European contribution from 150-200 floats to 250 floats/year and consolidating the data processing system. Secondly the Euro-Argo ERIC will prepare the evolution of Argo to address new scientific and operational challenges and in particular start implementing the new phase of Argo (biogeochemistry, deep ocean, Arctic).

The overall objectives of the Euro-Argo ERIC are:

- to provide, deploy and operate an array of around 800 floats contributing to the global array (a European contribution of ¼ of the global array);
- to provide enhanced coverage in the European regional seas;
- to provide quality controlled data and access to the data sets and data products to the research (climate and oceanography) and operational oceanography (e.g. Copernicus Marine Environmental Monitoring Service (CMEMS)) communities;
- to prepare the next phase of Argo with an extension to biogeochemical variables, to the deep ocean and the polar regions.

These data will be made freely available as a European contribution to the international Argo program. The Euro-Argo ERIC will organize interfaces with operational users and, in particular, with the Copernicus Marine Environmental Monitoring Service and with the ocean and climate change research communities.

The Euro-Argo ERIC is developing in two phases. In the ramping up phase (2014-mid 2015) the central entity (i.e. the Euro-Argo ERIC) works with a reduced budget funded by the Members and Observers. This budget allows to fund a programme manager a project assistant at 25% and one full time position (project scientist), and to provide basic support to the Euro-Argo RI (e.g. organization of workshops, maintenance of WWW sites including educational WWW site).

In the second phase (mid-2015-onwards) we expect a significant development of the Euro-Argo ERIC up to five persons. In line with the European nature of the infrastructure, a direct EU funding will be set up through the EMFF (European Maritime and Fisheries Fund) to complement national contributions and to ensure that Euro-Argo fulfils its objectives: deploying 250 floats/year (i.e. 25% of the overall international effort), providing high quality observations for ocean and climate research and the Copernicus Marine Environmental Monitoring Service, preparing the European contribution to the next phase of Argo.

Benefit for the European community

Thanks to a stronger European coordination of float deployments EURO-ARGO ERIC will ensure that certain areas are not overpopulated at the expense of other regions or the global array. Euro-Argo will deliver a stronger and more coherent European contribution to float technology development, with particular emphasis on European needs (e.g. sampling under ice, bio-geochemical sensors) leading to improved capability, performance and lifetime.

Figure 3:
In blue: Euro-Argo RI contribution
to Argo (Jan 2015)



The two European Argo data processing centres (Coriolis and BODC) will be strengthened to (i) ensure they are able to process all European floats and deliver the data to users, and (ii) ensure that Europe is able to fulfil its data processing commitments to the global programme (Coriolis GDAC, North Atlantic and Southern Ocean Regional Centres).



Euro-Argo will provide a mechanism for developing consistent inputs and a more concerted European voice into the international Argo programme, resulting in a stronger European influence on how Argo develops in the future. It will also provide the means to sustain important outreach activities (web-site, brochures, educational materials etc.) needed to explain to school children and the general public the importance of observations from the oceans towards dealing with climate change and other environmental issues.

Figure 4: About one hundred scientists met at Centre Ifremer Bretagne from 16th to 20th March 2015 for an "Argo week".

Dual Use: Research and Operational Oceanography

The oceans have a fundamental influence on our climate and weather, both of which are affected by changes in the currents and heat content of the ocean. Argo is a unique system to monitor heat and salt transport and storage, ocean circulation and global overturning changes and to understand the ability of the ocean to absorb excess CO₂ from the atmosphere. Long term, global and high quality ocean observations are needed to understand the role of the ocean on the earth's climate and to predict the evolution of our weather and climate. Concerns about the lack of observations of the key factors that influence the earth's climate led governments to form the Global Earth Observation System of Systems (GEOSS) and, in Europe, the Earth observation program Copernicus and the European Marine Observation and Data Network (EMODnet) marine data initiative.

Argo is the first-ever global, in-situ ocean-observing network in the history of oceanography, providing an essential complement to satellite systems. Argo is a unique system to monitor heat and salt transport and storage, ocean circulation and global overturning changes and to understand the ability of the ocean to absorb excess heat from the atmosphere. One of Argo's most important contributions so far is a huge improvement in the estimation of heat stored by the oceans - a key factor to gauge global warming and gain a better understanding of the mechanisms behind rising sea level. Argo will be critical for developing reliable seasonal to decadal climate predictions. Argo has brought remarkable advances in ocean forecasting capability and is the single most important in-situ observing system for the Copernicus Marine Environmental Monitoring Service. It provides essential data in near real time to constrain global and regional CMEMS monitoring and forecasting centers. Without Argo, these centers will not be sufficiently constrained and will not be able to serve several key applications.

The development of the Euro-Argo ERIC, we will strengthen European contribution to Argo and contribute to a better coverage of the Global Ocean, Atlantic Ocean and European Seas. Argo float deployed and processed by Euro-Argo will directly feed the EMODnet data portals, the Copernicus Marine Environment Monitoring Service and their users. Thanks to the EU funding, the Euro-Argo ERIC jointly with its partners will be able to demonstrate that it:

- is able to manage a European Contribution to Argo and coordinate its implementation in coherence with the Euro-Argo and international partners. This It will ensure that certain areas are not overpopulated at the expense of others or the global array,
- provides a central capability for float testing and preparation (e.g. mission programming, installation of lithium batteries) and storage,
- provides enhanced at sea monitoring of the European fleet that will lead to an improvement of the fleet behavior with earlier detection of anomalies,
- strengthens the European Argo data processing centers so that they are (i) able to process all European floats and ensure the data are delivered to users, and (ii) ensure that Europe is able to fulfil its data processing commitments to the global program,
- improves the data management system and in particular the delayed mode data for research community,
- provides the means to outreach activities (web-site, brochures) needed to explain the importance of observations from the oceans towards dealing with climate change and other environmental issues,
- is able to extend float coverage into the marginal seas such as Mediterranean and Black Seas and also Nordic Seas and Arctic Ocean, regions which have a significant impact on the Atlantic circulation and climate change impacting Western Europe.

Maintaining observations in international waters over the long term is challenging. Frequently monitoring begins as part of a research project but once the concept is proven it can no longer be considered as research and be supported by national or EU research budgets. Furthermore, it is difficult to justify one Member State bearing the costs of an infrastructure that does not principally benefit its own citizens but rather serves the interests of all Member States. The Euro-Argo ERIC will demonstrate in the coming years that it is able to manage a direct EU contribution to the international Argo.

Future extensions

Finally, Euro-Argo has set up the following priorities for the next five years

- Contribute to the global array and sampling of European regional seas. and Improve European coordination.
- Work with DG MARE, Copernicus and Emodnet to set up a long term (7-year) EU funding for Euro-Argo
- Maximise the relevant knowledge of the Seas and Oceans, e.g. their role in a changing climate (towards deeper measurements).
- Continue working with the user communities Develop /extend the user base. Education and outreach
- Maintain strong links with Copernicus and Emodnet.
- Prepare high quality delayed mode data sets required by ocean and climate change research.
- Improving float technology (e.g. extend life time, new sensors) and interactions with float manufacturers.
- Prepare the implementation of the new phase of Argo at European level:
 - deep ocean, biogeochemistry and Arctic.
 - Pilot projects, evolution of national roadmaps and new agreements at European level.
- Integration of Euro-Argo with other marine research infrastructures: towards an European Ocean Observing

References

Freeland, H. & Co-Authors (2010). "Argo - A Decade of Progress" in Proceedings of OceanObs'09: (<http://dx.doi.org/10.5270/OceanObs09.cwp.32>)