The European Research Infrastructure Consortium

**Argo: a global ocean observing system**

The ocean has a fundamental influence on our climate and weather. It stores, transports and exchanges large amounts of heat, water and gases with the atmosphere. These exchanges dramatically affect global and regional climates in time-scales ranging from days to centuries.

Long-term high quality global 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.

Nearly 4000 autonomous profiling floats drifting at sea supply all over the world’s oceans using measurements of temperature and salinity from the sea surface down to a depth of 2000 m. Observations are delivered via satellite to data centres where the data are processed and provided to users within a few hours of acquisition. Argo provides a free and open-access data policy.

**Users & applications**

The Argo network provides fundamental ocean observations used both for operational services through the assimilation of data in forecasting systems and for progressing in ocean knowledge and better understand the marine ecosystem and the role of the Ocean on climate, through scientific analysis.

Argo is the single most important in situ observing system required for the Copernicus Marine Environment Monitoring Service (CMEMS).

Argo and similar data are assimilated into CMEMS models used to deliver regular and systematic reference information on the state of the seas, with applications in the domains of coastal and marine environment, maritime safety, resources management, weather and seasonal forecasting and climate.

Observing System Simulation Experiments are carried out to explore the importance of Argo and its contributions for operational systems. The Figure opposes the impact of deep Argos measurements (down to 4000 m) and 600 m in reducing the error in the daily (2000-4000 m) Ocean Heat Content, compared to when only classical Argo measurements (0-2000 m) are used [2].

Following with bios-optical sensors reveal what processes trigger the North Atlantic bloom

**The strategy for Argo in Europe**

One of the main challenges for Euro-Argo is to implement the new phase of Argo with an extension towards biogeochemistry (BiogeoArgo), the polar oceans, the marginal seas and the deep ocean (down to 4000 m). Euro-Argo has recently published an “strategy for evolution of Argo in Europe” (Euro-Argo ERIC, 2017), an reference document that will be revised regularly taking into account technological developments, the international Argo strategy and the users needs. The current strategy for Argo floats deployments is summarized in the Table below, in numbers of operational European floats.

Euro-Argo will ensure that the European deploymens fulfill the international core Argo programme requirements in terms of global geographical repartition. The Atlantic Ocean is a region of great interest for the European research community, and float deployment will be continued in this ocean, with a specific attention on keeping the appropriate sampling in seasonal and boundary regions.

With the ongoing technological developments, a further extension of the global Argo array in the ice-covered areas of the Northern high latitudes - including Arctic - is envisioned (at about 5 years) and also coverings of the most severely ice-covered areas in the Northern Sea (e.g. the Greenland Current).

**Observing System Framework**

The increasing demand for better observing the ocean is being recognised at the highest political levels (G7, IOC and its Special Report on the ocean and cryosphere) and developing Argo and its expansions are top priorities within the G7 Future of Ocean working group.

The international ocean observing community has identified a need for integration and coordination of interdisciplinary ocean observations (A Framework for Ocean Observing 2012). Significant progress has been recently achieved at pan-European and regional scales to enhance integrated access to ocean observation products (e.g. Copernicus Marine Environment Monitoring Services, EuroGOOS and BIOSes, EMB/Dean timer, SeaDataNet network of National Oceanographic Data Centres).

There are a number of drivers for a stronger coordination of ocean observations in Europe, necessary to underpin our knowledge, the delivery of ocean services and future projections. The 2016 ESRL roadmap report stresses that Europe urgently needs to develop an integrated and sustained European Ocean Observing System (EOOS). The EOOS framework will look the currently disjoint components by an overarching strategy, maximizing the benefits of optimization, infrastructure reuse, standardization, open data and exchange capacity building, strengthening the European contribution to the GOOS.

Argo has demonstrated the importance of implementing and sustaining a global network, as well as the number of variables measured. But even if Argo has a fantastic instrument, it has its weaknesses and a multi-platform approach is necessary to address GOOS and EOOS societal challenges. Euro-Argo is engaging with the other ocean ERIs (EMSO, IOCOS) and Research Infrastructure (Golds, coastal networks, GOMPER) to contribute to an integrated observing network and be able to fill gaps whenever possible through initiatives such as TOPE for the Pacific Tropical Ocean, or the Atlantic BluePrint.

**The Euro-Argo Research Infrastructure**

The objectives of the Euro-Argo ERIC (European Research Infrastructure Consortium) are to coordinate and sustain the European contribution to the global Argo network, with around 1000 European Argo floats operational at any time (1/4 of the network), through both national and European funds.

Euro-Argo involves 13 countries: 10 members, 2 observers and 1 candidate. In 2014, Euro-Argo gained the status of a European Research Infrastructure Consortium (ERIC), a legal entity that ensures its funding in the medium-term through contributions of its members and observer, at state-level.

![Euro-Argo ERIC](https://example.com/euroargoeric.png)

Today, the European contribution represents more than 21% of the global Argo networks in terms of active floats.

**References**