



The Euro-Argo European Research Infrastructure

Towards a sustained European contribution to a global ocean observatory

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Outline

Why do we need Argo and Euro-Argo ?

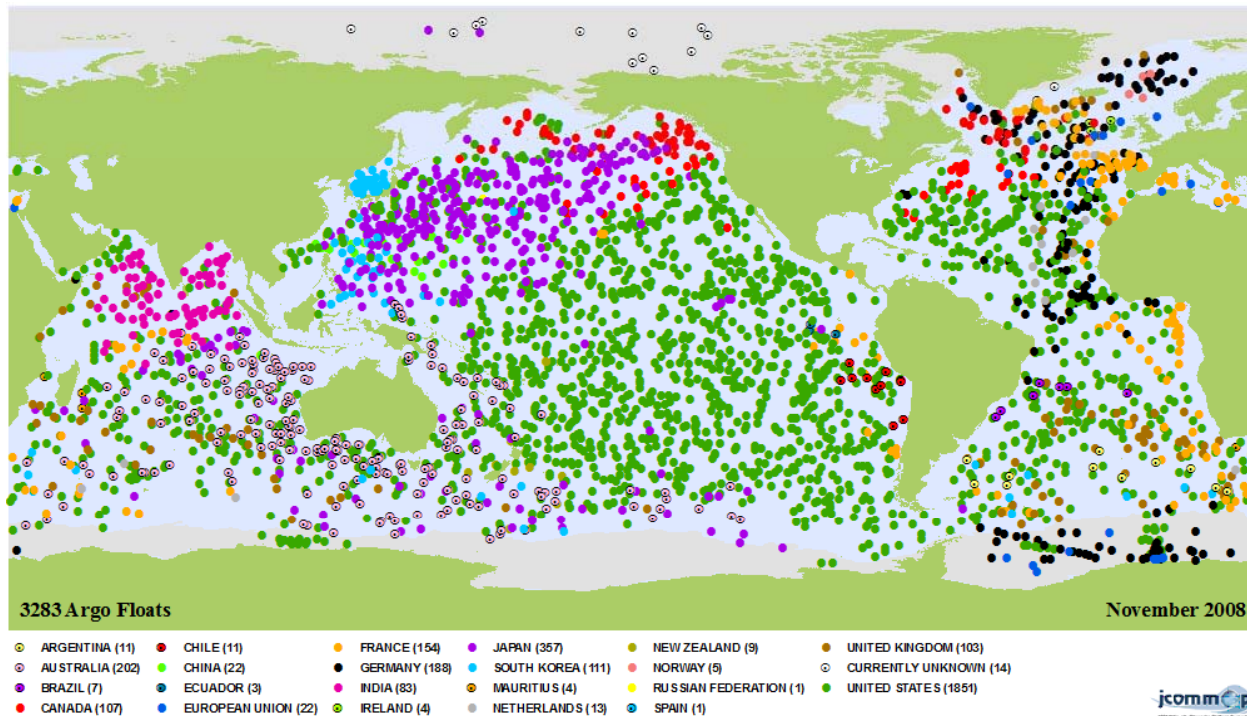
The Euro-Argo infrastructure

The Euro-Argo FP7 Preparatory Phase Project and the long term organisation of Euro Argo

Conclusions



Argo: the first global real time in-situ ocean observing system
3000 floats measuring temperature and salinity to a depth of 2000 m.



Maintaining the array's size in the coming decades is the next challenge for Argo. This is essential for ocean and climate research and operational oceanography (GMES Marine Core Service)

Evolutions => new scientific challenges : biogeochemistry, deep ocean, sea ice



The science case : climate change

The oceans have a fundamental influence on our climate and weather

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.

Over 100 research papers per year are now being published using Argo data.

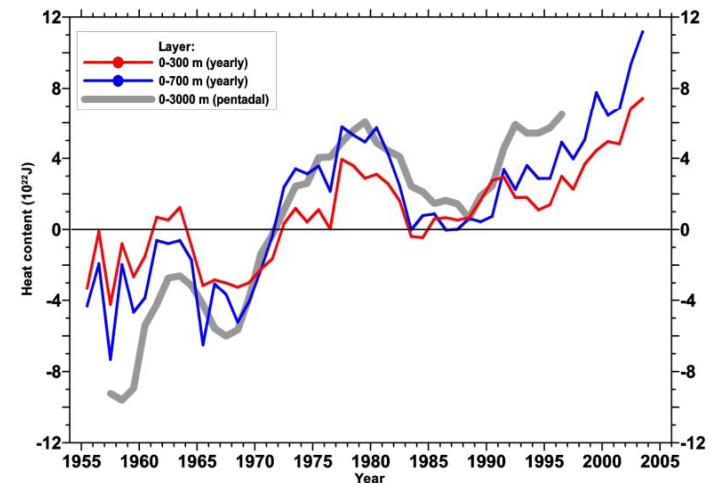
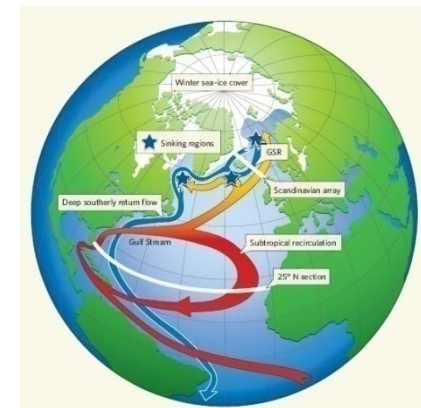


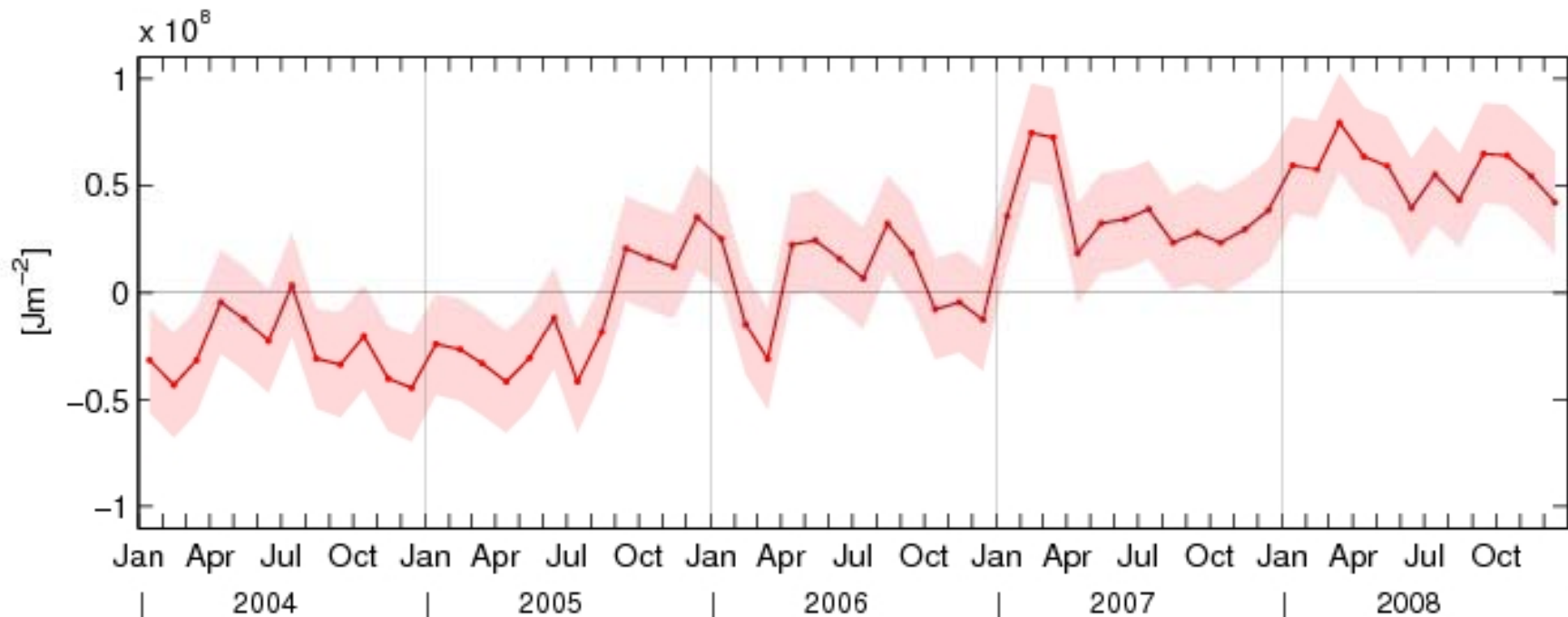
Figure 1. Time series of yearly ocean heat content (10²¹J) for the 0-300 and 0-700 m layers and pentadal (5-year running composites for 1955-59 through 1994-98) ocean heat content (10²¹J) for the 0-3000 m layer. Each yearly estimate is plotted at the midpoint of the year, each pentadal estimate is plotted at the midpoint of the 5-year period.





One of the Argo's most important contributions is a huge improvement in estimations of heat stored by the oceans

A key factor to gauge global warming and gain a better understanding of the mechanisms behind rising mean sea level.



Global ocean heat content derived from Argo data (2004-2008)
(Von Schuckmann et al., 2009). See also Trenberth, 2010.



Operational Oceanography

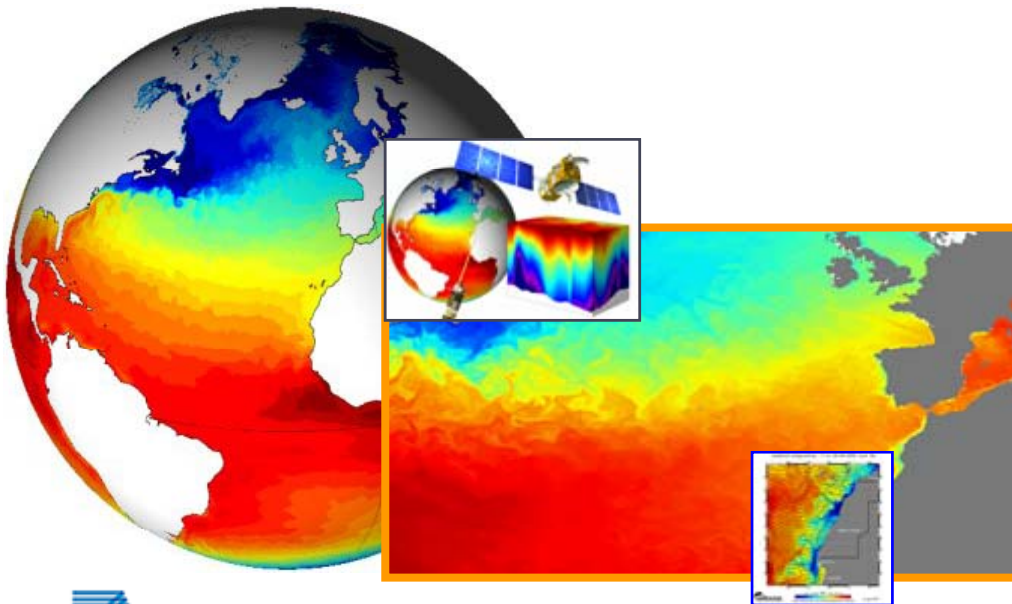


The GMES Marine Core Service



Combining in situ and satellite data, with models to deliver **regular and systematic reference information on the state of the oceans** and regional seas. **A wide range of ocean services.**

Argo is a critical component. Single most important in-situ observing system



- Physical state of the ocean, and primary ecosystem
- For global ocean, and main European basins and seas
- Hindcast, Nowcast, Forecast
- Data, Assimilation and Models



The Euro-Argo infrastructure



Euro-Argo : A new European Research Infrastructure

European contribution to a global ocean observatory

- A significant component of the global Argo array of 3.000 floats in operations
- Requires strong international and European cooperation
- Proposal : Europe establishes an infrastructure for $\frac{1}{4}$ of the global array
 - Requirement : 250 floats per year including regional enhancements (Nordic seas, Mediterranean&Black seas) (about 50 floats per year for regional enhancements)

Dual use : research and operational oceanography (GMES)

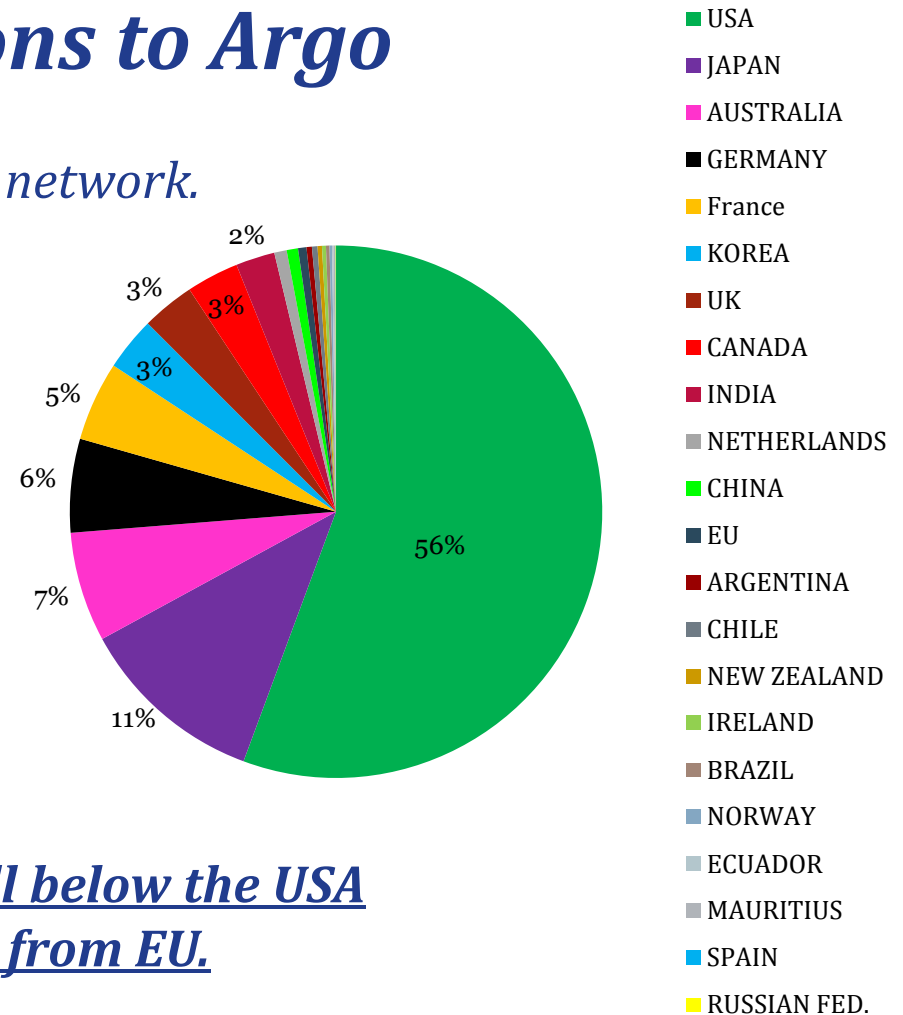


International contributions to Argo

A dozen countries are sustaining the global network.

Another dozen takes care of regional gaps.

Many others are supporting Argo.



EU contributes to about 15%. This is well below the USA contribution and what we should expect from EU.



Euro Argo Preparatory Phase (January 2008- December 2010)

FP7 project. New European research infrastructure
(ESFRI roadmap)



Objectives :

- Undertake the work needed to ensure that Europe will be able to:
 - Deploy, maintain and operate an array of 800 floats. This will require Europe to deploy 250 floats per annum worldwide.
 - Provide a world-class service to the research (climate) and operational oceanography (GMES Marine Core Service) communities.

Main expected outcomes :

- Agreement for long term (10-20 years) operation of Euro-Argo (financial, legal and governance, organisation, technical). Member States and GMES.

[see http://www.euro-argo.eu/](http://www.euro-argo.eu/)



Euro Argo Preparatory Phase partnership

12 countries, 15 partners

- **France**: IFREMER (Coriolis consortium) and SHOM
- **Germany**: BSH and KDM
- **UK** : Met Office and NERC.
- **Netherlands**: KNMI
- **Spain**: IEO
- **Italy**: OGS
- **Ireland**: Marine Institute
- **Norway** : IMR
- **Portugal** : FCCUL
- **Greece** : HCMR
- **Bulgaria** : USOF
- **Poland** : IOPAS





Main outcomes of the Euro-Argo preparatory phase (www.euro-argo.eu)

- 1/ Improve key components of the infrastructure (float technology, new biogeochemical sensors, QC and data system, user forum, capacity building).
- 2/ Define and agree on the long-term organisation of Euro-Argo (governance) and its future legal structure (Euro-Argo ERIC).
- 3/ Consolidate national commitments to Argo and work with GMES, DG Research, DG Mare and EMODNET and EEA to set up a direct long term support from the EC.



Purpose of Euro-Argo long-term infrastructure

- Manage and supervise operation of the Research Infrastructure (RI),
- Organize float procurement,
- Coordinate float deployments in the world ocean,
- Monitor array performance and operations,
- Decide on evolutions (array design, technology, new sensors, data systems),
- Facilitate access to users, develop new data sets and products,
- Conduct R&D activities at European level,
- Interfaces with users and user requirements (research, GMES),
- Link with, and integrate into, international structure.



Organisation of the Euro-Argo RI

The Research Infrastructure (RI) will comprise :

- ❑ A central facility (Central RI)
- ❑ Distributed national facilities (as of today but with coordination via the C-RI)
- ❑ Floats will be procured through the C-RI and through national facilities

The Central RI will be a European legal entity: Euro-Argo ERIC (European Research Infrastructure Consortium)

Plays the coordination role and participates actively in the programme :

- ✓ Float procurement, deployments, array monitoring
- ✓ Expertise on all aspects of the programme

It hosts the programme manager, the RI Office, logistics coordinator

Facilities : storage/testing/shipping of floats, meetings, visiting scientists, etc



Status of the Euro-Argo ERIC application

- **Statutes, technical & scientific description have been validated:**
 - Members: Germany, UK, France, Italy, Netherlands, Greece, Spain, Norway (TBC)
 - Observers : Greece, Ireland, Poland, Portugal
 - Contributions of different countries defined
 - Hosting institution for the ERIC : France (Ifremer) for the first 5 years.
- **Next step:** send an official application (French ministry of research) for the Euro-Argo ERIC and validation at ministerial and EC levels (on going).
- **Setting up of the ERIC and its governance bodies** (council, management board, scientific and technical advisory group, user group): early to mid 2011



Conclusion (1)

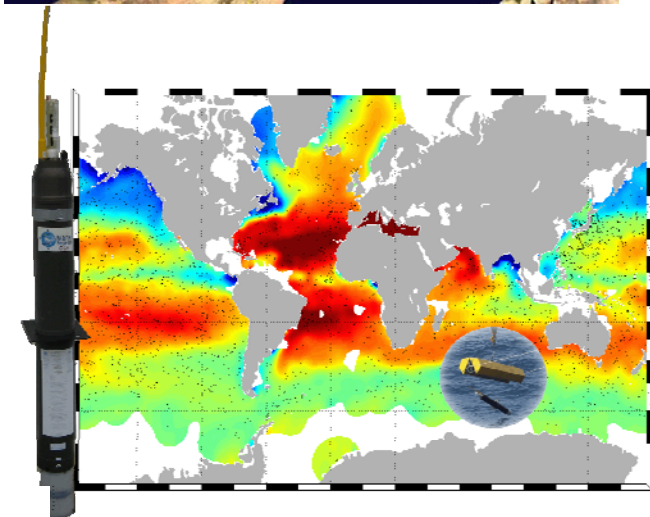
The very objective of Euro-Argo is to ensure a long term contribution of Europe to a global ocean observing system

European level is needed : improved efficiency in all implementation aspects

⇒ We have defined, agreed and are setting up a new European legal structure and organization.

⇒ This will allow EU member states to better coordinate, consolidate and sustain their contribution to Argo international.

⇒ Good progress to agree on the required direct EC (GMES) contribution to Euro-Argo. Decision is now needed.





Conclusion (2)

Argo and Euro-Argo is only one (essential) component of the in-situ global ocean observing system required for ocean and climate research and prediction. Need to organize and sustain on the longer run the other elements (e.g. Euro-Sites).

Main gaps are known (see EEA/EuroGOOS workshop): overall organization and coordination, sustainability and long term commitments, lack of observations and undersampling

This should be solved at European level (EC and member states). Role of EEA and EuroGOOS for the GMES in-situ infrastructure. Role of EMODNET.



Meeting Announcement

The future of the 21st century ocean Marine sciences and European Research Infrastructures

An international symposium
Brest, 28 June- 1st July 2011
Centre de Congrès “Le Quartz”

- List of invited programs: European Commission, Seas-ERA, ESFRI, Eurofleets, EMBRC, Euro-Argo, EMSO, MESOAQUA, Jerico, Euro-Marine, European Space Observatory, Seadatanet, MyOcean, GMES, OOI, Neptune Canada, IMOS, VISO-ESONET
- Specific program meetings: EMSO, Euro-Argo, EMBRC, JERICO