Euro-Argo achievements and long-term structure

P.Y. Le Traon

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Coordinator: Ifremer

Institut Français de Recherche pour l'Exploitation de la Mer - France

Outline

Why do we need Argo and Euro-Argo ?

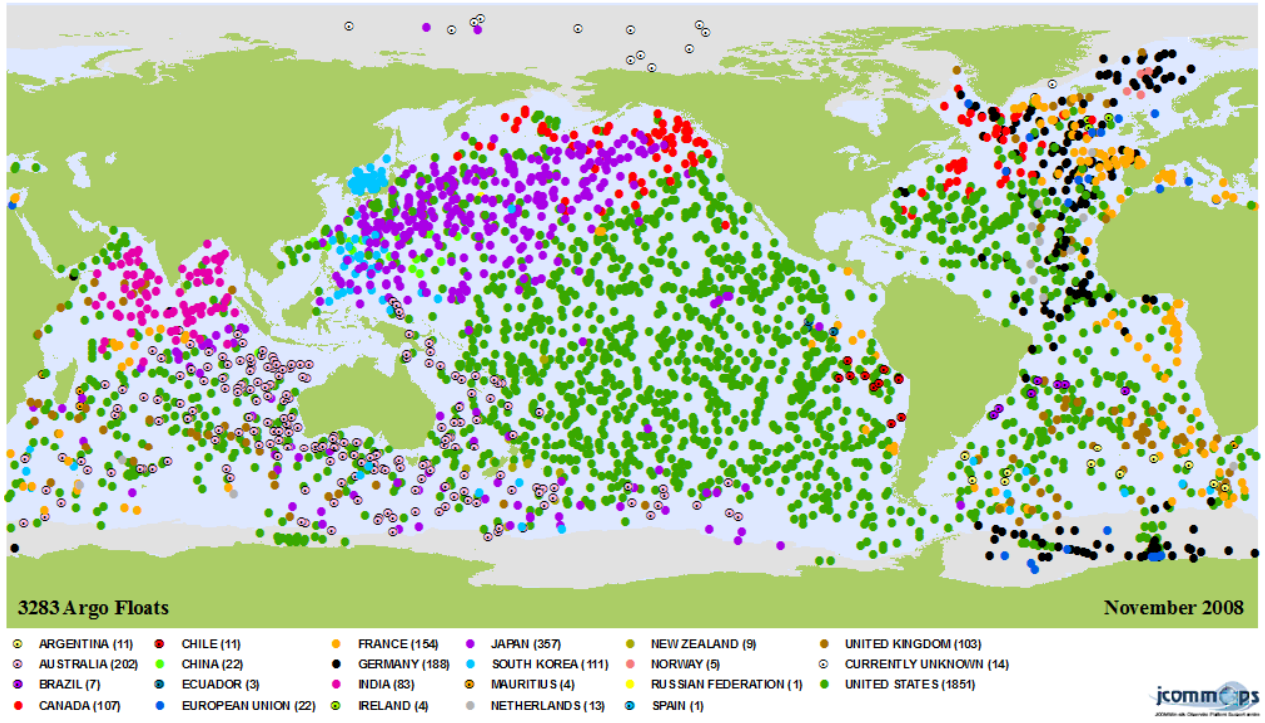
The Euro-Argo FP7 PP Project and its achievements

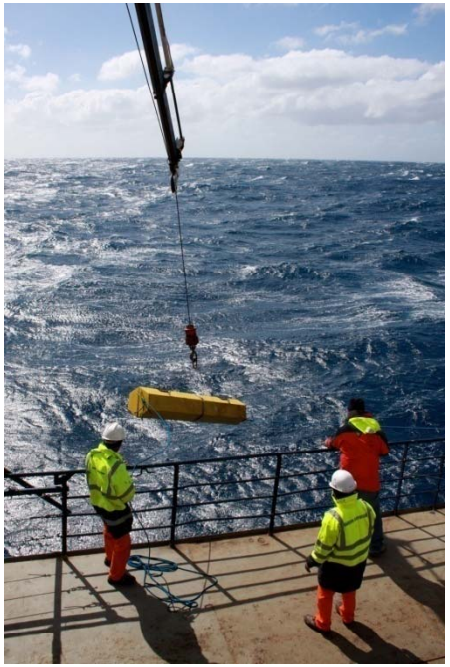
The Euro-Argo User Group

The long term organisation of Euro Argo

Argo: the first global real time in-situ ocean observing system

3000 profiling floats worldwide measuring the 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 climate research and operational oceanography applications (GMES Marine Core Service)

The science case : climate change

The oceans have a fundamental influence on our climate and weather

Over the past 50 years, the oceans have absorbed more than 80% of the Earth warming due to the anthropogenic increase of greenhouse gas concentration

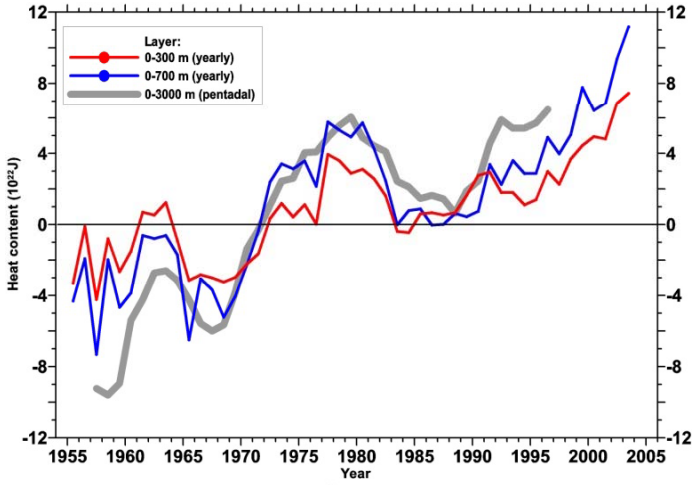
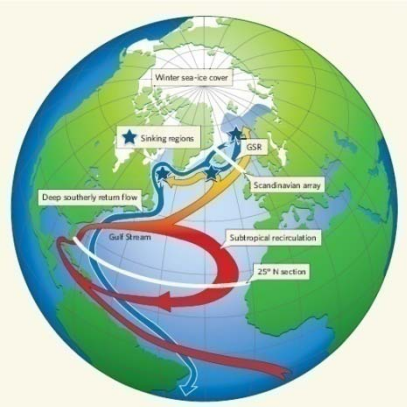


Figure 1. Time series of yearly ocean heat content (10^{22}J) for the 0-300 and 0-700 m layers and pentadal (5-year running composites for 1955-59 through 1994-98) ocean heat content (10^{22}J) for the 0-3000 m layer. Each yearly estimate is plotted at the midpoint of the year, each pentadal estimate is plotted at the midpoint of the 5-year period.

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 CO_2** from the atmosphere.



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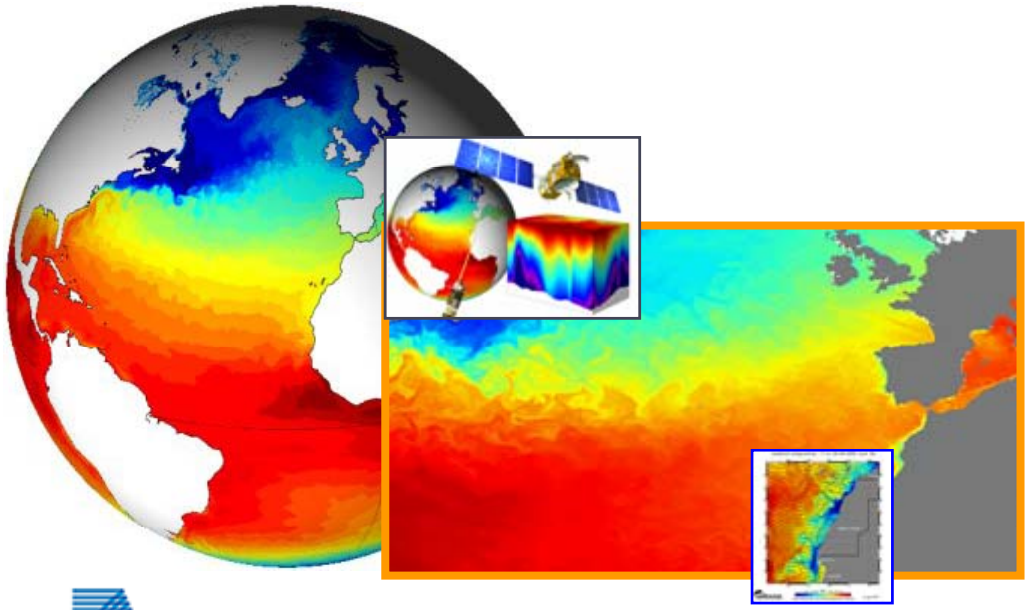
Operational Oceanography

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.

Argo is a critical component. Single most important in-situ observing system for the GMES MCS. Strong complementarities with satellite observations (altimetry).



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

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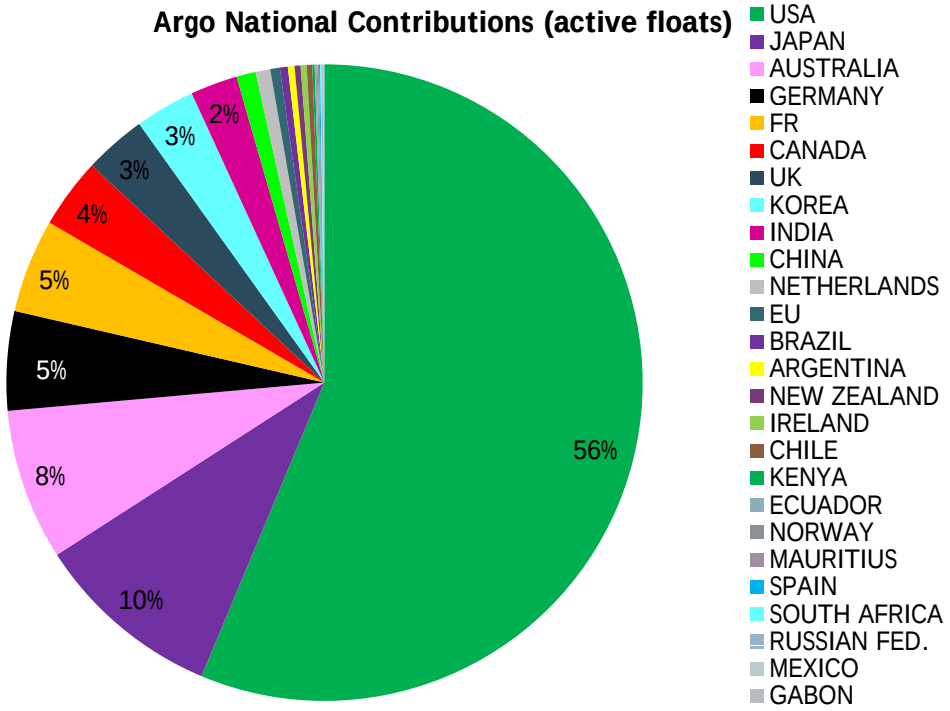
http://www.myocean.eu.org/

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 member states contribute to about 15%. This is well below what we should expect from EU. ***Need to improve and consolidate the EU contribution => sustained organization and funding at European level***

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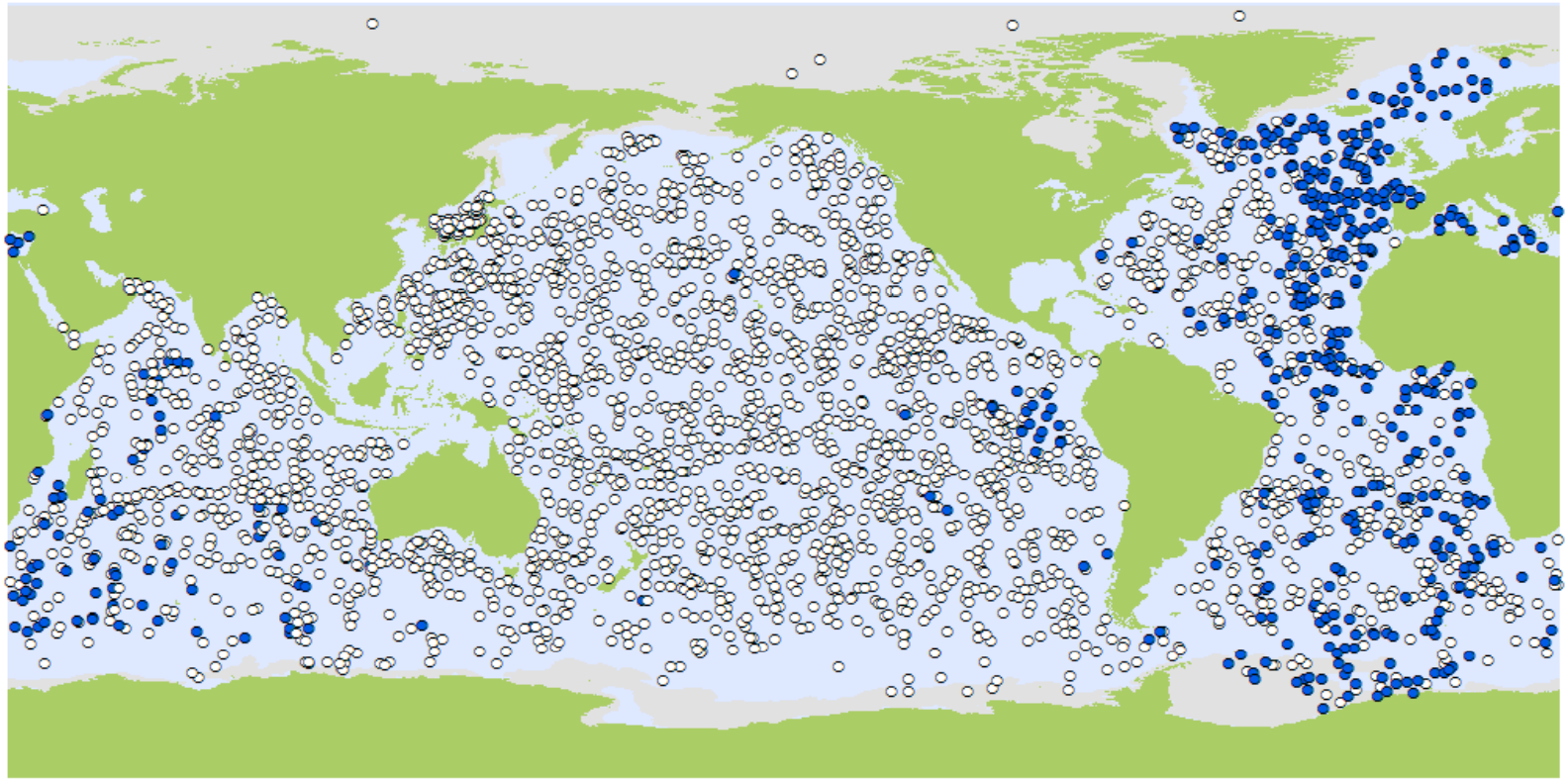
European contribution to the global array

(from Argo Information Center) (15% - December 2009)

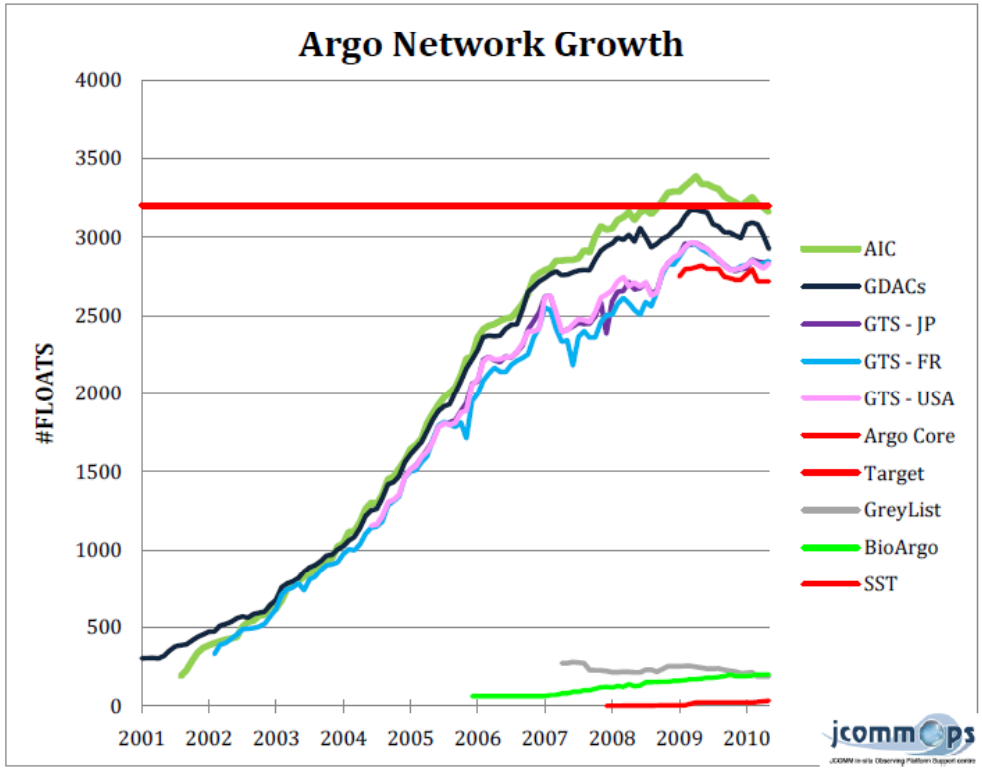


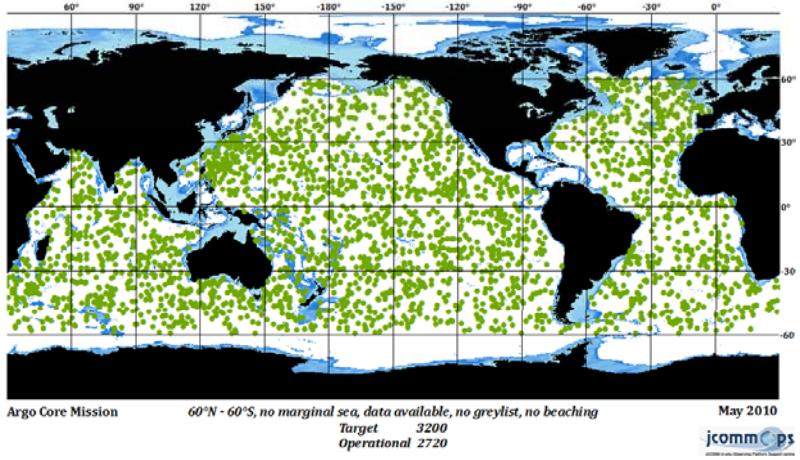
3198 Argo Floats
494 Euro Argo

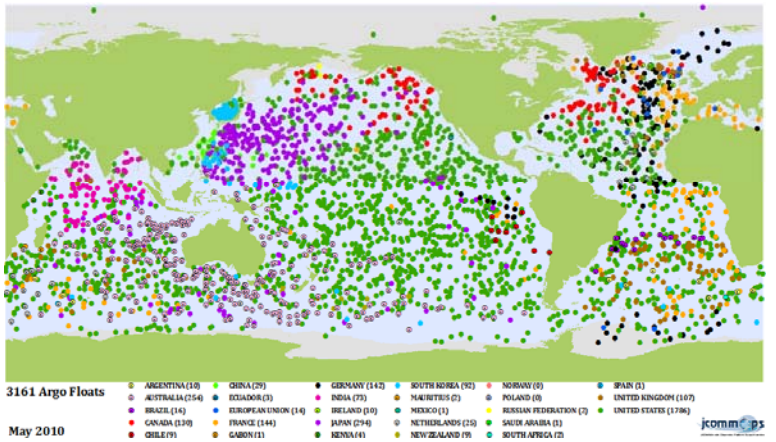
Bulgaria - France - Finaland - Germany - Greece - Ireland - Italy
Netherlands - Norway - Poland - Portugal - Spain - United Kingdom

December 2009

Global Argo core mission not yet fully achieved. Array starts to decline. Sustainability challenges !







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 ¼ 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)

Why a European Research Infrastructure ?

- Maintenance and evolution of the system requires high level of cooperation between European partners
- Efficiency in all aspects of implementation:
  - Operations at sea
  - Array monitoring and evolution
  - Sharing expertise on all scientific/technological developments
  - Facilitate data access for research
  - Interfaces/links with the GMES Marine Core Service
  - Coordinate the European contribution to the international management of the Argo programme

A well organized European research infrastructure will be highly beneficial for GMES and will strenghten European excellence and expertise in climate research

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/

Euro-Argo PP progress (see www.euro-argo.eu)

- Develop/consolidate long term national plans for Euro-Argo and attract new countries.
- Links with GMES Marine Core Service - MyOcean project.
- Work on the development of a long term EC funding through GMES, DG Research and EMODNET. Working with the EEA (in-situ data coordination for GMES).
- Several reports on infrastructure description, costs, float technology, deployement issues, data processing issues and improvements, synthesis on the use and impact of Argo data for research and operational oceanography in Europe
- Technical developments and improvements of the Argo data system.
- Float technology tests : Arvor-Iridium, Argos3, Sea Ice and O2 sensors
- **Strengthening the user community in Europe (user meetings)**
- Education and capacity building (educational WWW site, training)
- **Definition and agreement on the future governance and legal structure**

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Euro-Argo User Workshops

- Southampton, NOCS 26-28 June 2008
  63 attendees – 9 countries

- Trieste, OGS – 15-16 June 2009 (+ Training day)
  50 attendees – 11 countries

- Paris, Institut Océanographique, 17-18 June 2010
  70 attendees – 16 countries

The role of Euro-Argo user group

- Need to set up an active European user group to:
  - Advise on the evolution of the infrastructure (data&products, QC, sampling, new sensors, etc).
  - Develop the use of Argo in Europe (research, climate, operational oceanography and GMES).
  - Share expertise and ideas at European level, develop joint research projects and collaborative works (see tomorrow morning discussion).
  - Promote and disseminate results on Argo achievements.

- Critical to sustain Euro-Argo and Argo

- Need your inputs/ideas on the long term organization of the Euro-Argo user group and its interactions with the Euro-Argo ERIC (tomorrow afternoon discussion)

Euro-Argo long-term organization

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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, OO and GMES),
- Link with, and integrate into, international structure.

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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

2 people from 2011 – 4 to 5 people from 2013.

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

Governance

- A Council (high level)
  - ✓Establishes the infrastructure and takes major strategic decisions
- A Management Board
  - ✓Supervises operation of the infrastructure; decisions on implementation of annual work plan
- Programme Manager
  - ✓Executes, organizes, coordinates, manages day to day operations
  - ✓Representation to other international bodies
  - ✓The Programme Office
- Scientific and Technical Advisory Group
  - ✓Advises, recommends to the PM and to the MB.
- Users Group : forum for all users of the EuroArgo -RI

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Status of the Euro-Argo ERIC application

- **Statutes, technical & scientific description have been validated at institute level:**
  - Members : Germany, UK, France, Italy, Netherlands, Bulgaria, Spain (TBC)
    - Commitments of at least 3 floats/years, funding for the C-RI 30 keuros
  - Observers : Greece, Ireland, Poland, Portugal
    - Funding of the C-RI 10 keuros/year
  - Contribution of different countries defined
    - float procurement, deployment, data system (GDAC, ARC, delayed mode QC)
  - Hosting institution for the ERIC : France (Ifremer) for the first 5 years.

- **Next steps :** send an official application for the Euro-Argo ERIC => validation at ministerial and EC levels during 2010.

- **Setting up of the ERIC and its governance bodies** (council, management board, scientific and technical advisory group): early 2011

Cost and funding issues

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Euro-Argo consolidated costs
8.2 Meuros/year (250 floats+35 FTE/y)

Category	Unit cost (k€)	Number	Cost (k€)
Float procurement			
Global (assumes standard Argo float)	14	200	2800
Regional (assumes enhanced floats)	17	50	850
Operations			
Telecommunications	0.4	800	320
Personnel for management/coordination	100	5	500
Personnel for technical/logistic support	100	6	600
Misc (e.g. freighting)	0.2	250	50
Equipment and consumables			50
Dedicated ship time			300
Data management			
Personnel	100	19	1900
Equipment, other			100
Euro-Argo central infrastructure (CI)			
Personnel for management/coordination	100	2	200
Personnel for technical/logistic support	100	3	300
Missions (users workshops, board, council), equipment, etc.			100
International infrastructure support			
Support to Argo Information Centre			40
Support for Argo Project Office/Director			30
Total			**8140**

Funding issues

Based on planned Member States contributions (4-5 Meuros/year), a direct EC funding (through GMES and EEA, DG Research and EMODNET) of about 3.3 Meuros/year focused on activities of European relevance will be needed.

Category	Member States	EC	TOTAL
Float procurement			
Global	1400	1400	2800
Regional	850		850
Operations			
Telecommunications	160	160	320
Personnel for management/coordination	500		500
Personnel for technical/logistic support	600		600
Misc (e.g. freighting)	50		50
Equipment and consumables	50		50
Dedicated ship time		300	300
Data management (part of GMES Marine Core Service)			
Personnel	950	950	1900
Equipment, other	50	50	100
Euro-Argo central infrastructure (CI)			
Personnel for management/coordination	200		200
Personnel for technical/logistic support		300	300
Missions (users workshops, board, council), equipment, etc	50	50	100
International infrastructure support			
Support to Argo Information Centre		40	40
Support for Argo Project Office/Director		30	30
Total without MCS	**3850**	**2280**	**6140**
Total with MCS	**4860**	**3280**	**8140**

Conclusion

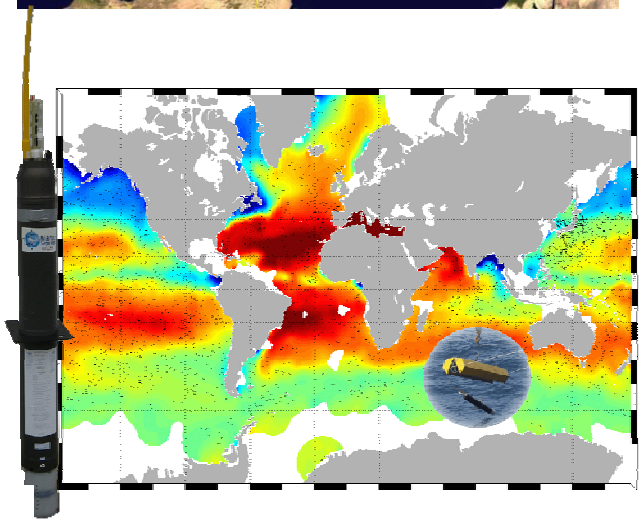
The very objective of Euro-Argo is to ensure a long term contribution of Europe to Argo

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 define and agree on the required direct EC long term contribution to Euro-Argo. Decision needed.



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GMES
Observing our planet for a safer world