



Euro-Argo Status

P.Y. Le Traon, E. Mamaca
and Euro-Argo partners

AST-12, Buenos Aires, March 2011

Euro-Argo: A new European Research Infrastructure



Coordinator: **Ifremer**

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



Outline

- Euro-Argo and its preparatory phase project
- The future long-term organisation of Euro-Argo
- Euro-Argo float deployment plans
- Euro-Argo views on the long-term evolution of Argo



Euro Argo Preparatory Phase (January 2008- June 2011)

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, governance, organisation, technical). Member States and GMES.

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



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 operation
- Requires strong international and European cooperation
- Proposal : Europe establishes an infrastructure for $\frac{1}{4}$ of the global array
 - o Requirement (as of today) : 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)



Euro-Argo Preparatory Phase partnership

12 countries, 15 partners

- France: IFREMER (representing the multi-agency Coriolis project) + SHOM
- Germany: BSH + Konsortium Deutsche Meeresforschung (KDM)
- UK: Met Office and NERC
- Netherlands: KNMI
- Spain: IEO
- Italy: OGS
- Ireland: Marine Institute
- Norway: IMR
- Portugal: FFCUL
- Greece: HCMR
- Bulgaria: USOF
- Poland: IOPAS



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

- Develop/consolidate long term national plans for Euro-Argo and attract new countries. New countries (Italy, Poland, Bulgaria, Greece, Finland) have joined Argo.
- Links with GMES Marine Core Service - MyOcean project.
- Work on the development of a long term EC funding line through GMES and DG Research.
- Several reports on infrastructure description, costs, float technology, deployment issues, data processing issues and improvements, benefits of Argo data.
- 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



Euro-Argo long-term organization



Organisation of the Euro-Argo RI

The 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) that will initially be hosted by France (Ifremer)

Plays the coordination role and actively participates 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 and facilities : technical support, storage, testing, shipping, etc.



Two phases for the Euro-Argo ERIC

- **2011-2013**

- **Light structure:** 1 programme assistant (100%) (E. Mamaca), 1 programme manager (20%) (S. Pouliquen). Ifremer personnel seconded to the ERIC.
- **Budget for missions** (incl. ERIC members), workshops, WWW
- **Funding by members and observers**

- **2014+**

- **Structure :** 1 programme assistant (E. Mamaca), 1 programme manager (50%) (S. Pouliquen), 1 technician, 1 engineer/scientist (ERIC employees or seconded by members to the ERIC).
- **Budget for missions** (incl. ERIC members), workshops, WWW
- **Funding by members and observers and the European Commission**
- **50 to 100 floats/year** procured by the ERIC (EC funding). EC co-funding for the data system.
- **Consolidated European contribution to the Argo Information Centre.**



Status of Euro-Argo ERIC application

- *List of members: France, Germany, UK, Italy, Netherlands, Greece, Bulgaria, Spain*
- *List of observers : Ireland, Poland, Portugal - Norway (decision in Spring - member)*
- *Final version of statutes and technical/scientific annex*
- *Official application by France (ministry of research with an interministerial agreement) for the creation of the Euro-Argo ERIC. The validation step at ministerial level will take a few months then the application will be officially sent to the EC.*
- *Validation by the EC. Signature by all countries (members).*
- *Start of the ERIC: January 1st 2012 (our objective).*
- *Need an interim structure handled through Ifremer from July 2011.*



Euro-Argo and the long term sustainability of Argo

The very objective of the Euro-Argo PP is to ensure long term European contributions to Argo.

All countries have agreed to set up a new European legal structure (Euro-Argo ERIC) that provides strong visibility for Argo in Europe and will allow European countries to consolidate and improve their contribution to Argo international. Agreements are at ministerial level and this will help to ensure long term sustainability.

The existence of a European legal entity will facilitate the access to long term European funding through GMES.



Direct European (EC) Funding for Euro-Argo

2011-2013

SIDERI (Strengthening International Dimension of Euro-Argo Research Infrastructure) (1 Meuros). Proposal under evaluation. 5 objectives :

- International integration
- Integrating and extending Euro-Argo activities in the European Neighbourhood
- Float deployment coordination
- Legal and policy issues
- Conferences, workshops and outreach

R&D call (GMES) this Fall (2 Meuros) : evolution of Argo technology

2014 – 2020

Long term funding from GMES in-situ

- Up to 100 floats/year
- Part of the data system



Euro-Argo float deployment plans

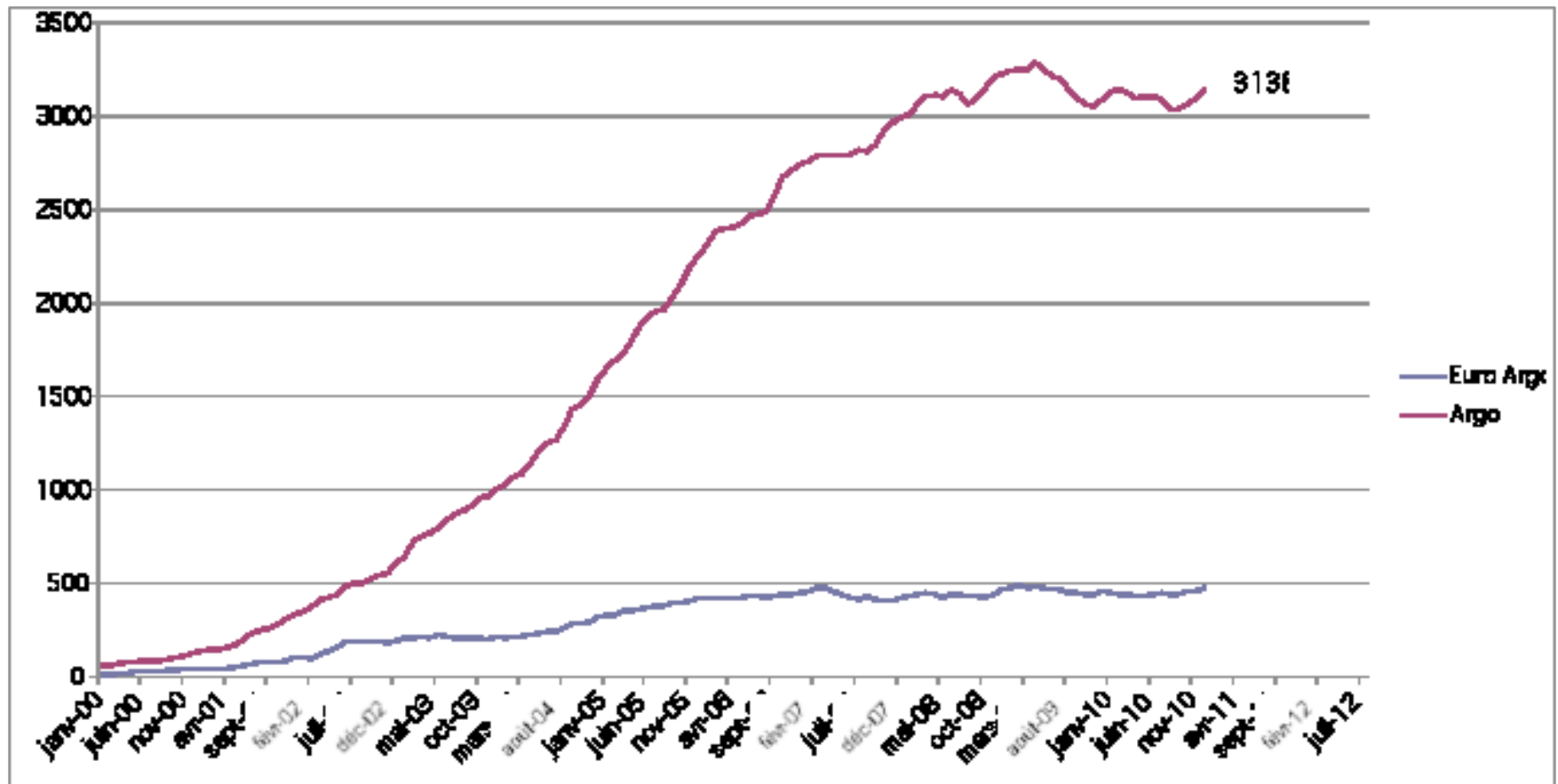


Euro-Argo – deployed floats (from AIC)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
UNITED KINGDOM	37	37	45	28	24	33	29	20	25	31
FRANCE	8	34	85	89	51	36	90	35	57	54
GERMANY	14	27	44	55	36	35	71	33	61	42
ITALY	0	0	0	0	0	0	0	0	1	0
NETHERLANDS	0	0	3	4	4	4	13	4	9	5
NORWAY	3	6	0	0	2	0	0	0	4	2
SPAIN	0	7	2	1	1	0	0	0	12	3
IRELAND	0	2	0	0	0	0	4	4	3	1
POLAND	0	0	0	0	0	0	0	2	0	0
GREECE	0	0	0	0	0	0	0	0	1	0
BULGARIA										
FINLAND									2	2
EUROPEAN COMMISSION	70	4	19	26	20	9	0	0	0	16
TOTAL	132	117	198	203	138	117	207	98	175	156



Euro-Argo active floats (GDAC) versus total Argo floats (from AIC)



Euro-Argo target is 800 active floats (about 500 floats today)



Euro-Argo float deployment plans

	2011-2014 Total	2011-2014 Global/Core	2011-2014 Regional	2014-2020 Total	2014-2020 Global/Core	2014-2020 Regional
France*	80	65	15	80	65	15
UK	40	40		40	40	
Germany	70	50	20	70	50	20
Ireland	3	3		3	3	
Norway	8		8	8		8
Netherlands	7	7		7	7	
Spain	5	5		10	5	5
Italy	30	15	15	30	15	15
Greece	3		3	3		3
Portugal						
Poland	2	2		2	2	
Bulgaria	3		3	3		3
Finland						
Europe (EC)				100	75	25
TOTAL - (almost) committed	235	179	56	195	139	56
TOTAL - Maximum	251	187	64	356	262	94

* + 120-150 new floats (bio, O₂, deep, Med Sea, Arctic) from research proposals (Remocean, NAOS) over 2011-2017

Regional : Med Sea, Black Sea, Nordic Seas, Arctic

2014-2020

T&S floats - likely addition of biogeochemical sensors will reduce the total number of floats

EC contribution if at the level of 100 floats/year would allow us to reduce national contributions



Euro-Argo and the evolution of the Argo programme

Euro-Argo needs to meet requirements from the research and operational (GMES) oceanography community in Europe.

Strong European requirement for marginal seas: Mediterranean and Black Seas.
Euro-Argo requirements have been defined. Implementation is ongoing.

Important European research activities in high latitudes: Nordic Seas, Arctic

Strong interest (and good maturity) of the European research community and GMES (operational oceanography) for extension to biogeochemical variables : Oxygen, Chl-a. This needs to be organized at international level. Several pilot experiments ongoing or planned (Nordic seas, Atlantic, Med Sea, Eastern Pacific).

Improved resolution at the surface (SST, SSS) needed (on going)

Deeper measurements needed - a longer term issue. France will start a pilot project in the North Atlantic (20-30 floats) in 2014-2016.



Sampling strategy for the Mediterranean Sea, the Black Sea and Nordic seas (Poulain et al., 2009 - Quadfasel, 2010)

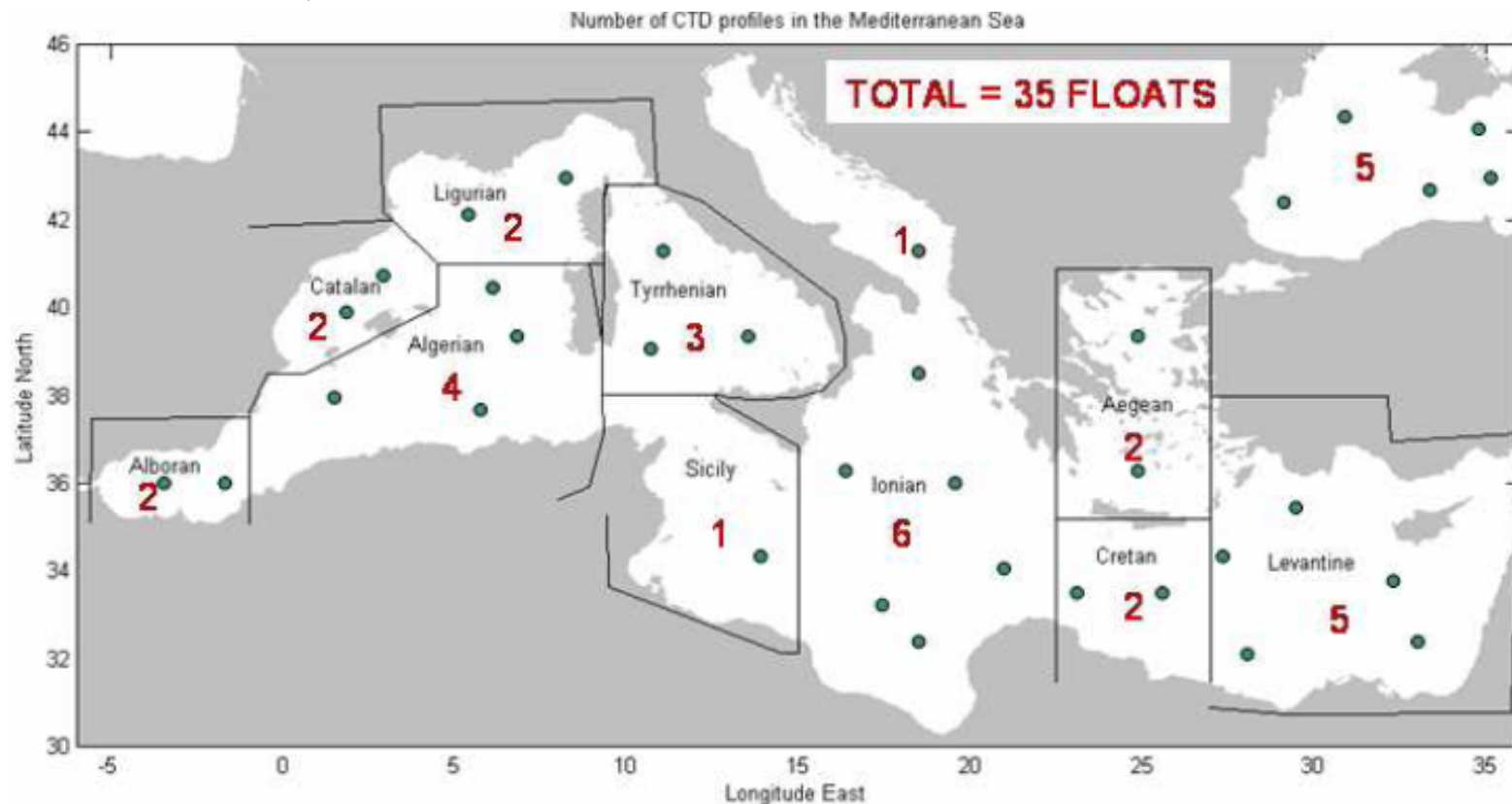


Figure 23. Proposed minimum distribution of the float array in the Mediterranean and Black Seas for the continuation of the Argo project. Numbers indicate the quantity of proposed floats in the sub-basins.



Euro-Argo and the evolution of the Core Argo program

**There is a need to redefine the Argo international mission
so that it better matches activities**

Proposal :

1. Keep the Argo « Core mission » as the global +/-60° array (T&S)
2. Define and agree on an Argo « extended mission » for marginal seas (T&S)
3. Define and agree on an Argo « extended mission » for high latitudes (T&S)
4. Define and agree on a strategy for O2 and Bio Argo « extended mission » implementation
 - Common sensor package ?
 - Pilot experiments from now to 2014 or +
 - Sharing of best practices, develop/improve the data system, technology
 - Part of the global and regional arrays from 2014 or + ? (what is the target for the global array and for marginal seas ?)
5. Deep floats : start with pilot experiments. Design studies needed.



End



Funding issues

Euro-Argo refined estimation of costs/year

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

****Includes extra staff for processing, operation and coordination***



Funding issues

Estimation of Euro Argo cost is about 8.2 Meuros/year (250 floats+ 35 FTE/y). Based on planned Member States contributions (4-5 Meuros/year), a direct EC funding (through GMES) of about **3.3 Meuros/year focused on activities of European relevance** is 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



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's oceans,
- ☐ Monitor array performance and operations,
- ☐ Decide on evolutions (array design, technology, data systems),
- ☐ Facilitate data 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.