



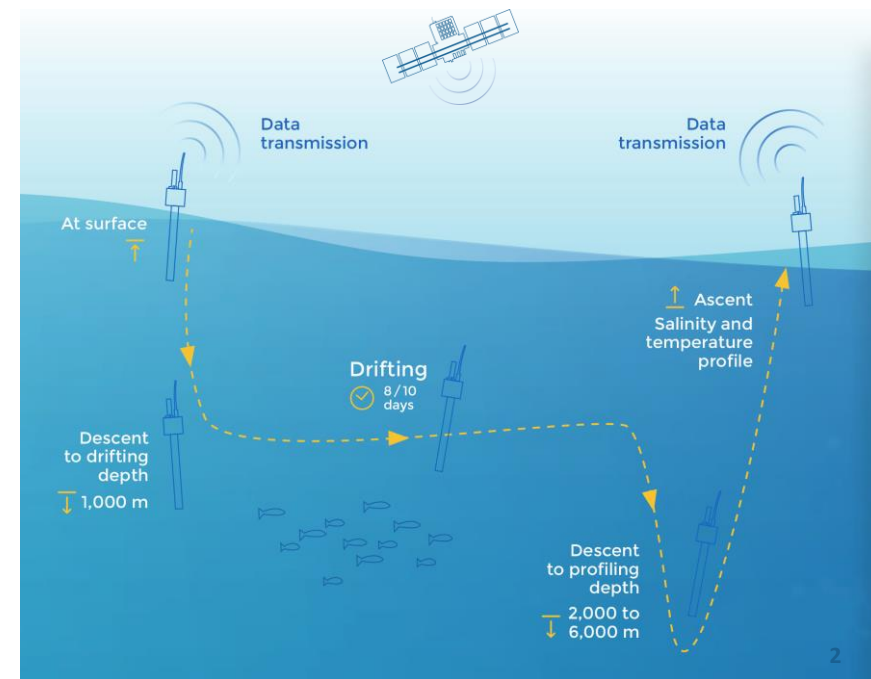
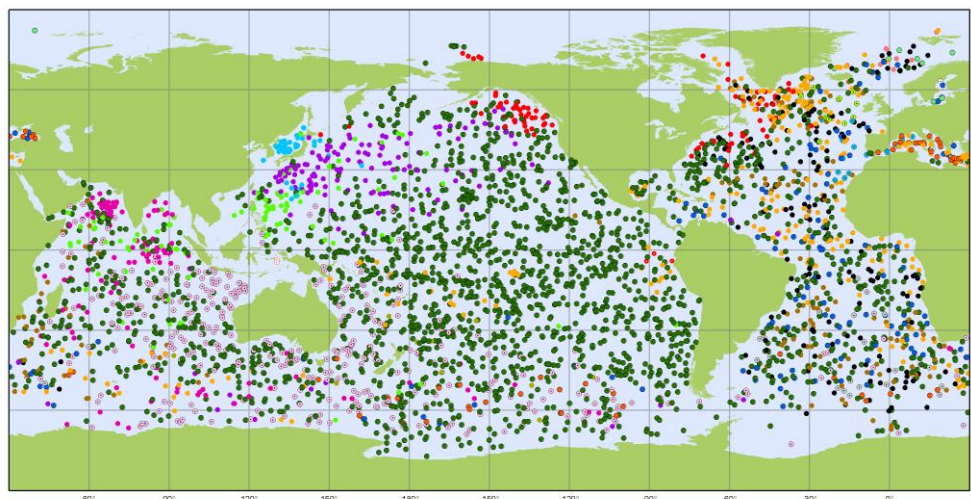
Euro-Argo

The European contribution to the global Argo ocean observation network



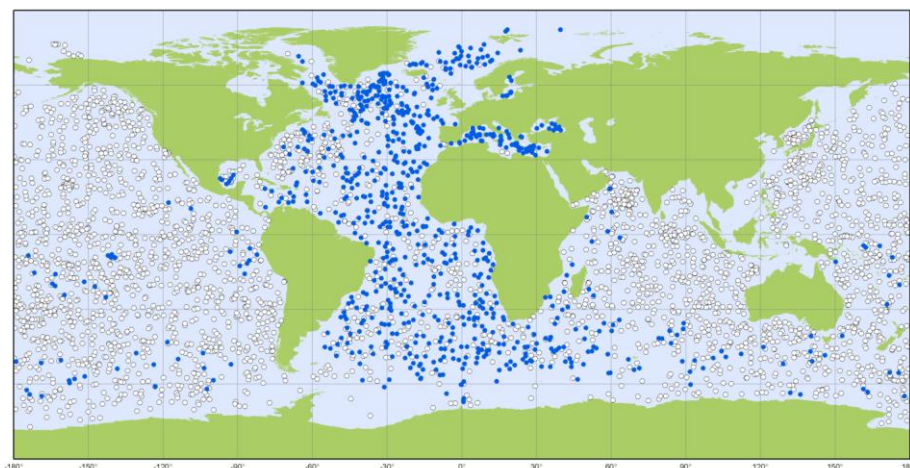
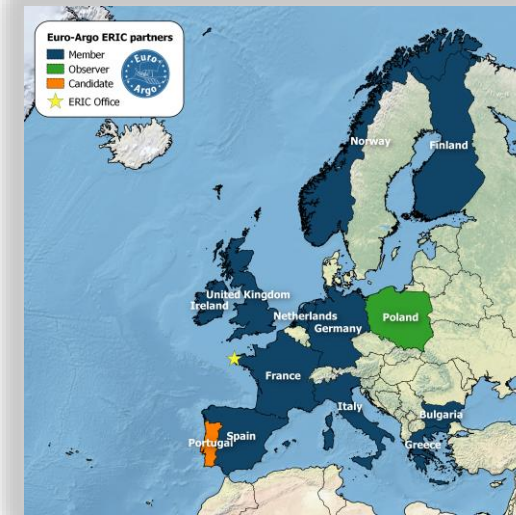
Argo: a global *in situ* observing system

- About 4000 autonomous profiling floats are measuring ocean temperature and salinity up to 2000 m depth, all over the globe
- The Argo network delivers essential data both for climate change research and for ocean analysis and forecasting systems



Objective : To coordinate and sustain the European contribution to the global Argo network (1/4 of the network)

- Euro-Argo was part of the 2006 ESFRI Roadmap
- The **Euro-Argo ERIC** (European Research Infrastructure Consortium) **was created in May 2014** and has increased from 9 funding members to 12 members in 2018.
- Euro-Argo is a Landmark in the ESFRI 2018 roadmap

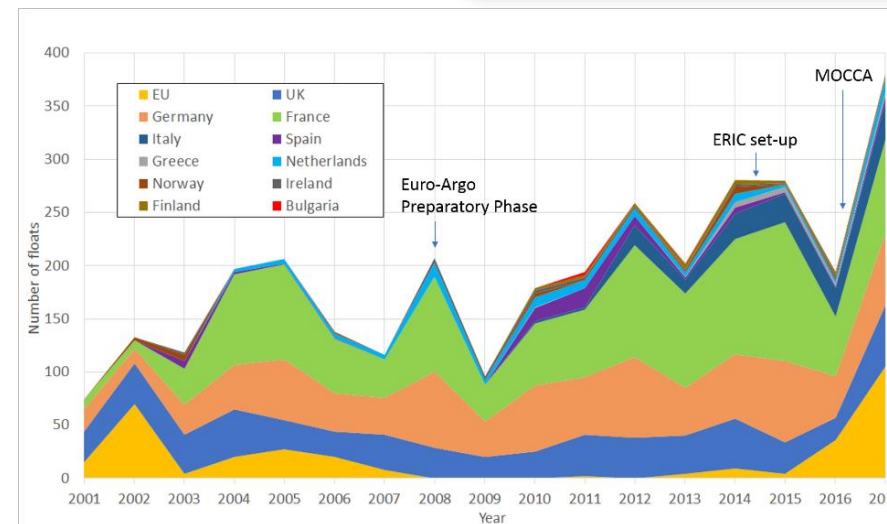


Argo
EuroArgo
 European contribution to the Argo program via EuroArgo Research Infrastructure
 Latest locations of operational profiling floats (data distributed within the last 30 days)
 January 2019

● Argo EU (832) ○ Argo non EU (3077)



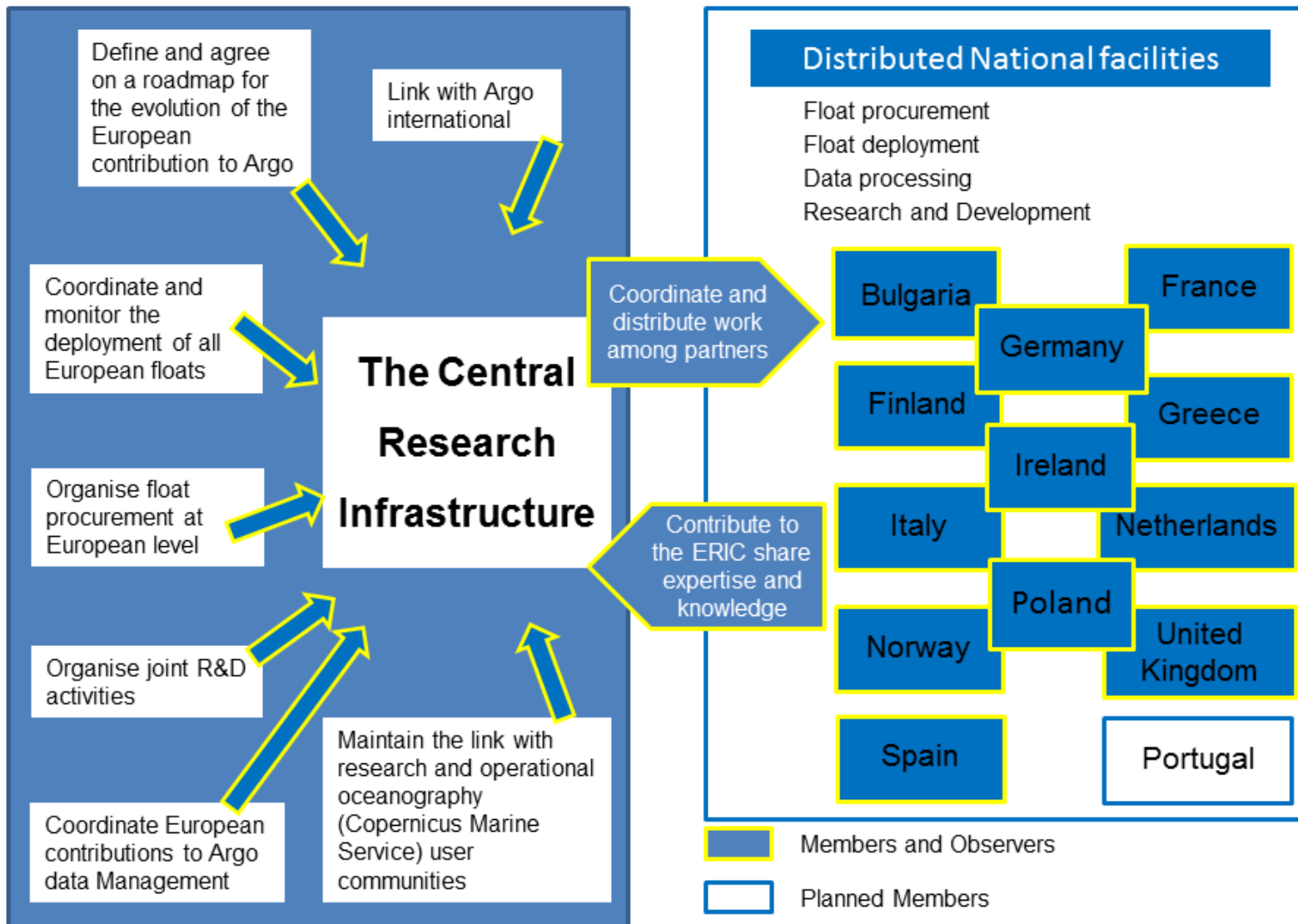
Generated by www.jcommaps.org



Increase of the European contribution to the international network (number of deployments / year)



Organisation of the Euro-Argo ERIC





The ERIC Office team – Brest, France



Sylvie Pouliquen
Programme Manager



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Technical Coordinator



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Research Engineer



Euro-Argo success in EU Projects

- **AtlantOS [2015 – 2019]**

- The Euro-Argo ERIC has coordinated operations at sea and associated logistics to allow deployment of 7 deep-oxygen and 7 Biogeochemical Argo floats
- OSE-OSSE have been performed to help improving the design of ocean observing systems - including Argo - in the Atlantic Ocean



- **ENVRIplus [2015 – 2019]**

- A cluster of Research Infrastructures for Environmental and Earth System sciences, built around the ESFRI roadmap and associating leading e-infrastructures and integrating Activities together with technical specialist partners
- Euro-Argo was involved in Themes 1 – Technological Innovation, 2 – Data for Science and 6 – Communication and Dissemination



- **MOCCA: Monitoring the Oceans and Climate Change with Argo [2015 – 2020]**

- 5 years project started in 2015 funded through a EASME grant (DG-MARE):
 - ✓ Procurement of 150 T/S Argo floats during 2015-2016 (20% co-funded by Euro-Argo partners)
 - ✓ Arrangement for their deployment in 2016-2018, including at-sea monitoring
 - ✓ Data processing in real-time and delayed-mode, during the period 2015-2019





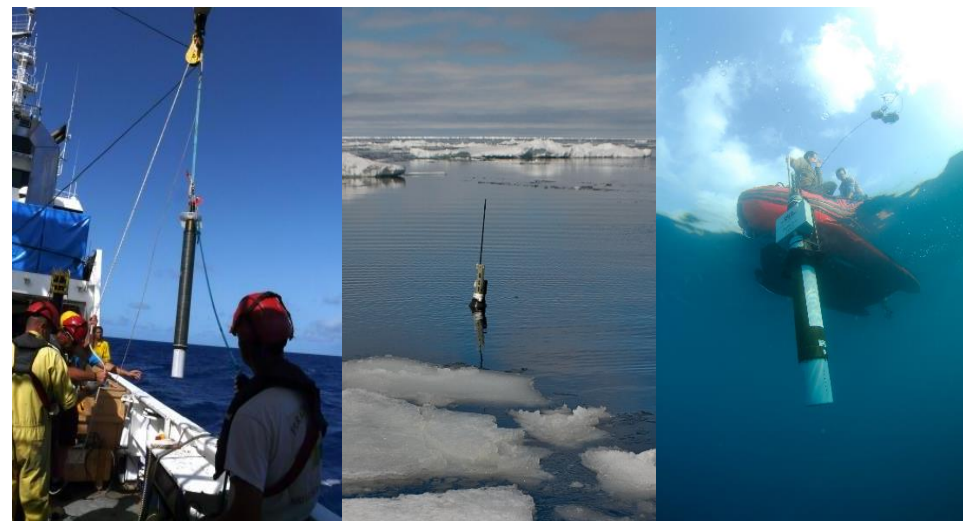
Main achievements over the last 5 years

- Set-up a Euro-Argo ERIC team and office which supports the European contribution to Argo
- ERIC membership extended from 9 to 12 countries
- European contribution increased from less than 20% to nearly 25% of the global network
 - Next challenge is sustainability of network and extension to new missions
- Development of a European community in Argo
 - European contribution more visible and acknowledged at international level
 - Built a stronger European user Community
- New services for the members:
 - Centralised float procurement/testing and
 - Tools for at-sea monitoring of the Argo fleet
- Fostered links with other environmental and marine Research Infrastructures [ENVRiplus – H2020]
- Capacity to extend the network to biogeochemistry, greater depths and specific regions through technological developments (higher latitudes, marginal seas) [E-AIMS - FP7, AtlantOS – H2020]
- Success in setting-up proposals for EU funded projects



Argo in Europe for the next decade

- Main Challenges:
 - **Maintain** the Research Infrastructure
 - **Extend** its capacity to abyssal ocean (4000 to 6000m), biogeochemistry, partially ice covered areas and shallow waters regions
- Euro-Argo is developing the European strategy in coherence with Argo international:
 - Sustain the core T&S mission, with an emphasis in Western Boundary regions
 - Monitor European marginal seas (Baltic, Mediterranean & Black seas)
 - Monitor high latitudes
 - Monitor the abyssal oceans
 - Monitor ecosystem parameters
- Euro-Argo plans to contribute **to ¼ of the global network** and is now starting to implement the new phase of Argo
- Reference document: ***“Strategy for evolution of Argo in Europe”*** (Euro-Argo ERIC, 2017)
DOI: 10.13155/48526

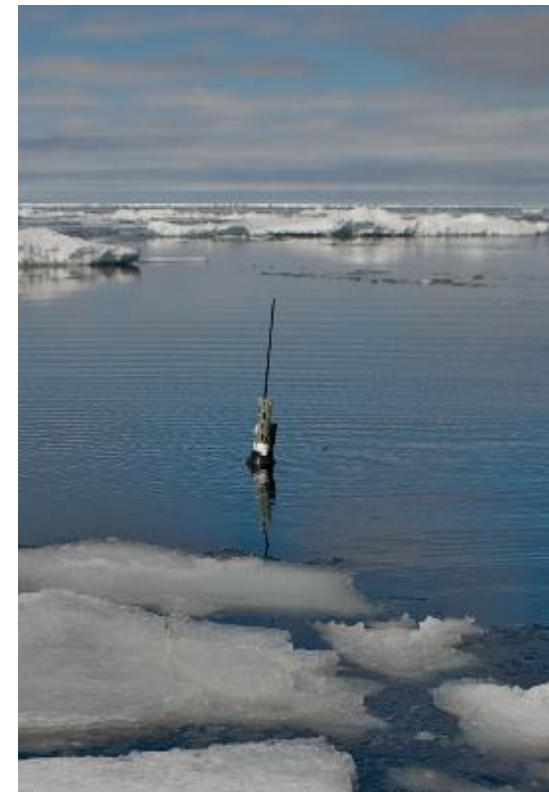


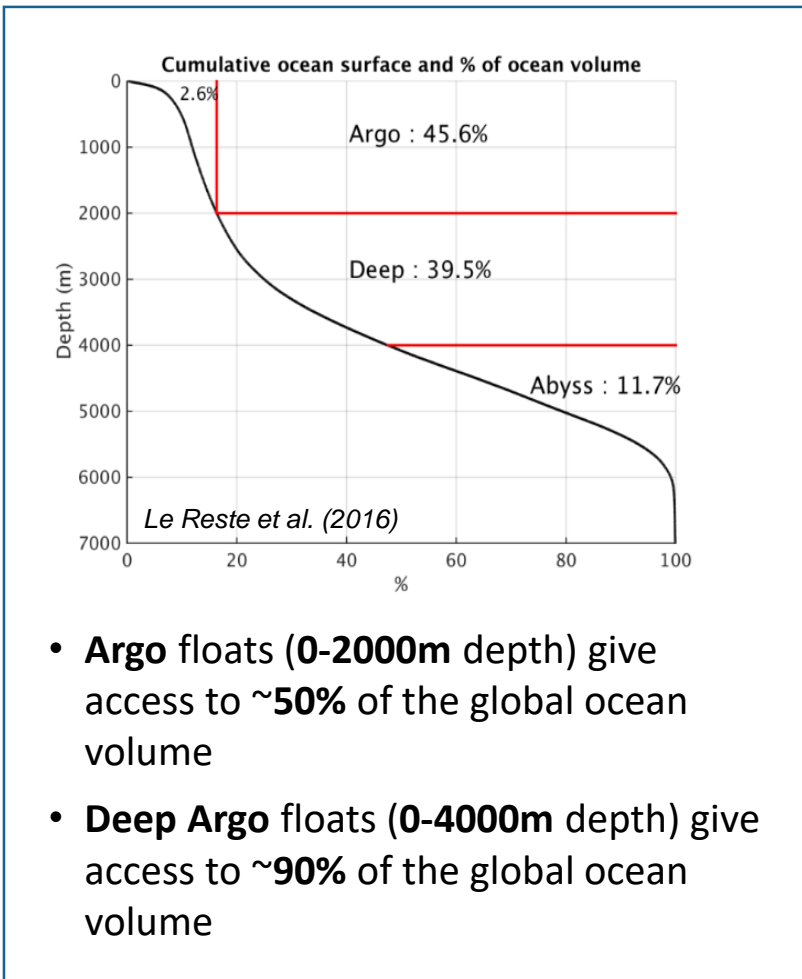


Core T/S Argo mission & marginal seas

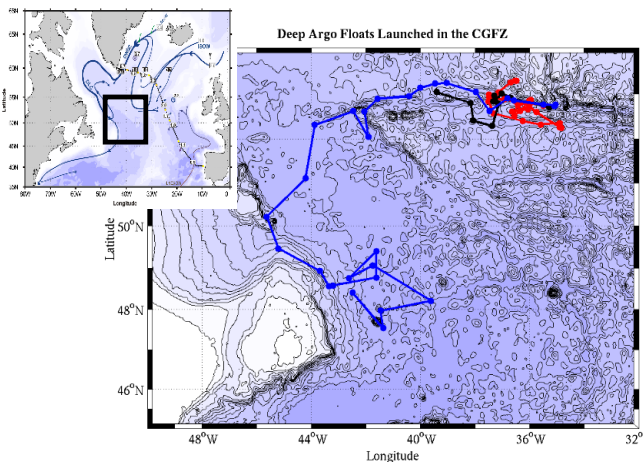
- Both national & EU (MOCCA project) contributions
- Euro-Argo ensures that the European deployments fulfil both the international Argo programme requirements and the European scientific and operational oceanography community's needs
 - Specific attention on keeping the appropriate sampling in **equatorial and boundaries regions (twice the classical sampling)**.
 - **Doubling** the classical Argo sampling in the **Mediterranean and Black Seas**, with 60 active floats at all time in the Mediterranean Sea and at least 10 active floats in the Black Sea
 - Recommendation for the **Baltic Sea** is to keep **7 active floats** at all time, with a precise repartition within the several basins
 - Exploration of the capacity of Argo to monitor shallow waters regions

- Argo is a complementary technology to other platforms, like Ice Tethered Platforms (ITP) in the Arctic, sea mammals, vessels and mooring in Arctic and Antarctic areas
- Technology has been proven in Weddell Sea with floats able to stay for a long period under ice located with acoustic sources and is under definition/testing for the Arctic and Nordic Seas:
 - Tests occurring in Baffin Bay (NAOS project) and in the Baltic Sea
 - First promising results of Ice Sensing Algorithm definition for the Barents Sea
 - Collaboration opportunities within INTAROS project for underwater positioning (acoustic sources)



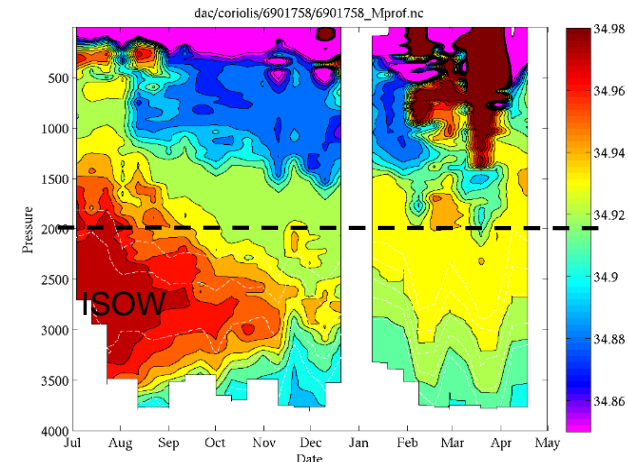


- **Argo floats (0-2000m depth)** give access to ~50% of the global ocean volume
- **Deep Argo floats (0-4000m depth)** give access to ~90% of the global ocean volume



Southward trajectory of the deep Argo float 6901758 (blue) between deployment (July 2015) and May 2016

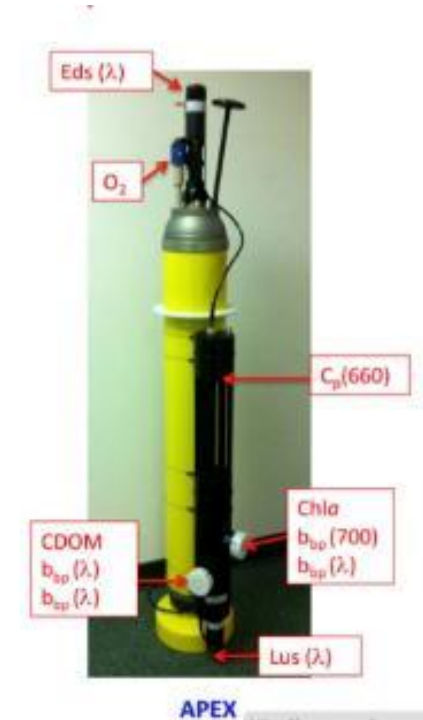
Courtesy of G.Maze & V.Thierry



One year time series [2015-2016] of salinity measured by the deep Argo float 6901758

- **Strategy for Deep Argo:** Focus on areas where large deep signals are located, that is where deep-water masses are formed, namely the North-Atlantic Ocean and the Southern Ocean
- Target: **250 active deep floats (4000/6000m)**

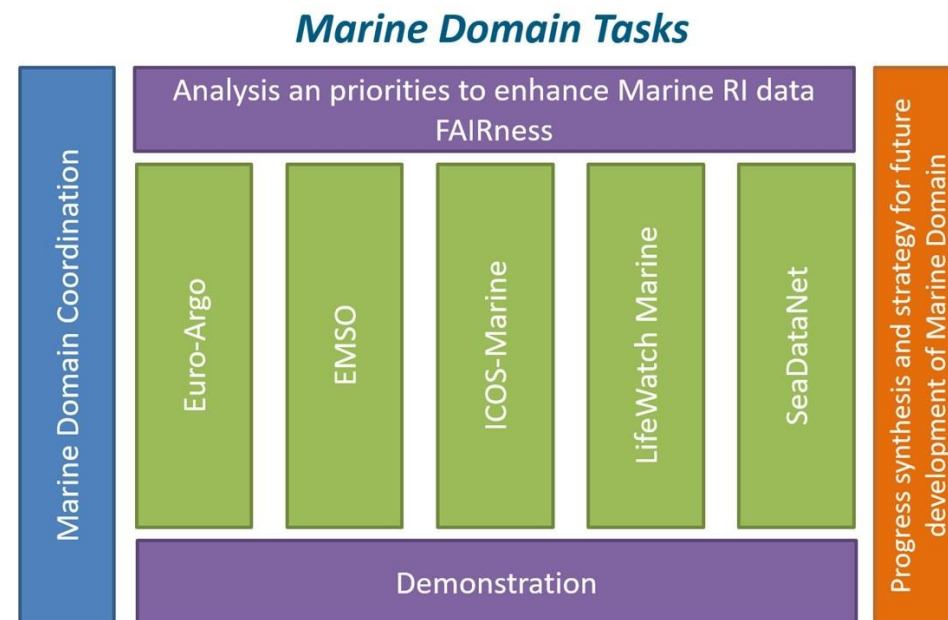
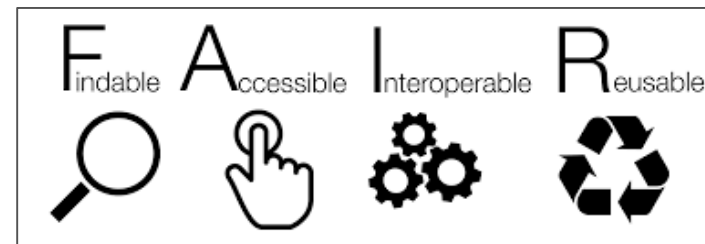
- Biogeochemical-Argo *Scientific and Implementation plan* was finalized in 2016
 - Target for the global array: 1000 fully equipped BGC-Argo active floats with a uniform spatial distribution
 - Euro-Argo aims at contributing to $\frac{1}{4}$ of the global effort, which represents **250 active BGC floats**
 - ✓ Regional refinement depending on scientific interest in specific areas
 - ✓ Additional effort put on equipping **additional floats with oxygen sensors** (target under definition).



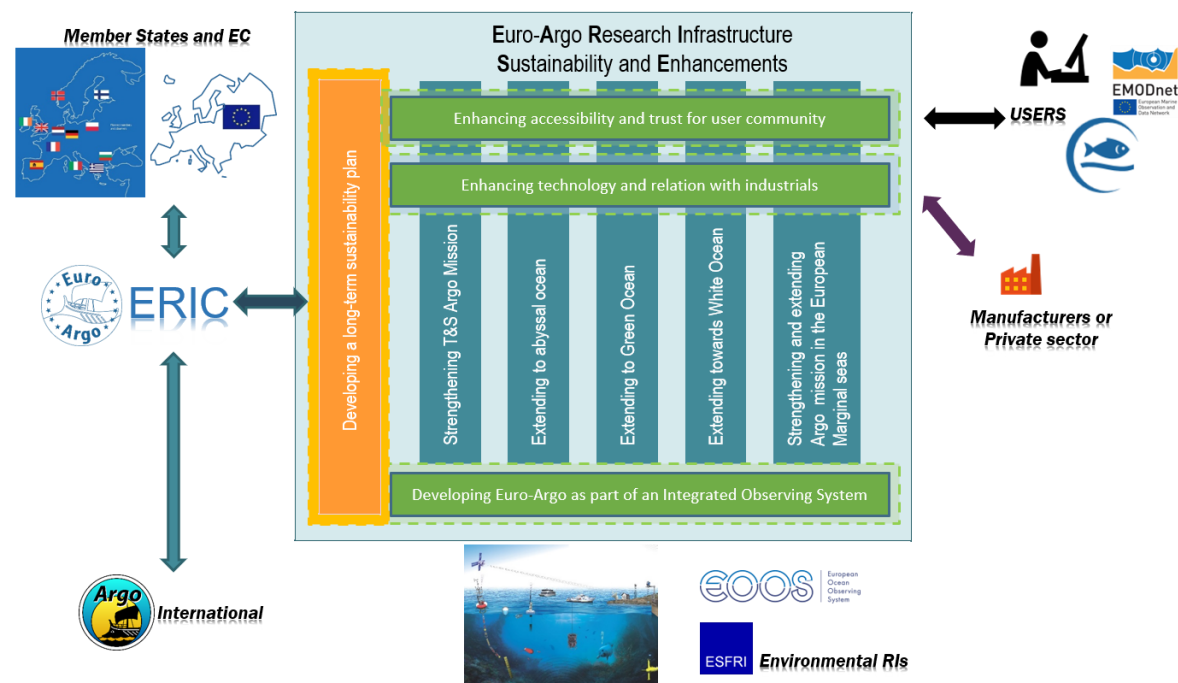
- ENVRI-FAIR [H2020, 2019-2022]

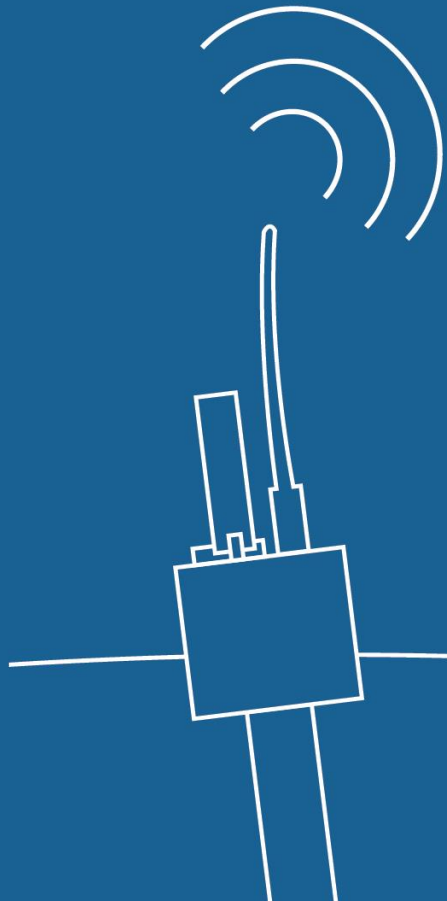


- The goal of ENVRI-FAIR is to implement the FAIR principles in the ENVRI cluster of Research Infrastructures for Environmental and Earth System sciences community and connect it to the European Open Science Cloud (EOSC).
- Euro-Argo is co-coordinating the Marine Domain activities work package with EMSO
- Euro-Argo is also involved in:
 - ✓ Joint communication activities
 - ✓ ENVRI community strategy, as part of the BEERI (*Board of Environmental ESFRI Research Infrastructures*) and in the task to foster links with industry
 - ✓ Common FAIR policies, as part of the Data policy Working Group



- Euro-Argo RISE [H2020, 2019-2022]
 - The Euro-Argo ERIC is coordinating the project, with 19 partners involved
 - Objective: Enhance and extend the capacity of the Argo network to provide essential ocean observations to answer societal and scientific challenges.
 - ✓ Sustain the European contribution to Argo,
 - ✓ Organize the new components of the network, extending Argo observations towards biogeochemistry, greater depth, ice-covered and shallow water regions.





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