Euro-Argo report 2018 – AST20

The Euro-Argo research infrastructure organizes and federates European contribution to Argo (www.euro-argo.eu); it is part of the European ESFRI roadmap on large research infrastructures The Euro-Argo ERIC (European Research Infrastructure Consortium) and its governance structure (Council, Management Board and Science and Technological Advisory Group) was set up by the Commission Implementing Decision (2014/261/EU) of May 5, 2014, with 9 funding members. The Research Infrastructure is made up of a central office based in France (Ifremer, Brest) and distributed national facilities (Figure 1). The distributed national facilities operate with direct national resources. As part of the Euro-Argo Research Infrastructure, they agree to a multi-annual commitment of resources (in particular in terms of floats to be deployed and for the data system), and to coordinate their activities through the Euro-Argo ERIC. The Euro Argo ERIC delegates some of its activities to the national facilities who have the relevant expertise (e.g. data management and quality control, float deployment), and according to their areas of responsibility.

In 2018, the Euro-Argo ERIC involves 13 countries: **11 Members, 1 Observer** and 1 Candidate.

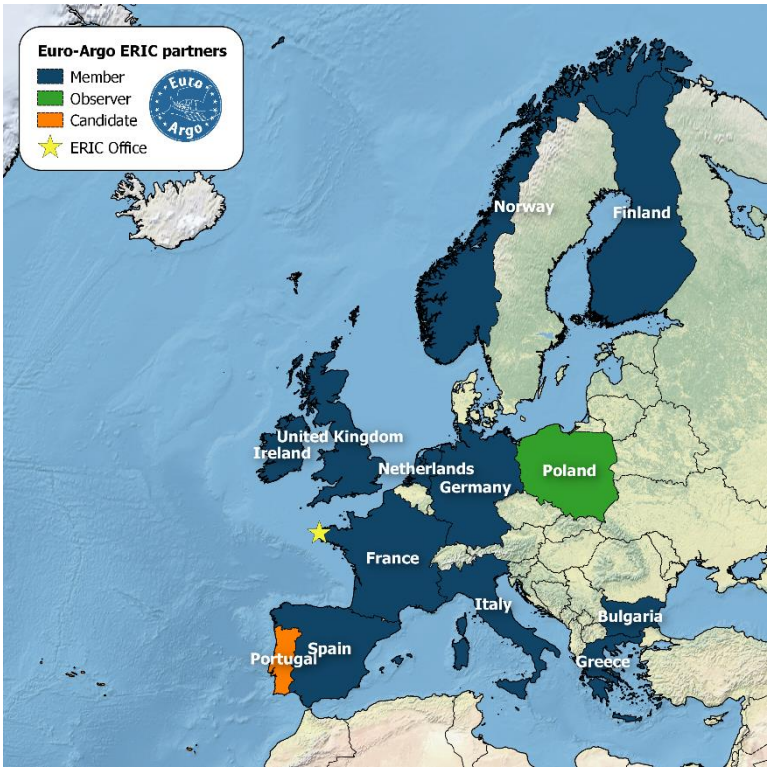

Figure 1. Euro-Argo ERIC membership in 2018

The Euro-Argo ERIC coordinates the European contribution to Argo and monitor it with the aims of **maintaining ¼ of the Argo array**.

1. The status of implementation (major achievements and problems in 2018)

- ***floats deployed and their performance***
- ***technical problems encountered and solved***

- status of contributions to Argo data management (including status of conversion to V3 file formats, pressure corrections, etc)
- status of delayed mode quality control process

Since 2008 Euro-Argo has been working with the European commission to develop a European contribution in addition to the national ones. This is done through projects funded by EC and documented on Euro-Argo website.

In 2018, 31 T/S "EU" floats have been deployed, funded under the EASME/EMFF MOCCA project (2015-2020) and 2 BGC & 7 DEEP floats under the AtlantOS H2020 EU project (2015-2019) (Table 1).

In total (EU + national), 281 floats have been deployed in 2018 (see Table 1, and Figure 2 for the geographical repartition).

Table 1. European floats deployed in 2018, by type of floats

2018	T/S	T/S/O2	BGC	DEEP	**TOTAL**
EU funded	*31*	*0*	*2*	*7*	***40***
Total Europe (EU funded + national)	215	18	28	20	**281**

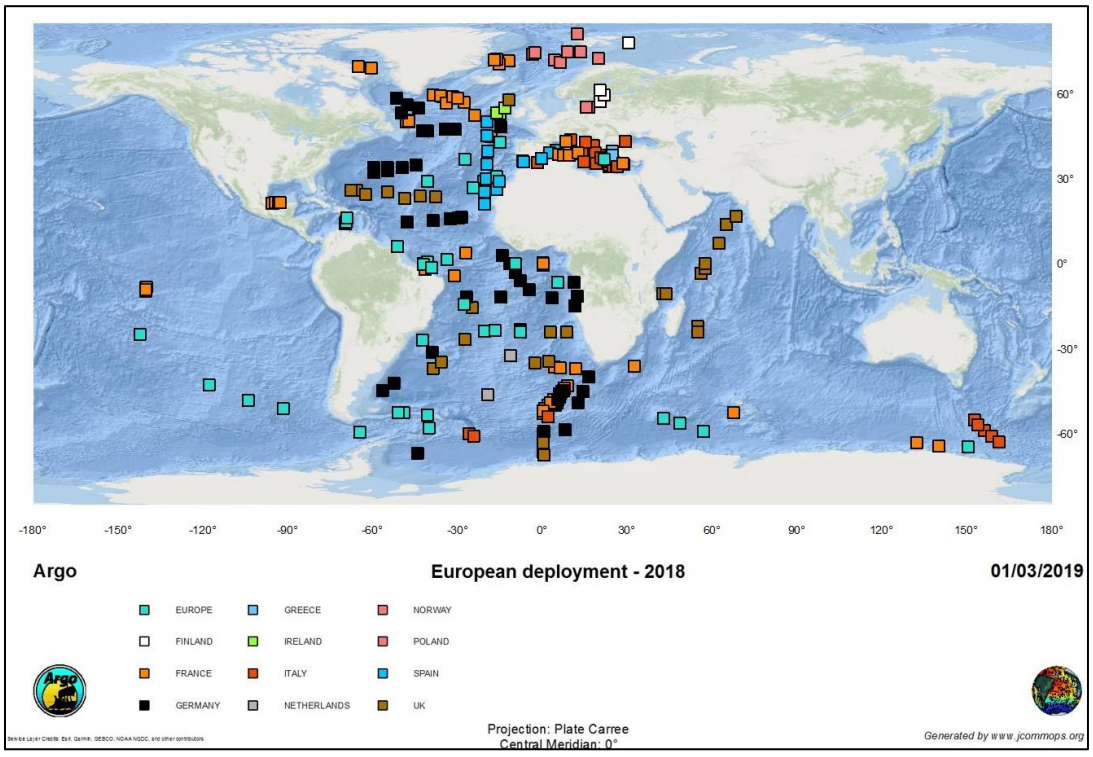

Figure 2. European deployments – 2018

All the European floats are processed by the European DACs (Coriolis and BODC) and all data are provided in V3.1. Delayed mode QC of the MOCCA floats data has started. It is done by the European DM-Operators (BODC, BSH, Ifremer and OGS) and data are provided to the GDAC. Some of the MOCCA floats have been identified as presenting the SBE salty drift anomaly.

In total, 150 MOCCA floats have been deployed between 2016 and 2018 (median age of approximatively 2 years), all with SBE CTD S/N higher than 7900, and among which 75% have been

processed in Delayed Mode. 14 out of these 150 floats show a salinity drift (9% of the fleet), with 9 of the 14 on the greylist (data not correctable).

European partners are working together to develop checks on the European fleet, in particular using the MINMAX test developed by Ocean-Scope (Gourrion et al. 2018), able to generate alerts on potential early salinity drifts, and facilitate triage on the profiles eligible for DMQC and then identify the ones that need DM processing rapidly. First tests are promising. An analysis has been performed on a daily basis on the GDAC since mid-November 2018, with approximatively 4 new floats subject to drift/bias suspicion per week.

2. Present level of and future prospects for national funding for Argo including a summary of the level of human resources devoted to Argo.

The Euro-Argo ERIC is coordinating a new EU H2020 4 years project named Euro-Argo RISE starting on January, 1st 2019, in which most of the Euro-Argo participating countries are involved. Euro-Argo RISE will enable significant improvement of the European contribution to Argo, through both float deployments (17 in total) and personal time to work on improving the network, data management as well as developing training and outreach material. The Euro-Argo RISE project has been granted a total amount of 4M€.

Euro-Argo is also involved in the ENVRI-FAIR H2020 EU project (2019-2022), through the participation of the Euro-Argo ERIC, Ifremer and BODC (nearly 1M€ funds) Euro-Argo tasks within ENVRI-FAIR are dedicated to improvements in terms of data management, in particular the development of standardised vocabularies for Argo, enhancement of interoperability with other Marine Research Infrastructures and development of new services based on big data technologies.

The Euro-Argo ERIC office consists in a team of 6 persons with project management, technical & scientific background.

3. Summary of deployment plans (level of commitment, areas of float Deployment, low or high resolution profiles, Argo extensions) and other commitments to Argo (data management) for the upcoming year and beyond where possible.

2019	T/S	T/S/O2	BGC	DEEP	**TOTAL**
EU funded	*18*	*0*	*2*	*3*	***23***
Total Europe (EU funded + national)	205	20	28	12	**260***

Table 2. European floats deployed in 2018, by type of floats
** UK contribution not final*

Euro-Argo will continue to deploy floats following its strategy defined in Euro-Argo ERIC (2017), and regularly updated following technological developments and recommendations from Argo international. Europe is slowly getting closer to its targets for BGC & Deep extensions (50 BGC & 50 Deep floats deployed per year), with new countries entering the game (e.g. Norway & Finland) for BGC Argo. Plans for 2019 show an increased contribution of Europe in high latitudes regions, but also in the Pacific Ocean, compared to previous years (Figure 3).

Figure 3 shows Euro-Argo total implementation for 2018 and planned for 2019, versus the targets identified in Euro-Argo ERIC (2017) (line), by basin.

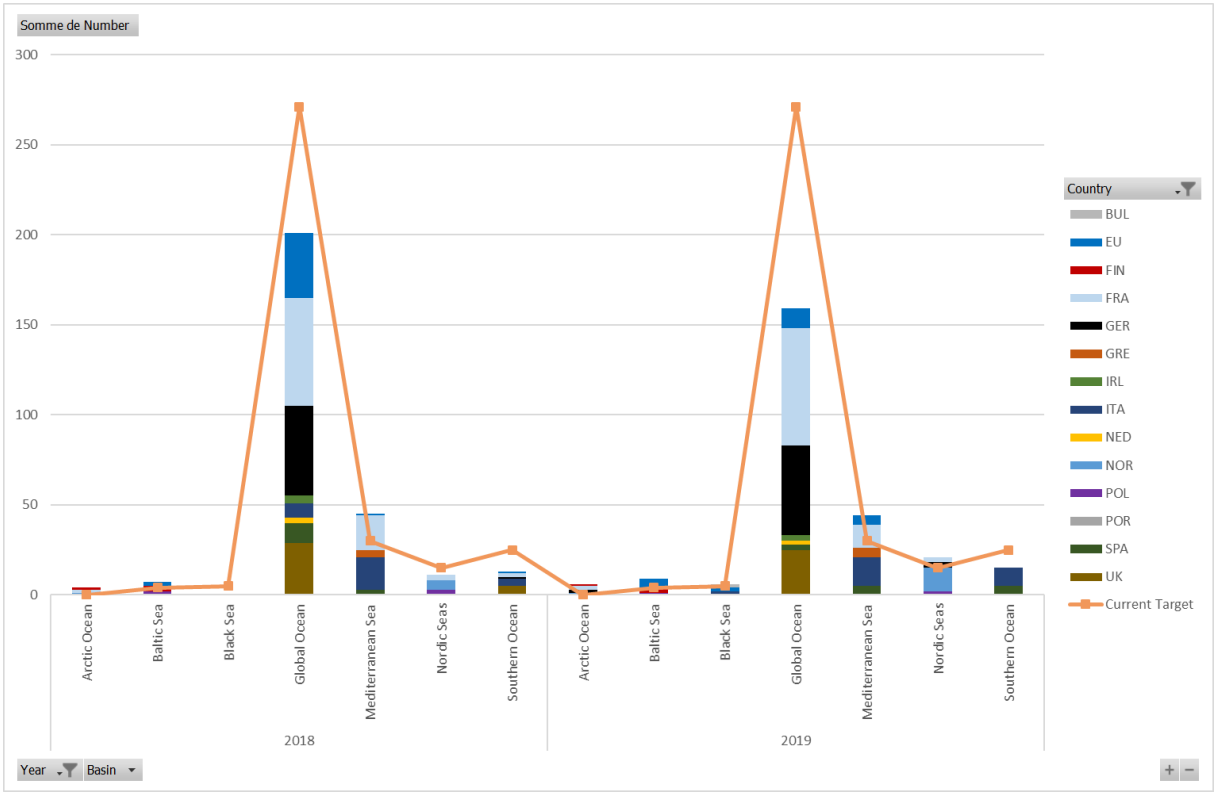

Figure 3. Geographical repartition of European deployments in numbers of floats – 2018 (left) and 2019 (planned, right)

4. Summary of national research and operational uses of Argo data as well as contributions to Argo Regional Centers. Please also include any links to national program Argo web pages to update links on the AST and AIC websites.

Argo data and/or products derived from Argo data are used for operational oceanography within the Copernicus Marine Environment Monitoring Service (http://marine.copernicus.eu/), for satellite calibration and validation and for research carried on by the Euro-Argo ERIC partners (see national reports for details). Website: www.euro-argo.eu.

Within the EU project Euro-Argo RISE, European contribution to Argo ARCs will be reinforced, in particular in the Southern Ocean ARC.

Within the EU project ENVRI-FAIR, an Argo vocabulary service will start to be developed using the BODC vocabulary server as presented at last ADMT in San Diego.

5. Issues that your country wishes to be considered and resolved by the Argo Steering Team regarding the international operation of Argo.

None at the writing of this report.

6. To continue improving the quality and quantity of CTD cruise data being added to the reference database by Argo PIs, it is requested that you include any CTD station data that was taken at the time of float deployments this year. Additionally, please list CTD data (calibrated with bottle data) taken by your country in the past year that may be added to the reference database. These cruises could be ones designated for Argo calibration purposes only or could be cruises that are open to the public. To help CCHDO track down this data, please list the dates of the cruise and the PI to contact about the data.

See national reports.

Deployment CTDs for MOCCA floats have been sent to Coriolis in order to be included in the reference database. For AtlantOS deployments (BGC & Deep floats) , the CTD data will be retrieved in 2019.

7. Keeping the Argo bibliography (http://www.argo.ucsd.edu/Bibliography.html) up to date and accurate is an important part of the Argo website. This document helps demonstrate the value of Argo and can possibly help countries when applying for continued Argo funding. To help me with this effort, please include a list of all papers published by scientists within your country in the past year using Argo data, including non-English publications.

There is also the thesis citation list (http://www.argo.ucsd.edu/argo_thesis.html). If you know of any doctorate theses published in your country that are missing from the list, please let me know.

Finally, if you haven't already sent me a list of Argo PIs in your country, please do so to help improve the statistics on how many papers are published including an Argo PI vs no Argo PIs.

The Euro-Argo ERIC maintains a summary of the European bibliography at http://www.euro-argo.eu/Bibliography and advertise publications on the Euro-Argo website (http://www.euro-argo.eu/Main-Achievements/European-Contributions/Scientific-Results), including a list of thesis.

For lists of PIs see national reports.

8. As discussed at the AST-18, I'm making an additional request to help Argo scientists who are asked to give talks or do outreach programs. This action item asks for each National Program to submit a slide with figures and text describing their favorite Argo discovery paper. I will collect these slides and make them available to AST members. The idea is that when an AST member is asked to give a talk on Argo, they could choose from a collection of slides describing key Argo discovery papers. Please consider contributing a slide to this collection.

For EU AtlantOS deep floats: https://www.euro-argo.eu/News-Meetings/News/Latest-News/First-deep-ARVOR-profiles-under-the-ice

Improvement in the Artic Ocean from EU and National floats : https://www.euro-argo.eu/News-Meetings/News/Latest-News/Euro-Argo-floats-in-the-Arctic

References:

Euro-Argo ERIC (2017). **Strategy for evolution of Argo in Europe**. EA-2016-ERIC-STRAT. https://doi.org/10.13155/48526

Gourrion, Jérôme, T. Szekely, R. Killick, B. Owens, G. Reverdin, and B. Chapron, Improved statistical method for quality control of hydrographic observations, *submitted to JAOT (2018).*