Argo National Report March-2025 – Norway

Submitted by Kjell Arne Mork (IMR) on behalf of NorArgo

1. The status of implementation of the new global, full-depth, multidisciplinary Argo array (majorachievements and problems in 2024)

   Argo Norway (NorArgo, https://norargo.hi.no) is the Norwegian contribution to the Euro-Argo European research infrastructure (ERIC), and some points in this report are therefore (also/instead) included in the report from Euro-Argo. Focus area for Argo Norway is the Nordic Seas (Greenland, Iceland, and Norwegian Sea) and Arctic.

   a. floats deployed and their performance

   In 2024, Norway deployed **6 Argo floats**:
   - 2 BGC-floats (6 bgc-variables)
   - 2 BGC-floats (4 bgc-variables = Bio floats)
   - 2 core floats

   b. technical problems encountered and solved

   - One BGC-float (PROVOR float: WMO 6990639) deployed in 2024 has an issue with communication. The reason is not clear and the problem is not solved.
   - Some BGC floats (PROVOR floats) had some issues with pH sensors, producing bad data.

   c. status of contributions to Argo data management

   All our floats are processed at the DAC in the Coriolis Centre.

   Four (4) floats deployed 2019-2020 (6903556, 6903557, 6903561, 6903562) had fast salinity drift (ASD). SBE will grant warranty credit (100%) for these floats.

   d. status of delayed mode quality control process

   We do DMQC of our floats that were deployed in 2019 and later while Argo Germany did DMQC for our “older” floats. We do DMQC of core, bgc and deep floats.

   We have done DMQC of temperature/salinity for most of our floats deployed in 2019 and later. Exceptions are floats deployed in the shallow Barents Sea where reference data are missing. However, work is ongoing to collect reference data also for the Barents Sea. There are now some delay in DMQC of core data since our DMQC-person quit and we need to find someone else to do the job.

For the BGC-floats we have done DMQC for oxygen, nitrate, pH and Chl-a for some floats. There are issues with several pH-sensors that are uncorrectable.
NORCE is responsible for the DMQC of oxygen and pH, while IMR is responsible for the DMQC of T/S, nitrate, chlorophyll, backscatter (not done so far), and irradiance (not done so far).

2. Present level of, and prospects for, national funding for Argo including a summary of the level of human resources devoted to Argo, and funding for sustaining the OneArgo mission: Core, BGC, Deep, Polar, Spatial (equator, WBCs)

   Financial resources
   The funding has been a combination of self-financed (i.e., funded by Institute of Marine Research) and funding from the Research Council of Norway (RCN, Ministry of Education and Research) during 2012-2015 and 2018-2024. In 2025 we again we receive funding from the RCN for 1,5 M€ for the extension of the national Argo infrastructure project (NorArgo2). With this funding we will purchase core, BGC and deep floats to be deployed in the Nordic Seas and Arctic (Polar). A new project proposal will also be submitted to the RCN in 2025.

   Human resources
   Number of human resources vary over years due to the level of funding. The last years NorArgo2 had approximately 30 person months per year and more than 10 people contribute from six Norwegian institutes (IMR, Norce, NERSC, MET.no, Akvplan-niva, UoB). This includes Argo monitoring, logistic, deployment, quality control, and data management.

3. Summary of deployment plans: as was done last year, please fill out this spreadsheet to help us understand the progress towards implementation of OneArgo. There is one new column this year for floats being deployed with experimental sensors such as UVP, C-sensor, etc. This spreadsheet is to be **returned separately by 17 March** to help prepare for the meeting. It can be sent to Megan or dropped in this folder link.

   In 2025, we will deploy 4 Argo floats in the Nordic Seas: 1 x BGC (4 bgc-var.) and 3 x core floats.

4. Summary of any research and development efforts over the past year to try new sensors or improve float technology. This could include new collaborations with vendors or other partners.

   In 2023 we deployed two BGC-floats with UVP6 and transmissometer sensors. In 2025, we willrecover these two floats and download the images from the UVP6. There is increased interests in Argo among biologists in Norway due to the UVP6 sensor.

5. 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 Argo websites.

Argo Norway focuses on both research topics and marine climate monitoring of the Nordic Seas. There is an increasing interest in using Argo data in Norway, and two climate centres are now using the data operationally in climate models (NERSC and MET.no). For instance, the operational TOPAZ4 modeling system assimilates Argo data into the ocean model to provide forecast product for the Nordic Seas and Arctic Ocean under the EUs Copernicus Marine Environment Monitoring Services (CMEMS, http://marine.copernicus.eu/).
The present scientific topics are mainly within the Nordic Seas (Norwegian, Iceland and Greenland Seas) and Arctic, including:

- Heat and fresh water contents in the Nordic Seas are regular updated
- Water mass changes in relation with biological activities. This topic is also one of the reasons that we have included bgc sensors on the Argo floats.
- Studies that involve the mixed layer, primary production, and carbon cycle.

6. Issues that your country wishes to be considered and resolved by the Argo Steering Team regarding the international operation of Argo. These might include tasks performed by OceanOPS, the coordination of activities at an international level and the performance of the Argo data system. If you have specific comments, please include them in your national report. Also, during the AST-26 plenary**, each national program will be asked to mention a single highlight or issue via a very brief oral report**.

7. Outreach and communication: please describe, in brief, outreach efforts within your national program over the past year. Also, if you've issued any communications, press releases, participated in articles, etc, please send the links. We are considering our social media strategy, so please let us know which social media you engage with and the corresponding handles.

   We have a national Argo web site (NorArgo, https://norargo.hi.no) where news are distributed, and an operational Argo web site where data can be viewed and downloaded (https://norargo-map.hi.no/). In NorArgo we also have a user forum with representative persons in different fields (biology, fishery, education, ….) that meet once per year.

8. 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.

   At all deployment locations a CTD station with water samples are normally taken. All ship CTD-data are sent regular to the ICES, EUs CMEMS, and World Ocean Database.

9. Keeping the Argo bibliography (Bibliography | Argo (ucsd.edu)) 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 (Thesis Citations | Argo (ucsd.edu)). 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.

   No new articles to add that are not included in the Argo bibliography.

10. Does your National Program have any deployment plans for RBR floats in the next couple years? If so, please indicate how many floats will you be buying in 2025 and 2026 (if known) and where they might be deployed.

    No RBR-floats will be deployed this year, but we plan to purchase some floats with RBR-sensors in the future (TBD).