

Argo National Data Management Report 2022

BSH (Federal Maritime and Hydrographic Agency), Germany

1. Status

(Please report the progress made towards completing the following tasks and if not yet complete, estimate when you expect them to be complete)

- Data acquired from floats
Presently there are 223 active/operational German floats which belong to BSH except for 28 associated to AWI, 2 to ICBM and 1 to GEOMAR. 55 floats have been deployed in 2022 to date. 13 more are on their way to deployments in the South Atlantic in early 2023. 5 of these are sent to storage in South Africa with the Weather Service to be used on the SANAE/Goodhope/Crossroads cruises by South African colleagues in the following month. Data from all presently active floats are available from the GDACS.
- Data issued to GTS
All German floats are processed in real-time by Coriolis and immediately inserted into the GTS.
- Data issued to GDACs after real-time QC
All profiles from German floats are processed by Coriolis following the regular quality checks and are routinely exchanged with the GDACs.
- Data issued for delayed QC
At present (05.12.2022) the German Argo fleet comprises 1107 floats which have sampled 100950 profiles. 87590 profiles of all eligible files are already available as D-files and 8223 are still pending. The total rate of eligible D-files provided to the GDACs is 96%.
- Delayed data sent to GDACs
The D-files are submitted by email to Coriolis together with the diagnostic figures and a short summary of the DMQC decision taken and are inserted into the GDAC after format testing.
- Web pages
BSH is maintaining the new Argo Germany Web site at <https://www.bsh.de/DE/THEMEN/Beobachtungssysteme/ARGO/>. It provides information about the international Argo Program, the German contribution to Argo, Argo array status, data access and deployment plans. It also provides links to the original sources of information.
- Statistics of Argo data usage
Currently no statistics of Argo data usage are available. The German Navy uses Argo data on a regular basis for the operational support of the fleet and uses their liaison officer at BSH to communicate their needs. The SeaDataNet portal uses German Argo data operationally for the Northwest European Shelf. Based on the feedback from the national user workshop (Argo data are routinely assimilated in the GECCO reanalysis, which is used for the initialisation the decadal prediction system MiKlip. They are also routinely assimilated into the Earth-System-model of the Max-Planck

Society in various applications reaching from short term to decadal predictions and are used for model validation. At BSH the data are used within several applications such as EArise and Expertennetzwerk BMVI. Data are also used in various research groups at universities.

- Products generated from Argo data
A quality screened subset of float data in the Atlantic has been created on the yearly basis and has been exchanged with the universities.

2. Delayed Mode QC

(Please report on the progress made towards providing delayed mode Argo data, how it is organized and the difficulties encountered and estimate when you expect to be pre-operational).

The overall percentage of D-files from all German programs is remaining at a quota of above 90%. BSH had adopted floats from all German universities and agreed last year to perform similar services for the AWI floats. DMQC for the subset of re-processed AWI floats (56 now in V3.1) has now been performed after the reference database was updated with more recent reference data from Pangea. The associated d-files will be submitted as soon as permission has been received from the PI. A meeting with AWI colleagues after summer had to be postponed and needs to be hold at the beginning of 2023. Remaining issues with the AWI floats are handling of small constant offsets in the order of ± 0.005 psu and the cut-off for TBT issues in early cycles. Therefore at the moment 8721 profiles are available from the 216 AWI floats and but only 48% are available as D-files. For all other floats (891 floats) the DMQC quota is at 96%. Some older floats were reprocessed due to audit requests during the year and new d-files were submitted-

German Floats/ Program Name	Number of profiles	Number of D-files	D-files pending	Comments
Argo BSH	75410	67001	3288	Overall 95%
Argo AWI	8721	3926	4781	Overall 48%, DMQC for 56 reprocessed Nemo float files has been carried out after the update to the reference database and wait for approval of PI.
Argo GEOMAR (129 floats)	13474	13407	67	Reprocessing nearly finished Overall 99 %
Argo U. HH (28 floats)	3347	3258	89	Reprocessing nearly finished Overall 98 %
Argo Denmark (5 floats)	371	360	11	Old floats associated with U. HH, reprocessing nearly finished Overall 97%

BSH has also adopted some floats from Finland (10 non Baltic floats), the Netherlands (121 floats), Norway (30 floats) and Poland (15 floats) for DMQC and is performing DMQC on parts of the MOCCA fleet (44 floats) from the European Union. The progress in these programs providing D-files is generally good, but redecoding of older file-formats and pending DMQCs for floats in the Baltic until endorsement from ADMT are resulting in lower numbers in some programs. Since Argo-Norway has received fundings from the national research council to increase the number of Norwegian floats deployed per year, the program has gotten more involved in the dmqc activities. Floats deployed from 2019 onward have been covered by Norwegian DMQC operators. The same is true for Argo-Poland which also has performed DMQC on their own floats from 2019 onward. The statistics shown below are already a mixture of dmqc performed by BSH and the national DMQC-operators.

Germany has recently started to deploy BGC floats and dmqc of the BGC parameters has been organized within the research project DArgo2025. The host of BGC parameters is divided between research institutes based on their expertise: GEOMAR will oversee pH and O2, IOW will care for nitrate and ICBM will oversee the bio-optical sensors from the radiometers. Starting in 2023 a full term position for dmqc of BGC parameters is established at BSH and will revisit the issues of dmqcs and collaboration with the institutes on their floats. We hope to make swift progress in 2023 and integrate well in the European structures.

There are remaining issue with floats from Finland, Poland and MOCCA which are operating in the Baltic and will receive their DMQC decisions from regular laboratory calibrations performed when floats are recovered annually or from nearby calibration stations. The system for the DMQC is set-up within the EuroArgo ERIC in research projects as MOCCA and EArise. These floats had been assigned by their association to the country, but since there are dm-pathways established in these countries, their dmqc should be carried out by the national dmqc operators.

Adopted floats/ Program Name	Number of profiles (all)	Number of D-files (all)	D-files pending (all)	Comments
Argo Poland (15 floats out of 29)	5608	1878	2818	Mostly Baltic floats pending Overall 40%
Argo Finland (10 floats out of 43)	4446	795	3343	Mostly Baltic and Barent Sea floats pending Overall 21%
Argo Netherlands (121 floats)	13731	12218	632	Overall 95%
Argo Norway	11068	8027	925	Mostly Barent Sea floats

(30 floats out of 85)				pending Overall 91%
MOCCA (44 floats out of 119)	25095	16265	6708	Baltic floats pending Overall 70 %
US Navy (10 floats)	1940	1790	150	Overall 93% Overlooked new cycles from one float
NAAMES/US (E. Boss) (13 floats)	2743	2641	102	Overall 96%

Investigations of fast salty drifters were continued and consolidated with the entire European fleet. Information is now available in a shared spreadsheet. Efforts have been undertaken this year to make sanity checks on the manually entered entries into the table and afterwards to perform statistical analysis from the data holdings at the GDACs. Delphine Dobler from Ifremer has undertaken most of this work.

<https://docs.google.com/spreadsheets/d/1TA7SAnTiUvCK7AyGtSTUq3gu9QFbVdONj9M9zAq8CJU/edit#gid=974650348>

3. GDAC Functions

(If your centre operates a GDAC, report the progress made on the following tasks and if not yet complete, estimate when you expect them to be complete)

- National centres reporting to you
- Operations of the ftp server
- Operations of the www server
- Data synchronization
- Statistics of Argo data usage : Ftp and WWW access, characterization of users (countries, field of interest : operational models, scientific applications) ...

4. Regional Centre Functions

(If your centre operates a regional centre, report the functions performed, and in planning)

BSH is part of the SOARC consortium and is working in EArise to updating the CTD Reference data base for the Weddell gyre. Since 2021 all available data from the PANGEA data base have been downloaded and these will be added to the upcoming release of the data base.

As part of work performed in the European projects MOCCA and EArise we are presently working on reference data for the Nordic Seas and Arctic proper. The reference data base for these areas will be updated/established. The main data sources are data from the Norwegian and Polish monitoring cruises and from NABOS for the Arctic. A meeting was held with the Norwegian program to discuss dmqc applications and an audit for the data set from the Norwegian Sea. A follow-up meeting was proposed for early next year with the active dmqc-operators in the area.

5. References