Argo National Data Management Report 2019

- 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 149 active/operational German floats which all belong to BSH. 26 floats have been deployed in 2019 to date and 21 more will follow until the end of the year. 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 (23.09.2019) the German Argo fleet comprises 928 floats which have sampled 75695 profiles. 69012 profiles of all eligible files are already available as D-files and 4999 are still pending. The total rate of eligible D-files provided to the GDACs is 92% and has continued to increase from last year's value of 88%.
- 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 Argo Germany Web site. The URL for the Argo Germany has moved from http://www.german-argo.de/ to 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 (22.08.2019) 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 projects such as KLIWAS, RACE,

MiKlip, ICDC 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's 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 increasing again and has reached a quota of 92%. BSH had adopted floats from all German universities and agreed last year to perform similar services for the AWI floats. The DMQC for the yet unprocessed AWI floats is still pending, since the reprocessing of the float data at Coriolis has been delayed due to formatting issues. There has been ongoing communication between AWI and Coriolis how to re-decode float files and provide all files in V3.1. A last exchange of information has been submitted in August 2019. The decoding at Coriolis should start soon and hopefully been finished until the end of the year. At the moment 7240 profiles are available from the 187 AWI floats and only 49% are available as D-files. We hope to get this up to 100% as soon as Coriolis releases the new files. For all other floats (741 floats) the DMQC quota has increased to 97%. Additional time was spend to check files updated to format V3.1 and repeat DMQCs (if necessary), particular for old floats from the universities with BGC sensors with format inconsistencies in the older formats. Occasionally new R-files would be created during reprocessing which were not created before.

German Floats/ Program Name	Number of profiles	Number of D-files	D-files pending	Comments
Argo BSH	51635	48813	1138	Overall 97%
Argo AWI	7240	3548	3692	Are waiting for reprocessing Overall 49%
Argo GEOMAR (129 floats)	13474	13393	81	Reprocessing nearly finished Overall 99 %
Argo U. HH (187 floats)	3346	3258	88	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 floats from Finland (34 floats), the Netherlands (89 floats), Norway (40 floats) and Poland (23 floats) for DMQC and is performing DMQC on parts of the MOCCA fleet (42 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 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 will get more involved in the dmqc activities. Floats deployed from 2019 onward will be covered by Norwegian DMQC operators.

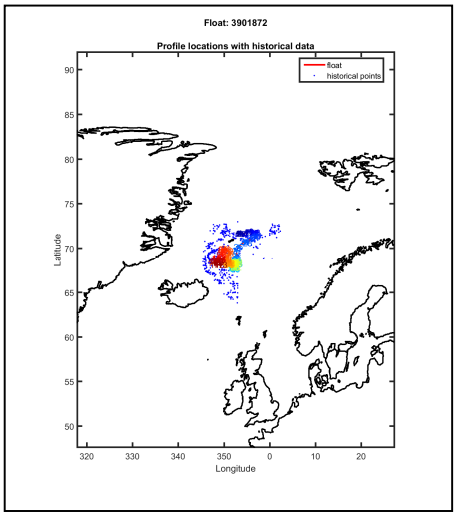
There are remaining issue with floats from Finland, Poland and MOCCA which are operating in the Baltic and will receive their DMQC decisions from regular laboratory calibrations performed when floats are recovered annually or from nearby calibration stations. The system for the DMQC is set-up within the EuroArgo ERIC in research projects as MOCCA and EArise.

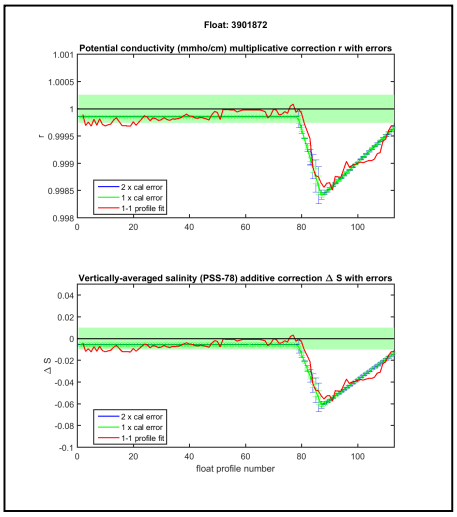
Adopted floats/ Program Name	Number of profiles	Number of D-files	D-files pending	Comments
Argo Poland (23 floats)	2466	887	662	Baltic floats pending Overall 54%
Argo Finland (34 floats)	3038	795	1800	Baltic floats pending Overall 30%
Argo Netherlands (89 floats)	10648	9998	184	Overall 98%
Argo Norway (40 floats)	4502	3625	569	Due to reprocessing Overall 85%
MOCCA (42 floats)	5347	2766	499	Baltic floats pending Overall 80%
US Navy (10 floats)	1990	1843	147	Overall 93% Overlooked new cycles from one float
NAAMES/US (E. Boss) (13 floats)	2854	2736	118	Overall 96% Have to check why files have not been uploaded

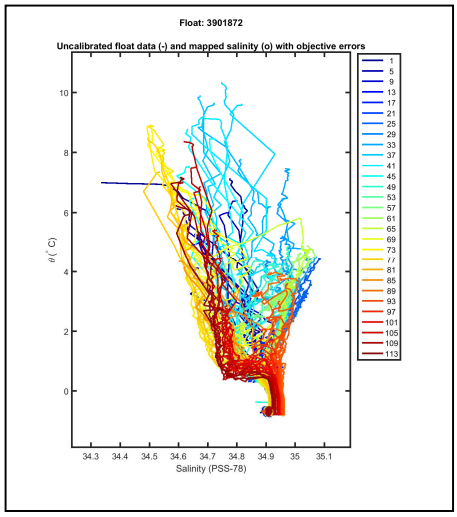
Some data archeology has been performed to retrieve missing CTD-serial numbers for older floats in the German fleet. The updated information has been exchanged with Coriolis and will be included in the meta-files. AWI has just submitted CTD serial numbers for its NEMO floats which will be included in meta-files.

Checks have been performed on the CTDs with serial numbers between 6000-7100 which were suspicious of showing large salinity drifts. The sample of floats from BSH covers 165 floats with deployments ranging from 2013-2016. All floats within the list have been in run through dmqc and are either finished or have their next half-yearly dmqc scheduled within a few months. For 18 floats out of this set the dmqc had showed large positive salinity drift and therefore negative

corrections, two other have received positive corrections and 9 had malfunctioning salinity sensors too bad to be repaired sometimes during their life. Additional floats with fast salty drift have been detected with serial numbers ranging from 8000-10000 with a major cluster around 8100-8300.
All diagnostic plots for fast salty drifters have been shared with SBE (Kim Martini) for their assessment. Drifts are not only differing in rate, some show reversal of drift. Since it remains unclear how the cells are behaving and which corrections could be applied under these non-monotonic behaviour, all cycles affected by non-monotonic drift have been flagged as bad until more information is given by SBE. This float behavior has been included in SBE analysis, but no explanation could be given so far.







Example of float 3901872 showing drift behavior with increasing and decreasing values of ‘fast-salty-drift’.

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)

As work performed in the European projects MOCCA and EArise we are presently working on RDAC functions for the Nordic Seas and Arctic proper. The reference data base for these areas is updated/established and once done the dmqc results for all floats in this area will be checked to test for data set homogeneity.

5. References