Argo Canada Data Management Report
ADMT 24
Hobart, Australia, Oct 23-28, 2023

1. Real Time Status

- Deployments:

Between December 2022 to September 2023, Argo Canada deployed a total of 20 floats manufactured by NKE. Ocean Network Canada contributed Arvor -I Deep floats to the Argo Canada program for the first time. The table below summarizes the floats deployed since December 2022.

| Float Type	# of Float
Arvor -I	4
Arvor – I with Aanderaa Optode sensor	5
Arvor – I with RBR sensor	2
Arvor – I Deep	5
Provor III (CTD, DOXY, Chlorophyll- A, Backscattering)	3
Provor III (CTD, DOXY, Chlorophyll- A, Backscattering and SBE PH)	1

- Data acquired from floats

As of September 2023, Argo Canada has 165 active floats, including 7 NOVA, 136 Arvor – I, 7 Arvor with RBR sensor, 5 Arvor Deep and 10 PROVOR III floats.

The process to acquire data for Arvor and NOVA floats runs every 3 hours while the process to acquire data from PROVOR III runs every 6 hours. The data processing was developed in Fortran, Java and Python.

- Data issues to GTS

All data are issued to the GTS in BUFR format. From December 2022 to September 2023, an average of 407 BUFR messages were issued on the GTS monthly, of which 80% of the messages met the 12-hour target. During the year, we experienced some significant drops in timeliness due to the deployment of new float types and software to handle new float data format. Figure 1 shows the performance of Argo real-time data delivery on the GTS.
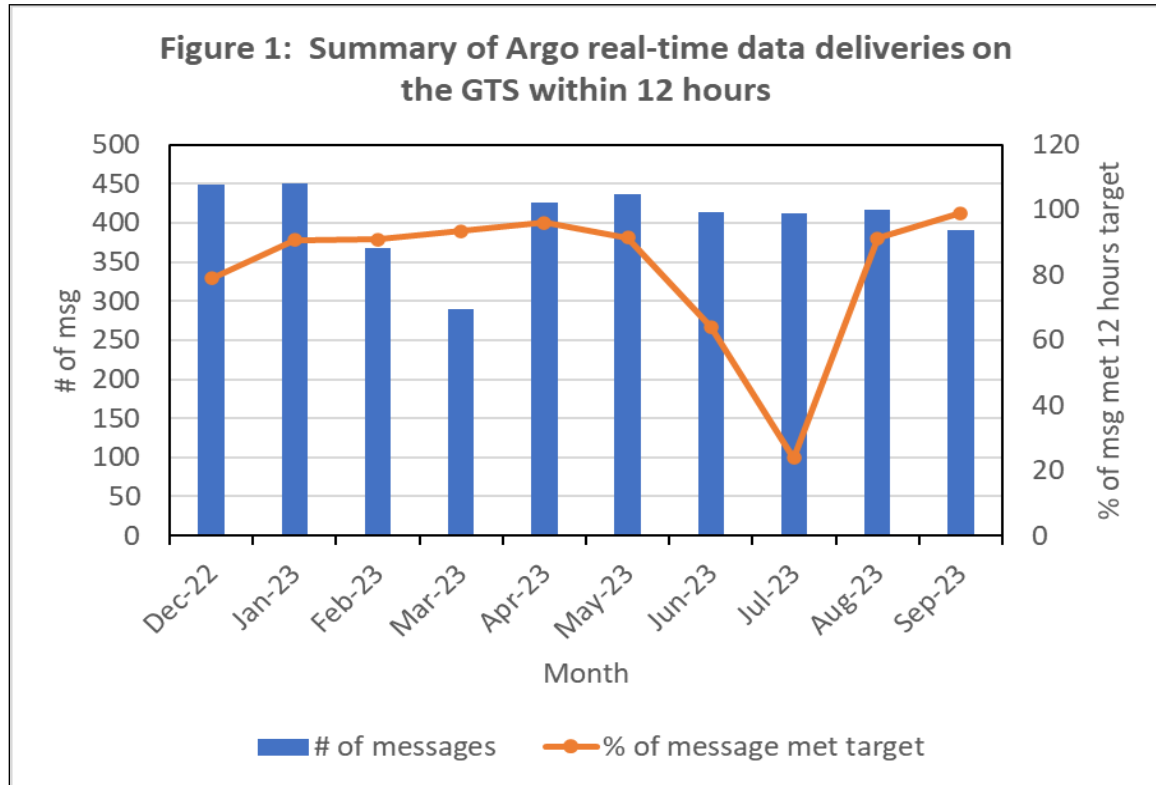
- Data issued to GDACs after real-time QC

The profile, technical, trajectory and meta files are transmitted to the GDACs in NetCDF format version 3.1 on an operational basis for all floats except BGC and Arvor Deep floats.

For BGC and Arvor Deep floats, the profile, technical and meta files are available at the GDAC in NetCDF format version 3.1 every 6 hours after the float surfaces. We are currently working on incorporate the cycle data into the trajectory NETCDF file for these floats. We anticipate to complete the transition of Argo Trajectory NETCDF format from version 3.1 to 3.2 by AST 2024.

- BGC RT Flags

Following ADMT23, chlorophyll and pH RTQC updated to comply with proper flagging schemes. Prior to this update, there was an error in the chlorophyll mixed layer depth calculation causing data to be incorrectly flagged as 2 instead of 1, and pH was being flagged with no QC, 0.

Updated BBP RTQC is in the process of being implemented following Dall'Olmo et al. 2023. Tests are written, now working on tests to ensure agreement with publication.

2.   Delayed Mode QC status

- Core Argo DMQC

Delayed mode QC has resumed at MEDS, with 1,105 profiles processed since last year. Approximately 71% of eligible profiles have been DMQC'd at least once, and 72% of eligible floats have been DMQC'd at least once for salinity, while 53% of floats have been DMQC'd at least once with both salinity and pressure.

- BGC-Argo DMQC

Other tasks took priority over DMQC for much of the year, however roughly 400 new D-mode profiles were submitted to the GDAC. For 2 other floats (4901140, 4901141), D-mode files were re-submitted after removing some bad data identified by the DOXY audit.

Near-future priority on fixing data that appears in the DOXY audit. Currently 6 Argo Canada floats have points identified in the audit. Of those 6, 2 are ready for submission to the GDAC and 1 has been deemed ok based on visual inspection.

Delayed mode quality control of DOXY profiles has resulted in 16% of eligible profiles, from 5% of eligible DOXY floats being DMQC'd at least once.

3.   Value Added items

- List of current national Argo web pages, especially data specific ones

We are working on upgrading the Argo Canada web pages, http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/argo/index-eng.html, that show float track and all data collected by Canadian core floats to handle the new variables collected by PROVOR III floats. Links to both real-time and delayed mode data are also available for download directly from GDAC. The pages are updated daily.
Argo Canada data is discoverable from the Government of Canada Open Government Portal, https://open.canada.ca/en.
It provides links to download data in NETCDF and web services to access float positions.

- Statistics of National Argo data usage (operational models, scientific applications, number of National PIs…)

Argo data have been used to generate monthly maps and anomaly maps of temperature and salinity along line P in the Gulf of Alaska. Line-P has been sampled for 50 years and has a reliable monthly climatology. For more information on the Line-P products and other uses of Argo to monitor the N.E. Pacific go to: http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/argo/canadian-products/index-eng.html.

The Canadian Meteorological Centre (Dorval, Québec) of Environment Canada is assimilating real-time Argo data in operational mode.

- Publicly available software tools to access or qc Argo data

The python package bgcArgoDMQC provides code to load in BGC-Argo oxygen data, calculate gain via comparison to WOA climatology data in the water column or NCEP data using in-air measurements, update QC flags and DOXY_ADJUSTED values, and export them to a D-mode netCDF file. The software is under active development, but a stable release is available that has been shown to closely agree with the analogous MATLAB software, SAGE-O2. This release can be installed via Anaconda or pip, and to code can be found on the ArgoCanada github page. This package also provides a simple framework to update flags in netCDF files, for example to update historical raw DOXY flags from 1 to 3.

Python software for performing RTQC on CHLA and BBP (medsrtqc) continues to be developed. Radiometry RTQC will be added shortly, as will updated BBP processing following Dall'Olmo et al. 2023 as described above. While the package is currently specific to the MEDS DAC, the code was written in a modular way, and there is strong interest in contributing to a "system-agnostic" python package for RTQC. This code is also publicly available on the ArgoCanada github page.

4.   GDAC Functions

Canada has no Argo GDAC function. However, Canada forwards TESAC data to the GDACs in Ifremer (France) and USGODAE (USA) three times a week. Canada also monitors the timeliness of Argo data on the GTS in BUFR format.

5. Regional Centre Functions
Canada has no regional centre function

6. Other Issues
There was no issue reported during the compilation of this report.