Argo Canada Data Management Report
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1. Real Time Status

Deployments

Between December 2021 to November 2022, Argo Canada deployed a total of 48 floats. Of these floats, 21 were Arvor-I, 17 were Arvor -I equipped with additional Aanderaa Optode 4330 sensor, 4 were Arvor-I with RBR sensor, 4 were BGC(Provor III) floats with dissolved oxygen, chlorophyll-A, backscattering sensor, and 2 were BGC (Provor III) with the above BGC sensors plus SBE PH sensor. All floats are manufactured by NKE. Below is the figure showed the deployment location of these floats.
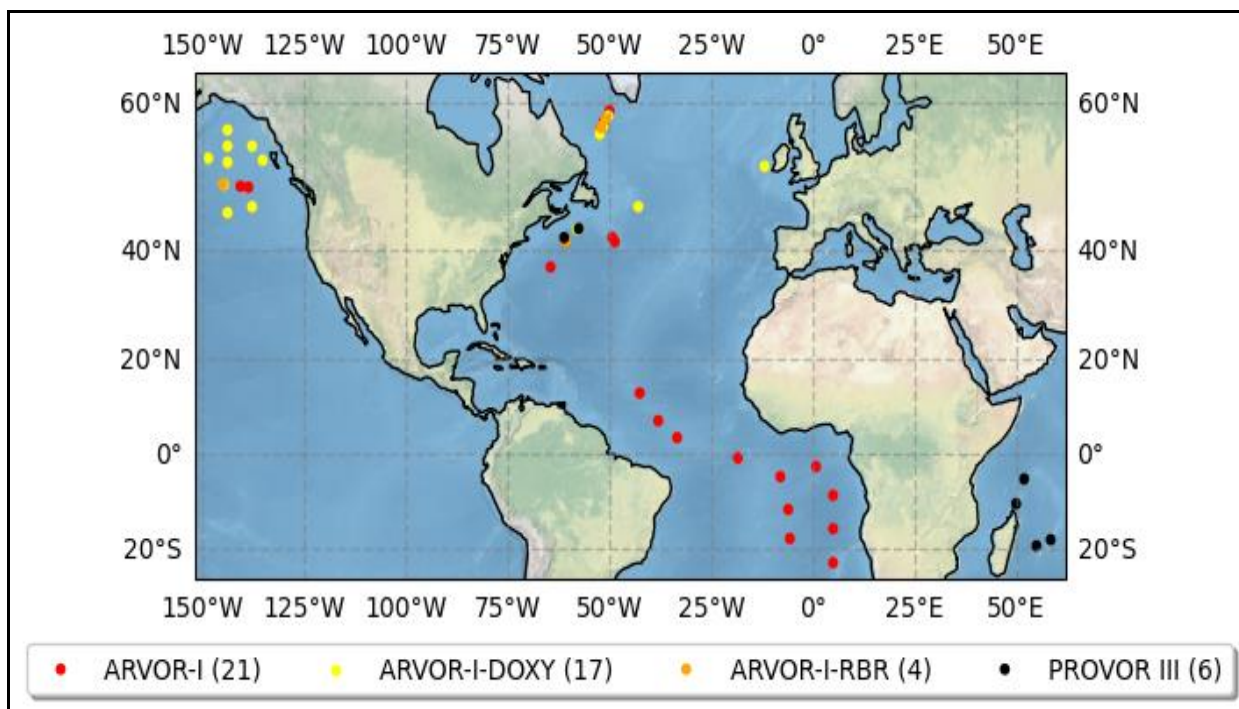

Data acquired from floats

As of the end of November 2022, Argo Canada has 149 active floats, including 12 NOVA, 1 DOVA, 125 NKE Arvor, 5 NKE Arvor with RBR, and 6 BGC floats.

For BGC floats, the data are processed every 6 hours in the system of mixed Java and Python codes. For other floats, the data are processed hourly in the system of mixed Java, and FORTRAN codes. We plan to migrate both processes into one when the BGC processing system is more stable.

Data issued to GTS

All data are issued to the GTS in BUFR format. From November 2021 to October 2022, on average 313 BUFR messages were issued on the GTS monthly, of which 76% of the messages met 12 hours target. During the year, we experienced some significant drops in timeliness because MetOcean Telematics canceled the decoding service from SBD format to CSV for Nova and Dova floats. Hence, we had to developed the software to decode data for Nova and Dova floats. Figure 1 showed the performances of Argo real-time data delivery on the GTS.

Figure 1: Summary of Argo real-time data deliveries on the GTS within 12 hrs
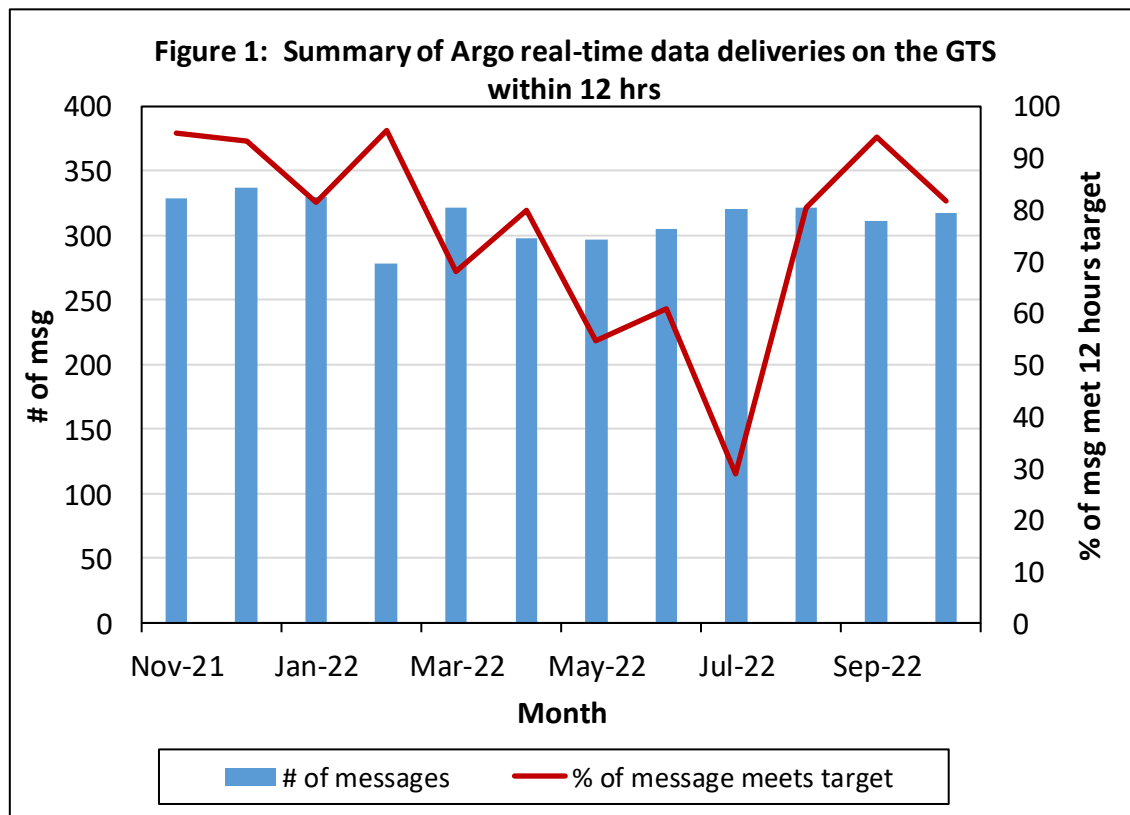
Data issued to GDACs after real-time QC

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 floats.

For BGC 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 still have to develop the software to construct the trajectory NetCDF file for these floats. We estimate that the trajectory file for BGC float will be available in early 2023.

2. Delayed Mode QC status

Core Argo DMQC

Due to change in the delayed mode operator, and ongoing updates and validation of the DMQC Matlab toolkit developed by MEDS, delayed mode data submissions have been paused since March 2022. Delayed mode QC and submissions are expected to resume at the end of 2022 or early 2023, including responses to monthly anomaly reports and delayed-mode audits of past data submissions.

BGC-Argo DMQC

Delayed mode quality control of DOXY was not completed this year due to other tasks taking precedence, such as the development of real time quality control processing for CHLA and BBP which are new variables to the MEDS DAC. Development of the python package bgcArgoDMQC continued (see below for more details). As the RTQC processing chain becomes more stable, submission of delayed mode BGC files will restart.

3. Value Added items

Web pages

We maintain 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. 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

- 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.

Software tools and training

Argo Canada continues to maintain and update the R argoFloats package[1], which was developed during the early stages of the Commonwealth Blue Charter program. Since the publication of the package, training material related to reading and analyzing ocean data was organized into a two day tutorial that was delivered to Commonwealth participants (around the globe) in 4 virtual workshops. Day two of the course involved an introduction to Argo, the argoFloats package, and instruction on how to use the package to find, download, and analyze Argo data. The course materials are currently being turned into an online self-guided course, supported by the Commonwealth Secretariat.

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. A short paper detailing the software's use is planned for the new year.

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[1] https://www.frontiersin.org/articles/10.3389/fmars.2021.635922/full

Additionally, python software for performing RTQC on CHLA and BBP was developed this year ([medsrtqc](#)). 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.