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# NAFO STACFEN Report 2019

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## Abstract

The Marine Environmental Data Section (MEDS) of the Oceans Science Branch of Fisheries and Oceans Canada serves as the Regional Environmental Data Center for NAFO. As part of this role, MEDS provides an annual inventory of environmental data collected in the NAFO Convention Area to the NAFO subcommittee for the environment (STACFEN), including inventories and maps of physical oceanographic observations such as ocean profiles, near surface thermosalinographs, drifting buoys, currents, waves, tides and water level measurements for the previous calendar year. Reporting includes data and information from NAFO member countries where these are provided to the data center.

## Introduction

The Marine Environmental Data Section (MEDS) of the Oceans Science Branch of Fisheries and Oceans Canada (DFO) acts as Regional Environmental Data Center for NAFO. This role began in 1965 when the Canadian Oceanographic Data Centre started providing data management functions to the International Commission for the Northwest Atlantic (ICNAF), and was subsequently formalized in 1975, by which time the Canadian Oceanographic Data Centre (CODC) had become the Marine Environmental Data Service (MEDS). MEDS underwent several name changes from 2005 to 2017, it was known in the interim under acronyms such as ISDM and OSD.

In order for MEDS to carry out its responsibility of reporting to the Scientific Council, the Designated National Representatives selected by STACFEN are requested to provide MEDS with all marine environmental data collected in the Northwest Atlantic for the preceding years. Provision of a meaningful report to the Council for its yearly meetings in May and June requires the submission to MEDS of a completed oceanographic inventory form for data collected in the previous calendar year, and oceanographic data pertinent to the NAFO Convention Area, for all stations occupied in the years prior to the meetings. The data of highest priority are those from the standard sections and stations, as described in NAFO SCR DOC., No. 1, Serial N 1432, 9p.

Data that have been formatted and archived at MEDS are available to all members on request, and are available from DFO institutes. Requests can be made by telephone (613) 990-6065, by e-mail to info@dfo-mpo.gc.ca, by completing an on-line order form on the MEDS web site at http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/request-commande/form-eng.asp or by writing to Oceans Science branch, Fisheries and Oceans Canada, 12th Floor, 200 Kent St., Ottawa, Ont. Canada K1A 0E6.

**Data Processing and Management**

A variety of oceanographic surface, near-surface, and subsurface observations are made every day in the NAFO Convention Area by ship-borne instruments and autonomous devices, including vertical profiles of parameters such as temperature, salinity, oxygen, nutrients and other chemical and biological variables. The Marine Environmental Data Section (MEDS) of the Oceans Science Branch of DFO receives these data either in real-time or delayed mode.

Real-time or near real-time data are acquired directly from instruments (for instance, Argo Canada profilers), from research ships or ships of opportunity, from universities, from DFO research institutes, from the Global Telecommunication System (GTS) of the World Meteorological Organization Information System, and from NOAA's Geostationary Operational Environmental Satellite system. Some real-time data transmitted over satellite or low bandwidth communications are pre-formatted in a way that reduces their vertical resolution or significant figures. Such data receive some form of quality control but generally do not benefit from the calibration made possible after a cruise or an instrument's recovery (in the case of moored equipment or remote controlled devices).

Delayed mode data are acquired through exchanges with research institutes, universities and other ocean databases, such as the World Ocean Database (WOD, NOAA) and the ICES Oceanographic database. The delayed mode data generally take months to years to process from the time a cruise is completed or an instrument has been recovered. For this reason, MEDS continually receives delayed mode data from years preceding the previous observation years and must also query the aforementioned international databases (ICES, WOD) for observational periods covering a number of years. Most real-time data are subject to be replaced with a delayed mode version when available, and even delayed mode data are sometimes subject to recalibration, at which point they must be updated in the archives.

Data processing at MEDS begins by reformatting files from their original formats into a common format. Quality control is carried out by a combination of specially designed software and trained personnel. The quality control has four main functions. The first is to check and ensure that each data message is properly formatted, units are standardized, and parameter range checks are performed. The second is to identify any duplication, and select the best version based on data type, source of the data, and general qualities in analysis and reporting of the observations. The third is to identify and correct date/time and geographical positioning errors using computer tests and visual inspection of the track for each cruise. The final quality control procedure uses a series of algorithms to find and flag common instrument failures found in profiles or series of subsurface measurements. These algorithms depend on data, platform and/or observation program type.

**Data Summary**

Table 1 and Table 2 below summarize data received by MEDS for the NAFO Convention Area (NCA) in 2019. These refer to the more detailed platform-specific figures and tables at the end of this report. Table and figure numbers in these two tables differ for some platform types, as slightly different groupings of data (e.g., by variable type, sampling type, platform type, real-time vs. delayed mode, or source) are used to maximize clarity in the platform-specific figures and tables.

Due to time constraints, delayed-mode CTD data provided in May 2020 by the Spanish Institute of Oceanography and DFO Northwest Atlantic Fisheries Organization could not be included in this report, and so only appear in the tables and figures below if they were transmitted in real-time on the GTS. These data will be included in next year’s report.

**Table 1.** Data observed in NAFO Convention Area in 2019

| Data Type | Platform Type | Counts/Duration | Table # | Figure # |
|---|---|---|---|---|
| Oceanographic profiles | Autonomous drifting (Argo) | 4348* profiles from 184 platforms | 3 | 1 |
| | Moorings (Viking) | 1151* profiles from 6 platforms** | 3 | 1 |
| | Gliders | 3038* profiles from 11 platforms | 3 | 1 |
| | Ship | 3226 profiles (826 CTD; 1830 CTD*; and 570 XBT* profiles) from at least 21 ships | 4 | 2 |
| Surface/near-surface observations | Ship (thermosalinograph) | 12904* obs. from 1 ship | 4 | 4 |
| | Drifting buoys | 307473* obs. from 184 buoys | 6 | 4 |
| | Moored buoys | 242445* obs. from 20 buoys** | 6 | 4 |
| | Fixed platforms | 60312* obs. from 3 platforms | 6 | 4 |
| | Water level gauges | 12 sites, avg. ~1 year each | 7 | 4 |

*Data formatted for real-time transmission
**all Canadian wave buoys described in this report measure waves, and the moorings measuring CTD oceanographic profiles in this table are also equipped with surface buoys measuring waves

**Table 2.** Data observed prior to 2018 in NAFO Convention Area and acquired between January 2019 and May 2020

| Data Type | Platform Type | Counts/Duration | Table # | Figure # |
|---|---|---|---|---|
| Oceanographic profiles | Ship | 8996 profiles (3869 CTD + 1258 bottle + 175 XBT profiles) from 17 ships | 5 | 3 |

*Data formatted for real-time transmission

**Description**

Oceanographic profiles

*Argo (Figure 1, Table 3)*

Argo is an international program which started in 2000 and which aims to deploy profiling floats on a 3 by 3 degree grid in the oceans of the world. Each profiling float samples and reports temperature and salinity from 2000 m to the surface every 10 days; pilots are also currently underway for deep Argo floats capable of sampling to 6000 m. Additionally, biogeochemical-Argo floats report oxygen, nitrate, pH, chlorophyll-a, suspended particles, and downwelling irradiance in addition to temperature and salinity. Data are distributed on the GTS within 12 hours of collection and made available on two mirrored Global servers located in France and in the USA.

MEDS carries out data management for Argo Canada profilers, from instrument to publication to the GTS and global servers. MEDS also decodes and stores all Argo data circulating on the GTS. Over 4000 Argo profiling floats owned by multiple countries are currently sampling the world's oceans.

Autonomous profiling floats programmed with sampling patterns other than a maximum sampling depth of 2000 m (or deeper for Deep Argo) and reporting interval of 10 d are often designated Argo-equivalent. In 2019, no Argo-equivalent floats reported within the NCA.

*Gliders (Figure 1, Table 3)*

Underwater gliders are autonomous underwater vehicles following saw tooth-like profiles in the ocean while measuring various parameters, during missions that can last months and extend over thousands of kilometers. MEDS regularly acquires data from the gliders owned by the Coastal Environmental Observation Technology and Research (CEOTR) group (headquartered at Dalhousie University) and creates messages for transmission on the GTS after performing automatic quality control. The full data set can be accessed from CEOTR.

*Mammals (Figure 1, Table 3)*

Among data decoded and acquired from the GTS by MEDS are real-time data transmitted by the Sea Mammal Research Units of University of St Andrews (Scotland). These data are measured by tags featuring miniaturized CTD sensors attached to marine mammals and transmitting oceanographic data in real-time when the animals surface. These devices are used by a variety of researchers worldwide.

*Ships (Figures 2 and 3, Table 4)*

MEDS receives real-time (within 30 days of observation) messages containing temperature and salinity profile data (either from CTD or XBT) from various Canadian Coast Guard ships, helicopters or opportunity vessels performing research or monitoring activities. The messages are sometimes sent from the ships or shortly after the ship's return. The data are quality controlled (see reference, GTSPP QC manual) prior to transmission on the GTS (if within 30 days of observation) and ingestion in the archive.

MEDS decodes and stores all ship based data circulating on the GTS, either CTD or XBT, including data sampled by ships of opportunity. MEDS further receives delayed mode data from DFO institutes: Northwest Atlantic Fisheries Centre (NAFC), Bedford Institute of Oceanography (BIO), Maurice-Lamontagne Institute (MLI), St. Andrews' Biological Station, Gulf Fisheries Center (GFC, indirectly through BIO or MLI), Institute of Ocean Sciences (IOS) and the Freshwater Institute (FWI). MEDS ingests the data after conversion and visual quality assurance.

MEDS receives delayed mode data from foreign institutes, for example the Spanish Institute of Oceanography, either directly or through BIO. MEDS also periodically queries the World Ocean Database and ICES Oceanographic Database for additional data in the NAFO Convention Area (NCA). Due to time restrictions in the preparation of the report, these sources of data could not be included in this year's report.

<u>Near-surface observations</u>

*Moored buoys and fixed stations (Figure 4, Table 6)*

MEDS continuously acquires data from meteorological buoys in Canadian waters equipped with ocean data acquisition systems. These buoys belong to Environment and Climate Change Canada (Meteorological Service of Canada) and measure wind velocity, air and water temperature, pressure and wave spectral energy with estimated period and significant wave height. All data are currently acquired via the Geostationary Operational Environmental Satellite (GOES), on which the buoys transmit, but in some situations the data is acquired in delayed-mode or from the GTS. MEDS also acquires, in delayed mode, data from wave measuring buoys deployed near offshore oil and gas sites as per NEB Guidelines.

BIO, NAFC, and MLI maintain surface buoys, most of which are equipped with subsurface moored instruments such as ADCPs (see mooring section) and a CTD profiler. Those buoys are informally known as "Viking" buoys. MEDS transmitted data from the CTD profiler those buoys on the GTS in 2019. The data can otherwise be requested from MLI, NAFC, BIO.

A number of U.S. moored buoys and fixed stations in the NCA transmit data on the GTS, and those are also acquired by MEDS. The stations belong to various institutions, such as the National Estuarine Research Reserve System, the University of North Carolina (including the Coastal Ocean Research and Monitoring Program) and the Chesapeake Bay Interpretive Buoy System. Their data management is coordinated by NOAA's National Data Buoy Center. Their positions are typically near the coast.

*Drifting buoys (Figure 4, Table 6)*

MEDS decodes and stores all drifting buoy data circulating on the GTS. These buoys are deployed by various countries. Most buoys are designed for the Surface Velocity Program and are drogued at 15 m depth. The data reported are temperature and sometimes salinity. The buoy-calculated displacement, over time, provides an estimation of currents at the drogued depth.

*Thermosalinographs (Figure 4, Table 5)*

MEDS decodes and stores all thermosalinograph data circulating on the GTS. In 2019, one ships (from Canada) reported thermosalinograph data in the NCA.

*Water level gauges (Figure 4, Table 7)*

MEDS processes and archives observed water level data collected from the gauge network maintained by the Canadian Hydrographic Service (CHS), plus a few stations operated by Environment and Climate Canada (Water Survey of Canada). Over 2 million new observations are archived every month.

**Other Activities**

Atlantic Zone Monitoring Program

Activities under the DFO Atlantic Zone Monitoring Program (AZMP) include regular sampling at 5 fixed stations and 16 standard sections, various monitoring and survey activities, and research cruises in the AZMP area to collect physical, chemical and biological data. MEDS archives physical oceanographic data from the AZMP (as outlined in the preceding sections), and also maintains program information and publications at http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/azmp-pmza/index-eng.html.

Offshore Oil and Gas Environmental Monitoring Data

As mentioned in the near-surface observations section, MEDS acquires, in delayed mode, monitoring physical oceanographic data collected near offshore oil and gas sites as per NEB Guidelines. No data submissions were received in 2019.

**Data Access**

- *Argo:* Real-time data are sent to the global data centers within 12 hours of collection; data are also updated in delayed mode. Global Argo data can be downloaded from various sources, as described at http://www.argo.ucsd.edu/Argo_data_and.html.
- *Real-time oceanographic data:* Real-time oceanographic profiles from the GTS and other sources, as well as US coastal mooring and fixed platform data from the GTS, are forwarded three times a week to

the Global Temperature Salinity Profile Programme's Continuously Managed Database (https://www.nodc.noaa.gov/GTSPP/access_data) and to the Copernicus Environment Monitoring Service where they are made available in "near real time in situ" products (http://marine.copernicus.eu/services-portfolio/access-to-products/?option=com_csw&view=details&product_id=INSITU_GLO_NRT_OBSERVATIONS_013_030) . GTS thermosalinograph data are forwarded to the Global Ocean Surface Underway Data archive (http://www.gosud.org). The latter two databases are harvested by the EMODnet Physics portal (http://emodnet-physics.eu/Map).

- *Canadian bottle and plankton data:* Data are available from the BioChem Database (https://www.dfo-mpo.gc.ca/science/data-donnees/biochem/index-eng.html).
- *Delayed-mode Canadian oceanographic profiles:* Data are exchanged bilaterally with the World Ocean Database (https://www.nodc.noaa.gov/OC5/WOD/pr_wod.html). Synchronization is however a work in progress and one may need to allow from months to more than a year for Canadian data to become available from these databases after it has been collected.
- *Drifting buoy equatorial moored buoy data from the GTS:* These are sent to the US NOAA National Centers for Environmental Information Ocean Archive System on a yearly basis (https://www.nodc.noaa.gov/cgi-bin/OAS/prd/text/query).
- *Canadian moored buoys:* Data are made available on a national website within days of collection (updates on business days): http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/waves-vagues/index-eng.htm.
- *Canadian water levels:* Data are available from two national websites: http://waterlevels.gc.ca/ (last 24 hours) and http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/twl-mne/index-eng.htm (validated, historical). Relevant stations data are shared with international initiatives such as the Permanent Service for Mean Sea Level, Global Sea Level Observing System and IOC Sea Level Station Monitoring facility.
- *Canadian moorings:* Data are available from BIO (http://www.bio.gc.ca/science/data-donnees/base/index-en.php) and MLI (https://slgo.ca/app-sgdo/en/accueil.html) depending on the site locations.
- *Gliders:* Full resolution glider data from measured by CEOTR can be accessed from their website : http://ceotr.ocean.dal.ca/. Information on DFO glider deployments can be accessed from the "Everyone's Glider Observations" website: https://www.ego-network.org/dokuwiki/doku.php and the data can be accessed from : https://www.ego-network.org/dokuwiki/doku.php?id=public:dataaccess.
- *Marine mammals:* Observations from sensors mounted on marine mammals can be accessed from the MEOP website : http://www.meop.net/
- *Other MEDS data:* Canadian oceanographic data and global drifting buoy data can be requested through this form: http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/request-commande/form-eng.asp.

**References**

List of NAFO Standard Oceanographic Sections and Stations. The reprint of NAFO SCR DOC., NO. 1, Serial N1432, 9p. Printed and distributed by: NAFO, P.O. Box 638, Dartmouth, Nova Scotia, Canada B2Y 3Y9.

GTSPP Real-Time Quality Control Manual First Revised Edition. UNESCO-IOC 2010. (IOC Manuals and Guides No. 22, Revised Edition.) (IOC/2010/MG/22Rev.)

Boyer, T.P., J. I. Antonov, O. K. Baranova, C. Coleman, H. E. Garcia, A. Grodsky, D. R. Johnson, R. A. Locarnini, A. V. Mishonov, T.D. O'Brien, C.R. Paver, J.R. Reagan, D. Seidov, I. V. Smolyar, and M. M. Zweng, 2013: World Ocean Database 2013, NOAA Atlas NESDIS 72, S. Levitus, Ed., A. Mishonov, Technical Ed.; Silver Spring, MD, 209 pp., http://doi.org/10.7289/V5NZ85MT

**Figures and Tables**

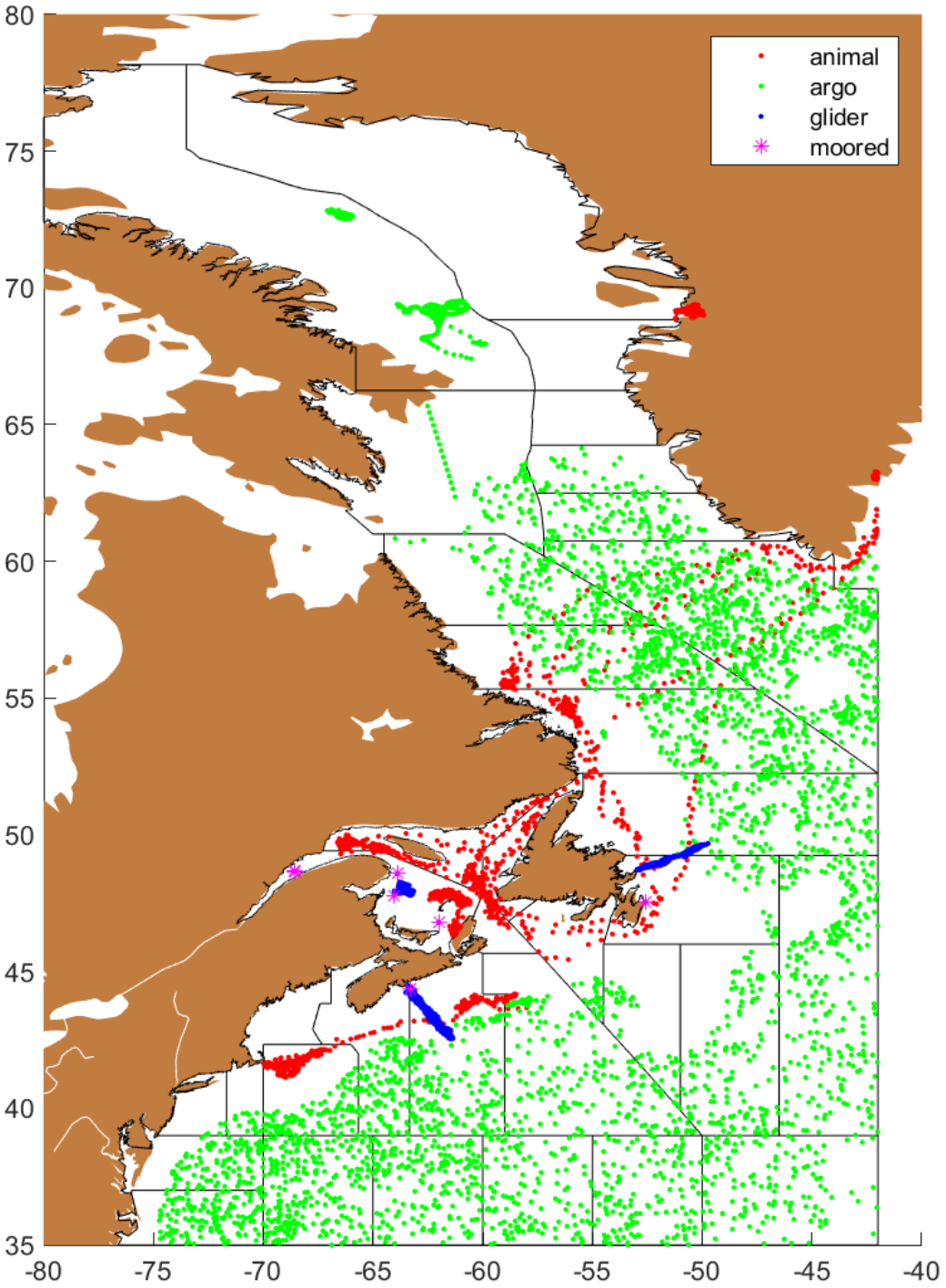


**Figure 1.** Position of profiles sampled by autonomous platforms in 2019

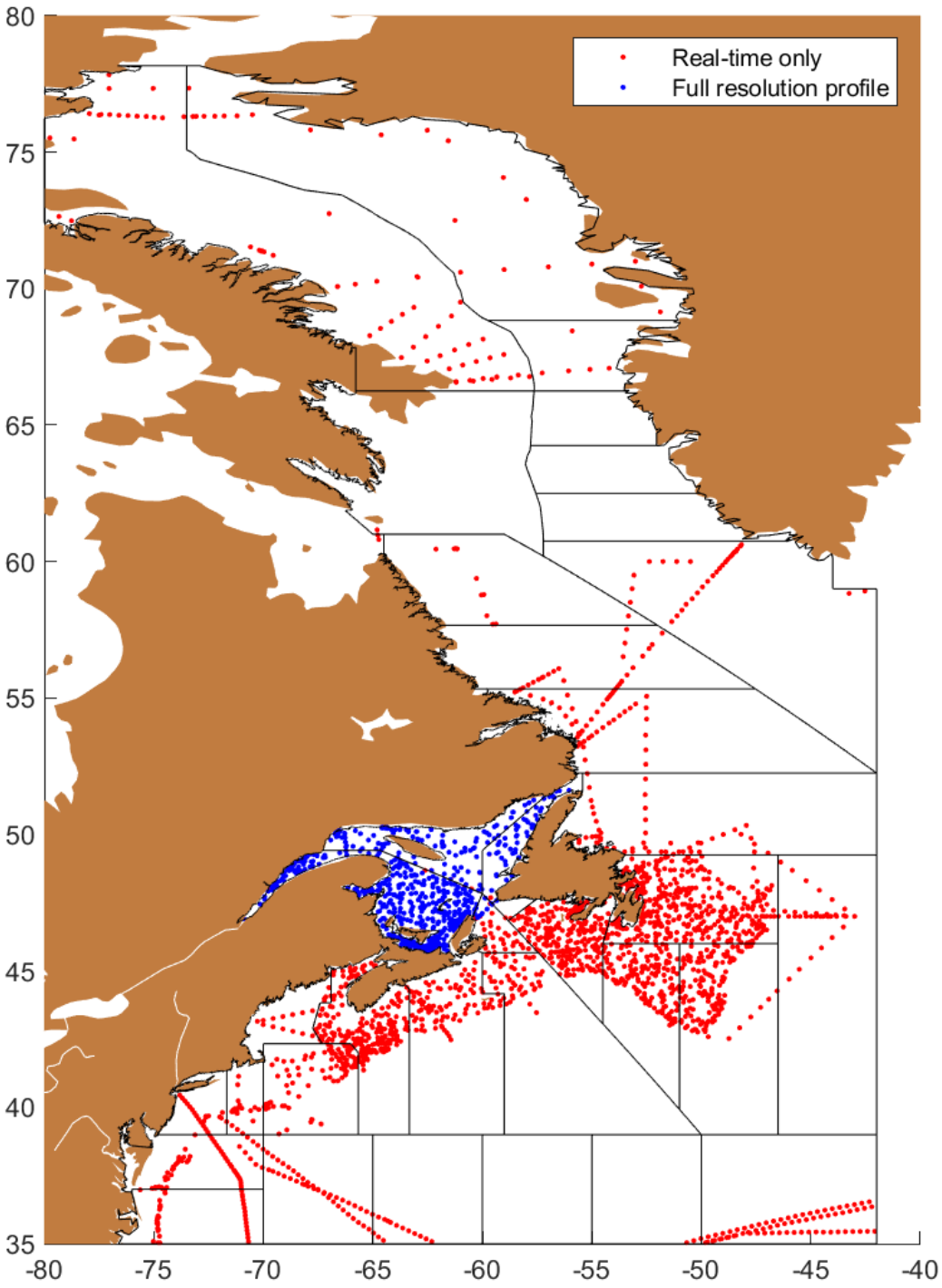


**Figure 2.** Position of profiles sampled by ships in 2019. NAFC and IEO data for 2019 are still being processed by MEDS, and may be missing or shown as real-time only.

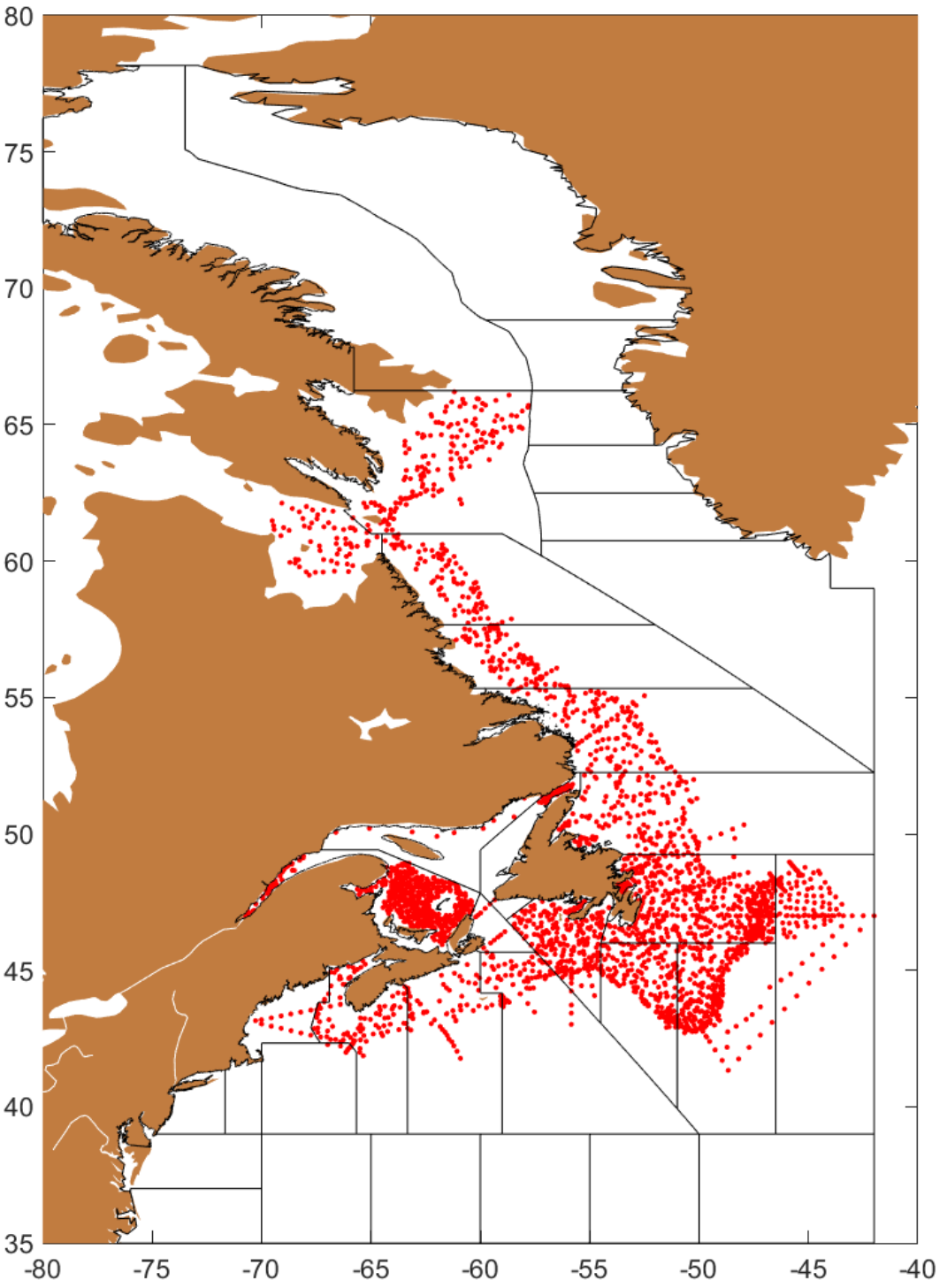


**Figure 3.** Position of profiles sampled by ships before 2019 and acquired in 2019/2020

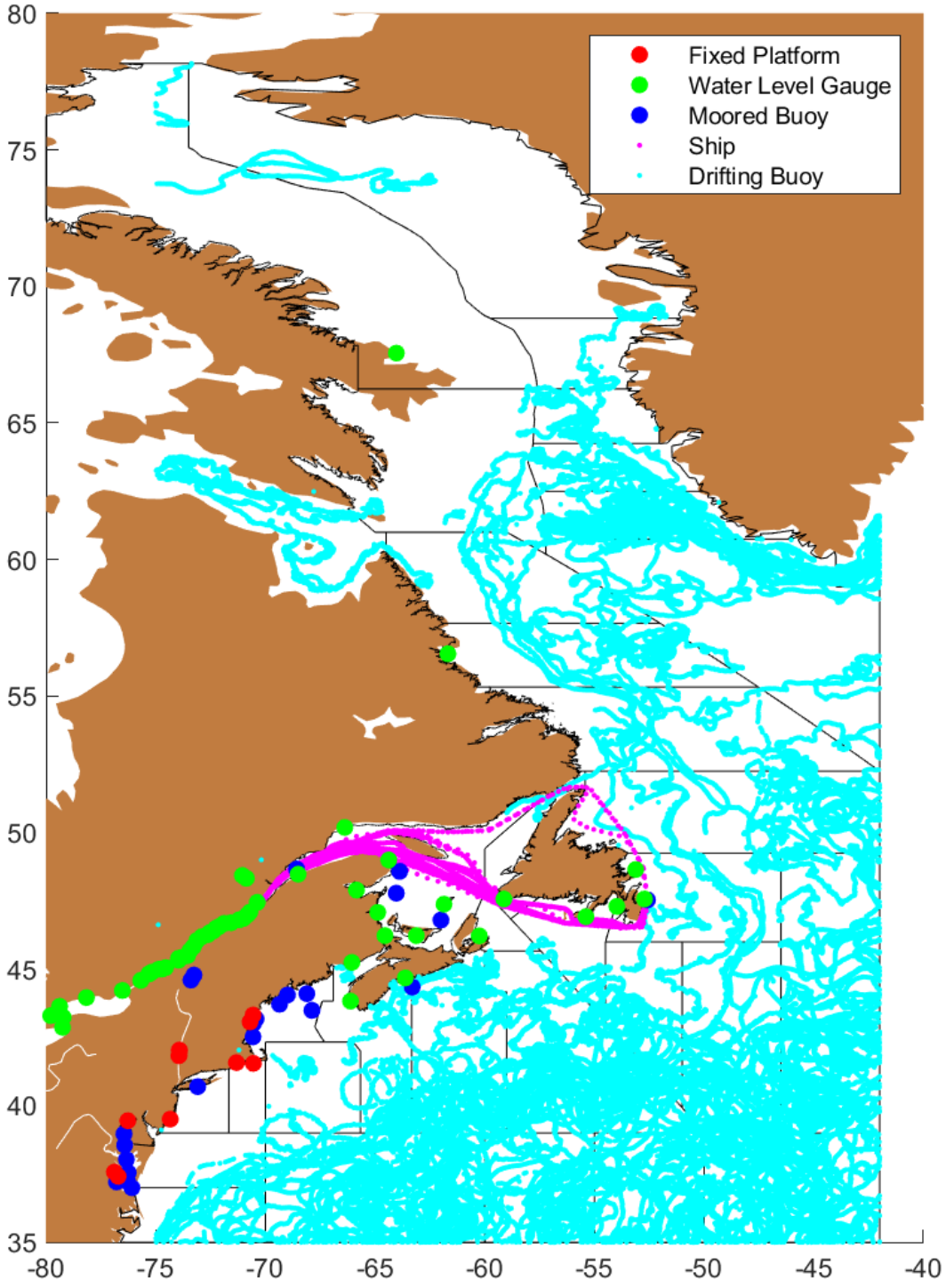


**Figure 4.** Position of near surface observations made in 2019

**Table 3.** Real-time temperature and /or salinity profiles from autonomous platforms collected and processed in 2019

| Platform Type | Platform Name | Country | WMO ID | Reporting Period (months) | Profiles | NAFO Subareas |
|---|---|---|---|---|---|---|
| moored | PMZA-RIKI** | Canada | 4400481 | Jun-Nov | 367 | 4T |
| moored | IML-BA** | Canada | 4400483 | Jun-Sep | 154 | 4T |
| moored | AZMP-ESG** | Canada | 4400484 | May-Oct | 181 | 4T |
| moored | AZMP-VAS** | Canada | 4400485 | Jun-Nov | 200 | 4T |
| moored | AZMP-STA27** | Canada | 4400486 | Jun-Oct | 246 | 3L |
| moored | AZMP-HLX** | Canada | 4400487 | Jan-Jan | 3 | 4W |
| glider | SEA019 | Canada | 4800925 | Mar-Nov | 265 | 4W |
| glider | SEA021 | Canada | 4800926 | Feb-Oct | 396 | 4W |
| glider | SEA032 | Canada | 4800937 | Jan-Feb | 90 | 4W |
| glider | SEA022 | Canada | 4800993 | Jun-Oct | 364 | 4W 4X |
| glider | SEA024 | Canada | 4800994 | Jun-Dec | 1213 | 3K 3L 4W 4X |
| glider | SEA019 | Canada | 4800925 | Oct-Nov | 13 | 4W |
| glider | SEA021 | Canada | 4800926 | Sep-Oct | 25 | 4W |
| glider | SEA022 | Canada | 4800993 | Jul-Oct | 38 | 4W |
| glider | SEA024 | Canada | 4800994 | Jun-Dec | 385 | 3K 3L 4W 4X |
| glider | Fundy | Canada | 4800999 | Jun-Jul | 183 | 4T |
| glider | Pearldiver | Canada | 6801735 | Dec- | 66 | 2J |
| argo | | USA | 3901219 | Jan-Dec | 24 | 6F 6G |
| argo | | Germany | 3901601 | Jan-Dec | 34 | 4X 5Ze6B 6C 6D |
| argo | | Germany | 3901602 | Jan-Dec | 33 | 3N 3O 4Vs6G 6H |
| argo | | Germany | 3901603 | Mar-Dec | 28 | 4Vs4W 6E 6F 6G |
| argo | | Germany | 3901604 | Jan-May | 11 | 6D 6E |
| argo | | Germany | 3901637 | Jan-Dec | 30 | 3M 3N 4Vs6H |
| argo | | Germany | 3901638 | Jan-Dec | 37 | 3N 4Vs4W 6E 6F 6G 6H |
| argo | | Germany | 3901639 | Jan-Dec | 31 | 4W 4X |
| argo | | Germany | 3901640 | Jan-Dec | 37 | 3M 3N 3O 4Vs4W 6E 6F 6G 6H |
| argo | | Germany | 3901641 | Jan-Dec | 37 | 4W 4X 5Ze6B 6C 6D 6E |
| argo | | Germany | 3901642 | Jan-Oct | 30 | 3N 4Vs4W 4X 5Ze6D 6E 6H |

| | | | | | |
|---|---|---|---|---|---|
| argo | Germany | 3901654 | Jul-Oct | 9 | 6F 6G |
| argo | Germany | 3901656 | Jan-Dec | 30 | 6B 6C 6D 6E 6F |
| argo | Germany | 3901657 | Apr-Nov | 24 | 4X 5Ze6D 6E |
| argo | Germany | 3901659 | Jan-May | 5 | 6H |
| argo | Germany | 3901660 | Jan-Jun | 6 | 1F |
| argo | Germany | 3901665 | Jan-Apr | 12 | 1F |
| argo | Germany | 3901667 | Jan-Jul | 14 | 1F 2G |
| argo | Germany | 3901668 | Jan-Dec | 53 | 1F 2G 2H |
| argo | Germany | 3901669 | Jan-Dec | 54 | 1F 2H |
| argo | France | 3901856 | Aug-Sep | 4 | 6D |
| argo | USA | 4901462 | Jan-Jan | 1 | 3N |
| argo | USA | 4901467 | Jan-Mar | 7 | 6G 6H |
| argo | USA | 4901594 | Jan-Dec | 38 | 3N 3O 4Vs6G 6H |
| argo | USA | 4901621 | Apr-Dec | 26 | 4W 4X 5Ze5Zw6B 6D 6E |
| argo | USA | 4901630 | Jan-Jul | 20 | 6F 6G 6H |
| argo | USA | 4901631 | Jan-Dec | 36 | 4W 4X 5Ze6D 6E |
| argo | USA | 4901699 | Aug-Dec | 12 | 6F 6G |
| argo | USA | 4901702 | Apr-Nov | 13 | 6F |
| argo | USA | 4901704 | Jan-Jan | 5 | 3K |
| argo | USA | 4901721 | Mar-Dec | 30 | 3N 3O 4Vs4W 6B 6C 6D 6E 6H |
| argo | Canada | 4901747 | Jan-Dec | 36 | 1F 2G 2H 2J |
| argo | Canada | 4901765 | Jan-Oct | 15 | 4Vs4W 6D 6E 6F |
| argo | Canada | 4901779 | May-Jul | 5 | 1F |
| argo | Canada | 4901788 | Jan-Dec | 37 | 4W 4X 5Ze5Zw6B 6C 6D 6E |
| argo | Canada | 4901798 | Jan-Dec | 36 | 3N 4Vs4W 4X 6B 6D 6E 6H |
| argo | Canada | 4901806 | Jul-Sep | 8 | 0A |
| argo | Canada | 4901813 | Jan-Sep | 17 | 6D 6E 6F |
| argo | Canada | 4901817 | Jan-Mar | 8 | 1F |
| argo | USA | 4902099 | Jan-Dec | 36 | 4X 5Ze6B 6C 6D |
| argo | USA | 4902102 | Apr-Dec | 22 | 6B 6C 6D |
| argo | USA | 4902107 | Feb-Feb | 1 | 3K |
| argo | USA | 4902109 | Jun-Oct | 11 | 6C 6D 6E |
| argo | USA | 4902111 | Jul-Dec | 17 | 4Vs4W 6B 6C 6D 6E |
| argo | USA | 4902112 | Jan-Dec | 35 | 3N 4Vs4W 6B 6C 6D 6E 6H |
| argo | USA | 4902114 | May-Dec | 24 | 3O 4Vs4W 6B 6C 6D 6E 6F 6G |

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|---|---|---|---|---|---|
| argo | USA | 4902116 | Jan-May | 5 | 2J 3K |
| argo | USA | 4902118 | May-Dec | 23 | 1E 1F 2G |
| argo | USA | 4902119 | Aug-Dec | 15 | 1E 1F |
| argo | USA | 4902120 | Jan-Dec | 37 | 4Vs4W 6E 6F 6G |
| argo | USA | 4902122 | Jan-Oct | 16 | 5Ze5Zw6C |
| argo | USA | 4902337 | Jan-Dec | 36 | 4W 4X 6D 6E 6F 6G |
| argo | USA | 4902344 | Jan-Dec | 35 | 4W 4X 5Ze6B 6C 6D 6E |
| argo | USA | 4902346 | Jan-Dec | 37 | 4Vs4W 4X 5Ze6D 6E 6F |
| argo | USA | 4902347 | Jan-Feb | 5 | 3M 3N |
| argo | USA | 4902348 | Jan-Dec | 40 | 3O 3Ps4Vs4W 4X 5Ze |
| argo | Canada | 4902391 | Jan-May | 12 | 4W 6B 6C 6D 6E |
| argo | Canada | 4902392 | Jan-Dec | 35 | 3N 4Vs4W 4X 6D 6E 6F 6H |
| argo | Canada | 4902393 | Jan-Aug | 21 | 6F 6G 6H |
| argo | Canada | 4902394 | Jan-Dec | 35 | 4Vs4W 4X 5Ze5Zw6A 6B 6C 6D 6E 6F |
| argo | Canada | 4902395 | Jan-Dec | 35 | 1F 2G 2H 2J |
| argo | Canada | 4902397 | Jan-Nov | 32 | 1F 2H 2J |
| argo | Canada | 4902398 | Jan-Feb | 3 | 3K 3M |
| argo | Canada | 4902399 | Jan-Dec | 37 | 2J 3K |
| argo | Canada | 4902400 | Jan-Dec | 30 | 3L 3M |
| argo | Canada | 4902409 | Jan-Dec | 36 | 1F |
| argo | Canada | 4902410 | Jan-Dec | 35 | 2H 2J 3K 3L 3M |
| argo | Canada | 4902412 | Jan-Nov | 32 | 3K 3L 3M 3N |
| argo | Canada | 4902419 | Jan-Dec | 31 | 0B 1D 1E 2G |
| argo | Canada | 4902420 | Jan-Feb | 5 | 3M |
| argo | Canada | 4902422 | Jan-Dec | 37 | 0B 1E 1F 2G 2H |
| argo | Canada | 4902423 | Jan-Mar | 7 | 1F |
| argo | Canada | 4902424 | Jan-Dec | 33 | 2J 3K 3L 3M |
| argo | Canada | 4902438 | Jan-Dec | 36 | 2H 2J |
| argo | Canada | 4902439 | Jan-Dec | 36 | 1F 2G 2H |
| argo | Canada | 4902440 | Jan-Dec | 37 | 3M 3N 4Vs4W 4X 5Ze6B 6D 6E 6F |
| argo | Canada | 4902441 | Jan-Dec | 36 | 3O 3Ps4Vs |
| argo | Canada | 4902442 | Jan-Dec | 37 | 3O 4Vs4W 4X 6D 6E 6F |
| argo | Canada | 4902450 | Jan-Aug | 23 | 1F |
| argo | Canada | 4902452 | Jan-Dec | 37 | 1F 2J |
| argo | Canada | 4902453 | Jan-Aug | 24 | 5Ze5Zw6A 6B 6C |

| | | | | | |
|---|---|---|---|---|---|
| argo | Canada | 4902455 | Jan-Dec | 37 | 4Vs4W 4X 5Ze6D 6E 6F |
| argo | Canada | 4902456 | Jan-Dec | 34 | 3M 3N 3O 4Vs6G 6H |
| argo | Canada | 4902457 | Jan-Jul | 20 | 3Ps4Vs4W |
| argo | Canada | 4902458 | Jan-Mar | 6 | 3N |
| argo | Canada | 4902467 | Apr-Dec | 27 | 4Vs4W |
| argo | Canada | 4902468 | Jun-Dec | 22 | 2H 2J 3K |
| argo | Canada | 4902469 | Jun-Dec | 20 | 1F 2G 2H |
| argo | Canada | 4902470 | Apr-Dec | 27 | 4Vs4W |
| argo | Canada | 4902471 | Jun-Dec | 21 | 1F |
| argo | Canada | 4902477 | Jun-Dec | 21 | 1F |
| argo | Canada | 4902478 | Jun-Dec | 20 | 1F 2G 2H |
| argo | Canada | 4902479 | Jun-Dec | 21 | 1F 2G 2H |
| argo | Canada | 4902480 | Jun-Dec | 21 | 1F |
| argo | Canada | 4902481 | Jun-Dec | 22 | 1F 2H 2J |
| argo | Canada | 4902487 | Jun-Dec | 21 | 1F 2H |
| argo | Canada | 4902488 | Jun-Dec | 19 | 1F 2G 2H |
| argo | Canada | 4902489 | Sep-Dec | 12 | 1F 2H 2J |
| argo | Canada | 4902495 | Sep-Dec | 11 | 1F |
| argo | Canada | 4902496 | Nov-Dec | 4 | 3M |
| argo | Canada | 4902497 | Nov-Dec | 4 | 3M |
| argo | Canada | 4902498 | Dec-Dec | 3 | 3N |
| argo | Canada | 4902499 | Dec-Dec | 3 | 3N |
| argo | USA | 4902910 | Sep-Dec | 12 | 4Vs4W 4X 6C 6D |
| argo | USA | 4902911 | Mar-Dec | 30 | 4W 4X 5Ze6B 6C 6D 6E |
| argo | USA | 4902912 | Jan-Dec | 65 | 6B 6C 6D |
| argo | USA | 4902913 | Jan-Dec | 20 | 6E 6G 6H |
| argo | USA | 4902918 | Jan-Oct | 25 | 3K 3M 6H |
| argo | USA | 4902927 | Mar-Dec | 30 | 4W 4X 5Ze5Zw6A 6B 6C 6D 6E |
| argo | USA | 4902928 | Jan-Oct | 30 | 4W 4X 6D 6E |
| argo | USA | 4903035 | Jan-Dec | 37 | 3N 4Vs4W 5Ze6B 6D 6E 6H |
| argo | USA | 4903036 | Jan-Dec | 37 | 3N 3O 4Vs6F 6G 6H |
| argo | USA | 4903042 | Sep-Dec | 12 | 6B 6C 6D |
| argo | USA | 4903047 | Jan-Dec | 22 | 4W 6C 6D 6E 6F |
| argo | USA | 4903048 | Jan-Dec | 37 | 3N 4Vs4W 4X 6D 6E |
| argo | USA | 4903049 | Jan-Dec | 35 | 4X 5Ze5Zw6B 6C 6E |

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|---|---|---|---|---|---|
| argo | USA | 4903260 | Nov-Dec | 7 | 5Ze5Zw |
| argo | USA | 5903390 | Jan-Jan | 1 | 1F |
| argo | USA | 5903395 | Jan-Jun | 17 | 1D 1E 1F 2G |
| argo | USA | 5904176 | Mar-Dec | 30 | 1E 1F 2G 2H 2J 3K |
| argo | USA | 5904771 | Jan-Dec | 31 | 2J 3K |
| argo | USA | 5904772 | Jan-Dec | 29 | 2G 2H 2J 3K 3L 3M |
| argo | UK | 6901147 | Mar-Jul | 2 | 1F |
| argo | UK | 6901149 | Jan-Jan | 1 | 1F |
| argo | UK | 6901167 | Dec-Dec | 2 | 1F |
| argo | UK | 6901169 | Jan-Dec | 36 | 1E 1F |
| argo | UK | 6901171 | Jan-Dec | 27 | 1F 2G 2H 2J 3K 3L 3M |
| argo | UK | 6901173 | Jan-Dec | 18 | 3K 3M |
| argo | UK | 6901178 | Jan-Dec | 37 | 0B 1E 1F 2G 2H |
| argo | UK | 6901190 | Jan-Dec | 36 | 0B 2G 2H 2J 3K 3L 3M |
| argo | UK | 6901192 | May-Aug | 9 | 1F |
| argo | UK | 6901194 | May-Dec | 25 | 0B 1D 1E 1F |
| argo | UK | 6901207 | Oct-Dec | 9 | 1D 1E 1F |
| argo | France | 6901564 | May-Jul | 7 | 1D 1E 1F |
| argo | France | 6901566 | Jan-Aug | 21 | 2G 2H 2J 3K 3L |
| argo | France | 6901568 | Jan-Mar | 8 | 2J 3K |
| argo | France | 6901719 | Aug-Dec | 14 | 1E 1F |
| argo | France | 6901721 | Jan-Dec | 35 | 2G 2H 2J 3K 3M |
| argo | France | 6901722 | Jan-Dec | 37 | 1F 2J |
| argo | France | 6901723 | Feb-Jul | 7 | 1F |
| argo | France | 6901726 | Jan-Apr | 10 | 3K 3M |
| argo | France | 6901751 | Jan-Dec | 36 | 1F 2H 2J |
| argo | France | 6901753 | Jan-Jan | 3 | 3M |
| argo | France | 6901754 | Jan-Oct | 26 | 2G 2H 2J 3K 3L 3M |
| argo | Germany | 6901911 | Jan-Mar | 9 | 0B 1E 2G |
| argo | Ireland | 6901921 | Nov-Dec | 7 | 1F |
| argo | Germany | 6902632 | Jan-Sep | 18 | 3N 3O 4Vs6G 6H |
| argo | Germany | 6902633 | Jan-May | 15 | 3M |
| argo | Germany | 6902634 | Jan-Nov | 25 | 4Vs4W 6D 6E 6F |
| argo | Germany | 6902635 | Jan-Nov | 31 | 3M 3N 4Vs6G 6H |
| argo | France | 6902659 | Feb-Dec | 20 | 3M 6H |
| argo | France | 6902661 | Jan-Dec | 26 | 3M 3N 6G 6H |

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|---|---|---|---|---|---|
| argo | France | 6902684 | Aug-Dec | 15 | 1E 1F |
| argo | France | 6902686 | Jan-Dec | 37 | 1F 2H |
| argo | France | 6902694 | Nov-Dec | 6 | 1E 1F |
| argo | France | 6902696 | Jan-May | 7 | 3K 3M |
| argo | France | 6902697 | Aug-Sep | 2 | 1F |
| argo | France | 6902707 | Jan-Dec | 37 | 2J 3K 3L 3M 3N |
| argo | France | 6902708 | Jan-Feb | 4 | 2J |
| argo | France | 6902709 | Jan-Dec | 36 | 0B 1E 1F 2G 2H 2J 3K 3L 3M |
| argo | France | 6902727 | Jul-Nov | 104 | 0A |
| argo | France | 6902728 | Feb-Mar | 7 | 1F |
| argo | France | 6902752 | Jun-Jun | 1 | 1F |
| argo | France | 6902753 | Jan-Dec | 37 | 0B 1D 2G 2H 2J 3K |
| argo | France | 6902754 | Apr-Dec | 26 | 1F |
| argo | France | 6902755 | Jan-Dec | 35 | 0B 1D 1E 1F |
| argo | France | 6902756 | Jul-Dec | 17 | 0B 1D 1E 1F |
| argo | France | 6902787 | Oct-Dec | 9 | 1D 1E 1F |
| argo | France | 6902789 | Dec-Dec | 2 | 1F |
| argo | France | 6902794 | Jan-Jan | 2 | 3K |
| argo | France | 6902796 | Aug-Aug | 1 | 1F |
| argo | France | 6902802 | Jan-Dec | 37 | 1F |
| argo | France | 6902862 | Jan-Dec | 19 | 2J 3K 3M |
| argo | France | 6902863 | Jan-Dec | 32 | 2J 3K 3M |
| argo | France | 6902864 | Jan-Jun | 11 | 3K 3M |
| argo | France | 6902865 | Jan-Dec | 26 | 2J 3K 3M |
| argo | France | 6902881 | Aug-Sep | 4 | 1F |
| argo | France | 6902896 | Feb-May | 15 | 0B |
| argo | France | 6902897 | Jan-Oct | 82 | 0A |
| argo | France | 6902952 | Jul-Nov | 110 | 0A 1A |
| argo | France | 6902953 | Jan-Jul | 22 | 0A |
| argo | France | 6902967 | Jul-Nov | 110 | 0A |
| argo | Germany | 7900527 | Jun-Dec | 14 | 2J 3K 3M |
| argo | Germany | 7900528 | Jun-Dec | 11 | 3K 3M |
| animal | | 9901124 | Jan-Feb | 77 | 4Vs4W |
| animal | | 9901125 | Jan-May | 382 | 4W 4X 5Ze |
| animal | | 9901221 | Mar-May | 180 | 1F 2G 2H 2J 3K 4R 4S 4T |

| | | | | |
|---|---|---|---|---|
| animal | 9901222 | Mar-Jun | 203 | 1F 2H 2J 3K 3L 3Pn3Ps4R 4S 4T |
| animal | 9901223 | Mar-May | 183 | 1F 2H 2J 3K 3Pn4R 4S 4T 4Vn |
| animal | 9901224 | Mar-Jun | 193 | 1F 2G 2H 2J 3K 3L 3Pn3Ps4R 4S 4Vn |
| animal | 9901225 | Mar-Jun | 217 | 1F 2H 2J 3K 3L 3Pn3Ps4R 4S 4Vn |
| animal | 9901246 | Jul-Dec | 425 | 4T |
| animal | 9901248 | Jul-Nov | 377 | 1A |
| animal | 9901249 | Jul-Dec | 418 | 1A |
| animal | 9901250 | Jul-Dec | 557 | 1A |

*Dates are of first and last data reports within the NAFO Convention Area
**Moorings equipped with fixed profiling CTDs, mounted with Viking buoys. Deployments were seasonal and the full data are available at the MLI.

**Table 4.** Oceanographic profiles collected by ships in 2019

| Platform | Country | Mission | First Date | Last Date | CTD | CTD RT* | XBT | XBT RT* | Bottle | TSG** | NAFO Subareas |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Viola M. Davidson | CAN | | 20190212 | 20191217 | 0 | 9 | 0 | 0 | 0 | 0 | 4X |
| Alfred Needler | CAN | | 20190212 | 20191105 | 0 | 1098 | 0 | 13 | 0 | 0 | 3L 3N 3O 3Pn3Ps4Vn4Vs4W 4X 5Y 5Ze |
| C-GCGP | | 184119002 | 20190304 | 20190313 | 103 | 0 | 0 | 0 | 0 | 0 | 3Pn4R 4S 4T 4Vn |
| Tubul | USA | | 20190321 | 20190322 | 0 | 0 | 0 | 24 | 0 | 0 | 6H |
| Leim | | 18LO19003 | 20190406 | 20190411 | 8 | 0 | 0 | 0 | 0 | 0 | 4T |
| Hudson | CAN | | 20190409 | 20190423 | 0 | 61 | 0 | 0 | 0 | 0 | 4Vn4Vs4W 4X 5Y 5Ze |
| Beluga II | | 18BP19004 | 20190412 | 20191213 | 32 | 0 | 0 | 0 | 0 | 0 | 4T |
| Teleost | CAN | | 20190412 | 20190520 | 0 | 81 | 0 | 55 | 0 | 0 | 3K 3L 3M |
| Leim | | 18LO19005 | 20190421 | 20190506 | 40 | 0 | 0 | 0 | 0 | 0 | 4S |
| Vladykov | CAN | | 20190427 | 20191015 | 0 | 119 | 0 | 0 | 0 | 0 | 3K 3L 3Ps |
| Oceanex Connaigra | CA | | 20190101 | 20191231 | 0 | 0 | 0 | 0 | 0 | 1290 4 | 3K 3L 3Pn3Ps4R 4S 4T 4Vn |
| Nuka Arctica | FRA | | 20190429 | 20190429 | 0 | 2 | 0 | 0 | 0 | 0 | 1F |
| Various Small Vessels | | 18VA19668 | 20190509 | 20191004 | 6 | 0 | 0 | 0 | 0 | 0 | 4T |
| Leim | | 18LO19011 | 20190511 | 20190519 | 7 | 0 | 0 | 0 | 0 | 0 | 4S |
| L'Alliance | | 18K819001 | 20190521 | 20190821 | 29 | 0 | 0 | 0 | 0 | 0 | 4T |
| Teleost | CAN | 18TL19009 | 20190526 | 20190615 | 144 | 0 | 0 | 0 | 0 | 0 | 3Pn4R 4S 4T 4Vn |
| Chicago Express | USA | | 20190530 | 20190716 | 0 | 0 | 0 | 49 | 0 | 0 | 6G 6H |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Amundsen | CAN | | 20190601 | 20190904 | 0 | 200 | 0 | 0 | 0 | 0 | 0A 0B 1A 1B 1F 2G 2H 2J 4R 4T 4Vn4 W |
| Maersk Vilnius | USA | | 20190610 | 20190814 | 0 | 0 | 0 | 70 | 0 | 0 | 5Zw6A 6B 6D 6E |
| Teleost | CAN | | 20190627 | 20190713 | 0 | 86 | 0 | 56 | 0 | 0 | 2H 2J 3K 3L 3M |
| Leim | | 18LO19016 | 20190628 | 20190705 | 19 | 0 | 0 | 0 | 0 | 0 | 4T |
| Okeanos Explorer | USA | | 20190703 | 20190816 | 0 | 0 | 0 | 196 | 0 | 0 | 4X 5Ze5Z w6A 6B 6C |
| Leim | | 18LO19023 | 20190707 | 20190726 | 21 | 0 | 0 | 0 | 0 | 0 | 4T |
| M. Perley | CAN | 18MU19040 | 20190723 | 20190805 | 54 | 7 | 0 | 0 | 0 | 0 | 4T |
| Leim | | 18LO19021 | 20190730 | 20190816 | 86 | 0 | 0 | 0 | 0 | 0 | 4T |
| unknown | CAN, USA | | 20190731 | 20191030 | 0 | 5 | 0 | 67 | 0 | 0 | 3L 3Ps4V s4W 6A 6B 6C |
| Frederick G. Creed | CAN | 18FC19033 | 20190808 | 20190823 | 11 | 0 | 0 | 0 | 0 | 0 | 4R |
| M. Perley | CAN | 18MU19008 | 20190815 | 20190819 | 21 | 0 | 0 | 0 | 0 | 0 | 4T |
| Teleost | CAN | 18TL19036 | 20190815 | 20190903 | 65 | 1 | 0 | 0 | 0 | 0 | 4R 4S 4T 4Vn |
| Teleost | CAN | 18TL19021 | 20190906 | 20191001 | 123 | 0 | 0 | 0 | 0 | 0 | 4T 4Vn |
| Leim | CAN | 18LO19047 | 20190916 | 20190922 | 8 | 0 | 0 | 0 | 0 | 0 | 4T |
| M. Perley | CAN | 18MU19001 | 20190921 | 20191010 | 18 | 0 | 0 | 0 | 0 | 0 | 4T |
| Leim | CAN | 18LO19050 | 20191001 | 20191009 | 20 | 0 | 0 | 0 | 0 | 0 | 4T |
| M. Perley | CAN | 18MU19142 | 20191016 | 20191030 | 11 | 0 | 0 | 0 | 0 | 0 | 4T |
| Coriolis II | CAN | | 20191021 | 20191106 | 0 | 78 | 0 | 0 | 0 | 0 | 3Pn4R 4S 4T 4Vn |
| James Cook | CAN | | 20191117 | 20191209 | 0 | 83 | 0 | 40 | 0 | 0 | 3K 3L 3M 3N 3O 3Ps |

* Messages formatted for transmission on the GTS. These messages are of lower vertical resolution and uncalibrated versions of the data, to be replaced in the future.
**TSG counts are not number of profiles, but number of point thermosalinograph observations

Dates are of first and last data reports within the NAFO Convention Area.
Additional full resolution CTD profiles from some of these cruises were received at MEDS but could not be ingested and counted in time for this report

**Table 5.** Pre-2019 temperature (XBT) and/or salinity (CTD, bottle) profile data collected aboard ships, entered or updated in 2018/2019

| Platform | Mission Number | First Date | Last Date | CTD | Bottle | XBT | NAFO_Subareas |
|---|---|---|---|---|---|---|---|
| Hudson | 18HU07033 | 20070802 | 20070809 | 61 | 0 | 0 | 4Vs4W |
| Alfred Needler | 18NE10002 | 20100311 | 20100330 | 72 | 0 | 0 | 4Vs4W |
| Teleost | 18TL13124 | 20130308 | 20130308 | 0 | 1 | 0 | 3L |
| Teleost | 18TL13113 | 20130403 | 20130409 | 0 | 2 | 0 | 3L |
| Teleost | 18TL13114 | 20130410 | 20130429 | 0 | 74 | 0 | 3K 3L 3M 3N 3O 3Ps |
| Teleost | 18TL13115 | 20130510 | 20130510 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE13433 | 20130514 | 20130514 | 0 | 1 | 0 | 3L |
| Teleost | 18TL13116 | 20130527 | 20130527 | 0 | 1 | 0 | 3L |
| Vladykov | 18VD13014 | 20130613 | 20130624 | 0 | 2 | 0 | 3L |
| Alfred Needler | 18NE13435 | 20130621 | 20130621 | 0 | 1 | 0 | 3L |
| Hudson | 18HU13021 | 20130628 | 20130705 | 42 | 0 | 0 | 3L 3M 4W |
| Teleost | 18TL13117 | 20130709 | 20130728 | 0 | 64 | 0 | 2H 2J 3K 3L 3M |
| Vladykov | 18VD13023 | 20130813 | 20130813 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE13438 | 20131001 | 20131001 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE13439 | 20131015 | 20131015 | 0 | 1 | 0 | 3L |
| Hudson | 18HU13113 | 20131118 | 20131208 | 0 | 78 | 0 | 2J 3K 3L 3M 3N 3O 3Ps |
| Teleost | 18TL14127 | 20140203 | 20140203 | 0 | 1 | 0 | 3L |
| Teleost | 18TL14129 | 20140411 | 20140429 | 0 | 66 | 0 | 3K 3L 3M 3N 3O 3Ps |
| Teleost | 18TL14130 | 20140511 | 20140511 | 0 | 1 | 0 | 3L |
| Hudson | 18HU14007 | 20140516 | 20140516 | 0 | 1 | 0 | 3L |
| Teleost | 18TL14131 | 20140525 | 20140525 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE14447 | 20140619 | 20140619 | 0 | 1 | 0 | 3L |
| Teleost | 18TL14140 | 20140623 | 20140623 | 0 | 1 | 0 | 3L |
| Teleost | 18TL14132 | 20140709 | 20140728 | 0 | 72 | 0 | 2H 2J 3K 3L 3M |
| Vladykov | 18VD14033 | 20140814 | 20140814 | 0 | 1 | 0 | 3L |
| Hudson | 18HU14114 | 20141116 | 20141207 | 0 | 69 | 0 | 2J 3K 3L 3M 3N 3O |
| Teleost | 18TL14141 | 20141221 | 20141221 | 0 | 1 | 0 | 3L |
| Teleost | 18TL15142 | 20150121 | 20150121 | 0 | 1 | 0 | 3L |
| Teleost | 18TL15143 | 20150202 | 20150202 | 0 | 1 | 0 | 3L |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Teleost | 18TL15155 | 20150320 | 20150320 | 0 | 1 | 0 | 3L |
| Teleost | 18TL15144 | 20150410 | 20150427 | 0 | 71 | 0 | 3L 3M 3N 3O 3Ps |
| Teleost | 18TL15146 | 20150511 | 20150511 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE15453 | 20150526 | 20150526 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE15455 | 20150619 | 20150619 | 0 | 1 | 0 | 3L |
| Teleost | 18TL15148 | 20150709 | 20150727 | 0 | 78 | 0 | 2H 2J 3K 3L 3M |
| Vladykov | 18VD15046 | 20150813 | 20150813 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE15457 | 20150920 | 20150920 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE15458 | 20151002 | 20151002 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE15459 | 20151010 | 20151010 | 0 | 1 | 0 | 3L |
| Hudson | 18HU15115 | 20151115 | 20151206 | 0 | 93 | 0 | 2J 3K 3L 3M 3N 3O 3Ps |
| Teleost | 18TL16168 | 20160211 | 20160211 | 0 | 1 | 0 | 3L |
| Teleost | 18TL16157 | 20160401 | 20160406 | 0 | 7 | 0 | 3L 3Ps |
| Vladykov | 18VD16053 | 20160415 | 20160415 | 0 | 1 | 0 | 3L |
| Teleost | 18TL16169 | 20160510 | 20160510 | 0 | 1 | 0 | 3L |
| Teleost | 18TL16159 | 20160511 | 20160517 | 0 | 28 | 0 | 3L 3M |
| Teleost | 18TL16171 | 20160608 | 20160616 | 0 | 2 | 0 | 3L |
| Teleost | 18TL16172 | 20160621 | 20160621 | 0 | 1 | 0 | 3L |
| Teleost | 18TL16160 | 20160708 | 20160728 | 0 | 57 | 0 | 2J 3K 3L 3M |
| Inquisitor | 18QM16619 | 20160815 | 20160815 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE16464 | 20160825 | 20160825 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE16465 | 20160909 | 20160909 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE16466 | 20160927 | 20160927 | 0 | 1 | 0 | 3L |
| Teleost | 18TL16164 | 20161106 | 20161106 | 0 | 1 | 0 | 3L |
| Hudson | 18HU16116 | 20161113 | 20161120 | 0 | 30 | 0 | 3L 3N 3O 3Ps |
| Alfred Needler | 18NE16470 | 20161122 | 20161122 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE16471 | 20161202 | 20161206 | 0 | 2 | 0 | 3L |
| Teleost | 18TL16166 | 20161206 | 20161206 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE16472 | 20161215 | 20161215 | 0 | 1 | 0 | 3L |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Teleost | 18TL17173 | 20170406 | 20170423 | 0 | 77 | 0 | 3K 3L 3M 3N 3O 3Ps |
| Teleost | 18TL17174 | 20170501 | 20170501 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE17480 | 20170603 | 20170603 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE17481 | 20170617 | 20170617 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE17482 | 20170622 | 20170622 | 0 | 1 | 0 | 3L |
| Teleost | 18TL17176 | 20170708 | 20170728 | 0 | 80 | 0 | 2G 2H 2J 3K 3L 3M |
| Jean Mathieu | 182P17001 | 20170710 | 20170922 | 350 | 0 | 0 | 4T |
| Alfred Needler | 18NE17484 | 20170925 | 20170925 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE17486 | 20171023 | 20171023 | 0 | 1 | 0 | 3L |
| Alfred Needler | 18NE17487 | 20171025 | 20171106 | 0 | 2 | 0 | 3L |
| Fugro Discovery | PADS17009 | 20171111 | 20171216 | 0 | 44 | 0 | 2J 3K 3L 3M |
| Alfred Needler | 18NE17488 | 20171121 | 20171121 | 0 | 1 | 0 | 3L |
| Hudson | 18HU18118 | 20180112 | 20181211 | 290 | 72 | 33 | 3K 3L 3M 3N 3O 3Pn3Ps4Vn4Vs4W 4X 5Y 5Ze |
| Various Small Vessels | 18VA18669 | 20180116 | 20181211 | 25 | 0 | 0 | 4T 4W 4X |
| Various Small Vessels | 18VA18666 | 20180207 | 20181221 | 25 | 0 | 0 | 4T 4W 4X |
| Multiple Ships | 1.89E+08 | 20180312 | 20181206 | 32 | 0 | 0 | 4T |
| Hudson | 18HU18004 | 20180406 | 20180423 | 85 | 0 | 0 | 3Pn3Ps4Vn4Vs4W 4X 5Y 5Ze |
| Teleost | 18TL18185 | 20180406 | 20180424 | 69 | 55 | 42 | 3K 3L 3M 3N 3O 3Ps |
| Alfred Needler | 18NE18493 | 20180414 | 20180418 | 2 | 0 | 2 | 3L 3Ps |
| Teleost | 18TL18186 | 20180426 | 20180501 | 11 | 1 | 0 | 3L |
| Alfred Needler | 18NE18494 | 20180427 | 20180507 | 78 | 0 | 0 | 3L 3Ps |
| Teleost | 18TL18187 | 20180502 | 20180522 | 38 | 1 | 43 | 3K 3L |
| Alfred Needler | 18NE18495 | 20180510 | 20180519 | 82 | 0 | 8 | 3L 3Ps4Vs |
| Teleost | 18TL18194 | 20180524 | 20180604 | 56 | 0 | 0 | 3L 3O |
| Alfred Needler | 18NE18496 | 20180525 | 20180605 | 63 | 0 | 5 | 3L 3N 3O 3Ps |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Vladykov | 18VD18092 | 20180527 | 20180602 | 16 | 0 | 0 | 3Ps |
| Vizconde de Eza | 29VE180602 | 20180602 | 20180621 | 107 | 0 | 0 | 3N 3O |
| Alfred Needler | 18NE18497 | 20180606 | 20180618 | 94 | 2 | 2 | 3L 3N 3O |
| Teleost | 18TL18195 | 20180606 | 20180618 | 81 | 0 | 2 | 3L 3N |
| Leim | 18LO18020 | 20180619 | 20180625 | 14 | 0 | 0 | 4T |
| Alfred Needler | 18NE18498 | 20180620 | 20180621 | 6 | 0 | 0 | 3L |
| Vizconde de Eza | 29VE180626 | 20180626 | 20180723 | 74 | 0 | 0 | 3L 3M |
| Colvert | 18ZG18043 | 20180630 | 20181009 | 64 | 0 | 0 | 4T |
| Colvert | 18ZG18032 | 20180705 | 20181027 | 67 | 0 | 0 | 4T |
| Vladykov | 18VD18095 | 20180706 | 20180706 | 1 | 0 | 0 | 3L |
| Teleost | 18TL18023 | 20180714 | 20180728 | 84 | 0 | 0 | 4W 4X 5Y 5Ze |
| Coriolis II | 18OL18011 | 20180715 | 20180802 | 0 | 81 | 0 | 2G 2H 2J 3K 3L 3M |
| Kildir | 1.88E+08 | 20180716 | 20180920 | 34 | 0 | 0 | 4T |
| L'Alliance | 18K818001 | 20180717 | 20181015 | 43 | 0 | 0 | 4T |
| Jean Mathieu | 182P18001 | 20180719 | 20180916 | 352 | 0 | 0 | 4T |
| Aqviq | 18QQ18113 | 20180722 | 20180901 | 307 | 0 | 0 | 0B 2G 3K |
| Vladykov | 18VD18097 | 20180725 | 20180801 | 13 | 0 | 0 | 3L |
| Vizconde de Eza | 29VE180730 | 20180730 | 20180819 | 93 | 0 | 0 | 3L |
| Vladykov | 18VD18098 | 20180803 | 20180805 | 10 | 0 | 0 | 3L |
| Various Small Vessels | 18VA18668 | 20180806 | 20180806 | 1 | 0 | 0 | 4T |
| Leim | 18LO18029 | 20180811 | 20180814 | 24 | 0 | 0 | 4T |
| Vladykov | 18VD18100 | 20180817 | 20180819 | 15 | 0 | 0 | 3L |
| Vladykov | 18VD18101 | 20180826 | 20180828 | 12 | 0 | 0 | 3K |
| Alfred Needler | 18NE18499 | 20180830 | 20180910 | 44 | 0 | 7 | 3L 4R |
| Vladykov | 18VD18102 | 20180907 | 20180916 | 20 | 0 | 0 | 3K |
| Alfred Needler | 18NE18500 | 20180912 | 20180925 | 79 | 1 | 8 | 3L 3N 3O |
| Hudson | 18HU18030 | 20180915 | 20181005 | 105 | 0 | 0 | 3Pn3Ps4Vn4Vs4W 4X 5Y 5Ze |
| Vladykov | 18VD18103 | 20180923 | 20180926 | 17 | 0 | 0 | 3L |
| Kildir | 1.88E+08 | 20180925 | 20180927 | 64 | 0 | 0 | 4T |
| Alfred Needler | 18NE18501 | 20180926 | 20181009 | 95 | 0 | 1 | 3L 3N 3O |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Vladykov | 18VD18104 | 20181003 | 20181003 | 2 | 0 | 0 | 3L |
| Alfred Needler | 18NE18502 | 20181010 | 20181023 | 69 | 0 | 6 | 3L |
| Teleost | 18TL18189 | 20181011 | 20181118 | 149 | 0 | 3 | 2H 2J 3L |
| Vladykov | 18VD18105 | 20181015 | 20181015 | 2 | 1 | 0 | 3L |
| Frederick G. Creed | 18FC18046 | 20181018 | 20181108 | 11 | 0 | 0 | 4R 4S 4T |
| Vladykov | 18VD18106 | 20181020 | 20181028 | 3 | 0 | 0 | 3L |
| Leim | 18LO18055 | 20181022 | 20181101 | 8 | 0 | 0 | 4T |
| Alfred Needler | 18NE18503 | 20181024 | 20181103 | 60 | 0 | 2 | 3K 3L |
| Teleost | 18TL18190 | 20181026 | 20181104 | 59 | 0 | 0 | 2H 2J |
| Alfred Needler | 18NE18504 | 20181108 | 20181121 | 20 | 0 | 2 | 3K 3L |
| Teleost | 18TL18191 | 20181109 | 20181119 | 23 | 0 | 3 | 2J |
| Alfred Needler | 18NE18505 | 20181121 | 20181128 | 27 | 0 | 3 | 2J 3K |
| Teleost | 18TL18192 | 20181122 | 20181203 | 58 | 0 | 1 | 2J 3K |
| Teleost | 18TL18193 | 20181207 | 20181218 | 61 | 1 | 2 | 2J 3K 3L |

Dates are of first and last data reports within the NAFO Convention Area

**Table 6.** Real-time surface water, air, atmospheric parameters and wave* data from buoys, collected and processed in 2019

| Country | Type | Name | ID | Reporting Period | Profiles | NAFO Subareas |
|---|---|---|---|---|---|---|
| USA | Fixed Platform | Coastal Marine Lab, New Castle, NH | CMLN3 | Jul-Dec | 2484 | 5Y |
| USA | Fixed Platform | Jacques Cousteau Reserve, NJ | JCTN4 | Jan-Dec | 23218 | 6A |
| USA | Fixed Platform | T-Wharf Bottom, Narragansett Bay Reserve, RI | NAQR1 | Jan-Dec | 34610 | 5Zw |
| USA | Fixed Platform | Menauhant, Waquoit Bay Reserve, MA | WAQM3 | Jan-Dec | 28224 | 5Zw |
| USA | Moored Buoy | Massachusetts Bay | 4400029 | Jan-Dec | 8575 | 5Y |
| USA | Moored Buoy | Western Maine Shelf | 4400030 | Jan-Dec | 8600 | 5Y |
| USA | Moored Buoy | Central Maine Shelf | 4400032 | Jan-Dec | 8189 | 5Y |
| USA | Moored Buoy | Penobscot Bay | 4400033 | Jan-Dec | 8595 | 5Y |
| USA | Moored Buoy | Eastern Maine Shelf | 4400034 | Jan-Dec | 8601 | 5Y |
| USA | Moored Buoy | Jordan Basin | 4400037 | Jan-Dec | 7833 | 5Y |
| USA | Moored Buoy | Potomac, MD | 4400042 | Jan-Dec | 46862 | 6B |
| USA | Moored Buoy | Stingray Point, VA | 4400058 | Feb-Dec | 18432 | 6B |
| USA | Moored Buoy | Gooses Reef, MD | 4400062 | May-Dec | 22360 | 6B |
| USA | Moored Buoy | Annapolis, MD | 4400063 | May-Dec | 39336 | 6B |
| USA | Moored Buoy | First Landing, VA | 4400064 | Jan-Dec | 7573 | 6B |
| USA | Moored Buoy | Great South Bay | 4400069 | May-Dec | 10911 | 6A |
| USA | Moored Buoy | York Spit, VA | 4400072 | Jan-Dec | 7323 | 6B |
| USA | Moored Buoy | CO2 Gulf of Maine Buoy | 4400073 | Jul-Dec | 1061 | 5Y |
| Canada | Moored Buoy* | East Scotia Slope | 4400137 | Jan- Dec | 8232 | 4W |
| Canada | Moored Buoy* | Banquerau Banks | 4400139 | Jan-Dec | 8116 | 4Vs |
| Canada | Moored Buoy* | La Have Bank | 4400150 | Jan-Dec | 8179 | 4X |
| Canada | Moored Buoy* | Halifax Harbour | 4400258 | Jan-Dec | 7885 | 4W |
| Canada | Moored Buoy* | Mont-Louis | 4500138 | May-Dec | 5782 | 4S |
| USA | Drifting Buoy | | 2101547 | Aug-Aug | 1 | 4S |
| UK | Drifting Buoy | | 3100735 | Jun-Aug | 964 | 6D 6E |
| USA | Drifting Buoy | | 3201560 | Jan-Apr | 1748 | 6F 6G 6H |

| | | | | | |
|---|---|---|---|---|---|
| USA | Drifting Buoy | 4100538 | Jun-Dec | 3305 | 4Vs4W 6D 6E 6F 6G |
| | Drifting Buoy | 4101529 | Dec-Dec | 124 | 6E |
| | Drifting Buoy | 4101532 | Jan-Apr | 1200 | 3M 3N 6H |
| | Drifting Buoy | 4101533 | Jan-Mar | 1243 | 2J 3K |
| | Drifting Buoy | 4101535 | Jan-Feb | 624 | 3M 3N 3O 4Vs4W 6G |
| | Drifting Buoy | 4101539 | Jan-Jul | 4426 | 3M 3N 4Vs6D 6E 6F 6H |
| USA | Drifting Buoy | 4101541 | Jan-Aug | 2425 | 6D 6E 6F 6G |
| USA | Drifting Buoy | 4101544 | Apr-Jun | 1242 | 6H |
| USA | Drifting Buoy | 4101546 | Sep-Dec | 2652 | 3M 3N 4Vs6F 6G 6H |
| USA | Drifting Buoy | 4101548 | Mar-Apr | 251 | 6G 6H |
| | Drifting Buoy | 4101560 | Jan-Mar | 812 | 6H |
| | Drifting Buoy | 4101562 | Apr-May | 28 | 6G |
| | Drifting Buoy | 4101567 | Jan-Oct | 5434 | 3M 3N 3O 4Vs6G 6H |
| | Drifting Buoy | 4101568 | Jan-Oct | 2893 | 6F 6G 6H |
| | Drifting Buoy | 4101573 | Jan-Apr | 2096 | 3N 3O 4Vs6F 6G 6H |
| | Drifting Buoy | 4101574 | Sep-Dec | 2313 | 4X 5Ze5Zw6B 6C 6D 6E 6F 6G |
| | Drifting Buoy | 4101575 | Jan-May | 2298 | 3M 3N 3O 4Vs4W 6E 6F |
| USA | Drifting Buoy | 4101586 | Jan-Aug | 4363 | 3M 3N 3O 4Vs4W 4X 6E 6F 6G 6H |
| | Drifting Buoy | 4101623 | Jan-Dec | 8742 | 1F 2G 2H 2J |
| | Drifting Buoy | 4101624 | May-Dec | 5258 | 0B 1E 1F 2G 2H 2J 3K |
| | Drifting Buoy | 4101625 | Feb-Aug | 3798 | 1B 1C 1D 1E 1F |
| | Drifting Buoy | 4101627 | Oct-Dec | 2047 | 1D 1E 1F |
| USA | Drifting Buoy | 4101637 | Jan-Feb | 1044 | 3M 3N 6F 6G 6H |
| USA | Drifting Buoy | 4101647 | Jan-Mar | 1418 | 3N 4Vs6F 6G 6H |
| USA | Drifting Buoy | 4101649 | Jan-Sep | 2523 | 4Vs4W 4X 6D 6E 6F 6G |
| USA | Drifting Buoy | 4101650 | Dec-Dec | 524 | 6G 6H |
| USA | Drifting Buoy | 4101663 | Dec-Dec | 464 | 1E 1F |
| USA | Drifting Buoy | 4101690 | Jun-Oct | 3539 | 2J 3K 3L 3M 3N |

| | | | | | |
|---|---|---|---|---|---|
| France | Drifting Buoy | 4101702 | Jun-Nov | 3127 | 4Vs4W 6C 6D 6E 6F |
| | Drifting Buoy | 4101713 | Jan-Sep | 2943 | 6D 6E 6F |
| | Drifting Buoy | 4101719 | Apr-Jun | 1315 | 6G |
| | Drifting Buoy | 4101720 | Jan-Dec | 8242 | 3M 3N 3O 3Ps4Vs6H |
| | Drifting Buoy | 4101721 | Jan-Sep | 2793 | 3N 3O 4Vs6F 6G 6H |
| France | Drifting Buoy | 4101742 | Jan-Feb | 1324 | 3M 3N 3O 4Vs4W 6D 6E 6H |
| USA | Drifting Buoy | 4201512 | May-Sep | 1677 | 6B 6C 6D |
| USA | Drifting Buoy | 4201517 | Jan-Apr | 1170 | 3N 3O 4Vs5Ze6D 6H |
| USA | Drifting Buoy | 4201527 | Jan-May | 2352 | 4W 4X 6B 6C 6D 6E |
| USA | Drifting Buoy | 4201545 | May-Sep | 2558 | 4Vs6B 6C 6D 6E 6F 6G 6H |
| USA | Drifting Buoy | 4201554 | Jun-Sep | 2461 | 3M 3N 3O 4Vs4W 6D 6E |
| USA | Drifting Buoy | 4201556 | May-Dec | 5326 | 3N 3O 4Vs4W 4X 6B 6C 6D 6E |
| USA | Drifting Buoy | 4201557 | Jan-Feb | 1283 | 3M 3N 3O 4Vs4W 4X 6B 6C 6D 6E 6F 6G 6H |
| USA | Drifting Buoy | 4201558 | Jan-Sep | 5354 | 3M 3N 3O 4Vs4W 6B 6C 6D 6E 6H |
| USA | Drifting Buoy | 4201559 | Jan-Jul | 4217 | 3O 4Vs4W 4X 5Ze6B 6C 6D 6E |
| | Drifting Buoy | 4400501 | May-Jun | 396 | 3M |
| | Drifting Buoy | 4400502 | May-Jul | 184 | 3K 3M |
| | Drifting Buoy | 4400503 | May-Jul | 1151 | 3K 3L 3M 3N |
| | Drifting Buoy | 4400504 | May-Sep | 2505 | 3L 3O |
| | Drifting Buoy | 4400505 | May-Sep | 2502 | 3L |
| USA | Drifting Buoy | 4400906 | Nov-Nov | 94 | 6F |
| | Drifting Buoy | 4401503 | Jan-Mar | 1688 | 4Vs6F 6G |
| France | Drifting Buoy | 4401527 | Jan-Apr | 1112 | 6G 6H |
| France | Drifting Buoy | 4401531 | Jan-Apr | 1763 | 3M 3N 3O 4Vs6F 6G 6H |
| | Drifting Buoy | 4401540 | Jan-Apr | 1074 | 6F 6G 6H |
| | Drifting Buoy | 4401542 | Oct-Dec | 1397 | 5Ze6B 6C 6D 6E |
| | Drifting Buoy | 4401544 | Jan-Mar | 1546 | 3N 6G 6H |

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|---|---|---|---|---|---|
| | Drifting Buoy | 4401557 | Dec-Dec | 176 | 6H |
| | Drifting Buoy | 4401563 | Dec-Dec | 680 | 6G 6H |
| | Drifting Buoy | 4401567 | Jan-Jan | 629 | 1F 2J |
| | Drifting Buoy | 4401568 | Jan-Feb | 990 | 3K 3M |
| | Drifting Buoy | 4401569 | Jan-May | 2493 | 1F 2J 3K |
| | Drifting Buoy | 4401572 | Jan-Jun | 3490 | 3L 3M 3N 3O 4Vs |
| | Drifting Buoy | 4401573 | Jan-Feb | 1143 | 3K 3M 3N |
| | Drifting Buoy | 4401575 | Feb-Dec | 7260 | 3K 3L 3M |
| | Drifting Buoy | 4401577 | Jun-Aug | 1376 | 3M |
| | Drifting Buoy | 4401578 | Jun-Jul | 705 | 3M 3N |
| | Drifting Buoy | 4401580 | Aug-Nov | 2059 | 3K 3L 3M |
| | Drifting Buoy | 4401581 | Aug-Dec | 3164 | 3M 3N 3O 4Vs4W 6G 6H |
| | Drifting Buoy | 4401582 | Aug-Oct | 1299 | 3M 3N 3O |
| | Drifting Buoy | 4401583 | Aug-Sep | 541 | 3O 4Vs |
| | Drifting Buoy | 4401584 | Aug-Aug | 27 | 3O |
| Canada | Drifting Buoy | 4401611 | Jan-Oct | 5788 | 3K 3M 3N 3O 4Vs4W 6H |
| USA | Drifting Buoy | 4401756 | Jan-Jul | 134 | 3K 3M |
| USA | Drifting Buoy | 4401786 | Dec-Dec | 115 | 1F |
| USA | Drifting Buoy | 4401787 | Jan-Feb | 322 | 6H |
| USA | Drifting Buoy | 4401813 | Nov-Dec | 380 | 6F |
| USA | Drifting Buoy | 4401816 | Jan-Jun | 1159 | 3O 4Vs4W 4X 6D 6E 6H |
| | Drifting Buoy | 4401821 | Aug-Sep | 2550 | 0B |
| | Drifting Buoy | 4401822 | Nov-Dec | 3074 | 2G |
| | Drifting Buoy | 4401825 | Sep-Dec | 2304 | 3O 3Ps4Vn4Vs4W |
| | Drifting Buoy | 4401826 | Sep-Dec | 2225 | 0A 1A 3O 4Vs |
| | Drifting Buoy | 4401827 | Sep-Dec | 842 | 3Ps4Vs4X |
| | Drifting Buoy | 4401828 | Dec-Dec | 497 | 3K |
| | Drifting Buoy | 4401829 | Dec-Dec | 475 | 3K 3L |
| | Drifting Buoy | 4401830 | Dec-Dec | 430 | 3L 3N |
| USA | Drifting Buoy | 4401845 | Feb-Dec | 6911 | 3M 3N 3O 4Vs4W 4X 6B 6C 6D 6E |
| USA | Drifting Buoy | 4401846 | Feb-Jul | 3094 | 5Ze |
| USA | Drifting Buoy | 4401893 | May-Nov | 3930 | 2J 3K 3L |
| USA | Drifting Buoy | 4401894 | Jun-Dec | 5016 | 2J 3K 3L 3N 3O |

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|---|---|---|---|---|---|
| | Drifting Buoy | 4402510 | Jan-Dec | 8145 | 3M 3N 3O 4Vs4W |
| | Drifting Buoy | 4402511 | Jan-Jul | 3022 | 3M 3N 3O 4Vs4W 6H |
| | Drifting Buoy | 4402512 | Jan-Feb | 690 | 3M |
| | Drifting Buoy | 4402514 | May-Aug | 1670 | 4W |
| | Drifting Buoy | 4402516 | May-Aug | 1670 | 4X |
| | Drifting Buoy | 4402517 | May-Nov | 3875 | 3M 3N 3O 4Vs4W 4X 6H |
| | Drifting Buoy | 4402521 | May-Sep | 2428 | 4W |
| | Drifting Buoy | 4402526 | May-Jul | 3002 | 4Vs4W |
| | Drifting Buoy | 4402681 | Nov-Dec | 869 | 4Vn4Vs4W |
| | Drifting Buoy | 4402684 | Nov-Dec | 1133 | 4Vs4W |
| | Drifting Buoy | 4402685 | Nov-Dec | 1249 | 4Vs4W |
| | Drifting Buoy | 4402686 | Nov-Dec | 1604 | 4Vs4W |
| | Drifting Buoy | 4402687 | Nov-Dec | 1133 | 4Vs4W 4X |
| | Drifting Buoy | 4402688 | Nov-Dec | 1133 | 4W 4X |
| | Drifting Buoy | 4402689 | Nov-Dec | 1133 | 4W 4X 5Ze |
| | Drifting Buoy | 4402690 | Dec-Dec | 276 | 4X |
| | Drifting Buoy | 4402691 | Dec-Dec | 276 | 4X |
| | Drifting Buoy | 4402704 | Dec-Dec | 254 | 4X |
| | Drifting Buoy | 4402705 | Dec-Dec | 223 | 4X |
| | Drifting Buoy | 4402706 | Dec-Dec | 651 | 4X |
| | Drifting Buoy | 4402707 | Dec-Dec | 200 | 4X |
| Canada | Drifting Buoy | 4700539 | Jul-Nov | 2398 | 4Vs4W 6B 6C 6D 6E 6F |
| | Drifting Buoy | 4700546 | Dec-Dec | 211 | 6F 6G |
| | Drifting Buoy | 4700552 | Jan-Jan | 605 | 3K 3L 3M |
| Canada | Drifting Buoy | 4700584 | Aug-Sep | 502 | 6D 6E 6F |
| | Drifting Buoy | 4701675 | Jan-Jan | 149 | 3M |
| | Drifting Buoy | 4700552 | Jan-Jan | 1 | 3K |
| Canada | Drifting Buoy | 4800770 | Aug-Aug | 65 | 1F |
| Canada | Drifting Buoy | 4802504 | Jun-Jun | 365 | 0A 1A |
| USA | Drifting Buoy | 6202679 | Nov-Dec | 1322 | 1E 1F |
| | Drifting Buoy | 6203529 | Nov-Dec | 950 | 4W 4X 6B 6C 6D 6E 6F |
| USA | Drifting Buoy | 6203564 | Sep-Dec | 2318 | 0B 1D 1E 1F 2G |
| USA | Drifting Buoy | 6203566 | Sep-Dec | 2405 | 0B 1C 1D 1E 1F |

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|---|---|---|---|---|---|
| USA | Drifting Buoy | 6203571 | Aug-Dec | 3074 | 1A 1B 1C 1D 1E 1F |
| USA | Drifting Buoy | 6203574 | Oct-Dec | 2109 | 0B 1D 1E 1F 2G |
| USA | Drifting Buoy | 6203576 | May-Dec | 5348 | 0B 1D 1E 1F 2G 2H 2J 3K 4R 4S |
| USA | Drifting Buoy | 6203578 | Oct-Dec | 2121 | 0A 0B 1B 1C 1D 1E 1F |
| USA | Drifting Buoy | 6203584 | Oct-Dec | 1569 | 0B 1C 1D 1E 1F |
| | Drifting Buoy | 6203602 | Jan-Jan | 260 | 0B |
| | Drifting Buoy | 6203707 | Feb-Feb | 2 | 6H |
| | Drifting Buoy | 6301562 | Jun-Dec | 4336 | 1F 2G 2H 2J |
| | Drifting Buoy | 6301563 | May-Nov | 4462 | 0B 1E 1F 2G 2H 2J 3K |
| USA | Drifting Buoy | 6401531 | Jan-Jan | 465 | 1F |
| USA | Drifting Buoy | 6401539 | Jan-Dec | 6343 | 0B 2G 2H 2J 3K |
| USA | Drifting Buoy | 6401544 | Jan-Jan | 369 | 1E 1F |
| | Drifting Buoy | 6401572 | Mar-May | 1259 | 1F |
| USA | Drifting Buoy | 6401783 | Dec-Dec | 684 | 1E 1F |
| | Drifting Buoy | 6401809 | Nov-Dec | 644 | 1E 1F |
| | Drifting Buoy | 6401810 | Nov-Dec | 607 | 0B 1E 1F |
| | Drifting Buoy | 6401811 | Nov-Dec | 622 | 1E 1F |
| | Drifting Buoy | 6401812 | Nov-Dec | 615 | 0B 1E 1F |
| | Drifting Buoy | 6401813 | Nov-Dec | 597 | 1E 1F |
| | Drifting Buoy | 6401814 | Nov-Dec | 636 | 0B 1E 1F |
| | Drifting Buoy | 6401815 | Nov-Dec | 603 | 1E 1F |
| | Drifting Buoy | 6401816 | Nov-Dec | 639 | 1E 1F |
| | Drifting Buoy | 6401817 | Nov-Dec | 625 | 1E 1F |
| | Drifting Buoy | 6401818 | Dec-Dec | 627 | 0B 1E 1F |
| | Drifting Buoy | 6401819 | Nov-Dec | 615 | 1E 1F |
| | Drifting Buoy | 6401820 | Nov-Dec | 620 | 1E 1F |
| | Drifting Buoy | 6401821 | Nov-Dec | 614 | 1E 1F |
| | Drifting Buoy | 6401822 | Nov-Dec | 622 | 1E 1F |
| | Drifting Buoy | 6401823 | Nov-Dec | 633 | 1E 1F |
| | Drifting Buoy | 6401824 | Nov-Dec | 591 | 1E 1F |
| | Drifting Buoy | 6402505 | Nov-Dec | 595 | 1E 1F |
| | Drifting Buoy | 6402506 | Nov-Dec | 575 | 1E 1F |
| | Drifting Buoy | 6402507 | Nov-Dec | 619 | 1E 1F |

| | | | | | |
|---|---|---|---|---|---|
| | Drifting Buoy | 6402508 | Nov-Dec | 641 | 1E 1F |
| | Drifting Buoy | 6402509 | Nov-Dec | 639 | 1E 1F |
| | Drifting Buoy | 6402510 | Nov-Dec | 606 | 1E 1F |
| | Drifting Buoy | 6402511 | Nov-Dec | 615 | 1E 1F |
| | Drifting Buoy | 6402512 | Nov-Dec | 637 | 1E 1F |
| | Drifting Buoy | 6402513 | Nov-Dec | 628 | 1E 1F |
| | Drifting Buoy | 6402514 | Nov-Dec | 618 | 1E 1F |
| | Drifting Buoy | 6402515 | Nov-Dec | 632 | 1E 1F |
| | Drifting Buoy | 6402516 | Nov-Dec | 626 | 0B 1E 1F |
| | Drifting Buoy | 6402517 | Nov-Dec | 631 | 0B 1E 1F |
| | Drifting Buoy | 6402518 | Nov-Dec | 614 | 1E 1F |
| | Drifting Buoy | 6402519 | Nov-Dec | 637 | 1E 1F |
| | Drifting Buoy | 6402520 | Nov-Dec | 621 | 1E 1F |
| | Drifting Buoy | 6402521 | Nov-Dec | 623 | 1E 1F |
| | Drifting Buoy | 6402522 | Nov-Dec | 635 | 0B 1E 1F |
| | Drifting Buoy | 6402523 | Nov-Dec | 641 | 1E 1F |
| | Drifting Buoy | 6402524 | Nov-Dec | 620 | 1E 1F |
| | Drifting Buoy | 6402525 | Nov-Dec | 631 | 1E 1F |
| | Drifting Buoy | 6402526 | Nov-Dec | 613 | 1E 1F |
| | Drifting Buoy | 6402527 | Nov-Dec | 643 | 1E 1F |
| | Drifting Buoy | 6402528 | Nov-Dec | 627 | 1E 1F |
| | Drifting Buoy | 6402529 | Nov-Dec | 606 | 1E 1F |
| | Drifting Buoy | 6402530 | Nov-Dec | 618 | 1E 1F |
| | Drifting Buoy | 6402531 | Dec-Dec | 637 | 1E 1F 2G |
| | Drifting Buoy | 6402532 | Nov-Dec | 633 | 1C 1D 1E 1F |
| | Drifting Buoy | 6402533 | Nov-Dec | 639 | 1E 1F |
| | Drifting Buoy | 6402534 | Nov-Dec | 628 | 1D 1E 1F |
| | Drifting Buoy | 6402535 | Nov-Dec | 643 | 1E 1F |
| | Drifting Buoy | 6402536 | Nov-Dec | 639 | 1E 1F |
| | Drifting Buoy | 6402537 | Nov-Dec | 636 | 1D 1E 1F |
| | Drifting Buoy | 6402538 | Nov-Dec | 612 | 1D 1E 1F |
| | Drifting Buoy | 6501555 | Jan-Feb | 1237 | 1C |
| Canada | Drifting Buoy | 6801735 | Dec-Dec | 109 | 2J 3K |

*Buoys marked by this symbol also measure waves
Dates are of first and last data reports within the NAFO Convention Area
Viking buoys are not shown in this table; see Table 3

**Table 7.** Water level data collected in 2019

| Station ID | Name | Reporting period (months) | Longitude (W) | Latitude (N) | NAFO Sub-Area |
|---|---|---|---|---|---|
| 65 | Saint John | Jan-Dec | 66.063 | 45.251 | 4X |
| 365 | Yarmouth | Jan-Dec | 66.1167 | 43.8333 | - |
| 491 | Bedford Institute | Jan-Dec | 63.6167 | 44.6833 | 4W |
| 612 | North Sydney | Jan-Dec | 60.25 | 46.2167 | - |
| 665 | Port aux Basques | Jan-Dec | 59.1333 | 47.5667 | - |
| 755 | St. Lawrence | Mar-Dec | 55.3901 | 46.9168 | - |
| 835 | Argentia | Jan-Dec | 53.9833 | 47.3 | 3Ps |
| 905 | St. John's | Jan-Dec | 52.7167 | 47.5667 | - |
| 990 | Bonavista | Jan-Dec | 53.115 | 48.651 | - |
| 1430 | Nain | Jan-Jul | 61.6833 | 56.55 | - |
| 1700 | Charlottetown | Jan-Dec | 63.1167 | 46.2333 | 4T |
| 1805 | Shediac Bay | Jan-Dec | 64.546 | 46.227 | 4T |
| 1970 | Cap-aux-Meules | Jan-Dec | 61.8573 | 47.3789 | - |
| 2000 | Lower Escuminac | Jan-Dec | 64.8833 | 47.0833 | 4T |
| 2145 | Belledune | Jan-Dec | 65.85 | 47.9 | - |
| 2330 | Rivière-au-Renard | Jan-Dec | 64.3805 | 48.997 | 4T |
| 2780 | Sept-Îles | Jan-Dec | 66.3768 | 50.1948 | - |
| 2985 | Rimouski | Jan-Dec | 68.5137 | 48.4783 | 4T |
| 3057 | Saint-Joseph-de-la-Rive | Jan-Dec | 70.3655 | 47.4488 | 4T |
| 3075 | Banc du Cap Brûlé | Jan-Nov | 70.710833 | 47.0895 | 4T |
| 3100 | Saint-Francois Île d'Orléans | Jan-Dec | 70.8082 | 46.9965 | 4T |
| 3110 | Saint-Laurent île d'Orléans | Jan-Dec | 71.0033 | 46.8582 | 4T |
| 3248 | Vieux-Québec | Jan-Dec | 71.2019 | 46.8111 | - |
| 3980 | Qikiqtarjuaq | Jul-Dec | 64.031752 | 67.56052 | 0A |