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NAFO STACFEN Report 2017

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Abstract

The Marine Environmental Data Section (MEDS) of the Oceans Science branch, as the Regional Environmental Data Center for NAFO, is required to provide an annual inventory of environmental data collected in the NAFO Convention Area to the NAFO subcommittee for the environment (STACFEN). 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 calendar year 2017 are included.

It is important for STACFEN to encourage members to send data and information to the designated data center in order to get significant return for NAFO member countries.

Introduction

The Marine Environmental Data Section (MEDS) of the Oceans Science branch of 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 ICNAF, and was subsequently formalized in 1975 by which time the CODC had become the Marine Environmental Data Service (MEDS). MEDS underwent several name changes from 2005 to 2016, 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 meeting in June 2018 required the submission to MEDS of a completed oceanographic inventory form for data collected in 2017, and oceanographic data pertinent to the NAFO Convention Area, for all stations occupied in the year prior to 2017. 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, or 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

In the NAFO Convention Area, a variety of oceanographic surface, near-surface and subsurface observations, including vertical profiles of parameters such as temperature, salinity, oxygen, nutrients and other chemical and biological variables, are being made every day by ships borne instruments and autonomous devices. 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 either 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 the 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 takes from months to years to process after a cruise is over or after 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 it 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

The data collected in the NAFO Convention Area (NCA) can be grouped by a number of ways (variable type, sampling type, platform type, real-time vs. delayed mode, source, etc.). To facilitate table and geographical representation, the categorization behind tables and figures differs slightly. The following table summarizes counts for 2017 by data type with a correspondence to the figures (p. 9-13) and tables (p. 14-33) where more information can be found.

Data observed in NAFO Convention Area in 2017 and acquired between January 2017 and May 2018

Data Type	Platform Type	Counts/Duration	Table #	Figure #
Oceanographic profiles	autonomous drifting	11291* profiles from 170 platforms	1	1
	Moorings	15* profiles from 3 platforms**	1	1
	ship	5411 profiles (2050 CTD; 1608 CTD*; 1059 bottle and 695 XBT* profiles) from at least 30 ships	2	2a
Surface/near-surface observations	ship (thermosalinograph)	15168* obs. from 2 ships	2	3
	drifting buoys	456042* obs. from 200 buoys	4	3
	moored buoys	117456* obs. from 17 buoys**	4	3
	fixed platforms	101188* obs. from 3 platforms	4	3
	water level gauges	25 sites, avg. ~1 year each	6	3
Sub-surface observations	moored CTD, waves, ADCP	6 time series, seasonal (~5 months avg each)	5	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

Data observed prior to 2017 in NAFO Convention Area and acquired between January 2017 and May 2018

Data Type	Platform Type	Counts/Duration	Table #	Figure #
Oceanographic profiles	Ship	6870 profiles (2954 CTD + 3435 bottle** profiles) format least 17 ships	3	2b
Sub-surface observations	Moored CTD, waves, ADCP	4 time series (3X 1 year and 1X 5 years)	5	4

*Data formatted for real-time transmission

**The amount of bottle data profiles measured prior to 2017 and loaded in BioChem in 2017 could not be fully assessed

Description

Oceanographic profiles

Argo (figure 1, table 1)
Argo is an international program which started in 2000 with aims to deploy profiling floats on a 3 by 3 degree grid in the oceans of the world. Each profiling float samples and reports both temperature and salinity from 2000 m to the surface every 10 days. Some of the floats also report oxygen. Data are distributed on the GTS within 24 hours of collection and made available on two mirror Global servers located in France and in the USA.

MEDS performs the data management duties of Argo Canada profilers from instrument to the GTS and global servers. MEDS also decodes and stores all Argo data circulating on the GTS. Over 3800 Argo profiling floats are currently sampling the world oceans. The distribution of countries (Canada, USA, France, Germany, UK and Norway) owning floats who were present in the NCA in 2017, highlights the success of Argo as an international project.

Argo-equivalent (figure 1, table 1)

Autonomous profiling floats who do not follow the aforementioned Argo sampling pattern are often designated Argo-equivalent. In 2017, one float belonging to the Alamo program of the Woods Hole Oceanographic Institute drifted through the shelf-slope area. Alamo floats are air-deployed and smaller than typical Argo floats; they can sample the ocean either in rapid seesaw or daily profile mode.

Gliders (figure 1, table 1)
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 Ocean Tracking Network (headquartered at Dalhousie University) owned gliders, both active in NCA, and creates messages for transmission on the GTS after performing automatic quality control. MEDS also decodes and stores all glider data circulating on the GTS. The full data set can be accessed from the MEOPAR / Ocean Tracking Network.

DFO acquired gliders in 2017 but did not deploy them on the East Coast until 2018 and so are not represented in this report.

Mammals (figure 1, table 1)
Among data decoded by MEDS from the GTS 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 2a & 2b, table 2)
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, helicopter 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) or ingestion

in the archive.

MEDS decodes and stores all ship based data circulating on the GTS, either CTD or XBT. Some of this data are sampled by ships of opportunity

MEDS further receives delayed mode data from DFO institutes: Northwest Atlantic Fisheries Centre, Bedford Institute of Oceanography (BIO), Maurice-Lamontagne Institute (MLI), St. Andrews' Biological Station, Gulf Fisheries Center (GFC, indirectly through BIO or MLI) and the Freshwater Institute (FWI), which it then ingests after conversion and visual quality assurance.

MEDS also receives delayed mode data from foreign institutes, either directly or through BIO. This year, MEDS received data directly from the Spanish Institute of Oceanography and the French Naval Hydrographic and Oceanographic Service (SHOM), plus some data from Woods Hole Oceanographic Institution through BIO. MEDS periodically queries the World Ocean Database and ICES Oceanographic Database for additional data in the NAFO Convention Area (NCA). Comparisons are made between various sources to ensure always store the most recently calibrated data and with the most available number of fields.

Near-surface observations

Moored buoys and fixed stations (figure 3, table 3)
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.

The MLI maintains a network of surface buoys, most of which equipped with subsurface moored instruments such as ADCPs (see mooring section) and a CTD profiler. MEDS started transmitting data from the CTD profiler of three of those buoys on the GTS in late October, towards the end of the deployment. The data can otherwise be requested to the MLI.

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 3, table 3)
MEDS decodes and stores all drifting buoy data circulating on the GTS. Like in Argo, 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 3, table 2)
MEDS decodes and stores all thermosalinograph data circulating on the GTS. In 2017, only two

ships reported thermosalinograph data in the NCA.

Sub-surface moorings (figures 4a-4b, table 4)
Current meters and other instruments such as CTDs and thermistors have been deployed in the NCA along mooring lines, under the surface, for many years. Depending on location, the data are processed and archived by the BIO or MLI.

Water level gauges (figure 3, table 5)
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

The DFO Atlantic Zone Monitoring Program (AZMP) activities 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 other physical, chemical and biological data. MEDS continues to build and maintain the AZMP web site: http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/azmp-pmza/index-eng.html.

The wealth of data and information on the site includes:

- Physical and chemical data from 1999 to the present such as CTD, bottle and bathythermograph measurements
- Climate indices showing long term trends of physical variables in the water and atmosphere.

The data collected as part of AZMP is also compiled in figures and tables pertaining to ship observations. A climate index of area vs. bottom temperature-range distribution of bottom waters calculated for four NAFO sub-areas (4X, 4W, 4Vn, 4Vs), for the Northern Gulf and Magdalen Shallows, is made available along with other climate indices on the AZMP website.

Offshore Oil and Gas Environmental Monitoring Data

As mentioned in the near-surface observations section, MEDS also acquires, in delayed mode, monitoring physical oceanographic data collected near offshore oil and gas sites as per NEB Guidelines. Data submissions from years 2012-2016 at Flemish Pass, Grand Banks, Terra Nova and White Rose sites, containing wave, moored CTD and current, ice and meteorological, in addition to seabird and marine mammals observations, were received at MEDS in 2017. The Terra Nova waves data were ingested in the MEDS wave archives and are reported in table 4. Mooring data will be sent to BIO.

Data Access

Argo data are sent to the global data centers within 24 hours of collection and a national website (http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/Argo/index-eng.html) presents products and statistics on Argo Canada profilers along with links to the data.

GTS-decoded or otherwise acquired real-time oceanographic profiles, US costal mooring and US 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). The 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).

Delayed-mode Canadian oceanographic profile 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.

Selected ocean profiles along AZMP sections can be viewed and downloaded from the AZMP website (http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/azmp-pmza/index-eng.html). MEDS sends updates of data acquired to DFO research institutes on a monthly basis. Canadian oceanographic profiles data can otherwise always be requested through this form: http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/request-commande/form-eng.asp.

GTS-decoded drifting buoy and equatorial moored buoy data 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 buoy 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 level 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.

Full resolution glider data from measured by the MEOPAR / Ocean Tracking Network can be accessed from their website : http://gliders.oceantrack.org/

Observations perfored by sensors mounted on marine mammals can be accessed from the MEOP website : http://www.meop.net/

References

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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

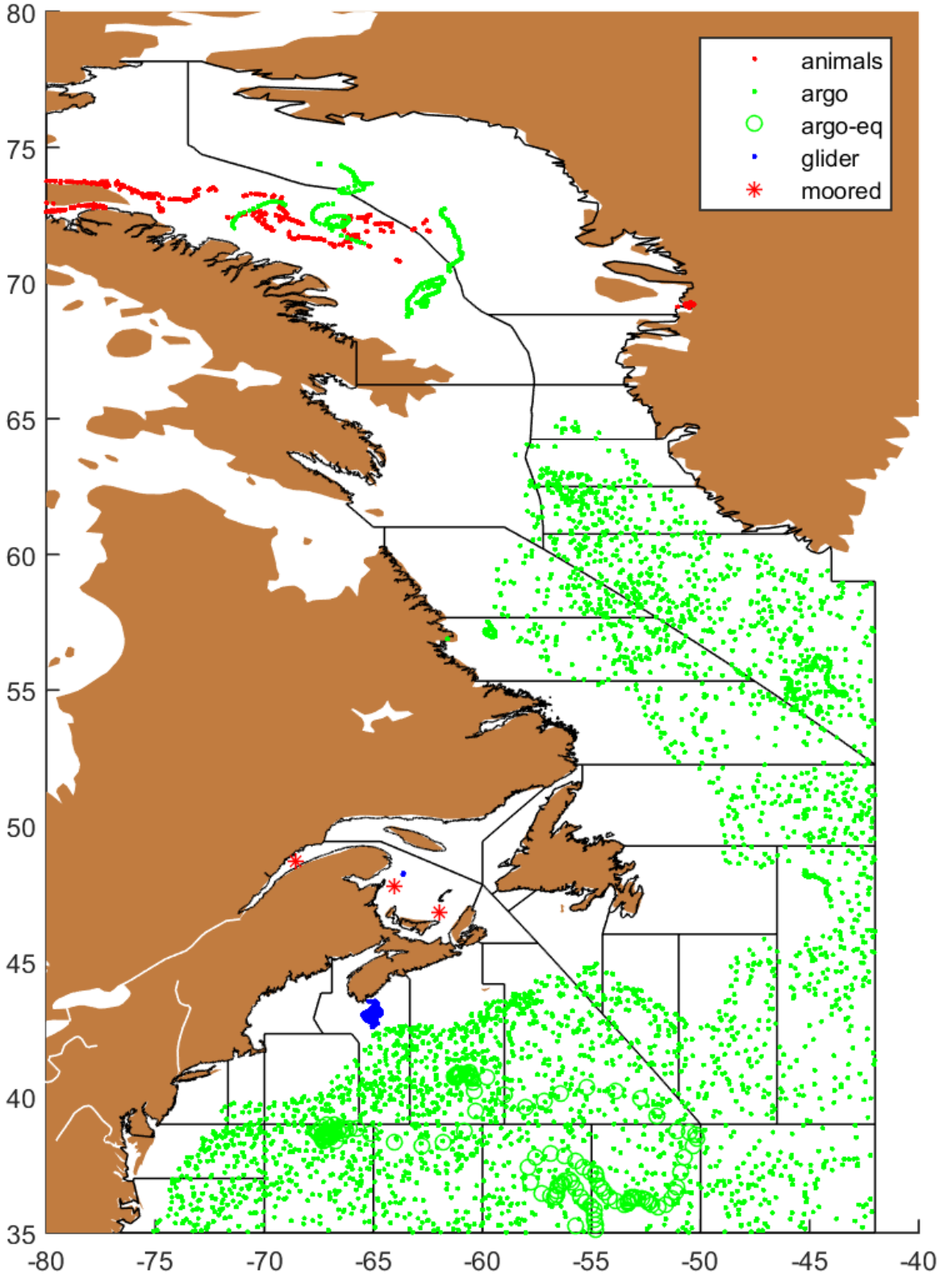

Fig. 1. Position of profiles sampled by autonomous platforms in 2017 and acquired in 2017/2018

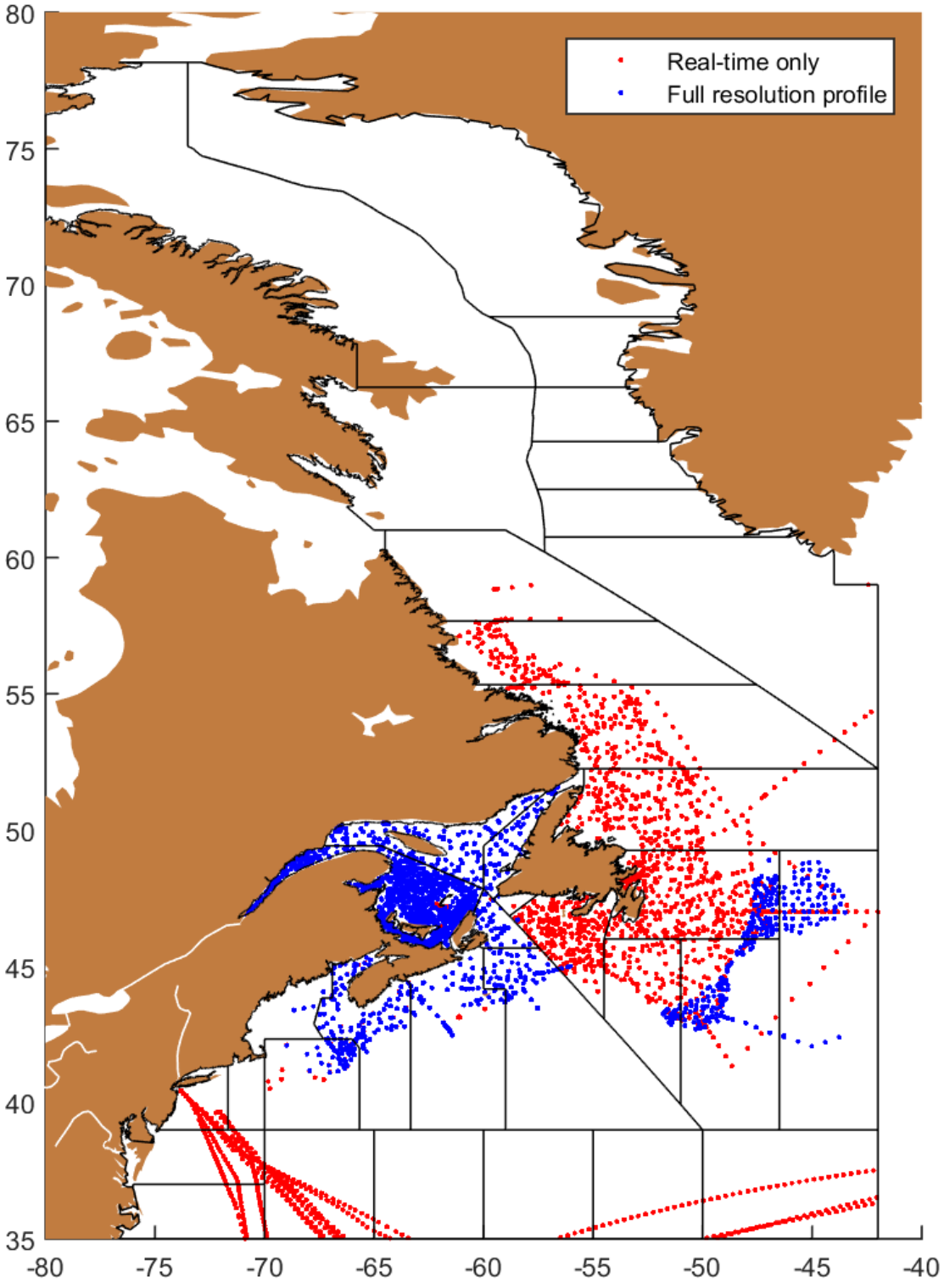

Fig. 2a. Position of profiles sampled by ships in 2017 and acquired in 2017/2018

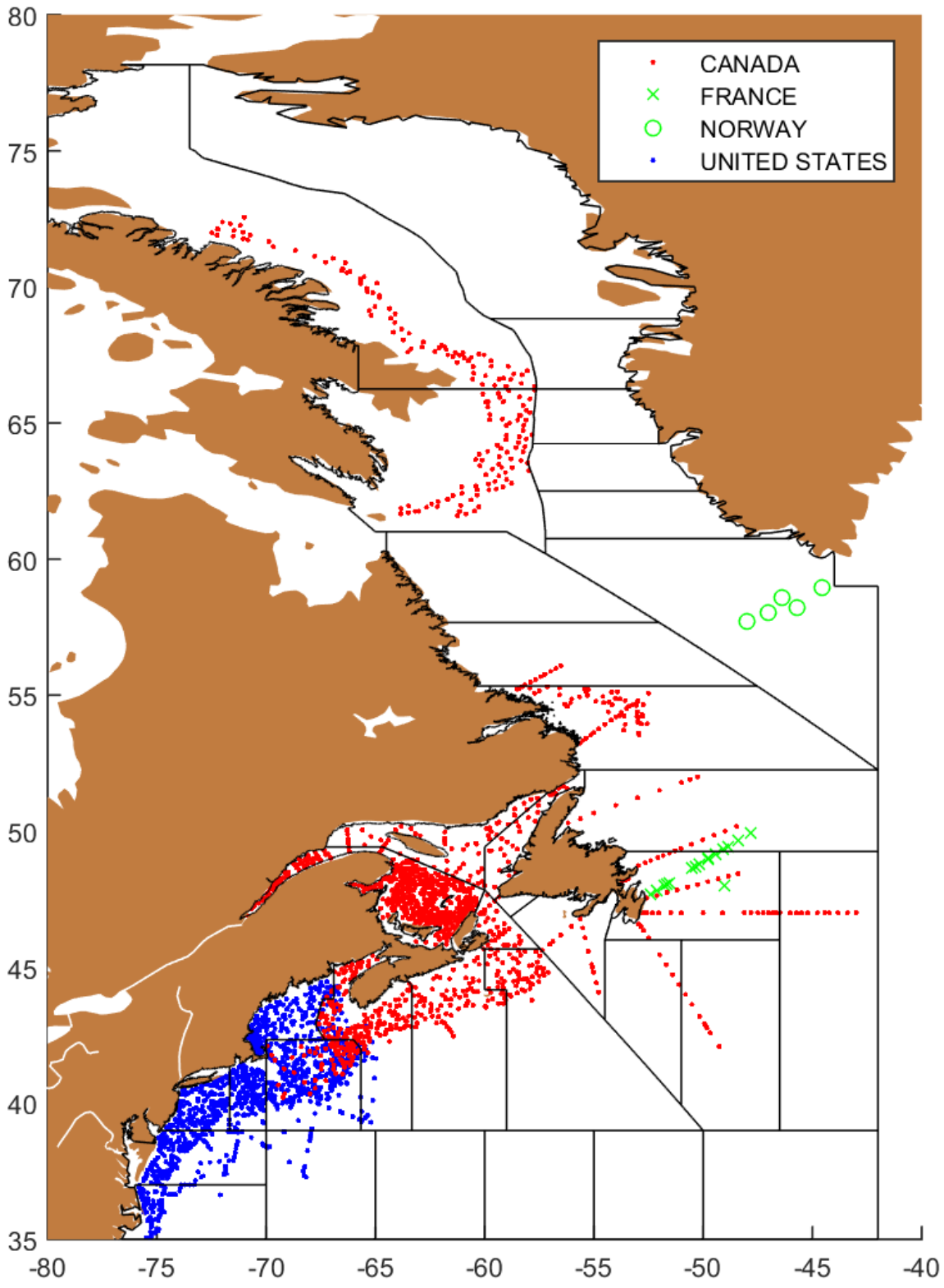

Fig. 2b.Position of profiles sampled by ships before 2017 and acquired in 2017/2018

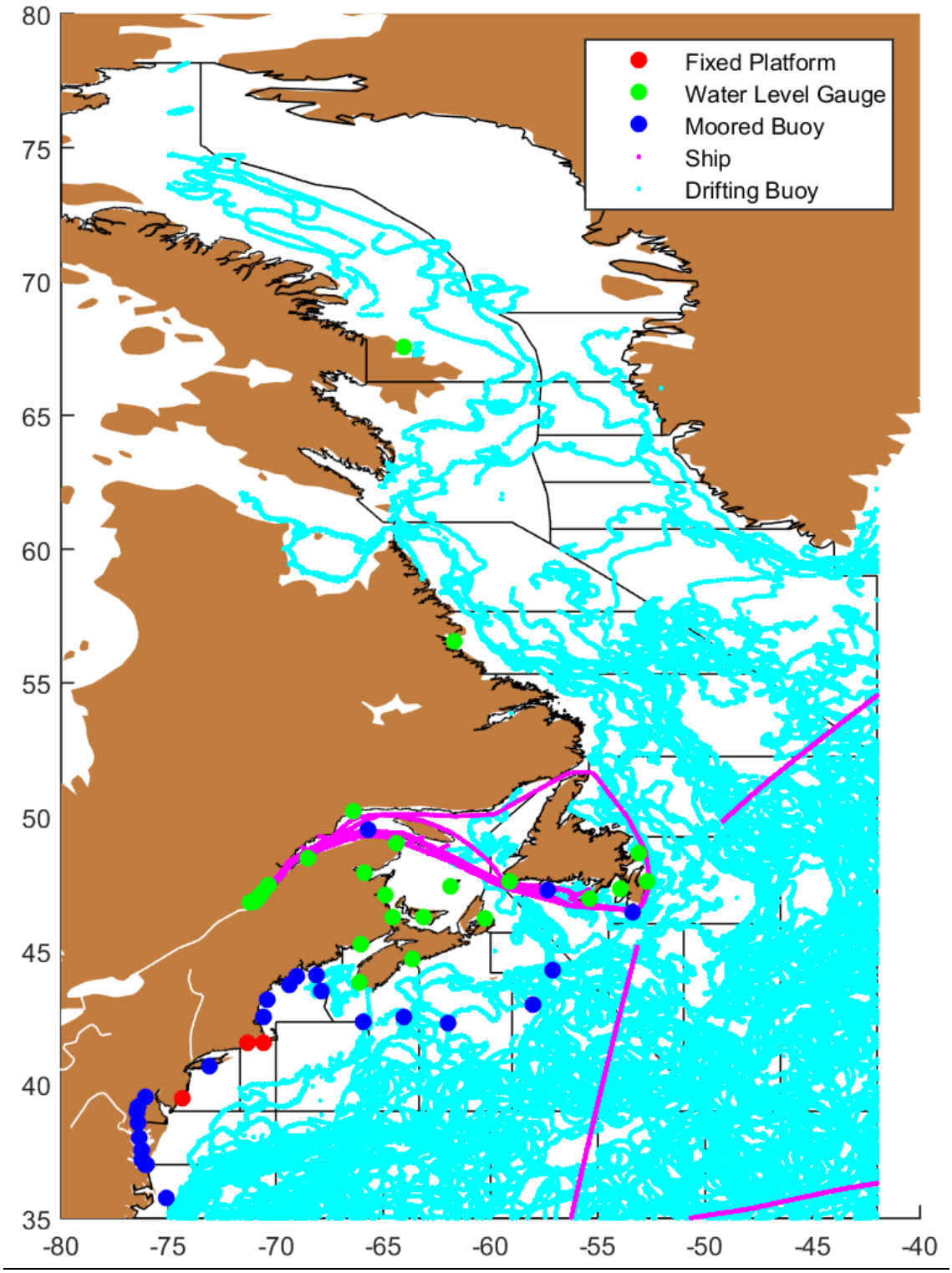

Fig. 3. Position of near surface observations made in 2017 and acquired in 2017/2018. Water level gauges are listed in table 6.

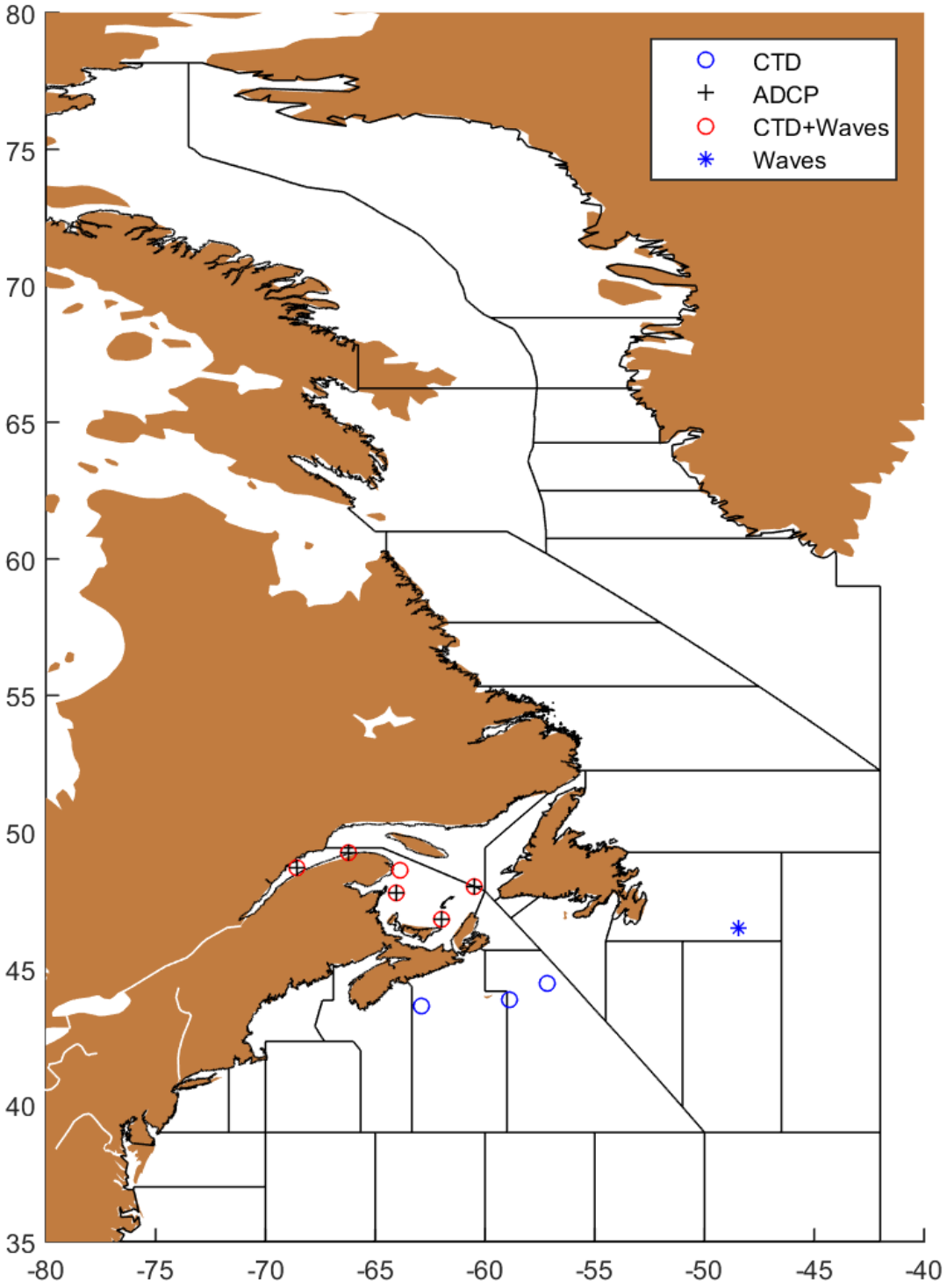

Fig. 4. Position of moorings with subsurface instruments whose were processed in 2017/2018 (CTD=Conductivity-Temperature-Depth, ADCP = Acoustic Doppler Current Profiler)

Table 1. Real-time temperature and /or salinity profiles from autonomous platforms collected and processed in 2017

Platform Type	Platform Name	Country	WMO ID	Reporting Period (Months)*	Profiles	NAFO Subareas
Moored**	PMZA-RIKI	CAN	4400481	Oct-Oct	1	4T
Moored**	AZMP-ESG	CAN	4400484	Oct-Oct	7	4T
Moored**	PMZA-VAS	CAN	4400485	Oct-Oct	7	4T
glider	OTN200	CAN	4800922	Aug-Dec	6772	4X
glider	DAL556	CAN	4800998	Oct-Oct	49	4T
argo		FRA	1901217	Jan-Jan	2	3K
argo		GBR	1901294	Jan-Dec	34	3M
argo		USA	1901597	May-Dec	9	3K 3M 6H
argo		USA	3901219	May-Dec	23	4Vs6B 6D 6E 6F
argo		DEU	3901601	Jan-Dec	37	3N 3O 4Vs
argo		DEU	3901602	Jan-Dec	33	4Vs4W 4X 5Ze6D 6E 6F 6G
argo		DEU	3901603	Jan-Dec	33	3M 3N 3O 4Vs4W 6E 6F 6H
argo		DEU	3901604	Jan-Jun	18	5Ze6B 6C 6D
argo		DEU	3901605	Jan-Dec	37	4W 4X 5Ze5Zw6B 6C 6D 6E
argo		DEU	3901629	Jul-Dec	16	1F 2J 3K 3M
argo		DEU	3901630	Jun-Dec	14	2J 3K 3M
argo		USA	4901044	Feb-Mar	4	6C
argo		USA	4901057	Jan-Jan	2	3M
argo		CAN	4901192	Jan-Jan	1	1F
argo		CAN	4901195	Nov-Dec	4	3M
argo		CAN	4901198	Jan-Apr	11	3N 3O
argo		USA	4901285	Jan-Nov	14	3M 3N
argo		USA	4901298	Jan-Jan	1	3K
argo		USA	4901400	Jan-Dec	34	4W 4X
argo		DEU	4901417	Jan-Aug	22	1F 2G 2H
argo		DEU	4901418	Jan-Jan	2	2J
argo		DEU	4901419	Jan-Mar	9	1F 2G
argo		USA	4901462	Jan-Dec	20	3N 4Vs6G
argo		USA	4901466	Jan-Dec	29	3N 3O 4Vs6F 6G
argo		USA	4901467	Jan-Dec	23	3N 3O 4Vs6F 6G
argo		USA	4901470	Apr-Apr	1	6H
argo		USA	4901591	Jan-Jun	17	6B 6C 6D
argo		USA	4901594	Jan-Dec	38	4Vs6E 6F 6G 6H
argo		USA	4901621	Jan-Dec	34	4Vs4W 6D 6E 6F 6G
argo		USA	4901628	Jan-Nov	28	6C 6D 6E
argo		USA	4901631	Jan-Dec	37	4Vs4W 6E 6F 6G 6H
argo		USA	4901699	Jan-May	13	6G 6H
argo		USA	4901701	Jun-Dec	18	6G 6H

argo	USA	4901704	Jan-Dec	37	3M 3N 6H
argo	CAN	4901745	Jan-Dec	34	4Vs4W 4X 6D 6E
argo	CAN	4901747	Jan-Dec	33	1F 2H 2J
argo	CAN	4901748	Feb-Mar	2	3M
argo	CAN	4901755	Jan-Dec	34	3N 3O 3Ps4Vs6F
argo	CAN	4901762	Jan-Dec	33	3O 3Ps4Vs4W
argo	CAN	4901763	Jan-Dec	33	4Vs4W 4X 5Ze6B 6D 6E 6F
argo	CAN	4901765	Feb-Dec	26	4W 4X 5Ze6D 6E
argo	CAN	4901780	Jan-Oct	12	3K 3L 3M
argo	CAN	4901783	Jan-Oct	19	2H 2J 3K 3L 3M
argo	CAN	4901787	Jan-Dec	34	4W 4X 5Ze5Zw6A 6B 6C
argo	CAN	4901788	Jan-Dec	32	4W 5Ze6D 6E
argo	CAN	4901798	Jan-Dec	31	4W 4X 5Ze5Zw6B 6C 6D 6E
argo	CAN	4901801	Feb-May	93	1F
argo	CAN	4901805	Sep-Nov	59	0A 1A
argo	CAN	4901809	Jan-Dec	21	1F
argo	CAN	4901812	Jan-Dec	30	4X 5Ze5Zw6B 6D 6E
argo	CAN	4901813	Jan-Dec	32	4Vs4W 4X 5Ze6D 6E
argo	CAN	4901814	Jan-Dec	32	4W 4X 5Ze6B 6C 6D 6E
argo	CAN	4901815	Jan-Dec	33	3M 3N 4Vs6B 6C 6D 6E 6F 6G 6H
argo	CAN	4901816	Jan-Dec	33	4Vs4W 6B 6C 6D 6E 6F 6G 6H
argo	CAN	4901817	Jan-Dec	34	1E 1F 2H
argo	CAN	4901827	Jan-Dec	34	4W 4X 5Ze6B 6D 6E 6F
argo	CAN	4901828	Jan-Dec	32	3N 3O 3Ps4Vs
argo	USA	4902099	Jan-Dec	36	4Vs4W 4X 5Ze6B 6C 6D 6E
argo	USA	4902100	Jan-Dec	36	3Ps4Vs4W
argo	USA	4902102	Jan-Nov	7	6C 6G
argo	USA	4902103	Feb-Apr	4	3M
argo	USA	4902104	Apr-May	3	6H
argo	USA	4902107	Jan-Oct	17	3M 3N
argo	USA	4902108	Jan-Dec	30	6D 6E 6F
argo	USA	4902109	Jan-Nov	33	4Vs4W 6C 6D 6E 6F 6G 6H
argo	USA	4902111	Mar-Mar	1	6D
argo	USA	4902114	Jul-Dec	18	6C 6D 6E
argo	USA	4902115	Jun-Dec	19	3N 4Vs6D 6E 6F 6G 6H
argo	USA	4902120	Jul-Dec	8	6C
argo	USA	4902121	Jan-Dec	29	6G 6H
argo	USA	4902122	Jan-Dec	36	3O 3Ps4Vs6G 6H
argo-eq	USA	4902263	Jan-Jul	137	4Vs4W 6D 6E 6F 6G
argo	USA	4902338	Jan-Dec	10	6H
argo	USA	4902339	Jan-Jul	21	6H
argo	USA	4902344	Jul-Sep	6	6D 6E

argo	USA	4902347	Jan-Dec	31	4X 5Ze6B 6C 6D
argo	USA	4902348	Jan-Dec	34	3Ps4Vs4W 6E 6F
argo	CAN	4902381	Jan-Jun	16	3M 3N
argo	CAN	4902382	Jan-Dec	27	3M 3N 6F 6G 6H
argo	CAN	4902383	Jan-Dec	33	1F 2H 2J
argo	CAN	4902390	Sep-Dec	12	3O 3Ps4Vs
argo	CAN	4902391	Apr-Dec	22	4Vs4W 4X
argo	CAN	4902392	Apr-Dec	22	4Vs4W
argo	CAN	4902393	Apr-Dec	23	4W 4X 5Ze6B 6D
argo	CAN	4902394	Apr-Dec	20	4W 6E
argo	CAN	4902395	Oct-Dec	9	1F 2G 2H
argo	CAN	4902396	Oct-Dec	9	1F 2G 2H
argo	CAN	4902397	Oct-Dec	9	1F 2G
argo	CAN	4902398	Sep-Nov	5	3M 3N
argo	CAN	4902399	Sep-Dec	10	3M 3N
argo	CAN	4902400	Oct-Dec	9	1F 2G
argo	CAN	4902409	Oct-Dec	9	1F
argo	CAN	4902410	Oct-Dec	9	1F
argo	CAN	4902412	Aug-Dec	14	1E 1F 2G 2H
argo	CAN	4902413	Oct-Dec	9	1F 2G
argo	CAN	4902415	Oct-Dec	9	1F
argo	CAN	4902419	Oct-Dec	9	1F 2G 2H
argo	CAN	4902426	Jul-Dec	158	2H
argo	USA	4902911	May-Dec	18	4X 6C 6D 6E
argo	USA	4902912	Apr-Dec	38	4W 4X 6B 6C 6D 6E
argo	USA	4902913	Apr-Dec	25	4W 4X 6C 6D 6E
argo	USA	4902919	Oct-Dec	10	6H
argo	USA	5903390	Jan-Dec	36	1F 2H 2J 3K
argo	USA	5903750	Apr-May	3	6H
argo	USA	5903889	Jan-Jan	2	6F
argo	USA	5904175	Jan-Dec	36	0B 1D 1E 1F 2G 2H 2J 3K
argo	USA	5904769	Jan-Jan	2	3M
argo	USA	5904771	Feb-Dec	23	1F
argo	USA	5904773	Jan-Dec	25	1F 2J 3K 3M
argo	NOR	5904988	Jan-Jul	42	2H 2J 3K 3L 3M
argo	NOR	5904989	Jan-Dec	77	0B 1D 1E 1F 2G
argo	GBR	6900446	Jan-May	9	1F
argo	GBR	6900447	Jun-Dec	22	1E 1F 2G
argo	GBR	6900448	Jan-Jan	1	1F
argo	FRA	6900910	Jan-Apr	11	4Vs4W
argo	FRA	6900966	Dec-Dec	3	1E 1F
argo	FRA	6901022	Jan-Dec	36	2J 3K 3L 3M 3N
argo	FRA	6901023	Jan-Dec	37	0B 1D 1E 1F 2G 2H 2J

argo	FRA	6901030	Jan-Aug	17	3K 3M
argo	GBR	6901147	Jan-Dec	37	1F 2H 2J
argo	GBR	6901149	Jan-Dec	36	1F 2H 2J 3K
argo	GBR	6901166	May-Dec	23	1F
argo	GBR	6901171	Feb-Jun	11	1F
argo	GBR	6901172	Jan-Mar	8	3M
argo	GBR	6901178	Dec-Dec	1	1F
argo	FRA	6901448	Jan-Dec	34	3M 3N 3O 4Vs6G
argo	FRA	6901480	Jan-May	30	1F 2H 2J
argo	FRA	6901486	Jan-Jul	48	1F 2G 2H
argo	FRA	6901524	Apr-Jul	24	3K 3M
argo	FRA	6901589	Jan-Dec	30	2J 3K 3M
argo	FRA	6901646	Apr-Sep	34	1D 1E 1F
argo	FRA	6901721	Jul-Dec	17	1C 1D 1E 1F
argo	FRA	6901726	May-Dec	24	0B 1C 1D 1E 1F
argo	FRA	6901751	Jan-Dec	36	1E 1F 2G 2H
argo	FRA	6901753	Mar-Dec	30	0B 1D 1E 1F
argo	FRA	6901754	Jul-Dec	18	1E 1F
argo	FRA	6901760	Sep-Dec	11	1E 1F 2G
argo	DEU	6902563	Jan-Dec	37	4Vs4W 4X 5Ze6D 6E 6F
argo	DEU	6902564	Jan-Dec	36	4Vs4W 4X 6C 6D 6E 6F
argo	DEU	6902565	Jan-Feb	5	6F 6G
argo	DEU	6902566	Jan-Dec	37	3O 4Vs4W
argo	DEU	6902567	Jan-May	6	3K 3M
argo	DEU	6902584	Jan-Apr	11	2G 2H 2J
argo	DEU	6902632	Jan-Dec	15	6C 6D
argo	DEU	6902633	Jan-Dec	34	4Vs4W 4X 6D 6E 6F
argo	DEU	6902634	Jan-Jun	18	5Ze5Zw6B 6C 6D
argo	DEU	6902635	Jan-Dec	36	4W 4X 5Ze5Zw6A
argo	DEU	6902636	Jan-Aug	20	3K 3M 3N
argo	FRA	6902659	Apr-Sep	11	2J 3K 3M
argo	FRA	6902660	Jan-Dec	36	1F
argo	FRA	6902661	Aug-Dec	13	1E 1F 2G 2H
argo	FRA	6902666	Sep-Sep	24	0A
argo	FRA	6902669	Sep-Nov	61	0A
argo	FRA	6902670	Sep-Nov	58	0A
argo	FRA	6902671	Sep-Oct	38	0A 1A
argo	FRA	6902696	Oct-Dec	9	1E 1F 2G
argo	FRA	6902708	Sep-Dec	12	1E 1F
argo	FRA	6902709	Nov-Dec	7	1E 1F
argo	FRA	6902829	Sep-Oct	44	0A
animals	UNK	9900887	Jan-Apr	65	1A
animals	UNK	9900958	Jul-Nov	32	1A

animals	UNK	9900959	Jul-Aug	3	1A
animals	UNK	9900962	Jul-Aug	13	1A
animals	UNK	9900980	Oct-Oct	11	0A
animals	UNK	9900981	Sep-Nov	468	0A 1A

*Dates are of first and last data reports within the NAFO Convention Area; when empty, reporting period was from January through December

**Moorings equipped with fixed profiling CTDs, mounted with Viking buoys. The coverage period corresponds to the time at which MEDS started transmitting this data on the GTS, which started late in the season. Deployments were seasonal and the full data is available at the MLI.

Table 2. 2017 Temperature (XBT) and/or salinity (CTD, bottle) profile and surface (thermosalinograph: TSG) data collected aboard ships, processed in 2017 and from Jan-May 2017

Platform Name	Country	Cruise Number	Description ***	First Date	Last Date	CTD	CTD RT*	XBT RT*	Bot	TSG RT*	NAFO Sub-areas
(multiple)	CAN	18VA17667	Bedford Basin	20170104	20171220	0	50	0	50	0	4W
(multiple)	CAN			20170104	20171204	0	26	0	0	0	2G 2H 4T 4W 4X
L'Atalante	FRA			20170112	20170717	0	15	0	0	2429	1F 2J 3K 3O 4Vs6F 6G 6H
Oleander	-		SOOP	20170114	20170514	0	0	132	0	0	6A 6B 6D
(multiple)	CAN	18VA17666	AZMP Halifax 2	20170116	20171003	7	0	0	6	0	4W
(multiple)	CAN	18VA17669	AZMP Prince 5	20170119	20171211	0	11	0	11	0	4X
(multiple)	CAN	189017005	AZMP Rimouski	20170207	20171204	30	0	0	56	0	4T
Cma Cgm Georgia	-		SOOP	20170219	20170625	0	0	49	0	0	6H
Maersk Visby	-		SOOP	20170227	20170425	0	0	45	0	0	5Zw6A 6B 6D
Nuka Arctica	-		SOOP	20170301	20170301	0	1	0	0	0	1F
Alfred Needler	CAN	18NE17102		20170302	20170303	0	2	0	2	0	4W 4X
Earl Grey	CAN	18EG17004	Convection	20170303	20170311	72	0	0	69	0	4R 4S 4T 4Vn
Alfred Needler	CAN	18NE17002		20170304	20170308	0	9	0	5	0	4W 4X 5Ze
George R. Pearkes	CAN		AZMP	20170307	20170325	0	0	16	0	0	3K 3L
Winning Pioneer 43	USA		SOOP	20170309	20170311	0	0	46	0	0	6A 6B 6C
Teleost	CAN	18TL17002		20170321	20170330	0	36	0	34	0	4W 4X 5Ze
Teleost	CAN		AZMP	20170406	20170523	0	148	55	0	0	3K 3L 3M 3N 3O 3Ps
Alfred Needler	CAN		AZMP	20170406	20170622	0	368	1	0	0	3L 3N 3O 3Ps
Coriolis II	CAN	18OL17001	AZMP	20170419	20170503	0	55	0	95	0	3Pn3P s4Vn4 Vs4W 4X 5Ze
Celtic Explorer	IRL /CAN	45CE17007	A02 Line	20170429	20170505	17	0	0	0	0	3M 3N
Leim	CAN	18LO17007	Snow Crab	20170430	20170513	42	0	0	0	0	4S
Oceanex Connaigra	CAN		SOOP	20170501	20171231	0	0	0	0	12739	3K 3L 3Pn3P s4R 4S

											4T 4Vn
Frederick G. Creed	CAN	18FC17014	Estuary Eutrophication	20170512	20170520	37	0	0	0	0	4T
(multiple)	CAN	18VA17668	AZMP Shediac Valley	20170514	20170922	0	3	0	3	0	4T
Vizconde de Eza	ESP	29VE170523	Flounder	20170523	20170611	113	0	0	0	0	3N 3O
L'Alliance	CAN	18K817001	Prey monitoring	20170524	20171013	98	0	0	0	0	4T
Teleost	CAN	18TL17008	AZMP/ Mackerel Grid	20170530	20170619	173	0	0	94	0	3Pn4R 4S 4T 4Vn
Vladykov	CAN		AZMP	20170609	20170819	0	45	0	0	0	3K 3L
Vizconde de Eza	ESP	29VE170615	Flemish Cap	20170615	20170714	70	0	0	0	0	3L 3M
M. Perley	CAN	18MU17016	Bradelle Bank	20170615	20170616	6	0	0	6	0	4T
Leim	CAN	18LO17011	Stimpson's Surfclam Evaluation	20170616	20170627	84	2	0	0	0	4T
Maersk Vilnius	-		SOOP	20170619	20171128	0	0	101	0	0	5Zw6A 6B 6D 6E
Teleost	CAN		AZMP	20170622	20170725	0	101	51	0	0	2G 2H 2J 3K 3L 3M 3Pn3P s4Vn
(multiple)	CAN	189017017	Sillex	20170623	20170915	91	0	0	0	0	4T
M. Perley	CAN	18MU17018	Scallop Survey	20170623	20170628	4	0	0	4	0	4T
Procyon Leader	-		SOOP	20170626	20170628	0	0	60	0	0	6A 6B 6C 6D
Alfred Needler	CAN	18NE17020		20170628	20170805	0	102	0	200	0	4Vn4V s4W 4X 5Y 5Ze
Leim	CAN	18LO17026	Snow Crab Demog. Structure	20170709	20170720	21	0	0	0	0	4T
Jean Mathieu	CAN	182P17001	Snow Crab	20170710	20170922	350	0	0	0	0	4T
M. Perley	CAN	18MU17024	Northumberland Strait	20170712	20170802	114	0	0	38	0	4T
Vizconde de Eza	ESP	29VE170721	Black Fletan	20170721	20170808	94	0	0	0	0	3L
Leim	CAN	18LO17028	Buccinidae Inventory	20170722	20170731	45	1	0	0	0	4T
Teleost	CAN	18TL17027	Multidisciplinary Survey	20170803	20170901	105	1	0	97	0	4R 4S 4T 4Vn
Frederick G. Creed	CAN	18FC17032	Multispecies Hydroacoust. Survey	20170815	20170827	7	0	0	0	0	4T
M. Perley	CAN	18MU17026	Snow Crab Tagging	20170816	20170821	27	0	0	27	0	4T
Leim	CAN	18LO17012	Scallop	2017081	2017082	0	43	0	0	0	4T

			Stock	8	8						
Global Leader	-		SOOP	20170821	20170823	0	0	45	0	0	6A 6B 6C
Martha L. Black	CAN	18MF17001	Benthic Habitat	20170825	20170830	23	0	0	0	0	4S 4T
Alfred Needler	Canada		AZMP	20170903	20171204	0	252	11	0	0	3K 3L 3Ps
Teleost	CAN	18TL17177	Ground Fish Survey	20170905	20170928	123	0	0	109	0	4T
M. Perley	CAN	18MU17034	Herring Survey	20170924	20171007	15	0	0	0	0	4T
Kildir	CAN	187817047	Salinity Front	20171006	20171010	115	0	0	0	0	4T
Teleost	CAN		AZMP	20171011	20171203	0	247	0	0	0	2H 2J 3K 3L
Cma Cgm Florida	-		SOOP	20171013	20171015	0	0	46	0	0	6F 6G 6H
Frederick G. Creed	CAN	18FC17043	Acoustic Survey	20171015	20171105	10	0	0	0	0	4R 4T
Coriolis II	CAN	18OL17048	Ice Forecast /Eutrophication	20171101	20171128	157	1	0	84	0	4R 4S 4T 4Vn
Wilfred Templeman	CAN		AZMP	20171111	20171214	0	54	37	0	0	2J 3K 3L 3M 3Ps
Endeavor	CAN	32EV17606	AZMP	20171124	20171216	0	35	0	69	0	3Pn3Ps4Vn4Vs4W 4X 5Y 5Ze

* 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.
** Dates are of first and last data reports within the NAFO Convention Area.
***SOOP = Ship of Opportunity Programme
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 3. Pre-2017 temperature (XBT) and/or salinity (CTD, bottle) profile data collected aboard ships, entered or updated in 2017/2018

Platform Name	Country	Cruise Number	Description	First Date	Last Date	CTD	Bot	NAFO Sub-areas
(multiple)	CAN	189982001	Estuary	19820731	19820806	78	0	4T
(multiple)	CAN	18VA04667	Bedford Basin	20040107	20041229	78	0	4W
(multiple)	CAN	18VA07667	Bedford Basin	20070103	20071219	48	0	4W
(multiple)	CAN	18VA08667	Bedford Basin	20080103	20081223	51	0	4W
Helicopter	CAN	18HE11003	Convection	20110308	20110317	3	0	3Pn4R 4S 4T 4Vn
Helicopter	CAN	18HE12004	Convection	20120305	20120316	3	0	3Pn4R 4S 4T 4Vn
Helicopter	CAN	18HE13004	Convection	20130305	20130314	5	0	3Pn4R 4S 4T 4Vn
Teleost	CAN	18TL15142	AZMP	20150121	20150121	0	1	3L
Teleost	CAN	18TL15143	AZMP	20150202	20150202	0	1	3L
Teleost	CAN	18TL15155	AZMP	20150320	20150320	0	1	3L
Teleost	CAN	18TL15144	AZMP	20150410	20150427	0	648	3L 3M 3N 3O 3Ps
Teleost	CAN	18TL15040	AZMP	20150504	20150504	0	1	3L
Teleost	CAN	18TL15146	AZMP	20150507	20150511	0	2	3L
Alfred Needler	CAN	18NE15452	AZMP	20150512	20150512	0	1	3L
Alfred Needler	CAN	18NE15041	AZMP	20150516	20150516	0	1	3L
Alfred Needler	CAN	18NE15453	AZMP	20150526	20150526	0	1	3L
Alfred Needler	CAN	18NE15454	AZMP	20150528	20150528	0	1	3L
Alfred Needler	CAN	18NE15455	AZMP	20150619	20150619	0	1	3L
Teleost	CAN	18TL15148	AZMP	20150709	20150727	0	783	2H 2J 3K 3L 3M
Teleost	CAN	18TL15046	AZMP	20150813	20150813	0	1	3L
Alfred Needler	CAN	18NE15456	AZMP	20150915	20150915	0	1	3L
Alfred Needler	CAN	18NE15457	AZMP	20150920	20150920	0	1	3L
Alfred Needler	CAN	18NE15458	AZMP	20150924	20151002	0	2	3L
Teleost	CAN	18TL15150	AZMP	20151007	20151007	0	1	3L
Alfred Needler	CAN	18NE15459	AZMP	20151010	20151010	0	1	3L
Hudson	CAN	18HU15115	AZMP	20151118	20151206	0	790	2J 3K 3L 3M 3N 3O 3Ps
George R. Pearkes	CAN	18GP16002	AZMP	20160121	20160121	0	1	3L
Teleost	CAN	18TL16168	AZMP	20160211	20160211	0	4	3L
Teleost	CAN	18TL16002	AZMP	20160222	20160310	49	0	4W 5Ze
Teleost	CAN	18TL16003	AZMP	20160310	20160325	68	0	4W 4X 5Y
Teleost	CAN	18TL16157	AZMP	20160401	20160406	0	61	3L 3Ps
Henry B. Bigelow	USA	33HH16001		20160408	20160607	352	0	4X 5Y 5Ze5Zw6A 6B 6C
Hudson	CAN	18HU16003	Scotian Shelf	20160409	20160425	55	0	4Vn4Vs4W 4X 5Ze
Vladykov	CAN	18VD16053	AZMP	20160415	20160415	0	3	3L
Vladykov	CAN	18VD16054	AZMP	20160426	20160426	0	1	3L

Teleost	CAN	18TL16169	AZMP	20160510	20160510	0	1	3L
Teleost	CAN	18TL16159	AZMP	20160511	20160517	0	253	3L 3M
Gordon Gunter	USA	33GG16008		20160521	20160620	256	0	4X 5Y 5Ze5Zw6A 6B 6C
Hugh R. Sharp	USA	33H516001		20160521	20160623	16	0	5Ze6B
Teleost	CAN	18TL16170	AZMP	20160525	20160525	0	1	3L
Coriolis	CAN	18OL16015	AZMP / Mackerel Grid	20160601	20160626	180	0	3Pn4R 4S 4T 4Vn
Teleost	CAN	18TL16171	AZMP	20160608	20160617	0	3	3L
Teleost	CAN	18TL16172	AZMP	20160621	20160621	0	2	3L
Alfred Needler	CAN	18NE16016	Scotian Shelf	20160628	20160815	250	0	4Vn4Vs4W 4X 5Y 5Ze
Henry B. Bigelow	USA	33HH16003		20160628	20160824	239	0	4X 5Ze5Zw6A 6B 6C 6D
Vladykov	CAN	18VD16058	AZMP	20160706	20160706	0	1	3L
Teleost	CAN	18TL16160	AZMP	20160708	20160728	0	580	2J 3K 3L 3M
Jean Mathieu	CAN	182P16001	Gulf	20160710	20161004	340	0	4T
Pourquoi Pas?	FRA	35PK16008		20160802	20160806	0	0	3K 3L
Pisces	USA	334B16007		20160809	20160819	115	0	4X 5Ze5Zw6A 6B 6C
Inquisitor	CAN	18MQ16619	AZMP	20160815	20160815	0	3	3L
Alfred Needler	CAN	18NE16464	AZMP	20160821	20160825	0	2	3L
G.O. Sars	NOR	58GS16112		20160823	20160830	5	0	1F
Alfred Needler	CAN	18NE16465	AZMP	20160829	20160909	0	2	3L
Henry B. Bigelow	USA	33HH16004		20160909	20161109	374	0	4X 5Y 5Ze5Zw6A 6B 6C
Alfred Needler	Canada	18NE16466	AZMP	20160915	20160927	0	2	3L
Teleost	Canada	18TL16162	AZMP	20161004	20161004	0	1	3L
Paamiut	Canada	26PA16008		20161007	20161105	178	0	0A 0B
Alfred Needler	Canada	18NE16468	AZMP	20161014	20161014	0	1	3L
Hudson	Canada	18HU16050	Ice Forecast / Eutrophication	20161016	20161103	149	0	3Pn4R 4S 4T 4Vn
Pisces	USA	334B16009		20161019	20161020	13	0	5Zw6A
Teleost	CAN	18TL16164	AZMP	20161024	20161106	49	1	2J 3L
Alfred Needler	CAN	18NE16469	AZMP	20161028	20161108	0	2	3L
Teleost	CAN	18TL16165	AZMP	20161110	20161110	0	1	3L
Hudson	CAN	18HU16116	AZMP	20161114	20161122	0	263	3L 3N 3O 3Ps
Alfred Needler	CAN	18NE16470	AZMP	20161122	20161122	0	1	3L
Alfred Needler	CAN	18NE16471	AZMP	20161123	20161206	0	3	3L
Teleost	CAN	18TL16166	AZMP	20161206	20161206	0	1	3L
Teleost	CAN	18TL16167	AZMP	20161207	20161207	0	1	3L
Alfred Needler	CAN	18NE16472	AZMP	20161215	20161215	0	1	3L

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

Table 4. Real-time surface water, air, atmospheric parameters and wave* data from buoys, collected and processed in 2017

Platform Type	Name	Country	WMO / other ID	First Date**	Last Date**	NAFO Subareas
Fixed Platform	Buoy 126, Jacques Cousteau Reserve, NJ	USA	JCTN4	20170101	20171231	6A
Fixed Platform	T-Wharf Bottom, Narragansett Bay Reserve, RI	USA	NAQR1	20170101	20171231	5Zw
Fixed Platform	Menauhant, Waquoit Bay Reserve, MA	USA	WAQM3	20170101	20171231	5Zw
Moored Buoy	Hatteras Bay (B1)	USA	4100062	20170504	20170916	6C
Moored Buoy	Northeast Channel (N01)	USA	4400024	20170101	20170715	4X
Moored Buoy	Massachussetts Bay (A01)	USA	4400029	20170101	20171231	5Y
Moored Buoy	Western Maine Shelf (B01)	USA	4400030	20170101	20171231	5Y
Moored Buoy	Central Maine Shelf (E01)	USA	4400032	20170101	20171231	5Y
Moored Buoy	Penobscot Bay (F01)	USA	4400033	20170101	20171231	5Y
Moored Buoy	Eastern Maine Shelf (I01)	USA	4400034	20170101	20171229	5Y
Moored Buoy	Jordan Basin (M01)	USA	4400037	20170101	20171231	5Y
Moored Buoy	Potomac, MD	USA	4400042	20170101	20171231	6B
Moored Buoy	Patapsco, MD	USA	4400043	20170406	20171204	6B
Moored Buoy	Susquehanna, MD	USA	4400057	20170405	20171208	6B
Moored Buoy	Stingray Point, VA	USA	4400058	20170318	20171231	6B
Moored Buoy	Gooses Reef, MD	USA	4400062	20170101	20171231	6B
Moored Buoy	Annapolis, MD	USA	4400063	20170411	20171204	6B
Moored Buoy	First Landing, VA	USA	4400064	20170413	20171231	6B
Moored Buoy	Great South Bay	USA	4400069	20170101	20171215	6A
Moored Buoy	York Spit, VA	USA	4400072	20170101	20171231	6B
Moored Buoy	East Scotia Slope*	CAN	4400137	20170101	20170125	4W
Moored Buoy	Banquereau Banks*	CAN	4400139	20170101	20171231	4Vs
Moored Buoy	Laurentian Fan*	CAN	4400141	20170101	20170105	4Vs
Moored Buoy	La Have Bank*	CAN	4400150	20170101	20171231	4X
Moored Buoy	Nickerson Bank*	CAN	4400251	20170101	20170411	3L
Moored Buoy	Halifax Harbour***	CAN	4400258	***	***	4W
Moored Buoy	Mont Louis*	CAN	4500138	20170527	20171115	4S
Drifting Buoy		USA	1300601	20170101	20171128	6E 6F 6G
Drifting Buoy		USA	1300602	20170101	20180101	6E 6G 6H
Drifting Buoy		USA	1300624	20170719	20171016	6G 6H
Drifting Buoy		USA	1300636	20170112	20170117	3M
Drifting Buoy		USA	1300637	20170101	20170107	3M
Drifting Buoy			1300872	20170831	20171231	6G 6H
Drifting Buoy			2500622	20171217	20171231	1F
Drifting Buoy			2601561	20171128	20171231	1E 1F 2G
Drifting Buoy			4101505	20170121	20170730	6C 6D
Drifting Buoy			4101506	20170101	20170227	6C 6D 6E

Drifting Buoy		4101507	20170101	20170203	3M 3N 4Vs6H
Drifting Buoy		4101510	20170101	20170525	3M 6H
Drifting Buoy		4101511	20170324	20170620	3N 4Vs4W 4X 6B 6C 6D 6E 6F 6G 6H
Drifting Buoy	USA	4101512	20170101	20170204	3M 3N 4Vs4W
Drifting Buoy	USA	4101513	20170831	20171231	4X 5Ze5Zw6A 6B 6C 6D
Drifting Buoy	USA	4101515	20170413	20171219	3N 3O 4Vs4W 6B 6C 6D 6E 6F 6H
Drifting Buoy	USA	4101516	20170517	20171231	6B 6C 6D
Drifting Buoy	USA	4101517	20170617	20171018	6C 6D 6E 6F
Drifting Buoy	USA	4101522	20170216	20171231	4W 4X 5Ze5Zw6A 6B 6C 6D 6E
Drifting Buoy	USA	4101523	20170217	20170815	3M 3N 3O 4Vs4W 5Ze6D
Drifting Buoy		4101524	20170220	20170328	6B 6C 6D
Drifting Buoy		4101529	20171225	20171227	6E
Drifting Buoy		4101538	20170929	20171231	6B 6C 6D 6E
Drifting Buoy		4101539	20170710	20170711	6C
Drifting Buoy	USA	4101540	20171005	20171231	4Vs4W 4X 6B 6C 6D 6E
Drifting Buoy	USA	4101541	20170801	20171231	4Vs4W 6B 6C 6D 6E 6F 6G 6H
Drifting Buoy	USA	4101542	20170901	20171207	3N 4Vs4W 6B 6C 6D 6E 6F 6G 6H
Drifting Buoy		4101543	20170803	20170924	3N 3O 4Vs4W 6C 6D 6E
Drifting Buoy	USA	4101546	20170825	20171120	3M 3N 4Vs4W 6B 6C 6D 6E 6F 6H
Drifting Buoy	USA	4101548	20171017	20171231	4Vs4W 6B 6C 6D 6E 6F 6G
Drifting Buoy		4101554	20171016	20171020	6E
Drifting Buoy		4101556	20171013	20171220	3M 3N 6H
Drifting Buoy		4101557	20171109	20171231	3M 3N 3O 4Vs4W 6E 6F 6G 6H
Drifting Buoy		4101558	20171112	20171224	3M 3N
Drifting Buoy		4101560	20171016	20171222	6G
Drifting Buoy		4101562	20171231	20171231	6H
Drifting Buoy	USA	4101563	20171016	20171203	6D 6E 6F
Drifting Buoy		4101564	20171016	20171103	6H
Drifting Buoy		4101573	20171227	20171231	6D
Drifting Buoy		4101574	20171226	20171231	6E 6F
Drifting Buoy		4101700	20170101	20170601	3M 3N 4Vs6G 6H
Drifting Buoy		4101705	20170919	20171013	6H

Drifting Buoy		4101706	20170824	20171026	6H
Drifting Buoy		4101710	20170706	20171231	6G 6H
Drifting Buoy		4101712	20171115	20171231	6E 6F
Drifting Buoy	USA	4100510	20170101	20170227	3M 3N 6G 6H
Drifting Buoy	USA	4100538	20171028	20171204	6C 6D
Drifting Buoy		4100539	20170814	20170921	6B 6C 6D
Drifting Buoy	USA	4100540	20171103	20171231	4Vs4W 4X 6B 6C 6D
Drifting Buoy		4100541	20171028	20171231	4Vs4W 6B 6C 6D 6E 6G
Drifting Buoy	USA	4100545	20171224	20171231	6C
Drifting Buoy	USA	4100558	20170418	20180101	3M 3N 6G 6H
Drifting Buoy	USA	4100575	20170104	20171218	6C 6D
Drifting Buoy	USA	4100590	20170116	20170126	3M
Drifting Buoy		4100597	20170101	20171023	6F 6G 6H
Drifting Buoy	USA	4100690	20170106	20171231	3M 3N 3O 4Vs4W 4X 5Ze6B 6C 6D 6G 6H
Drifting Buoy	USA	4100691	20170101	20171003	3M 3N 4Vs6F 6G 6H
Drifting Buoy		4100729	20170101	20170124	3M
Drifting Buoy		4100730	20171030	20171231	4Vs4W 6B 6C 6D 6E 6F 6G
Drifting Buoy		4100731	20171024	20171202	6C
Drifting Buoy	USA	4100934	20170802	20171211	6G 6H
Drifting Buoy	USA	4100970	20170312	20170515	4X 5Ze6B 6C 6D
Drifting Buoy	USA	4100974	20170101	20170205	3M 6H
Drifting Buoy	USA	4201500	20170101	20170616	6C 6D 6H
Drifting Buoy	USA	4201507	20170716	20171231	3M 3N 4Vs4W 4X 6B 6C 6D 6E 6F 6G 6H
Drifting Buoy	USA	4201517	20171101	20171231	4X 5Ze6B 6C 6D
Drifting Buoy	USA	4201518	20170915	20171228	6C 6D 6E
Drifting Buoy	FRA	4401500	20170101	20170913	6B 6C 6D 6E
Drifting Buoy		4401503	20170822	20171008	4X 6E 6F 6G
Drifting Buoy		4401528	20170101	20170313	3M 6H
Drifting Buoy	USA	4401530	20170101	20170327	4Vs4W 6D 6E 6G
Drifting Buoy	FRA	4401531	20171106	20171219	6C 6D
Drifting Buoy		4401532	20170101	20170516	6B 6C 6D 6E
Drifting Buoy		4401534	20170101	20170615	6D 6E 6F
Drifting Buoy	USA	4401536	20170101	20170904	2J 3K 3L 3M
Drifting Buoy		4401539	20170103	20171220	3N 3O 4Vs6E 6F 6G 6H
Drifting Buoy		4401541	20170919	20171231	3N 3O 4Vs6D 6E 6F 6G
Drifting Buoy		4401542	20171005	20171121	6D

Drifting Buoy		4401544	20171125	20171218	6B 6C 6D 6E
Drifting Buoy		4401545	20170103	20170520	4W 6D 6E
Drifting Buoy		4401550	20170101	20170620	3M 3N 6H
Drifting Buoy		4401551	20170714	20170911	6H
Drifting Buoy		4401552	20170101	20170314	3M 3N 3O 4Vs
Drifting Buoy		4401553	20170101	20170731	1F 2J
Drifting Buoy		4401555	20170101	20170327	3K 3M
Drifting Buoy		4401556	20170509	20170816	3M 3N 3O 4Vs4W 6F 6G 6H
Drifting Buoy		4401557	20170529	20171224	3M 3N 4Vs4W 4X 6F 6G 6H
Drifting Buoy		4401558	20170529	20171231	3M 3N 3O 3Ps4Vs
Drifting Buoy		4401559	20170606	20170716	3M
Drifting Buoy		4401560	20170607	20170719	3M 3N
Drifting Buoy		4401561	20170607	20171231	3N 3O 3Ps4Vs
Drifting Buoy		4401564	20170911	20171015	3M 3N 4Vs6H
Drifting Buoy		4401565	20170918	20171119	3L 3M 3N
Drifting Buoy		4401566	20170919	20171224	1F 2J 3K 3M
Drifting Buoy	CAN	4401601	20170101	20171231	1F 2G 2H 2J
Drifting Buoy	CAN	4401602	20170101	20171231	3L 3O 3Ps4Vn4Vs
Drifting Buoy	CAN	4401603	20170101	20170112	1F
Drifting Buoy	CAN	4401604	20170101	20170412	2H
Drifting Buoy	CAN	4401605	20170101	20171016	1F 2H 2J 3K
Drifting Buoy	CAN	4401606	20170101	20170306	3K 3L 3M 3N
Drifting Buoy	CAN	4401607	20170101	20170716	2G 2H 2J 3K 3L 3M
Drifting Buoy	CAN	4401608	20170101	20170831	2H 2J 3K 3L 3M 3N
Drifting Buoy	CAN	4401609	20170101	20171231	3M 3N 3O 3Pn3Ps4R 4S 4T 4Vn4Vs4W 4X 6G 6H
Drifting Buoy	CAN	4401611	20170725	20171231	2H 2J 3K 3L 3O
Drifting Buoy	CAN	4401612	20170101	20170712	3M 3N 3O 3Ps4Vs
Drifting Buoy	CAN	4401613	20170101	20170406	3K 3L 3M 3N
Drifting Buoy	CAN	4401616	20170101	20171010	3L 3M 3N 3O 3Ps
Drifting Buoy	CAN	4401619	20170101	20171225	2J 3K 3L 3M
Drifting Buoy	CAN	4401620	20170101	20170106	0B
Drifting Buoy	CAN	4401622	20170101	20170331	3K 3L
Drifting Buoy	CAN	4401625	20170101	20170330	3Ps
Drifting Buoy	CAN	4401627	20170112	20170414	1F 2G 2H 2J 3K
Drifting Buoy	CAN	4401628	20170101	20171207	3K 3L 3M 3N 3O 3Ps
Drifting Buoy	CAN	4401629	20170101	20170630	2G 2H 2J 3K

					3L 3M 3N
Drifting Buoy	CAN	4401630	20170101	20170327	2J 3K 3L
Drifting Buoy	CAN	4401631	20170101	20170308	3L 3M
Drifting Buoy	CAN	4401633	20170101	20170415	3L 3M 3N
Drifting Buoy	CAN	4401634	20170101	20170109	3K
Drifting Buoy	CAN	4401635	20170101	20170722	2J 3K 3L 3M 3N
Drifting Buoy	CAN	4401636	20170101	20170720	1F 2J 3K 3L 3M
Drifting Buoy	CAN	4401637	20170101	20170504	4R 4S 4Vs
Drifting Buoy	USA	4401756	20171115	20171231	0B 1D 1E 1F
Drifting Buoy		4401759	20171005	20171106	3M
Drifting Buoy		4401760	20170904	20171026	3M
Drifting Buoy		4401762	20170911	20170925	3M
Drifting Buoy		4401763	20170911	20171006	3M
Drifting Buoy		4401764	20170912	20171211	3M 6H
Drifting Buoy		4401765	20170906	20170926	3M
Drifting Buoy		4401768	20170913	20170927	3K 3M
Drifting Buoy		4401769	20171119	20171202	3M
Drifting Buoy		4401772	20170917	20171203	1F 2J 3K 3M
Drifting Buoy		4401774	20171101	20171127	3M
Drifting Buoy		4401775	20171129	20171223	3K
Drifting Buoy		4401793	20170831	20171231	3M 3N 3O 4Vs4W 4X 5Ze6D 6E 6F 6G 6H
Drifting Buoy		4401796	20171218	20171223	3K 3M
Drifting Buoy		4401797	20171219	20171222	3M
Drifting Buoy		4401798	20170907	20171002	3K 3M
Drifting Buoy	CAN	4401800	20170508	20171123	3Ps
Drifting Buoy	CAN	4401802	20170916	20171231	4Vs
Drifting Buoy		4401904	20171124	20171231	2J 3K
Drifting Buoy		4401905	20171124	20171231	2J 3K
Drifting Buoy	USA	4400501	20170320	20170714	3L 3M 3N 3O
Drifting Buoy	USA	4400502	20170418	20170619	3K 3M 3N
Drifting Buoy	USA	4400503	20170418	20170828	3K 3L 3M 3N
Drifting Buoy	USA	4400504	20170419	20170606	3L 3N
Drifting Buoy	USA	4400505	20170502	20170826	3K 3L 3M 3N
Drifting Buoy	USA	4400506	20170606	20170717	3L 3M 3N
Drifting Buoy	USA	4400510	20170101	20170223	3M 3N 3O
Drifting Buoy	CAN	4400670	20170101	20170606	3M 3N 3O 4Vn4Vs4W
Drifting Buoy		4400775	20170101	20170116	6H
Drifting Buoy		4400777	20170101	20170913	3M 3N 3O 6G 6H
Drifting Buoy	USA	4400839	20170919	20171003	6D

Drifting Buoy		4400875	20170101	20170111	6H
Drifting Buoy	USA	4400887	20171017	20171124	6F 6G 6H
Drifting Buoy	USA	4400891	20170717	20171108	6F 6G
Drifting Buoy	USA	4400893	20170903	20171219	4Vs4W 6D 6E 6F
Drifting Buoy	USA	4400907	20170604	20171103	4X 5Y
Drifting Buoy		4701654	20170929	20171024	0A
Drifting Buoy		4701656	20170105	20170814	0A 0B 1C
Drifting Buoy	CAN	4701662	20171024	20171231	0A
Drifting Buoy		4701665	20171208	20171209	0A
Drifting Buoy	CAN	4701668	20170725	20171231	2H 2J 3K 3L 3Ps
Drifting Buoy	CAN	4701669	20170627	20171231	2G 2H 2J 3K 3L 3N
Drifting Buoy		4701670	20170725	20171103	0B
Drifting Buoy		4701671	20170725	20170923	0A
Drifting Buoy		4701672	20170725	20170921	0A
Drifting Buoy	CAN	4701673	20171105	20171231	0A
Drifting Buoy	CAN	4701674	20170725	20171231	0A 1A
Drifting Buoy		4701675	20170624	20171231	2G 2H 2J 3K 3L 3N 3O
Drifting Buoy		4701676	20170806	20171231	0A 0B 1A 2G
Drifting Buoy		4701677	20170831	20171231	2G 2H 2J
Drifting Buoy		4701678	20170811	20171128	2G
Drifting Buoy		4701679	20170806	20171111	0A 1A
Drifting Buoy	CAN	4700546	20170101	20170427	3M 3N 3O 3Ps4Vs
Drifting Buoy	CAN	4700551	20170101	20170207	3M 3N
Drifting Buoy	CAN	4700552	20170101	20171231	0A
Drifting Buoy	USA	4700555	20170101	20170223	3M 3N
Drifting Buoy		4801632	20171107	20171107	2J
Drifting Buoy		4800664	20170109	20170327	0B 2G 2H 2J 3K 3L
Drifting Buoy		6203505	20170128	20170219	3M 3N
Drifting Buoy		6203518	20170822	20170831	1F
Drifting Buoy	USA	6203519	20170723	20171225	0B 1B 1C 1D 1E 1F
Drifting Buoy	USA	6203524	20170915	20171231	1B 1C 1D 1E 1F
Drifting Buoy	USA	6401534	20171226	20171231	1F
Drifting Buoy		6401557	20171015	20171231	1E 1F
Drifting Buoy		6400526	20170101	20170721	2G 2H 2J 3K 3L 3M
Drifting Buoy		6400534	20170131	20170205	1F
Drifting Buoy		6400551	20170205	20170904	1F 2J 3K
Drifting Buoy	DEU	6400757	20170203	20170208	1F
Drifting Buoy		6501551	20170101	20171231	1F 2G 2H 2J 3K 3L 3M

Drifting Buoy	6501552	20170101	20170915	1F 2H 2J 3K 3L
Drifting Buoy	6501553	20170101	20170728	1F 2H 2J
Drifting Buoy	6501555	20170101	20171231	1C
Drifting Buoy	6501556	20170101	20170822	1F
Drifting Buoy	6501558	20170101	20170213	2G

*Buoys marked by this symbol also measure waves

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

*** Data from this buoy are not archived at MEDS

Table 5. Mooring data processed in 2017/2018

Ref	Institute	Mooring Name / Project	Longitude (W)	Latitude (N)	First Date	Last Date	Instruments	NAFO Sub-Area
HUD2015006 M1906	BIO	Mid Gully AMAR	58.9104667	43.8596817	20150523	20160423	CTD	4Vs
HUD2015006 M1907	BIO	Emerald Basin AMAR	62.8683167	43.6087133	20150524	20160419	CTD	4W
HUD2015030 M1908	BIO	Laurentian Channel AMAR	57.1841817	44.462385	20150922	20160921	CTD	4Vs
PMZA-RIKI	MLI	Rimouski	68.5833333	48.6666667	20170425	20171113	CTD,ADCP, Waves	4T
PMZA-VAS	MLI	Shediac Valley	64.0333333	47.7833333	20170616	20171028	CTD,ADCP, Waves	4T
IML-7	MLI	Gaspé Current	66.2	49.2416667	20170527	20171115	CTD,ADCP, Waves	4T
IML-10	MLI	Old Harry	60.5	48	20170604	20171021	CTD,ADCP, Waves	4T
AZMP-ESG	MLI	Southeast Gulf	62	46.8	20170605	20171115	CTD,ADCP, Waves	4T
AZMP-BA	MLI	American Bank	63.8833333	48.5833333	20170613	20171028	CTD,Waves	4T
WEL448	MEDS/ NEB	Terra Nova FPSO	48.43	46.48	20120101	20161231	Waves	3L

Table 6. Water level data collected in 2017

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	Jan-Dec	55.3901	46.9168	-
835	Argentia	Mar-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-Dec	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
3071	Rocher Neptune	Jun-Nov	70.6077	47.1618	4T
3075	Banc du Cap Brûlé	Jun-Nov	70.8965	46.9157	4T
3100	Saint-Francois Île d'Orléans	Jan-Dec	70.8082	46.9965	4T
3110	Saint-Laurent île d'Orléans	Apr-Nov	71.0033	46.8582	4T
3248	Vieux-Québec	Jan-Dec	71.2019	46.8111	-
3980	Qikiqtarjuaq	Jan-Dec	64.0667	67.5167	0A