TITLE: **SirWilfridLaurier2019_Bottle_data_README.pdf**

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ORIGINAL AWARD TITLE: Collaborative Research: The Distributed Biological Observatory (DBO)-A Change Detection Array in the Pacific Arctic Region

DATA ARCHIVE: NSA Arctic Data Center link: https://arcticdata.io/

DATASET OVERVIEW:
This dataset includes measurements of water samples collected at hydrographic stations from the annual Canadian Coast Guard Service Sir Wilfrid Laurier cruise during July 2019. Data includes by column, Cruise #, Event #, Station Number (#), Station Name (Stn. Name), Station Water Depth (m), Date and time (UTC) (yy/mm/dd), UTC time (hh:mm), latitude (°N), and longitude (°W), nominal depth (w), Rosette Bottle #, Sample Number, bottle trip location, raw CTD data (pressure, temperature (°C), Salinity, dissolved Oxygen concentration, Chlorophyll a concentration, nutrients (Phosphate, Silica, Nitrite+Nitrate, Ammonium) , and delta-O18 (stable oxygen isotope) values. Additional parameters in the columns from sensors and data descriptors are provided in this file and defined below.

INSTRUMENT DESCRIPTION:
Water samples were collected from rosette bottles attached to a Seabird Model SBE19 CTD for nutrients, chlorophyll and oxygen-18/16 ratios. Water temperature, salinity, and other data that were electronically measured with sensors on the CTD are also provided for the depths where each bottle was closed.

DATA COLLECTION AND PROCESSING
Water column collections included water sampling for inorganic nutrients, dissolved oxygen, oxygen-18/16 ratios of seawater, and chlorophyll *a* at up to 6 depths at each station from the rosette bottles. Sensor data for temperature and salinity are also included. Subsamples for inorganic nutrients were collected from the CTD rosette, filtered shipboard, and frozen for post cruise analyses. Nutrient samples were processed by either technical support at the Institute of Ocean Sciences (IOS), Department of Fisheries and Oceans Canada (DFO) and/or at the Nutrient Analytical Services Laboratory (NASL) at the Chesapeake Biological Laboratory (CBL), (http://nasl.cbl.umces.edu/) at the University of Maryland Center for Environmental Science (UMCES). Samples were processed for all 4 nutrients: phosphate (PO4), nitrite + nitrate (NO2+NO3), silica (SiO4), and to a limited extent, ammonium (NH4); data on dissolved oxygen are available also from the uncalibrated CTD sensor. Water samples for $^{18}O/^{16}O$ ratios were collected in small vials, sealed to prevent evaporation and returned for analysis. These samples were analyzed at the University of Maryland Center for Environmental Science using a Thermo DeltaPlus Stable Isotope Mass Spectrometer coupled to a Gasbench peripheral. Data are reported in the delta notation relative to Vienna Standard Mean Ocean Water (V-SMOW). The

water column chlorophyll was analyzed shipboard using a Turner Designs AU-20 fluorometer (non-acidification or Welschmeyer method) following a 24-hour in the dark incubation with 90% acetone at 4°C method (see Cooper et al. 2012, 2013 for further details).

Data File Structure:
File Names (Formats)*: **SirWilfridLaurier2019_Bottle_data.csv**

Files Data Parameters by Column:
A CruiseID - Cruise identifier (nominal)
B Cast_No - Unique number designating data collection sample (nominal)
C StationName - Name of station where data has been collected historically under a different name at the current DBO location (nominal)
D DBO_LineRegion - Distributed Biological Observatory code indicating the regional location of the cruise. (nominal)

E DBO_StationName - Distributed Biological Observatory station name that refers to a particular site and can be referenced with the Latitude and Longitude coordinates or by going to the CBL DBO website: https://dbo.cbl.umces.edu/data.html (nominal)

F CastStartTime_UTC-Cast Start Time [UTC] (dateTime, mon/DD/YYYY hh:mm:ss)
G DataDate – date of data collection (YYYYMMDD)
H Latitude-The DBO Line/Region and station name latitude in decimal degrees (degree, real)
I Longitude-The DBO Line/Region and station name longitude in decimal degrees (degree, real)
J Water_Depth-Station water depth measured in meters (meter)
K Cast Depth [m]- Cast depth measured in meters
L Rosette_Bottle_No - Rosette bottle number

M CTDScan_raw – scan (dimensionless)
N CTDPres_dbar – pressure measured in decibars (CTD (conductivity, temperature and depth) device measurement)
O CTDTemp_1 – first temperature measurement (degrees C)
P CTDTemp_2 – second temperature measurement (degrees C)
Q CTDCond_1 – first conductivity measurement (mS/cm)
R CTDCond_2 – second conductivity measurement (mS/cm)
S CTDSalt_1 – first salinity measurement (practical salinity units)
T CTDSalt_2 – second salinity measurement (practical salinity units)
U CTDOxy_volts_downcast – dissolved oxygen by CTD sensor, uncalibrated (volts), -9999 designates bad data
V CTDOxy_mL/L_downcast – dissolved oxygen by CTD sensor, uncalibrated (mL/L), -9999 designates bad data
W CTDOxy_percent_Sat_downcast – dissolved oxygen saturation (% saturation of oxygen), -9999 designates bad data
X CTDFluo_mg_m3 – fluorescence (mg/m3)
Y CTDFluo_v_raw – fluorescence (volts)
Z CTDTrans_percent – transmissivity (%)
AA CTDTrans_v_raw – transmissivity (volts)
AB CTDAlt_m – altimeter, distance above seafloor (meters)

AC CTDPAR – photosynthetic active radiation (Photosynthetic Photon Flux Density, mol $m^{-2}s^{-1}$)
AD CTDSPAR – surface photosynthetic active radiation (Photosynthetic Photon Flux Density, mol $m^{-2}s^{-1}$)
AE chla – chlorophyll a concentration (µg/L)
AF Silicate – dissolved silica concentration (mmol/m3)
AG Nitrite_Nitrate – dissolved nitrite and nitrate concentration (mmol/m3)
AH Phosphate – dissolved phosphate concentration (mmol/m3)
AI Ammonia – dissolved ammonia concentration (mmol/m3)
AJ O18-1 – oxygen isotope ratios ($^{18}O/^{16}O$, ‰ VSMOW)

Data Version Number and Date: Version 1, 5/27/2021

REFERENCES

Cooper, L.W., M.A. Janout, K.E. Frey, R. Pirtle-Levy, M.L. Guarinello, J.M. Grebmeier, and J.R. Lovvorn. 2012. The relationship between sea ice break-up, water mass variation, chlorophyll biomass, and sedimentation in the northern Bering Sea. Deep Sea Research Part II 65, 141-162; doi:10.1016/j.dsr2.2012.02.002.

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