TITLE: **SWL14_Bottle_data_README v2.docx**

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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: DBO data archive link: http://dbo.eol.ucar.edu/

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 2014. 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, chromophoric dissolved organic carbon (CDOM), 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).

Water samples for chromophoric dissolved organic carbon (CDOM) analysis were filtered using pre-rinsed (10% HCl and then Milli-Q (18 Ω) water) 0.2 *μ*m Whatman nuclepore polycarbonate track-etched membranes immediately after sampling. CDOM samples were stored in the dark at 4ºC in acid washed (10% HCl) pre-combusted (450°C for 6 hours) foil-covered Qorpack clear glass bottles and analyzed shipboard within 24 hours. CDOM absorbance was measured using a Shimadzu UV-1800 UV-Visible spectrophotometer at 1 nm intervals between 200 and 800 nm using a 10 cm quartz cuvette. All sample spectra were blank corrected and referenced against Milli-Q water**.** Measurements were made after samples had equilibrated to laboratory temperature in order to minimize temperature effects. CDOM absorbance was treated as zero above 750 nm, and the average absorbance between 750 nm and 800 nm was subtracted from the spectrum to correct for offsets owing to instrument baseline drift, temperature, scattering and refractive effects. CDOM absorption coefficients were calculated from:

$$a(\lambda) = 2.303A(\lambda)/l \quad (1)$$

where ***a*** is the Naperian absorbance coefficient (m^{-1}) at a specific wavelength, λ, in nanometers. *A* is the absorbance at the wavelength, and *l* is the cell path length in meters. The detection limit is approximately ± 0.05 m^{-1}, based upon instrument specifications and characteristics. The spectral slope (*S*, nm^{-1}) of each CDOM absorbance spectrum was calculated using a nonlinear fit of an exponential function,

$$a(\lambda) = a(\lambda_0)e^{-S(\lambda-\lambda_0)} \quad (2)$$

where ***a(λ)*** is the absorption coefficient of CDOM (m^{-1}) at wavelength λ, and λ_0 the reference wavelength (in this case 250 nm). All slopes are reported as positive numbers such that higher (i.e., steeper) slopes indicate a greater decrease in absorption with increasing wavelength.

Data File Structure:
File Names (Formats)*: **SWL14 Bottle data.xls** (*NOTE: the most recent version on EOL website will have updated version number for data file, but readme file stays the same, unless content modified)

Files Data Parameters by Column:

A	Cruise
B	Cast No.=Cast number
C	DBO Line
D	DBO Station Name or Region=DBO Bounding Box (see EOL DBO site for coordinates)
E	Historical Station Name
F	Rosette Bot (Bottle) No (Number)
G	Place holder
H	Cast start time [UTC]
I	LAT N=Latitude in decimal degrees (°N)
J	LON W=Longitude in decimal degrees (°W)
K	Station water column depth (m)
L	Cast Depth [m]
M	Sample # [All others match to this sample number]
N	Bottle integrity [0=good, 1=leak, 2=bad]

O Tripping direction (downcast or upcast) [US (up stop), UN (up no stop), USM (up stop mix) or DN (down no stop)]
P Scan
Q Raw pressure [dbar]
R T0 90C (Temperature sensor 1; °C)
S T1 90C(Temperature sensor 2; °C)
T Conductivity0 mS/cm)
U Conductivity1 (mS/cm)
V CTD Salinity 0
W CTD Salinity 1
X SBEox (mL/L) (Dissolved oxygen by CTD sensor, uncalibrated)
Y SBEox (mL/L) (Dissolved oxygen by CTD sensor, uncalibrated)
Z SBEox % Sat (Oxygen, percent saturation)
AA FLSP
AB Volt O (fluorometer, uncalibrated)
AC Xmiss-Transmissometer
AD Volt 1 (Transmissometer)
AE Alt=Altimeter (meters)
AF PAR=Photosynthetic Active Radiation
AG SPAR
AH Extracted volume [L] for chlorophyll a (chl a)
AI Volume seawater filtered for chl a (0.25 L)
AJ ChlTOT-1 (Total Chl a, µg/L)
AK Chla a (µg/L)-Frey value
AL Phaeophytin (µg/L)
AM CDOM a250 (m^{-1})
AN CDOM a254 (m^{-1})
AO CDOM a350 (m^{-1})
AP CDOM a365 (m^{-1})
AQ CDOM a375 (m^{-1})
AR CDOM a412 (m^{-1})
AS CDOM a440 (m^{-1})
AT CDOM a250:a365 (m^{-1})
AU CDOM S290-350 (nm^{-1})
AV CDOM S275–295 (nm^{-1})
AW CDOM S350–400 (nm^{-1})
AX CDOM S275–295:S350–400 (nm^{-1})
AY SPM (Suspended Particulate Matter; g/L)
AZ Nitrite+Nitrate [mmol/m3]
BA Silicate [mmol/m3]
BB Phosphate [mmol/m3]
BC Ammonium [mmol/m3] Analyzed at the University of Maryland Center for Environmental Science
BG O18 [‰ VSMOW]

Data Version Number and Date: Version 2, 07/08/2015

REFERENCES

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