The Distributed Biological Observatory: Progress in Developing Data Sharing Mechanisms

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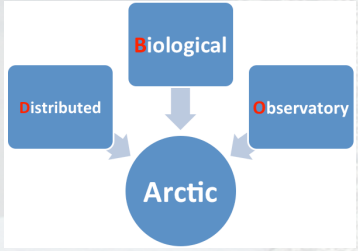
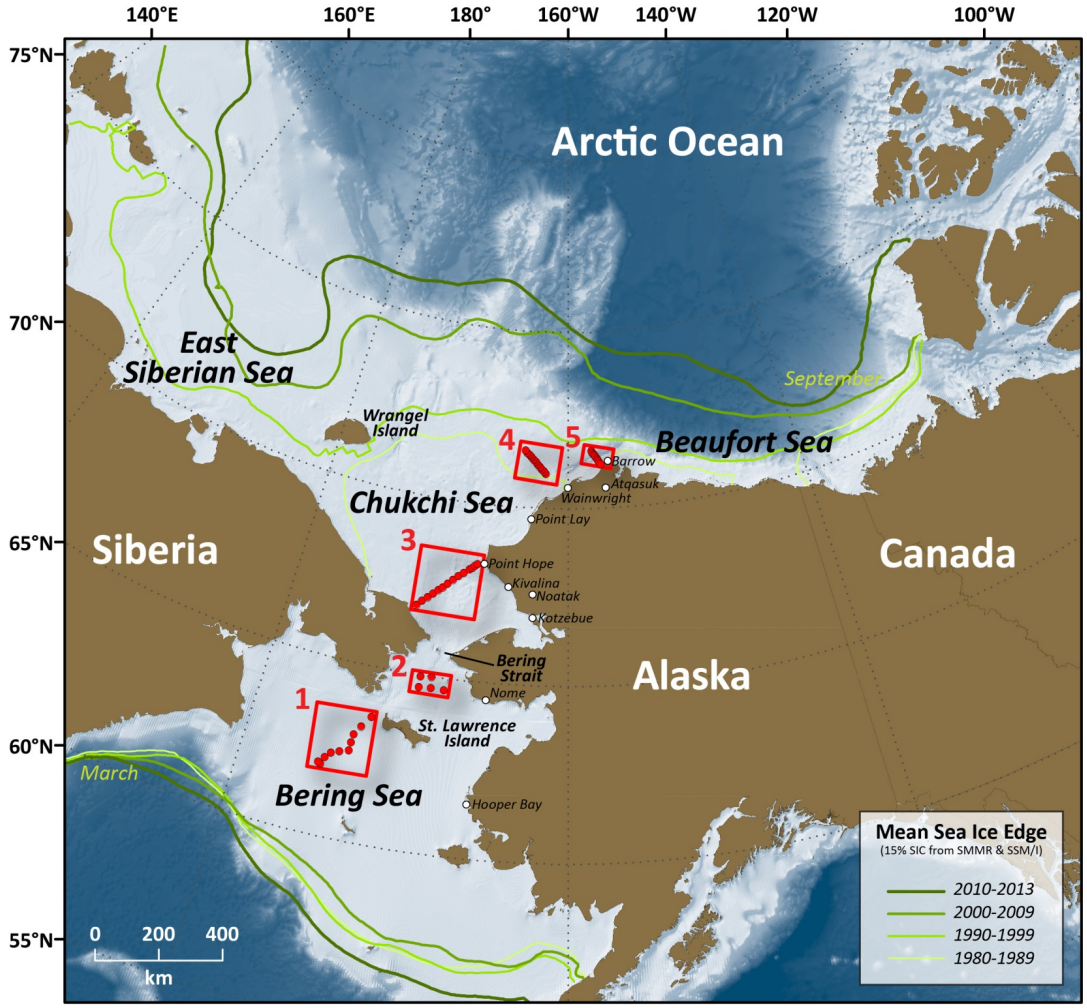
November 18, 2015

Arctic Observing Open Science Meeting
Seattle

http://dbo.eol.ucar.edu/
http://arctic.cbl.umces.edu
http://www.arctic.noaa.gov/dbo/



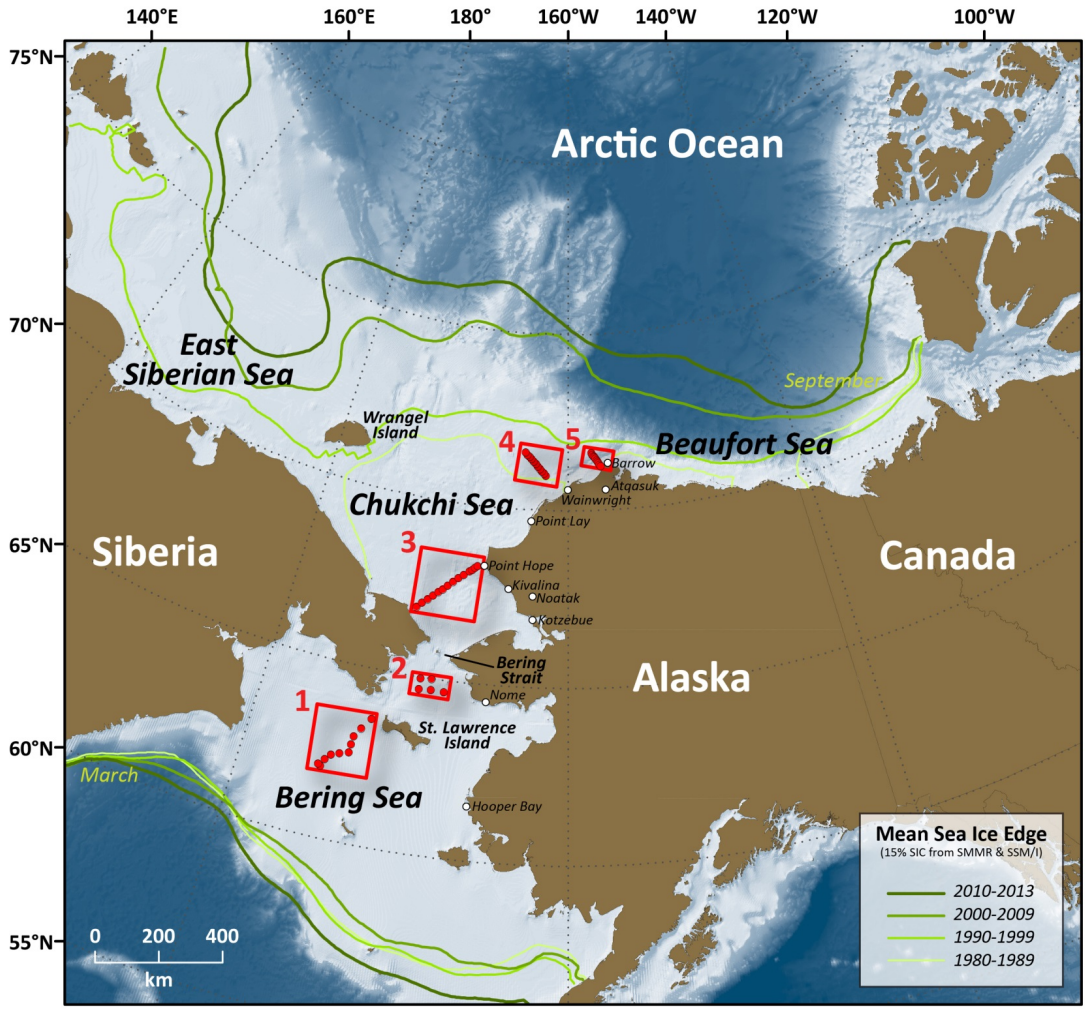
Linking Physics to Biology: the Distributed Biological Observatory (DBO)



- DBO sites (red boxes) are regional "hotspot" transect lines and stations located along a latitudinal gradient
- DBO sites exhibit high productivity, biodiversity, and/or overall rates of change
- DBO sites serve as a change detection array for consistent monitoring of biophysical responses
- Sites occupied by national and international entities with shared data plan

[modified by Karen Frey from Grebmeier et al. 2010, EOS 91]

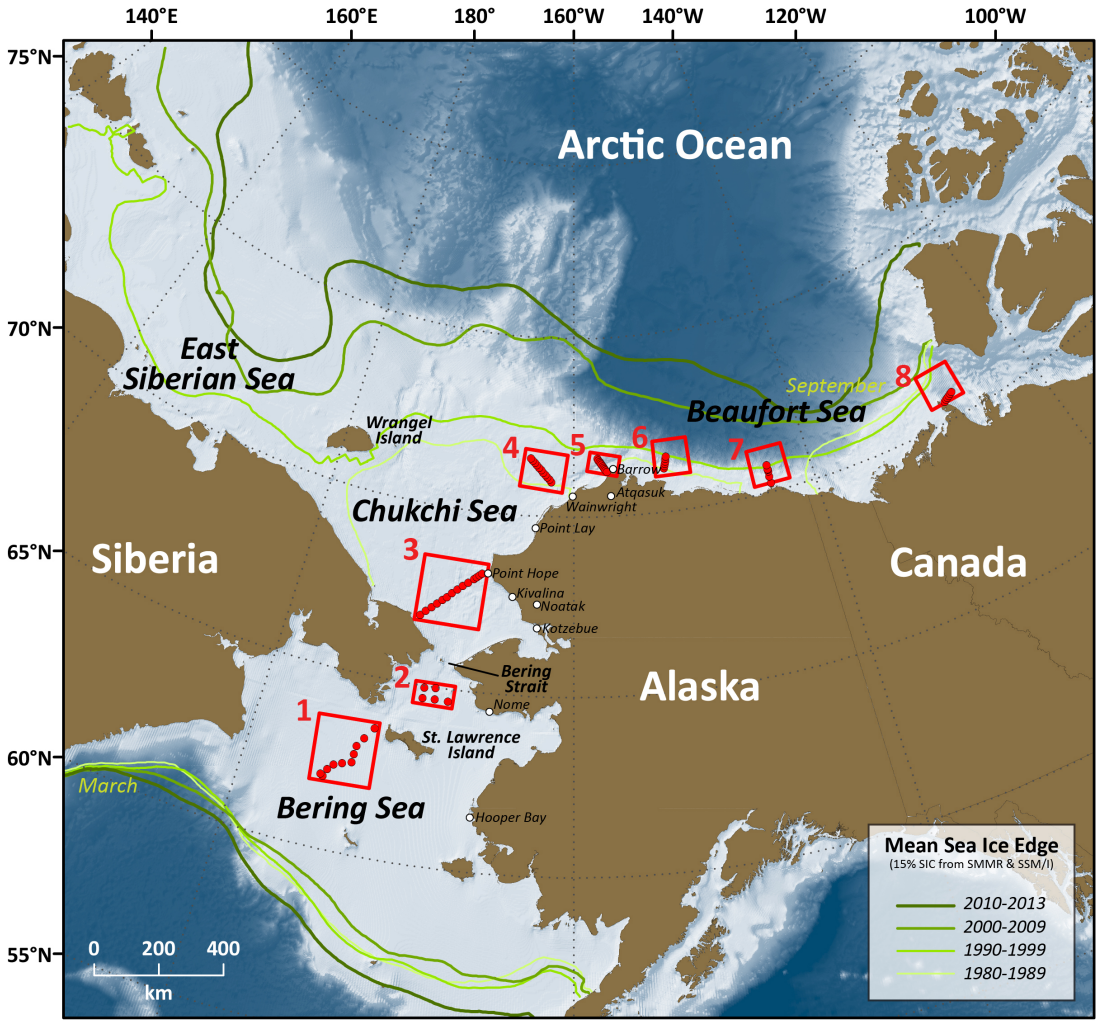
Implementation of the Distributed Biological Observatory (DBO)



[modified by Karen Frey from Grebmeier et al. 2010, EOS 91]

- Data Sharing Site Established and Supported Through NSF at Earth Observations Laboratory, UCAR: dbo.eol.ucar.edu
- Data Policy Protocol Approved by International Partners. 2015 http://dbo.eol.ucar.edu/data_policy-dbo.html
- Collaboration Team chaired by Jackie Grebmeier and Sue Moore through US IARPC meets monthly and coordinates US agency efforts. http://www.iarpccollaborations.org/teams/Distributed-Biological-Observatory

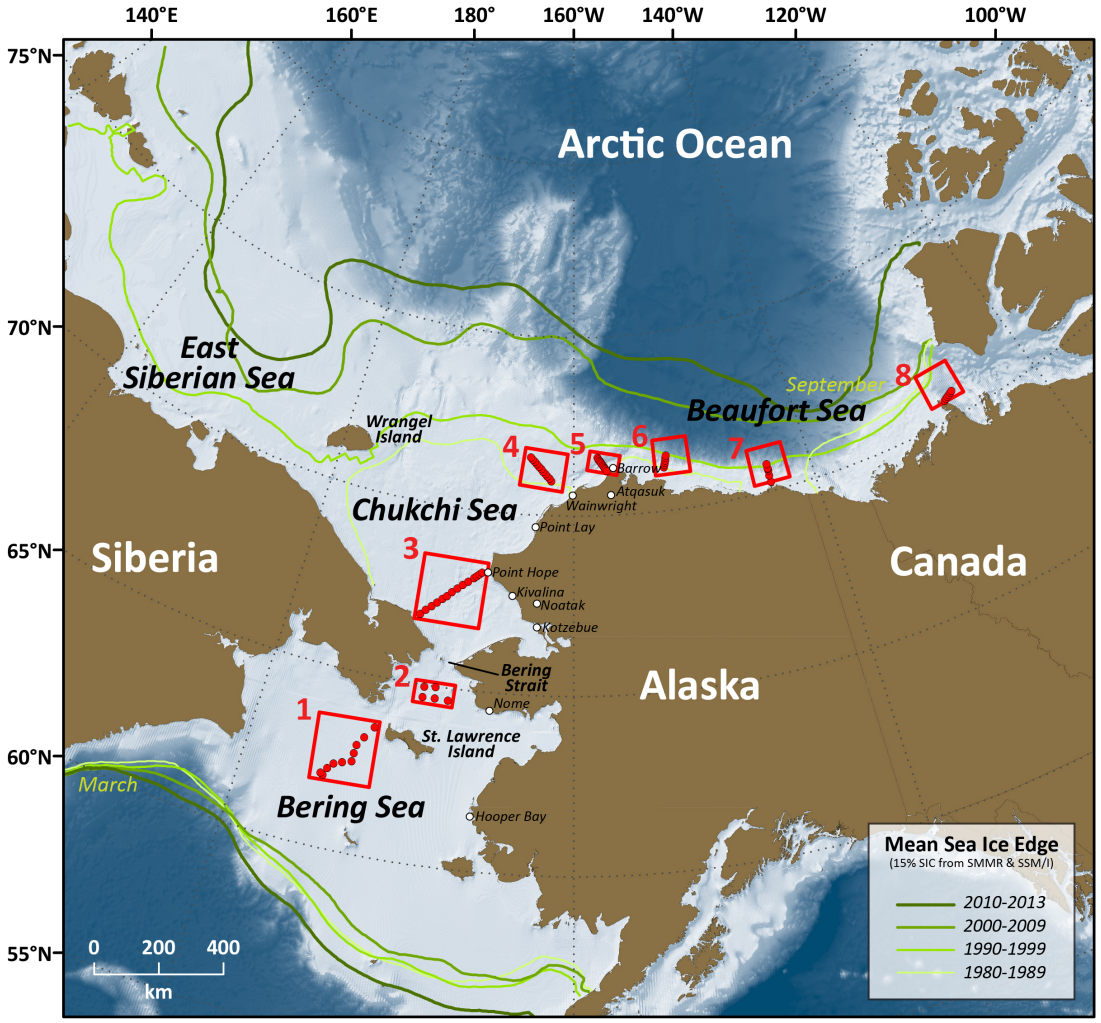
Implementation of the Distributed Biological Observatory (continued)



[modified by Karen Frey from Grebmeier et al. 2010, EOS 91]

- Pacific Marine Arctic Regional Synthesis (PacMARS) project (Shell and ConocoPhillips funding via NPRB funding) facilitated public sharing of annual Sir Wilfrid Laurier cruise data from 2000-present. Posted at EOL site
- Annual data meeting (in Incheon, Korea in 2015; in Seattle USA in 2016) sponsored by Pacific Arctic Group to share past and upcoming data collections and to coordinate
- Expansion of observation efforts to Beaufort Sea, 2015

Implementation of the Distributed Biological Observatory (continued)



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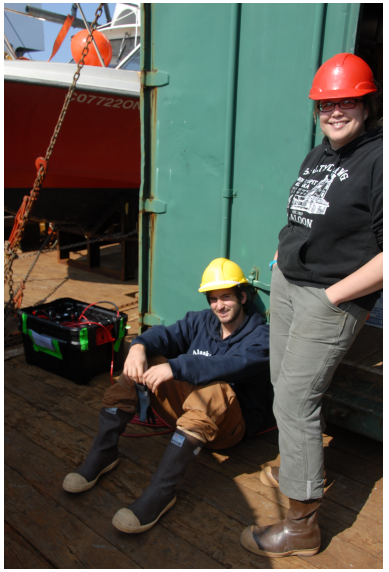
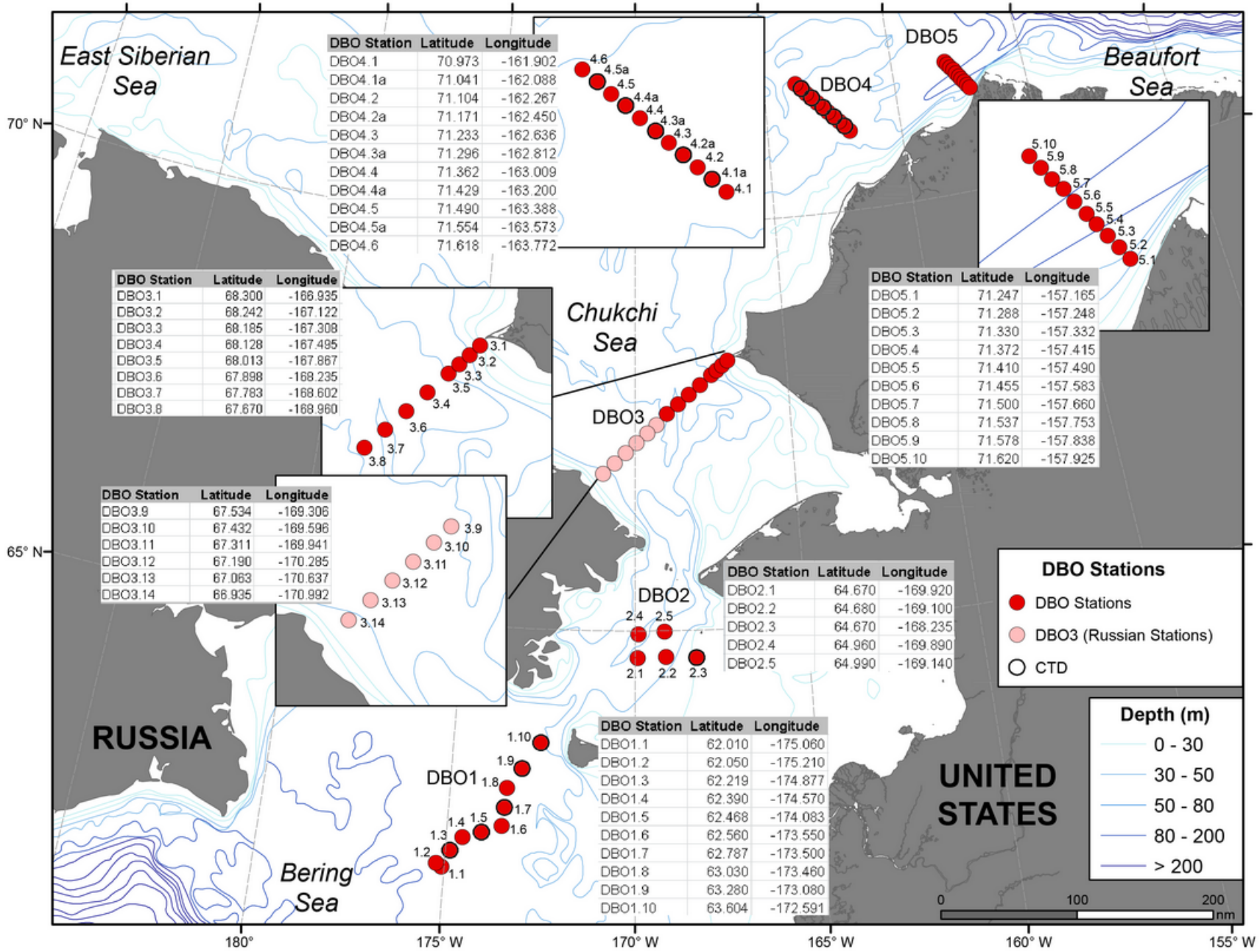
Potential for European and further Canadian expansion

US DBO Implementation Plan underway through IARPC Collaboration Team---will commit US agencies to specific efforts and milestones



Core DBO stations occupied by Sir Wilfrid Lauier each July 1998-2017 (current funding end)



DBO Station	Latitude	Longitude
DBO4.1	70.973	-161.902
DBO4.1a	71.041	-162.088
DBO4.2	71.104	-162.267
DBO4.2a	71.171	-162.450
DBO4.3	71.233	-162.636
DBO4.3a	71.296	-162.812
DBO4.4	71.362	-163.009
DBO4.4a	71.429	-163.200
DBO4.5	71.490	-163.388
DBO4.5a	71.554	-163.573
DBO4.6	71.618	-163.772

DBO Station	Latitude	Longitude
DBO3.1	68.300	-166.935
DBO3.2	68.242	-167.122
DBO3.3	68.185	-167.308
DBO3.4	68.128	-167.495
DBO3.5	68.013	-167.867
DBO3.6	67.898	-168.235
DBO3.7	67.783	-168.602
DBO3.8	67.670	-168.960

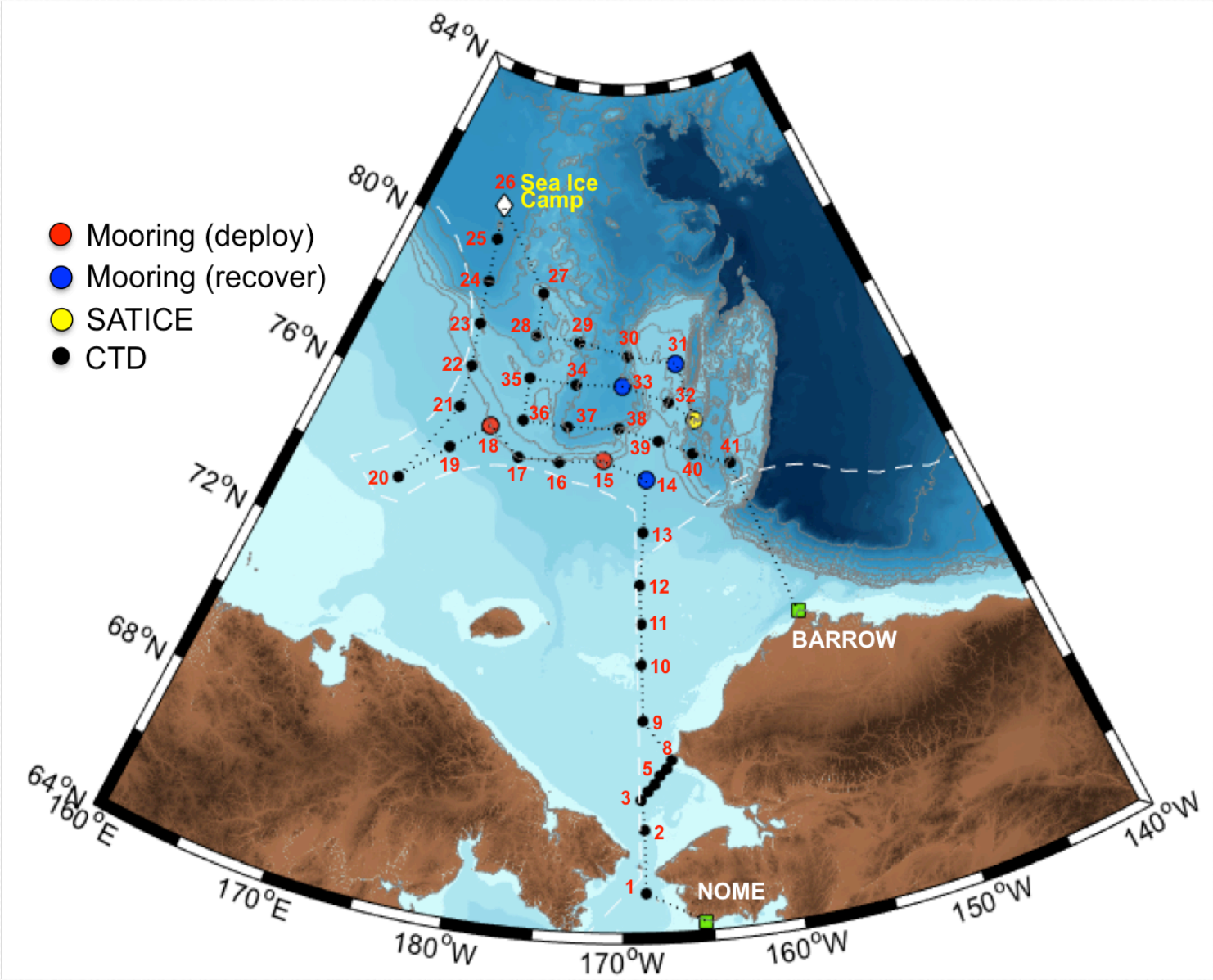
DBO Station	Latitude	Longitude
DBO3.9	67.534	-169.306
DBO3.10	67.432	-169.596
DBO3.11	67.311	-169.941
DBO3.12	67.190	-170.285
DBO3.13	67.063	-170.637
DBO3.14	66.935	-170.992

DBO Station	Latitude	Longitude
DBO5.1	71.247	-157.165
DBO5.2	71.288	-157.248
DBO5.3	71.330	-157.332
DBO5.4	71.372	-157.415
DBO5.5	71.410	-157.490
DBO5.6	71.455	-157.583
DBO5.7	71.500	-157.660
DBO5.8	71.537	-157.753
DBO5.9	71.578	-157.838
DBO5.10	71.620	-157.925

DBO Station	Latitude	Longitude
DBO2.1	64.670	-169.920
DBO2.2	64.680	-169.100
DBO2.3	64.670	-168.235
DBO2.4	64.960	-169.890
DBO2.5	64.990	-169.140

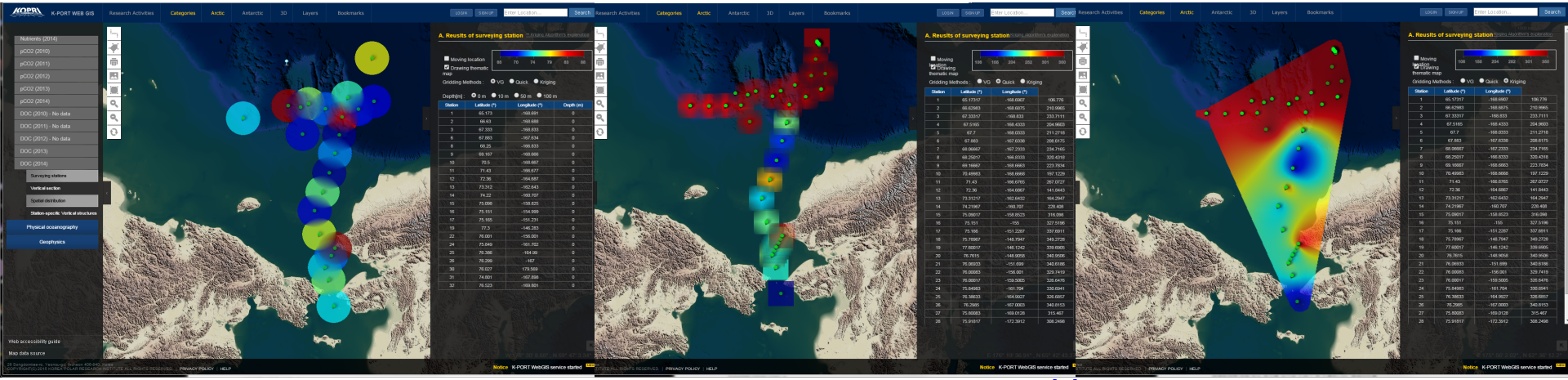
DBO Station	Latitude	Longitude
DBO1.1	62.010	-175.060
DBO1.2	62.050	-175.210
DBO1.3	62.219	-174.877
DBO1.4	62.390	-174.570
DBO1.5	62.468	-174.083
DBO1.6	62.560	-173.550
DBO1.7	62.787	-173.500
DBO1.8	63.030	-173.460
DBO1.9	63.280	-173.080
DBO1.10	63.604	-172.591

Korean Study Area, 2015



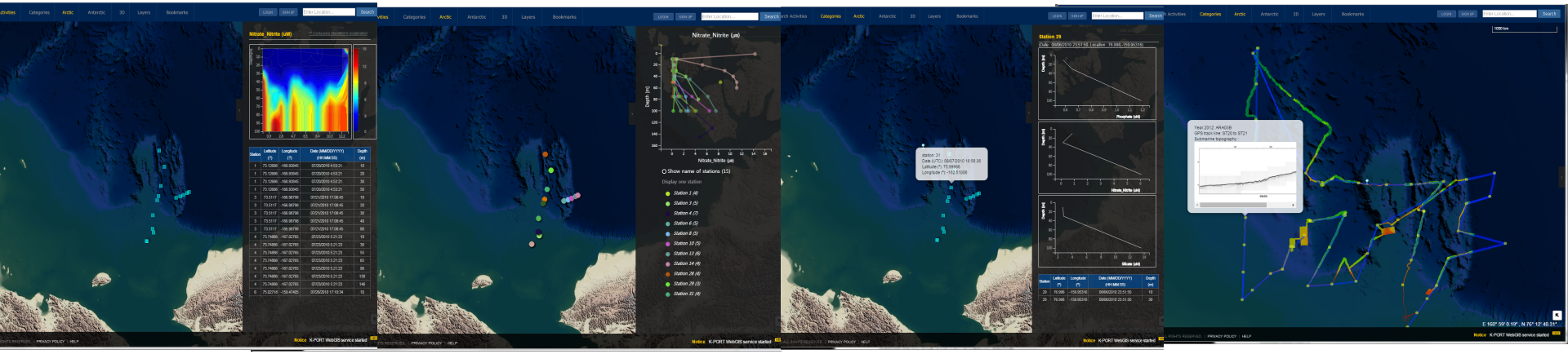
K-PORT (Korea-Polar Ocean in Rapid Transition) Web GIS

Junhwa Chi, Department of Remote Sensing, Korean Polar Research Institute



Chlorophyll, Temperature, Salinity, Geophysics, etc

http://kport.kopri.re.kr



Distributed Biological Observatory Standardized Sampling Protocols

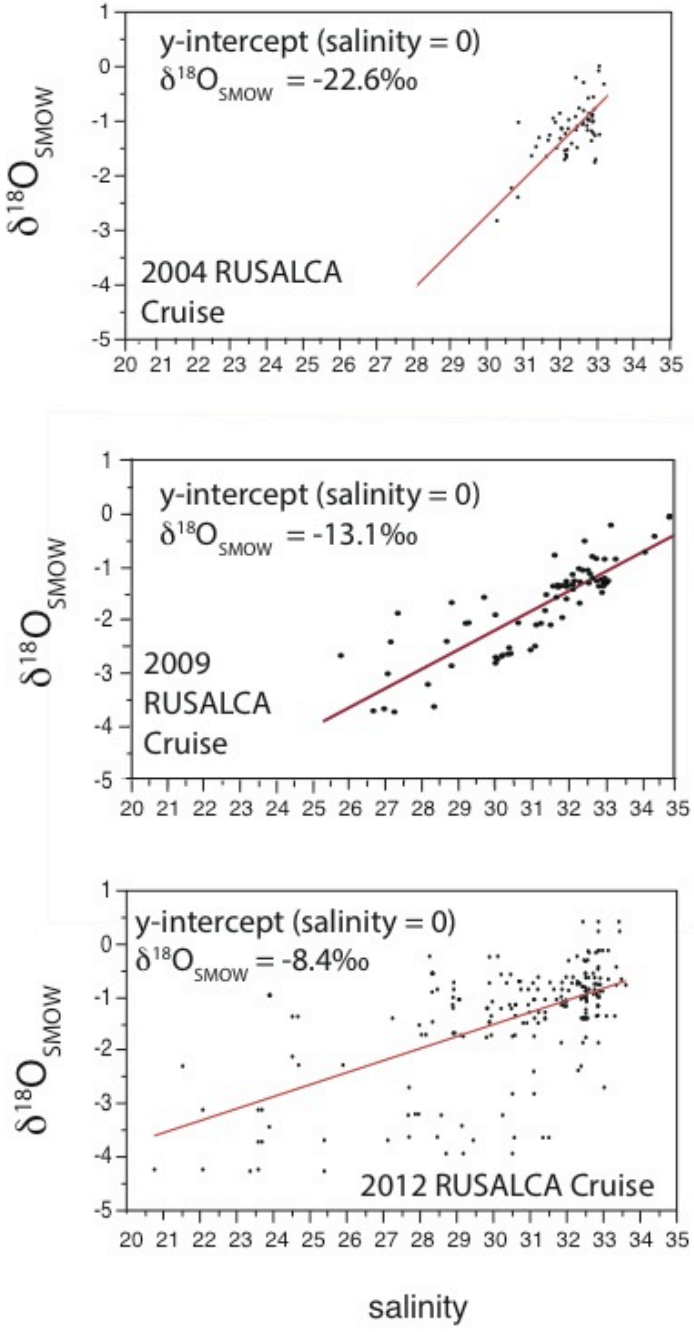
Core ship-based sampling:

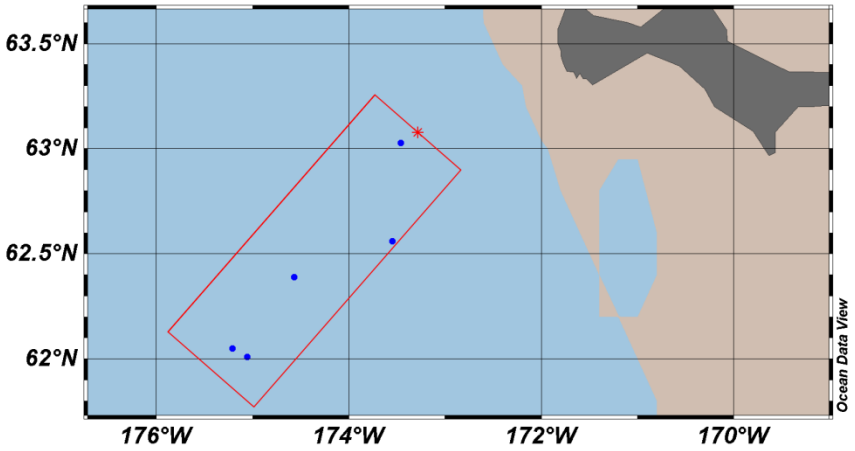
- CTD and ADCP
- Chlorophyll
- Nutrients
- Ice algae/Phytoplankton (size, biomass and composition)
- Zooplankton (size, biomass and composition)
- Benthos (size, biomass and composition)
- Seabird surveys (standard transects)
- Marine mammal surveys (standard transects)

Second tier ship-based sampling:

- Fishery acoustics (less effort than standardized bottom trawling)
- Bottom trawling (every 3-5 years)

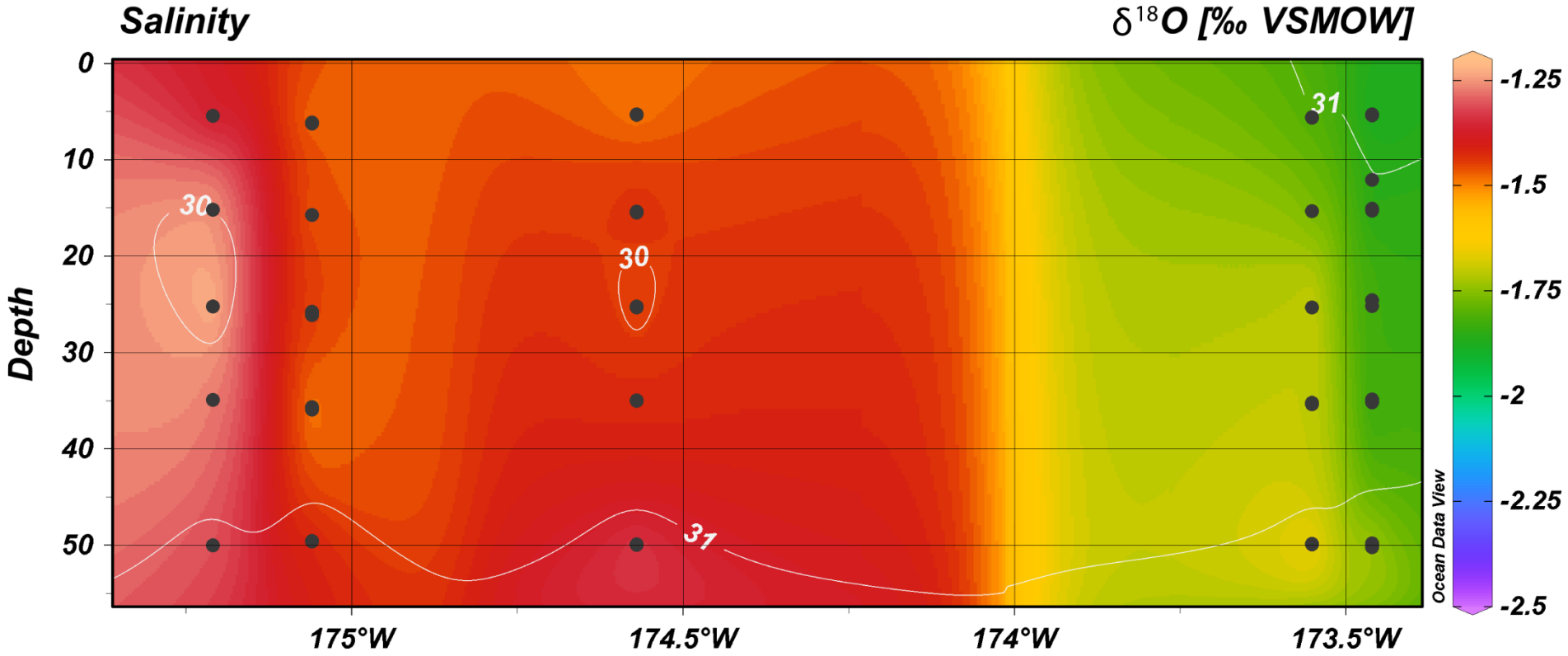
DBO sampling by national & international science programs

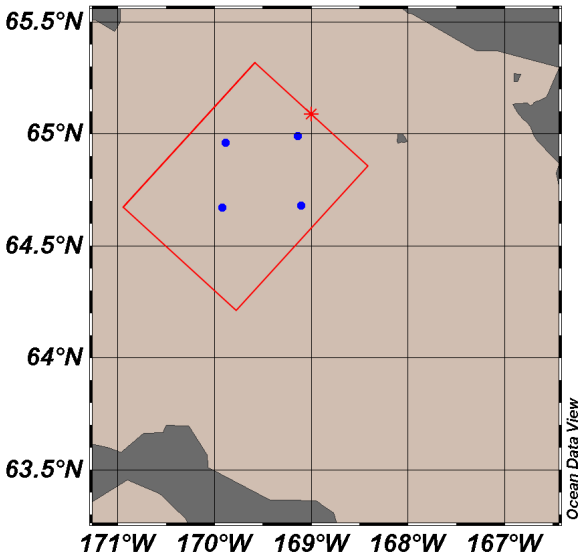

y-intercept (salinity = 0)
δ18OSMOW = -22.6‰
2004 RUSALCA Cruise
y-intercept (salinity = 0)
δ18OSMOW = -13.1‰
2009 RUSALCA Cruise
y-intercept (salinity = 0)
δ18OSMOW = -8.4‰
2012 RUSALCA Cruise
δ18OSMOW
salinity



SWL15 DBO 1

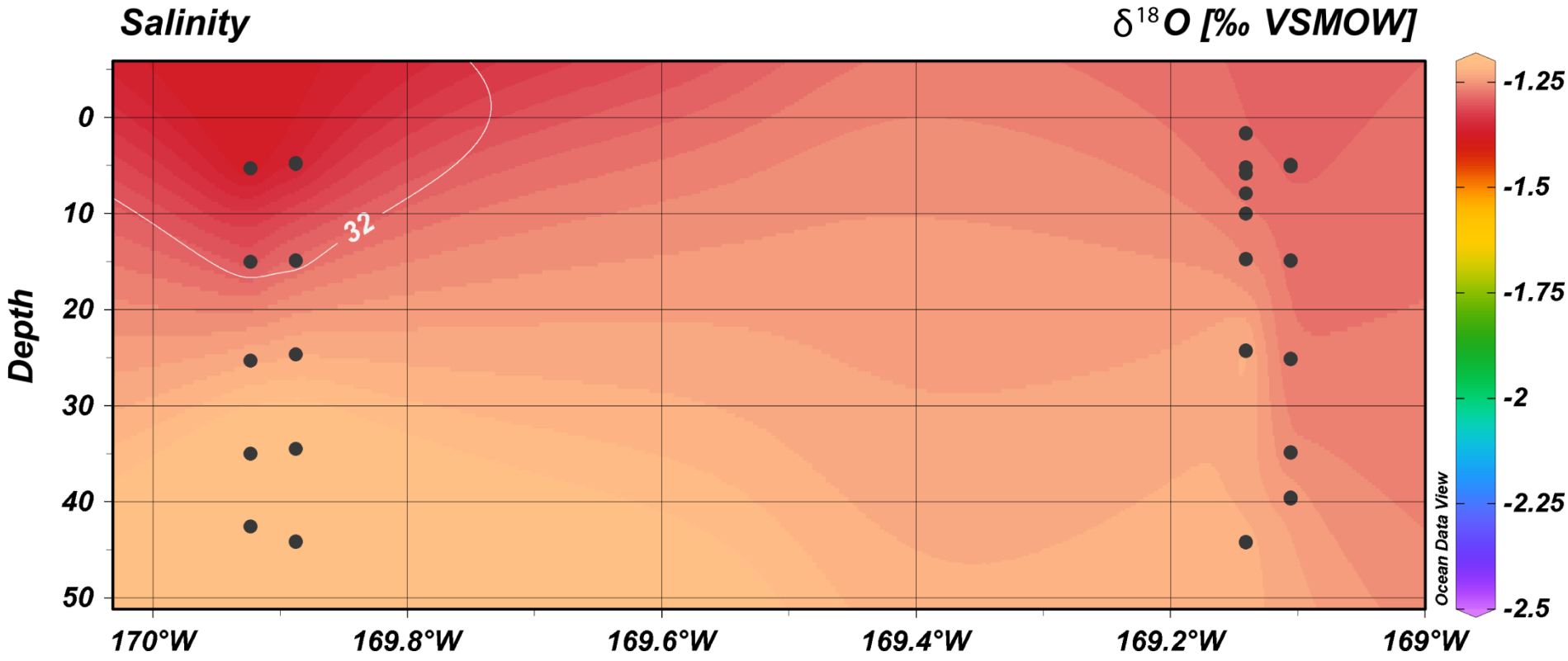
Interpretation: No sea ice melt, water mass gradient only between Anadyr and Bering Shelf Water

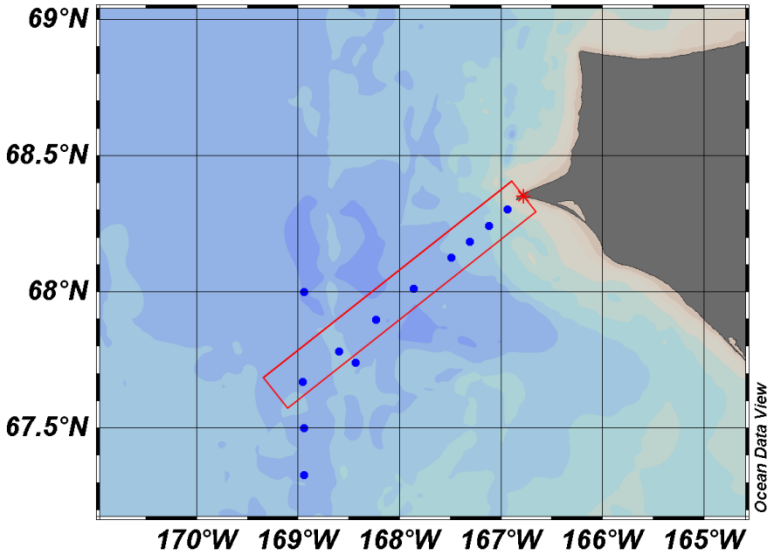




SWL15 DBO 2

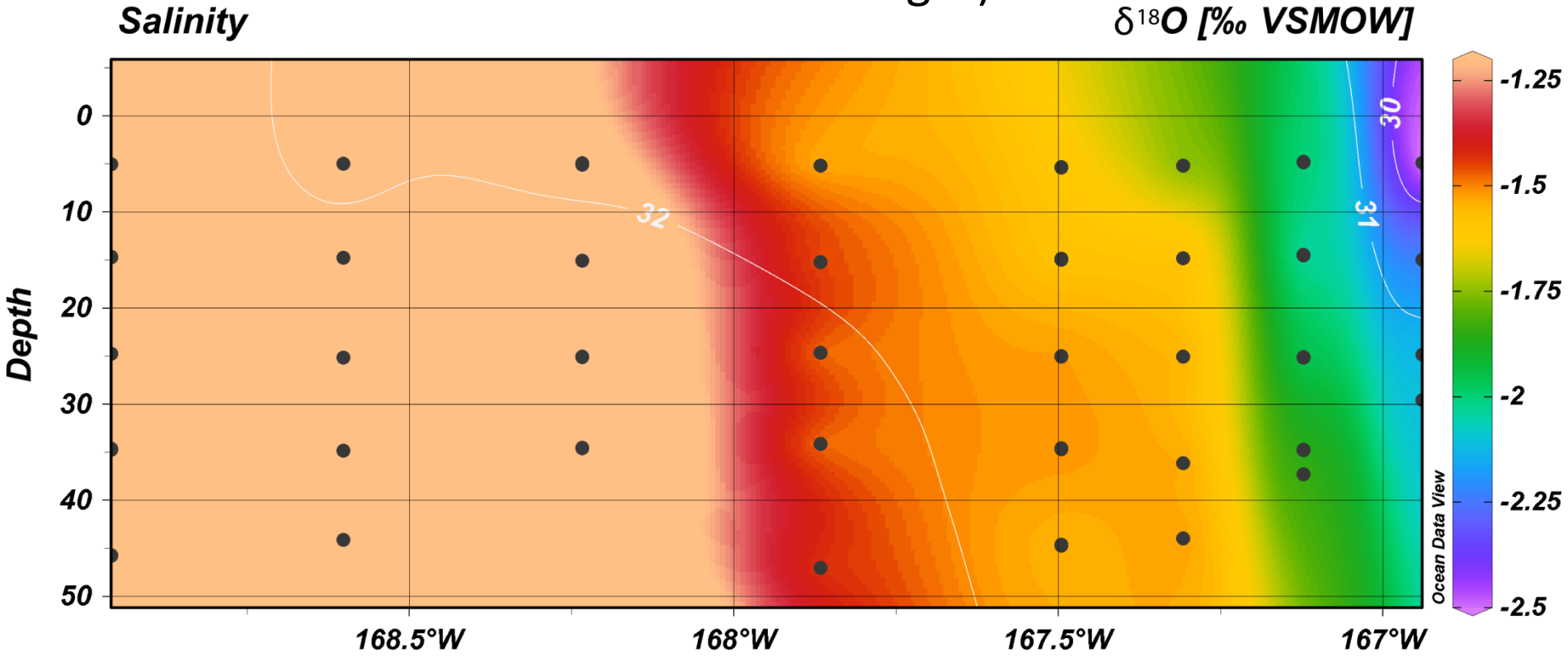
Interpretation: Anadyr Water Influence

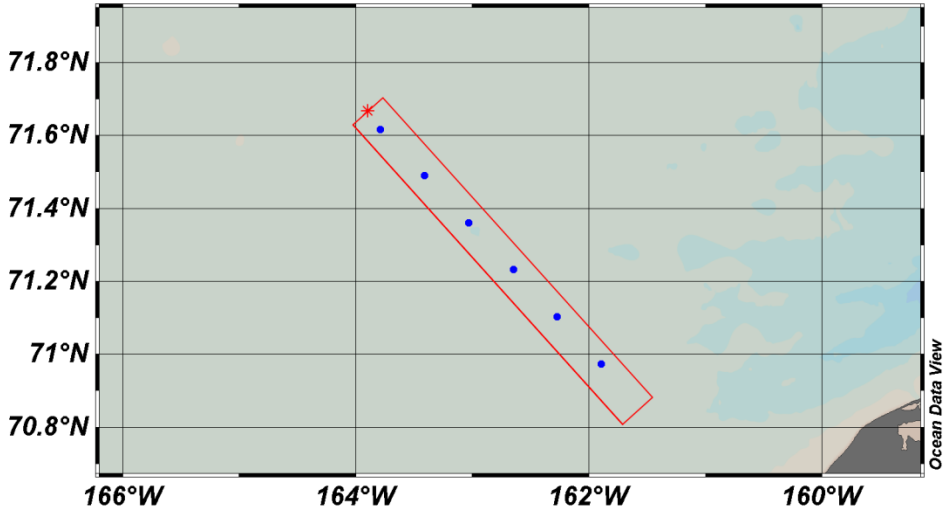




SWL15 DBO 3

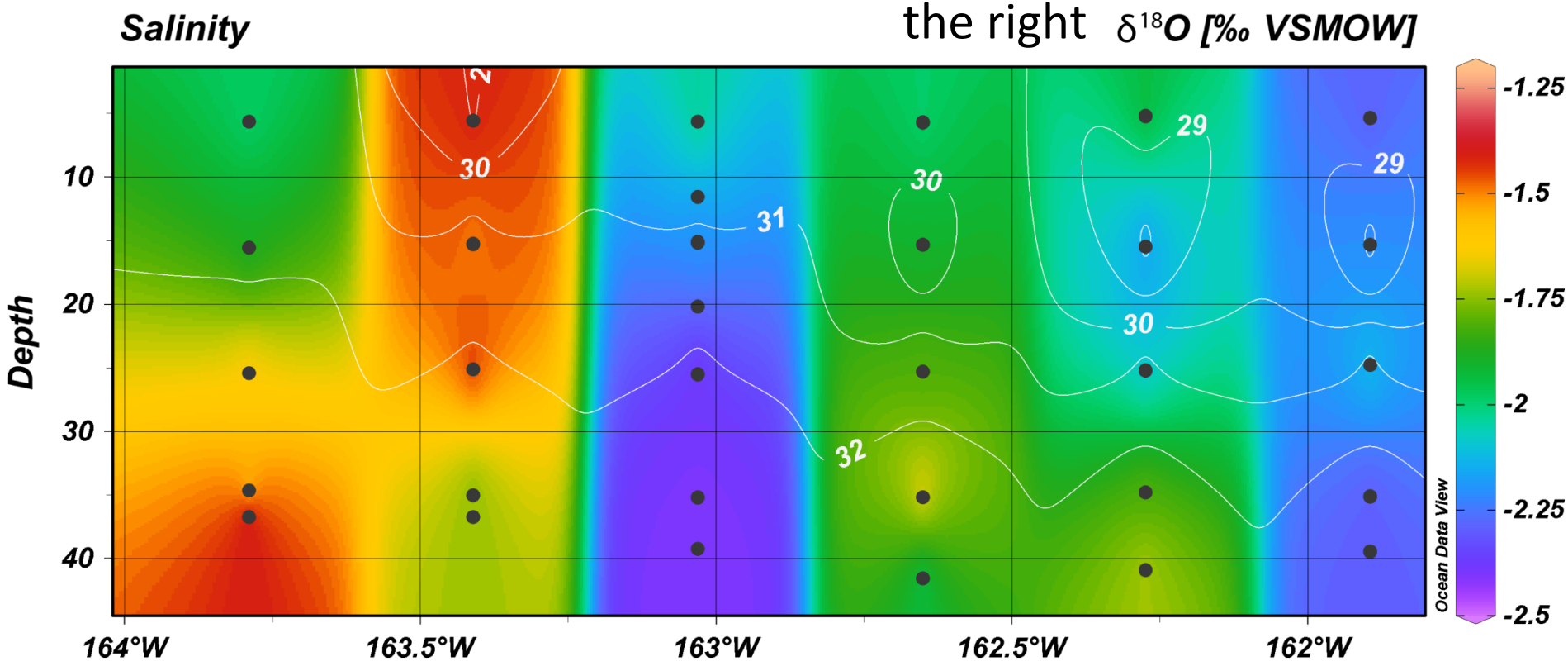
Interpretation: No sea ice melt, water mass gradient. Anadyr to Bering Shelf Water to Alaska Coastal Water (left to right)

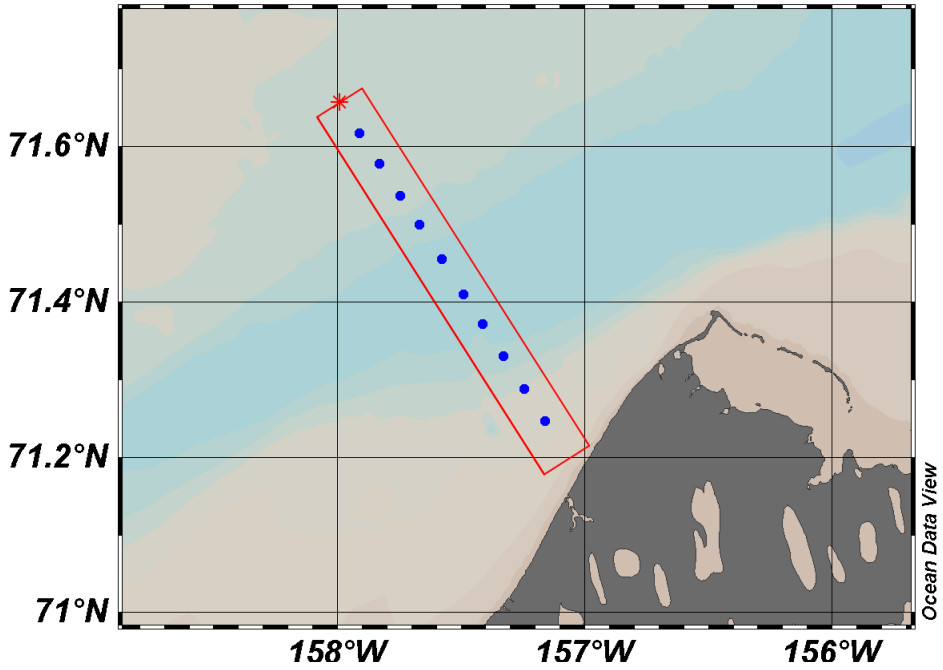




SWL15 DBO 4

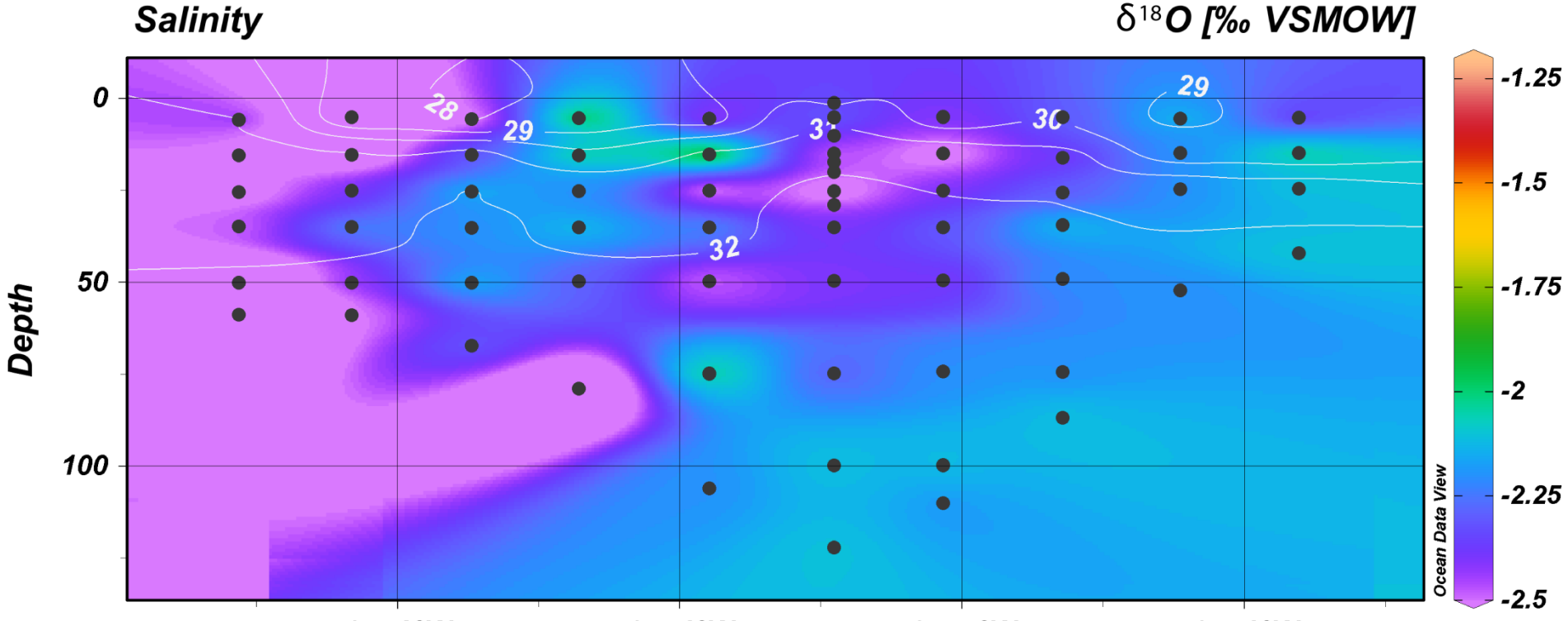
Interpretation: Sea ice melt present (particularly orange colors at surface), Alaska Coastal Water to the right





SWL15 DBO 5

Interpretation: Sea ice melt present mid transect (greenish colors at surface)



Instructions for filling out the online form to inventory the Parameters for DBO Stations and Bounding Boxes

Principal Investigators of the DBO and Pacific Arctic Group (PAG) will need to submit parameter information for data collected in the DBO regions using the form below. Click here for the Mobile version.

This form has multiple pages including various data modes of collection:

1. Transects
2. Upper Trophic Data
3. Satellite
4. Mooring

Only one mode of collection can be submitted at a time. When you have completed the form for a mode of collection, click the Submit button. The information you provide will go into a DBO archive database, and a copy of your submission will be sent to the email address that was provided on the first page. Be sure to return to https://www.eol.ucar.edu/field_projects/dbo to submit the parameters for any other mode of collection.

If unable to complete this form, you may save it and return later to finish. When saving, you will be provided with a unique link to your partially completed form.

We are working to have a usable copy of the product from this form available for download, and an annual summary matrix of DBO data collections by year available on this website.

3rd DBO DATA WORKSHOP BRIEF AGENDA

March 8-10, 2016

PMEL/NOAA, Seattle, Washington, USA

Workshop Overview:

1. Present results from the 2010-2015 DBO field program, in context if developing DBO DSR special issue to showcase results of the DBO international effort

2. Evaluation of DBO data submission effort through the EOL open data site

3. Evaluate results from new DBO transect lines in the Beaufort Sea, planned western Chukchi Sea, and developing northern Barents Sea, and

4. Identify future efforts

DBO Achievements and Challenges

The DBO is providing a value-added approach to ecosystem science

The DBO allows observations of seasonality on a scale that is not possible with individual studies

Modular and flexible as shipboard sampling opportunities are available

- Data sharing agreements moving forward; still some uncertainties, e.g. ArcticNet work in September 2014 (CCGS Amundsen): ArcticNet has 3 year data embargo policy
- Coast Guard may be requiring veseels to join Alaska Maritime Prevention and Response Network (http://www.ak-mprn.org/)

  Vessels in network shall: "sail on a route that ensures a distance of minimum of 12 miles offshore is maintained with exception of the Bering Strait, where a distance of 3 miles offshore shall be maintained."

  Potentially serious impacts: DBO3 and DBO5