

Update on Pacific Arctic Group (PAG) activities

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FARO Meeting-ASSW 2015
April 25, 2015
Toyama, Japan



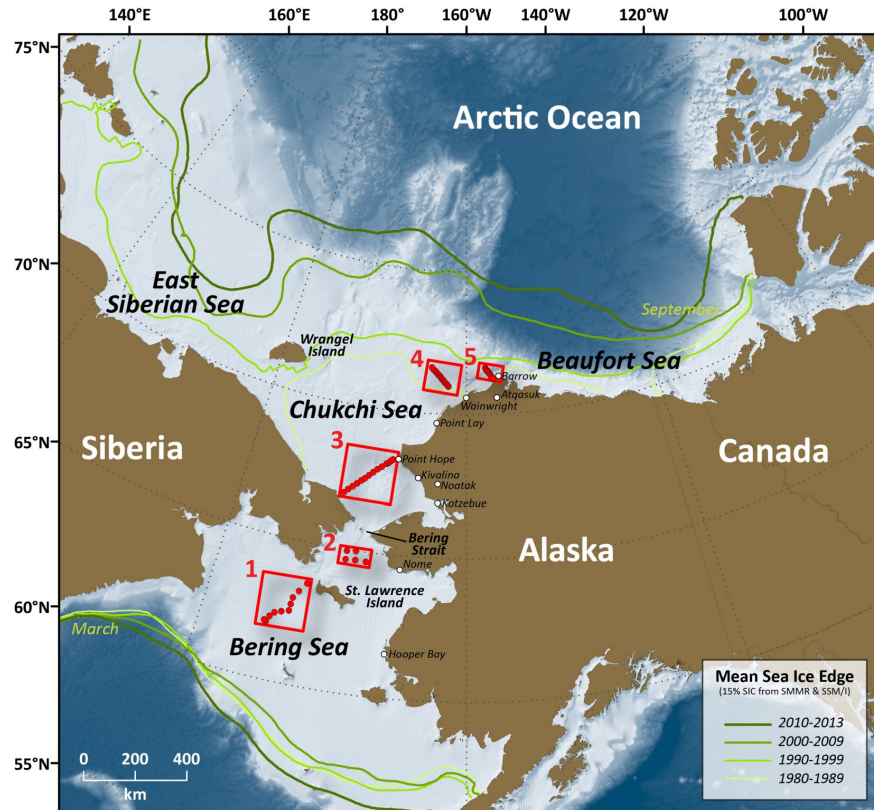
<http://pag.arcticportal.org/>

Pacific Arctic Group

- The Pacific Arctic Group (PAG) is an informal group of organizations and individuals having **a Pacific perspective on Arctic science**. Originally organized under the International Arctic Science Committee (IASC), the PAG is now an **independent affiliate of the IASC** and has as its mission **to serve as a Pacific Arctic regional partnership to plan, coordinate and collaborate** on science activities of mutual interest. The PAG has established five objectives:
- To identify gaps in knowledge and priority research needs across the Pacific Arctic Region and seek means to implement programs and activities that address them.
- **To facilitate and coordinate science operations among PAG member countries.**
- To promote and facilitate data accessibility and integrated data bases for the region.
- To serve as a forum for information exchange on Pacific Arctic Region (PAR) science programs.
- To establish and maintain a direct link between PAG and other relevant science organizations.



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



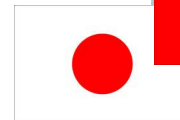
- DBO sites serve as a change detection array for consistent monitoring of biophysical responses



- Pacific Arctic Group
- IASC Marine Working Group
- Arctic Icebreaker Coordinating Committee



- Viktor Buynitsky & Professor Khromov
- RUSALCA
- NOAA-RAS Agreement



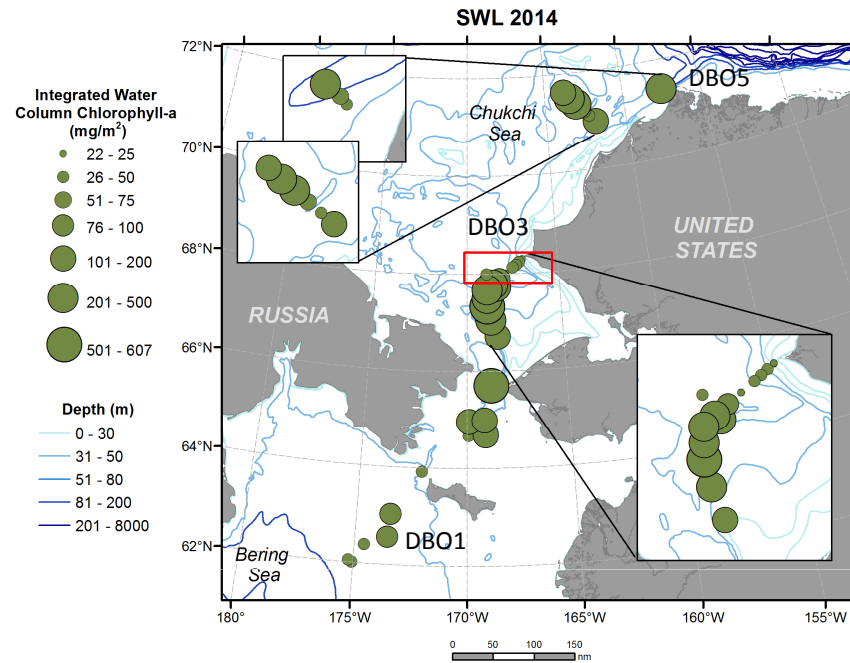
- Sir Wilfrid Laurier
- Collaborative Agreement UMCES & DFO



Abbreviations: IASC, International Arctic Science Committee; RUSALCA, Russian-American Long-term Census of the Arctic; RAS, Russian Academy of Sciences; UMCES, University of Maryland Center for Environmental Science; DFO, Fisheries and Oceans Canada



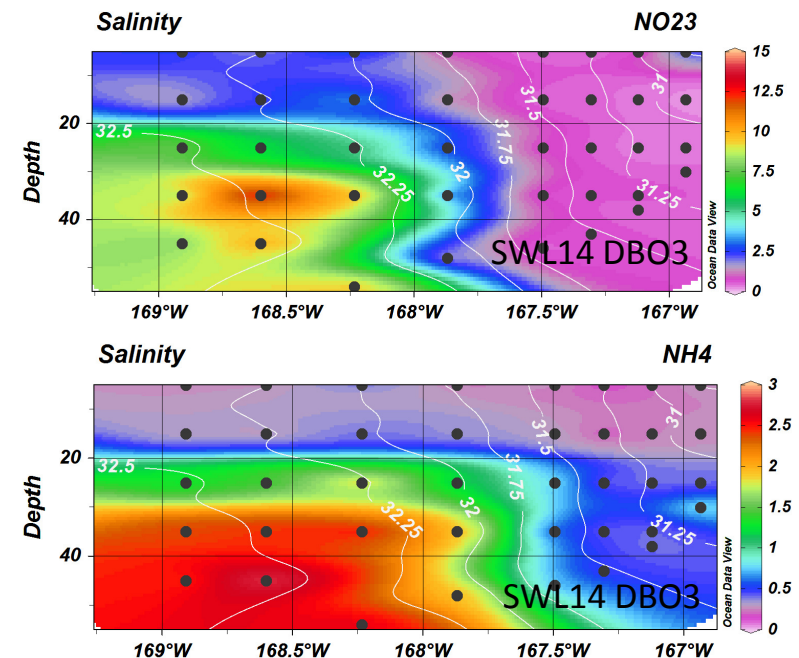
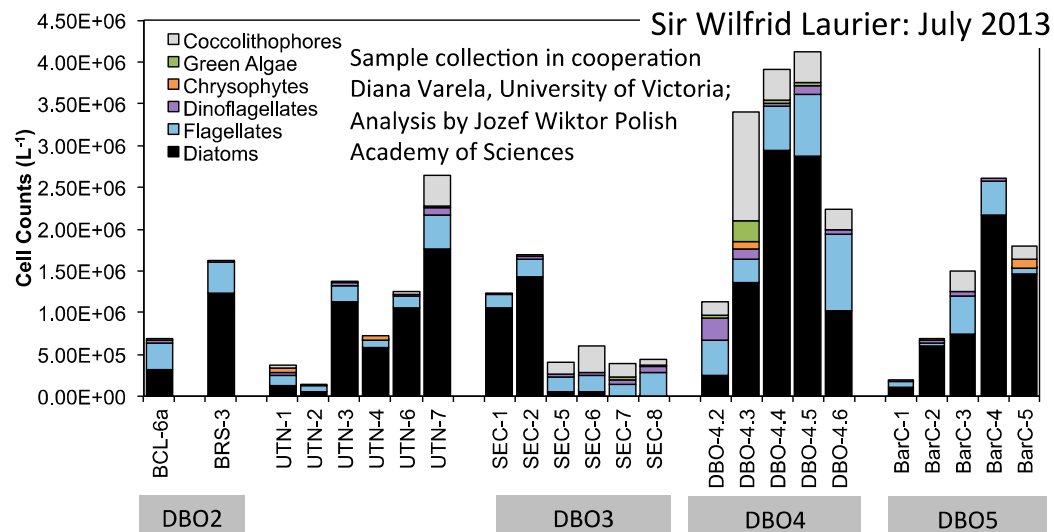
Examples of DBO Data Products



Top Left: Integrated Chlorophyll *a* during annual DBO cruise

Bottom left: Phytoplankton taxonomy, with dominance by diatoms in western side maintained by nutrient rich Anadyr and Bering Shelf waters

Bottom right: nitrate/nitrite (top panel) and ammonium (bottom panel) (μM)



CCGS Sir Wilfrid Laurier

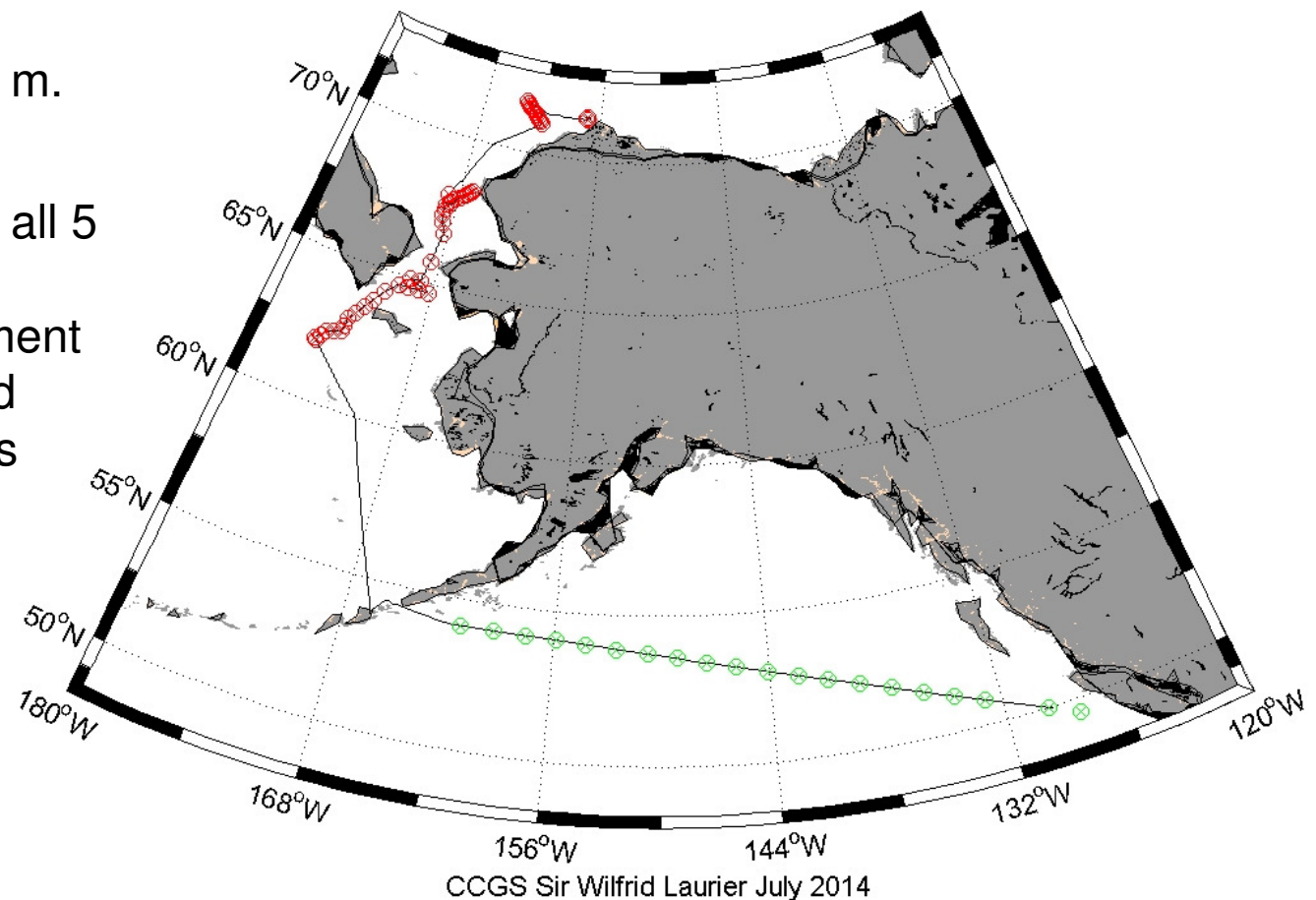
04 - 24 July 2015: Victoria BC to Barrow AK

Chief Scientist: Svein Vagle

Collaborations: C3O-DFO - DBO (Jackie Grebmeier)

Green stations are underway UCTD to 400 m.

Red stations are DBO sampling stations along all 5 DBO lines (CTD/ADCP, water column and sediment parameters, seabird and marine mammal surveys)

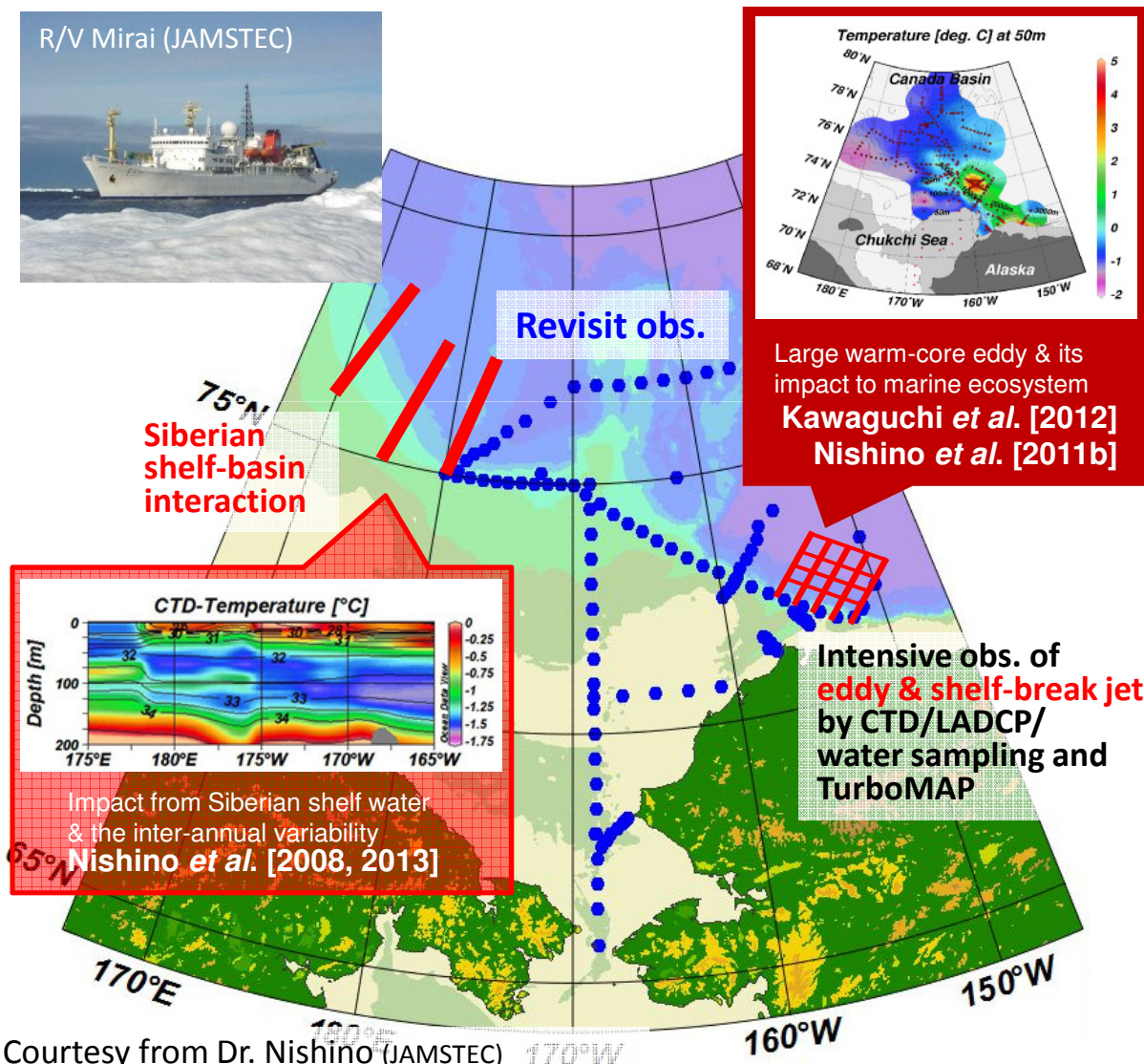


Japanese research vessel cruise in 2015

R/V Mirai Arctic cruise in September-October 2015

“Observational Studies on the Arctic Ocean Climate and Ecosystem Variability”

PI: Dr. S. Nishino (JAMSTEC)



[Tentative cruise plan]

August 25: Hachinohe (JAPAN)

September 4: Bering Str.

**Observations
in the Arctic Ocean**

October 3: Bering Str.

October 6: Dutch Harbor (in)

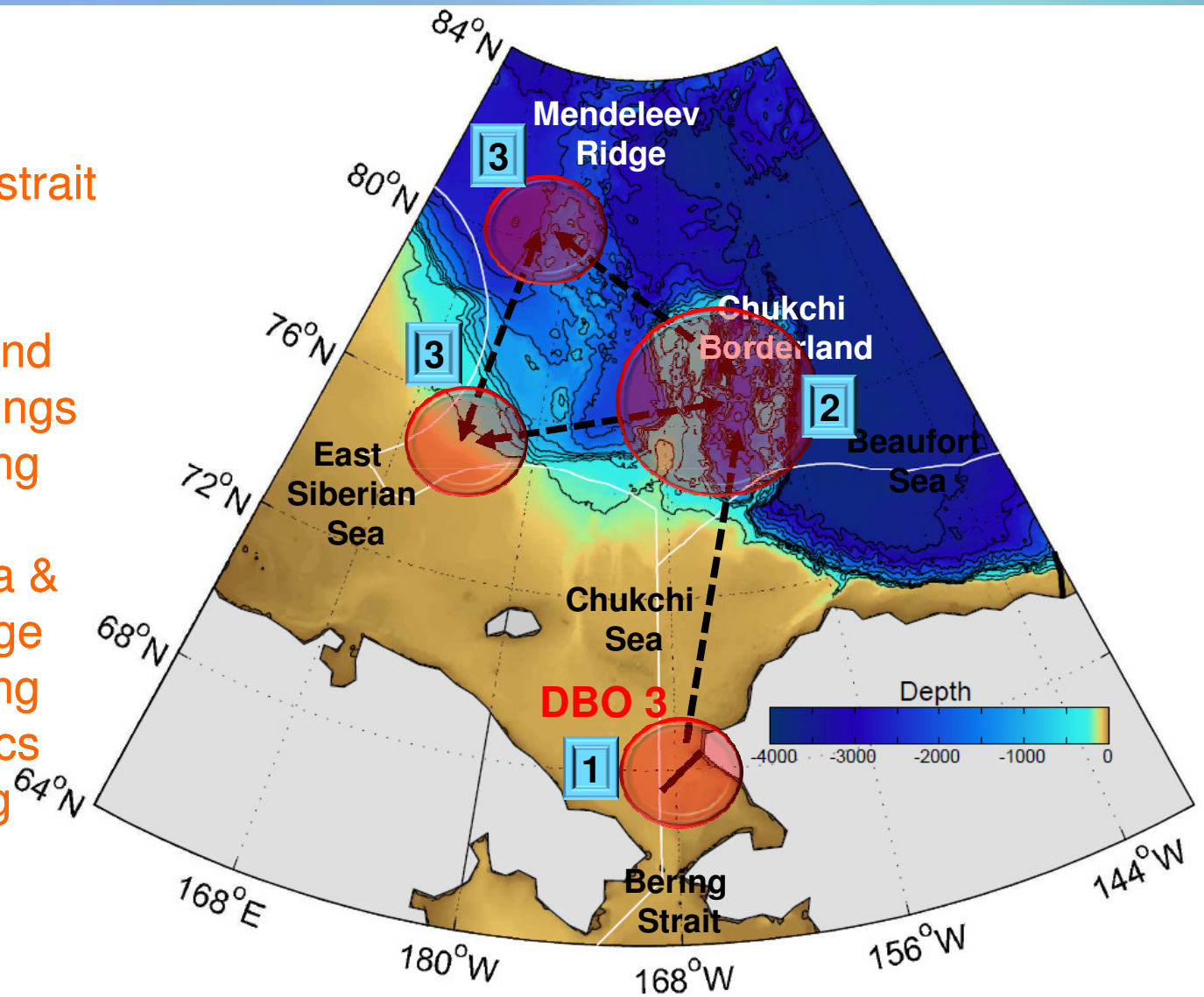
October 9: Dutch Harbor (out)

October 21: Hachinohe (JAPAN)

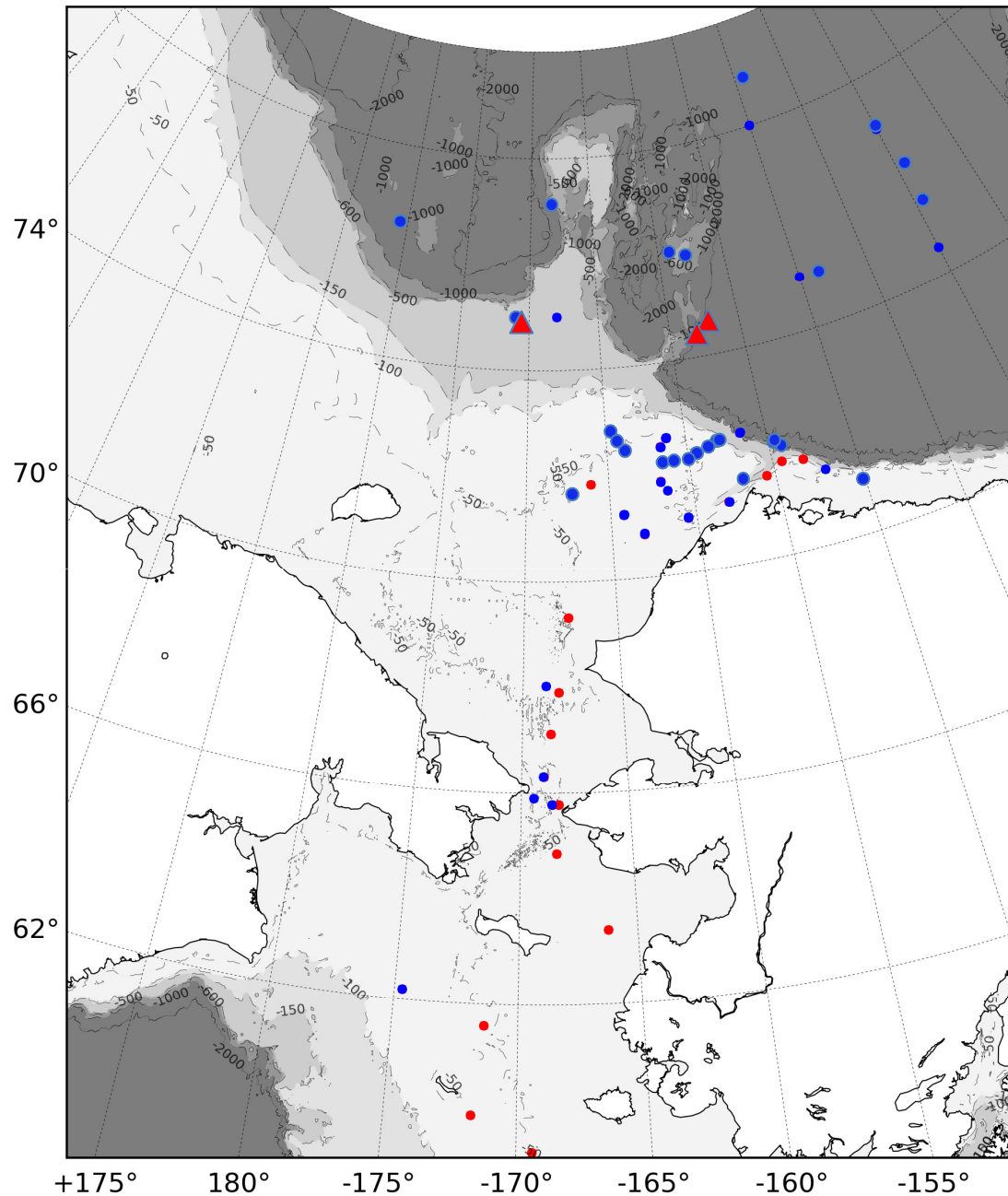
Plan of 2015 Araon Arctic Cruise

Target areas

1. Northern Bering strait
→ DBO line3
2. Chukchi Borderland
→ 2 TUMST Moorings
→ 1 KOPRI Mooring
3. East Siberian Sea & Mendeleev Ridge
→ 1 KOPRI Mooring
→ Sea ice dynamics
→ Sediment coring



Arctic Moorings -Phyllis Stabeno (PMEL/NOAA) 2014



- Moorings-national and international
- Acoustic (Passive listening)-Kate Stafford, Catherine Berchok
- Working on combining US and international mooring locations into one figure, with location table

2015 PAG and DBO Field Season: Sampling Contributors. Projects Key: AON=US Arctic Observing Network; ARCWEST=Arctic Whale Ecology Study; C30=Canada's Three Oceans; JAMSTEC= Japan Agency for Marine-Earth Science and Technology; KOPRI = Korea Polar Research Institute. DBO Region Key: DBO1=So. St. Lawrence Is., DBO2=Chirikov Basin, DBO3=So Chukchi Sea, DBO4=NE Chukchi Sea, DBO5=Barrow Canyon, DBO6=East Beaufort Sea, DBO7=Beaufort Sea Central

Dates (Port calls)	Ship	DBO Region	Projects	PAG contact	Chief Scientist
July 2-8 (Nome-Nome)	Norseman II	3	Bering Strait Mooring Project/AON?	Rebecca Woodgate woodgate@apl.washington.edu	Rebecca Woodgate woodgate@apl.washington.edu
July 11-22 (Nome-Nome)	Norseman II	-	USGS	Jackie Grebmeier jgrebmei@umces.edu ;	USGS-walrus tagging?
July 4-25 (Victoria, BC-Barrow)	Sir Wilfrid Laurier	1,2,3,4,5; + moorings at 1, 3	C30/DBO, plus JAMSTEC DBO moorings	Jackie Grebmeier jgrebmei@umces.edu	Svein Vagle Svein.Vagle@dfo-mpo.gc.ca
July 30-Aug 5	Norseman II	DBO6,7 (Beaufort)	ANIMIDA	Jackie Grebmeier jgrebmei@umces.edu	Ken Dunton
August-Sept (Dutch-Barrow)	Healy	-	GEOTRACERS	TBD	David Kadko dkadko@fiu.edu
Aug 18-Sept 7 (Barrow-Barrow)	Annika Marie	5	AON	Carin Ashjian cashjian@whoi.edu	Carin Ashjian cashjian@whoi.edu
	Explorer				mueter@alaska.edu
Aug 6-Sept 2 (Prudhoe Bay-Wainwright)	Araon	3	Korean Expedition (KOPRI)	Sung-Ho Khang shkang@kopri.re.kr	Eun Jin Yang ejyang@kopri.re.kr
Aug 9-Sept 2	Norseman II	3, 4	AMBON	Jackie Grebmeier jgrebmei@umces.edu	Katrin Iken Iken@alaska.edu
Aug 20-28	Brown	3,4,5,6	NOAA/PMEL	Phyllis.Stabeno@noaa.gov	Phyllis.Stabeno@noaa.gov
Sept (Anadyr-Anadyr)	Viktor Buynitsky	3	RUSALCA Bering Strait mooring	Kathy.Crane@noaa.gov Phyllis.Stabeno@noaa.gov	Kathy.Crane@noaa.gov
Sept 4-12	Norseman II	?4	Winsor gliders	Jackie Grebmeier jgrebmei@umces.edu	Peter Winsor
Aug 15-Sept 10	Mirai	3,5	JAMSTEC	Takashi Kikuchi takashik@jamstec.go.jp	Shigeto Nishino nishinos@jamstec.go.jp
Sept-Oct	Louis S St-Laurent	-	JOIS	Bill Williams Bill.Williams@dfo-mpo.gc.ca	Bill Williams Bill.Williams@dfo-mpo.gc.ca
Sept-Oct	Sir Wilfrid Laurier	4		Bill Williams Bill.Williams@dfo-mpo.gc.ca	Humfrey.Melling@dfo-mpo.gc.ca



Pacific Arctic Group, PMEL, Seattle, October 28-29, 2014

Photo credit: Aleksey Ostrovskiy

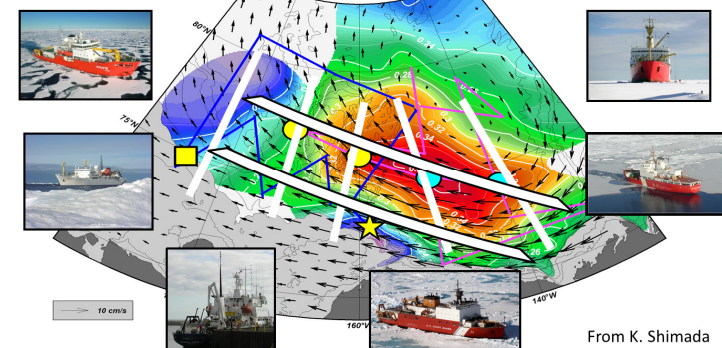
THE PACIFIC ARCTIC GROUP (PAG) MEETING

October 28-29, 2014
Seattle, Washington

Citation: Grebmeier, J.M, A. Bayard, L.S. Guy, and J. Lee (eds). 2015. The Pacific Arctic Group (PAG) Fall 2014 Meeting Report. CBL/UMCES, 24 pp.

- In October 2014, the Pacific Arctic Group fall meeting focused on **review of accomplishments during the previous summer and outlooks for the future research plans.**
- One major outcome of the meeting was **to engage in an expert-level discussion of observing needs in the higher Pacific Arctic** that could provide valuable data to forecasters and modelers of climate change impacts on and surrounding the Arctic reaching to the mid-latitudes.
- The area of observing interest includes the **outer shelf of the East Siberian and Chukchi Seas northwards to 80°N** and extending **from the Makarov Basin in the West to the Canada Basin in the East.**

Proposed international Pacific Arctic climate monitoring sections



From K. Shimada

Background color: dynamic height at 100dbar relative to 800dbar from Mirai and Louis S. St-Laurent 2008 cruises (Oceanic Beaufort Gyre)

Black vectors: average sea ice motion vectors for Nov. 2007- Apr. 2008 (Sea Ice Beaufort Gyre)

Symbols: Mooring array in 2012-2013 (TUMSAT/KOPRI/NIPR & WHOI)



ICARP3 Process 2015

**Pacific Arctic Group
TUMSAT, Tokyo, April 21-22, 2015**



The workshop goals were to investigate and refine the following key future observing objectives and to develop an implementation plan for action:

- **To study the evolution, structure, and variability of Pacific Arctic upper ocean water masses, including heat transport of Atlantic Water and its interaction with northward flowing Pacific Water.**
- **To carry out atmospheric, sea ice and upper ocean observations to understand the rapid sea ice loss in the region and its impact on the local and global climate and regional ecosystems. This effort will also incorporate atmospheric observations to support the WMO's Polar Prediction Project (PPP).**
- **To carry out a repeat census of the trophic components of the ecosystem, identify key species, their relationship to physical forcing and biogeochemical conditions including their changes through time and space.**
- **To carry out time-series observations from long-term moorings to reveal annual and inter-annual variability.**
- **To coordinate this work with the vessels of our respective countries from 2015-2020 and beyond, which will provide a unique suite of synoptically collected data made available for joint analysis and assessment via the mechanisms already set up within the Pacific Arctic Group. www.pag.arcticportal.org**

**The PAG participants agree to collaborate on the development and implementation of this
Pacific Arctic climate integrated-ecosystem Observing Network**

**B2: Current and Future Observing Strategies for Understanding the
Evolving Arctic Climate and Ecological System**

April 28, 2015 (Tuesday), Room 203

10:45-12:15

Chair: Leif Anderson, Terry Callaghan

10:45-11:03	B02-O11	ARCTIC OCEAN BOUNDARY ARRAY: CORNERSTONE OF ARCTIC MONITORING S. Bacon*, T. Tsubouchi, Y. Aksenov
11:03-11:21	B02-O12	THE DISTRIBUTED BIOLOGICAL OBSERVATORY: A LATITUDINAL DETECTION ARRAY FOR TRACKING ECOSYSTEM CHANGE IN THE PACIFIC ARCTIC J. M. Grebmeier*, L. W. Cooper, K. E. Frey, T. Kikuchi, S. E. Moore, S. Vagle
11:21-11:39	B02-O13	THE PACIFIC ARCTIC GROUP CLIMATE OBSERVING SYSTEM: AN INTERNATIONAL EFFORT TO UNDERSTAND THE CAUSES AND CONSEQUENCES OF SEA ICE LOSS IN THE 'HOT SPOT' OF THE ARCTIC OCEAN K. H. Cho, J. He, S. H. Kang, J. H. Kim, H. Melling, A. Ostrovskiy, G. Panteleev, R. Pickart, I. Polyakov, K. Shimada, T. Uttal, W. Williams, H. Yamaguchi, J. Zhao, J. Wang, K. Crane
11:39-11:57	B02-O14	YEAR-LONG, DAILY-SCALE ECOSYSTEM OBSERVATIONS UNDER PERENNIAL ICE COVER IN THE ARCTIC OCEAN S. Laney*, J. Toole, R. Krishfield, M. L. Timmermans
11:57-12:15	B02-O15	SIZONET: MULTI-PURPOSE, MULTI-PLATFORM OBSERVATIONS TO INFORM RESPONSES TO AN ARCTIC SEA ICE COVER IN TRANSFORMATION H. Eicken*, A. R. Mahoney, D. O. Dammann, J. Jones, S. Hendricks, Y. Fukamachi, K. I. Ohshima, C. Haas, S. Gerland, A. Makshtas

Thank you for your attention.

Any questions?

