

Pacific Arctic Group (PAG)



**PICES meeting
October 22, 2014
Yeosoo, Korea**



June 2, 2014

Dr. Jackie M. Grebmeier
Chair
Pacific Arctic Group (PAG)
Chesapeake Biological Laboratory
University of Maryland Center for Environmental Science,
P.O. Box 38, 146 Williams Street, Solomons
Maryland 20688
U.S.A.

**Re: Invitation - North Pacific Marine Science Organization (PICES)
PICES-2014, Twenty Third Annual Meeting**

Dear Dr. Grebmeier,

On behalf of the Council of the North Pacific Marine Science Organization (PICES), I have the honour of inviting a PAG representative to be present as an observer at our Twenty Third Annual Meeting to be held in Yeosu, Korea. The theme for PICES-2014 is "*Toward a better understanding of the North Pacific: Reflecting on the past and steering for the future*".

Should PAG decide to participate, it would be greatly appreciated if the name(s) and contact information of your appointed observer(s) could be forwarded to the PICES Secretariat (secretariat@pices.int) by June 20, 2014. If your representative would like to address PICES on collaborative issues, we will gladly arrange a time for this presentation to be given at our Committee meeting(s), to be held Wednesday afternoon, October 22.

To allow our participants to learn more about PAG, it would be desirable to have a poster display that gives some general information and highlights of your Organization's scientific objectives and recent activities. If your representative is interested in presenting a poster, please kindly indicate in your response to me so a poster board can be arranged.

Details of the scientific program, schedule, registration, hotel accommodation and other logistics for the meeting can be found on the PICES website at: <http://www.pices.int/meetings/annual/PICES-2014/2014-background.aspx>.

Your representative can register for the meeting on-line. Should he/she have any questions, please contact me or our Database and Web Administrator, Ms. Julia Yazvenko at secretariat@pices.int.

Thank you very much for your attention in this matter and I hope to see you or your representative in Yeosu.

Yours sincerely,

Dr. Alexander Bychkov
Executive Secretary

Secretariat
P.O. Box 6000,
Sidney, B.C.,
Canada, V8L 4B2
Phone: (250) 363-6366
Fax: (250) 363-6827
E-Mail: secretariat@pices.int
Internet: www.pices.int

Chairman
Dr. Laura Richards

Vice-Chairman
Dr. Chul Park

Executive Secretary
Dr. Alexander Bychkov



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North Pacific Marine Science Organization
PICES 2014 Annual Meeting
Toward a better understanding of the North Pacific:
Reflecting on the past and steering for the future
October 16 – 26, 2014 Yeosu, Republic of Korea

The North Pacific Marine Science Organization (PICES)

- **The North Pacific Marine Science Organization (PICES)**, an intergovernmental scientific organization, was established in 1992 to promote and coordinate marine research in the northern North Pacific and adjacent seas especially northward of 30 degrees North.
- Its present members are Canada, Japan, People's Republic of China, Republic of Korea, the Russian Federation, and the United States of America.
- Advance scientific knowledge about the ocean environment, global weather and climate change, living resources and their ecosystems, and the impacts of human activities.
- Promote the collection and rapid exchange of scientific information on these issues.

Overview of PAG

- **The Pacific Arctic Group (PAG) is a consortium of institutes and individuals having a Pacific perspective on Arctic science**
- **PAG serves as a Pacific Arctic regional partnership to plan, coordinate, and collaborate on science activities**
- **The four PAG principal science themes are climate, contaminants, human dimensions and structure and function of Arctic ecosystems**
- **The PAG membership is led by an Executive Committee consisting of a Chair, two Vice Chairs, and the Project leads from ongoing PAG activities from Canada, China, Japan, Korea, Russia, USA.**



Brief review of PAG history:

- ASSW in 2002 (Gröningen):

Start of a discussion on Arctic research from Pacific perspective.

As the International Arctic Science Committee (IASC) enlarged its membership, three Asian countries (Japan, Korea, and China) became members. Yet the focus of IASC science remained on the Atlantic sector and the central portions of the Arctic, regions of lesser interest to the Asian members who quite naturally viewed the Arctic from a Pacific perspective.

- ASSW in 2003 (Kiruna):

Meeting among the Pacific-bordering members

→ Following the discussions, a proposal was presented for creation of the **Pacific Arctic Group (PAG) to IASC council**, and then **the Council agreed to welcome PAG under its umbrella.**

- ASSW in 2004 (Reykjavik): Initial PAG meeting

PAG Attendees - April 23, 2004

Last Name	First Name	Country	Email
Augner	Magnus	Sweden	magnus@polar.se
Bergmann	Martin	Canada	bergmannm@dfm-mpo.gc.ca
Bowden	Sarah	USA	bowden@patriot.net
Brass	Garry	USA	g.brass@arctic.gov
Calder	John	USA	John.Calder@noaa.gov
Chen	Bo	PRC	chenbo688@sina.com
Chen	Liqi	PRC	lqchen@soa.gov.cn
Drobot	Sheldon	USA	sdrobot@nas.edu
Eppi	Rene	USA	Rene.Eppi@noaa.gov
Fukuchi	Mitsuo	Japan	fukuchi@nipr.ac.jp
Grebmeier	Jackie	USA	jgrebmei@utk.edu
Harrison	Peter	Canada	peter.harrison@nrc-cnrc.gc.ca
Kang	Sung-Ho	Korea	shkang@kordi.re.kr
Klauder	Josh	USA	josh@arcus.org
Larsen	John	Iceland	inl@svs.is
Pryamikov	Sergey	Russia	priamiks@aari.nw.ru
Pyle	Tom	USA	tpyle@nsf.org
Ryabinin	Vsladimir	Switzerland	vryabinin@wmo.int
Watanabe	Okitsugu	Japan	watanabe@nipr.ac.jp
Webber	Patrick	USA	webber@msu.edu
Zhang	Zhanhai	PRC	zhangzhanhai@pric.gov.cn



Brief review of PAG history:

During the formative years the Group developed a number of science themes that it wished to pursue and adopted a mode of action based on **two primary types of activities**:

- 1) Enhancement of individual national field programs by inclusion of **an international component**;
- 2) Creation of collaborative activities focused on **synthesis of data and publication on topics of mutual interest**.



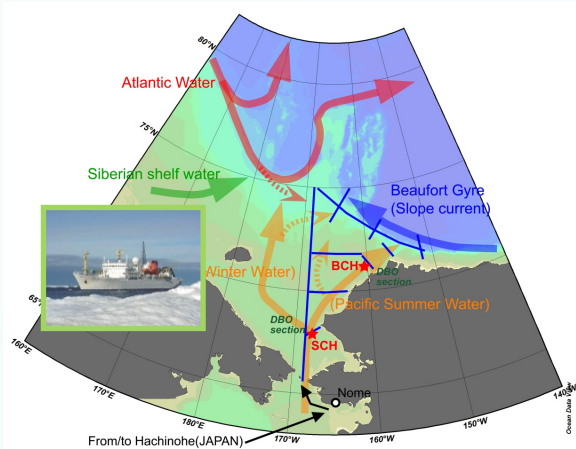
Examples of current PAG activities

- Sharing information on **annual field activities** in the Pacific Arctic region
- **Continued development and implementation of long-term monitoring activity such as the Distributed Biological Observatory (DBO)** - environmental and biological sampling at stations on transect lines located along a latitudinal gradient extending from the northern Bering Sea to the Barrow Arch, and new regions
- **Undertake a Pacific Arctic regional, multidisciplinary synthesis of scientific findings** in the marine region relevant to ongoing scientific objectives at the core of the PAG
- **Project development and sampling in the Chukchi Borderland and Canada Basin region** to investigate climate, oceanography, air-sea ice interactions, physical oceanography, and modeling

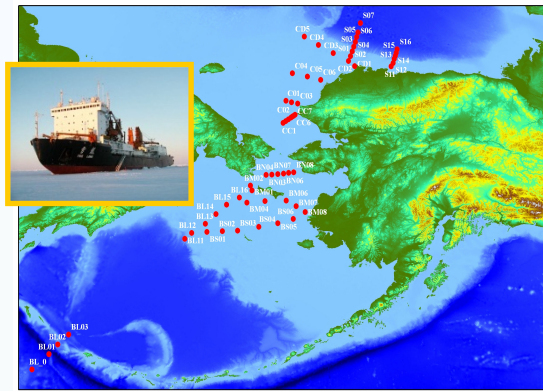


2010-14 PAG research cruises in Pacific Arctic Region

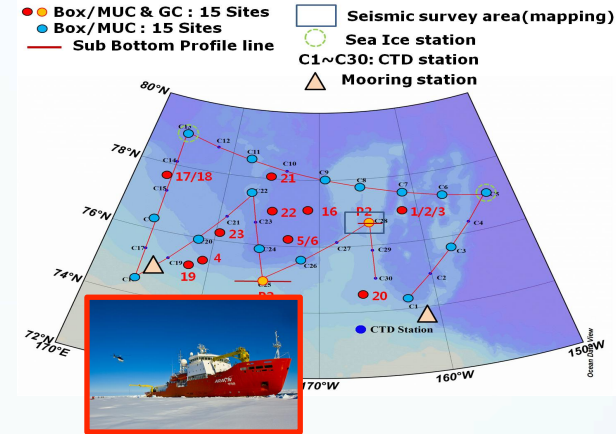
Japan: RV Mirai



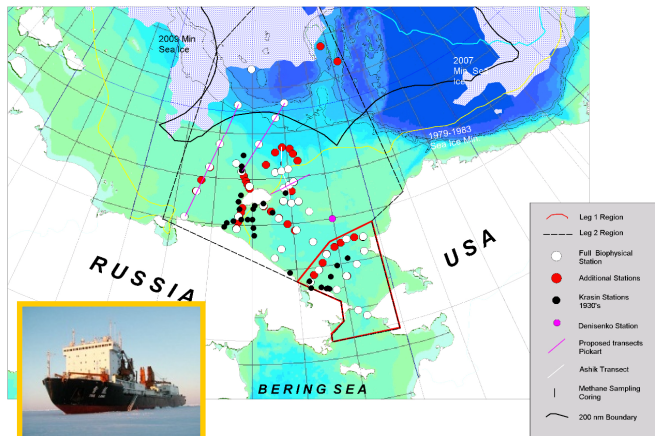
China: RV Xuelong



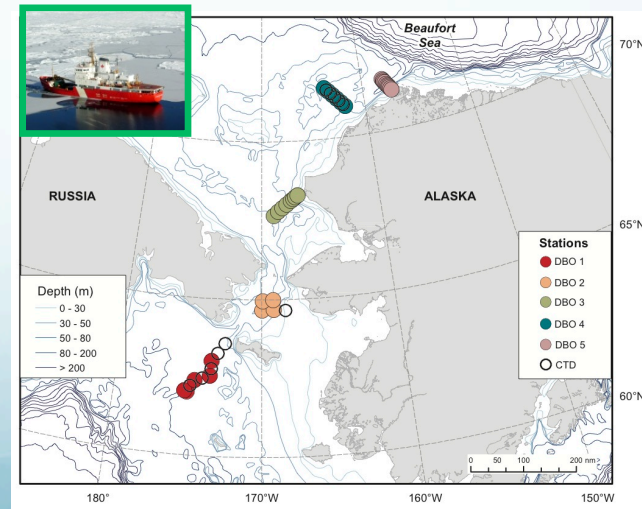
Korea: RV Araon



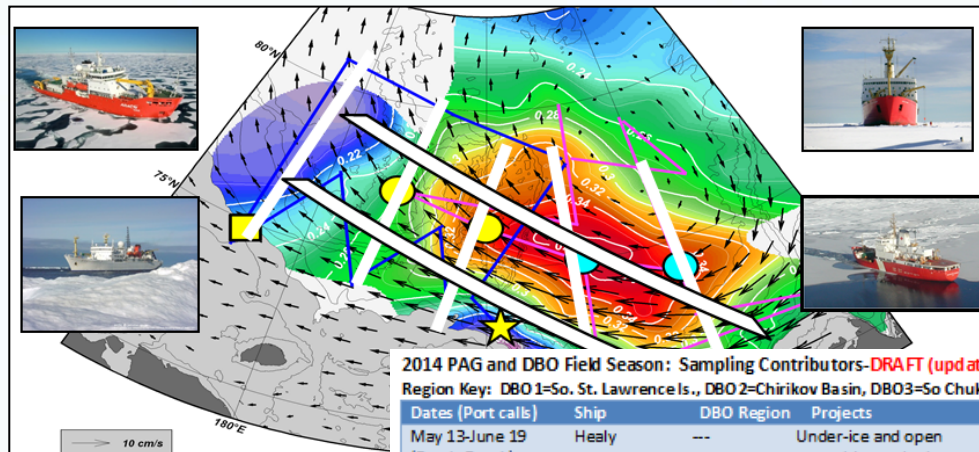
Russia-USA: RV Khromov



Canada-USA: CCGS Sir Wilfrid Laurier (DBO 1-5 and RV Westward Wind DBO4)



Sharing information on annual field activities

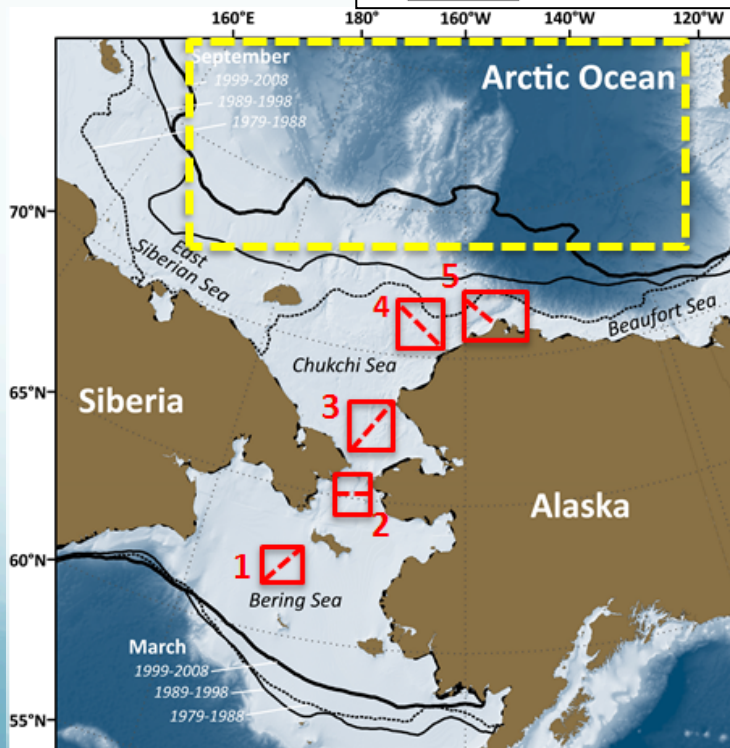


2014 PAG and DBO Field Season: Sampling Contributors-DRAFT (updates pending PAG meeting April 2014)

Region Key: DBO 1=So. St. Lawrence Is., DBO 2=Chirikov Basin, DBO3=So Chukchi Sea, DBO4=NE Chukchi Sea, DBO5=Barrow Canyon.

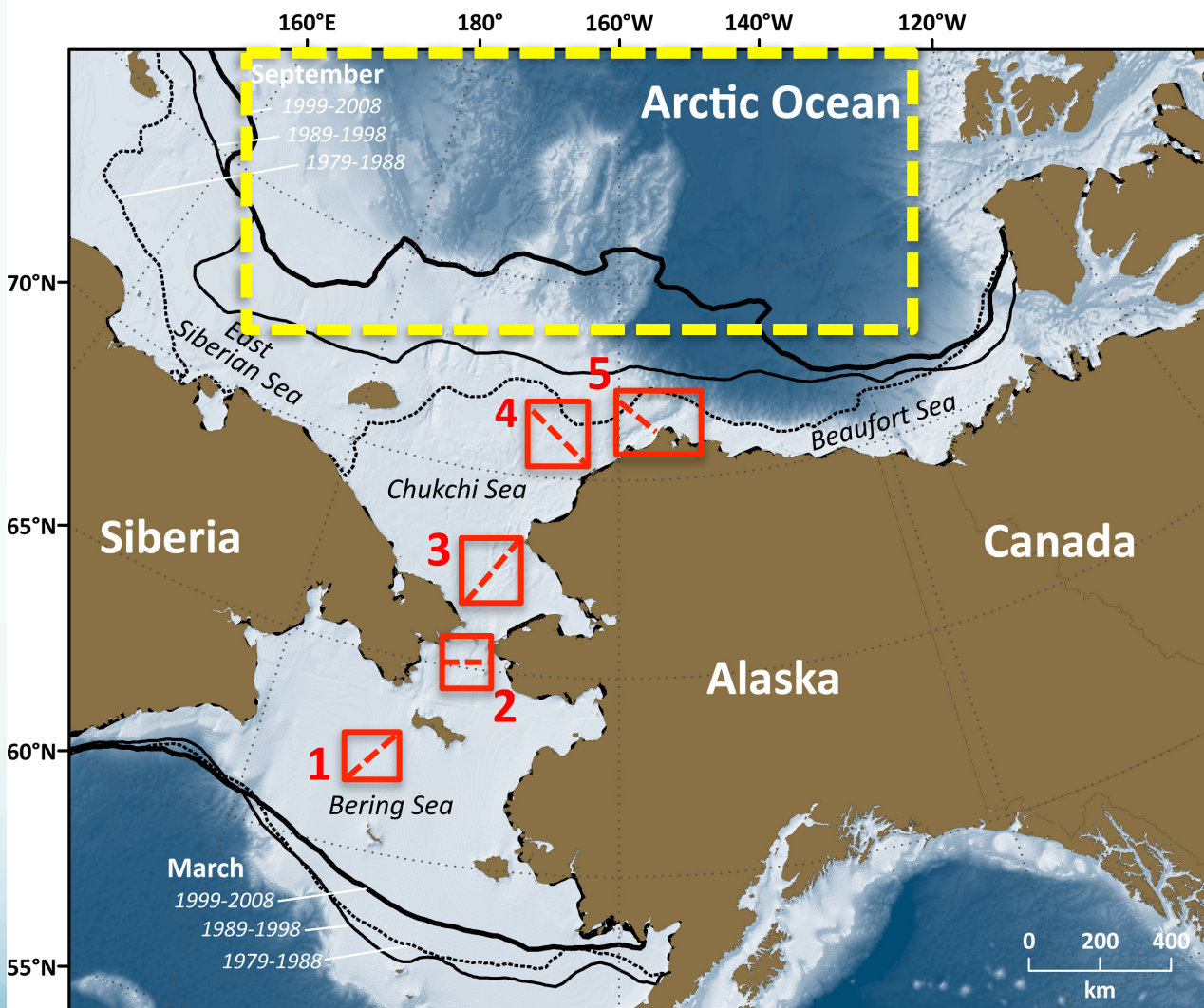
Dates (Port calls)	Ship	DBO Region	Projects	PAG contact	Chief Scientist
May 13-June 19 (Dutch-Dutch)	Healy	---	Under-ice and open water blooms in the Chukchi Sea	Robert Pickart rpickart@whoi.edu	Kevin Arrigo arrigo@stanford.edu
July 3 (Nome-Nome)	Norseman II	3	Bering Strait Mooring Project/AON?	Rebecca Woodgate woodgate@apl.washington.edu	Rebecca Woodgate woodgate@apl.washington.edu
July (Anadyr-Anadyr)	Khromov	3	RUSALCA Bering Strait mooring	Kathy Crane kathy.crane@noaa.gov Phyllis Stabeno Phyllis.Stabeno@noaa.gov	Kathy.Crane@noaa.gov
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 Takashi Kikuchi takashik@jamstec.go.jp	Svein Vagle Svein.Vagle@dfo-mpo.gc.ca
July 11-Sept 24 (Shanghai-return)	Xuelong	(1-2 partial, 3,5)	Chinese Arctic Research Expedition	Jianfeng He	
July 4-29-August 15 (Dutch-Barrow)	Healy	5 (TBD)	AON	Robert Pickart rpickart@whoi.edu	Robert Pickart rpickart@whoi.edu
August-Sept (Nome-Nome)	Araon	3	Korean Expedition (KOPRI)	Sung-Ho Kang shkang@kopri.re.kr	Sung-Ho Kang shkang@kopri.re.kr
August-Sept (Barrow-Barrow)	Annika Marie	5	AON	Carin Ashjian cashjian@whoi.edu	Carin Ashjian cashjian@whoi.edu
August-Sept	Aquila?	1,3, 5	ARCWEST	Jeff Napp Jeff.Napp@noaa.gov Sue Moore Sue.Moore@noaa.gov	Catherine Berchok Catherine.Berchok@noaa.gov Phyllis Stabeno Phyllis.Stabeno@noaa.gov
August-October	Westward Wind	4	CSESP	Tom Weingartner weingart@ims.uaf.edu	Bob Day bday@abrinc.com John Burns jburnsr@gsi.net
August-September	Bristol or Alaska Explorer	1 and/or 2	Arctic Eis	Ed Farley Ed.Farley@noaa.gov	Franz Mueter mueter@alaska.edu
September-October	Mirai	3,5	JAMSTEC	Takashi Kikuchi takashik@jamstec.go.jp	Shigeto Nishino nishinos@jamstec.go.jp
September-Oct	Louis S St-Laurent	-	JOIS	Bill Williams Bill.Williams@dfo-mpo.gc.ca	Bill Williams Bill.Williams@dfo-mpo.gc.ca

Projects Key: AON=US Arctic Observing Network; ARCWEST = Arctic Whale Ecology Study; COMIDA=Chukchi Offshore Monitoring in Drilling Area; CSESP=Chukchi Sea Environmental Studies Program; C30=Canada's Three Oceans; JAMSTEC= Japan Agency for Marine-Earth Science and Technology; KOPRI = Korea Polar Research Institute.

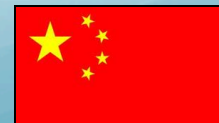
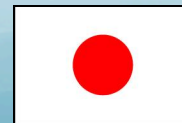
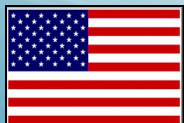


(modified by Karen Frey from Grebmeier)

Continued development and implementation of long-term monitoring activity - the Distributed Biological Observatory (DBO)



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



Undertake a Pacific Arctic regional, multidisciplinary synthesis of scientific findings

		DBO 3-SCS			DBO 5-BC		
		2010	2011	2012	2010	2011	2012
	Physics	C30, CHAOZ, Chinare	C30, CHAOZ	C30, CHINARE, Rusalca, Mirai, CHAOZ	C30, CHAOZ, Mirai, Anaka Marie, HLY01,03	C30, CHAOZ	Comida HS, Mirai, Chaoz, AON, (pickart, ashjian)
T/S	CTD	C30, CHAOZ, Chinare	C30, CHAOZ	C30, CHINARE, Rusalca, Mirai, CHAOZ	C30, CHAOZ, Mirai	C30, CHAOZ	Comida HS, Mirai, Chaoz, AON, (Pickart, Ashjian)
Currents	ADCP	C30, CHAOZ, Chinare?	C30, CHAOZ	C30, CHINARE?, Rusalca, Mirai, CHAOZ	C30, CHAOZ, Mirai, Anaka Marie, HLY01,03	C30, CHAOZ	Comida HS, Mirai, Chaoz, AON, (Pickart, Ashjian)
Nutrients	Nutrients	C30, CHAOZ, CHINAIRE	C30, CHAOZ, CHINAIRE	C30, CHAOZ, CHINAIRE	C30, AON-Ashjian, CHAOZ	C30, AON-CA, CHAOZ	Comida, HS, CHAOZ
Primary production	Satellite Primary Prod	K.Frey	K.Frey, C30(1stn)	K.Frey, Sang Lee 2, Diana 1	K.Frey	K.Frey	K.Frey
Phytoplankton	chl	C30	C30	C30	C30	C30	C30
	species		C30	RUSALCA, C30		C30	COMIDA HS
Intermediate	microzooplankton						
Zooplankton	standing stock	C30, CHAOZ	C30, CHAOZ	C30 July, CHAOZ Aug, Greene Sept, Acoustic	C30, CHAOZ	C30, CHAOZ	COMIDA HS, Ashjian, CHAOZ, Greene
	species	C30, CHAOZ	C30	C30 July, CHAOZ Aug, Greene Sept, Acoustic	C30, CHAOZ	C30, CHAOZ	COMIDA HS, Ashjian, CHAOZ, Greene
Benthos	standing stock	C30, infauna, CHINARE	C30	C30, RUSALCA epi-benthos, CHINARE	C30	C30	COMIDA HS, AKM, Jouett/Dasher
	species	C30	C30	C30	C30	C30	C30
Marine mammals	survey	CHAOZ, AOS/transist	CHAOZ	CHAOZ	CHAOZ	CHAOZ	CHAOZ
	watch	RUSALCA mooring	C30, RUSALCA mooring	RUSALCA mooring, Greene, Acoustic	BOWFEST	BOWFEST, Akmap-Day	COMIDA, Greene
Seabirds	survey	Kuletz, C30-Bentley?, AOS/transist, Greene	Kuletz, C30-Bentley?, AOS/transist, Greene	Kuletz, C30-Bentley?, AOS/transist, Greene	Kuletz	Kuletz, AKMAP-Day	Kuletz, Greene

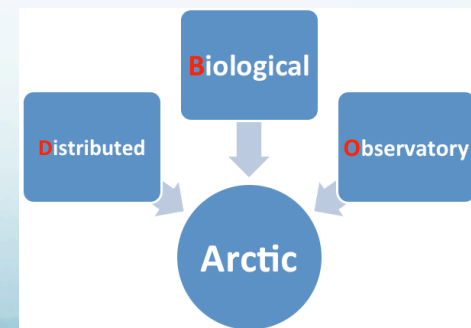
PAG ICARPIII Activity

DBO 2nd Data Workshop

The 1st DBO Data Workshop (Feb 27-Mar 1, 2013) focused on:

- Present results from the 2010-2012 pilot study and determine a basis for **multidisciplinary paper(s)** to showcase the DBO international effort
- **Archive metadata** with either link to data set in a national archive or submitting the DBO data to common data archive
- Determine how to **plan for full implementation for the DBO.**

The 2nd DBO Data Workshop (Oct 29-31) will evaluate the continued international data collections on up to 5 DBO lines seasonally, discuss the current submission of data to the DBO data sharing sites, develop publication plans, and coordinate



<http://www.arctic.noaa.gov/dbo/>

Project development and sampling in the Chukchi Borderland and Canada Basin region to investigate climate, oceanography, air-sea ice interactions, physical oceanography, and modeling



2 U.S. Biologists



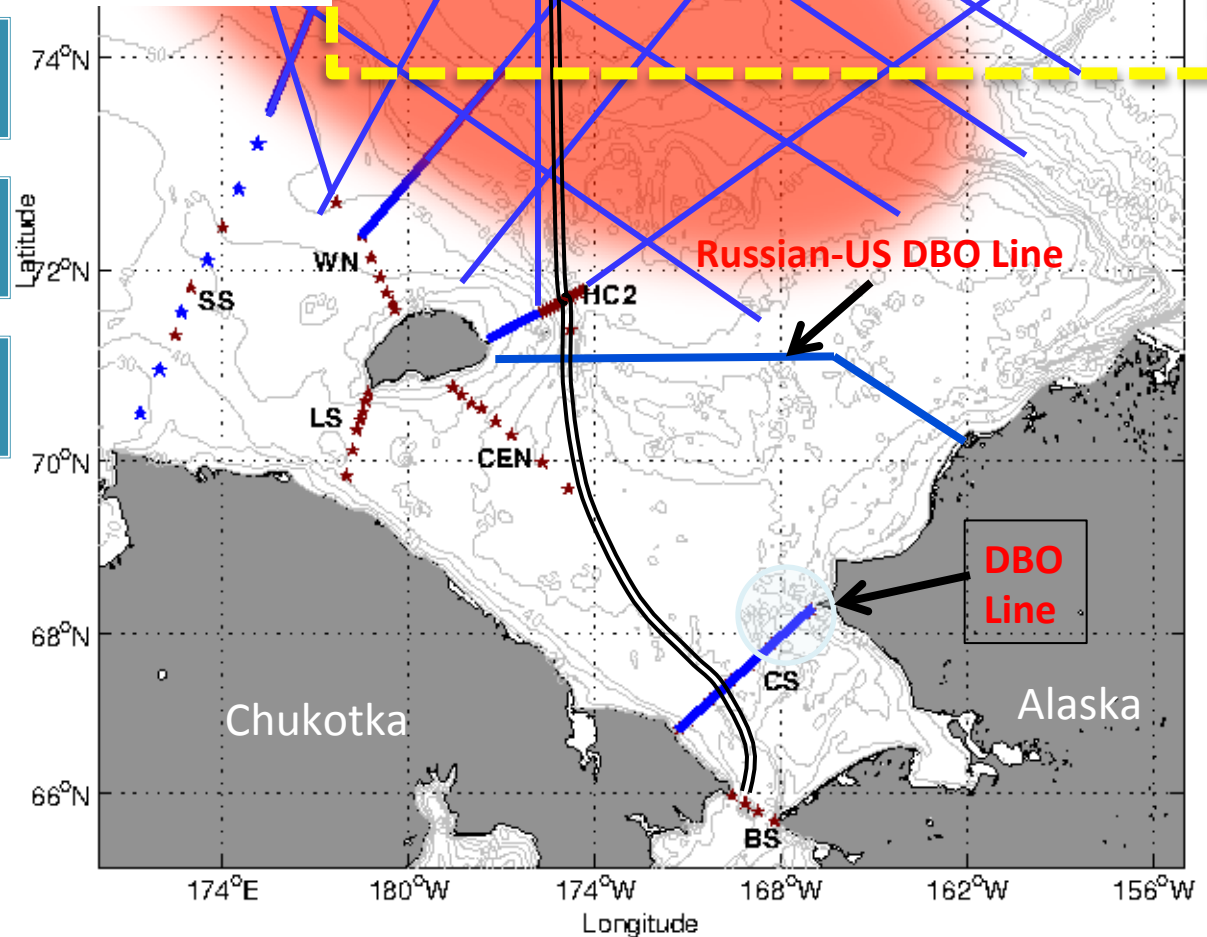
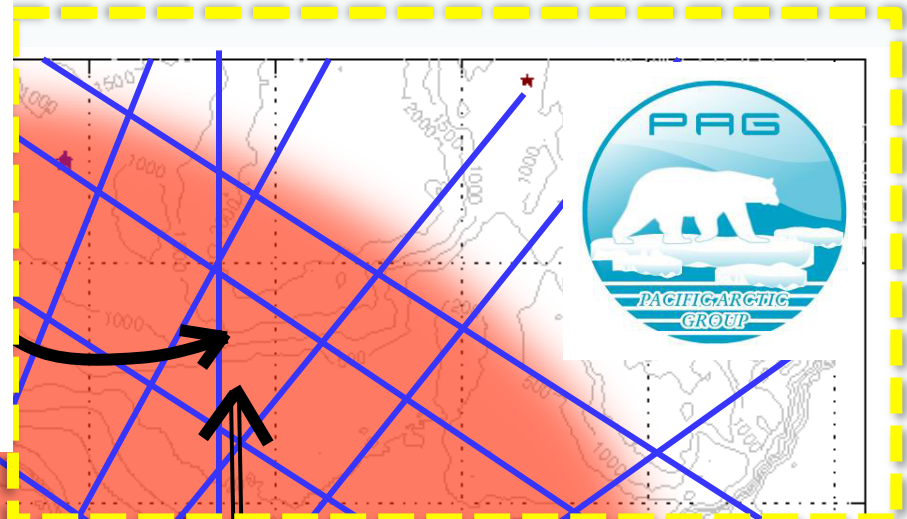
10 Hydrographic transects, Pacific, Atlantic Water's lateral and vertical heat flux, air, ice sea fluxes



Census of Marine Life and Census of Benthic Methane Fluxes



RUSALCA + Pacific Arctic Group + EU (3 – 5 vessels and aircraft)



PAG update - PICES

- **A PAG update was given to the Technical Committee on Monitoring of PICES (North Pacific Marine Science Organization) on 22 October 2014 at its Annual Conference held in Yeosu, Korea.**
- **PAG was represented by Dr. Hyoung Chul Shin, Head of the international cooperation office of KOPRI at this Committee.**
- **Three main points were made in the report to the Committee; 1) planning to expand the PAG observation (new sites, for example), 2) recent developments with data exchange and sharing, and 3) the PAG contribution to the ongoing initiative to coordinate and prioritize the future Arctic research questions.**
- **Exactly coinciding membership of PICES and PAG was noted. Interests were expressed on the observations in sub-Arctic waters and data sharing practices of PAG. PAG website and contact details were provided to the members and observers of the Monitoring Committee.**