

# Pacific Arctic Group (PAG):

## Perspective of ICARP III



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



## 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**.

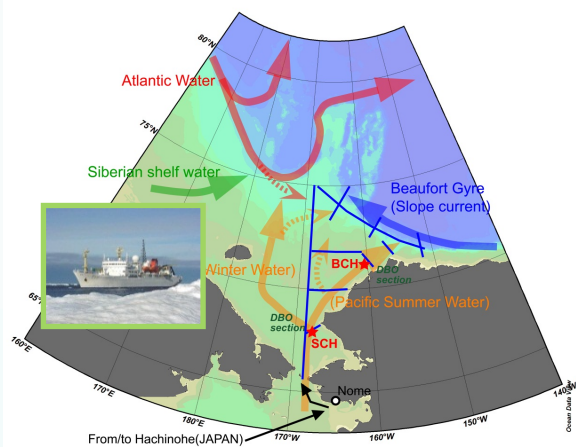


# Examples of current PAG activities

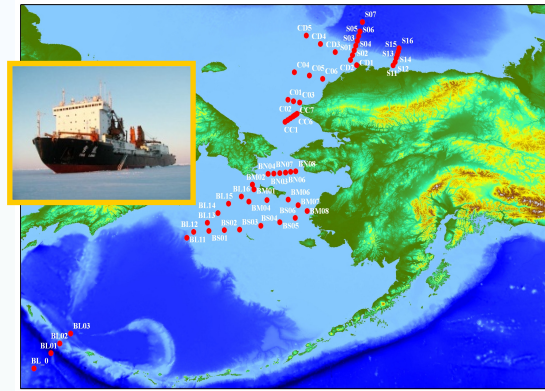
- **Annual field activities** in the **Pacific Arctic region**
- **Continued development and implementation of long-term monitoring activity such as the Distributed Biological Observatory (DBO)** - environmental and biological sampling at stations on transect lines located along a latitudinal gradient 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**

# 2010-13 PAG research cruises in Pacific Arctic Region

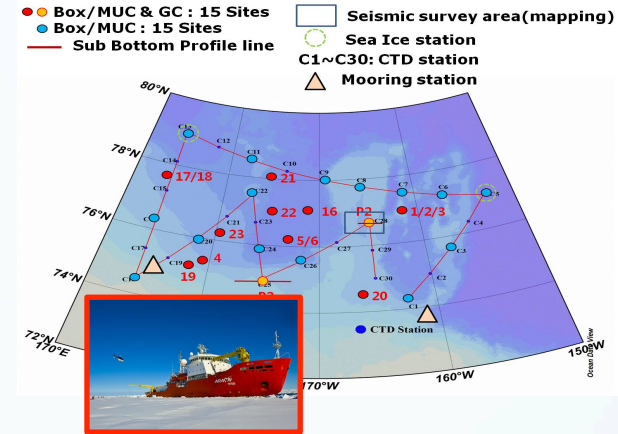
## Japan: RV Mirai



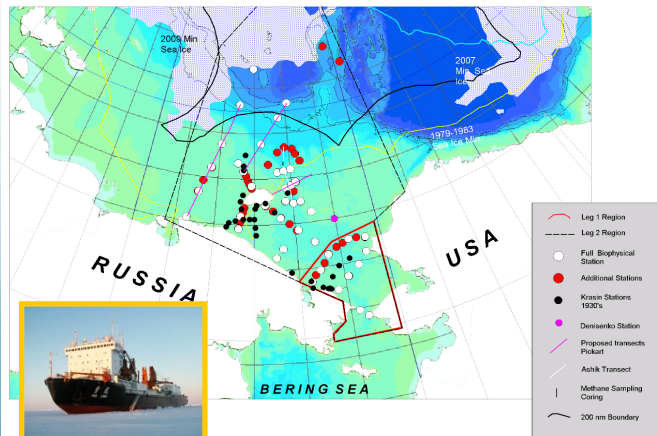
## China: RV Xuelong



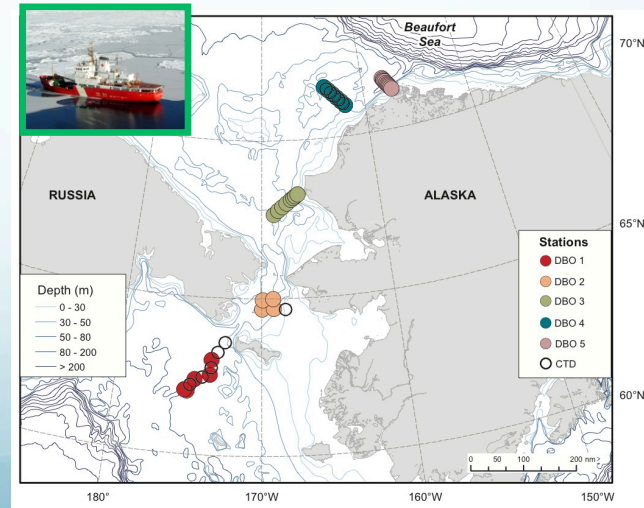
## Korea: IBRV Araon



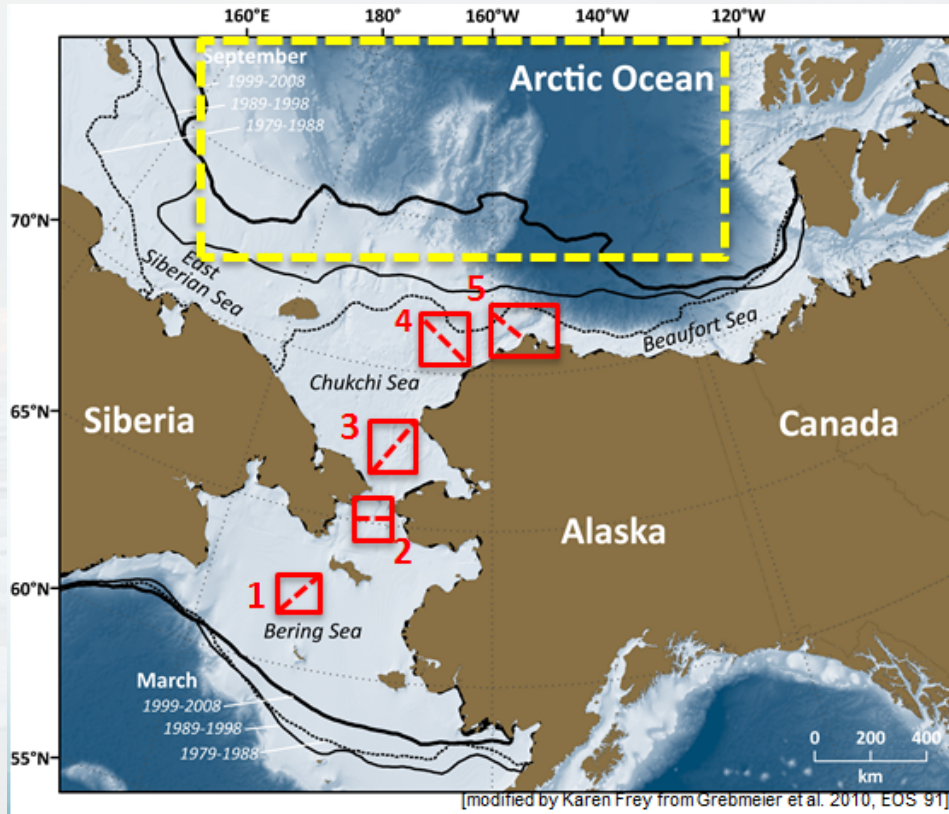
## Russia-USA: RV Khromov



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



# Updates plans of Arctic Ocean Research

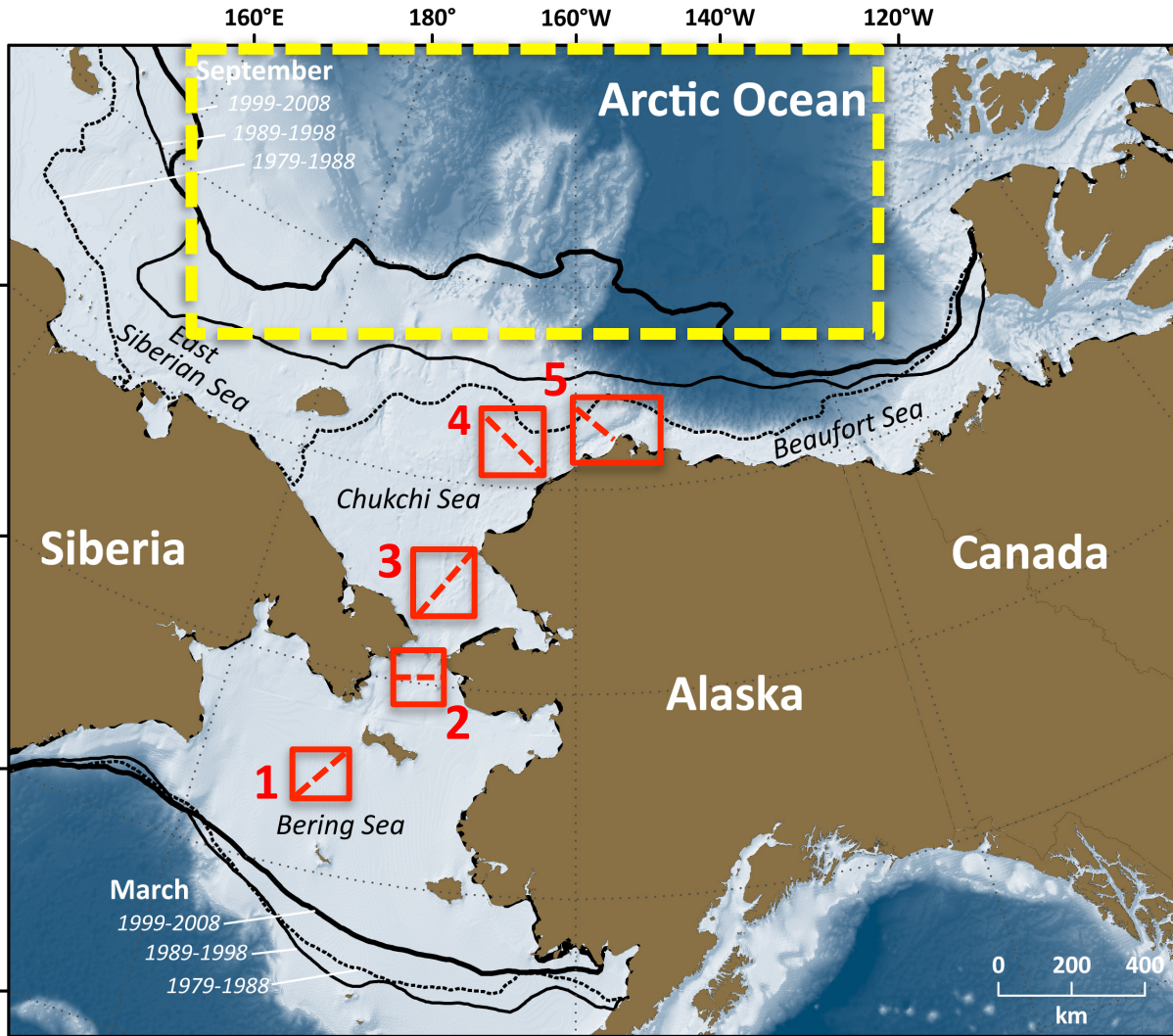


Vessel	Country	PI
<i>Moana Wave, Healy</i>	USA	Grebmeier
<i>Healy</i>	USA	Arrigo
<i>Xuelong</i>	China	He
<i>Mirai</i>	Japan	Itoh Kikuchi Vagle
<i>Laurier</i>	Canada	
<i>Araon</i>	Korea	Kang
<i>Khromov</i>	Russia and USA	Woodgate
<i>Alaskan Enterprise</i>	USA	Napp
<i>Annika Marie</i>	USA	Ashjian
<i>Healy</i>	USA	Pickart
<i>Westward Wind</i>	USA	Day



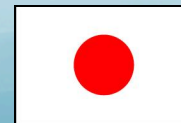
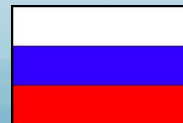
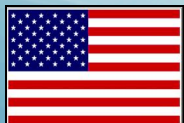


# Linking Physics to Biology: the Distributed Biological Observatory (DBO)



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

- 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**



# Synthesis of data and publication on topics of mutual interest

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

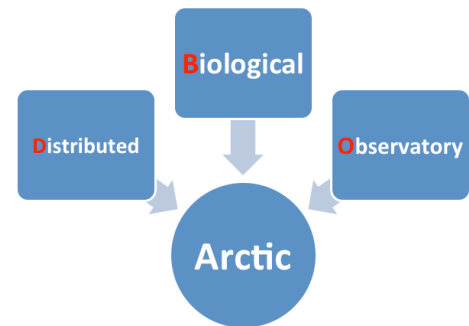
# PAG ICARPIII Activity

## DBO 2<sup>nd</sup> Data Workshop-fall 2014

**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 2<sup>nd</sup> DBO Data Workshop 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 future**



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





2 U.S.-Russian Distributed  
Biological Observatory Lines



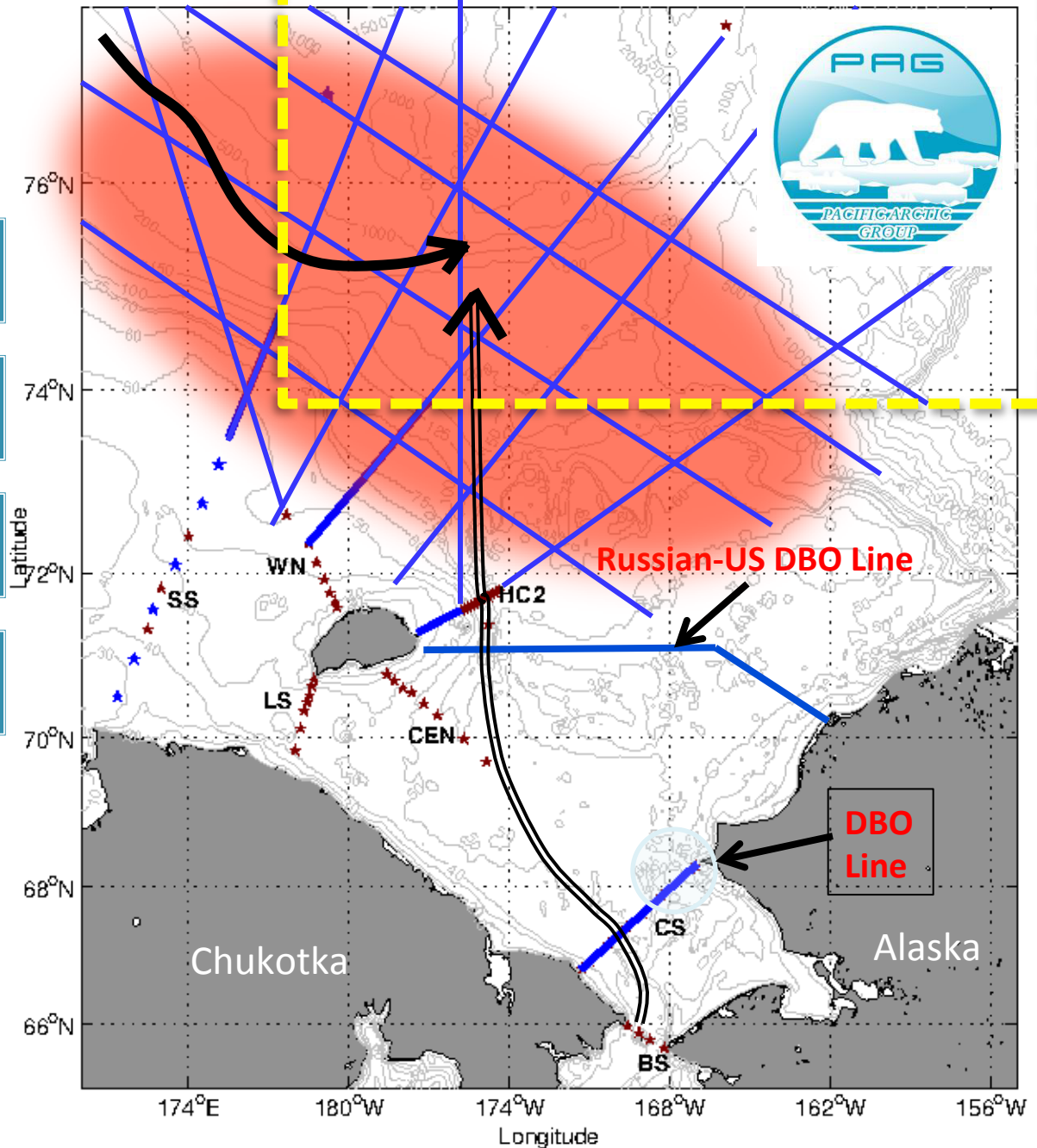
10 Hydrographic transects,  
Pacific, Atlantic Water's lateral and vertical heat flux,  
air, ice sea fluxes



Census of Marine Life and  
Census of Benthic Methane  
Fluxes



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



## PAG activities and topics that are high priority to highlight in the ICARPIII planning process include:

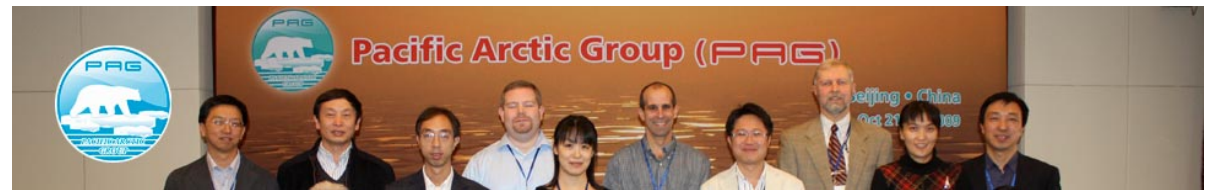
- **Data sharing and publications from international results of the DBO activities and continued development for full implementation of the DBO sites and identification of new sites in the East Siberian Sea, Beaufort Sea and Canada Basin-fall 2014 2<sup>nd</sup> DBO Data workshop**
- **Highlight studies in the western Chukchi/Canada Basin of physical oceanographic research programs, including continued development of a Chukchi Borderland/Arctic Basin Environmental Observing system**
- **Development of a coordinated sea ice/atmospheric sampling effort within the PAG**
- **Physical and ecosystem modeling of oceanographic and atmospheric data collected in the Pacific sector**
- **Highlights of the PAG synthesis activities (e.g., the Pacific Arctic region Springer synthesis volume, Deep-Sea Research II special issues from CHINARE, ARAON cruises, other publications and products**

## How can PAG participate in ICARP III?

- PAG works with **a pan-Arctic perspective** to promote synergies across the Arctic Ocean.
- PAG recognizes **the value of the ICARP III as a means to identify and prioritize overarching Arctic science issues**, and to improve international coordination of research agendas.
- PAG's ICARP III contribution as **data sharing and publications from results of the Distributed Biological Observatory (DBO)** and continued development and implementation of the project.
- PAG can **provide a valuable dataset for ongoing research and development of cooperative synthesis in the Pacific and Atlantic marine sector**.
- European research activity can **complement PAG studies with its research in the Atlantic side of the Arctic**. The PAG studies could also be integrated with programs such as MOSAiC etc.

All the ppts and documents associated with the PAG meetings available at the PAG website: <http://pag.arcticportal.org/>, under "documents".

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## What is PAG?

The Pacific Arctic Group (PAG) is a group of institutes and individuals having a Pacific perspective on Arctic science. Organized under the International Arctic Science Committee (IASC), the PAG has as its mission to serve as a Pacific Arctic regional partnership to plan, coordinate, and collaborate on science activities of mutual interest. The four PAG principle science themes are climate, contaminants, human dimensions and structure and function of Arctic ecosystems.

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