

# Welcome and Introduction

## Pacific Arctic Group (PAG)

**Sung-Ho Kang**

Chair, Pacific Arctic Group

Director, Division of Polar Ocean Environment

Korea Polar Research Institute (KOPRI), Incheon, Republic of Korea

PAG Fall meeting

28-29 October 2015

Korea Polar Research Institute (KOPRI)

Incheon, Korea



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

# Pacific Arctic Group

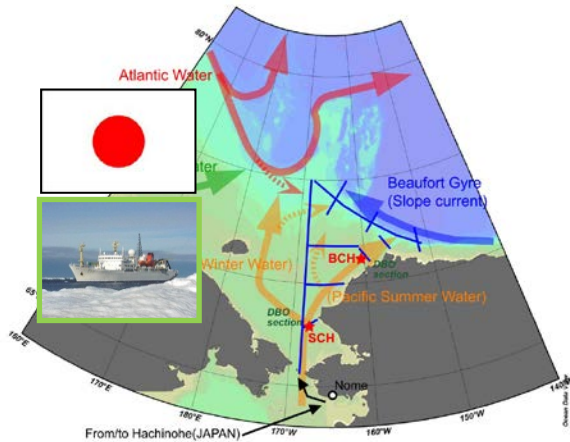
- The Pacific Arctic Group (PAG) is an informal group of organizations and individuals having **a Pacific perspective on Arctic science**. Originally organized under the International Arctic Science Committee (IASC), the PAG is now an **independent affiliate of the IASC** and has as its mission **to 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 organisations.



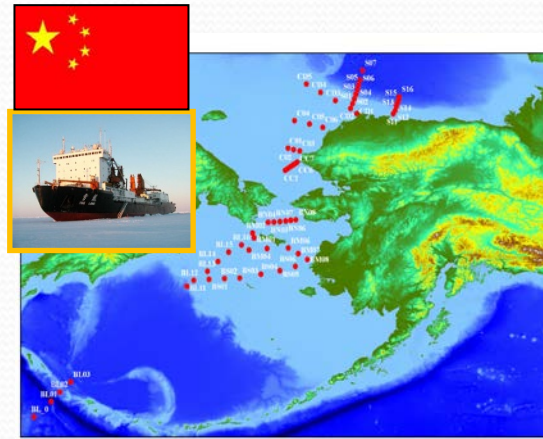


# PAG research cruises in Pacific Arctic Region

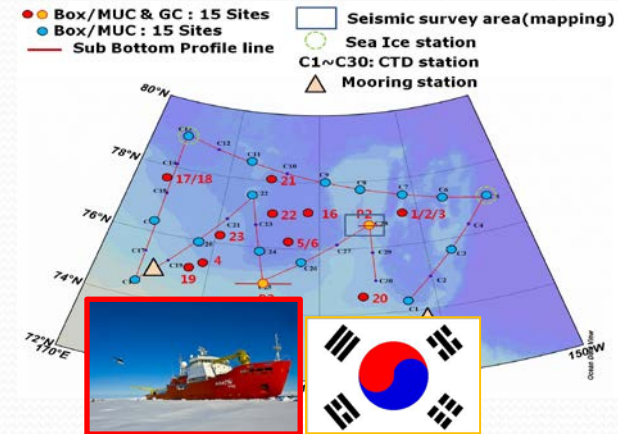
## Japan: RV Mirai



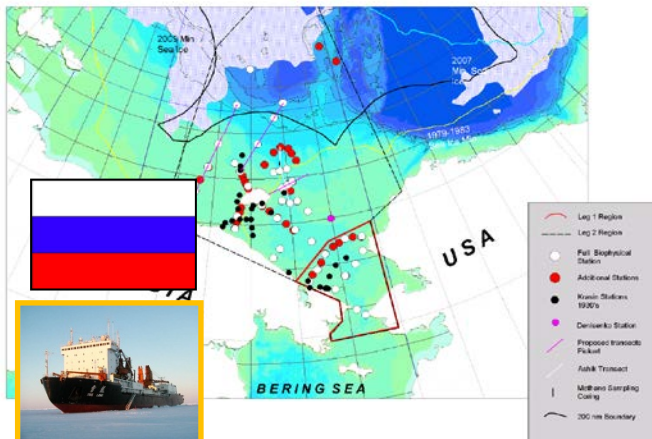
## China: RV Xuelong



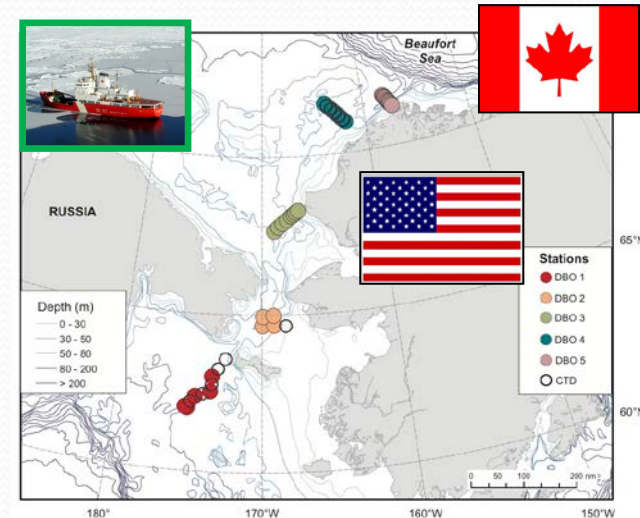
## Korea: RV Araon



## Russia-USA: RV Khromov



## Canada: CCGS Sir Wilfrid Laurier, Louis St. Laurent



## USA: Healy, RV Aquila, Brown etc.



# Sharing information on annual field activities

2015 PAG and DBO Field Season: Sampling Contributors (as of April 17, 2015)

Region Key: DBO1=So. St. Lawrence Is., DBO2=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 <a href="mailto:rpickart@whoi.edu">rpickart@whoi.edu</a>	Kevin Arrigo <a href="mailto:arrigo@stanford.edu">arrigo@stanford.edu</a>
June 30-July 8 (Nome-Nome)	Norseman 2	3	Bering Strait Mooring Project/AON	Rebecca Woodgate <a href="mailto:woodgate@apl.washington.edu">woodgate@apl.washington.edu</a>	Rebecca Woodgate <a href="mailto:woodgate@apl.washington.edu">woodgate@apl.washington.edu</a>
June-July	Norseman 2	-	Walrus tagging	Chad Jay <a href="mailto:cjay@usgs.gov">cjay@usgs.gov</a>	Chad Jay <a href="mailto:cjay@usgs.gov">cjay@usgs.gov</a>
July 8-17 (Anadyr-Anadyr)	Khromov	3	RUSALCA Bering Strait mooring	Kathy.Crane@noaa.gov <a href="mailto:Phyllis.Stabeno@noaa.gov">Phyllis.Stabeno@noaa.gov</a>	<a href="mailto:Kathy.Crane@noaa.gov">Kathy.Crane@noaa.gov</a>
July 4-29-August 15 (Dutch-Barrow)	Healy	5	AON	Robert Pickart <a href="mailto:rpickart@whoi.edu">rpickart@whoi.edu</a>	Robert Pickart <a href="mailto:rpickart@whoi.edu">rpickart@whoi.edu</a>
July 4-23 (Victoria, BC-Barrow)	Sir Wilfrid Laurier	1,2,3,4,5	C30/DBO	Jackie Grebmeier <a href="mailto:jgrebmei@umces.edu">jgrebmei@umces.edu</a>	<a href="mailto:Svein.Vagle@dfo-mpo.gc.ca">Svein.Vagle@dfo-mpo.gc.ca</a>
July 18-Sept 18 (Shanghai-return)	Xuelong	(1-2 partial), 3,5	Chinese Arctic Research Expedition	Jianfeng He <a href="mailto:jhe@pric.org.cn">jhe@pric.org.cn</a>	Jianfeng He <a href="mailto:jhe@pric.org.cn">jhe@pric.org.cn</a>
August 1-23 (Nome-Barrow) August 25- Sept 10 (Barrow-Nome)	Araon	3	ARA05, Korean Arctic Ocean Expedition (KOPRI)	Sung-Ho Kang <a href="mailto:shkang@kopri.re.kr">shkang@kopri.re.kr</a>	Leg 1 Eun Jin Yang <a href="mailto:ejyang@kopri.re.kr">ejyang@kopri.re.kr</a> Leg 2 Seung Il Nam <a href="mailto:sinam@kopri.re.kr">sinam@kopri.re.kr</a>
August 9-30 (Barrow-Tromso)	Oden	-	SEWUS-C3	Martin Jakobsson <a href="mailto:martin.jakobsson@geo.su.se">martin.jakobsson@geo.su.se</a>	Martin Jakobsson <a href="mailto:martin.jakobsson@geo.su.se">martin.jakobsson@geo.su.se</a>
August 18-Sept 8 (Barrow-Barrow)	Annika Marie	5	AON	Carin Ashjian <a href="mailto:cashjian@whoi.edu">cashjian@whoi.edu</a>	Carin Ashjian <a href="mailto:cashjian@whoi.edu">cashjian@whoi.edu</a>
August-October	Westward Wind	4* (modified)	CSESP	Tom Weingartner <a href="mailto:weingart@ims.uaf.edu">weingart@ims.uaf.edu</a>	Bob Day <a href="mailto:bday@abrinc.com">bday@abrinc.com</a> John Burns <a href="mailto:jburnssr@gci.net">jburnssr@gci.net</a>
Aug 30-Sept 12 (Dutch-Nome)	Alaska Endeavor	2	BASIS	<a href="mailto:Ed.Farley@noaa.gov">Ed.Farley@noaa.gov</a>	<a href="mailto:jim.murphy@noaa.gov">jim.murphy@noaa.gov</a>
Aug 25-Oct 6 (Japan-Dutch)	Mirai	-	JAMSTEC	Takashi Kikuchi <a href="mailto:takashik@jamstec.go.jp">takashik@jamstec.go.jp</a>	Shigeto Nishino <a href="mailto:nishinos@jamstec.go.jp">nishinos@jamstec.go.jp</a>
Aug 6 – Sep 4 (Kodiak-Dutch)	Brown	4,5	ARCWEST/CHAOZ-X	<a href="mailto:Sue.Moore@noaa.gov">Sue.Moore@noaa.gov</a> <a href="mailto:Catherine.Berchok@noaa.gov">Catherine.Berchok@noaa.gov</a>	<a href="mailto:Phyllis.stabeno@noaaa.gov">Phyllis.stabeno@noaaa.gov</a>
Sept 6-Sept 26 TENTATIVE!! (Nome-Dutch)	R/V Aquila	1,2,3,4,5 PAM moor + vis/PAM survey; 1,4,5 biophys. moor.	ARCWEST/CHAOZ-X	<a href="mailto:Sue.Moore@noaa.gov">Sue.Moore@noaa.gov</a> <a href="mailto:Catherine.Berchok@noaa.gov">Catherine.Berchok@noaa.gov</a>	<a href="mailto:Catherine.Berchok@noaa.gov">Catherine.Berchok@noaa.gov</a>
Sept 21-Oct 14 (Dutch-Kodiak)	Oscar Dyson	1	BASIS	Ed Farley : <a href="mailto:ed.farley@noaa.gov">ed.farley@noaa.gov</a>	Lisa Eisner : <a href="mailto:lisa.eisner@noaa.gov">lisa.eisner@noaa.gov</a>
September-October	Louis S St-Laurent	-	JOIS	<a href="mailto:Bill.Williams@dfo-mpo.gc.ca">Bill.Williams@dfo-mpo.gc.ca</a>	<a href="mailto:Bill.Williams@dfo-mpo.gc.ca">Bill.Williams@dfo-mpo.gc.ca</a>



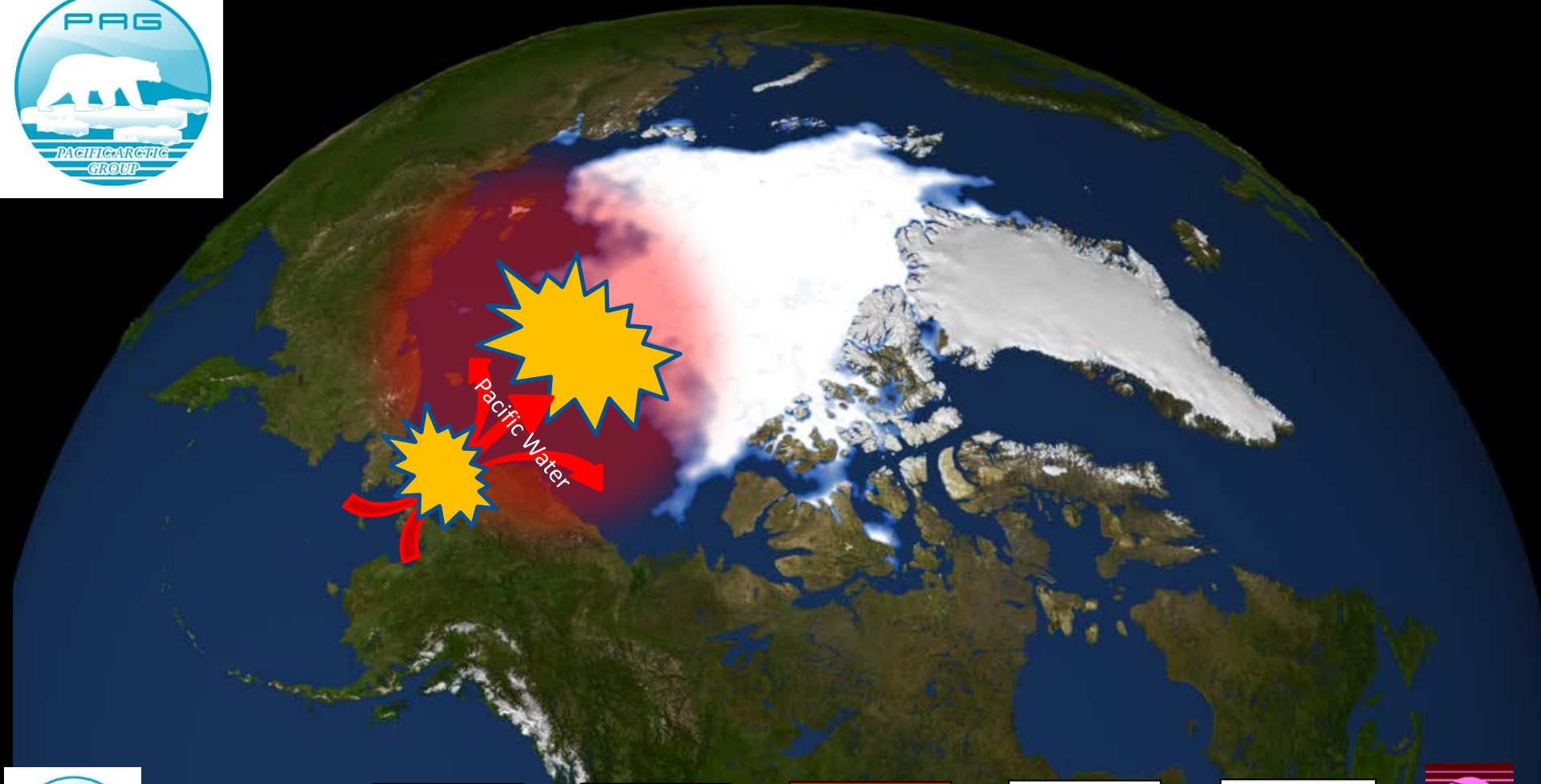


# Pacific Arctic Group

- PAG **shares information** on annual field activities in the Pacific Arctic region
- PAG **continues to develop and implement long-term monitoring activities** such as the Distributed Biological Observatory (DBO) and Pacific Arctic Climate Ecosystem Observatory (PACEO)
- PAG **undertakes Pacific Arctic regional, multidisciplinary syntheses of scientific findings** in the marine region relevant to ongoing scientific objectives at the core of the PAG
- PAG is engaged in **project development and sampling in the Pacific Arctic region** to investigate climate, oceanography, air-sea ice interactions, physical oceanography, and modeling

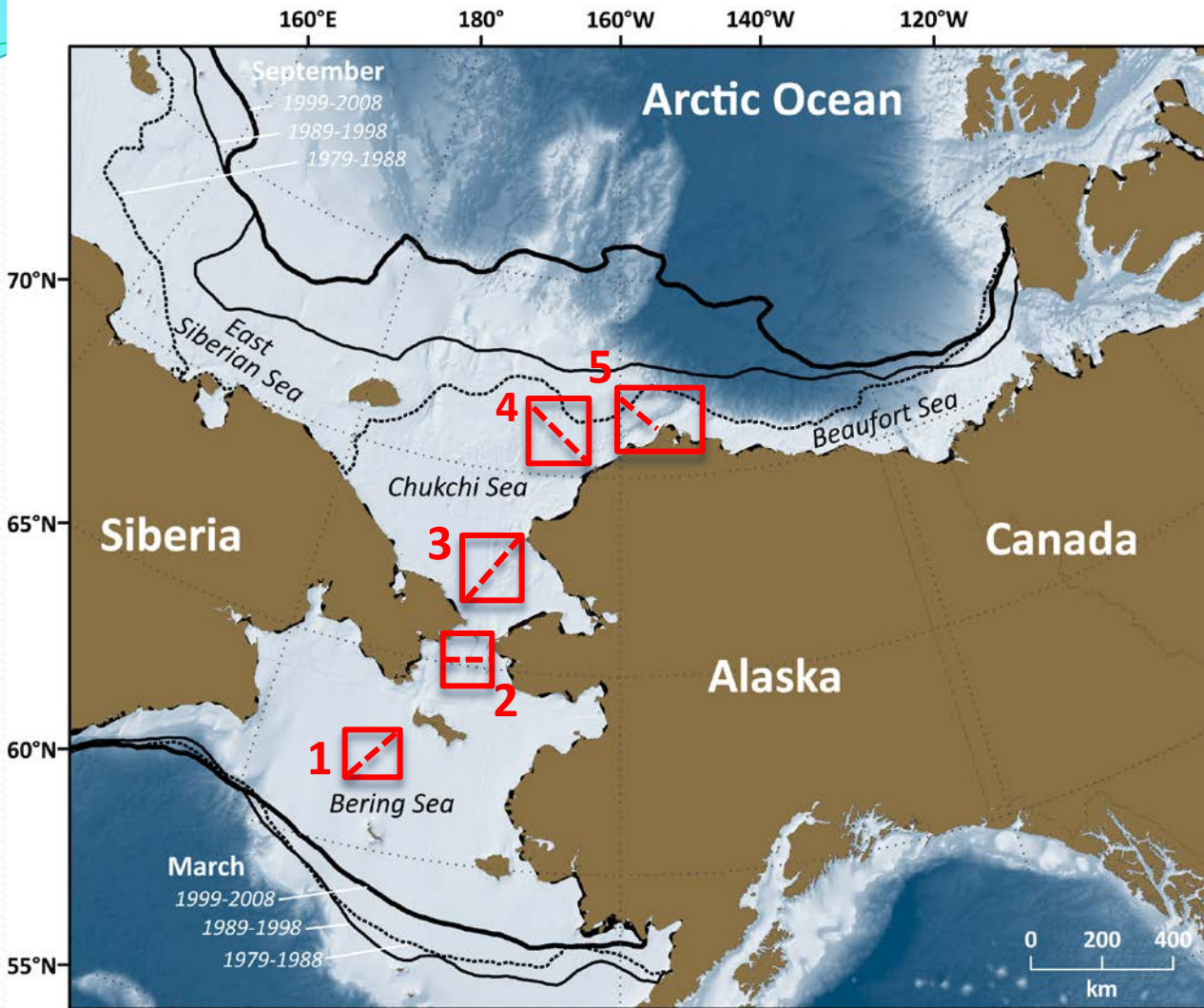


PAG is engaged in **project development and sampling in the Pacific Arctic region** in rapid transition to investigate climate, oceanography, air-sea ice interactions, physical oceanography, and modeling

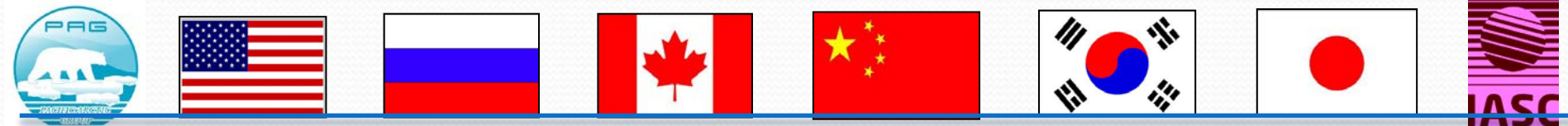




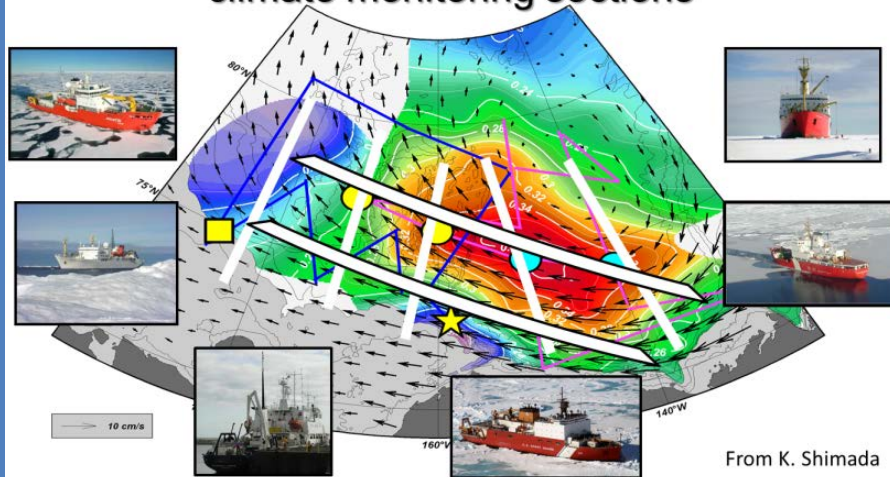
# Continued development and implementation of long-term monitoring activity in the lower Pacific Arctic - the Distributed Biological Observatory (DBO)



- 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



## Proposed international Pacific Arctic climate monitoring sections



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)

## New development and of long-term monitoring activity in the higher Pacific Arctic - the Pacific Arctic Climate Ecosystem Observatory (PACEO)

- **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**.





# Pacific Arctic Group

- The **Spring PAG meeting** is held during Arctic Science Summit Week and are focused on **“business” issues** and an **update on research plans** for the coming field season.
- The **Fall PAG meeting** is hosted at various locations in alternating PAG countries after the field season and is focused on **review of accomplishments** during the previous summer and outlooks for the future. These discussions are useful **in developing scientific exchanges and other types of collaborations during and after field operations.**
- The **annual fall meeting** will provide country updates on 2015 field activities and results, status reports on the developing Pacific Arctic Climate Ecosystem Observatory (PACEO) and shelf-basin exchange lines, sea ice studies, the Distributed Biological Observatory (DBO), and ongoing synthesis activities.





**Pacific Arctic Group (PAG) Fall Meeting  
Final Agenda**  
October 28-29, 2015

Korea Polar Research Institute (KOPRI)  
26 Songdomirae-ro, Yeonsoo-gu  
Incheon 21990, Republic of Korea



\*meeting agenda, presentations and final report will be posted on the PAG website <http://pag.arcticportal.org/>

<b>Wed. October 28, 2015</b>	<b>Thur. October 29, 2015</b>
0830 and 0930 - transport hotel to KOPRI (bus ride); security clearance and registration	0900 and 0930 transport hotel to KOPRI (bus ride)
0930 - 1140 Morning 1	0930 - 1030 Morning 1
1145 - 1200 Coffee break	1030 - 1050 Coffee break
	1050 - 1200 Morning 2
1200 - 1330 Lunch at KOPRI Library ( <b>Group Photo</b> , KOPRI tour)	1200 End of PAG meeting; bus rides to restaurant
1330 - 1530 Afternoon 1	1230-1400 Lunch hosted by KOPRI
1530 - 1550 Coffee break	1400 – Bus rides to hotels
1550 - 1720 Afternoon 2	
1740 - Bus rides to restaurant	
1800-2000 – Dinner hosted by KOPRI	
2000 – Bus rides to hotels	



# Agenda items

## Introduction and Welcome (Sung-Ho Kang)

- Welcoming remarks (Yeadong Kim, KOPRI President)
  - Brief introduction of PAG and meeting agenda (Sung-Ho Kang, Chair)
- 
1. Update (highlights) of 2015 field results and science findings; preliminary 2016 plans (up to 30 minute maximum time per country, including discussion)
    - Canada: Jackie Grebmeier for Bill Williams
    - China: Jinping Zhao for Jianfeng He
    - Japan: Takashi Kikuchi/Shigeto Nishino
    - Korea: Eun Jin Yang
    - Russia: Vladimir Ivanov
    - United States: Jackie Grebmeier



2. Updates and Planning of PAG joint field and modeling activities
- Chukchi Borderland/Arctic Basin joint activities
    - RUSALCA northern expansion program shelf to basin (Aleksey Ostrovskiy)
    - CB/Basin and shelf-basin exchange lines (Bob Pickart, Takashi Kikuchi, Koji Shimada)
    - NABOS update (Vladimir Ivanov, Igor Polyakov)
    - Ecosystem (Jackie Grebmeier, Takashi Kikuchi)
    - Satellite observations (Josefino Comiso, Hyun-cheol Kim, Hirawake Toru)
    - Long-term planning for Joint Program Scientific Research and Monitoring in the central Arctic Ocean and adjacent shelf areas (Phil Mundy)
  - Sea ice and atmosphere (Joo-Hong Kim, Jun Inoue)
  - Modeling activities (Jia Wang, Baek-Min Kim)
  - Coordinating mooring locations (Phyllis Stabeno-presented by Jackie Grebmeier, Kyoung-Ho Cho, Koji Shimada)
  - Other PAG relevant activities-open discussion





3. Status report on PAG-endorsed DBO and PACEO ongoing and planned future activities (Jackie Grebmeier-session lead, with results from others beyond presented in country reports)
- Brief highlight science findings from the DBO pilot program 2010-2015
  - The new DBO lines in the Beaufort Sea, pending extension of DBO4 in the NW Chukchi Sea, update on DBO-type lines in the Northern Barents Sea
  - DBO EOL archive and AXIOM workspace, DBO and PAG metadata policy
  - Plans for 2016 field activities and DBO publications
  - Results from pilot PACEO in 2015 and plans for PACEO 2016 field activities
    - Physical oceanography and sea ice dynamics (Vladimir Ivanov, Koji Shimada, Jinping Zhao, Kyoung-Ho Cho, Ho Kyung Ha)
    - Chemical oceanography (Jessica Cross, Tae Siek Rhee, Jin-young Jung, Sun-Yong Ha)
    - Biogeochemical oceanography (Sang Lee, Kyung-Hoon Shin, Naomi Harada)
    - Ecosystem (Jackie Grebmeier, Eun Jin Yang, Hyoung Sul La)
    - Sediment trap (Naomi Harada, Dong-sun Kim)
    - Atmosphere and sea ice (Joo-Hong Kim, Jun Inoue)
    - Satellite observations (Josefino Comiso, Hyun-cheol Kim, Hirawake Toru)
    - Modelling (Baek-Min Kim, Jia Wang)



#### 4. Data sharing and issues-discussion

- Discuss DBO/PAG data policy in relation to IASC data policy (Jackie Grebmeier)
- PAG Web-GIS for data sharing (Junwha Chi)
- Other input?

#### 5. Synthesis-status and future plans

- Biogeosciences-special issue update (Takashi Kikuchi)
- ARAON DSR Special issue update (Sang Lee)-completed
- DBO special issue (Jackie Grebmeier)
- Ideas for other synthesis products?

#### 6. Updates on interactions with other organizations and upcoming meetings – AFoPS, IASC, SAON, PICES, APECS, others

- CAFF/PAME/AMAP activities (Phil Mundy)
- AFoPS activities (Hyung Chul Shin)
- Arctic Observing Open Science Meeting, November 2015 (Kyoung-Ho Cho)
- North Pacific Research Board Arctic call (Danielle Dickson)
- Arctic Ocean Summit (AOS) White paper (Seong-Joong Kim)
- Gordon Research Conference/Seminar, March 2017, CA (Jackie Grebmeier)
- ASSW 2017 Science Symposium (Takashi Kikuchi, SSC of the ASSW 2017)
- Others?





## 7. PAG structure

- Executive committee composed of PAG Chair, Vice-Chairs, and leads from each of PAG activities: DBO (Jackie Grebmeier), Canada Basin, PACEO (Koji Shimada), sea ice-atmosphere (Joo-Hong Kim)
- Current rotation plan: Chair and Secretariat
  - 2014-2016 – Korea (Sung-Ho Kang, KOPRI)
  - 2016-2018 – Japan (TBD)
  - 2018-2020 – Russia, Canada, or China?

## 8. Future PAG meetings:

- March 12-18 2016 – ASSW2016, Fairbanks, Alaska (<https://assw2016.org/>)  
- (PAG meeting March 13, 2016)
- Fall 2016 – Qingdao, China
- Spring 2017 - ASSW2017, Prague, Czech Republic
- Fall 2017 – TBD (Tokyo, Japan?)
- June 2018 - ASSW2018, Davos, Switzerland

