

Pacific Arctic Group (PAG):

Perspective of ICARP III





Integrating Arctic Research *a Roadmap for the Future*

3rd International Conference on Arctic Research Planning
(ICARP III)

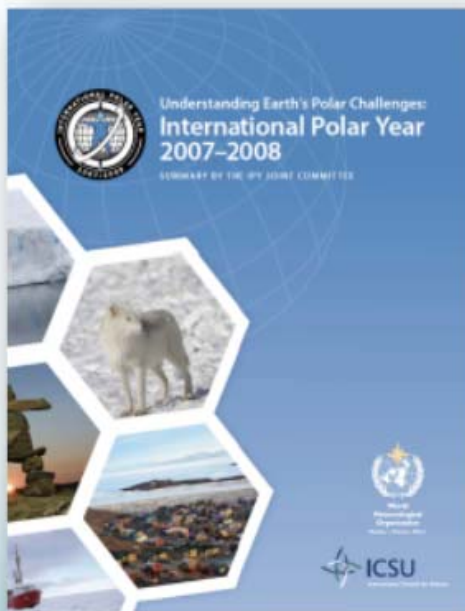
ICARP III

provides a framework to help:

- ◎ **identify** Arctic science **priorities** for the next decade;
- ◎ **coordinate** various Arctic research agendas;
- ◎ **inform** policy makers, people who live in or near the Arctic and the global community;
- ◎ **build constructive relationships** between producers and users of knowledge.

Considering

- the outcome of **ICARP II** and



- the **International Polar Year**



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NATURE | COMMENT

Polar research: Six priorities for Antarctic science

Mahlon C. Kennicutt, Steven L. Chown, John J. Cassano, Daniela Liggett, Rob Massom, Lloyd S. Peck, Steve R. Rintoul, John W. V. Storey, David G. Vaughan, Terry J. Wilson & William J. Sutherland



The aurora australis over the German Antarctic research base, Neumayer-Station III.

Six priorities for Antarctic science

SIX SCIENTIFIC PRIORITIES

- Define the global reach of the Antarctic atmosphere and Southern Ocean.
- Understand how, where and why ice sheets lose mass.
- Reveal Antarctica's history.
- Learn how Antarctic life evolved and survived.
- Observe space and the Universe.
- Recognize and mitigate human influences.

ICARP III is

a process for:

- ⊙ **integrating priorities** for forward-looking, collaborative, interdisciplinary Arctic research and observing;
- ⊙ **establishing an inventory** of recent and current synthesis documents and major developments in Arctic research.

ICARP III does not

- ⊙ undertake the development of **new science plans**

Rather:

- ⊙ ICARP III **builds** on the many comprehensive **science plans** that exist already;
- ⊙ and **compliments** existing activities with processes to identify and fill gaps that may need attention.

Engaging

all partners, including funders, in shaping the future of Arctic research needs, ICARP III will:

- ◎ produce a **consensus statement** identifying the most important Arctic research needs for the next decade;
- ◎ provide a **roadmap** for research priorities and partnerships;
- ◎ identify potential contributions of Arctic research partners to the **International Polar Partnership Initiative**.



current ICARP III partners



The program

includes a series of meetings and events during 2014/15:

- starting with a **formal launch** at the **Arctic Science Summit Week (ASSW) 2014** in Helsinki, Finland and
- culminating in a **final conference** during **ASSW 2015** in Toyama, Japan.





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

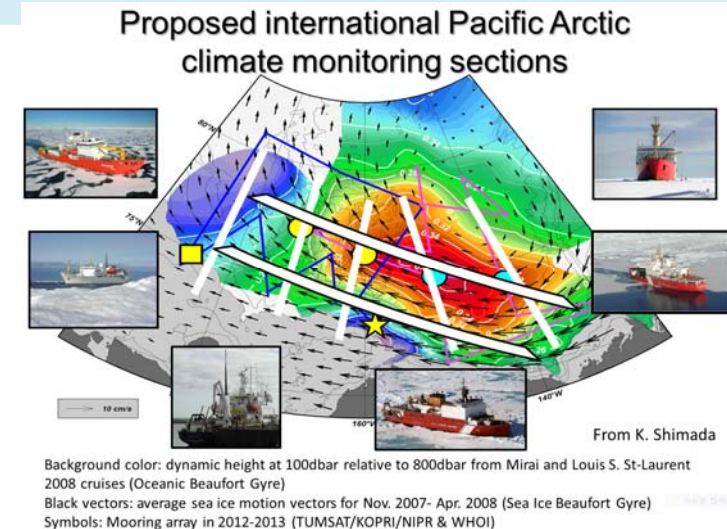
Photo credit: Aleksey Ostrovskiy

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 **a 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.**



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



A workshop held in Tokyo to investigate and refine the following key future observing goals and to develop an implementation plan for action.

- The goals are:

- * To study the evolution, structure, 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-

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

*** To contribute to the critical elements defined above**

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

shared data and publish the results



JOINT STATEMENT

Letter of Intent

Cooperation of the Pacific Arctic Group Members on: Developing a Pacific Arctic Climate-Ecosystem Observing Network

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.

In October, 2014, the Pacific Arctic Group fall meeting focused on a review of accomplishments during the previous summer and outlooks for the future research plans.

Korean Polar Research Institute, Korea

Arctic Research Program, NOAA, USA

Japan Agency for Marine-Earth Science
And Technology

National Institute of Polar Research, Japan

Polar Research Institute of China, China

Department of Fisheries and Oceans, Canada

Arctic and Antarctic Research Institute,
Russian Federation





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

PAG activities and topics in 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 2nd 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.

Update on PAG activities

Pacific Arctic Group (PAG)

Sung-Ho Kang

Chair, Pacific Arctic Group

Division of Polar Ocean Sciences, Korea Polar Research Institute (KOPRI), Incheon, Republic of Korea

MWG meeting

23 April 2015

Toyama, Japan



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

Pacific Arctic Group

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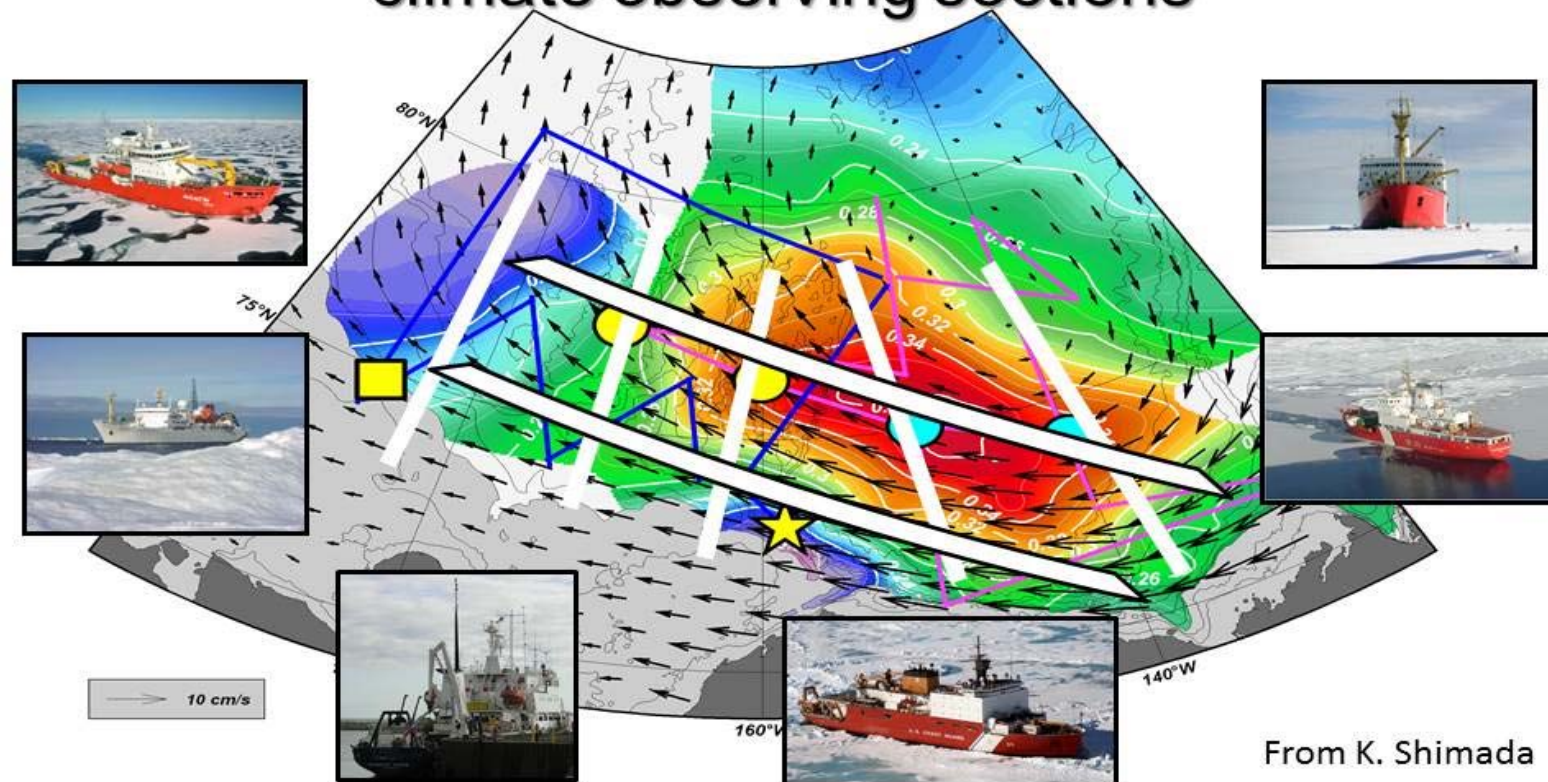


PAG ICARP III Activities

- The nations of the Pacific Arctic Group are proposing to carry out a series of repeat observations in the Arctic Ocean, north of the Chukchi Sea extending from the Makharov Basin in the West to the Canada Basin in the East.
- This region has undergone the most extreme loss of sea ice extent and thickness within the Arctic Ocean and yet is very poorly observed. We propose to study the evolution, structure, variability, and heat transport of Atlantic Water in this region and its interaction with northward flowing warm Pacific Water from the Chukchi Sea, which accelerates the positive ice/ocean albedo feedback cycle, leading to rapid loss of summer sea ice.
- We also propose to carry out a census of the ecosystem in this region which is likely in rapid transition due to the extreme physical changes.
- Repeat observational transects and time-series records from moorings will be planned to reveal year-round the interplay between the amount of heat that is being lost into the atmosphere from this part of the Pacific Arctic Ocean, the enhanced mixing of both surface and intermediate waters in response to increased storms, increased ocean absorption of solar radiation and the consequent impacts on the changing weather and climate of the Northern Hemisphere.
- The observing period will also incorporate atmospheric observations to support the WMO's Year of Polar Prediction (YOPP).
- We propose to coordinate this work with the vessels of our respective countries from 2015-2020, which will provide a unique suite of synoptically collected data made available for joint analysis, assessment, and modeling/data assimilation via the mechanisms already set up within the Pacific Arctic Group.

PAG ICARP III Observatory

Proposed international Pacific Arctic climate observing 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)

PAG ICARP III Contribution

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- **PAG's ICARP III contribution as data sharing and publications from results of the Distributed Biological Observatory (DBO), continued development of the Climate Observing System, 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.**