







Korea-Polar Ocean in Rapid Transition (K-PORT)

-  Polar Climate Change Research
-  Polar Earth-System Sciences
-  Polar Life Sciences
-  Polar Ocean Environment
-  Arctic Research
-  Promotion Program

Research Background and Importance

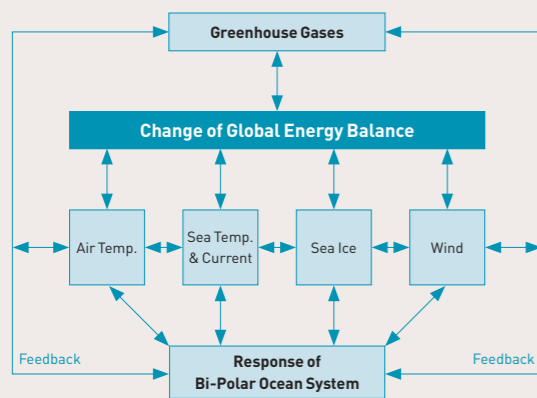
Background of Research

- ° Intensification and acceleration of international collaboration to understand the Bi-polar Oceans in rapid change and to cope with global issues (climate change, future energy & resources, and the Northern Sea Route) by using new Korean icebreaker RV Araon
- ° Need to integrate the polar ocean researches into the Bi-polar concept and build the comprehensive environmental map to compare the oceanic environments in the Bi-polar Oceans in the Pacific polar ocean regions (Pacific Arctic Ocean regions such as Bering, Chukchi, Beaufort, East Siberian Seas vs. Pacific Antarctic region, Ross Sea)

Necessity of Research

- ° Need for the studies related to global issues (climate change, energy/resources, and Northern Sea Route)
- Long-term monitoring studies to understand of global impact of rapid environmental changes in the Bi-polar Oceans and provide the countermeasure strategies

Connectivity of reactions of the marine environment of Bi-polar Oceans to climate change



- ° Need for the studies to conform to the paradigm shift of national studies of polar regions
- Measures to advance the government policies concerning the polar regions and proactive implementation of Bi-Polar policy encompassing both Arctic and Antarctic Oceans
- Strengthening of capability for polar ocean researches and exploration expected after the construction of the icebreaker RV ARAON and Jangbogo Antarctic Research Station

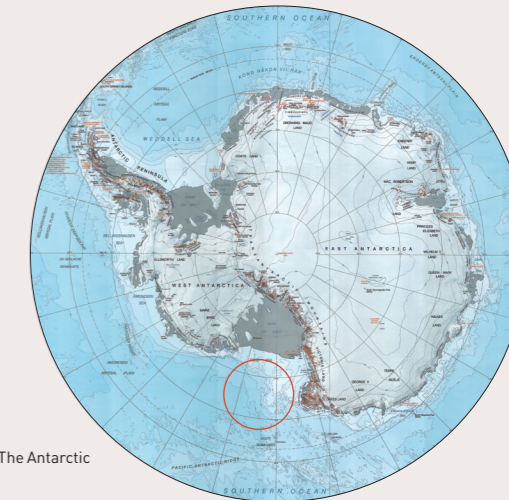
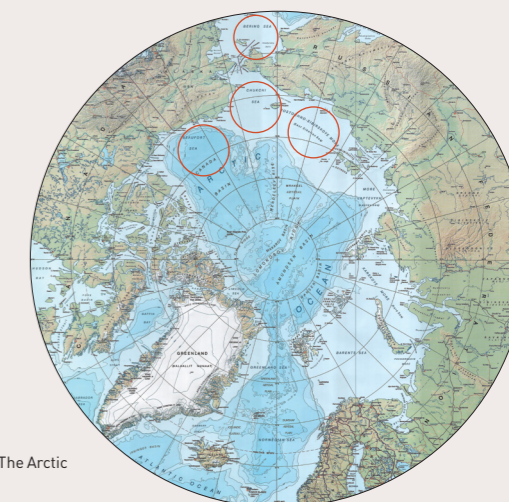
KOPRI
Korea Polar Research Institute

26 Songdomirae-ro, Yeonsu-gu,
Incheon, 406-840, Korea
Tel. +82-32-770-8400



Division of Polar Ocean Environment

Principle Investigator	Kang, Sung-Ho
E-Mail	shkang@kopri.re.kr
Partner Organizations	Pusan National Univ., Korea Maritime and Ocean Univ., Ulsan National Institute of Science and Technology, Jungwon Univ., Hanyang Univ., Seoul National Univ., Pukyong National Univ., Korea Maritime Institute
Research Duration	Dec. 2011 - Jun. 2016
Research Area	° Arctic Ocean : Pacific Arctic Ocean Region (Bering, Chukchi, Beaufort, East Siberian Seas) ° Antarctic Ocean : Pacific Antarctic Region (Ross Sea)



Aim and Contents of research

Major Purpose

- To understand rapid environmental changes and to operate multidisciplinary survey and mapping of water column and subsurface in temporal and spacial scales using the icebreaker RV Araon in the Bi-polar ocean
- To investigate the structure and processes in water columns and subsurface in rapid transition
- To construct monitoring system of environmental changes in the sea ice and water column in the Bi-polar ocean in rapid change

Research Contents

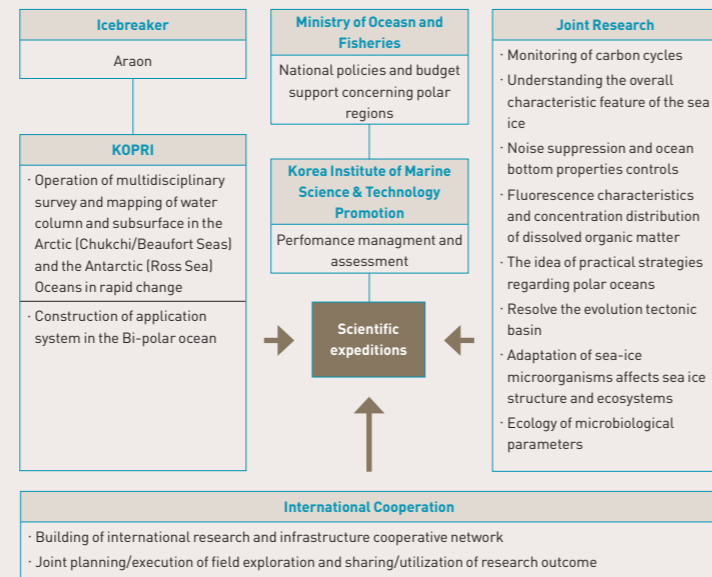
- Multidisciplinary survey and mapping of water column in the Pacific Arctic (around Northern Sea Route region) and Antarctic Oceans in rapid change
- Construction of scientific application system via construction of an integrated observing network in the Bi-polar ocean



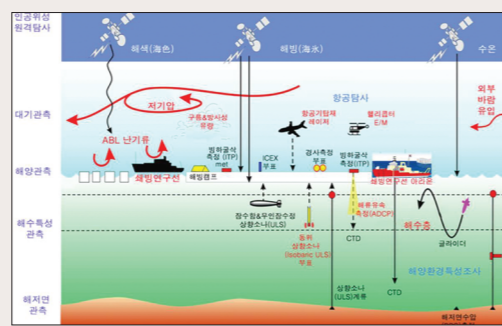
Research method

R&D Implementation Scheme and Execution

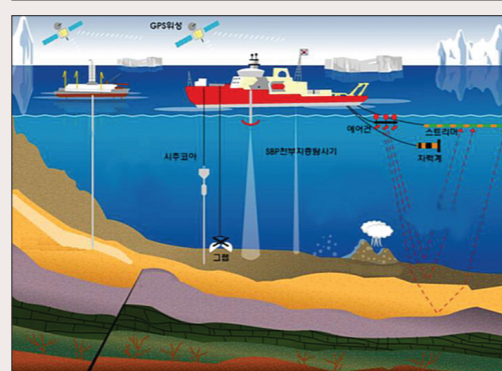
- Site survey of Bi-polar Oceans using Korean icebreaker RV Araon
- Joint researches of academia and research institutes to accomplish the project goal
- Strengthening of interdisciplinary collaboration in bi-polar ocean region through international joint researches



Survey of water column using RV Araon



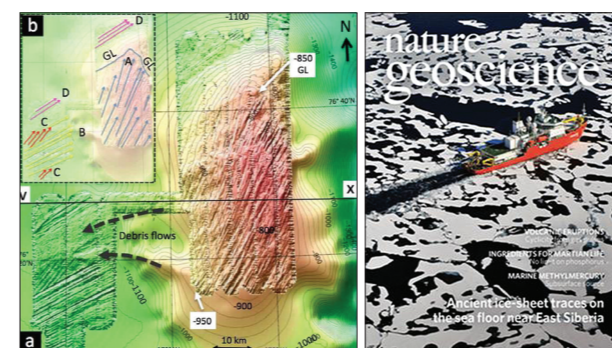
Survey of Subsurface using RV Araon



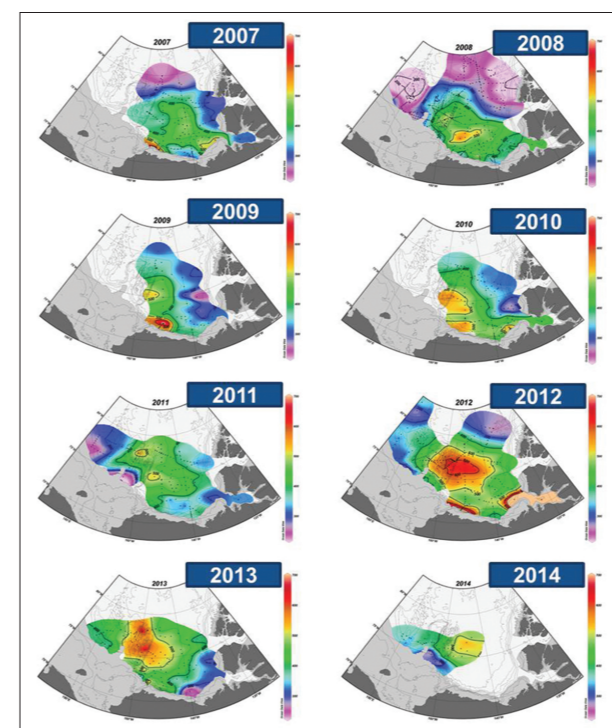
Overall Outcomes

Discovery of Evidence of Past Ice Sheet in the East Siberian Sea in the North Pole

- The traces of ice sheets that existed in the quaternary ice age (ice age between 2.6 million years ago and 10,000 years ago) in the East Siberian Sea in the North Pole was found for the first time in the world by a submarine topology survey using the RV Araon
- Published in Nature Geoscience (2013, 6:842-846, doi:10.1038/ngeo1904)



Monitoring of long-term environmental changes in Pacific Arctic Ocean



Future Plans and Application

- Accumulation of research and exploration know-how and training of domestic research professionals using the icebreaker Araon
- Establishment of the ground for scientifically utilizing the Bi-polar Oceans in the future by developing the integrated climate-ecosystem observatory
- Provision of the data to play the international leading role for coping with global issues (climate change and energy)
- Provision of the data related to the changes of the Bi-polar Oceans that can affect the weather in Korean Peninsula
- Provision of the data for sustainable development of the Polar Oceans
- Provision of policy data for scientific and diplomatic activities related to international energy resources and environment

Korea's First International Joint Research in the marginal ice zone (ice camp study)

- The multinational research teams and researchers from 10 countries led by Korea and including the US, UK, Japan, China, Canada, Russia, India, and Finland carried out the researches on ocean, sea-ice, atmosphere and eco-system changes



Leading role in international joint researches of the Pacific Arctic Ocean

- As Korea was elected as the chairing country (2014-2016) of the Pacific Arctic Group (PAG), KOPRI can play the leading role in joint researches of Pan-Arctic Ocean in the future.

