



The 25th International Symposium on Polar Sciences

May 13-15, 2019
Korea Polar Research Institute
Incheon, Republic of Korea

Third Circular

The 25th International Symposium on Polar Sciences organized by Korea Polar Research Institute (KOPRI) will be held on May 13-15, 2019 in Incheon, Republic of Korea. This Symposium aims to bring polar scientists together to discuss their research findings and to promote international collaborative research.

A detailed program and other practical information are attached. We are sincerely looking forward to meeting all of you in Incheon.

THEME AND SESSIONS

Korea's first icebreaking research vessel, *Araon*, was launched in 2009 and made her official maiden voyage to the Antarctica in 2010. Since then she became one of the world's busiest icebreaker, spending 294 days in the Arctic and Antarctic Oceans. With *Araon*, KOPRI has devoted its passion and commitment to unveil the mysteries of Polar regions.

In commemoration of the scientific dedication over the years and celebrating the 10th anniversary of *Araon*, the theme of the 25th International Symposium on Polar Sciences will be **"*Araon's Journey through the Decade: Findings in Ocean, Earth and Paleoclimate science*".**

The following six sessions are proposed.

- Response of the Southern Ocean to the Changing Climate
- Changing Arctic Ocean: Understanding the impacts of climate changes and their global consequences
- Geological and Geophysical (& Biological) processes in Circum-Antarctic Ridges
- Rapid changes in Arctic sub-seabed
- Late Quaternary Ocean-Cryosphere interactions in the Antarctic Ocean
- Past analogue for future Arctic: Glacial and oceanographic perspective

PLENARY LECTURER

Dr. Henry Dick
(Woods Hole Oceanographic Institution)

Prof. Leonid Polyak
(Ohio State University)

SPECIAL LECTURER

Prof. Paul G. Falkowski
(Rutgers, The State Univ. of New Jersey)

Prof. Jürgen Mienert
(UiT, The Arctic Univ. of Norway)

INVITED LECTURER

Dr. Yong Ahn Park
(UN Commission on the Limits of the Continental Shelf)

SIDE MEETINGS

Southern Ocean Observing System (SOOS) Meetings

- Amundsen and Bellingshausen Sector Working Group: May 8-10
- Executive Committee: May 13
- Data Hack: May 15
- Science Steering Committee: May 16-18
- Data Management Sub-Committee: May 16-18

Arctic Warming and East Asia Weather Linkage Workshop

- 09:00-18:00, May 13 at Sejong International Conference Room (2nd floor, Cafeteria building of KOPRI) Arctic Warming and East Asia Weather Linkage Workshop will be held to share and discuss the hot issue on the Arctic Warming and its connection to East Asia weather.

Early Career Polar Scientist Gathering

- 12:00-13:00 at Polar Bear Seminar Room (3rd floor, Main building of KOPRI)

SOCIAL EVENTS

Icebreaker Reception

- 18:30-20:00, May 13 at Lily, Orakai Songdo Park Hotel

Banquet

- 18:00-19:30, May 15 at Main Hall (1st floor, Mail building of KOPRI)
Young Scientist Awards will be presented to the outstanding poster presentations and the award ceremony will take place as a part of the banquet.

PROGRAM AT A GLANCE

May 13 (Monday)		
Time	Place	Program
18:30-20:00	Lily, Orakai Hotel	• Icebreaker Reception

May 14 (Tuesday)		
Time	Place	Program
08:30-09:00	Reception Desk	• Registration
09:00-09:30	Auditorium	• Opening Ceremony
09:30-12:00	Auditorium	• Plenary Lecture 1 • S1. Geological and Geophysical (& Biological) processes in Circum-Antarctic Ridges
12:00-13:00	Main Hall & Polar Bear Seminar Room	• Lunch • Early Career Scientist Gathering
13:00-15:30	Auditorium	• Special Lecture 1 • S2. Changing Arctic Ocean: Understanding the impacts of climate changes and their global consequences 1
15:30-16:00	Atrium	• Coffee Break and Poster Session
16:00-18:00	Auditorium & Sejong International Conference Room	• S3. Response of the Southern Ocean to the Changing Climate • S4. Past analogue for future Arctic Glacial and oceanographic perspective 1

May 15 (Wednesday)		
Time	Place	Program
08:30-09:00	Reception Desk	• Registration
09:00-11:30	Auditorium & Sejong International Conference Room	• Plenary Lecture 2 • S5. Past analogue for future Arctic Glacial and oceanographic perspective 2 • S6. Changing Arctic Ocean: Understanding the impacts of climate changes and their global consequences 2
11:30-12:00	Auditorium	• Invited Lecture
12:00-13:00	Main Hall	• Lunch
13:00-15:30	Auditorium	• Special Lecture 2 • S7. Rapid change in Arctic sub-seabed
15:30-16:00	Atrium	• Coffee Break and Poster Session
16:00-18:00	Auditorium	• S8. Late Quaternary Ocean-Cryosphere interaction in the Antarctic Ocean
18:00-19:30	Main Hall	• Banquet and Young Scientists Award Ceremony

DETAILED PROGRAM

May 14 (Tuesday)	
Registration - Reception Desk	
08:30-09:00	Registration
Opening Ceremony - Auditorium	
09:00-09:20	Welcome Remarks
09:20-09:30	Group Photo Session
Plenary Lecture 1 - Auditorium	
09:30-10:00	PL 01. Henry Dick (WHOI) <i>TBD</i>
Session 1. Geological and Geophysical (& Biological) processes in Circum-Antarctic Ridges - Auditorium	
10:00-10:25	S1 01. Henry Dick (WHOI) <i>TBD</i>
10:25-10:45	S1 02. Jonguk Kim <i>Discovery of active and inactive hydrothermal vents along the middle Central Indian Ridge</i>
10:45-11:05	S1 03. Jung-Woo Park <i>Chalcophile element fertility and Seafloor massive sulfide deposits</i>
11:05-11:25	S1 04. Seung-Sep Kim <i>Geophysics of the Southern Ocean mantle domain</i>
11:25-11:45	S1 05. Hakkyum Choi <i>Marine Magnetic Investigation on the Australian-Antarctic Ridge</i>
11:45-12:00	S1 06. Sung-Hyun Park <i>Geochemistry of basalt from the super-segment of the Australian-Antarctic Ridge</i>
12:00-13:00	Lunch & Early Career Scientist Gathering
Special Lecture 1 - Auditorium	
13:00-13:30	SL 01. Paul G. Falkowski (Rutgers University) <i>Understanding photosynthetic efficiency in the ocean</i>
Session 2. Changing Arctic Ocean: Understanding the impacts of climate changes and their global consequences 1 - Auditorium	
13:30-13:55	S2 01. Igor Polyakov <i>Atlantification of the eastern Arctic Ocean</i>
13:55-14:20	S2 02. Jacqueline Grebmeier <i>The Distributed Biological Observatory: A Change Detection Array in the Pacific Arctic</i>
14:20-14:40	S2 03. Kyoung-Ho Cho <i>Observation of Cold Halocline Waters at the Chukchi Sea Continental Margin</i>
14:40-15:00	S2 04. Seung-Kyu Kim <i>Microplastics (MPs) in Arctic Environment monitored by 2016-2017 ARAON Expedition: Bering Strait as Another Important Entry Channel of MPs</i>
15:00-15:20	S2 05. Deo Florence Onda <i>Implications of Warming and Strengthened Stratification to the Eukaryotic Microbial Communities of the Arctic Ocean</i>
15:30-16:00	Coffee Break and Poster Session

Session 3. Response of the Southern Ocean to the Changing Climate - Auditorium		Session 4. Past analogue for future Arctic Glacial and oceanographic perspective 1 - Sejong International Conference Room	
16:00-16:25	S3 01. Klaus Meiners <i>Understanding Change in Sea-Ice Ecosystems</i>	16:00-16:30	S4 01. Kyung Sik Woo <i>Why Did the Laurentide Ice Sheet Start to Build up at 50 KA</i>
16:25-16:45	S3 02. Craig Lee <i>Sustained, Autonomous Observations Beneath Dotson Ice Shelf</i>	16:30-16:50	S4 02. Seung-Il Nam <i>KOPRI's Arctic Research Programs: Scientific achievements and Future research plans</i>
16:45-17:05	S3 03. Patricia Yager <i>How Ice-Sheet-Ocean Interactions Impact The Carbon Cycle of An Antarctic Coastal Polynya</i>	16:50-17:10	S4 03. Kyeong Ja Kim <i>Glacial history and paleoceanographic changes of the western Arctic Ocean (Mendelev Ridge) using beryllium isotopes</i>
17:05-17:25	S3 04. Robert Sherrell <i>Iron Sources to the Amundsen Sea: Glacial Ice Melt May Not Be The Main Input</i>	17:10-17:25	S4 04. Young Jin Joe <i>Quaternary litho- and seismic stratigraphy of the Chukchi abyssal plain, Western Arctic Ocean</i>
17:25-17:45	S3 05. Jeomshik Hwang <i>Characteristics of Sinking Particles in the Amundsen Sea</i>	17:25-17:40	S4 05. Kenta Suzuki <i>Collapses of the Northwestern Sector of the Laurentide Ice Sheet During the Last Glaciation Constrained by Ramped Pyrolysis ¹⁴C Sediment Dating in the Western Arctic Ocean</i>
17:45-18:00	S3 06. Hyoung Sul La <i>Zooplankton Vertical Behavior in the Amundsen Sea, Antarctica</i>	17:40-18:00	S4 06. Christelle Not <i>Evolution of Western Arctic Ocean Water Masses Stratification During the Last 150,000 Years</i>

May 15 (Wednesday)			
Registration - Reception Desk			
08:30-09:00	Registration		
Plenary Lecture 2 - Auditorium			
09:00-09:30	PL 02. Leonid Polyak (Ohio State University) Current state and paleo perspectives of the changing Arctic Ocean		
Session 5. Past analogue for future Arctic Glacial and oceanographic perspective 2 - Auditorium		Session 6. Changing Arctic Ocean: Understanding the impacts of climate changes and their global consequences 2 - Sejong International Conference Room	
09:30-10:00	S5 01. Christoph Vogt The Plio-Pleistocene ACES (Leg 302) record revisited: A high resolution mineralogical record	09:30-10:00	S6 01. Craig Lee Stratified Ocean Dynamics of the Arctic: SODA
10:00-10:15	S5 02. Kwangkyu Park Changes of sedimentary mineral composition in the Makarov Basin for the last ~1 Ma	10:00-10:20	S6 02. Saewung Kim Exploring Biogenic Reactive Volatile Organic Compounds over the Arctic Ocean
10:15-10:30	S5 03. Hyo-Seok Park Arctic amplification as a key constraint on the Northern Hemisphere temperature in mid-Holocene	10:20-10:40	S6 03. Jeremy Wilkinson Eco-Light: Understanding the Impact of Changes in the Under-Ice Light Field
10:30-10:45	S5 04. Dukki Han Microbial Diversity and Community Composition in Holocene Sediments in the Arctic Ocean	10:40-11:00	S6 04. Chang-Qing Ke Arctic sea ice thickness retrievals from CryoSat-2: seasonal and interannual comparisons of three different products
10:45-11:00	S5 05. Haryun Kim Importance of organic matter in mercury spatial distribution into Svalbard fjord sediments	11:00-11:20	S6 05. Hyung-Gyu Lim Impact of Nonlinear Rectification of Interannual Chlorophyll Variability in Present-Day and Future Arctic Climate
11:00-11:30	S5 06. Tommaso Tesi Post-Glacial Warming and Permafrost Carbon Release into the Arctic Ocean		
Invited Lecture - Auditorium			
11:30-12:00	IL 01. Yong Ahn Park (UN CLCS) Recent CLCS/UNCLOS Activities and SOU(Statement of Understanding), Annex II, Final Act, Convention		
12:00-13:00	Lunch		

Special Lecture 2 - Auditorium	
13:00-13:30	SL 02. Jürgen Mienert (UiT, The Arctic University of Norway) <i>Migration of Greenhouse Gas Methane through the Arctic Seabed</i>
Session 7. Rapid change in Arctic sub-seabed - Auditorium	
13:30-13:50	S7 01. Mathieu J. Duschesne <i>Characterizing Offshore Permafrost Conditions Using Seismic Arrivals and Attenuation: A Preliminary Appraisal</i>
13:50-14:10	S7 02. Edward King <i>Shallow Marine Permafrost Occurrence on the Westernmost Arctic Canadian Shelf: A Potential Record of Long-Term Subsea Top-Down Thaw Rates?</i>
14:10-14:30	S7 03. Seung-Goo Kang <i>Identification of Subsea-Permafrost-Distribution on the Continental Shelf of the Canadian Beaufort Sea Using a Full Waveform Inversion Algorithm</i>
14:30-14:50	S7 04. Tae Siek Rhee <i>Modest Emission of the CH₄ From the Western Arctic Ocean</i>
14:50-15:10	S7 05. Dong-Hun Lee <i>Biogeochemical Signatures on Methane Oxidations in the Seafloor of the Arctic</i>
15:10-15:30	S7 06. Simona Retelletti Brogi <i>Exploring Sediment Porewater Dissolved Organic Matter (DOM) in a Mud Volcano: Clues of a Thermogenic DOM Source from Fluorescence Spectroscopy</i>
15:30-16:00	Coffee Break and Poster Session
Session 8. Late Quaternary Ocean-Cryosphere interaction in the Antarctic Ocean - Auditorium	
16:00-16:20	S8 01. Sunghan Kim <i>Sedimentation process in the deep-sea region off the Bellingshausen Sea in association with ice sheet dynamics</i>
16:20-16:40	S8 02. Li Wu <i>Late Quaternary dynamics of the Lambert Glacier Amery Ice Shelf System, Prydz Bay(East Antarctica)</i>
16:40-17:00	S8 03. Jinwook Kim <i>Biogeochemical Modification of Clay Minerals in Antarctic Region: Implications</i>
17:00-17:20	S8 04. Ji Young Shin <i>Rock Magnetic Properties of Scotia Sea Sediments from the Southern Ocean: Link Between Magnetic Susceptibility and Climate Change</i>
17:20-17:40	S8 05. Sangbeom Ha <i>Glacio-Marine Sedimentations in the Continental Slope and Rise to the East of Pennell-Iselin Banks in the Ross Sea</i>
18:00-19:30	Banquet and Young Scientists Award Ceremony

POSTER SESSION

May 14-15 (Tuesday-Wednesday)

Geological and Geophysical (& Biological) processes in Circum-Antarctic Ridges

- Hallway

P1 01	Sarang Choi (Seoul Nat'l Univ.)	<i>Melt-Rock Reaction in Garbbroic Rocks from the Central Indian Ridge and the Influence on MORB</i>
P1 02	Jae Eun So (UST, KOPRI)	<i>The Revision of Lichen Flora Around Maxwell Bay, King George Island, Antarctica</i>
P1 03	Inhye Ahn (UST, KOPRI)	<i>Application of microCT and cLSM to the internal structures of invertebrates</i>
P1 04	Ji-Hoon Kihm (UST, KOPRI)	<i>The Preliminary Taxonomic Report of Tardigrades from Sirius Passet, North Greenland</i>
P1 05	Chang-Sook Jeong (UST, KOPRI)	<i>Purification, crystallization and preliminary X-ray crystallographic analysis of aminoglycoside 2'-N-acetyltransferase from Mycobacterium smegmatis.</i>
P1 06	Jisu Choi (UST, KOPRI)	<i>Noble Gas Study of the Five Antarctic CK Chondrites</i>
P1 07	Soo Rin Lee (Pukyong Nat'l Univ.)	<i>Metabarcoding Analysis of Planktonic Biodiversity in the Ross Sea</i>
P1 08	Yun-seok Yang (Inha Univ. KOPRI)	<i>Geochemistry of olivine-hosted and plagioclase-hosted melt inclusions in basalts from Deception Island</i>
P1 09	Je-hyun Song (Chungnam Nat'l Univ.)	<i>Characterizing effects of bottom currents on deep-sea sediments in the northern Pacific Ocean using deep-sea sub-bottom profiler data</i>
P1 10	Larysa Samchyshyna (National Academy of Sciences of Ukraine)	<i>Community Structure and Biomass of Mesozooplankton in the Bransfield Strait: A Case Study from Krill Synoptic Survey in CCAMLR Subarea 48.1 in 2019</i>
P1 11	Yongjae Lee (Yonsei Univ.)	<i>Extreme Conditions Study at the Institute for High-pressure Mineral Physics and Chemistry at Yonsei University</i>
P1 12	Alysse Bebin (Chungnam Nat'l Univ.)	<i>Structure and evolution of the central intra-transformant segment of St Paul, Equatorial Atlantic Ocean, from the analysis of fault distribution and petrology</i>

Changing Arctic Ocean: Understanding the impacts of climate changes and their global consequences

- Hallway

P2 01	Hyerim Kim (Hanyang Univ.)	<i>Decline of Arctic Sea Ice and Persistence of the Pacific Decadal Oscillation</i>
P2 02	Hyo Jin Kang (UST, KOPRI)	<i>Comparison of Microphysical Characteristics of Aerosols and Cloud Droplet Residuals at Zeppelin Station, Arctic Region</i>
P2 03	Tae-Ho Yoon (Pukyong Nat'l Univ.)	<i>Metabarcoding analysis of the zooplankton community in the Arctic Ocean</i>
P2 04	Haemin Won (Hanyang Univ.)	<i>Nitrogen source in the Pacific Arctic Ocean revealed by nitrogen stable isotope ratio of amino acids in Calanus spp.</i>
P2 05	Eri Yoshizawa (KOPRI)	<i>Variation of Convective Waters Originated in East Siberian Shelves of the Arctic Ocean</i>
P2 06	Wooseok Oh (Chonnam Nat'l Univ.)	<i>Underwater Backscattering Strength of Marbled Rockcod (Notothenia rossii) Using an acoustic theoretical Model</i>
P2 07	Jong-Ku Gal (KOPRI)	<i>Distribution of Lipid Biomarkers in the Water Column of the Kongsfjorden, Svalbard, Arctic</i>
P2 08	Soo-Bin Kim (Inha Univ., KOPRI)	<i>Appearance of the High-Salinity Cold Water In the Pacific Arctic Sector</i>
P2 09	Eunho Ko (UST, KOPRI)	<i>Effects of Nitrate Availability on Phytoplankton Photophysiology in the Arctic Ocean in Summer</i>
P2 10	Gwang Il Jang (KOPRI)	<i>Changes of Microbial Diversity Along Salinity Gradient in Melt Ponds on Arctic Sea Ice</i>
P2 11	Yung Mi Lee (KOPRI)	<i>Signatures of anaerobic methanotrophic communities in gas hydrate-bearing sediments of the Chukchi Sea</i>
P2 12	Seong-Su Kim (Incheon Nat'l Univ.)	<i>Investigating Air-Sea N2O Flux in the Western Arctic Ocean During Summer 2017-2018</i>

P2 13	Seunghan Lee (Marine Act co.)	<i>Zooplankton Community Structure in the Western Arctic Ocean, in Summer of 2016 and 2017</i>
P2 14	Ji Ran Lee (KOPRI)	<i>Diatoms in the Chukchi Sea During Summer Season</i>
P2 15	Jee-Hoon Kim (Seoul Nat'l Univ., KOPRI)	<i>The summer migration of Pacific zooplankton follows the temperature and salinity of Bering Sea/Anadyr Water in the Chukchi Sea</i>
P2 16	Cho Rom Shim (KOPRI)	<i>Spatial Distribution of Phytoplankton Community in the Kongsfjorden, Spitsbergen</i>
P2 17	Jinyoung Jung (KOPRI)	<i>Dynamics of Dissolved Organic Carbon in the Western Arctic Ocean</i>
P2 18	Ahra Mo (Korea Univ.)	<i>Total Alkalinity Contained in Sea Ice and The Impact of its Release on Total Carbon Contents at the East Siberian Sea</i>
P2 19	Kwanwoo Kim (Pusan Nat'l Univ.)	<i>Primary production of ice algae in the landfast sea ice zone at the Cambridge bay, Canadian Arctic Archipelago</i>
P2 20	Ahyoung Ku (Inha Univ.)	<i>Observation of Topographic Rossby Waves on the Shelfbreak of the Chukshi Sea</i>
P2 21	Eun-Jin Yang (KOPRI)	<i>Grazing impact of microzooplankton on the picophytoplankton and bacterioplankton in the Chukchi Sea and East Siberian Sea, the western Arctic Ocean</i>

Response of the Southern Ocean to the Changing Climate

- Hallway

P3 01	Mohd Riduan Ahmad (Universiti Teknikal Malaysia Melaka)	<i>Cloud-to-Ground Lighting Observations Over the Western Antarctic Region</i>
P3 02	Louise Newman (Southern Ocean Observing System)	<i>Delivering sustained, coordinated and integrated observations of the Southern Ocean for global impact</i>
P3 03	Pip Bricher (Southern Ocean Observing System)	<i>Data Discovery: The Backbone of Southern Ocean Science</i>
P3 04	Yoshihiro Nakayama (Hokkaido Univ.)	<i>Pathways of Circumpolar Deep Water Intruding Towards Pine Island and Thwaites Grounding Lines</i>
P3 05	Young-bae Ham (UST, KOPRI)	<i>Preliminary Results of the Aurora Observation in Jang Bogo Station</i>
P3 06	Eunho Jang (UST, KOPRI)	<i>Relationship Between the Taxonomic Composition of Phytoplankton and The Formation of Aerosol Particles in the Southern Ocean</i>
P3 07	Chang-Kyu Lim (KOPRI)	<i>A Statistical Reconstruction of ASL Intensity During 20th Century</i>
P3 08	Wuju Son (UST, KOPRI)	<i>Spatial Distribution of Antarctic Krill (EUPHAUSIA SUPERBA) and Ice Krill (EUPHAUSIA CRYSTALLOROPHIAS) in the Western Ross Sea During Summer 2018</i>
P3 09	Dukwon Bae (Pusan Nat'l Univ.)	<i>Recovery of ocean color data using machine learning techniques for regional-scale studies: focused on off the Cape Hallett, Ross Sea</i>
P3 10	Tae-Ho Yoon (Pukyong Nat'l Univ.)	<i>Metabarcoding analysis of the zooplankton community in the Arctic Ocean</i>
P3 11	Boyeon Lee (KOPRI)	<i>Distribution of the Major Inorganic Nutrients in the Ross Sea, Antarctica</i>
P3 12	Mi Seon Kim (KOPRI)	<i>Estimating Net Community Production Using Dissolved Inorganic Carbon Content in the Amundsen Sea Polynya, Antarctica</i>
P3 13	Kyoungsoon Lee (Chonnam Nat'l Univ.)	<i>Identification of Antarctic Krill (Euphausia superba) and lanternfish (Electrona carlsbergi) Using Frequency Difference Method</i>
P3 14	Heewon Yang (KOPRI)	<i>Oceanic heat transport into the Dotson Ice Shelf and its effect on melting</i>
P3 15	Bokyoung Kim (KOPRI)	<i>The Influence of Penguin Excrement on Phytoplankton Production During Short-term Incubation in the Ross Sea, Antarctica</i>
P3 16	Naeun Jo (Pusan Nat'l Univ.)	<i>The Biochemical Compositions of Phytoplankton and Zooplankton in Northwestern Ross Sea During Late Austral Summer in 2018</i>
P3 17	Junbeom Lee (Pusan Nat'l Univ.)	<i>Spatial Variation in Transparent Exopolymer Particles (TEP) Concentration in the Ross Sea</i>
P3 18	Hye Ju Yoo (Pusan Nat'l Univ.)	<i>Comparison of Macromolecular Composition of Different Sized-cells of Phytoplankton in the Amundsen Sea, Antarctica</i>

P3 19	Minkyung Kim (Seoul Nat'l Univ.)	<i>Reconstruction of the History of the Amundsen Sea Polynya in the Amundsen Sea, Antarctica</i>
P3 20	Kwanwoo Kim (Pusan Nat'l Univ.)	<i>Monthly Variation in Macromolecular Compositions in Phytoplankton in the Ross Sea</i>
P3 21	Seo Hee Ahn (UST, KOPRI)	<i>Measurement of Aerosol Optical Properties on the R/V Araon Using a Shipborne-Aureolemeter in Polar Regions</i>
P3 22	Eunho Jang (UST, KOPRI)	<i>Relationship Between the Taxonomic Composition of Phytoplankton and the Formation of Aerosol Particles in the Southern Ocean</i>
P3 23	Young Shin Kwon (UST, KOPRI)	<i>Spatial Variability of the Surface Phytoplankton Biomass in the Ross Sea During the Summer in 2018/2019</i>
P3 24	Sian Henley (Univ. of Edinburgh)	<i>Nutrient and carbon supply, uptake and cycling across the Antarctic Peninsula shelf during summer</i>
Past analogue for future Arctic: Glacial and oceanographic perspective		
- Hallway		
P4 01	Dahae Kim (KOPRI)	<i>Tracing terrestrial organic matter in two contrasting Arctic systems: a case study in the Mackenzie Trough in the Canadian Beaufort Sea and in Wijdefjorden in the Svalbard Archipelago</i>
P4 02	Kwangchul Jang (KOPRI)	<i>Spatial Variation in Detrital Neodymium Isotopes of Svalbard Surface Sediments</i>
P4 03	Hyun Young Chung (UST, KOPRI)	<i>Polymerization of Silica in Ice and its Implication for Polar Region</i>
P4 04	Sewon Chang (KIGAM)	<i>Mineralogy and geochemistry of glaciomarine sediment cores from the Eastern Arctic Ocean during the last 200 ka</i>
P4 05	Jung-Hyun Kim (KOPRI)	<i>Application of the PIP25index for reconstructing sea ice extent in the Chukchi Sea over the last 140 years</i>
P4 06	Yu-Hyeon Park (Pusan National Univ.)	<i>Paleoenvironmental changes based on biomarker in the northern Chukchi Sea during the Holocene</i>
P4 07	Young Ji Joo (KOPRI)	<i>Holocene Environmental Changes in Dicksonfjorden, West Spitsbergen, Svalbard</i>
P4 08	Yongwon Kim (Univ. of Fairbanks)	<i>Effect of Crustose Lichen on Soil Carbon Emission in Sphagnum Moss Community of Tundra Ecosystem, West Alaska)</i>
Rapid change in Arctic sub-seabed		
- Hallway		
P5 01	Young Keun Jin (KOPRI)	<i>Overview of the Araon's Arctic Marine Geoscience Expeditions</i>
P5 02	JeongKyu Jang (Gyeongsang Nat'l Univ.)	<i>Clay Mineral Characteristics of 420 MV (Mud Volcano) in Beaufort Sea, Arctic Ocean</i>
P5 03	Joonseop Lee (UNIST)	<i>Phase Equilibria, Guest Distributions, and Dissociation Behaviors of Natural Gas Hydrates in the Presence of Clay</i>
P5 04	Tae Siek Rhee (KORPI)	<i>Development of an Analyzing System for High Resolution Measurement of Dissolved CH₄ and CO₂ Concentrations in the Surface Ocean</i>
P5 05	Seung-Goo Kang (KORPI)	<i>Geophysical Investigation of Gas Hydrate in the Chukchi Plateau, Arctic</i>
P5 06	HyoJin Koo (Gyeongsang Nat'l Univ.)	<i>Characteristics of Manganese Nodule from the Arctic Ocean</i>
P5 07	Dong-Hun Lee (Hanyang Univ.)	<i>Biogeochemical Evidence of Anaerobic Methane Oxidation on Active Submarine Mud Volcanoes on the Continental Slope of the Canadian Beaufort Sea</i>
P5 08	Sookwan Kim (KOPRI)	<i>High-Resolution Seismic Stratigraphy, Glacigenic Sedimentary Processes and Seafloor Morphology in the Chukchi Rise (The Arctic Ocean): Preliminary Results</i>
P5 09	Young-Gyun Kim (Kangwon Nat'l Univ.)	<i>Seeping Activity of Gas Hydrate Mounds in the Eastern Slope of the Chukchi Basin, Arctic Ocean</i>
Late Quaternary Ocean-Cryosphere interactions in the Antarctic Ocean		
- Hallway		
P6 01	Young Kyu Park (Yonsei Univ.)	<i>Elemental composition of smectite tracing the sediment provenance in the southern Drake Passage and Bellingshausen Sea during glacial-interglacial period</i>
P6 02	Boo-Keun Khim (Pusan Nat'l Univ.)	<i>Seasonal and Inter-annual Change of Sediment Trap Particles (2014-2016) in the Terra Nova Bay of the Western Ross Sea</i>

GUIDE FOR ORAL / POSTER PRESENTATION

Oral Presentation

Please check your presentation schedule and prepare your presentation within the allocated time.

A beam projector and laptop will be provided for your presentation. To avoid technical problems, presenters are asked to use Microsoft Power Point. If you have any files that are not compatible with Windows, you are cordially invited to bring your own laptop for your presentation.

Poster Presentation

For your poster presentation, an A0 sized board will be provided. Each poster will/should be posted for 2 days from 09:00-18:00, according to poster session schedule. Please check the schedule and prepare your poster in advance.

TRANSPORTATION INFORMATION

From Incheon International Airport to the city central

Incheon International Airport is well connected to all major cities in Republic of Korea, including Incheon where KOPRI is located. Depending on your arrival time, you can choose between two options; Limousine Bus (**6707B**) or Taxi.

○ Limousine Bus (KRW 7,000; approx. USD 7)

There is a Korean Air Lines (KAL) Limousine Bus operating between the airport and the hotels located nearby KOPRI.

For those will arrive at Terminal 1, You can purchase bus tickets and get information at ticketing offices next to Exit 4 and 9 in Arrival Hall Floor 1 (indoors) or offices next to Exit 4, 6, 7, 8, 11, 13, and 9C (outdoors).

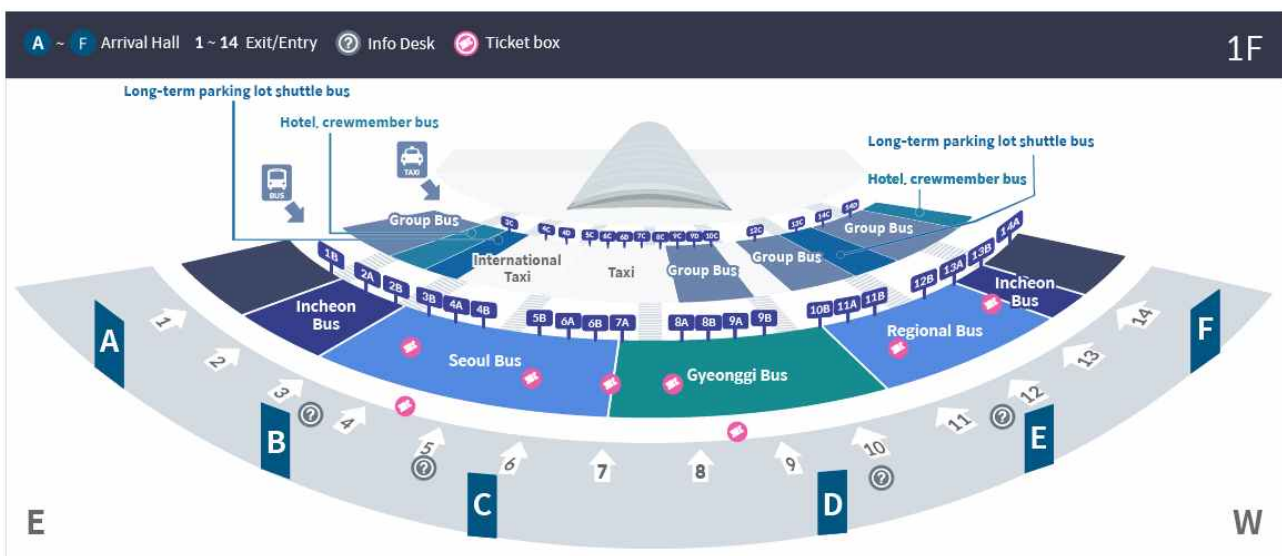
For those will arrive at Terminal 2, please proceed to the first basement (B1) level. You can purchase bus tickets and get information at ticketing offices indoors on The 2nd Transportation Center (B1).

Please refer to the Incheon Airport Homepage (https://www.airport.kr/ap_cnt/en/tpt/pblcpt/pblcpt.do).

1. Bus route : Incheon Airport Terminal 1 → Terminal 2 → Korea Coast Guard HQ → **Orakai Songdo Park Hotel** → Central Park Hotel / Gyeongwonjae Ambassador Hotel → Holiday Inn Incheon Songdo → Skypark Incheon Songdo → Oakwood Premier Incheon → Sheraton Grand Incheon Hotel

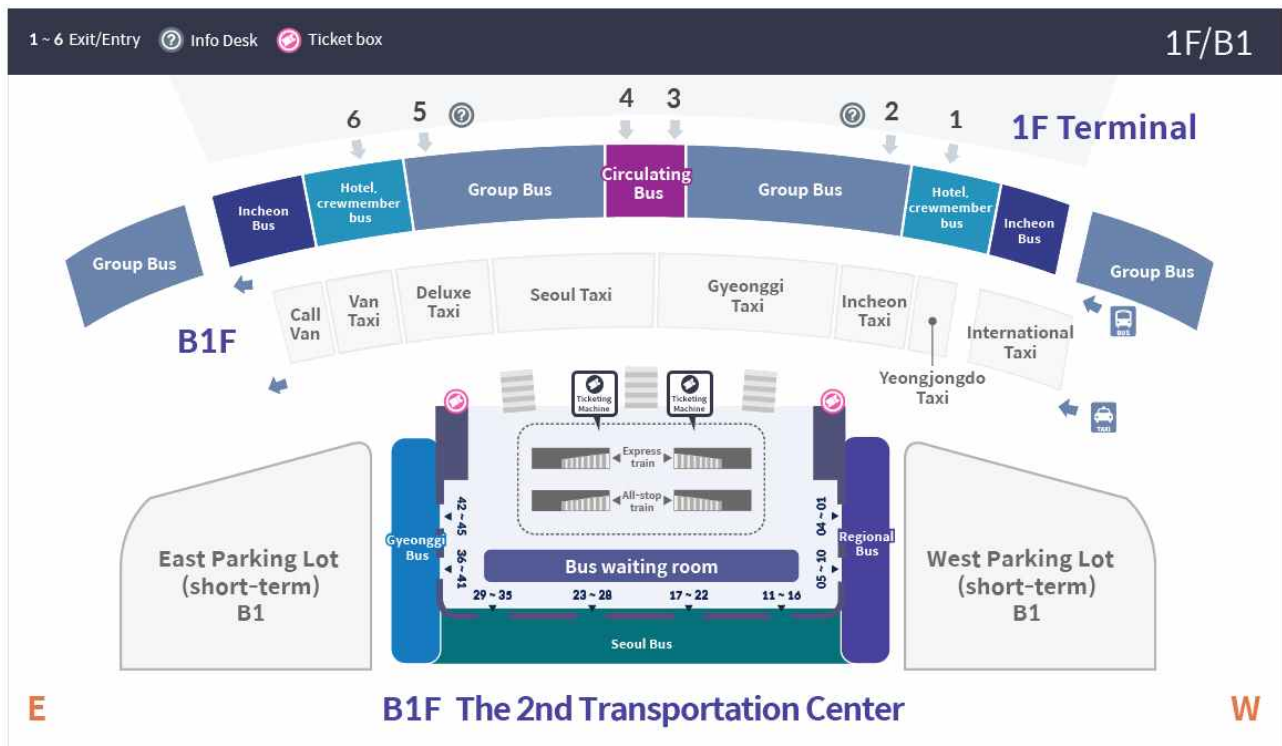
2. Bus timetable and location of bus stop for Terminal 1

Departure Time								
05:43	06:13	06:44	07:12	07:38	08:15	08:54	09:28	09:56
10:23	10:57	11:33	12:23	13:13	14:03	14:44	15:23	16:04
16:41	17:24	18:07	18:48	19:43	20:32	21:23	22:00	22:38



3. Bus timetable and location of bus stop for Terminal 2

Departure Time								
06:03	06:33	07:4	07:32	07:58	08:35	09:14	09:48	10:16
10:43	11:17	11:53	12:43	13:33	14:23	15:04	15:43	16:24
17:01	17:44	18:27	19:08	20:03	20:52	21:43	22:20	22:58

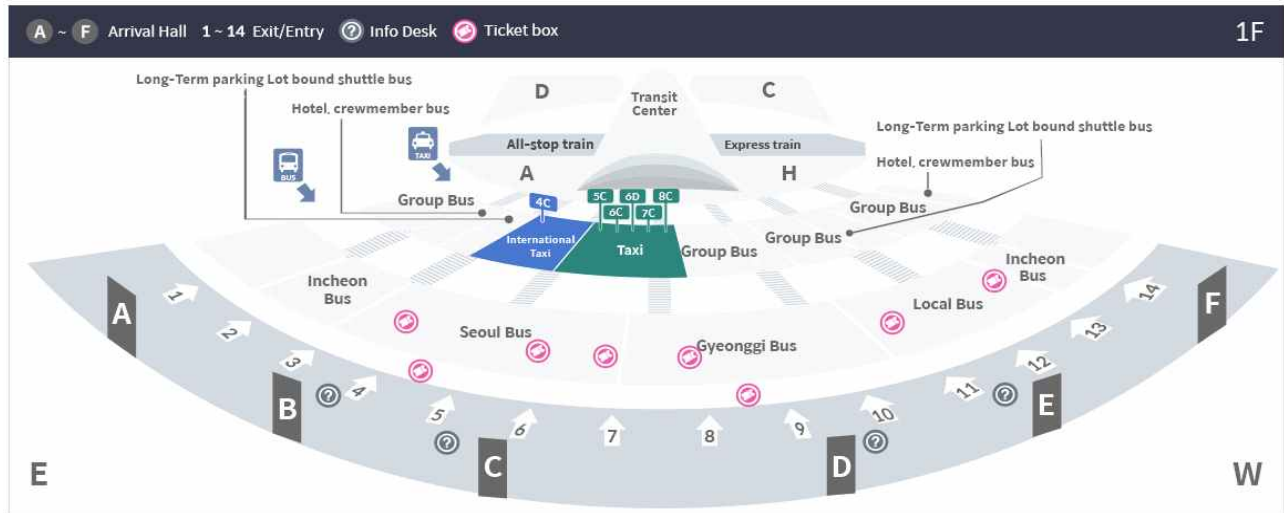


○ TAXI (KRW 30,000; approx. USD 30)

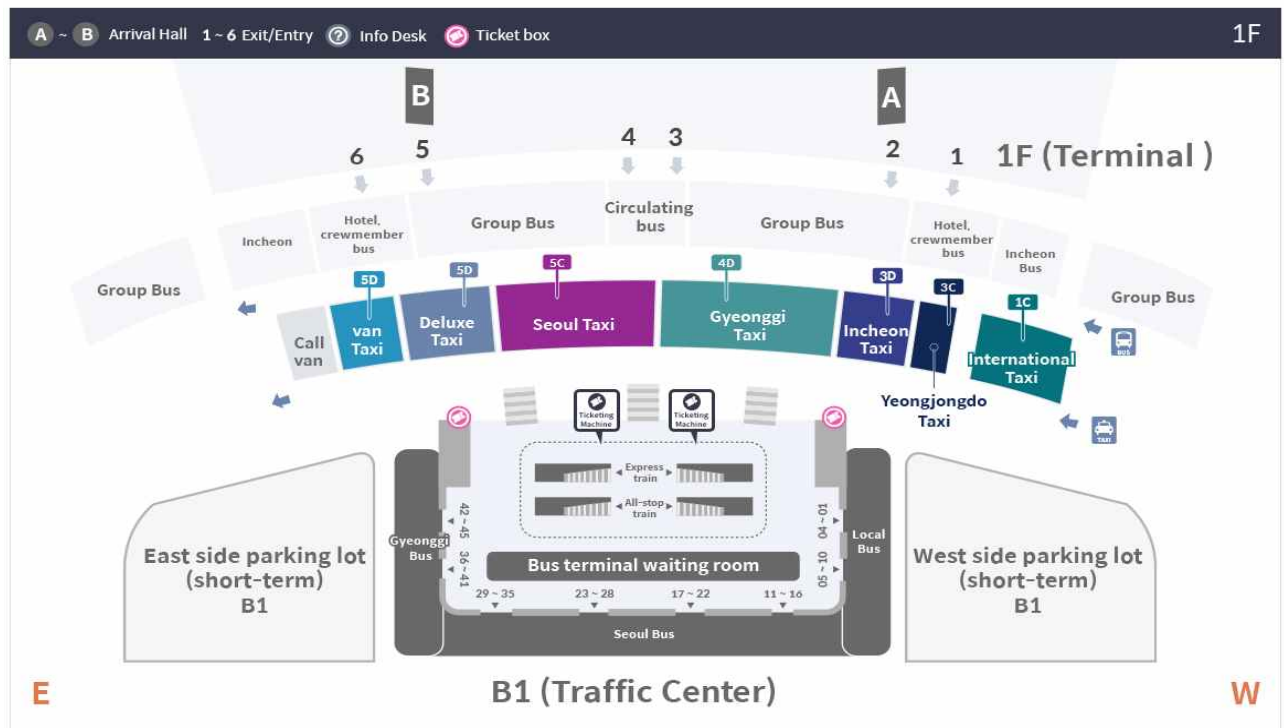
Please refer to the Incheon Airport Homepage (<https://www.airport.kr/ap/en/tpt/pblcTptTaxi.do>).

1. Taxi stand

Terminal 1



Terminal 2



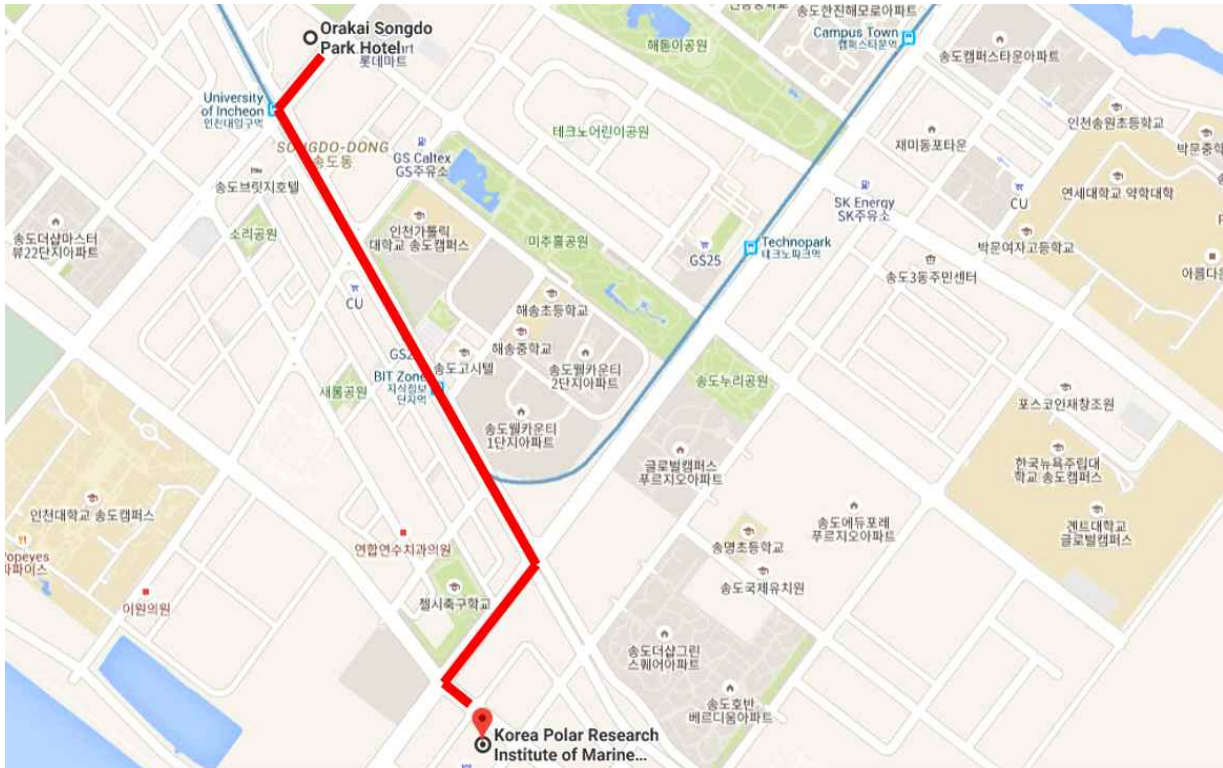
2. Address in Korean

Accommodation	Address	Telephone
KOPRI	인천 연수구 송도 미래로 26 극지연구소	032-770-8400
Orakai Songdo Park Hotel	인천 연수구 테크노파크로 151 오라카이 송도 파크 호텔	032-210-7000
Central Park Hotel	인천 연수구 테크노파크로 193 송도 센트럴 파크 호텔	032-310-5000
Gyeongwonjae Ambassador	인천 연수구 테크노파크로 200 경원재 앰배서더 호텔	032-729-1101
Holiday Inn Incheon Songdo	인천 연수구 인천타워대로 251 홀리데이인 인천 송도	032-250-0000
Skypark Incheon Songdo	인천 연수구 컨벤시아대로 233 호텔 스카이파크 인천 송도	032-717-0700
Oakwood Premier Incheon Hotel	인천 연수구 컨벤시아대로 165 오크우드 프리미어 인천 호텔	032-726-2000
Sheraton Grand Incheon Hotel	인천 연수구 컨벤시아대로 153 셰라톤 그랜드 인천 호텔	032-835-1000

From Hotel to KOPRI

Bus transportation between Orakai Hotel and KOPRI will be provided during May 14-15. It will take less than 10 mins by bus. You can find the timetable below;

DATE	Hotel → KOPRI	KORPI → Hotel
May 14	08:20	18:00
May 15	08:20	18:00 / 20:00



KOPRI's location on Google Maps: <https://goo.gl/maps/k5rZunPchEA3A2XW7>

Orakai Hotel's location on Google Maps: <https://goo.gl/maps/mF4sEnuMQQdsEKtM9>

Abstract: Dissolved organic carbon (DOC) is an important component for understanding the regional carbon budget and the global carbon cycle. As the amount of river discharge continues to increase, along with increasing DOC export due to climatic warming and permafrost thawing, the remineralization of terrigenous organic and marine-origin organic matter in the Arctic Ocean can reduce the Arctic Ocean's ability to absorb atmospheric carbon dioxide (CO₂). Thus, a complete understanding of the terrigenous and marine-origin DOC dynamics is required. To investigate behavior of DOC and sources of DOC, seawater sampling was carried out in the Chukchi Sea, using a CTD/rosette sampler holding 24-10L Niskin bottles during Korea research ice breaker R/V Araon cruises (ARA06B, August 1-22, 2015; ARA07B, August 6-19, 2016). $\delta^{18}\text{O}$ and salinity were used to estimate DOC inputs by river and sea ice melt, allowing the marine portion of the DOC pool. Concentration of DOC ranged from 34–116 μM . High DOC concentration was observed in the surface layer, suggesting the strong influence of terrigenous DOC derived from Arctic rivers. However, low-salinity water from ice melt diluted DOC concentration in the surface layer. The penetration depth of brine, rejected during sea ice formation, was observed from the surface layer to 200 m depth, where the contribution of riverine DOC was more than 50%. Our result revealed that sea ice formation, which injects brine into the underlying seawater, is a key mechanism for delivering riverine DOC into the deeper layer. Marine DOC has a significant positive relationship with heterotrophic bacterial abundance, whereas a weak negative relationship was found between riverine DOC and heterotrophic bacterial abundance, suggesting that marine DOC is more bioavailable, and that riverine DOC can be utilized more by heterotrophic bacteria than previous thoughts. To improve our understanding of carbon cycle in the Arctic Ocean, chemical characteristics of DOC, bacterial production and respiration data are required.

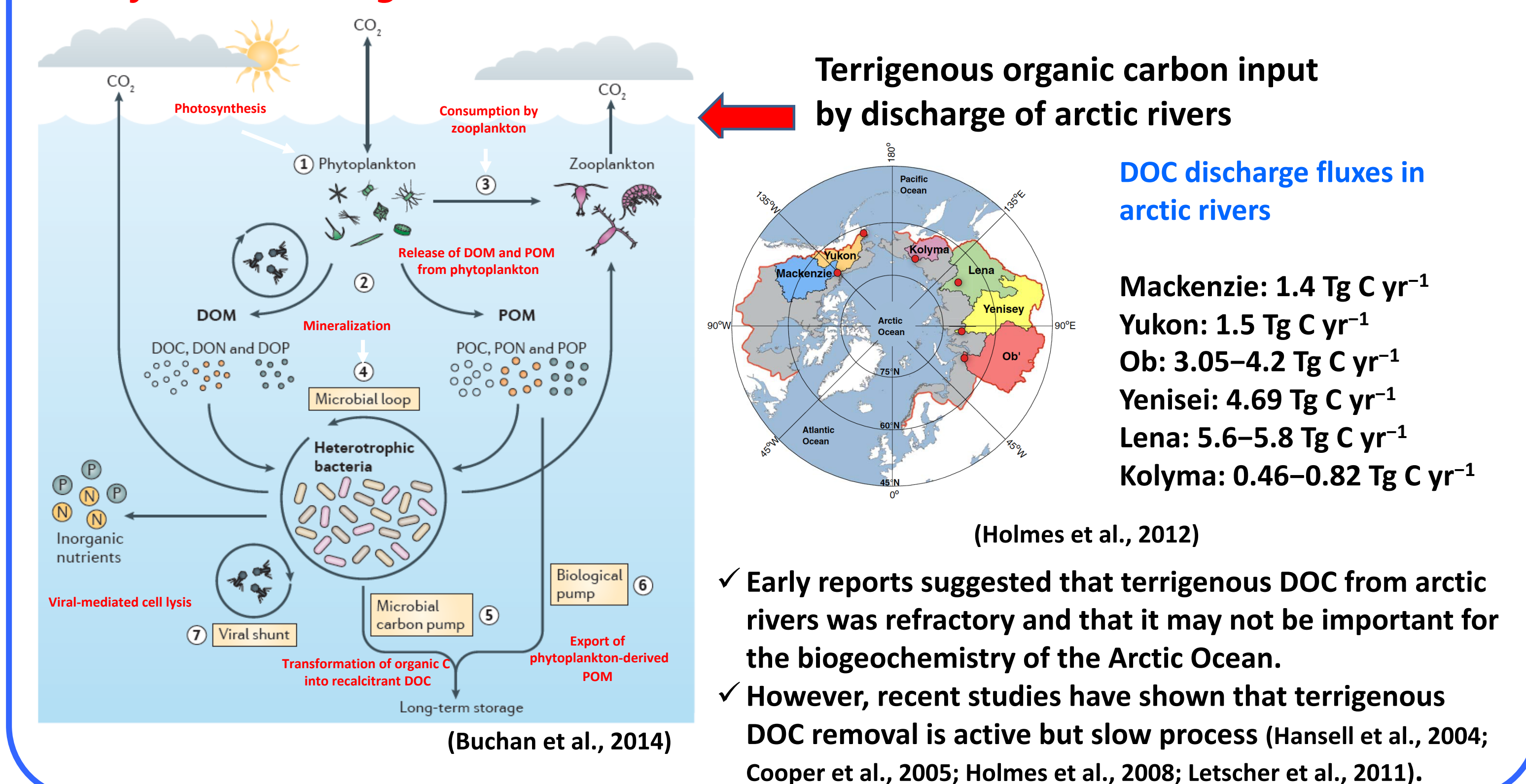
1 Introduction

Environmental Change in the Arctic Ocean

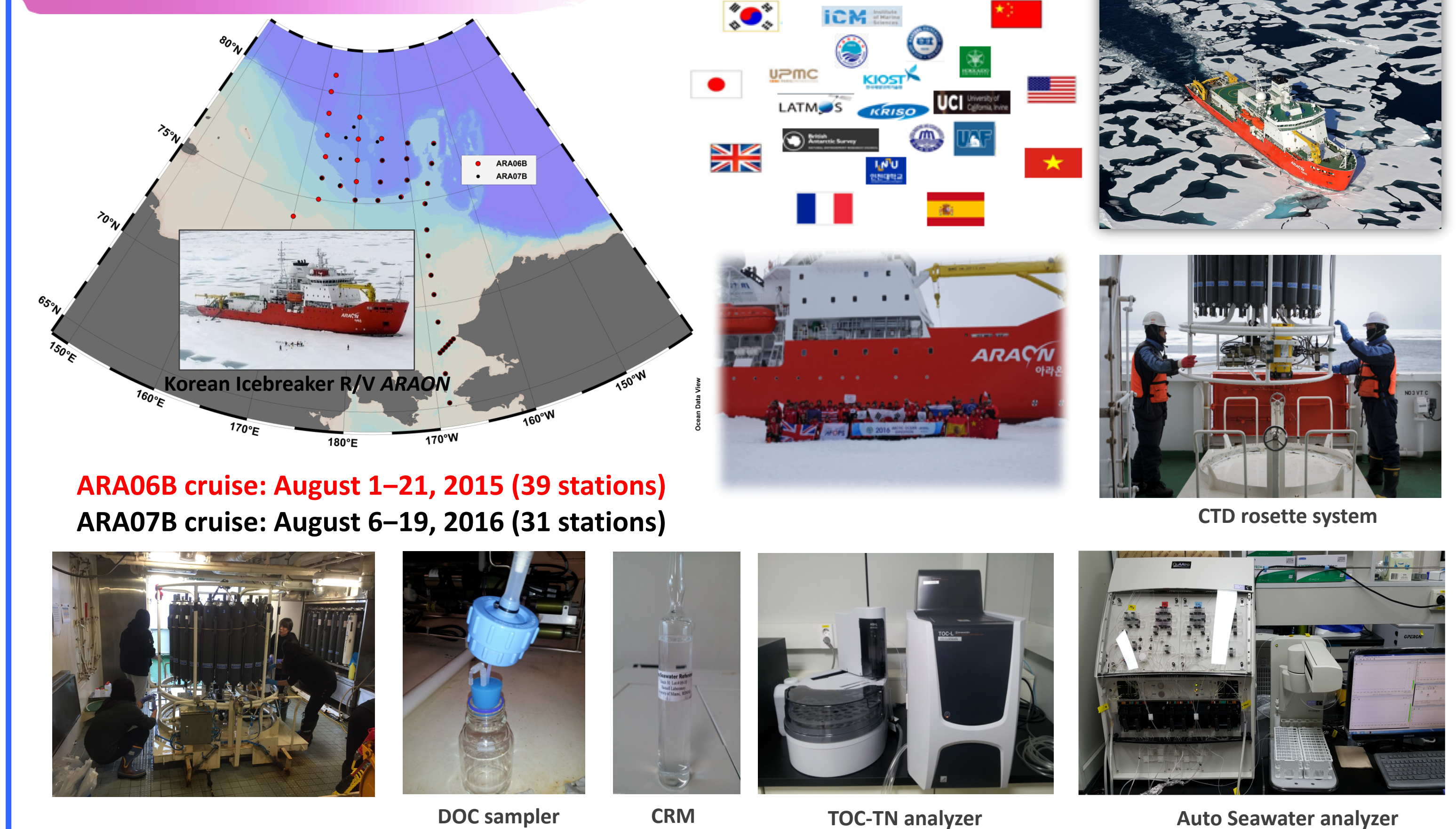
The Arctic Ocean is currently experiencing rapid environmental change. The most remarkable change is sea ice reduction. Warming by greenhouse gases and advection of warm water from Pacific Ocean are known as the main causes of sea ice reduction. Because of sea ice reduction, open water area exposed to sun light has increased, so that primary production in the Arctic Ocean has been increasing.

In addition, sea ice thickness in the Arctic Ocean is getting thinner and thinner, providing a preferable condition for sea ice algae, which can influence carbon cycle in the Arctic Ocean. The other environmental change is an increase in river discharge by thawing of permafrost. By this, a large amount of terrigenous organic carbon flows into the Arctic Ocean, which can influence carbon cycle in the Arctic ocean as well.

Why dissolved organic carbon?



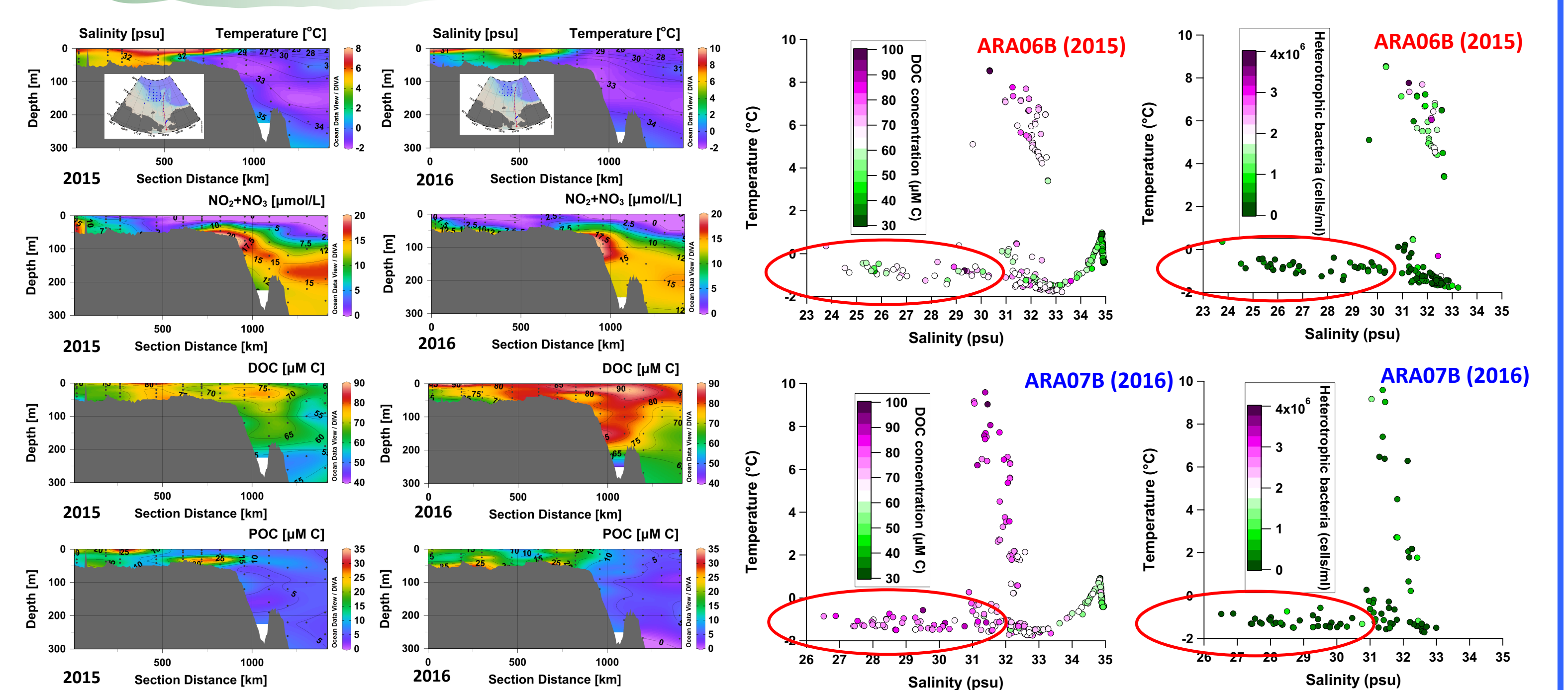
2 Research stations



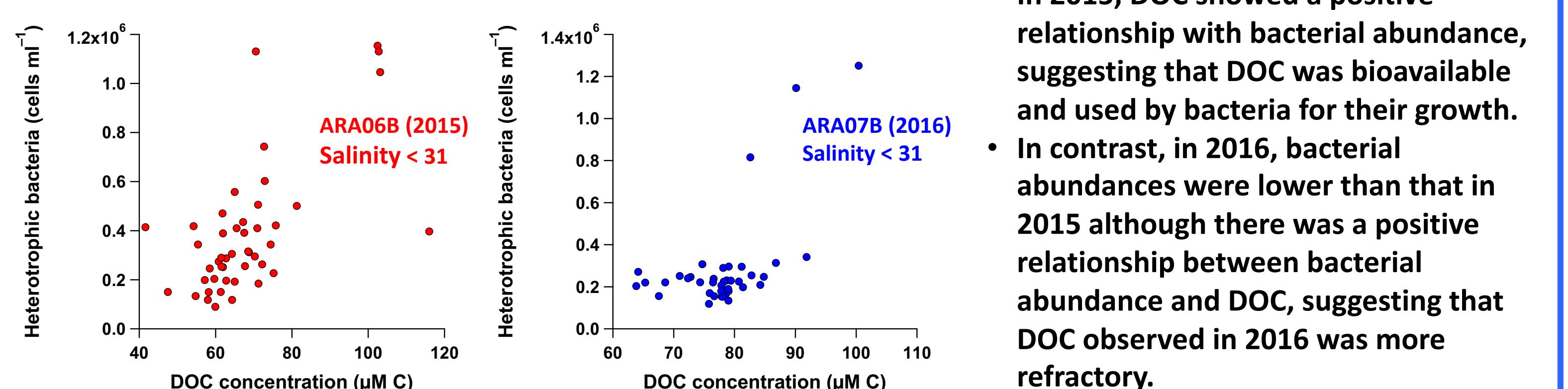
The objectives of this study are to

- (1) Investigate the distributions of nutrients and dissolved organic carbon in the Chukchi Sea
- (2) Estimate the contribution of terrigenous dissolved organic carbon to the observed dissolved organic carbon
- (3) Understand dynamics of nutrients and dissolved organic carbon in the Chukchi Sea

3-1 Distributions of DOC in 2015 and 2016



3-2 Relationships between heterotrophic bacterial abundance and DOC



3-3 Distribution of riverine DOC

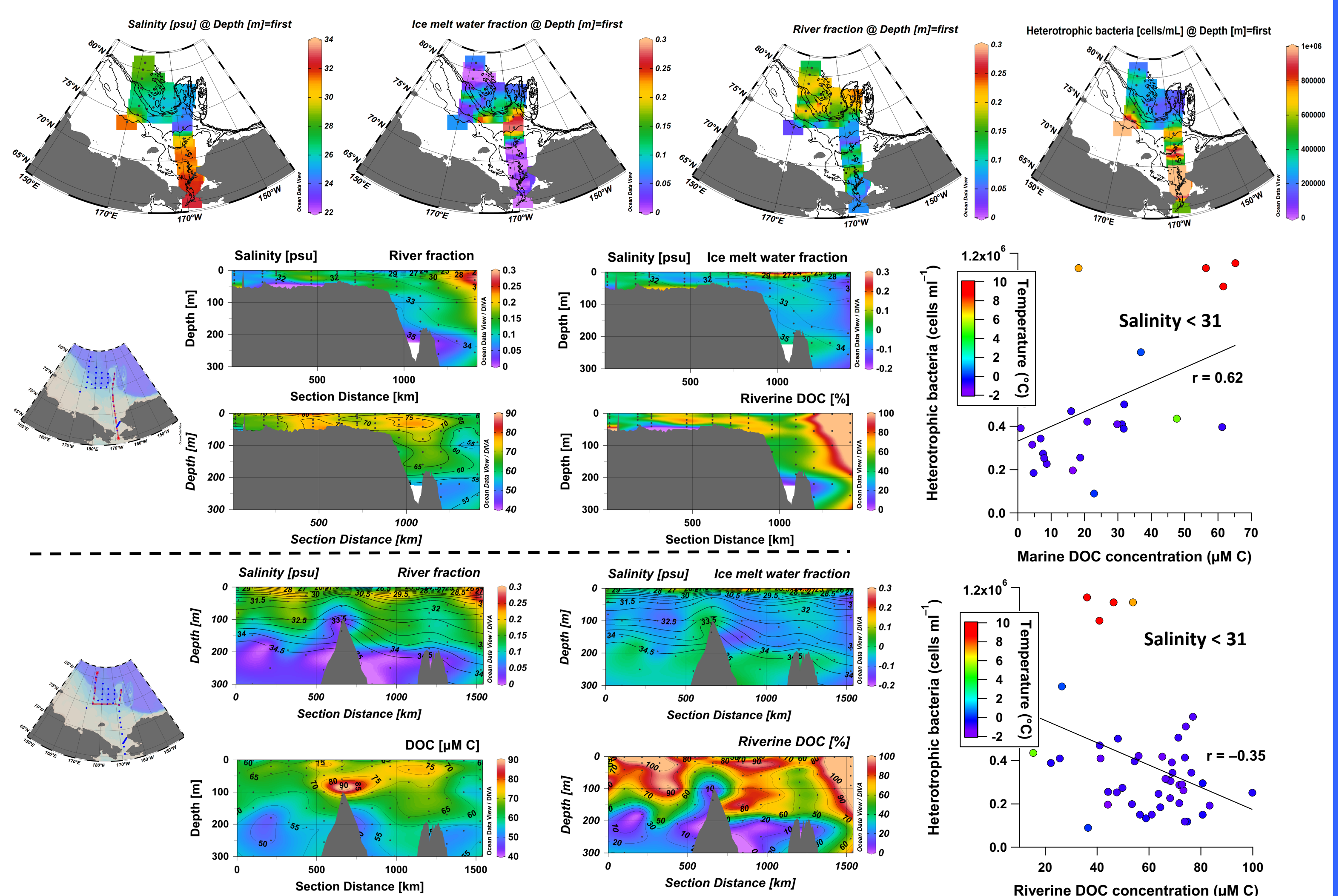
To distinguish freshwater sources, $\delta^{18}\text{O}$ was used.

$$1 = f_{\text{river}} + f_{\text{sea ice melt}} + f_{\text{seawater}}$$

$$\delta^{18}\text{O} = f_{\text{river}} \times \delta^{18}\text{O}_{\text{river}} + f_{\text{sea ice melt}} \times \delta^{18}\text{O}_{\text{sea ice melt}} + f_{\text{seawater}} \times \delta^{18}\text{O}_{\text{seawater}}$$

$$\text{Salinity} = f_{\text{river}} \times S_{\text{river}} + f_{\text{sea ice melt}} \times S_{\text{sea ice melt}} + f_{\text{seawater}} \times S_{\text{seawater}}$$

- End-member: **river water** (salinity = 0, $\delta^{18}\text{O} = -20.3$), **sea ice melt** (salinity = 4.5, $\delta^{18}\text{O} = -1.9$), **seawater** (salinity = 35, $\delta^{18}\text{O} = 0.3$) (Mathis et al., 2007).
- Marine DOC = Measured DOC – ($f_{\text{river}} \times \text{DOC}_{\text{river}} + f_{\text{sea ice melt}} \times \text{DOC}_{\text{sea ice}}$)
- DOC_{river}: 350 $\mu\text{M C}$ and DOC_{sea ice}: 33.4 $\mu\text{M C}$ (Mathis et al., 2007)



Acknowledgement

We are grateful to the captain and crews of IBR/V Araon for their enthusiastic assistance during the ARA06B and ARA07B cruises. This research was a part of the project titled 'Korea-Arctic Ocean Observing System (K-AOOS), KOPRI, 20160245', funded by the Ministry of Oceans and Fisheries, Korea.

DYNAMICS OF DISSOLVED ORGANIC CARBON IN THE WESTERN ARCTIC OCEAN

Jinyoung Jung

Jinyoung Jung^{1}, Sun-Yong Ha¹, Youngju Lee¹, Eun Jin Yang¹, Kyung-Hoon Shin²,
Kyung-Ho Cho¹, and Sung-Ho Kang¹*

¹Division of Polar Ocean Sciences, Korea Polar Research Institute, Incheon, Korea

*²Department of Marine Science and Convergence Engineering, Hanyang University,
Ansan, Korea*

jinyoungjung@kopri.re.kr

ABSTRACT

Dissolved organic carbon (DOC) is an essential component for understanding the regional carbon budget and the global carbon cycle. As the amount of river discharge continues to increase, along with increasing DOC export due to climatic warming and permafrost thawing, the remineralization of terrigenous organic marine-origin matter in the Arctic Ocean can reduce the Arctic Ocean's ability to absorb atmospheric carbon dioxide (CO₂). Thus, a complete understanding of the terrigenous and marine-origin DOC dynamics is required. To investigate behavior of DOC and sources of DOC, seawater sampling was carried out over in the Chukchi Sea, using a CTD/rosette sampler holding 24-10 L Niskin bottles during Korea research ice breaker R/V Araon cruises (ARA06B, August 1–22, 2015; ARA07B, August 6–19, 2016). $\delta^{18}\text{O}$ and salinity were used to estimate DOC inputs by Arctic rivers and sea ice melt, allowing the marine portion of the DOC pool. Concentration of DOC ranged from 34–116 μM . High DOC concentration was observed in the surface layer, suggesting the strong influence of terrigenous DOC derived from Arctic rivers. However, low-salinity water from ice melt diluted DOC concentration in the surface layer. In 2015, DOC concentrations observed in the northern Chukchi Sea showed a positive relationship with heterotrophic bacterial abundance, suggesting that DOC was bioavailable and used by bacteria for their growth. In contrast, in 2016, bacterial abundances were lower than those in 2015 although there was a positive relationship between bacterial abundance and DOC concentrations, suggesting that DOC observed in 2016 was more refractory. The penetration depth of brine, rejected during sea ice formation, was observed from the surface layer to 200 m depth, where the contribution of riverine DOC was more than 50%. Our result revealed that sea ice formation, which injects brine into the underlying seawater, is a key mechanism for delivering riverine DOC into the deeper layer.