

The 25th International Symposium on Polar Sciences



**ARACON**'s Journey through the Decade:

# Findings in Ocean, Earth and Paleoclimate Science

14-15 MAY 2019

INCHEON, REPUBLIC OF KOREA  
KOREA POLAR RESEARCH INSTITUTE



SYMPOSIUM PROGRAM



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| P2 10   | Gwang Il Jang<br>(KOPRI)                                   | <i>Changes of Microbial Diversity Along Salinity Gradient in Melt Ponds on Arctic Sea Ice</i>   |
| P2 11   | Yung Mi Lee<br>(KOPRI)                                     | <i>Signatures of anaerobic methanotrophic communities in gas hydrate-bearing sediments of the Chukchi Sea</i>   |
| P2 12   | Seong-Su Kim<br>(Incheon Nat'l Univ.)                      | <i>Investigating Air-Sea N<sub>2</sub>O Flux in the Western Arctic Ocean During Summer 2017-2018</i>  |
| P2 13   | Seunghan Lee<br>(Marine Act co.)                           | <i>Zooplankton Community Structure in the Western Arctic Ocean, in Summer of 2016 and 2017</i>  |
| P2 14   | Ji Ran Lee<br>(KOPRI)                                      | <i>Diatoms in the Chukchi Sea During Summer Season</i>  |
| P2 15   | Jee-Hoon Kim<br>(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<br>(KOPRI)                                    | <i>Spatial Distribution of Phytoplankton Community in the Kongsfjorden, Spitsbergen</i>   |
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| P2 18   | Ahra Mo<br>(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<br>(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<br>(Inha Univ.)                                 | <i>Observation of Topographic Rossby Waves on the Shelfbreak of the Chukchi Sea</i>   |
| P2 21   | Eun-Jin Yang<br>(KOPRI)                                    | <i>Grazing impact of microzooplankton on the picophytoplankton and bacterioplankton in the Chukchi Sea and East Siberian Sea, the western Arctic Ocean</i>              |
| P2 22   | Joo-Hong Kim<br>(KOPRI)                                    | <i>Salinity Control of Thermal Evolution of Late Summer Melt Ponds on Arctic Sea Ice</i>  |
| P2 23   | Youngju Lee<br>(KOPRI)                                     | <i>The Influence of Sea Ice Concentration on Phytoplankton Community Distribution in the Chukchi and East Siberian Seas, Pacific Arctic Ocean</i>                       |
| P2 24   | So-Young Kim<br>(KOPRI)                                    | <i>Distribution of Dinoflagellate Cysts in Surface Sediments from the East Siberian and Chukchi Seas and Their Relation to the Prevailing Hydrographical Conditions</i> |
| P2 25   | Lorena Rebolledo<br>(INACH)                                | <i>Analysis of Diatom Assemblages in Sediments from the Amundsen Sea, Antarctica</i>  |
| P2 26   | Dongseon Kim<br>(KIOST)                                    | <i>Temporal and spatial variations of particle fluxes in the western Arctic Ocean</i>   |
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| P3 01   | Mohd Riduan Ahmad<br>(Universiti Teknikal Malaysia Melaka) | <i>Cloud-to-Ground Lighting Observations Over the Western Antarctic Region</i>  |
| P3 02   | Louise Newman<br>(Southern Ocean Observing System)         | <i>Delivering sustained, coordinated and integrated observations of the Southern Ocean for global impact</i>  |
| P3 03   | Pip Bricher<br>(Southern Ocean Observing System)           | <i>Data Discovery: The Backbone of Southern Ocean Science</i>   |
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| P3 05   | Young-bae Ham<br>(UST, KOPRI)                              | <i>Preliminary Results of the Aurora Observation in Jang Bogo Station</i>   |

## Poster Presentation

### SALINITY CONTROL OF THERMAL EVOLUTION OF LATE SUMMER MELT PONDS ON ARCTIC SEA ICE

Joo-Hong Kim

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#### ABSTRACT

The thermal evolution of melt ponds on Arctic sea ice was investigated through a combination of autonomous observations and two-dimensional high-resolution fluid dynamics simulations. We observed one relatively fresh pond and one saline pond on the same ice floe, with similar depth. The comparison of observations and simulations indicates that thermal convection dominates in relatively fresh ponds, but conductive heat transfer dominates in salt-stratified ponds. Using a parameterized surface energy balance, we estimate that the heat flux to the ice is larger under the saline pond than the freshwater pond when averaged over the observational period. The deviation is sensitive to assumed wind, varying between 3 and 14 W/m<sup>2</sup> for winds from 0 to 5 m/s. If this effect persists as conditions evolve through the melt season, our results suggest that this imbalance potentially has a climatologically significant impact on sea-ice evolution.

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