The 25th International Symposium on Polar Sciences

KOPRI

ARAON '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

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 ACEX (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)** *Migration of Greenhouse Gas Methane through the Arctic Seabed*
Session 7. Rapid change in Arctic sub-seabed - Auditorium	
13:30-13:50	**S7 01. Mathieu J. Duschesne** *Characterizing Offshore Permafrost Conditions Using Seismic Arrivals and Attenuation: A Preliminary Appraisal*
13:50-14:10	**S7 02. Edward King** *Shallow Marine Permafrost Occurrence on the Westernmost Arctic Canadian Shelf: A Potential Record of Long-Term Subsea Top-Down Thaw Rates?*
14:10-14:30	**S7 03. Seung-Goo Kang** *Identification of Subsea-Permafrost-Distribution on the Continental Shelf of the Canadian Beaufort Sea Using a Full Waveform Inversion Algorithm*
14:30-14:50	**S7 04. Tae Siek Rhee** *Modest Emission of the CH_4 From the Western Arctic Ocean*
14:50-15:10	**S7 05. Kyung-Hoon Shin** *Biogeochemical Signatures on Methane Oxidations in the Seafloor of the Arctic*
15:10-15:30	**S7 06. Simona Retelletti Brogi** *Exploring Sediment Porewater Dissolved Organic Matter (DOM) in a Mud Volcano: Clues of a Thermogenic DOM Source from Fluorescence Spectroscopy*
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** *Sedimentation process in the deep-sea region off the Bellingshausen Sea in association with ice sheet dynamics*
16:20-16:40	**S8 02. Li Wu** *Late Quaternary dynamics of the Lambert Glacier Amery Ice Shelf System, Prydz Bay(East Antarctica)*
16:40-17:00	**S8 03. Jinwook Kim** *Biogeochemical Modification of Clay Minerals in Antarctic Region: Implications*
17:00-17:20	**S8 04. Ji Young Shin** *Rock Magnetic Properties of Scotia Sea Sediments from the Southern Ocean: Link Between Magnetic Susceptibility and Climate Change*
17:20-17:40	**S8 05. Sangbeom Ha** *Glacio-Marine Sedimentations in the Continental Slope and Rise to the East of Pennell-Iselin Banks in the Ross Sea*
18:00-19:30	Banquet and Young Scientists Award Ceremony

Oral Presentation

EXPLORING SEDIMENT POREWATER DISSOLVED ORGANIC MATTER (DOM) IN A MUD VOLCANO: CLUES OF A THERMOGENIC DOM SOURCE FROM FLUORESCENCE SPECTROSCOPY

Simona Retelletti Brogi

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ABSTRACT

Mud volcanoes (MVs) are potential conduit migration pathways for deep thermogenic DOM. In this study, we investigated the dissolved organic matter (DOM) of porewater in a MV in the Canadian Beaufort Sea and compared dissolved organic carbon (DOC) and fluorescent DOM (FDOM) between the MV and a reference site (RS). The chemical and isotopic compositions (Cl-, δ18O and δD) of porewater from the MVs indicated that these fluids are derived from a mixture of seawater, meteoric water, and clay dehydration, causing a freshening of the porewaters. Interestingly, the porewaters in the MV exhibited DOC concentrations up to 14 times higher than those in the RS. This high DOC concentration was attributed to a higher concentration in the deep fluid moving upwards through the MV, and in minor part to processes such as particulate organic matter sulfate reduction, anaerobic oxidation of methane and higher biological activity in the MV sediments. The fluorescence results showed the presence of four components in both MV and RS sites, which included two humic-like, one microbial humic-like, and a protein-like component. All the four fluorescent components increased with depth, showing a good linear relationship with DOC. However, the DOC-normalized fluorescence in the porewater DOM was on average 3 to 7 times lower in the MV, suggesting that the DOM molecules have undergone thermogenic processes in the deep sediments, and that shallow processes do not affect significantly to FDOM composition. Our results highlight that fluids migrating from the deep sediment through the MV can be an important source of thermogenically altered DOM to the shallow sediments and overlying water column.

Oral Presentation

Sedimentation process in the deep-sea region off the Bellingshausen Sea in association with ice sheet dynamics

Sunghan Kim

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ABSTRACT

Two sediment cores, 2.2 m-long core BS17-GC01 (67°22.8947′S, 96°23.2464′W, 4627 m deep) and 8.5 m-long core BS17-GC02 (68°09.4940′S, 94°34.7988′W, 4361 m deep), were collected from the deep basin off the Bellingshausen Sea during ANA07D cruise by *Araon*. Since core BS17-GC01 was collected from more distal location from the Belgica Fan than the other, their sedimentary differences would provide important information on deposition pattern with distance in response to ice sheet advance/retreat. The age model for core BS17-GC01 was constrained by graphic correlations with EDML ice core dust record and that for core BS17-GC02 was constrained by AMS 14C dates and additional sediment color correlation with core BS17-GC01. Both cores showed color alternation of brown and gray, although core BS17-GC02 has thick laminations. The brown layers are thought to be deglacial-interglacial deposition, whereas the gray layers are considered to be glacial deposition. In spite of similar sediment color variation, there were some clear distinctions in geochemical and sedimentological records between two cores indicating differences in sedimentary process with distance from the continental shelf. Our record suggests that a large amount of shelf sediments is transported into the deep-sea region during the deglacial period indicating that sub-glacial melting/pumping can be an important mechanism to transport shelf sediments to the deep sea off the Bellingshausen Sea.