
SCIENCE AND TECHNOLOGY IN ICE-COVERED SEAS

Almost 10 % of the earth's ocean is perennially or seasonally covered with ice layers. Variations in the sea ice cover have profound effects on the global heat balance and thus relate to dynamic cycles in the atmosphere and in the oceans.

The Sea of Okhotsk is known as Japan's only "freezing" sea, with its frozen coastal waters along Hokkaido being the southernmost (44°00'-45°30'N) on the Northern Hemisphere. Up to 60~70% of the Okhotsk surface is ice covered during the winter, hampering navigation and fishing operations. It is true that sea ice increases marine productivity but it can cause problems such as marine accidents, damage to equipment and rigs that are in the water, and damage to field crops due to cold weather. With development of seabed resources such as oil and gas, advanced studies in marine structures and ice engineering are in great demand.

The Okhotsk Sea & Polar Oceans Symposium is organized annually by the City of Mombetsu. The objectives of this annual Symposium are to promote the advancement of all ice-related studies such as oceanography, meteorology, biology and fisheries, to explore what may be common in various fields, to review the latest developments in these fields, and to outline new directions for future research. It is our hope at this 34th International Symposium that many excellent presentations and discussions amongst participants will lead to deeper understanding of sea ice studies.

Organized by

- ◇ City of Mombetsu
- ◇ Symposium Committee

Sponsored by

- ◇ National Institute of Polar Research (NIPR)
- ◇ Kitami Institute of Technology (KIT)
- ◇ Tokai University, Sapporo Campus
- ◇ Tokyo University of Agriculture, Okhotsk Campus
- ◇ Tokyo University of Marine Science and Technology
- ◇ Institute of Low Temperature Science, Hokkaido University (ILTS)
- ◇ Arctic Research Center, Hokkaido University (ARC)
- ◇ Graduate School of Fisheries Sciences, Hokkaido University
- ◇ Field Science Center for Northern Biosphere, Hokkaido University
- ◇ Atmosphere and Ocean Research Institute, The University of Tokyo (AORI)
- ◇ Hokkaido National Fisheries Research Institute
- ◇ Japan Consortium for Arctic Environmental Research (JCAR)

INTERNATIONAL ADVISORY COMMITTEE

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- ◆ Prof. Hiroyuki Enomoto, National Institute of Polar Research, Japan
- ◆ Dr. Katsushi Iwamoto, City of Mombetsu, Japan
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- ◆ Prof. Humio Mitsudera, Hokkaido University, Japan
- ◆ Prof. Ferdinant A. Mkrtchyan, Institute of Radioengineering & Electronics, Russia
- ◆ Prof. Emer. Tsuneo Nishiyama, Tokai University, Japan
- ◆ Prof. Akihiro Shiimoto, Tokyo University of Agriculture, Japan
- ◆ Prof. Emer. Shuhei Takahashi, Kitami Institute of Technology, Japan
- ◆ Dr. Kazutaka Tateyama, Kitami Institute of Technology, Japan
- ◆ Prof. Hajime Yamaguchi, The University of Tokyo, Japan

◇ PROGRAM ◇

Sunday 17 Feb. 2019

Mombetsu Citizens' Public Hall

Program for Ceremony

13:30~14:30 ◇ **Registration:** 【2F Lobby】

14:30~17:30 ◇ **Opening Ceremony:** 【Main Hall】

■ Welcome Address:

Yoshikazu Miyakawa	Mayor, City of Mombetsu
Shuhei Takahashi	Chair, The Symposium Committee
Susumu Fujita	Director, Okhotsk General Subprefectural Bureau

■ Introduction of Overseas Participants:

《Belgium》	Prof. Gaston R. Demarée	Royal Meteorological Institute of Belgium
《Canada》	Ms. Julie Babin	Laval University
《China》	Prof. Xianyao Chen	Ocean University of China
《France》	Dr. Laurie M. Charrieau	Lund University
《Germany》	Dr. Amin Chabchoub	The University of Sydney
《Korea》	Prof. Kyungsik Choi	Korea Maritime and Ocean University
	Prof. Seunghyun Ha	Korea Maritime and Ocean University
	Mr. Sungrok Cho	Korea Maritime and Ocean University
	Mr. Byungmo Kim	Korea Maritime and Ocean University
	Mr. Beomsik Son	Korea Maritime and Ocean University
	Dr. Yonghan Choi	Korea Polar Research Institute
	Dr. Kuk Jin Kang	Korea Res. Inst. of Ships & Ocean Engineering
	Dr. Young Shik Kim	Korea Res. Inst. of Ships & Ocean Engineering
	Mr. Hyungdo Song	Korea Res. Inst. of Ships & Ocean Engineering
	Mr. Cheol-Hee Kim	Korea Res. Inst. of Ships & Ocean Engineering
《Russian》	Mr. Sergey Serovetnikov	Arctic and Antarctic Research Institute
	Dr. Valentina Lobkina	Far East Geological Institute
	Ms. Alexandra Muzychenko	Far East Geological Institute
	Mr. Vitaly Kuzin	Nizhny Novgorod State Tech. Univ. n.a.R.E. Alekseev
	Prof. Natalia Ianchenko	Irkutsk National Research Technical University
	Dr. Igor Ognev	Irkutsk National Research Technical University
	Mr. Andrey Klepikov	Sakhalin Energy
	Ms. Natalia Gonchar	Sakhalin Energy
《Slovenia》	Dr. Nina Bednarsek	A Public Agency for Environmental Research
《USA》	Prof. Lawson W. Brigham	University of Alaska Fairbanks

■ **Introduction:** Foreign Students of Kitami Institute of Technology and
Mombetsu International Friendship Committee

■ **Attraction:** Dance by Mombetsu Otani Kindergarten

■ **Special Lectures:** Natural Environment and Hunting Culture in Greenland
Ms. Toku Ohshima (Qaanaaq, Greenland, Denmark)

■ **Movie Appreciation:** An Inconvenient Sequel, Truth to Power

18:00~19:30 ◇ **Memorial Reception (Banquet)** 【3F】

Monday 18 Feb. 2019

Mombetsu Arts & Culture Center

[1F Main Hall]

9:00~9:20 **OPENING ADDRESS** Shuhei Takahashi (Chair of the Symposium Committee)

9:20~11:00 **Keynote Address A:**

A-1 The meteorological observations in the far-east by Jean Barthe, physician on the French frigates *La Virginie* and *La Sibylle*
Gaston R. Demarée (Royal Meteorological Inst. Belgium, Belgium) and etc.

A-2 Multidecadal variability of Atlantic meridional overturning circulation and its impact on global and Arctic climate
Xianyao Chen (Ocean Univ. China, China)

A-3 Trends in supply of DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid) -a novel source-
Koretaro Takahashi (Kitami Inst. Tech.)

11:00~12:00 **Special Lecture A:**

A-4 Dynamics of precipitation and temperature in the Baikal region (on the example of the cities of Baikalsk, Irkutsk, Bratsk)
Natalia Ianchenko (Irkutsk National Res. Tech. Univ., Russia)

A-5 The climate of Hakodate (Hokkaido) in 1850-60s and the global warming
Takehiko Mikami (Tokyo Metropolitan Univ.) and etc.

13:00~16:00 **Scientific Session B : Snow, Ice and Human Life**

16:10~17:30 **Scientific Session C : Climate Change**

[3F Special Conference Room]

10:00~12:00 **Public Program M1 : Forum of oil pollution measures and environmental protection**
『What is Necessary to Protect Nature?』 *(in Japanese language only)*

13:00~17:45 **Scientific Session D : Workshop, Polar Prediction Project**
-From Observations to Predictions-

17:55~18:30 **Kickoff Meeting for Making a New Arctic Research Icebreaker**
(in Japanese language only)

13:00~16:10 **Scientific Session E : Cold Region Engineering** **[3F Meeting Room]**

Mombetsu Municipal Museum

[Museum Lecture Room]

13:00~17:00 **Public Program M2 : Our Home Okhotsk Sea** *(in Japanese language only)*

Okhotsk Sea Ice Museum

18:30~20:20 **White Concert**

Evening to Listen to Rinda Yamamoto -Song of a Human Life Affecting a Heart-
Rinda Yamamoto (Singer) and Yuko Suzuki (Piano)

Tuesday 19 Feb. 2019

Mombetsu Arts & Culture Center

[1F Main Hall]

9:00~12:05 **Scientific Session F :**

Workshop, Utilization of the Northern Sea Route and the Arctic Ocean

~ Update and New Concept

• **Keynote Address 9:05~9:35**

F-1 Future opportunities and challenges for Russia's Northern Sea Route
Lawson W. Brigham (Univ. Alaska, USA)

13:00~16:20 **Scientific Session G :**

**Workshop, Activities Industry-Government-Academia Collaborative Research on
the Arctic Region Supported by J-ARC Net**

16:30~18:30 **Public Program M3 :**

(in Japanese language only)

Prevention and Mitigation of Disasters in the Okhotsk Region of Hokkaido, Japan

[3F Special Conference Room]

9:00~15:00 **Scientific Session H :** **Workshop, Subarctic Climate System and
Land-Ocean Linkage**

15:10~16:10 **Scientific Session I :** **Meteorology and Oceanography in Polar Regions**

16:20~17:20 **Scientific Session J :** **Arctic Sea Routes**

10:00~11:40 **Scientific Session K :** **Remote Sensing**

[3F Meeting Room]

Mombetsu Municipal Museum

[Museum Lecture Room]

9:00~18:00 **Scientific Session L :** **Marine Biology and Fisheries**

• **Keynote Address 15:00~15:30**

L-14 Mystery of homing in Pacific salmon

- Sensory mechanisms of natal stream imprinting and homing -

Hiroshi Ueda (Hokkaido Univ./Hokkaido Aquaculture Promo. Corp.)

Mombetsu Central Hotel

19:00~20:30 **Dinner Party for Friendship between Scientists & Volunteers**

Wednesday 20 Feb. 2019

Mombetsu Arts & Culture Center

9:30~10:50 **Scientific Session J : Arctic Sea Routes**

【1F Main Hall】

11:00~11:30 **CLOSING SESSION :**

- Symposium Declaration
- A Review of the Symposium
- Prize-awarding Ceremony of the Aota Masaaki Award
- Closing Remarks, Shuhei Takahashi (Chair of the Symposium Committee)

Mombetsu Arts & Culture Center

【1F Main Hall】

13:30~16:00 **Public Program M4 : Symposium on the Forest-Ocean Linkage**

『Importance of the Forest -To Promote the Public Interest Function of the Forest and to Make the Forestry to Growing Industry』
(in Japanese language only)

【3F Special Conference Room】

13:30~17:30 **Public Program M5 : The Okhotsk Terroir Symposium 2019 in Mombetsu**

『Dispatch and Development of New Okhotsk Tourism』 *(in Japanese language only)*

- Part 1 :** Offer of Information and Topics
- Part 2 :** Practice Examples, Proposal and Suggestion
- Part 3 :** Panel Discussion

9:00~11:00 **Scientific Session P : Poster Session**

【3F Lobby】

Mombetsu Citizens' Public Hall

9:30~11:00 **Symposium for Public Education**

【Main Hall】

「Presentation by Junior-High School Students」 *(in Japanese language only)*

- I . Presentation of the General Learning -Mombetsu Junior High School
- II . Presentation of the International Understanding Learning -Shokotsu Junior High School
- III . Presentation of the Local Disaster Prevention Learning -Shiomi Junior High School

13:10~14:30 **Symposium on Sea Ice for Children and Parents**

(in Japanese language only)

- I . Wonder of drift ice in Okhotsk Sea
Shuhei Takahashi (Okhotsk Sea Ice Museum)
- II . What kind of country is Belgium?
Gaston Demarée (Royal Meteorological Inst. Belgium)
- III . Quiz about drift ice and Belgium
Shuhei Takahashi (Sea Ice Museum) and Gaston Demarée (Royal Meteorological Inst. Belgium)

Thursday 21 Feb. to Friday 22 Feb.

Field Study 「Tourism in Lake-Saroma, Tkoro, Abashiri and Okhotsk Sea」

Cosponsorship Exhibition

Okhotsk Sea Ice Museum

Tue. 12 Feb. to Thu. 28 Feb.

2019 International Photo Exhibition on the Okhotsk Sea & Polar Oceans, in Mombetsu

Tanka (Poem) Exhibitions of Sea Ice

9:00	<p>【Opening Address】 Shuhei Takahashi Chair of the Symposium Committee</p> <p>【A : Keynote Address】 Chair, Shuhei Takahashi (Sea Ice Museum)</p>
9:20	<p>A-1 The meteorological observations in the far-east by Jean Barthe, physician on the French frigates <i>La Virginie</i> and <i>La Sibylle</i> ◇Gaston R. Demarée (Royal Meteorological Inst. Belgium, Belgium), Takehiko Mikami (Tokyo Metropolitan Univ.), Patrick Beillevaire (French National Center Sci. Res., France), Yoshio Tagami (Univ. Toyama), Masumi Zaiki (Seikei Univ.), Togo Tsukahara (Kobe Univ.) and Junpei Hirano (Teikyo Univ.)</p>
9:50	Break
10:00	<p>【A : Keynote Address】 Chair, Shuhei Takahashi (Sea Ice Museum)</p> <p>A-2 Multidecadal variability of Atlantic meridional overturning circulation and its impact on global and Arctic climate ◇Xianyao Chen (Ocean Univ. China, China)</p>
10:30	<p>A-3 Trends in supply of DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid) -a novel source- ◇Koretaro Takahashi (Kitami Inst. Tech.)</p> <p>【A : Special Lecture】 Chair, Yoshio Tagami Univ. Toyama)</p>
11:00	<p>A-4 Dynamics of precipitation and temperature in the Baikal region (on the example of the cities of Baikalsk, Irkutsk, Bratsk) ◇Natalia Ianchenko (Irkutsk National Res. Tech. Univ., Russia)</p>
11:30	<p>A-5 The climate of Hakodate (Hokkaido) in 1850-60s and the global warming ◇Takehiko Mikami (Tokyo Metropolitan Univ.) and Masumi Zaiki (Seikei Univ.)</p>
12:00	Lunch
13:00	<p>【B : Snow, Ice and Human Life】 Chair, Kanichiro Matsumura (Tokyo Univ. Agriculture)</p> <p>《Keynote Address》</p> <p>B-1 Meteorological observations of the French warship at the end of the Tokugawa period and summer climate conditions around Hokkaido ◇Yoshio Tagami (Univ. Toyama), Gaston R. Demarée (Royal Meteorological Inst. Belgium, Belgium), Takehiko Mikami (Teikyo Univ.), Patrick Beillevaire (French National Center Sci. Res., France), Masumi Zaiki (Seikei Univ.), Togo Tsukahara (Kobe Univ.) and Junpei Hirano (Teikyo Univ.)</p>
13:30	<p>B-2 Utilization of discarded and unused woody materials for biomass heating and power plant ◇Tsuyoshi Yoda (City of Mombetsu/Aomori Pref. Ind. Tech. Res. Center)</p>
13:50	<p>B-3 Technical issues on undergrounding of utility cables to improve the rural landscape in Hokkaido ◇Hiroshi Ota, Tetsuo Takahashi, Madoka Ohtake, Keisuke Iwata and Yasuaki Matsuda (Civil Eng. Res. Inst. Cold Region)</p>
14:10	<p>B-4 Snow load on the ground on the Sakhalin. Damage, calculation, mapping ◇Valentina A. Lobkina (Far East Geological Inst., Russia)</p>
14:30	Break
14:40	<p>Chair, Toshihiro Ozeki (Hokkaido Univ. Edu.)</p> <p>B-5 Marine litter in the World Heritage “Shiretoko”: Estimations of the volume and the sources ◇☆A Yu Sugita, Yusuke Kobayashi and Takayuki Shiraiwa (Hokkaido Univ.)</p>
15:00	<p>B-6 The MONODUKURI PBL in cold area basis research to prevent smartphone electrical discharge ◇☆A Saki Iwadate, Kazuki Osanai, Muhammad Haziq Aiman, Kazutaka Yokota and Kei Horio (Utsunomiya Univ.)</p>
15:20	<p>B-7 The MONODUKURI PBL in cold area -Basis research on protection against cold and preservation of body temperature- ◇☆A Asahi Sawasato, Yuri Abe, Mohammad Alif Aimullah, Kazutaka Yokota and Kei Horio (Utsunomiya Univ.)</p>
15:40	<p>B-8 Preparing a handmade fixed wing UAV for drift ice observation ◇Kanichiro Matsumura (Tokyo Univ. Agriculture), Stanley Anak Suab and Ram Avtar (Hokkaido Univ.)</p>
16:00	Break

☆A The Aota Masaaki Award Candidate

Monday 18 Feb. 2019

Mombetsu Arts & Culture Center

Place: 1F Main Hall

	<p>【C : Climate Change】 Chair, Takayuki Shiraiwa (Hokkaido Univ.)</p>
16:10	<p>C-1 Changes in terminus positions, ice speed and surface elevation of marine-terminating glaciers in northwestern Greenland during the last 30 years ◇☆A Daiki Sakakibara, Shin Sugiyama (Hokkaido Univ.) and Anders Anker Bjørk (Univ. Copenhagen, Denmark)</p>
16:30	<p>C-2 Rapid retreat of Bowdoin Glacier in northwestern Greenland controlled by the ocean and glacier bed geometries ◇☆A Izumi Asaji, Daiki Sakakibara (Hokkaido Univ.), Shintaro Yamasaki (Kyoto Univ.) and Shin Sugiyama (Hokkaido Univ.)</p>
16:50	<p>C-3 Analysis and modeling of some characteristics of climate change in Central Siberia ◇Igor A. Ognev and Natalia I. Ianchenko (Irkutsk National Res. Tech. Univ., Russia)</p>
17:10	<p>C-4 El Niño Thermodynamics -Unusual weather is made in the surface mixed layer (200m) in Pacific equator east ◇Takao Nakajin (Tokai Univ.)</p>
18:30	<p>White Concert 『Okhotsk Sea Ice Museum』</p>

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Monday 18 Feb. 2019 Mombetsu Arts & Culture Center Place: 3F Special Conference Room

10:00 12:00	<p>【M1 : Public Program, Forum of oil Pollution Measures and Environmental Protection】 <i>(in Japanese language only)</i> Chair, Go Saito (OEPN, Okhotsk Environment Protection Net)</p> <p>Introduction, Masato Ito (OEPN, Okhotsk Environment Protection Net)</p> <p>M1-1 On the history of OEPN and the current situation surrounding us ◇Masato Ito (OEPN, Okhotsk Environment Protection Net)</p> <p>M1-2 About new information of Sakhalin II project ◇Andrey Klepikov and Natalia Gonchar (Sakhalin Energy, Russia)</p> <p>M1-3 Recent oil spill incidents and preparedness for oil spill incident ◇Kazumi Konno (Mombetsu Coast Guard Office)</p> <p>M1-4 Disaster relief volunteer activities in Hokkaido ◇Yutaka Sakamoto (Hokkaido Council of Social welfare)</p> <p>M1-5 Red list of birds of Lake Komuke -We take heavy responsibility for the future of birds ◇Kazuhiro Oodate (Mombetsu-Kaihatsu Club)</p>
12:00	<p>Lunch</p>

	【D : Workshop, Polar Prediction Project -From Observations to Predictions-】	
13:00	Introduction, Jun Inoue (NIPR)	Chair, Jun Inoue (NIPR)
13:05	D-1 Real-time forecasts over the Arctic region during 2017/2018 Arctic expedition of the KOPRI IBRV Araon ◇Yonghan Choi, Joo-Hong Kim (Korea Polar Res. Inst., Korea), Baek-Min Kim (Pukyong National Univ., Korea), Chang-Kyu Lim (Korea Polar Res. Inst., Korea), Shin-Woo Kim, Nam-Kyu Noh (Pukyong National Univ., Korea) and Xiangdong Zhang (Univ. Alaska, USA)	
13:25	D-2 Developing insights into the Arctic researches during early winter using RV Mirai ◇Jun Inoue (NIPR)	
13:45	D-3 Application of cloud particle sensor sondes to monitoring cloud evolution under off-ice flow condition over the Arctic Ocean ◇Kazutoshi Sato (Kitami Inst. Tech.) and Jun Inoue (NIPR/SOKENDAI)	
14:05	D-4 Operational sea ice prediction for the Japanese research vessel MIRAI's expedition cruise in 2018 ◇Liyanarachchi Waruna Arampath De Silva (Univ. Tokyo), Takeshi Terui (NIPR), Hajime Yamaguchi (Univ. Tokyo) and Jun Inoue (NIPR)	
14:25	Break	
		Chair, Takuji Waseda (Univ. Tokyo)
14:35	D-5 Sea ice observations along a fixed marginal ice zone transect in the refreezing eastern Chukchi Sea ◇☆A Takehiko Nose, Takuji Waseda and Tsubasa Kodaira (Univ. Tokyo) and Jun Inoue (NIPR)	
14:55	D-6 Observed waves in the refreezing eastern Chukchi Sea during 2018 Mirai Cruise ◇Takuji Waseda, Takehiko Nose, Tsubasa Kodaira (Univ. Tokyo), Alison Kohout (Univ. Victoria, Canada), Johannes Gemmrich (National Inst. Water Atmospheric Res., New Zealand), Hui Shen (Bedford Inst. Oceanogr., Canada) and Jun Inoue (NIPR)	
15:15	D-7 Oceanographic observation of refreezing warm Chukchi Sea during 2018 Mirai Cruise ◇☆A Tsubasa Kodaira, Takehiko Nose, Takuji Waseda (Univ. Tokyo) and Jun Inoue (NIPR)	
15:35	D-8 Influence of autumn ocean heat flux on sea ice advance in the Chukchi Sea ◇Takuya Nakanowatari, Jun Inoue (NIPR) and Jinlun Zhang (Univ. Washington, USA)	
15:55	Break	
		Chair, Jun Ono (JAMSTEC)
16:05	D-9 Impact of sea ice thickness on the predictability of the Arctic environmental variability ◇Jun Ono, Yoshiki Komuro and Hiroaki Tatebe (JAMSTEC)	
16:25	D-10 Incorporation of satellite-derived thin ice data into a global OGCM simulation ◇Takahiro Toyoda (Meteorological Res. Inst.), Katsushi Iwamoto (NIPR/Niigata Univ. /Mombetsu City), L. Shogo Urakawa, Hiroyuki Tsujino, Hideyuki Nakano, Kei Sakamoto, Goro Yamanaka (Meteorological Res. Inst.), Yoshiki Komuro, Shigeto Nishino (JAMSTEC) and Jinro Ukita (Niigata Univ.)	
16:45	D-11 Development of TOPAZ5 for the Arctic Ocean-Ice-Biogeochemistry-Wave forecast and reanalysis ◇Tsuyoshi Wakamatsu, Annette Samuelsen (Nansen Center, Norway/Bjerknes Center for Climate Res., Norway), Jiping Xie (Nansen Center, Norway), Çağlar Yumruktepe, Mostafa Bakhoday-Paskyabi (Nansen Center, Norway/Bjerknes Center for Climate Res., Norway), Alfati Ali (Norwegian Meteorological Inst., Norway) and Laurent Bertino (Nansen Center, Norway/Bjerknes Center for Climate Res., Norway)	
17:05	D-12 Information retrieval for Northern Sea Route (NSR) navigation: a statistical approach using the TOPAZ4 and AIS data ◇Tomoko Koyama, Jun Inoue and Takuya Nakanowatari (NIPR)	
17:25	D-13 Sea ice conditions in the Beaufort Sea in autumn 2018 ◇Kazutaka Tateyama, Kazutoshi Sato (Kitami Inst. Tech.), Noriaki Kimura (Univ. Tokyo) and Hayato Okuda (Kitami Inst. Tech.)	
17:45	Break	
17:55 18:30	【Kickoff Meeting for Making a New Arctic Research Icebreaker】 (in Japanese language only) Chair, Hajime Yamaguchi (Univ. Tokyo)	
18:30	White Concert 『Okhotsk Sea Ice Museum』	

Monday 18 Feb. 2019

Mombetsu Arts & Culture Center

Place: 3F Meeting Room

	[E : Cold Region Engineering] Chair, Kuk-Jin Kang (Korea Res. Inst. Ships Ocean Eng., Korea)
13:00	E-1 Turning features of an icebreaker during ramming operations: a case study ◇☆A Yuto Takahashi, Hajime Yamaguchi (Univ. Tokyo), Shuki Ushio (NIPR), Yutaka Yamauchi and Shigeya Mizuno (Japan Mar. United Corp.)
13:20	E-2 Experimental evaluation of ice load acting on an Arctic offshore structure with different ice drifting angle ◇☆A Cheolhee Kim, Young-Shik Kim, Hyung-Do Song, Kuk-Jin Kang and Jinho Jang (Korea Res. Inst. Ships Ocean Eng., Korea)
13:40	E-3 Systematic literature study for important factors of station-keeping in Arctic condition ◇Byungmo Kim and Seunghyun Ha (Korea Mar. Ocean Univ., Korea)
14:00	E-4 An experimental investigation on the mooring performance of a turret moored Arctic offshore vessel ◇☆A Hyungdo Song, Young-Shik Kim, Cheolhee Kim, Young-Uk Won and Kuk-Jin Kang (Korea Res. Inst. Ships Ocean Eng., Korea)
14:20	Break
	Chair, Koh Izumiyama (Hokkaido Univ.)
14:30	E-5 An experimental validation of an icevaning control algorithm for an Arctic offshore vessel in managed ice condition ◇Young-Shik Kim, Hyung-Do Song, In-Bo Park and Kuk-Jin Kang (Korea Res. Inst. Ships Ocean Eng., Korea)
14:50	E-6 Influence of initial arrangement of ice floes on ice loads in non-smooth discrete element method simulation ◇☆A Kenta Hasegawa, Shotaro Uto, Haruhito Shimoda, Daisuke Wako and Takatoshi Matsuzawa (Natl. Mar. Res. Inst.)
15:10	E-7 Modification of local ice load prediction based on IBRV ARAON's 2016 Arctic field data ◇Sungrok Cho and Kyungsik Choi (Korea Mar. Ocean Univ., Korea)
15:30	E-8 On interfacial wave making resistance of a ship ◇Hiromitsu Kitagawa and Eiji Sakai (Ocean Policy Res. Inst.)
15:50	E-9 Exploration of the parameter space for ice floe drift Luuk Blaauw (Univ. Twente, Netherlands), Grant Skidmore (Univ. Melbourne, Australia), ◇Amin Chabchoub (Univ. Sydney, Australia) and Jason Monty (Univ. Melbourne, Australia)
16:10	Break
18:30	White Concert 『Okhotsk Sea Ice Museum』

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Monday 18 Feb. 2019

Mombetsu Municipal Museum

Place: Museum Lecture Room

	[M2 : Public Program: Our Home Okhotsk Sea] <i>(in Japanese language only)</i> Chair, Masaki Fujiwara (City of Mombetsu)
13:00	M2-1 The current state of Mombetsu fisheries ◇Hiroaki Iida (Mombetsu Fish. Corp. Assoc.)
13:40	M2-2 Recent topics on chum salmon in Hokkaido ◇Hayato Saneyoshi (Salmon & Freshwater Fish. Res. Inst.)
14:20	Break
14:30	M2-3 Effective utilization of scallop mantle ~New snack food development and use as a functional material~ ◇Hirofumi Takeda (Abashiri Fish. Res. Inst.)
15:10	M2-4 Visualization of fish behaviour using bio-logging technology ◇Kazushi Miyashita (Hokkaido Univ.)
15:50	Break
16:00 17:00	「Discussion」 Chair, Tsuneo Nishiyama (Tokai Univ.)
18:30	White Concert 『Okhotsk Sea Ice Museum』

	<p>[F : Workshop, Utilization of the Northern Sea Route and the Arctic Ocean ~ Update and New Concept]</p> <p style="text-align: right;">Chair, Natsuhiko Otsuka (Hokkaido Univ.)</p>
9:00	Introduction, Natsuhiko Otsuka (Hokkaido Univ.)
	《Keynote Address》
9:05	<p>F-1 Future opportunities and challenges for Russia's Northern Sea Route ◇Lawson W. Brigham (Univ. Alaska, USA)</p>
9:35	<p>F-2 How the "Arctic League" views the use of the Arctic Ocean under climate change? Fujio Ohnishi, ◇Juha Saunavaara and Natsuhiko Otsuka (Hokkaido Univ.)</p>
9:55	<p>F-3 Improving connectivity between East Asia and Europe through the Arctic: Submarine fiber-optic cable projects current status ◇Juha Saunavaara (Hokkaido Univ.)</p>
10:15	<p>F-4 Framework of NSR gateway evaluation: A preliminary discussion ◇Motohisa Abe (Hokkaido Univ.)</p>
10:35	Break
10:45	<p>F-5 Investigation of ship speed along the Northern Sea Route by satellite AIS ◇Natsuhiko Otsuka, Xiaoyang Li (Hokkaido Univ.) and Kazutaka Tateyama (Kitami Inst. Tech.)</p>
11:05	<p>F-6 Characteristics of recent NSR shipping activities by destination and objective ◇Xiaoyang Li and Natsuhiko Otsuka (Hokkaido Univ.)</p>
11:25	<p>F-7 Desktop study of Northern Sea Route trial shipping ◇Natsuhiko Otsuka (Hokkaido Univ.), Eisaku Nakamura (Hokkaido Res. Inst. Twenty-First Century Co., Ltd.), Juha Saunavaara and Fujio Ohnishi (Hokkaido Univ.)</p>
11:45	<p>F-8 Scientific diplomacy in the Arctic - Japan's commitment to the Arctic Council - ◇Julie Babin (Laval Univ., Canada)</p>
12:05	Lunch
	<p>[G : Workshop, Activities Industry-Government-Academia Collaborative Research on the Arctic Region Supported by J-ARC Net]</p> <p style="text-align: right;">Chair, Masato Tanaka (Hokkaido Univ.)</p>
13:00	<p>G-1 Activities to promote industry-government-academia collaborative research on the Arctic region supported by Japan Arctic Research Network Center (J-ARC Net) ◇Masato Tanaka, Shingo Tanaka, Yasushi Fukamachi and Sei-ichi Saito (Hokkaido Univ.)</p> <p>Study on marine ecosystem during sea-ice season in the seasonal sea-ice region ◇Kohei Matsuno (Hokkaido Univ.), Seiji Katakura (City of Mombetsu), Hiromi Kasai (Hokkaido Natl. Fish. Res. Inst.) and Katsunori Kimoto (JAMSTEC)</p>
13:30	<p>G-2 Arctic technology research forum to consolidate opinions from industry ◇Takashi Kikuchi (JAMSTEC), Hajime Yamaguchi (Univ. Tokyo), Hiroshi Yoshinaga (Mitsubishi Heavy Industries Ltd.), Satoru Fukuba (Japan Marine United Corp.), Masahiro Miwa (INPEX CORPORATION), Takao Kashiwagi (Mitsui O.S.K. Lines, Ltd.), Hajime Yoshida (Zeni Lite Buoy, Ltd.), Kay I. Ohshima, Yasushi Fukamachi (Hokkaido Univ.), Hironori Yabuki and Yuji Kodama (NIPR)</p>
13:50	<p>G-3 LNG transportation from the Arctic Ocean - YAMAL LNG Project - ◇Shiro Izumi, Yuta Orito and Takao Kashiwagi (Mitsui O.S.K. Lines, Ltd.)</p>
14:10	<p>G-4 The feasibility study for ice navigation support system for the Northern Sea Route ◇Eisuke Akane (JAMSTEC), Hajime Yamaguchi (Univ. Tokyo), Akihisa Konno (Kogakuin Univ.), Kazutaka Tateyama (Kitami Inst. Tech.), Takatoshi Matsuzawa (Natl. Mar. Res. Inst.), Misako Kachi, Masahiro Hori (JAXA), Genki Sagawa (Weathernews Inc.), Shiro Izumi (Mitsui O.S.K. Lines, Ltd.), Toshiro Arima, Akira Teshima (Nippon Kaiji Kyokai), Hironori Yabuki, Tetsuo Sueyoshi (NIPR), Noriaki Kimura (Univ. Tokyo), Takashi Kikuchi and Takeshi Kawano (JAMSTEC)</p>
14:30	Break

	<p>[G : Workshop, Activities Industry-Government-Academia Collaborative Research on the Arctic Region Supported by J-ARC Net]</p> <p style="text-align: right;">Chair, Masato Tanaka (Hokkaido Univ.)</p>
14:40	<p>G-5 Recent activity and possibility of the Northern Sea Route ◇Natsuhiko Otsuka (Hokkaido Univ.), Eisaku Nakamura, (Hokkaido Res. Inst. Twenty-first Century Co., Ltd.), Juha Saunavaara and Fujio Ohnishi (Hokkaido Univ.)</p>
15:00	<p>G-6 The utilization marine bunker for ships in the Arctic zone ◇Hiroyuki Goda (Tokai Univ.)</p>
15:20	<p>G-7 Study on oil spill response technology in cold water condition - Lessons learned from Exxon Valdes and Deepwater Horizon - ◇Naoki Nakazawa (Syst. Eng. Assoc., Inc.), Hajime Yamaguchi (Univ. Tokyo), Akira Kurokawa (Eng. Adv. Assoc. Japan), Jun Ono (JAMSTEC), Takashi Terashima (Kumashiro Syst. Frontier Co., Ltd.), Genki Sagawa (Weathernews Inc.), Shuho Yano (Japan Workvessel Assoc.), Yasushi Fukamachi and Kay I. Ohshima (Hokkaido Univ.)</p>
15:40	<p>G-8 Assessing and mediating damages on infrastructure and changes in ground surface due to permafrost thaw ◇Takahiro Abe (JAXA), Go Iwahana (Univ. Alaska, USA), Takumi Kawamura (IWATA CHIZAKI Inc.), Syunji Kanie (Hokkaido Univ.), Takeo Tadono (JAXA), Masato Furuya (Hokkaido Univ.), Yoshihiro Iijima (Mie Univ.), Alexander Fedorov (Yakutsk Permafrost Inst., Russia), Yuri Zhigusov (Inst. Humanities & Indigenous People North, Russia), Anastasia Tseeva (Yakut State Design & Res. Inst. Constr., Russia), Petr Efremov (Yakutsk Permafrost Inst., Russia) and Alexey Desyatkin (Inst. Biological Problems Cryolithozone, Russia)</p>
16:00	<p>G-9 An indispensable condition to secure the continuity of sea ice and permafrost engineers in Japan ◇Satoshi Akagawa (Cryosphere Eng. Lab.), Shunji Kanie (Hokkaido Univ.), Takahiro Takeuchi (Hachinohe Inst. Eng.), Toshio Sone (Hokkaido Univ.), Yuji Kodama (NIPR), Akira Kurokawa (Eng. Adv. Assoc. Japan), Naoki Nakazawa (Syst. Eng. Assoc., Inc.) and Takashi Terashima (Kumashiro Syst. Frontier Co., Ltd.)</p>
16:20	Break
	<p>[M3 : Prevention and Mitigation of Disasters in the Okhotsk Region of Hokkaido, Japan] <i>(in Japanese language only)</i></p> <p style="text-align: right;">Chair, Masaki Minakawa (Abashiri Develop. Constr. Dept.)</p>
16:30	Introduction, Kazuhiro Takahashi (Abashiri Develop. Constr. Dept.)
16:35	<p>M3-1 Disaster prevention education promoting by a meteorological observatory ◇Kazuhiro Taniuchi (Abashiri Local Meteorological Office)</p>
16:55	<p>M3-2 Activity of one-day school for disaster prevention ◇Kazuaki Taki (Okhotsk General Subprefectural Bureau)</p>
17:05	Break
17:15 18:30	<p>Panel Discussion Coordinator, Kazuhiro Takahashi (Abashiri Develop. Constr. Dept.)</p> <p>『Action When Disaster Happened - Toward Disaster Mitigation』</p> <p>Masahiro Nemoto (Japan Red Cross Hokkaido College of Nursing) Kazuhiro Taniuchi (Abashiri Local Meteorological Office) Kazuaki Taki (Okhotsk General Subprefectural Bureau) Yasuyuki Ohara (City of Mombetsu) Takashi Sato (Mombetsu Shiomi Junior High School) Teruo Yamamoto (City of Mombetsu)</p>
19:00	Dinner Party for Friendship between Scientists & Volunteers 『Mombetsu Central Hotel』

	【H : Workshop, Subarctic Climate System and Land-Ocean Linkage】 Chair, Humio Mitsudera (Hokkaido Univ.)
9:00	Introduction, Humio Mitsudera (Hokkaido Univ.)
9:05	H-1 Formation of bottom water off Peter the Great Bay in the Sea of Japan ◇☆A Kiyoshi Tanaka (Univ. Tokyo)
9:25	H-2 Marine environment in Kamaishi Bay ◇☆A Yanmei Sun, Kiyoshi Tanaka, Yutaka Michida and Daigo Yanagimoto (Univ. Tokyo)
9:45	H-3 An analysis of hydrological characteristics in the tidal zone of Bekanbeushi River ◇☆A Manhui Ding and Takayuki Shiraiwa (Hokkaido Univ.)
10:05	H-4 Numerical simulation of typhoon storm surge in the Luoyuan Bay ◇☆A Yuan Nan (Ocean Univ. China, China), Xiping Chen (National Mar. Hazard Mitigation Service, China), Xueen Chen (Ocean Univ. China, China) and Jinrui Chen (FuJian Marine Forecasts, China)
10:25	Break
	Chair, Tomohiro Nakamura (Hokkaido Univ.)
10:40	H-5 Estimation of freshwater discharge from the Kamchatka Peninsula to its surrounding oceans ◇☆A Shi Muqing and Takayuki Shiraiwa (Hokkaido Univ.)
11:00	H-6 Role of river discharges from Kamchatka Peninsula in the Okhotsk Sea ◇Toru Miyama (JAMSTEC) and Humio Mitsudera (Hokkaido Univ.)
11:20	H-7 On global distribution and interannual variability of wintertime halocline Masato Oda, Hiromichi Ueno and ◇Humio Mitsudera (Hokkaido Univ.)
11:40	H-8 Distribution, variation and statistics of the index of mixing due to interaction of a vortex and internal waves in the North Pacific ◇Kaoru Ito and Tomohiro Nakamura (Hokkaido Univ.)
12:00	Lunch
	Chair, Hiroaki Ueda (Univ. Tsukuba)
13:00	H-9 Future projection of day-to-day temperature cooling in East Asia ◇Masamitsu Hayasaki (Japan Automobile Res. Inst.), Seiji Sugata (National Inst. Environ. Studies) and Hiroaki Ueda (Univ. Tsukuba/Hokkaido Univ.)
13:20	H-10 Modulation of snowfall, cyclogenesis and tropical cyclone in the East Asia relevant to the combined effect of the Indian and Pacific Ocean SSTs ◇Hiroaki Ueda (Univ. Tsukuba/Hokkaido Univ.)
13:40	H-11 Atmospheric circulation field regulating sea ice change and long-term trend in the Sea of Okhotsk ◇☆A Kaede Maesaki (Univ. Tsukuba)
14:00	H-12 Far-reaching effects of sea ice extent in the Sea of Okhotsk on sea-surface turbulent heat flux and their possible influence ◇Tomohiro Nakamura, Yusuke Takahashi (Hokkaido Univ.) and Takuya Nakanowatari (NIPR)
14:20	H-13 A study of predictability of environment for a heavy snowfall - A case study in Sapporo during 22-23 December 2016 - ◇Hiroaki Asai (SOKENDAI/Japan Meteorological Agency) and Jun Inoue (SOKENDAI/NIPR)
14:40	Discussion
15:00	Break
	【I : Meteorology and Oceanography in Polar Regions】 Chair, Toru Miyama (JAMSTEC)
15:10	I-1 Grease ice observations in the southern Sea of Okhotsk with P/V Soya ◇Masato Ito, Takenobu Toyota, Jun Nishioka, Daiki Nomura, Naoya Kanna, Kan Murakami and Kay I. Ohshima (Hokkaido Univ.)
15:30	I-2 Variations of sea ice band in the northern Chukchi Sea associated with sea ice rafting ◇☆A Jumpei Yamamoto and Koji Shimada (Tokyo Univ. Mar. Sci. Tech.)
15:50	I-3 Ocean measurements near the fronts of marine-terminating glaciers in northwestern Greenland ◇☆A Naoya Kanna, Shin Sugiyama, Takuto Ando, Izumi Asaji and Yoshiki Fujishi (Hokkaido Univ.)
16:10	Break

Tuesday 19 Feb. 2019 Mombetsu Arts & Culture Center Place: 3F Special Conference Room

	【J : Arctic Sea Routes】	Chair, Noriaki Kimura (Univ. Tokyo)
16:20	J-1 Sea spray observation and analysis on R/V Mirai ◇☆A Shuichi Fushimi (Univ. Tokyo), Toshihiro Ozeki (Hokkaido Univ. Edu.), Hajime Yamaguchi (Univ. Tokyo), Masaki Katsumata (JAMSTEC) and Jun Inoue (NIPR)	
16:40	J-2 Trial demonstration of Fluid-Ice-Ship interactive simulations by particle method ◇☆A Takahito Iida and Takefumi Higaki (Osaka Univ.)	
17:00	J-3 Evaluation of the Northern Sea Route feasibility by optimum route search ◇☆A Kengo Okada, Hajime Yamaguchi (Univ. Tokyo), Jun Ono (JAMSTEC) and Takatoshi Matsuzawa (Natl. Mar. Res. Inst.)	
19:00	Dinner Party for Friendship between Scientists & Volunteers 『Mombetsu Central Hotel』	

Tuesday 19 Feb. 2019 Mombetsu Arts & Culture Center Place: 3F Meeting Room

	【K : Remote Sensing】	Chair, Toshiyuki Takagi (Natl. Inst. Tech., Kushiro Coll.)
10:00	K-1 Application of ALOS-2/PALSAR-2 for detecting deformed sea ice area in the Sea of Okhotsk - Toward understanding ice deformation processes - ◇Takenobu Toyota (Hokkaido Univ.) and Junno Ishiyama (Toma Town Office)	
10:20	K-2 Observation of multi-year ice distribution using the satellite microwave data ◇Noriaki Kimura (Univ. Tokyo), Kazutaka Tateyama (Kitami Inst. Tech.), Hajime Yamaguchi and Hiroyasu Hasumi (Univ. Tokyo)	
10:40	K-3 Ship-based television complex STK – The program for remote sea ice thickness measurements ◇Sergey Serovetnikov, Sergey Frolov and Tatiana Alekseeva (Arctic & Antarctic Res. Inst., Russia)	
11:00	K-4 The system of video registration and visualization of the results of laboratory experiments Andrey Kurkin, ◇☆A Vitaly Kuzin, Dmitry Tyugin and Oxana Kurkina (Nizhny Novgorod State Tech. Univ. n.a. R.E. Alekseev, Russia)	
11:20	K-5 High resolution sea ice motion analysis with MODIS data in the western Arctic region ◇☆A Shungo Yaguchi, Noriaki Kimura (Univ. Tokyo), Motoyo Itoh (JAMSTEC), Yasushi Fukamachi (Hokkaido Univ.), Takashi Kikuchi (JAMSTEC) and Hajime Yamaguchi (Univ. Tokyo)	
12:00	Lunch	

Tuesday 19 Feb. 2019 Mombetsu Municipal Museum Place: Museum Lecture Room

	【L : Marine Biology and Fisheries】	Chair, Hiroshi Sasaki (Ishinomaki Senshu Univ.)
9:00	L-1 Characteristics in variability of primary production environments in the Okhotsk Sea waters off Hokkaido using satellite remote sensing ◇Hiromi Kasai (Hokkaido National Fish. Res. Inst.) and Takahiko Kameda (National Res. Inst. Fish. Sci.)	
9:20	L-2 Nitrogen fixation and diazotroph community structure in the high latitude region around Hokkaido, northern Japan ◇☆A Takuya Sato (Univ. Tokyo), Takuhei Shiozaki (JAMSTEC), Yukiko Taniuchi, Hiromi Kasai (Hokkaido Natl. Fish. Res. Inst.) and Kazutaka Takahashi (Univ. Tokyo)	
9:40	L-3 Time series monitoring of environmental DNA in Okhotsk Sea ◇Satoshi Nagai (National Res. Inst. fish. Sci.), Yoko Kawakami, Noriko Nishi (AXIOHELIX Co. Ltd), Sirje Sildever, Nanako Kanno (National Res. Inst. fish. Sci.), Akihiro Shiimoto (Tokyo Univ. Agriculture) and Seiji Katakura (City of Mombetsu)	
10:00	L-4 The effects of multiple stressors on the distribution of coastal benthic foraminifera: A case study from the Skagerrak-Baltic Sea region - Zombie foraminifera reveal impacts of ocean acidification in the Baltic Sea - ◇☆A Laurie M. Charrieau, Helena L. Filipsson, Karl Ljung (Lund Univ., Sweden), Melissa Chierici (Univ. Göteborg, Sweden/Inst. Mar. Res., Norway), Karen Luise Knudsen (Aarhus Univ., Denmark) and Emma Kritzberg (Lund Univ., Sweden)	
10:20	Break	

☆A The Aota Masaaki Award Candidate

	<p>[L : Marine Biology and Fisheries] Chair, Hiromi Kasai (Hokkaido Natl. Fish. Res. Inst.)</p>
10:30	<p>L-5 Shell morphology/density variations of thecosomatous pteropod <i>Limacina helicina</i> recovered from off Mombetsu, Sea of Okhotsk: A result from 2017 to 2018 ◇Katsunori Kimoto (JAMSTEC), Keisuke Shimizu (Univ. Exeter, UK), Erina Shima, Hiroshi Sasaki (Ishinomaki Senshu Univ.), Hiromi Kasai (Hokkaido Natl. Fish. Res. Inst.) and Seiji Katakura (City of Mombetsu)</p>
10:50	<p>L-6 Variability of shell density of thecosomatous pteropod <i>Limacina sp.</i> ◇☆A Erina Shima, Hiroshi Sasaki (Ishinomaki Senshu Univ.) and Katsunori Kimoto (JAMSTEC)</p>
11:10	<p>L-7 Genetic differences in spatially and temporally isolated populations: Winter and spring populations of pelagic mollusk <i>Clione</i> (Gymnosomata), southern Okhotsk Sea, Japan ◇☆A Tomoyasu Yamazaki (Shellfish Museum of Rankoshi), Takashi Kuwahara (Sea Ice Museum) and Kunio T. Takahashi (NIPR/SOKENDAI)</p>
11:30	<p>L-8 Ocean acidification driven biological vulnerability in the high latitudes: Comparison between the Gulf of Alaska, Bering Sea and Beaufort Sea ◇☆A Nina Bednarsek (Southern California Coastal Waters Res. Project, USA), Richard Feely (NOAA Pacific Mar. Environ. Lab., USA), Kerry Naish (Univ. Washington, USA), Katsunori Kimoto (JAMSTEC), Andrea Niemi (Fish. Ocean, Canada), Albert Hermann (NOAA Pacific Mar. Environ. Lab., USA), Lorenz Hauser, Isadora Jimenez (Univ. Washington, USA) and Phyllis Stabeno (NOAA Pacific Mar. Environ. Lab., USA)</p>
12:00	Lunch
	<p>Chair, Ikutaro Shimizu (Hokkaido Natl. Fish. Res. Inst.)</p>
13:00	<p>L-9 Lipid composition and autolytic activity of the northern North Pacific krill (<i>Thysanoessa inermis</i>) that was washed ashore in Shiretoko Peninsula Hokkaido, Japan ◇Koretaro Takahashi (Kitami Inst. Tech.), Daiki Yasunaka and Shingo Inoue (Hokkaido Univ.)</p>
13:20	<p>L-10 Study on homing of black rockfish (<i>Sebastes schlegeli</i>) by biotelemetry ◇☆A Yoshinori Tatsu, Makoto Tomiyasu, Hokuto Shirakawa and Kazushi Miyashita (Hokkaido Univ.)</p>
13:40	<p>L-11 Visualization of spawning migration of pacific herring <i>Clupea pallasii</i> - Three-dimensional change of the migration and its factors - ◇☆A Makoto Tomiyasu, Hokuto Shirakawa, Masahiro Ogawa, Daichi Oshiyama and Kazushi Miyashita (Hokkaido Univ.)</p>
14:00	<p>L-12 Diet and weaning period of Dall's porpoise around Hokkaido, Japan ◇☆A Ayaka Matsuda (Hokkaido Univ./JPN Society Promo. Sci.) and Takashi Fritz Matsuishi (Hokkaido Univ.)</p>
14:20	<p>L-13 Outline of the second expedition of whale scientific permit survey off coast of the Okhotsk Sea under the NEWREP-NP program ◇Hideyoshi Yoshida, Hikari Maeda (Natl. Res. Inst. Far Seas Fish.), Gen Nakamura (Tokyo Univ. Mar. Sci.), Tsutomu Tamura and Hidehiro Kato (Inst. Cetacean Res.)</p>
14:40	Break
	<p>[L : Workshop, Recent Progress in Salmon Researches: Perspectives to the Sustainable Use of Salmon Resources in the Okhotsk Area]</p> <p>《Keynote Address》 Chair, Yoshitaka Sasaki (Abashiri Fish. Res. Inst.)</p>
15:00	<p>L-14 Mystery of homing in Pacific salmon - Sensory mechanisms of natal stream imprinting and homing - ◇Hiroshi Ueda (Hokkaido Univ./Hokkaido Aquaculture Promo. Corp.)</p>
15:30	<p>L-15 Recent status of chum salmon stocks in Hokkaido ◇Yasuyuki Miyakoshi, Makoto Fujiwara, Hayato Saneyoshi (Salmon & Freshwater Fish. Res. Inst.) and Yoshitaka Sasaki (Abashiri Fish. Res. Inst.)</p>
15:50	<p>L-16 Migration period of juvenile chum salmon into and out of the littoral zone in the Nemuro region ◇Kiyoshi Kasugai (Salmon & Freshwater Fish. Res. Inst.)</p>
16:10	Break

	<p>【L : Workshop, Recent Progress in Salmon Researches: Perspectives to the Sustainable Use of Salmon Resources in the Okhotsk Area】 Chair, Yasuyuki Miyakoshi (Salmon & Freshwater Fish. Res. Inst.)</p>
16:20	<p>L-17 Migration and homing behavior of chum salmon tagged in the Okhotsk Sea, eastern Hokkaido ◇Hayato Saneyoshi, Makoto Fujiwara (Salmon & Freshwater Fish. Res. Inst.), Itsuki Tatsuoka, Satoki Ohba, Hokuto Shirakawa (Hokkaido Univ.), Yasuyuki Miyakoshi (Salmon & Freshwater Fish. Res. Inst.) and Kazushi Miyashita (Hokkaido Univ.)</p>
16:40	<p>L-18 Effects of terrestrial animals on carcass removal from salmon spawning streams in eastern Hokkaido ◇Kei Matsumoto and Katsuaki Komai (Kitami Inst. Tech.)</p>
17:00	<p>L-19 Balance between human economic activities and impacts on ecosystem by Atlantic salmon escape and Pacific salmon invasion ◇Ikutaro Shimizu (Hokkaido Natl. Fish. Res. Inst.)</p>
17:20	<p>Discussion 『The Future Salmon Research in the Okhotsk Region』</p>
19:00	<p>Dinner Party for Friendship between Scientists & Volunteers 『Mombetsu Central Hotel』</p>

	<p>【J : Arctic Sea Routes】 Chair, Hajime Yamaguchi (Univ. Tokyo)</p>
9:30	<p>J-4 Arctic & Security -from the Security View Point- ◇Takahiro Ishihara (Japan Mar. Self Defense Force /Keio Univ.)</p>
9:50	<p>J-5 Navigation Support by ADS in R/V MIRAI Arctic cruise 2018 ◇Hironori Yabuki, Takeshi Sugimura, Takeshi Terui, Jun Inoue (NIPR), Hajime Yamaguchi, Waruna Arampath (Univ. Tokyo) and Souichiro Sueyoshi (Nippon Marine Enterprises)</p>
10:10	<p>J-6 Development of ship speed prediction method in the ice-covered waters along the Northern Sea Route ◇Hayato Okuda Kazutaka Tateyama (Kitami Inst. Tech.) and Natsuhiko Otsuka (Hokkaido Univ.)</p>
10:30	<p>J-7 Introduction of KRISO Arctic safe routing system (KARS) ◇Kuk-Jin Kang, Seong-Yeob Jeong, Jeong-Joong Kim (Korea Res. Inst. Ships & Ocean Eng., Korea), Hyun-Soo Kim (Inha Tech. College, Korea), Chan-Su Yang (Korea Inst. Ocean Sci. & Tech., Korea), Seong-Heon Jeong (Dong-Kang M-Tech, Korea) and Myung-II Roh (Seoul National Univ., Korea)</p>
10:50	<p>Break</p>
11:00 11:30	<p>【Closing Session】 Chair, Seiji Katakura (City of Mombetsu)</p> <ul style="list-style-type: none"> •Symposium Declaration: •A Review of the Symposium: •Prize-awarding Ceremony of the Aota Masaaki Award: •Closing Remarks: Shuhei Takahashi (Chair of the Symposium Committee)
12:00	<p>Lunch</p>
13:30 16:00	<p>【M4: Public Program, Symposium on the Forest-Ocean Linkage】 <i>(in Japanese language only)</i> 『Importance of the Forest -To Promote the Public Interest Function of the Forest and to Make the Forestry to Growing Industry』 Introduction, Akihisa Ishida (Mombetsu City) Presenter, Norie Tamura (Res. Inst. Humanity & Nature)</p>

13:30 17:30	<p>【M5 : Public Program : The Okhotsk Terroir Symposium 2019 in Mombetsu】 <i>(in Japanese language only)</i></p> <p>『Dispatch and Development of New Okhotsk Tourism』</p> <p>Part 1 : Offer of Information and Topics Part 2 : Practice Examples, Proposal and Suggestion Part 3 : Panel Discussion</p>
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9:00 11:00	<p>【P : Poster Session】</p> <p>P-1 The relationship between phytoplankton bloom and sea ice melt in the Sea of Okhotsk, revealed from the profiling floats ◇Sachiko Kishi, Kay I. Ohshima, Noriaki Isshiki (Hokkaido Univ.), Sohey Nihashi (Natl. Inst. Tech., Tomakomai Coll.) and Stephen C. Riser (Univ. Washington, USA)</p> <p>P-2 Variability in abundance and shell size of the pteropods <i>Limacina</i> spp. in the seasonal ice zone of the Antarctic Ocean ◇Kunio T. Takahashi (NIPR/SOKENDAI), Haruko Umeda (Kaizansenri Inc.) and Tsuneo Odate (NIPR/SOKENDAI)</p> <p>P-3 Reaction behaviors of fish for LED light with different wavelength ◇Yoko Tanouchi, Yasuzumi Fujimori, Susumu Shimizu, Hiroki Yasuma, Naoto Matsubara, Takuma Hayashi (Hokkaido Univ.) and Seiji Katakura (City of Mombetsu)</p> <p>P-4 Abundance of eggs and larvae of Walleye Pollock in the Pacific area of Japan ◇Tomonori Hamatsu (Hokkaido Natl. Fish. Res. Inst.)</p> <p>P-5 Searching for male-dominantly expressed genes in undifferentiated gonad of Amur sturgeon ◇Ken Kitagawa, Shigeho Ijiri and Shinji Adachi (Hokkaido Univ.)</p> <p>P-6 Ovarian development in hybrid sturgeons ◇Takayuki Otomo, Yosuke Aizawa, Hikaru Takayanagi, Kazuki Mukai, Shigeho Ijiri and Shinji Adachi (Hokkaido Univ.)</p> <p>P-7 Measurement and modeling of underwater acoustic propagation in Mombetsu port area ◇Shun Sakamoto, Shingo Yoshizawa (Kitami Inst. Tech.), Tomotaka Niibo, Tomoya Tsukui (IHI Corp.), Takashi Saito (Mitsubishi Electric TOKKI Sys. Corp.)</p> <p>P-8 Relationship between transpolar flights over the Arctic and the upper atmospheric circulation ◇Kazutoshi Sato (Kitami Inst. Tech.) and Jun Inoue (NIPR)</p> <p>P-9 Verification of AMSR-2 sea ice concentration and utilization of ship navigation in the Arctic Ocean ◇Nodoka Ono (JAXA)</p> <p>P-10 Radar image segmentation for sea ice navigation using deep learning ◇Toshiyuki Takagi (Natl. Inst. Tech., Kushiro Coll.) and Kazutaka Tateyama (Kitami Inst. Tech.)</p> <p>P-11 Use of unmanned aerial vehicles (UAV) for surveys of anthropogenic snow patches ◇Alexandra A. Muzychenko, Valentina A. Lobkina and Leonid E. Muzychenko (Far East Geological Inst., Russia)</p> <p>P-12 Features of the elemental composition of snow cover in the Baikal region ◇Natalia Ianchenko (Irkutsk National Res. Tech. Univ. Russia)</p> <p>P-13 Arctic exploration history and climate change ◇Shuhei Takahashi (Sea Ice Museum)</p> <p>P-14 Transport of fresh fish before World War II ◇Masaya Yamada (Hokkaido Industrial Archaeology Society/Hokkaido Cultural Property Protection Assoc./City of Mombetsu)</p>
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【P : Poster Session 「Exhibition」】	
P-15	Migration of eelpout dipline <i>Lycodes soldatovi</i> (Perciformes: Zoarcidae) Oleg Z. Badaev (TINRO Center, Russia)
P-16	Geoecological information-modeling system and its implication for the biocomplexity and survivability assessment of the Okhotsk Sea ecosystem Vladimir F. Krapivin (Kotelnikov Inst. Radioengin. & Electronics, Russia) and Costas. A. Varotsos (National & Kapodistrian Univ., Greece)
P-17	An adaptive optical technology for monitoring marine ecosystems Ferdenant Mkrtychyan, Vladimir Krapivin and Vladimir Klimov (Kotelnikov Inst. Radioengin. & Electronics, Russia)
P-18	Arctic latitudes environmental pollution effects Costas. A. Varotsos (National & Kapodistrian Univ., Greece), Vladimir F. Krapivin and Vladimir Yu. Soldatov (Kotelnikov Inst. Radioengin. & Electronics, Russia)
P-19	Remote monitoring of water surface and ice cover of the Arctic Ferdenant Mkrtychyan (Kotelnikov Inst. Radioengin. & Electronics, Russia) and Sergey Shapovalov (Inst. Oceanology, Russia)
P-20	Oceanologic condition in the waters of South Primorye (Sea of Japan) in 2018 Boris S. Dyakov (TINRO-Center, Russia)
P-21	The Primorskoe Current on standard sections and satellite images of the Japan sea surface Boris S. Dyakov (TINRO-Center, Russia)
P-22	Hydrological characteristics of the Amur Bay (Japan Sea) in February 2018 Vladimir I. Matveev and Alexander L. Figurkin (TINRO-Centre, Russia)
P-23	The recent temperature changes in the Okhotsk Sea mesothermal waters core Alexander L. Figurkin (TINRO-Center, Russia)

9:30 11:00	【Public Program : Symposium for Public Education】 <i>(in Japanese language only)</i> Chair, Takashi Kuwahara (Okhotsk Sea Ice Museum) Presentations by Junior-High School Students I . Presentation of the General Learning -Mombetsu Junior High School II . Presentation of the International Understanding Learning -Shokotsu Junior High School III . Presentation of the Local Disaster Prevention Learning -Shiomi Junior High School Review, Shinya Otomo (Mombatsu Shiomi Elementary School)
12:00	Lunch
13:10 14:30	【Public Program : Symposium on Sea Ice for Children and Parents】 <i>(in Japanese language only)</i> Introduction, Fusao Saito (City of Mombetsu) Chair, Takashi Suzue (City of Mombetsu) I . Wonder of drift ice in Okhotsk Sea Shuhei Takahashi (Okhotsk Sea Ice Museum) II . What kind of country is Belgium? Gaston Demarée (Royal Meteorological Inst. Belgium) III . Quiz about drift ice and Belgium Shuhei Takahashi (Okhotsk Sea Ice Museum) and Gaston Demarée (Royal Meteorological Inst. Belgium)