

Session H

Activities to Promote Industry-Government-Academia (I-G-A) Collaborative Research on the Arctic Region

February 18, 2020

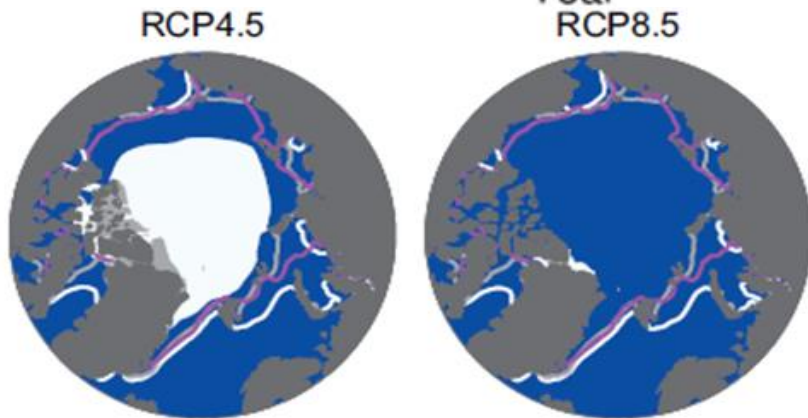
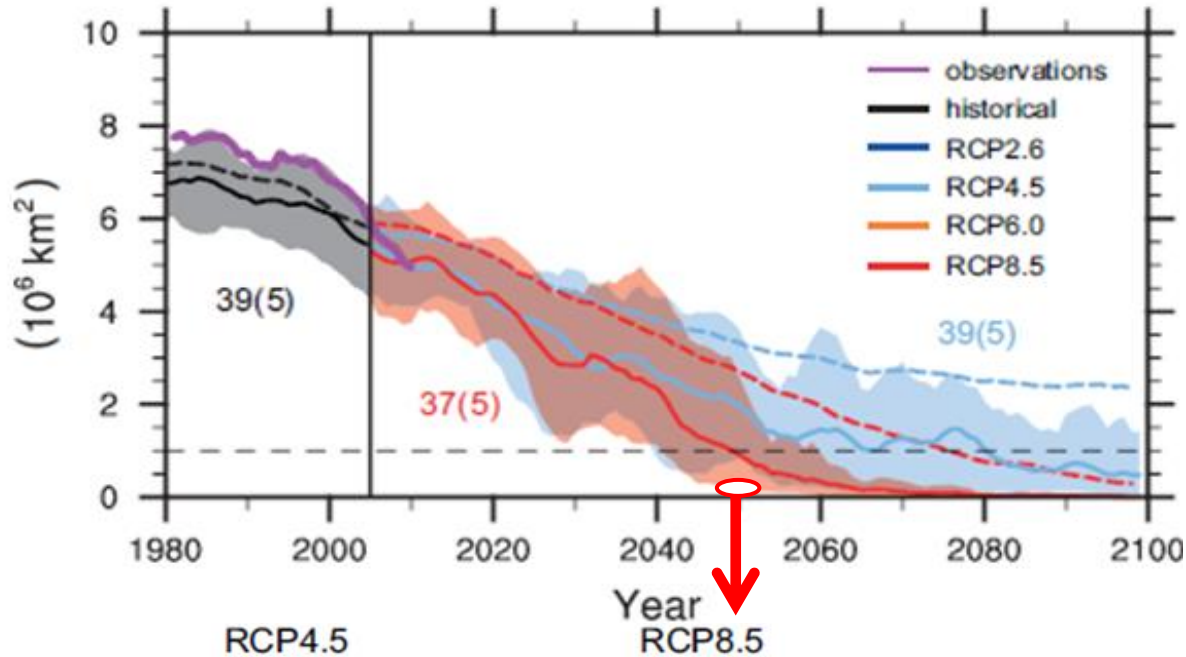
○ Masato TANAKA

**Japan Arctic Research Network Center
(J-ARC Net)
Hokkaido University**



Rapid decrease of Arctic sea ice

Prospects for Arctic sea ice area in September



Prospects for Arctic sea ice area in September, 2050 (IPCC AR5 WG1 Technical Summary TS-Fig.17)

Influence of global warming

- Decrease of sea ice
- Rise of sea level
- Changes of vegetation and ecosystem by rise of sea temperature, and Sea acidification etc.
- Changes of economic activities and utilization for industries



For future proposal

- What happens ?
- Influence to region and human society ?
- Countermeasure and sustainable utilization ?
- Geographic environment changes in Hokkaido as the northernmost prefecture ? etc.

Activities of J-ARC Net for the Arctic Region from FY2016 to 2021



Creation of new academic field conducive to solve issues in the Arctic region regarding Environment preservation and sustainable utilization on the Arctic region


- (1) Promoting advanced and interdisciplinary collaborative research**
- (2) Planning and promotion between research community, industry and government**
- (3) Nurturing personnel having broad outlook and leadership to solve international problems**

Activities of J-ARC Net for the Arctic Region founded in April, 2016

Supporting Research Communities Project (RC Project)

- (1) Challenging Exploratory Interdisciplinary Joint Research
 - (2) Joint Promotion Research
 - (3) Joint Research Meeting
- 
- ```
graph BT; A["(3) Joint Research Meeting"] --> B["(2) Joint Promotion Research"]; B --> C["(1) Challenging Exploratory Interdisciplinary Joint Research"]
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## Promotion Industry-Government-Academia (I-G-A) Collaboration Project (I-G-A Project)

- (1) I-G-A Collaboration Feasibility Study
  - (2) I-G-A Collaboration Planning Meeting
  - (3) Arctic region Open Seminar
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graph BT; A["(3) Arctic region Open Seminar"] --> B["(2) I-G-A Collaboration Planning Meeting"]; B --> C["(1) I-G-A Collaboration Feasibility Study"]
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Promoting researcher nurture programs

Providing **Arctic science course** and **Field Courses in Arctic region** for not only personnel in researchers but also in industries and governments

Disseminating results

Inviting experts to International symposium for discussion of our future activities
Opening intensive information to the public with website

Prospective effects

Creation of innovative academic fields and new industries, **Adoption** of new viewpoints and technologies, **Promotion** of international collaboration, **Supply** of personnel with broad outlook and **Contribution** to increase Japanese presence, through advanced and interdisciplinary research

Arctic region Open Seminar in FY2016, 2017,2018 and 2019

- To provide the latest information of Arctic region in natural and social sciences
- To promote new entry to activities to solve issues in Arctic region
- For personnel in industries and governments

Subjects

Titles of lectures

I / G / A

1st
Jan.17, **Future Arctic Region,**
2017 **Northern Sea Route**
@Sapporo **(NSR) and Hokkaido**

- (1)Utilization strategy for NSR in Hokkaido
- (2)Perspective & Challenge for transit shipping by NSR
- (3)Application Technology & Dev. needed by NSR
- (4)Investigation for NSR & Russia in Hokkaido
- (5)Arctic & World
- (6)Future Arctic

44/19/24

2nd
Mar.17, **Utilization for North**
2017 **Sea and NSR, and its**
@Tokyo **Perspective**

- (1)Utilization strategy for NSR in Hokkaido
- (2)Arctic Shipping and its perspective in Finland
- (3)Arctic Shipping and its perspective for Yamal-LNG
- (4)Perspective & Challenge for transit shipping by NSR
- (5)Utilization for submarine cable in the Arctic region

27/ 5/ 29

continued

Arctic region Open Seminar in FY2016, 2017,2018 and 2019

I / G / A

3rd
Jul.24,
2017
@Sapporo

**Utilization for Arctic
Region conducive to
Creation of Industries**

- (1)Shipping Logistics
- (2)Oil & Gas Development
- (3)Yamal LNG-PJ
- (4)Tele-communication (Submarine cable)
- (5)Fishery
- (6)Agriculture & Food

75/24/27

4rd
Dec.14,
2017
@Sapporo

**Trend of the economic
development
and international
governance
around the Arctic
region**

- (1)Necessity and possibility of economic Dev.
in Russian Arctic
- (2)International relations around the Arctic region
- (3)Current situation & perspective international
law related to the Arctic
- (4)The Arctic region policy & its perspective
in Russia
- (5)The Arctic region policy & its perspective
in China
- (6)International situation & Japanese correspondence
around the Arctic region

25/14/26

continued

Arctic region Open Seminar in FY2016, 2017,2018 and 2019

5th
Jul.20,
2018
@Sapporo

Progress of the latest
Arctic research and
the possibility of
application to industry
and society

- (1)The Arctic research from the AMAP-WG report
- (2)Climate impact from the Arctic to Japan and its prediction
- (3)New application model of Arctic sea route – possibility and challenges
- (4)Influence of climate change on life history and biomass dynamics of salmon
- (5)Current situation and prospects of the Arctic tourism and cruises
- (6)Feasibility of the Arctic Ocean Submarine Cable and its ripple effect - From TOW3

I / G / A

21/19/32

6th
Dec.12,
2018
@Tokyo

Possibilities and
challenges of
application to industry
on the latest Arctic
observation and
prediction technology

- (1)Arctic region observation by climate change observation satellite "Shikisai" (2)Changes and trends of permafrost in the Arctic region
- (2)Changes and trends of Arctic permafrost due to climate change and their effects
- (3)Fishery resources in the northern area under climate change ~Economic impact assessment~
- (4)Arctic Ocean Observation and expectation for icebreaker by Marine Earth Research Vessel "Mirai"
- (5)Observation of the Arctic ocean and sea ice on the latest icebreaker and its application
- (6)Prospects of observation and prediction technology for navigational support in the Arctic Ocean and expectations for icebreakers

29/ 2/27

Arctic region Open Seminar in FY2016, 2017,2018 and 2019

7th
Jul.24,
2019
@Sapporo

Changing Arctic
environment and its
impact on Hokkaido

- (1) Arctic climate change ~Real Images, forecasts and impact on Japan and the World
- (2) Arctic climate change and its impact on the weather in Hokkaido
- (3) Impact of Arctic climate change on fisheries in Hokkaido
- (4) Relationship between climate and environmental conditions in the Arctic and forest fire, and the impact of air pollution on Hokkaido
- (5) Expectations for Arctic Research: From the Viewpoint of Food and Health in Hokkaido

I / G / A

25/3/41

8th
Dec.12,
2019
@Tokyo

Current status and
prospects of
Arctic oil & gas
development

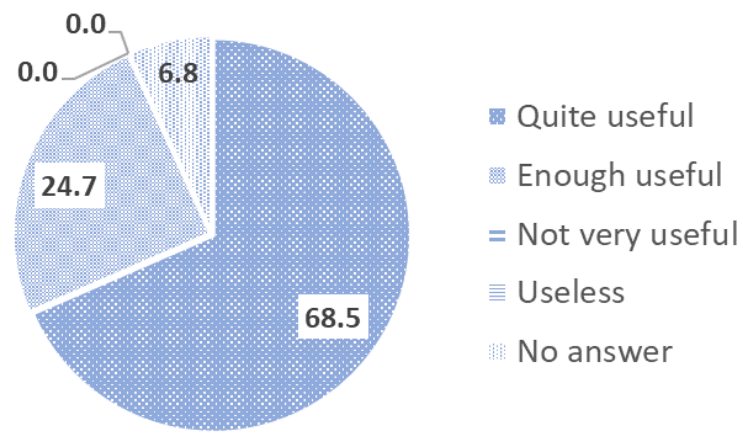
- (1) Oil and & development strategies and trends on Russian Arctic Region
- (2) Track records of Yamal LNG project and initiatives for new Arctic project
- (3) Use of the North Sea Route: Current status, issues, and research of ships and navigation
- (4) Roles and impacts of international environmental law on oil & gas development in the Arctic and domestic environmental law in the Yamal region
- (5) Development and Environmental Changes in the Arctic (Yamal Region): Impacts on Indigenous Peoples and Communities
- (6) General discussion

19/ 8/26

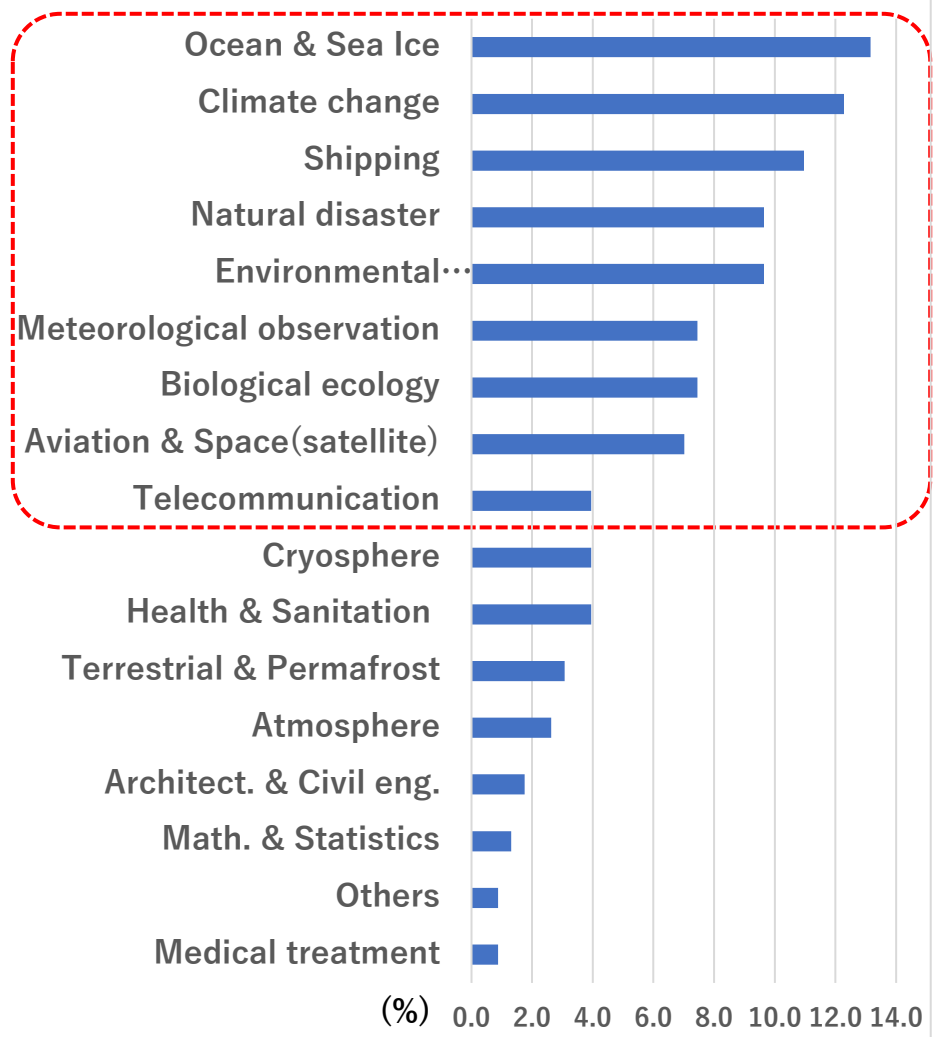
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Survey from stakeholders on the 7th and 8th Arctic region Open Seminar

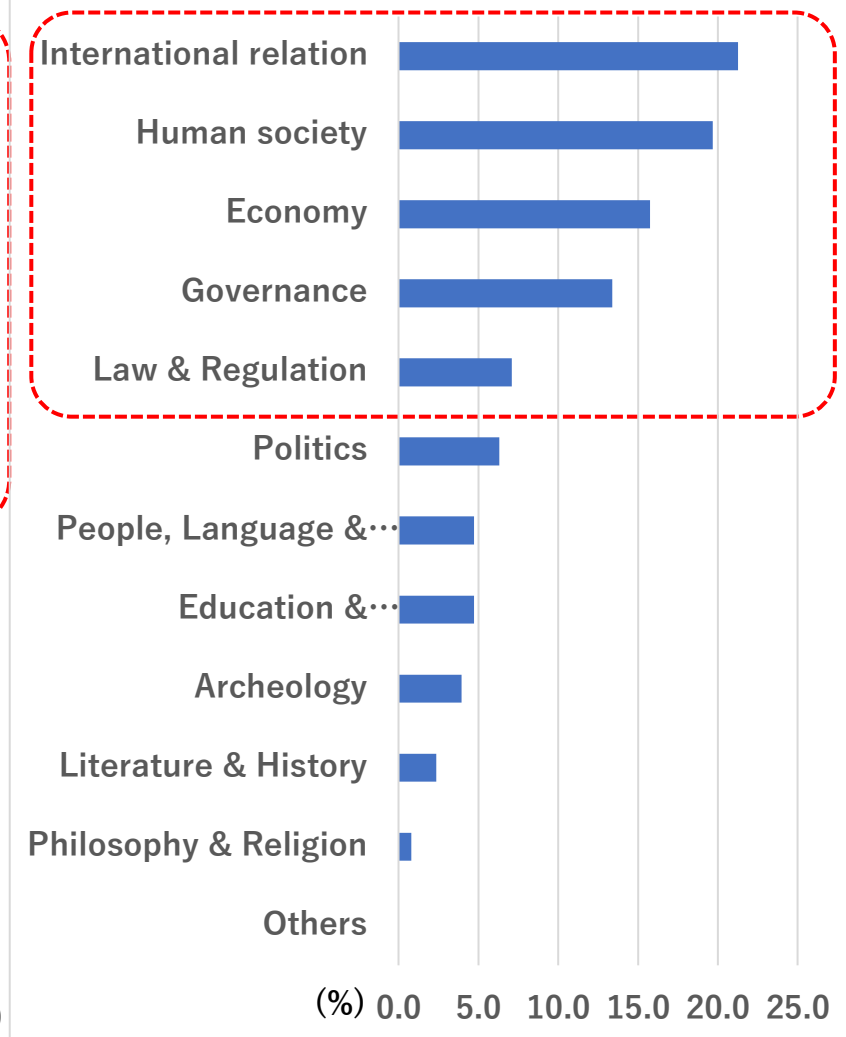
[Q1] Was the seminar **useful** for you ?



[Q2] Which **natural science fields** in the Arctic region can you expect the possibility of social implementation efforts ?

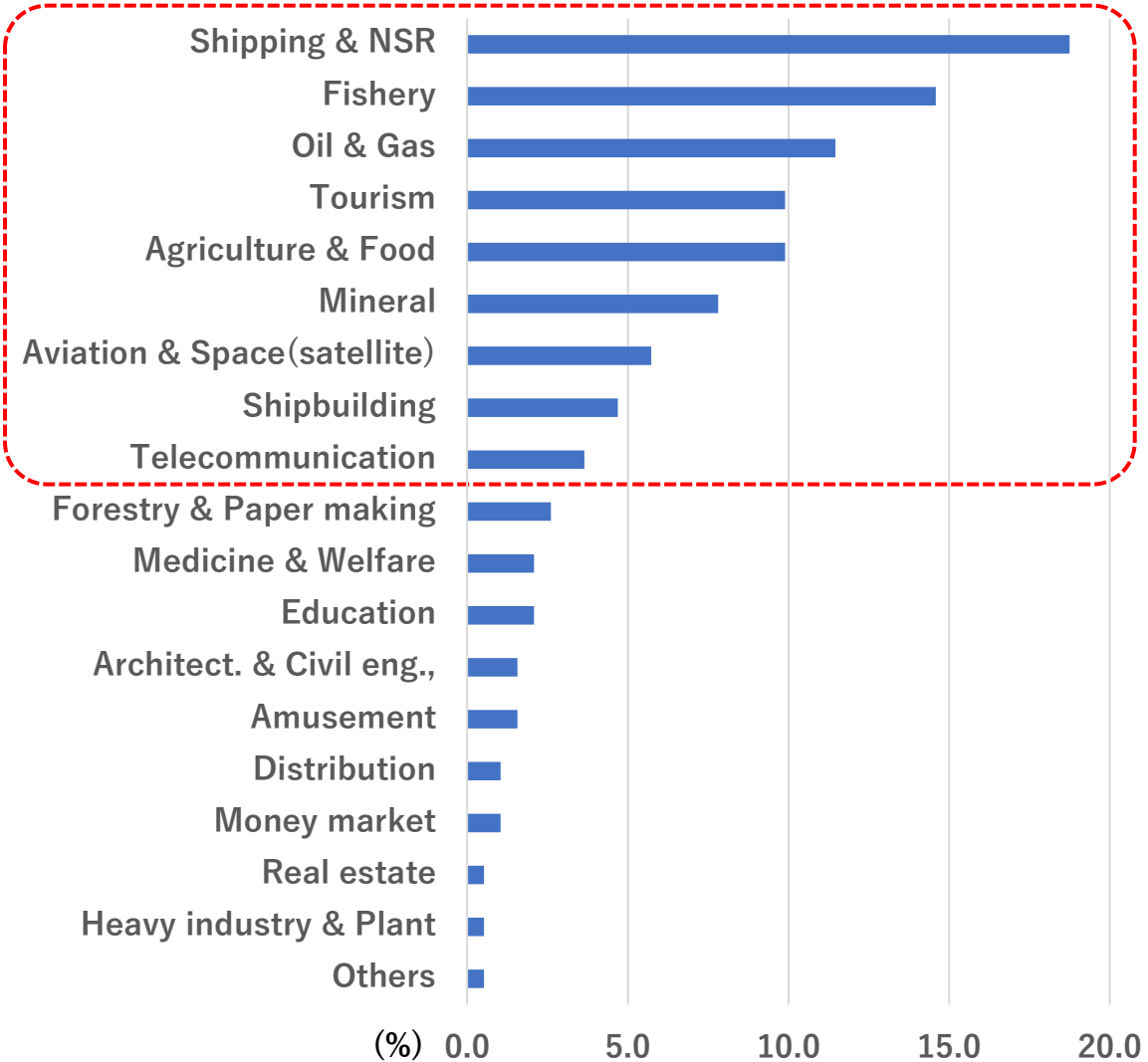


[Q3] Which **human and social science fields** in the Arctic region can you expect the possibility of social implementation efforts ?

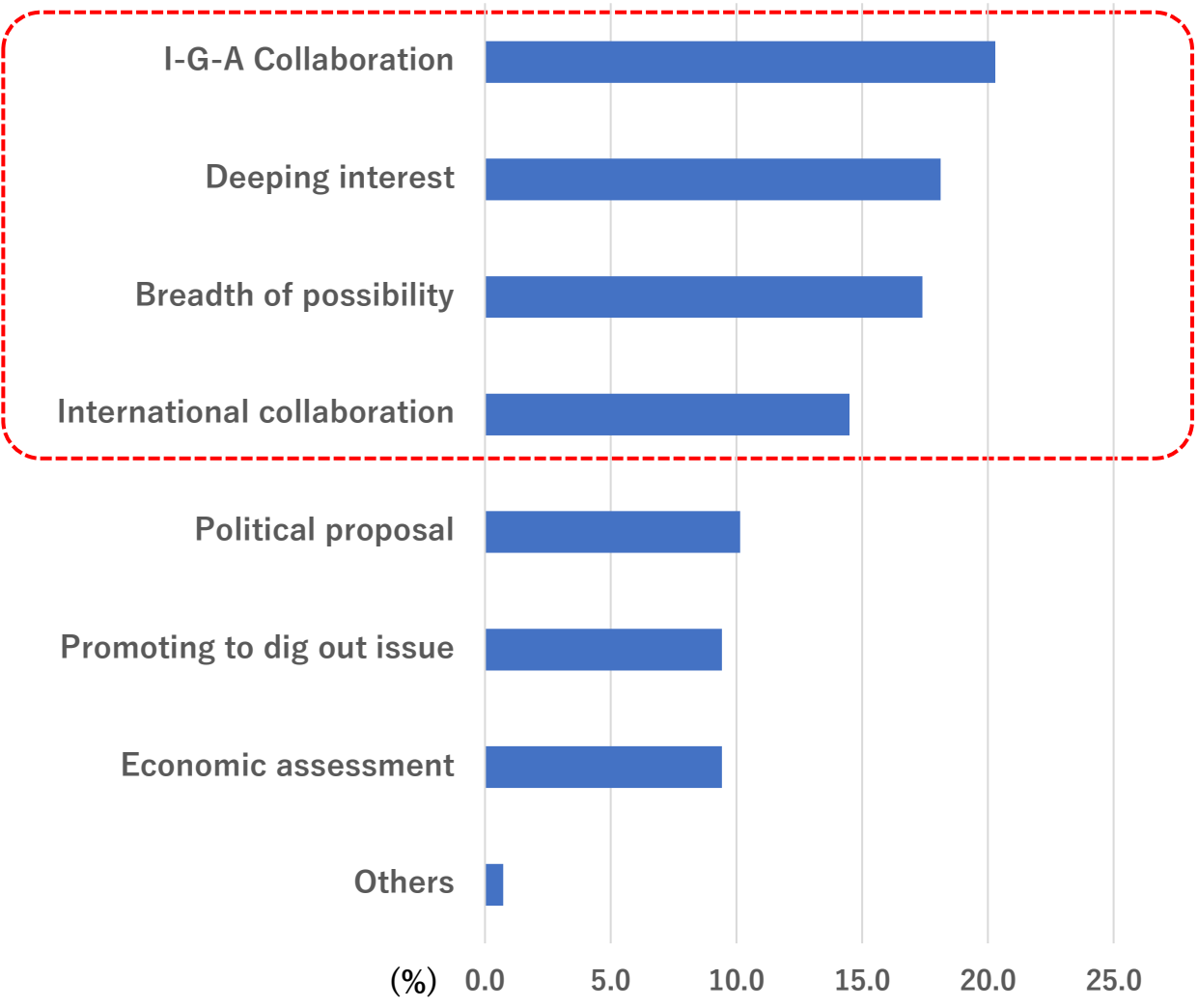


Survey from stakeholders on the 7th and 8th Arctic region Open Seminar

【Q4】 Which **Industrial fields** in the Arctic region can you expect the possibility of social implementation efforts ?

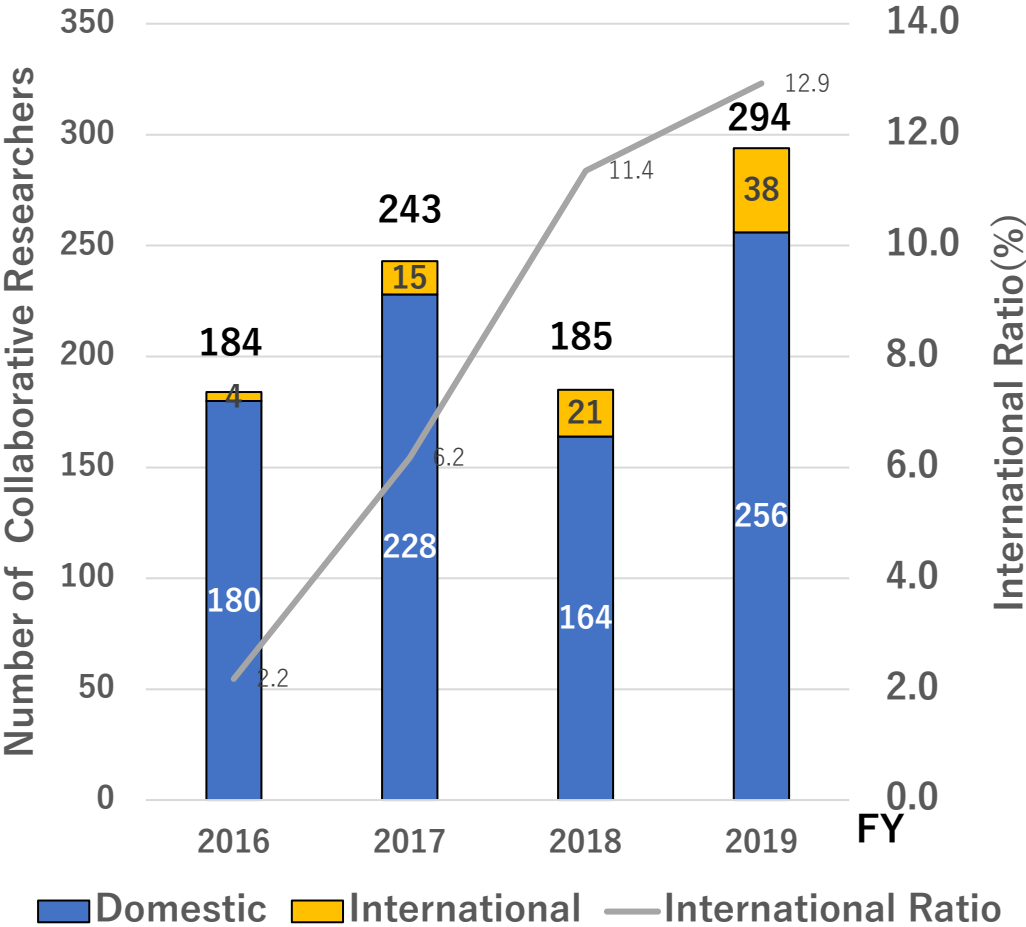


【Q5】 What are you **expected to this Open Seminar** promoting new entry to industrial activities in the Arctic region ?

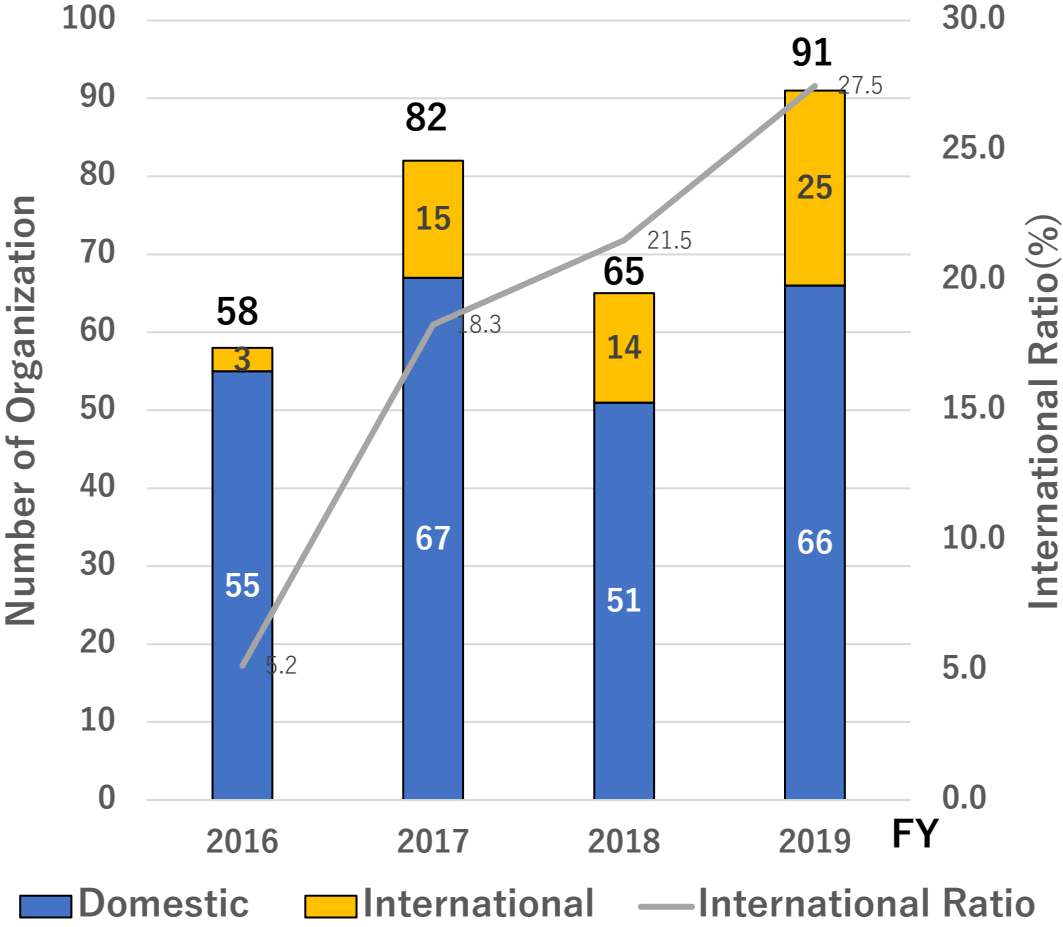


Accepted Collaborative Research Projects in FY2016-29019

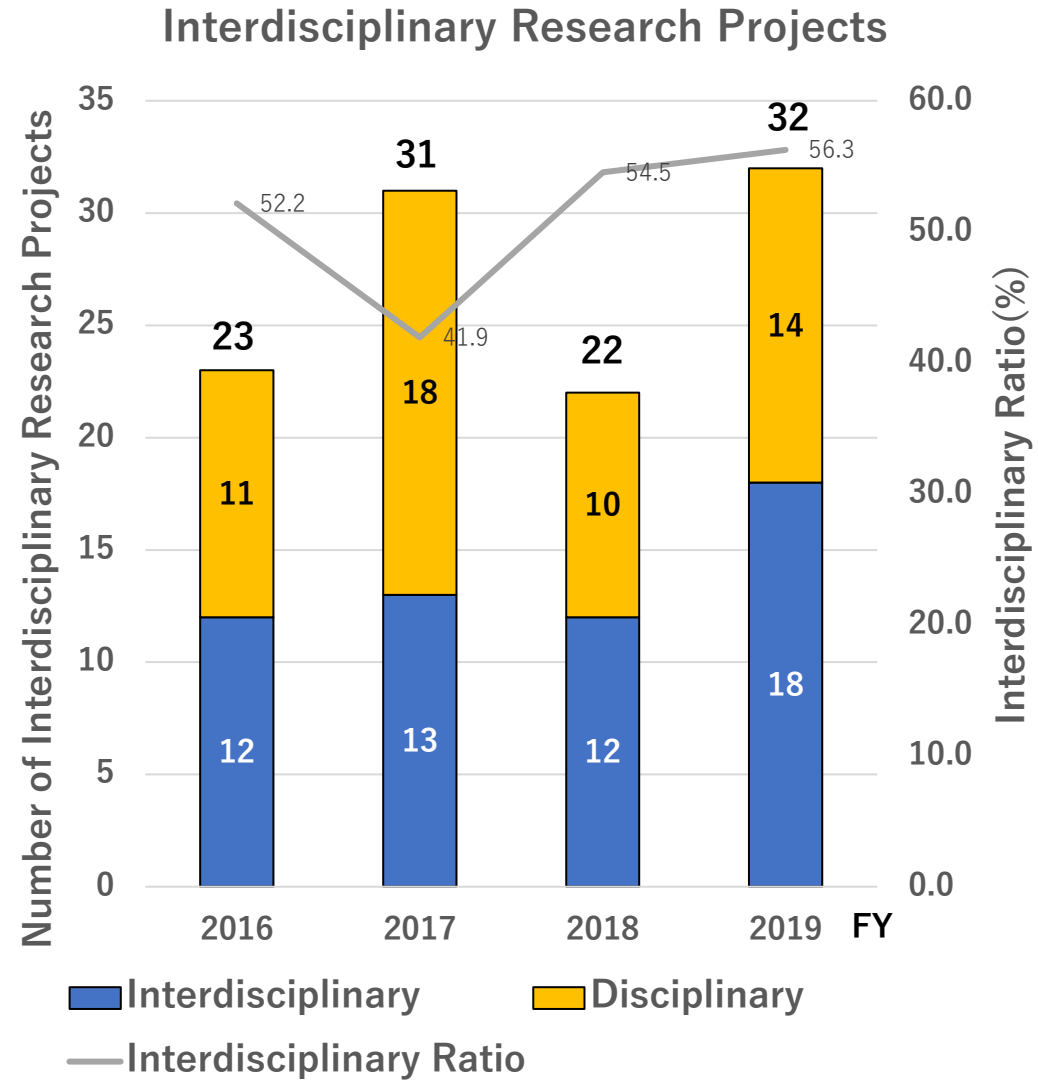
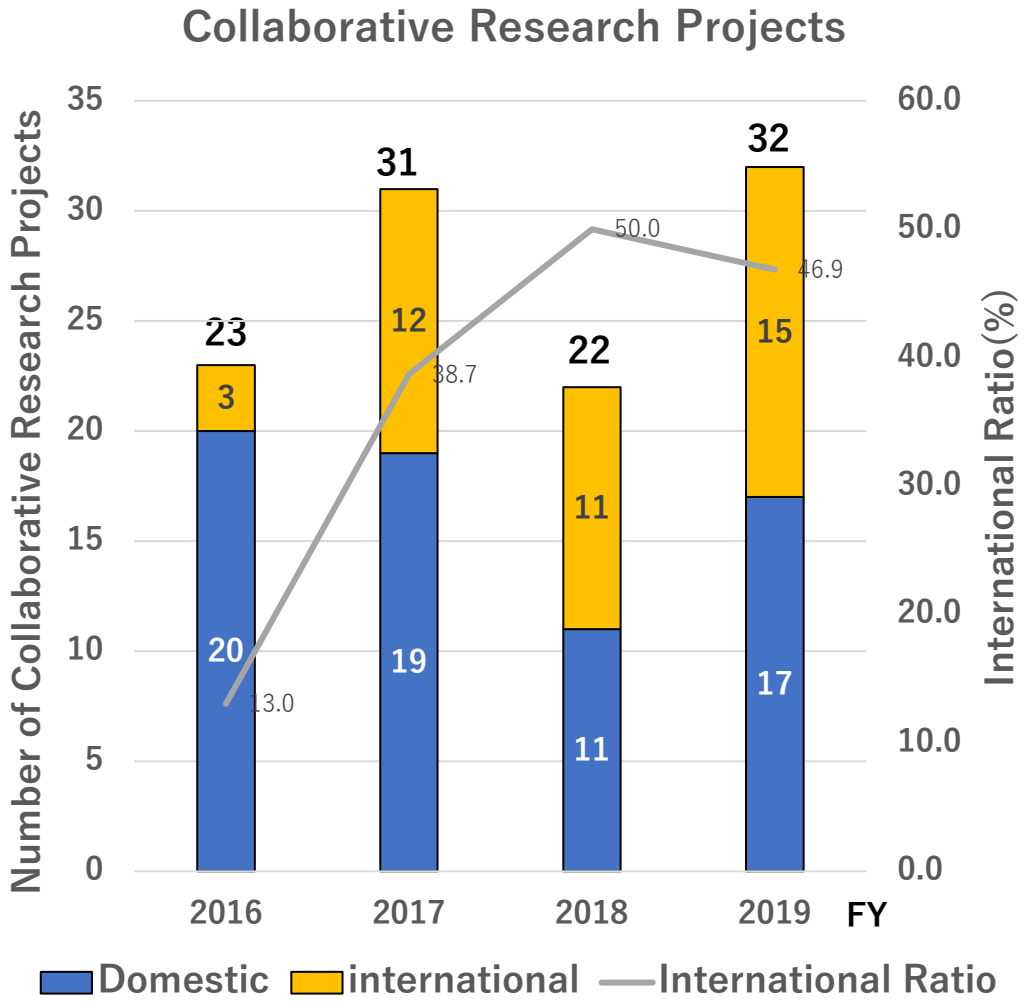
Collaborative Researchers



Participating Organizations



Accepted Collaborative Research Projects in FY2016-2019



※Interdisciplinary : HS/NS, HS/E, NS/E and HS/NS/E at Human & Social Science(HS)/Natural(NS) Science/Engineering(E)

Promoting researcher nurture to solve issues in the Arctic region

Arctic Science Course

Nov.21~22, 2019 at Sapporo and Tokyo

25 participants

Industries:8

Governments:2

Researchers:15 (incl. Students:6)

1. Opening, Guidance and Self-introduction
2. Lectures
 - (1) Geography & History
 - (2) Atmosphere
 - (3) Snow and ice
 - (4) Ocean
 - (5) Ocean Ecosystem
 - (6) Terrestrial Ecosystem
 - (7) North Sea Routes
 - (8) Resources Development
 - (9) Human beings and Society
 - (10)Governance
3. Social Gathering
4. Presentation & Discussion
5. Closing



Field Course

Feb.24-Mar.4, 2020 at Russia

Winter School on “Environmentat and Innovwtion of the North” at Yakutsk via Vladivostok

Participants : Personnel in Industries, Governments, Researches
Japan: I;2 (Mitsui Co.,Ltd., Ecotech), G:1(Kyushu Regional Environment Office), A:8 ,
Russia:10 (G and A)

Program:

(1) City Tour (2) Seminar and Lecture on Natural Enviro., Economy of Sakha, Life & History & Sustainable Dev. in the North, Arctic traffic infra., Satellite ecology, and Mammoth fauna, (3)Excursion of Cities and Suburbs in Cold Enviro., Sakha Flux Network site, and Spasskaya-Pad Research Station, (4)Tour of Arctic Innovation Center, Yakutsk State Museum of History and Culture, Permafrost Kingdom, and Permafrost Institute, (5) Presentation and Discussion etc.

What do we in J-ARC Net

Worldwide new information and cutting-edge research etc. on Arctic

J-ARC Net

HU / NiPR / JAMSTEC

Integration of information and human Net Work

- Global warming
- Reducing sea ice
- Melting permafrost
- Change to Fresh water
- Change of ecology
- Erosion of shore etc.

Influence and evaluation

- Climate Change
- Possibility of NSR
- Cost of Natural resource Development
- Change of Fishery Res.
- Change of Tundra, Forrest etc.

Natural Science Teams

Social, Humanity, Practical science Teams

Trans-disciplinary Cooperation, Joint Research

Collaboration with Industries and Academia

Industries

- Shipping, Marine
- Energy, Mining
- Civil, Harbor
- Trading ...

Universities

Jap, Rus, US, Fin, Nor ...

Future precise prediction

Platform: Sustainability, Application Utilization and Feasibility

Industrial Structural Revolution of Society in 21th Century

NSR



Oil & Gas, Natural Resources

Fishery



Tourism



The others



Creation of New Research & Industries

Promoting Industry-Government-Academia Collaboration (I-G-A)

Categories	FY	Fields	Subjects	Researchers
FS フィージビリティスタディ	2018 ~ 2019	NSR (D-2)	Summary of the Northern Sea Route trial shipping of containers *1Hokkaido Univ., *2Tomakomai Port Management Association, *3Hokkaido Research Inst. for the 21st Century Co., Ltd.	○Natsuhiko OTSUKA*1, Hideo SASAKI*2, Eisaku NAKAMURA*3, Tomomi KAKIZAKI*2, Akira MORIKI*1
FS フィージビリティスタディ	2018 - 2019	Engineer-ing (H-2)	Arctic Technology & Research Forum to consolidate opinions from industries *1 Japan Marine United Corporation , *2 The Univ. of Tokyo, *3 Mitsubishi Shipbuilding Co., Ltd., *4INPEX Corporation, *5Mitsui O.S.K. Lines, Ltd., *6Zeni Lite Buoy, *7National Inst. of Polar Research, Ltd., *8Hokkaido University, *9JAMSTEC, *10 Engineering Advancement Association of Japan	○Satoru FUKUBA*1, Hajime YAMAGUCHI*2, Hiroshi YOSHINAGA*3, Yoshihiko KUROKAWA*4, Takao KASHIWAGI*5, Hajime YOSHIDA*6, Hironori YABUKI*7, Yuji KODAMA*7, Keiichirou Ohshima*8, Yasushi FUKAMACHI*8, Takashi KIKUCHI*9, Akira KUROKAWA*10
PM 課題設定集会	2019	Future Arctic (H-3)	Future Arctic utilization Interpretive Structural Modelling (ISM) approach *1Hokkaido Univ., *2 University of Alaska Fairbanks, *3Hokkaido Research Inst. for the 21st Century Co., *4Hokkaido Local Government	○Natsuhiko OTSUKA*1, Lawson BRIGHAM*2, Eisaku NAKAMURA*3, Tomoaki KAGAWA*4, Fujio Ohnishi*1, Juha Saunavaara*1, Minori TAKAHASHI*1, Akira MORIKI*1
Industry	2019	NSR Shipping (H-4)	LNG Transportation from Arctic Sea ~ YAMAL LNG Project ~ *1 Mitsui O. S. K. Lines,Ltd.	○Shiro.IZUMI*1, Yuta ORITO*1, Takao KASHIWAGI*1

Promoting Industry-Government-Academia Collaboration

Categories	FY	Fields	Subjects	Researchers
Status Report	2019	Eco-system H-5	<p>WGICA(ICES/PICES/PAME working group for Integrated Ecosystem Assessment of the Central Arctic Ocean)</p> <p>*1Hokkaido Univ., *2Institute of Marine Research, *3Alaska Fisheries Science Center, National Oceanic and Atmospheric Administration</p>	Sei-ichi SAITOH*1, Natsuhiko OTSUKA*1, Fujio OHNISHI*1, Hein Rune SKJOLDAL*2 , John BENGTON*3
FS フィージビリティ スタディ	2019 - 2020	Perma-frost H-6	<p>Monitoring of surface displacement in permafrost regions by InSAR analysis and local needs</p> <p>*1 Hokkaido Univ. *2Iwata Chizaki Inc., *3Yakutsk Permafrost Institute, *4 Mie Univ., *5JAXA, *6Yakutsk State Design and Research Institute for Construction, *7Institute of the Humanities and the Indigenous People of North</p>	○Go IWAHANA*1, Takumi KAWAMURA*2 , Shunji KANIE*1, Alexander FEDOROV*3, Masato FURUYA*1, Yoshihiro IJIMA*4, Takahiro ABE*5, Takeo TADONO*5, Kazuki YANAGIYA*1, Anastasia TSEEVA*6, Yuri ZHEGUSOV*7
PM 課題設定 集会	2019	Oil Spill & Frozen Ground H-7	<p>Research meeting on ISO19906 and frozen ground engineering</p> <p>*1Systems Engineering Associates, Inc., *2Cryosphere Engineering Laboratory, *3Hachinohe Institute Univ., *4 Engineering Advancement Association of Japan, *5Civil Engineering Research Institute for Cold Region, *6National Institute of Technology (KOSEN), Tomakomai College, *7 Hokkaido Univ., *8Kajima Corporation, *9SEIKEN CO., LTD., *10SEIKEN CO., LTD., *11Hokkai-Gakuen University, *12National Inst. of Polar Research</p>	○ Naoki NAKAZAWA*1 , Satoshi AKAGAWA*2 , Takahiro TAKEUCHI*3, Akira KUROKAWA*4 , Shinji KIOKA*5 , Yuko MATSUO*6, Shunji KANIE*7, Teru YOSHIDA*8, Hisao IZUTA*9 , Hiroshi OGURA*10 , Tetsuya TOKORO*11, Toshio SONE*7, Hironori YABUKI*12

Thank you very much for your attention !

Japan
Arctic
Research
Network
Center

J-ARC Net
北海道研究開発機構

Let's join J-ARC Net Project !

- Open Seminar
- Feasibility study & Planning Meeting
- The deadline to apply for J-ARC Net joint research ⇒ 2/21**
- Researcher Nurture programs etc.

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Oshoro-maru V (Ice resistance)
To Arctic Ocean in 2018年

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 HOKKAIDO UNIVERSITY Arctic Research Center

 National Institute of Polar Research (NIPR)
Arctic Environment Research Center

 Japan Agency for Marine-Earth Science and Technology
Institute of Arctic Climate and Environment Research (IACE)