

Activities to Promote Industry-Government-Academia Collaborative Research on the Arctic Region

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Abstract

Activities to promote industry-government-academia collaboration support project in Japan Arctic Research Network Center (J-ARC Net) are shown in this report. These activities are consisting of the Arctic region open seminar, planning meeting for setting issue, feasibility study and promoting research nurture supported by planning, coordination and fund of J-ARC Net, and effective disseminating results are aiming to increase Japanese national presence of international Arctic research.

Key words: J-ARC Net, industry, government, collaborative research, Arctic region

INTRODUCTION

J-ARC Net as a project certified by of the Ministry of Education, Culture, Sports, Science and Technology, was funded in April 2016 as the first formulated network cooperated by three research centers (Three organizations constituting J-ARC Net) conducted to solve issues toward rapid environmental and amplified climatic changes and to promote sustainable utilization for industries in Arctic Region.

J-ARC Net promotes advanced and interdisciplinary collaborative research conducive to understanding environmental-human interactions and creation of new academic fields regarding sustainable utilization and preservation of Arctic region.

For promoting advanced and interdisciplinary collaborative research, J-ARC Net makes the best use of research infrastructures of the three research centers such as research vessels and overseas laboratories, and mediates between research communities, industries, and government offices to promote activities conducive to solve problems in Arctic region.

J-ARC Net also nurtures personnel who have broad outlook and can lead international discussion to solve challenges in Arctic region.

J-ARC Net disseminates the results of the above activities effectively and aims to increase Japanese national presence in international Arctic research.

ACTIVITIES

(1) Researcher's Community Support Projects

a) Innovative interdisciplinary collaborative research: J-ARC Net supports and promotes Challenging Innovative Interdisciplinary Research developed from Meeting for Collaborative Research and Collaborative Promoting Research, conducive to solve problems in Arctic region

b) Collaborative Promoting Research: J-ARC Net encourages bottom-up joint research for researchers not only in natural sciences but also in humanities, social and

practical sciences and those new to the Arctic region.

c) Meeting for Collaborative Research: J-ARC Net provides meeting opportunities for researchers in various fields to plan research projects for Challenging Innovative interdisciplinary research and collaborative promotion research.

(2) Industry-Government-Academia (I-G-A) collaboration Support Projects

a) The Arctic Region Open Seminar:

J-ARC Net holds the open seminars for personnel in industries and governments to provide the latest information of the Arctic region in natural and social sciences, and to promote new entry to activities to solve challenges in Arctic region, which were held four times as shown in Table 1.

Table 1. The Arctic Region Open Seminar in 2017

No.	Dates	Subjects	I ^{*3}	G ^{*4}	A ^{*5}
1 st *1	Jan 17	Future Arctic Region, and North Sea Route (NSR)	44	19	24
2 nd *2	Mar 17	Utilization for NSR and its Perspectives	27	5	29
3 rd *1	July 24	Utilization for the Arctic Region to create industries	75	24	27
4 th *2	Dec 14	Trend of the economic development and international governance around the Arctic region	25	14	26
Total 349			171	62	106

*1 at Sapporo, *2 at Tokyo

*3, *4 and *5: The number of participants from Industries^{*3}, Governments^{*4} and Academia^{*5}

Results of survey on the Arctic region by participants in the third Open Seminar shown in Fig. 1, 2, 3, 4 and 5.

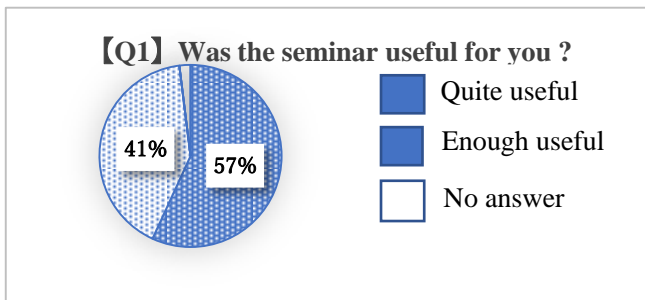


Fig. 1 Usefulness of the Arctic Region Open Seminar

【Q2】 Which fields of natural science in the Arctic region are you interested in ?

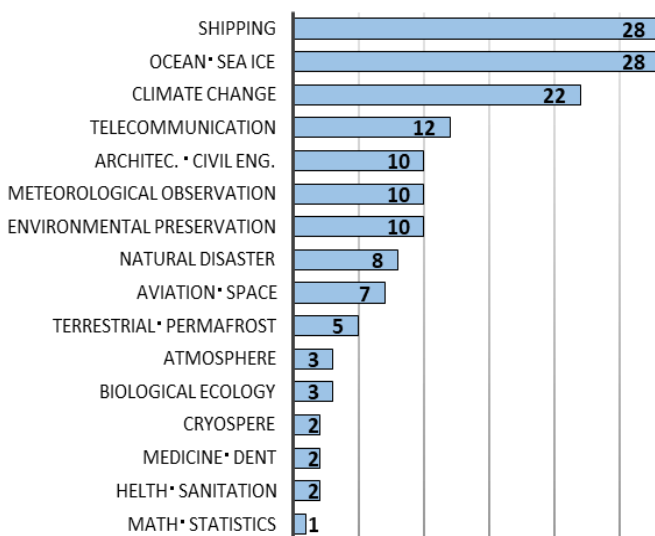


Fig. 2 Interesting natural scientific fields in the Arctic region

【Q3】 Which fields of the human and social science in the Arctic region are you interested in ?

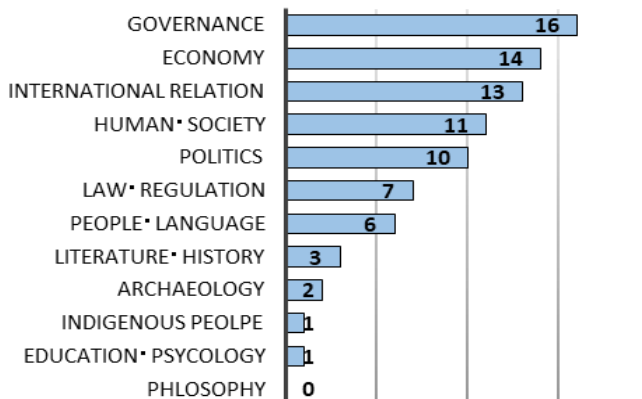


Fig. 3 Interesting human and social science fields in the Arctic region

【Q4】 Which Industrial fields in the Arctic region are you interested in ?

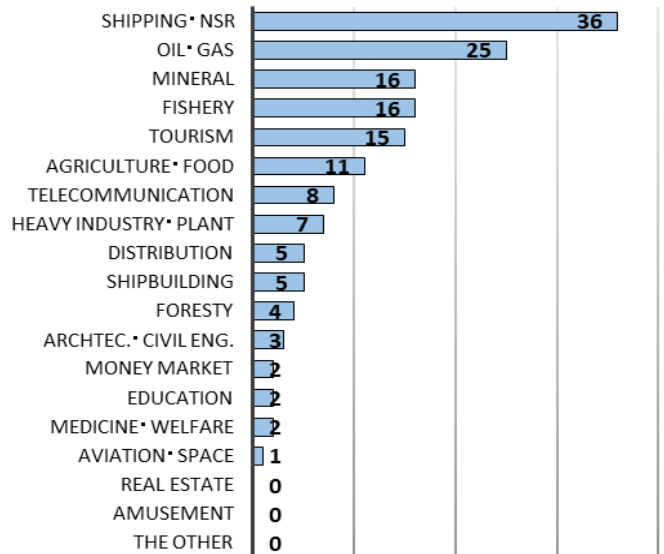


Fig. 4 Interesting industrial fields in the Arctic region

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

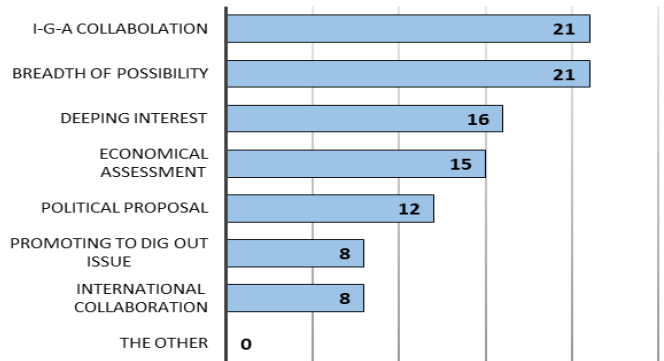


Fig. 5 Expectation to the Arctic Region Open Seminar

b) Planning Meeting for setting issues (PM): J-ARC Net provides meeting opportunities for personnel in industries and governments to discuss problems to be solved by **I-G-A** collaboration and to plan collaborative research.

c) Feasibility study (FS): For personnel in research, industries and governments, J-ARC Net promotes feasibility studies to carry out problem-solving joint research with **I-G-A** collaboration.

Results of adoptions from proposals for promoting advanced and interdisciplinary collaborative research are shown in Table 2.

Table 2. Adoptions from public applicable proposals for promoting advanced and interdisciplinary collaborative research in FY2016 and FY2017.

Activities	Categories	FY	Term (y)	Subsidy (x¥1000)	Adoptions
Researcher's Community Support Projects	Innovative interdisciplinary collaborative research	2016	Max	2500	1
		2017	2		0
	Collaborative promoting research	2016	1	700	9
		2017			16
	Meeting for collaborative research	2016	1	500	8
		2017			7
I-G-A Collaboration Support Projects	Feasibility Study (FS)	2016	Max	2500	3
		2017	2		1
	Planning Meeting for setting issues (PM)	2016	1	500	2
		2017			3
Total		2016			23
		2017			28

Nine **I-G-A** collaborative research in fifty-one research in total were adopted in FY2016 and FY2017.

Research Subjects of in **I-G-A** Collaboration Support Projects in 2016 and 2017 are shown in Table 3. Seven **I-G-A** collaborative research are progressing at the present with fiftyfive researchers as the total number.

Table 3. Research Subjects of in **I-G-A** Collaboration Support Projects in 2016 and 2017

Categories	Fields	Research Subjects	Researchers
FS	NSR	Study on Estimation Technology for Navigability depending on Sea Ice Conditions in the NSR	I:1 G:0 A:3
	Planning	Scenario for Industry Development in Arctic Region	I:3 G:0 A:5
	Engineering	Arctic Technology & Research Forum to consolidate opinions from industries	I:2 G:0 A:5
	Permafrost	Assessing and mediating damage on infrastructure and changes in ground surface due to permafrost thaw	I:1 G:2 A:7 (Russia:3)
PM	Planning	Future scenario for the Arctic 2050	I:3 G:0 A:5
	NSR	Study on Technical Issues for Possibility of NSR	I:1 G:0 A:3
	Permafrost	Activity of Sea Ice Engineering and Permafrost Engineering in Japan ~ History and Future ~	I:4 G:0 A:4

	Oil Spill	Research on Arctic Oil Spill Response Technology	I:4 G:0 A:4
Total: 55			I:17 G:2 A:36

(3) Promoting researcher nurture programs

For not only personnel in research but also in industries and governments, J-ARC Net provides courses to nurture personnel who can contribute to solve challenges in the Arctic region. The study courses include lectures and field courses utilized such as Japan-Russia Joint Research Center established by Hokkaido University and North-Eastern Federal University at Yakutsk as shown Table 4 and 5.

Table 4. Nurturing courses for the Arctic region (1)

Lectures	
Introduction of Arctic region	
Nov.20 to 22, 2017 at Sapporo and Tokyo	
Participants from relatives I-G-A: 32 auditors in total involving I:9, G:8 and A:16	
Program	
1. Opening & Guidance (1) Geography & History, (2) Development & Ingenious people, (3) Ocean, (4) Ocean Ecosystem (5) Atmosphere, (6) Glacier, (7) Terrestrial Ecosystem (8) Resources Development, (9) North Sea Routes (10) Governance, (11) Human beings, and (12) Data Science 2. Presentation & Discussion 3. Closing 4. Social Gathering	

Table 5. Nurturing courses for the Arctic region (2)

Winter School	
Field courses in FY2016	
Mar.3-Mar.11 Yakutsk via Vladivostok	
Participants Japan: I:2 (one banker in international dep. and one sale worker in overseas marketing Dep. of machinery company) G:0 A:8 (one assistant prof., one student at graduate school and five students at undergraduate school) Russia:10 (G and A)	
Program	
(1) Field Trip to Spasskaya Pad Experimental Forest (2) Lecture on Permafrost Ecosystem, relative International Projects and Discussion (3) Lecture on Economic Disparities between City and Rural and Its Impact to Society in Yakutia, and Discussion (4) Tour at Arctic Innovation Center Discussion	

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- (5) Field trip to Greenhouse project site Shinpo NEFU Bus
 - (6) Lecture on Society and People of the North and Discussion
 - (7) Excursion: Cities and Suburbs in Cold Environment Roman Petrovcar (Roman) in Russia Taiga forest, river ice road and so on
 - (8) Lecture on History, people, culture and Discussion
 - (9) Tour at Yakutsk State Museum of history and culture of the people of the North Forum “Environment and Innovation of the North”
 - (10) 12:30-13:10 Presentation by RJE3 participants
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**Winter School
Field courses in FY2017**

Being held as winter school on “Environment and Innovation of the North” on Feb. 23 to Mar. 3 at Vladivostok and Yakutsk in Russia

For entry;

- Public applicable proposal started on early Jan. and were adopted on the end of Jan.
- Participants : Personnel of I-G-A from Japan:5-10 and Russia:5-10 persons
- Language : English

Program

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- (1) City Ture at Vladivostok
 - (2) Natural Environment
 - (3) Introductory Seminar and Natural History
 - (4) Lecture and Tour
 - a) Economy and Education
 - b) Life and the North
 - c) History and Culture
 - d) Participant Forum
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(4) Disseminating results

- a) International symposium: J-ARC Net holds international symposiums to disseminate results of activities and invites experts to the symposium for discussion of our future activities.
- b) Website: J-ARC Net provides a website to disseminate results of activities and J-ARC Net information opens to the public.

(5) Prospective effects

- a) Advance of interdisciplinary research conducive to solve problems in Arctic region and creation of innovative academic fields by interdisciplinary research.
- b) Adoption of new viewpoints and technologies through interdisciplinary collaboration and creation of innovations.
- c) Promotion of international collaboration through advanced and interdisciplinary researches, and expansion of industry- academic-government Arctic research community.
- d) Creation of new industries and markets in Arctic region
- e) Supply of personnel with broad outlook who can

contribute solving problems in Arctic region.
f) Contribution to increase Japanese presence internationally by solving problems in Arctic region.

CONCLUSIONS

J-ARC Net has started entry of collaborative research for FY2018. Your participation to J-ARC Net Projects as below will be very appreciated.

I. Researcher’s Community Support Projects

- (1) Innovative interdisciplinary collaborative research
- (2) Collaborative promoting research
- (3) Meeting for collaborative research

II. I-G-A Collaboration Support Projects

- (1) Arctic region open seminar
- (2) Feasibility study
- (3) Planning meeting for setting issues

III. Researchers Nurture programs

J-ARC Net also will prepare to entry Researchers Nurture program for FY2018 on website, although that of collection in FY2017 was closed.

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REFERENCES

Three organizations constituting J-ARC Net

J-ARC Net was funded and organized in 2016 by Arctic Research Center in Hokkaido University, Arctic Environment Research Center in National Institute Polar Research and Institute Arctic Climate and Environment Research in Japan Agency for Marine- Earth Science and Technology.

<http://j-arcnet.arc.hokudai.ac.jp/organization/>

Summary in Japanese

「北極域をめぐる産学官連携共同研究活動紹介」
～北極域研究共同推進拠点産学官連携事業～

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平成 28 年度より文科省共同利用共同研究拠点に認定された北極域研究共同推進拠点において、北極域の持続可能な利用と保全に関する新たな学術領域の創成に向けて共同研究、人材育成プログラムを推進中。その中で特に産学官連携支援事業として、北極域オープンセミナー、課題設定集会、フィージビリティ等の共同研究による課題解決、課題解決型人材育成などの活動について紹介した。

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