

## WS2-4

# Co-working of industry-government-academia on Arctic issues - Footprints of Japan Arctic Research Network Center(J-ARC Net) -

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### Abstract

Japan Arctic Research Network Center(J-ARC Net) was launched in 2016 by Hokkaido University Arctic Research Center, the National Institute of Polar Research, and Japan Agency for Marine-Earth Science and Technology, aiming at promoting advanced and interdisciplinary Arctic researches through industry-government-academia cooperation and nurturing expert on the Arctic issues. In this paper, six years of J-ARC Net activity is summarized.

**Key words:** Arctic research, industry-government-academia, interdisciplinary research

### 1. Introduction

Japan Arctic Research Network Center(J-ARC Net) was launched in 2016 by three Japan's Arctic research institutions, "Hokkaido University Arctic Research Center(ARC)" as the core organization, "the Arctic Environment Research Center of the National Institute of Polar Research(NIPR)", and "Japan Agency for Marine-Earth Science and Technology(JAMSTEC)". J-ARC Net aimed at promoting advanced and interdisciplinary researches to understand environmental-human interactions and creating new academic fields regarding sustainable utilization and preservation of Arctic region. And to nurture personnel who have broad outlook and capable to lead international discussion to solve problems in Arctic region. This paper

summarizes the 6 years (2016~2021) of J-ARC Net activity and point out the importance of integration of multiple sectors, multiple academic fields, and stake holders in the Arctic issues.

### 2. Support for research communities

J-ARC Net had funded joint research activities and research meetings that aims at challenging Arctic problems through interdisciplinary collaboration, promoting exploratory research regarding the Arctic. As a result, 90 joint researches with 619 participants, and 34 joint research meetings with 418 participants between J-ARC Net and various field of institutions and various researchers had been conducted(Table-1).



Fig.1 Organizational structure of J-ARC Net

Table-1 Joint research for supporting research communities

	2016	2017	2018	2019	2020	2021
Joint research	11	17	11	19	12	20
participants	57	105	70	132	89	166
Research meeting	7	7	5	7	4	4
participants	89	73	41	88	51	76

### 3. Promoting industry- academia-government collaboration

J-ARC Net had promoted joint feasibility study and related meeting conducted by industry-academia-government collaboration. As a result, 21 joint feasibility study projects and 17 research meetings had been conducted by 347 researchers and experts (Table-2).

Fig.2 shows number of participated institutions to the joint research projects and meetings. Fig.3 shows the joint research fields which covers various Arctic issues. From the Table-1 and Table-2, 1384 researchers and experts from various fields had collaborated under the J-ARC Net projects.

Open seminars had been promoted in order to share the latest information, knowledge and to expand network on the Arctic issues. Through the six years activities, 12 open seminars were carried out and more than 1,000 participants gathered (Fig.4, Table-3).

Table-2 Industry- academia-government collaboration

	2016	2017	2018	2019	2020	2021
Joint feasibility study	3	4	4	3	3	4
participants	24	4	44	29	28	35
Joint feasibility study meeting	2	3	2	3	3	4
participants	18	26	17	28	31	63

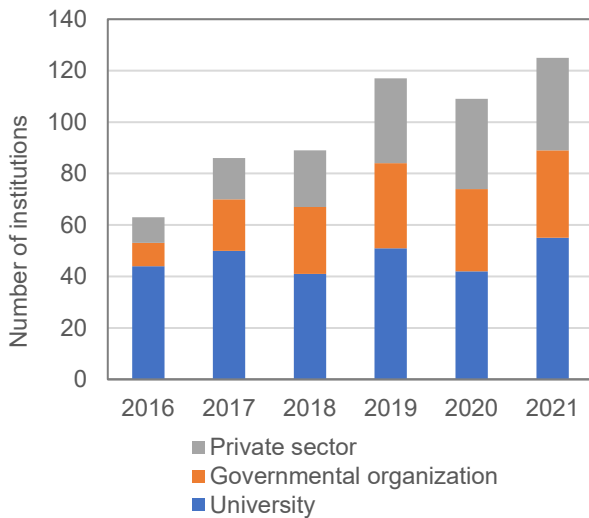


Fig.2 Collaboration of various institutions

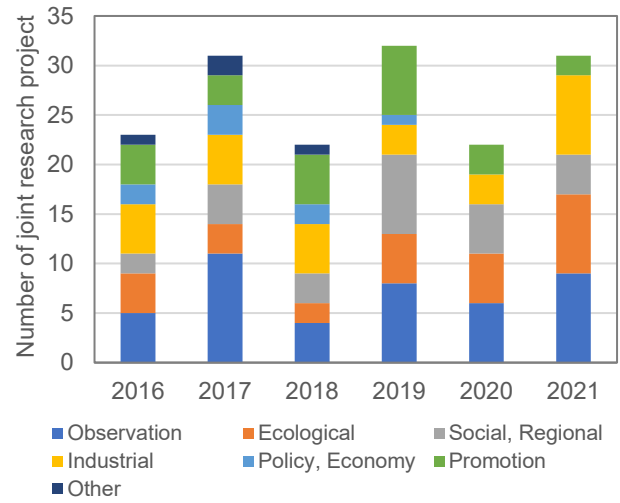


Fig.3 Joint research fields



Fig. 4 Third Open Seminar "Innovation and utilization of Arctic regions" (2017)

Table-3 List of Open Seminars

	Year	Title
1	2016	the Arctic Sea Route and utilization of the Arctic
2	2017	Utilization of the Arctic Ocean
3	2017	Innovation and utilization of Arctic regions
4	2017	Law, Policy, International Relation, and Economics over the Arctic
5	2018	Latest Science, and Technology of the Arctic
6	2018	Feasibility and possibility of the Technology on Arctic Observation and Prediction
7	2019	Changing Arctic Environment and It's Effect to the Hokkaido Region
8	2019	Crude oil and Natural Development in the Arctic
9	2020	Sustainable Use of the Arctic Ocean as an East-West Corridor
10	2020	Optic Fiber Cable Across the Arctic Ocean, Japan-Finland Joint Seminar
11	2021	Changing Arctic Environment under Climate Change
12	2021	The development of sustainable cruise industry in the Pacific Arctic: Past developments and future prospects J-ARC Net & UArctic Joint Seminar

#### 4. Capacity building and nurturing Arctic experts

In order to strengthen and nurture a background of Arctic related activity not only academic field but also policy making, international relations, social, economic and industrial fields, J-ARC Net had been promoting lecture series of “Introduction to Arctic studies”, “Winter school”, and “Introductory courses on the Arctic for citizens”.

The “Introduction to Arctic studies” provided a series of lectures on natural science and social science and humanities by various Arctic researchers to industry and government experts, and university students. The lectures provided about 200 pages of textbook to the participants.

The winter school was conducted by cooperation with The North Eastern Federal University(Yakutsk, Sakha Republic, Russia) and Far Eastern Federal University(Vladivostok, Russia). Before the pandemic, the winter school was carried out three times (2017, 2018, 2019) in Russia for 21 participants including students and business-peoples in Japan (Fig.5).



Fig. 5 Winter School in Yakutsk (2019)

But in 2020, due to the pandemic of COVID-19, the winter school was carried by on line style lectures. And in 2021~2022, the winter school was cancelled.

#### 5. Promoting various events regarding the Arctic

To strengthen the J-ARC Net activity and foster the Arctic related community in Japan, mailing list service for an information sharing was carried out to more than 600 members. And J-ARC Net actively supported and engaged in various Arctic events such as being a co-organizer of the “36th International Symposium on Okhotsk Sea & Polar Oceans, 2022”.

#### 6. Conclusion

Six years of J-ARC Net activity is summarized. In order to promote advanced and interdisciplinary Arctic research through industry-government-academia cooperation and to nurture expert on the Arctic issues,

111 joint research and 51 research meetings were funded. And 12 open seminars, 3 times of winter school in Russia, and other various research events were carried out.

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#### Summary in Japanese

和文要約

#### 産官学連携による北極研究への取り組み

#### 北極域研究共同推進拠点の足跡

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北極域研究共同推進拠点 J-ARC Net は 2016 に設置認定され、北海道大学北極域研究センターを中核施設、国立極地研究所国際北極環境研究センター及び、海洋研究開発機構北極環境変動総合研究センターを連携施設として、この3研究施設の連携ネットワーク型拠点として発足した。以降6年間にわたり、北極域研究分野において、研究者コミュニティ支援事業及び産官学連携推進事業を通じ、公募型共同研究、人材育成講座、ウィンタースクール、北極域オープンセミナー、国際シンポジウム、北極基礎市民講座等を実施した。これにより、産官学の連携と異分野連携による課題解決に資する学際的共同研究等の推進、ならびに、俯瞰的な視野を持って北極の課題解決に取り組む人材の育成に取り組んだ。6年間を通じ、海外を含む述べ1,500名を超える共同研究への参加者、1,000名を超える北極域オープンセミナーへの参加者などを得た。

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