Report on a session of the CAO fisheries agreement in the Arctic Circle Assembly

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(JAMSTEC)
Japan's contribution to the CAO agreement:
Science, Indigenous knowledge, Rule of law
Biological hotspots in the Pacific Arctic Region

GRENE & ArCS – Japanese Arctic Projects before ArCS II

DBO (Distributed Biological Observatory) since 2010

[Map of the Pacific Arctic Region with key biological hotspots marked]
Questions to be addressed for
Joint Program of Scientific Research and Monitoring (JPSRM)

1) What are the distribution and abundance of species with a potential for future commercial harvests in the CAO?

2) What other information is needed to provide advice necessary for future sustainable harvests of commercial fish stocks and maintenance of dependent ecosystem components?

3) What are the likely key ecological linkages between potentially harvestable fish stocks of the CAO and adjacent shelf ecosystem (e.g., Pacific and Atlantic gateways)?

4) Over the next 10-30 years, what changes in fish populations, dependent species, and the supporting ecosystems may occur in the CAO and adjacent shelf ecosystem?

5) How can Traditional Ecological Knowledge inform ecological baselines?
• Chapter 1 – Introduction
• Chapter 2 – Key characteristics of the CAO ecosystem
• Chapter 3 – The physical setting: topography, oceanography, and sea ice
• Chapter 4 – Algae and primary production
• Chapter 5 – Zooplankton and invertebrate ice fauna
• Chapter 6 – Sympagic and pelagic bacterial communities
• Chapter 7 – Arctic benthos
• Chapter 8 – Fish
• Chapter 9 – Marine birds
• Chapter 10 – Marine mammals
• **A coordinated multi-ship, multi-nation pan-Arctic ship-based sampling campaign (2020-2022)**

• This could allow for a synoptic view of the totality of hydrographic and ecosystem changes taking place in the Arctic Ocean

• **Hydrographic measurements:** T, S, Oxygen, Nutrients, Inorganic Carbon Chemistry, Organic Carbon (POC and DOC), age tracers (CFCs), C-isotopes, CH₄

• **Ecosystem characteristics:** Viruses, Bacteria, Phytoplankton, micro, meso, and macro zooplankton, benthos, acoustics, primary production
Japanese, Korean, and Canadian SAS cruises in 2020

Chukchi Plateau
Low DO and highly acidified water on the Chukchi Plateau

Ocean acidification: Prioritized indicator listed in the final report of FiSCAO.

Study area with hydrographic stations

Hydrographic stations in 2020
- Araon (Korea)
- Mirai (Japan)
- Louis S. St-Laurent (Canada)
- Other stations

75˚N-line across the Chukchi Plateau (CP)

Dissolved oxygen (DO) [μmol/kg]

CaCO₃ saturation state (Ω)

Geographical locations are abbreviated as follows: Canada Basin (CB), Chukchi Plateau (CP), Mendeleyev Ridge (MR), Makarov Basin (MB), Lomonosov Ridge (LR), Amundsen Basin (AB), and Nansen Basin (NB).
Japan's first research icebreaker for Arctic science delivered in 2026

The Arctic region is facing many difficult challenges including environmental changes that have led to the loss of sea ice. Understanding how to balance the increased economic activities that have resulted from these changes is crucial. The effects of these environmental changes are far-reaching and are often witnessed as extreme weather systems outside the Arctic region. One example of this is the extreme weather experienced in Japan. As such, the changing Arctic environment is really a threat to Japan. Recognizing the need to support scientific research, Japan made an agreement with the United States to do joint research. The measure was taken to understand the changing environment of the Arctic.

In order to fulfill the commitments, Japan has decided to build an Arctic research vessel with outstanding capabilities and world-class scientific facilities. This research vessel will be dedicated to promoting the importance of Arctic science and the need for a sustainable development of the Arctic region. Furthermore, Japan has committed to collaborating with other nations to further develop partnerships with international partners.

Fish finding echo sounder

Deep sea water sample

- Measure variables such as temperature, salinity, and pressure in the deep sea, which enables better characterization of the ongoing changes in the Arctic Ocean.

Fixed point observation by moorings

- Continue to maintain our moorings, which monitor physical and biological changes in the Arctic Ocean.

Survey of bathymetry and biological resources using echo sounders

- Conduct bathymetry and biological surveys of the Arctic Ocean.

Weather balloon carrying atmospheric instruments

- Measure atmospheric variables such as air pressure, temperature, and humidity.

Rainfall/snowfall observations using a meteorological radar

- Measure variables such as wind speed, speed direction of snowflakes and snowdrifts made in the clouds by radiating electro-magnetic waves over the Arctic Ocean.

Sea-ice observation using autonomous on-ice and under-ice vehicles

- Non-invasive observation above and below the sea ice to measure thickness and floe shape, and to observe the marine environment under the ice.

Monitoring the hull structure of the ship

- Collect data on hull deformation by measuring the strains of the hull, ensuring the safety and stability of the research vessel.

Seafloor survey using ROV/AUV

- Operate autonomous underwater vehicles for data collection.
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A challenge arises when some look at only one piece of this puzzle and begin to make decisions, policy recommendations and regulations without understanding the interconnecting components, cumulative impacts, our holistic world view – or how the young hunter giving their first catch to an elder is an intricate part of this ecosystem.
15:05 – 16:00 THE CENTRAL ARCTIC OCEAN: A MODEL FOR COOPERATIVE SUCCESS

Organized by: Korea Polar Research Institute (KOPRI); Ocean Conservancy, USA; Polar Institute – Wilson Center, USA
Location: Akrafjall, Harpa Fourth Level

SPEAKERS

- Henry P. Huntington, Director, Arctic Science, Ocean Conservancy, USA
- Evan T. Bloom, Senior Fellow, Woodrow Wilson International Center for Scholars, USA
- Ambassador David A. Balton, Executive Director, Arctic Executive Steering Committee, White House Office of Science and Technology Policy, USA
- Hyoung Chul Shin, Vice President, Korea Polar Research Institute (KOPRI)