

Annual Update on Korean Arctic Research Program

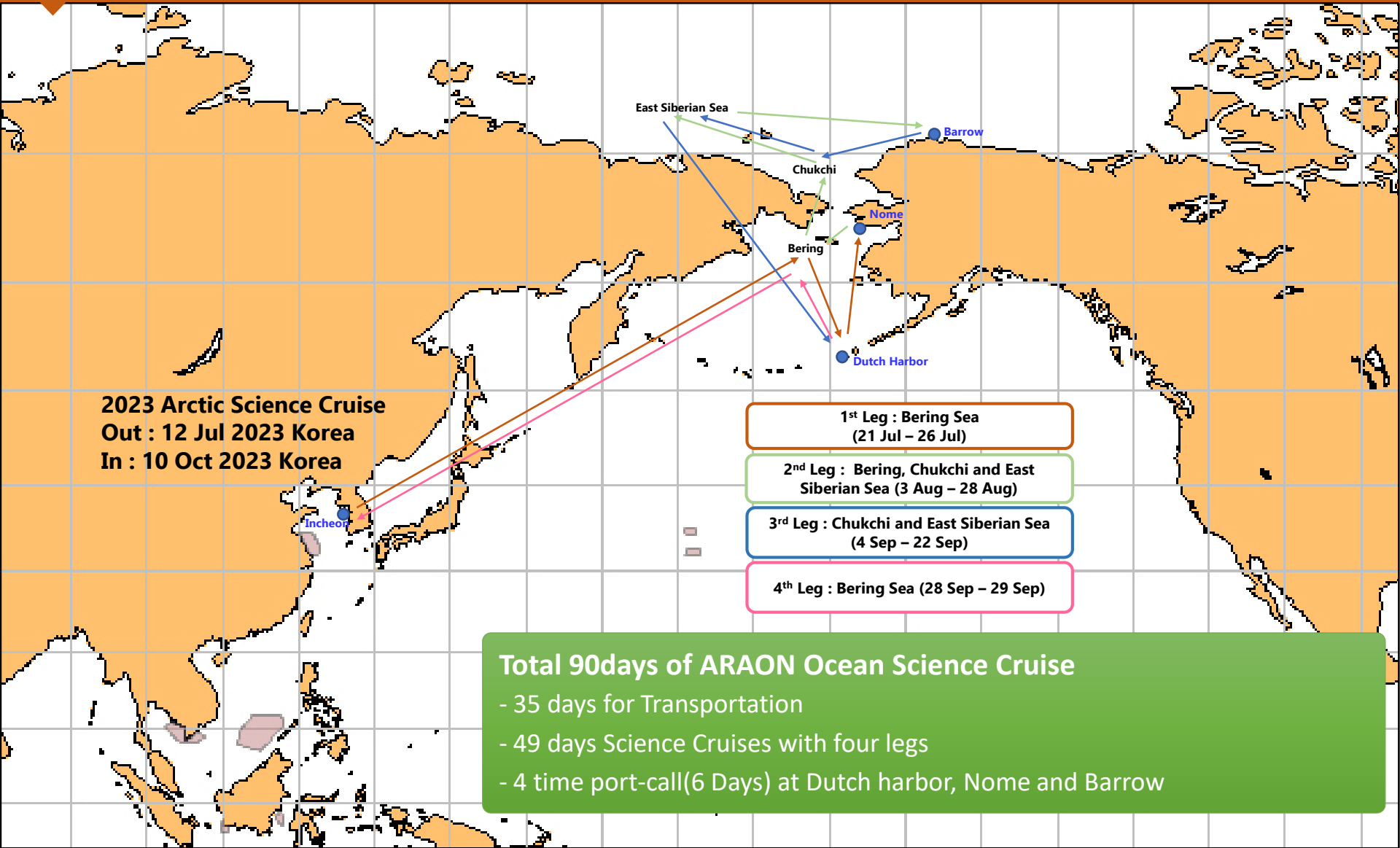
For 2024 FARO Annual Meeting



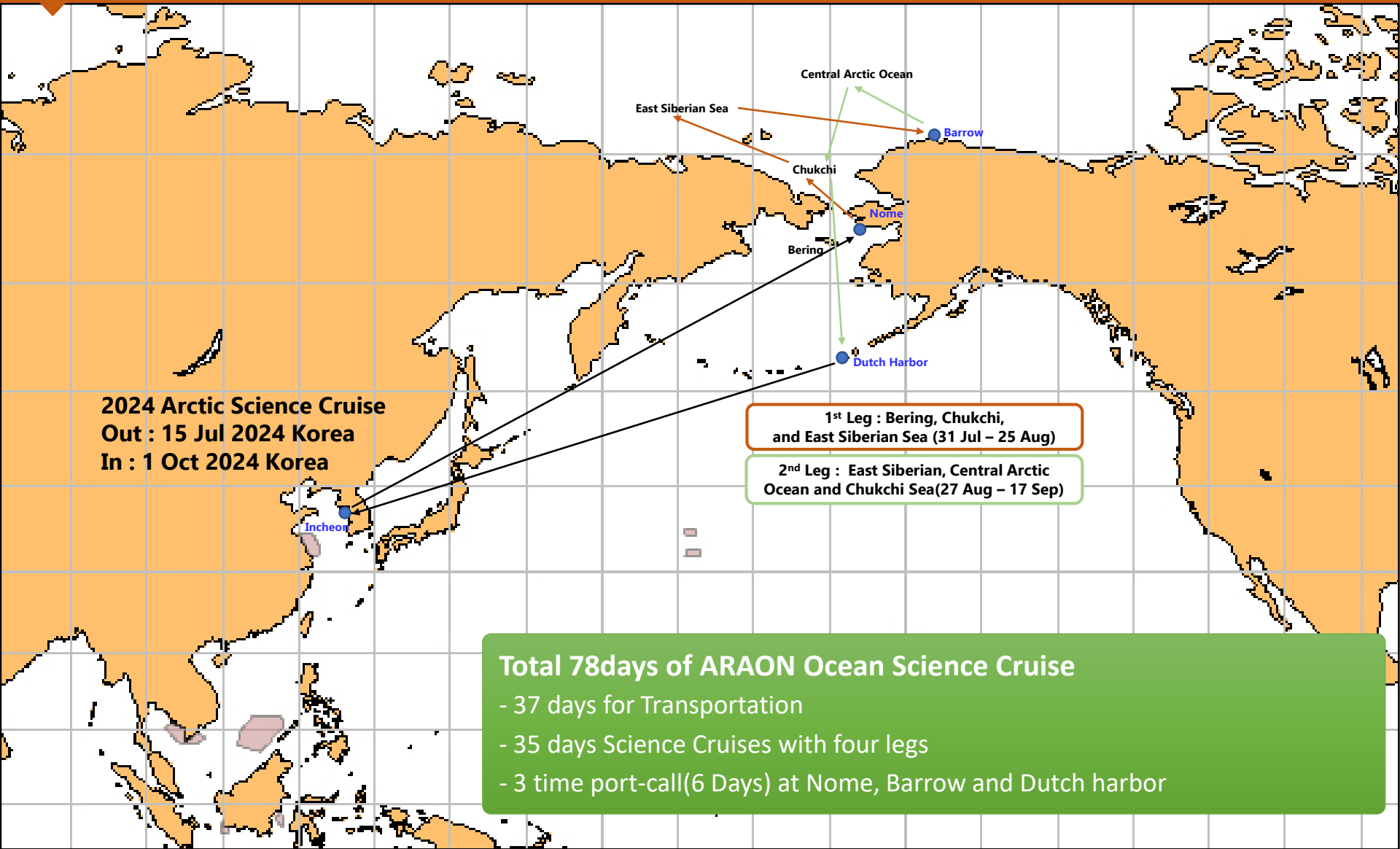
Highlights on Korean Arctic Research Campaign in 2023

- ◆ KOPRI News: The 8th President, Hyoung Chul Shin elected in Dec 2023
- ◆ Korean Arctic Research Projects in 2023: 20 research groups with 72 scientists of 21 institutions from March to August (250 days)
 - Arctic Dasan station : 13 research groups, 44 scientists, 14 institutions
 - Other Arctic Areas* : 7 research groups, 28 scientists, 7 institutions
 - * Alaska Nome, Canada Cambridge bay, Greenland EGRIP camp etc
- ◆ Arctic Ocean Science Cruise by IBRV *ARAON* in 2023: Supported 19 ocean science research projects with 96 participants in the area of Bering / Chuckchi / East-Siberian sea by four science Cruise legs from July to October (90days)
- ◆ Next Generation Icebreaking Research Vessel Building Project: No bidders last year, the completion of the ship has been delayed from 2026 to 2029.

2023 Arctic Ocean Science Cruise by *ARAON*



2024 Arctic Ocean Science Cruise by *ARAON*



Next Generation Icebreaker Project

At a Glance

- The final result of feasibility survey on Korea's Next Generation Icebreaker Building Projects gave a greenlight for this project in the mid of 2021.
- KOPRI set up a special unit for Next Generation IBRV project in August 2021.
- Project Period & Estimated Budget: 2022- 2029 / Approx. USD 200 Million
- Draft Time line

2023	Concept Design
2024- 2025	Basic Design
2025	Steel Cutting
2026	Keel Laying / 2027 Launching
2028	Sea Trial & Test Voyage
2029	Delivery & Commission



Next Generation Icebreaker Project

Concept Specification

	ARAON since 2009	Next Generation IBRV
Icebreaking Capability (Winterization)	1m / 3knots (-35°C)	1.5m / 3knots (-45°C)
Research Equipment	Fixed Research Equipment	Module-type Research Equipment (Moonpool, ROV, U-CTD and etc.)
Gross Tonnage	7,507tons	16,560tons
Dimension (L x W x D)	111m x 19m x 9.9m	140.8m x 25m x 13m
Operation Days with no Resupply	70days	75days
Fuels	MGO(Low Sulphur)	MGO(Low Sulphur) + LNG
Accommodation	85 pax. (including 26 crews)	100 pax (including 34 crews)
Operation Area	Arctic & Antarctic ocean	Arctic ocean (Mainly)

Korean Arctic Research Projects in 2023 (Arctic Dasan Station)

NO	PROJECT	PERSONS	DAYS
1	Developments of Analytical Methods for Climate Regulating Components and its application to Polar Environment	3	15
2	Korea Polar Prediction System (KPOPS) Development and Its Application to the High-impact Weather Events originated from the Changing Arctic Ocean and Sea Ice	4	10
3	Vulnerability and resilience of the Arctic Svalbard to climate variability	4	9
4	A modeling study on mechanisms of material circulation due to oceanic current variations in Svalbard coast	3	8
5	Ice cube project 2	5	11
6	Korea-Arctic Ocean Warming and Response of Ecosystem (K-AWARE)	3	11
7	Korea Polar Prediction System (KPOPS) Development and Its Application to the High-impact Weather Events originated from the Changing Arctic Ocean and Sea Ice (KPOPS)	4	8
8	Arctic Vegetation monitoring program	3	12
9	Korea Outreach Program - Pole to Pole Korea	7	4
10	Exploration of reactive substances for changes in Arctic permafrost by climate change	2	8
11	Classification and Ecology Study of Huperzia arctica (CESH)	1	8
12	Korea Polar Prediction System (KPOPS) Development and Its Application to the High-impact Weather Events originated from the Changing Arctic Ocean and Sea Ice	2	8
13	Study of Space Sciences (Space Climate, Solar Physics, Planetary Science) in the Arctic (SSSA)	3	11

13 research groups, 44 scientists, 14 institutions, 123 days

Korean Arctic Research Projects in 2023 (Other Arctic Areas)

NO	PROJECT	AREA	PERSONS	DAYS
1	4th Korea-Norway international scientific cruise to 11 fjord systems in western Spitsbergen with RV Helmer Hanssen	Svalbard fjorden (RV Helmer Hanssen)	9	13
2	Field survey at Dicksonfjorden to monitor morphological changes resulting from recent global warming	Svalbard fjorden	5	12
3	East Greenland Ice-core Project	Greenland EGRIP camp	1	36
4	Geological and paleontological survey at the western margin of Midsommer Lake of Peary Land, North Greenland	Greenland Midsommer	8	20
5	Measuring greenhouse gas fluxes in wet tundra during the summer season of 2023	Alaska Nome, council	2	12
6	Repairing the measurement system and to secure permafrost environmental factors	Alaska Nome, council	1	8
7	Understanding the contribution of the pond to CO2 exchange between the atmosphere and the dry tundra through continuous measurements	Canada Cambridge bay	2	26

7 research groups, 28 scientists, 7 institutions, 127 days

Korean Arctic Research Projects in 2023 (R.V *ARAON* Science Cruise)

NO	PROJECT	AREA	PERSONS	DAYS
1	Investigation and prediction system development of marine heatwave around the Korean Peninsula originated from the subarctic and western Pacific	Bering Sea	11	5
2	Survey of Geology and Seabed Environmental Change in the Arctic Seas	Chukchi Sea, East Siberian Sea	24	25
3	Korea-Arctic Ocean Warming and Response of Ecosystem	Bering Sea	24	5
4	Study on remote sensing for quantitative analysis of changes in the Arctic cryosphere	East Siberian Sea	3	25
5	Understanding of Antarctic climate and environment and assessments of global influence	Chukchi Sea	2	18
6	Development and Application of the Earth System Model-based Korea Polar Prediction System (KPOPS-Earth) for the Arctic and Midlatitude High-impact Weather Events	Bering Sea	2	5
7	Interrelationship Investigation and Comprehensive Monitoring based on Permafrost-Atmospheric Environment	Bering Sea	2	5
8	The Role of the Korean Navy in the Polar & Development of the Arctic sea route	Bering Sea	4	5
9	Effects of Marine Desalination on Calcium Carbonate Skeletal Marine Animals	Chukchi Sea	2	25
10	Forecasting and Developing Technology for the Arctic Circle Land-Atmospheric Environmental Change	East Siberian Sea	3	18
11	A Study on the Ecological and Geochemical Process of Microorganisms in the Arctic Ocean	Bering Sea	3	25
12	Long-term monitoring system for changes in the marine environment of rapid sea ice decrease	Chukchi Sea	2	25
13	A Study on the Possibility of Measuring Ice Characteristics Using Surface Transmission Radar	Chukchi Sea	2	25
14	Other Six Research Activities related to Polar Engineering	Bering, Chukchi, East Siberian Sea	12	25

19 research groups, 96 scientists, 25 institutions, 236 days(all projects)

Korean Arctic Research Projects in 2024 (R.V *ARAON* Science Cruise)

NO	PROJECT	AREA	PERSONS
1	Study on remote sensing for quantitative analysis of changes in the Arctic cryosphere	Bering sea, Chukchi sea, East Siberian Sea	42
2	Development and Application of the Earth System Model-based Korea Polar Prediction System (KPOPS-Earth) for the Arctic and Midlatitude High-impact Weather Events		
3	Korea-Arctic Ocean Warming and Response of Ecosystem		
4	Acquisition of long-term underwater acoustic observation data in sea ice areas		
5	Development of ship performance, propulsion performance, ice performance evaluation technology and machine learning-based performance prediction technology in extreme environments		
6	Survey of Geology and Seabed Environmental Change in the Arctic Seas	East Siberian Sea, Central Arctic Ocean, Chukchi Sea	47
7	Evolution of plate tectonic theory through integrated research in geology, geophysics, and geodynamics, and elucidation of Earth structure through geological surveys		
8	Development of high-resolution deep-sea data processing for permanent permafrost monitoring in the Arctic Ocean and research on climate and environmental changes		

8 research groups, 89 scientists, 4 institutions

FARO Annual meeting 2024 / END/

Thank you

