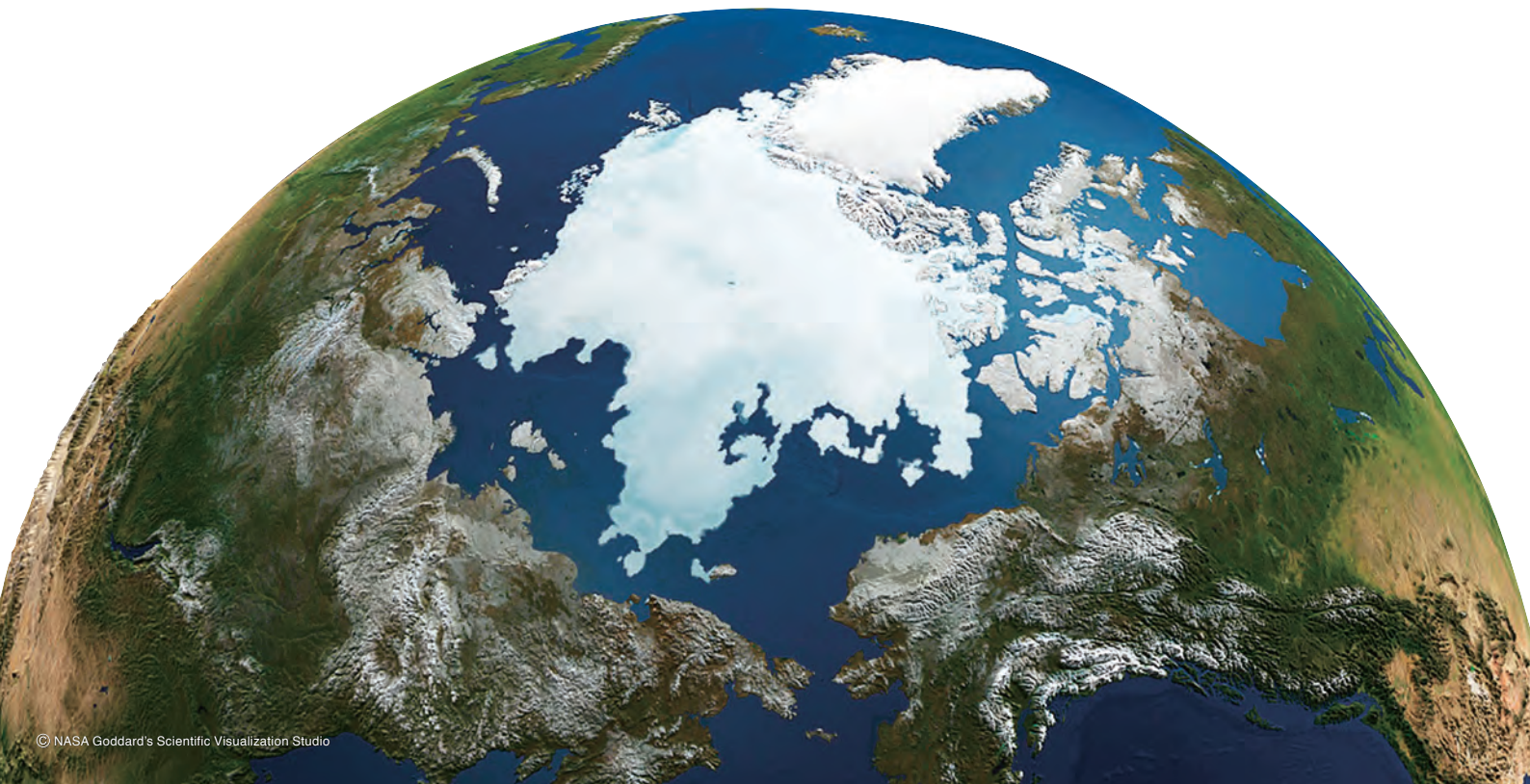




National Institute of Polar Research  
Inter-University Research Institute Corporation  
Research Organization of Information and Systems

2023-2024





# FOREWORD

The Intergovernmental Panel on Climate Change (IPCC) published "Special Report on the Ocean and Cryosphere in a Changing Climate" in 2019. The report stresses that the ocean and cryosphere are essential for predicting global climate change. As described by the IPCC, the importance of research and observation in both the Antarctic and the Arctic—which has an ice sheet—is growing in the global environmental problems like global warming. The National Institute of Polar Research (NIPR) of the Research Organization of Information and Systems, the core institute for conducting research and observation of the polar regions, is playing an increasingly critical role. The NIPR must conduct research and observations of the polar regions with a global perspective and consistently produce results internationally while also widely educating the public on the importance of such activities. As global warming accelerates, the NIPR functions as a research institute that conducts polar research and observations to predict future changes in the global environment. We will highlight the various changes in the Arctic and Antarctic from past to present on the temporal scale and spatial scales for more accurate predictions about the global environment.



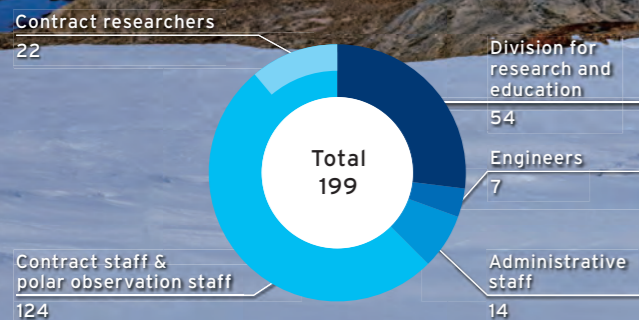
The NIPR is an inter-university research institute established in 1973 to conduct polar observations and comprehensive research. This type of institute boosts the research capabilities of universities around Japan through collaborative domestic and international research. With a research target of global-scale environmental changes focused on the polar region, international cooperation is essential. While conducting collaborative observational research with various countries within a framework of academic organizations under the International Science Council (ISC), including the Scientific Committee on Antarctic Research (SCAR), International Arctic Science Committee (IASC), the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), and the Scientific Committee on Oceanic Research (SCOR), we pursue world-leading scientific research of the polar regions.

The primary topic for Antarctic observation in the six-year plan (FY2022-2027) of Phase X of the Japanese Antarctic Research Projects is "the future global environment system as inferred through investigating the past and present of the Antarctic," around which we are engaged in activities such as drilling of the oldest ice core at the Dome station and intensive marine observation with the Antarctic research vessel "Shirase". In the Arctic, we are in the midst of the Arctic Challenge for Sustainability II (ArCS II) Project (FY2020-2024) and are discussing further developments and the launching of new research and observation activities for the next project period. As we pursue these observational research projects, we look forward to your support and understanding of the activities of the NIPR in fulfilling its role as Japan's only research institute conducting comprehensive observational research in the polar regions.

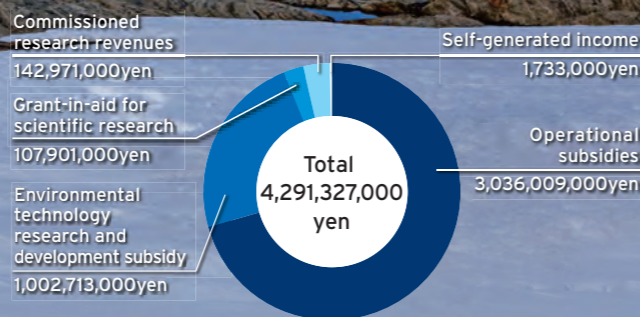
**Dr. Yoshifumi NOGI**  
Director-General, National Institute of Polar Research

## Institute Data

Number of Employees (as of July 1, 2023)



Funding for Operations (as of April 1, 2023)



# History

## History of the National Institute of Polar Research

May 1961	The Science Council of Japan advised the creation of the "Institute of Polar Research" (tentative) to the government
(April 1962)	"Polar Department" of the National Science Museum established
(April 1970)	"Polar Department" reorganized as "Polar Research Center"
September 1973	The National Institute of Polar Research (NIPR) established. Four research divisions, two document and data divisions, a management department, and an administrative department
April 1990	Arctic Environment Research Center (Current Arctic Research Center) established. Information Science Center (Current Communications and Computing Science Center) established
April 1993	NIPR became a Foundational institution for the Graduate University for Advanced Studies (SOKENDAI)
April 1995	Antarctic Environmental Monitoring Research Center established (-March 2004)
April 1998	Antarctic Meteorite Research Center established (Current Polar Science Resources Center SHRIMP Laboratory)
April 2004	NIPR was reorganized as part of Research Organization of Information and Systems (ROIS). Center for Antarctic Programs established. Polar Science Resources Center established
May 2009	NIPR relocated to new campus in Tachikawa
July 2010	NIPR Polar Science Museum opened
April 2014	Ice Core Research Center established
April 2018	Central Administration Department Tachikawa Administration Department established
April 2022	Advanced Radar Research Promotion Center established
April 2023	International Polar and Earth Environmental Research Center established
September 2023	50th anniversary

## History of Antarctic Expeditions

January 1912	Nobu Shirase Antarctic Expedition team reached lat. 80°
November 1956	First Antarctic expedition team departed upon the icebreaker ship "Soya"
January 1957	"Syowa Station" established
February 1962	"Syowa Station" closed temporarily
November 1965	Research vessel "Fuji" launched
January 1966	"Syowa Station" reopened
February 1969	Round-trip to the South Pole achieved
December 1969	First Antarctic meteorite discovered
February 1970	Observation by rocket
June 1970	"Mizuho Station" (observation base) established
October 1982	"Ozone hole" observed
November 1983	Research vessel "Shirase" launched
March 1985	"Asuka Station" established
February 1995	"Dome Fuji Station" established
December 1996	Ice core drilled to a depth of 2,503 m
February 2002	Specialized ship was added for South Pacific expedition
February 2004	Intelsat satellite communication system activated. Obtained consistent Internet connection
January 2005	Aircraft observation base established on the continent of Antarctica
January 2007	Ice core drilled to a depth of 3,035 m
November 2009	New "Shirase" launched. Tokyo University of Marine Science and Technology's training ship "Umitaka-Maru" joined Antarctic research project
April 2010	Over 17,000 Antarctic meteorites collected
March 2011	"PANSY" large-scale atmospheric radar began recording data
April 2016	Japanese Antarctic Research Project Phase IX started (finished on March 2023)
March 2018	Initiated Totten Glacier observation
April 2022	Japanese Antarctic Research Project Phase X started
December 2022	Second deep ice-core drilling site at Dome Fuji area established

## History of Arctic Researches

August 1976	Japan-France International Joint Observation in Norway
August 1977	Geomagnetic Conjugate Point Observation in Iceland
August 1984	Bipolar Aurora Conjugate Observation in Iceland started (up to now)
January 1991	Ny-Ålesund Research Station established. Joined International Arctic Science Committee (IASC)
April 1996	Joined European Incoherent Scatter Scientific Association (EISCAT)
March 1998	Japanese-German airborne Arctic expedition
April 2008	North Greenland Eemian Ice Drilling (NEEM) began (finished on 2012)
July 2011	GRENE - Arctic Project started (finished on March 2016)
April 2015	"Arctic Science Summit Week" was held in Toyama
September 2015	ArCS (Arctic Challenge for Sustainability) Project started (finished on March 2020)
April 2016	J-ARCNet started (finished on March 2022)
March 2018	Joined SIOS (Svalbard Integrated Arctic Earth Observing System)
April 2019	Relocation of Ny-Ålesund NIPR Observatory
June 2020	ArCS II (Arctic Challenge for Sustainability II) Project started



## What We Do

### As the Core Base for Polar Scientific Research in Japan and Polar Observation

NIPR has both Arctic and Antarctic observation bases and is engaged in comprehensive polar science research with polar observation as the foundation. As an inter-university research institute, it provides researchers around Japan with the infrastructure for Arctic and Antarctic observation and promotes polar science through joint use of the institution; for example, by public solicitation for collaborative research projects and the provision of samples, materials, and information.

## Research Groups

NIPR has established four foundational research and education groups in the Division for Advanced Research Promotion (space and upper atmospheric sciences, meteorology and glaciology, geoscience, and bioscience) and one in the Division for Collaborative Research Promotion (polar engineering). These groups utilize the unique characteristics of their field while also collaborating for the pursuit of comprehensive polar science research.

### Space and Upper Atmospheric Sciences Group



The Space and Upper Atmospheric Sciences Group aims to clarify the effects of changes in geospace surrounding the earth on the earth's environment, and the global characteristics of the earth's atmosphere. The group uses ground-based observation networks and advanced remote sensing techniques in the Antarctic and Arctic regions maintained through international collaborations to carry out comprehensive observational research on aurora phenomena and middle and upper atmospheric phenomena.

### Meteorology and Glaciology Group



The Polar Meteorology and Glaciology Group aims to determine past, present, and future conditions of the global environment and climate through studies on the polar atmosphere (including the troposphere and stratosphere), the cryosphere, and the ocean. To this end, the group conducts research in atmospheric science, meteorology, glaciology, sea ice and marine science, and paleoclimatology, primarily through on-site observations, satellite remote sensing, and numerical modeling.

### Geoscience Group



Various phenomena and processes on the "Solid Earth" and "Planetary materials" are the research targets of the group. The Geoscience Group applies geology, mineralogy, geomorphology, Quaternary research, geodesy, and solid earth geophysics to reveal the formation of the solar system 4.6 billion years ago, changes in the earth's crust, changes in the Quaternary environment as well as present-day changes in the earth's crust and surface accompanying the retreat and advancement of the ice sheet.

### Bioscience Group



The Bioscience Group has three core research areas: research on polar marine production and biological oceanographic processes, research on behavioral ecology of large animals using a bio-logging approach, and research on ecosystems that develop on land and in lakes. The group studies topics such as polar biodiversity, biological adaptation to recent changes in the global environment, and ecosystem response.

### Polar Engineering Group



Technical backup is essential for conducting high-quality observation in the unique polar environment of below-freezing temperatures, strong winds, and dense snow under constraints such as limited means for transportation. The Polar Engineering Group addresses technical challenges associated with polar observation and logistics by studying, for example, the stable use of renewable energy and developing technology related to unmanned observation.

## Collaborative Research

### Research Projects

The aim of the research projects led by NIPR researchers who also collaborate with researchers at universities and other research institutes is to study polar science in a focused, systematic manner. There are currently eight topics being investigated: four as Fundamental Advanced Research Projects, two as Collaboration Projects, and two as Special Research Projects. Scan the 2D barcode on the right for a description of these studies.



### General Collaboration Projects

General Collaboration Projects are polar research projects conducted by individuals outside NIPR or multiple researchers working with NIPR researchers that use NIPR as a collaborative space. In 2023, 59 projects were selected and are underway. NIPR also has research meetings to discuss articles on research directions and results, and publicly recruits collaborative research training researchers to foster younger researchers.

## Symposia

The Symposium on Polar Science is held every year around November as an international symposium to promote networking and sharing of information among polar science researchers.

## International Academic Journals

NIPR has published the Polar Science academic journal since 2007 and the Polar Data Journal, Japan's first data journal by an academic organization, since 2017. These publications promote polar research globally and help to increase the international visibility of Japan's research findings.



## Research Facilities

To promote the joint use of polar science data and samples obtained by polar observation, NIPR has established research facilities that provides joint use services to researchers from Japan and other countries.

### Communications and Computing Science Center (CCC)



With the aim of promoting polar science, the Communications and Computing Science Center promotes the joint use of satellite links, the Polar Science Computer System, and the Polar Science Data Library System, which are required to obtain, send, store, analyze, and publish the results of polar observation data.

### Polar Science Resources Center



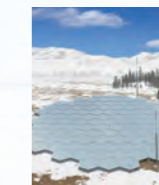
The Polar Science Resources Center consists of four laboratories: the Antarctic Meteorite Research Center, the SHRIMP (Sensitive High Resolution Ion Microprobe) Laboratory, the Biological Specimen Archive, and the Rock Specimen Archive. These facilities serve domestic and international researchers by providing materials and samples, and by operating advanced analytical equipment.

### Ice Core Research Center



Ice core samples drilled from the polar ice sheets are extremely valuable, containing information that enables precise reconstruction of the past global environment. The Ice Core Research Center fosters collaborative research and encourages joint use by focusing on the technological development, storage, and analysis of these ice cores in Japan.

### Advanced Radar Research Promotion Center (ARRC)



The Advanced Radar Research Promotion Center promotes joint usage of advanced large-scale radars such as the EISCAT\_3D radar in the Arctic and the PANSY radar in Antarctica and their collaborative research, and contributes to understanding of future climate change and space weather forecasting.

### International Polar and Earth Environmental Research Center (IPERC)

The Center aims to promote integrated and pioneering international collaborative research and joint use related to polar and global environmental changes in the past and present, and increase the precision of future predictions by collaborating with domestic and international universities and research institutes, in addition to acting as an international base for polar research and other types of global warming research.



## Antarctica - As a Core Institution

Antarctic research is a national project in which many government ministries and agencies as well as research institutes participate as implementing bodies under the Headquarters for the Japanese Antarctic Research Expedition headed by the Minister of Education, Culture, Sports, Science and Technology. In addition to carry out monitoring and research programs, NIPR plays a wide range of roles in the management of research expeditions as the core institution for conducting Antarctic research, such as organizing research expeditions, conducting trainings, transportation, safety management, and publicity. In promoting collaborative international research and observation and the use of ships and aircraft as key infrastructure for conducting observation, NIPR considers the environment and performs coordination and support activities to assist in the various research activities in the Antarctic region. It has four research stations in the Antarctic. The core of them, Syowa Station, can accommodate about 30 expedition team members in winter and over 100 in summer. Joint use of the research platform at Syowa Station and the other stations is offered to Japanese and foreign researchers, greatly contributing to the advancement of polar science.



## Arctic - As a Core Institution

NIPR established research and observation sites in the Arctic, including the Ny-Ålesund observatory on the Svalbard archipelago, Norway, and other sites in northern Scandinavia, Alaska, Canada, Greenland, Iceland and Russia to carry out international joint research projects in geospace, atmosphere, cryosphere and terrestrial regions by providing these facilities with domestic researchers as an inter-university research organization. NIPR is facilitating data science as well by archiving integrated observation data in polar regions with use of visualization tools and transmitting Arctic sea ice data. As a representative organization in charge of the Arctic Research Acceleration Project (ArCS II), NIPR leads advanced and interdisciplinary research projects in the Arctic in cooperation with domestic universities and research institutes. Affiliated in the European Incoherent Scatter Scientific Association (EISCAT), NIPR is contributing to construct and operate the next generation EISCAT\_3D radar, while carrying out cutting-edge studies on upper and middle atmospheres. Through these activities, NIPR plays a vital role as a core institute for Arctic research in Japan.



## As an Institution that Develops Researchers

### Graduate School Education

The Graduate University for Advanced Studies (SOKENDAI) was established in 1988 as Japan's first independent graduate university under close communication and cooperation with inter-university research institutes and other institutions. NIPR has been participating in SOKENDAI since 1993 and is currently responsible for graduate school education in the five-year doctoral program as the polar science course.

This course provides education and research centered on natural phenomena in the Arctic and Antarctic from a global perspective. It develops outstanding researchers with strong research capabilities and competencies as field scientists.

There were 14 students enrolled in the course as of October 2023 and, to date, a total of 84 students have obtained the doctoral degree.

### Special Collaborative Research Fellows

NIPR has been accepting graduate students in polar science and related fields from other universities as special

collaborative research fellows since 1981.

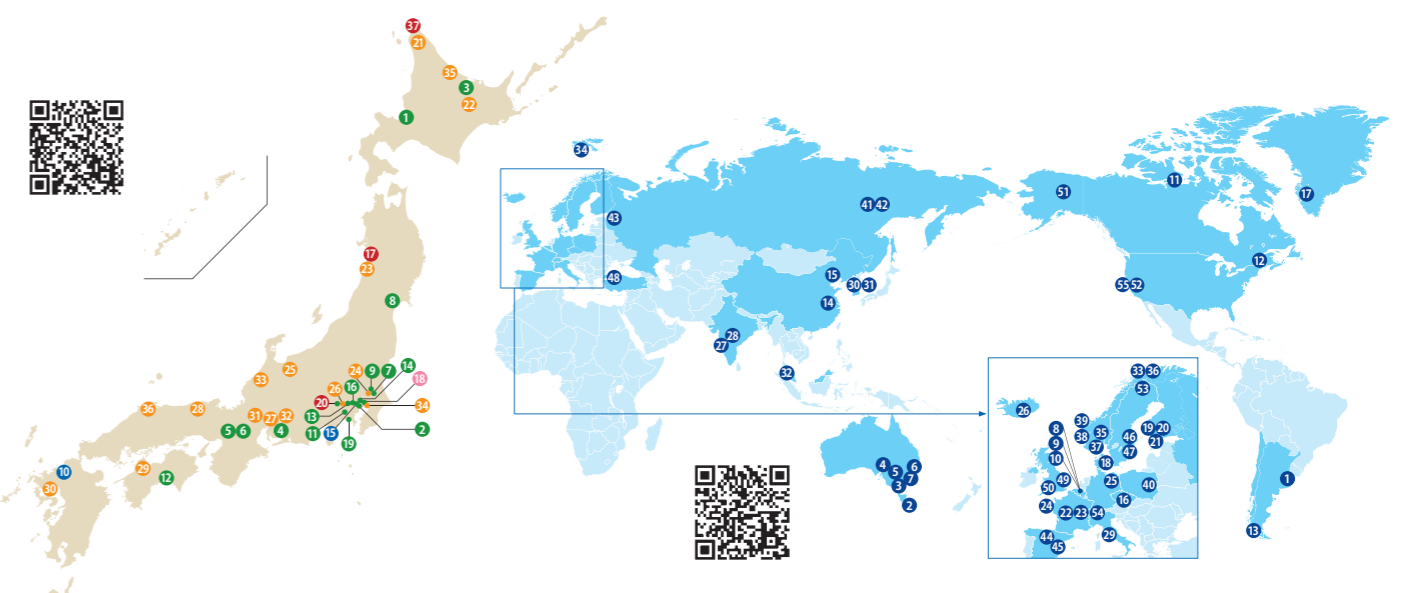
### Partner Graduate Schools

NIPR and Kyushu University entered into an Agreement on Partnership and Cooperation in Education and Research in 2006 to collaborate on graduate school education in the field of environment in the polar region.



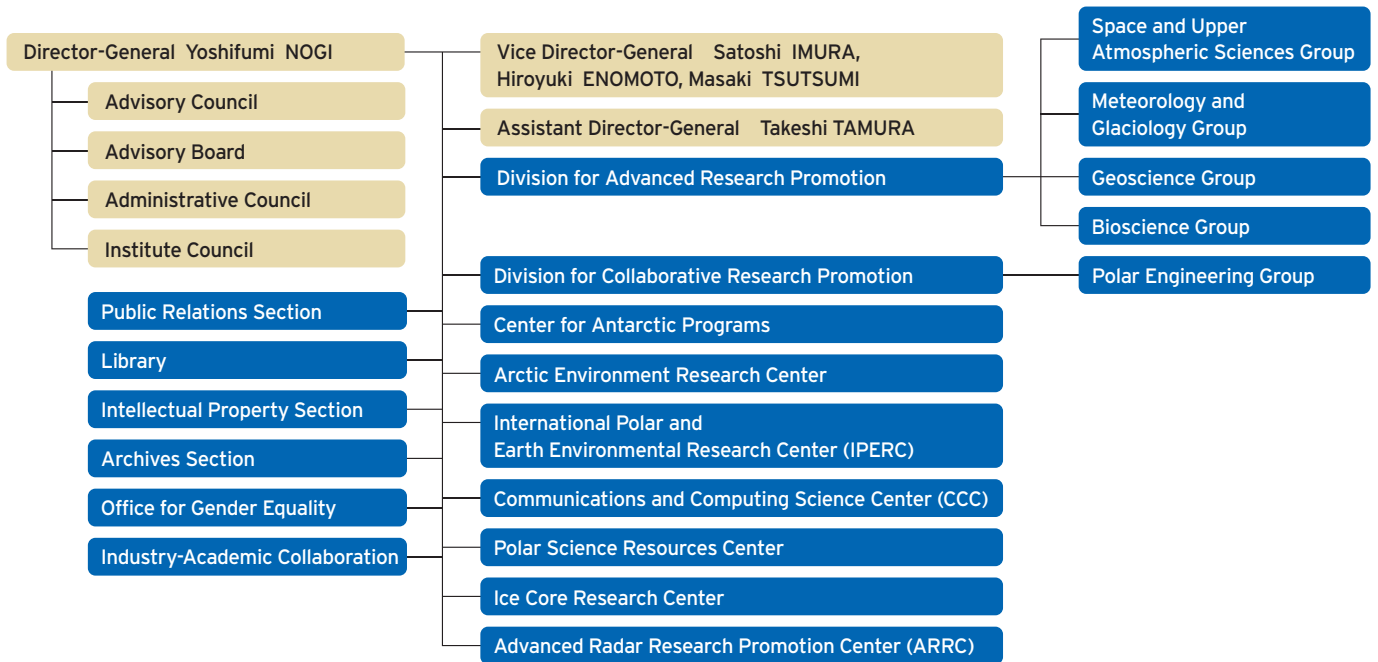
## Collaboration with Domestic and International Partners

To spread polar science and related findings, NIPR has entered partnership agreements with domestic and international research institutions, companies, and local governments. As of June 2023, it has signed agreements with 37 Japanese institutions and 55 in 25 other countries. Scan the 2D barcode below to view for details of each institution.





# National Institute of Polar Research Organization Chart



## Polar Science Museum

Polar Science Museum has no admission fee and is open to the public. It displays observation equipment used in actual polar regions and valuable academic materials and samples such as rocks, meteorites, or animal specimens. Visitors can see the latest research findings in polar science and information on NIPR's activities.

See here for details ►



## Library

The library collects, organizes and provides access to materials in various fields with a focus on the polar regions. It is available free of charge for anyone to use. The library also issues academic publications as a part of efforts to share research findings and publishes an academic information repository for NIPR.

See here for details ►



## Industry-Academic Collaboration

NIPR opened a new Industry-Academia Collaboration Promotion Office in FY2022 that is working towards the wide application of research findings to benefit society. It also has the important mission of promoting technological development in the industrial sector using the geographical and environmental characteristics of the polar regions. Recently, NIPR collaborated with the industrial sector to develop technology to transmit 8K video footage from the Antarctic in real time.



**NiPR**  
National Institute of Polar Research

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