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FOREWORD



Sixty years have passed since the International Geophysical Year (IGY) scientific project was carried out in 1957-1958, and since the First Japanese Antarctic Research Expedition (JARE) was sent to the Antarctic. It has also been a quarter of a century since Japan's National Institute of Polar Research (NIPR) opened its Arctic research station in Svalbard, Norway. More recently, observations and research on the Antarctic and Arctic regions have become increasingly important due to the progress of investigations into Earth's environmental changes and global warming. Founded in 1973, NIPR is an inter-university research institute that conducts comprehensive scientific research and observations in the polar regions. As one of the four institutes constituting the Research Organization of Information and Systems (ROIS), NIPR is making ongoing contributions to the enhancement of research universities across the country. However, since our research targets global issues, with an emphasis on the polar regions, international cooperation is a key component to fulfilling our mission.

Currently, NIPR is conducting observations and research with other countries under the frameworks of various academic organizations such as the Scientific Committee on Antarctic Research (SCAR), the International Arctic Science Committee (IASC), and the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) under the International Science Council (ICSU), thereby helping to hone the cutting edge of the world's pursuit of science.

The recent rapid decrease of the Arctic sea ice cover is not only impacting the appearance of global environmental change, it is also affecting the Earth's ecosystems as well as the economic and political activities in many countries surrounding the Arctic region, including Japan. Looking southward, the Antarctic continent, with ten times more ice content than the Arctic region, has also started to change. Should the region's huge ice sheets start to melt, the resulting sea-level rises could reach tens of meters, and would severely affect human living environments. Thus, the comprehensive monitoring of both polar regions is an urgent matter for all human beings.

Furthermore, investigations into paleo-climates such as the glacial-interglacial cycle, with periods of tens of thousands of years, and eras with very high carbon dioxide (CO₂) levels, can be expected to provide very useful information for predicting the Earth's future environmental conditions. Therefore, it is very important to study oceanic, ice-sheet, landscape, geology, and atmosphere variations in the Arctic and Antarctic regions from different aspects.

At the same time, it is also important to note that the Arctic and the Antarctic regions provide windows into both geo-space and deep space. For example, since the high energy particles emitted by solar flares from the sun precipitate along the magnetic fields into the polar regions, those regions provide the best locations for observing the effects of solar flares on our lives and society. In addition, the very low temperature and humidity of those regions allows us to observe space using various electromagnetic spectra such as infrared and radio wave spectra.

Because of recent technological developments, our observations and analysis have advanced significantly, and since the value of our data collected from polar regions has drastically increased, and it is very fortunate that NIPR belongs to ROIS, which strongly promotes data science. In 2017, the Polar Environment Data Science Center (PEDSC) was established under the Joint-Support-Center for Data Science Research of ROIS. Together with PEDSC, NIPR promotes collaborative research efforts using observational and sample data from the polar regions. We are also engaged in carrying out the IX term JARE (2016-22) mission, with a special emphasis on 'Variations of global system revealed by Antarctic observations', and executing the Arctic region research project, entitled 'Arctic Challenge for Sustainability (ArCS) (2015-2020)'.

Through these and many other efforts, we believe NIPR has a special role to play as the only institute in Japan that comprehensively pursues observations and research effort in both Antarctic and Arctic regions.

We appreciate your continuous support for all NIPR research activities.



Dr. Takuji NAKAMURA

Director-General, National Institute of Polar Research

What we do

As the core center for Japanese scientific research and observation of the polar regions

We engage in comprehensive research via our observation stations in the Arctic and Antarctica. We are also an inter-university research institute that provides researchers in all parts of Japan with infrastructure support for Arctic and Antarctic observations while working diligently to promote polar science by publicly soliciting collaboration research projects as well as providing samples, materials, and information.

As the core institution in Japan's Antarctic observations

We plan and implement Japan's Antarctic observation projects. Our ninth six-year plan, which starts with the 58th Antarctic Observation, will carry out various research observations, with the main theme focusing on "Exploring Geosystem Changes from the Polar Regions." In addition to maintaining and operating the facilities at our Antarctic observation stations, our tasks include organizing the Japanese Antarctic Research Expedition Team, conducting various training evolutions, procuring goods and supplies necessary for observation projects (together with the development of appropriate delivery plans), as well as managing and storing the samples and materials obtained via our projects.

As the core institution in observation of the Arctic region

We conduct Arctic observations that cover observations of the atmosphere, ice sheets, the ecosystem, the upper atmosphere, the aurora, the Earth's magnetic field and so on, from ground-based observation stations in Svalbard, Greenland, northern Scandinavia, Iceland, and other areas. We also conduct observations of the oceanic ecosystem and the atmosphere in the Arctic Ocean and its peripheral seas. Additionally, we are one of the representative institutions implementing the Arctic Challenge for Sustainability (ArCS) Project, which is a subsidiary project funded by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and which kicked off in FY2015.

As an educational institution to foster researchers

As part of efforts to foster researchers with a broad, global perspective and a sense of originality, we offer a five-year doctoral program for graduate students of the Department of Polar Science at the School of Multidisciplinary Sciences of SOKENDAI(the Graduate University for Advanced Studies).

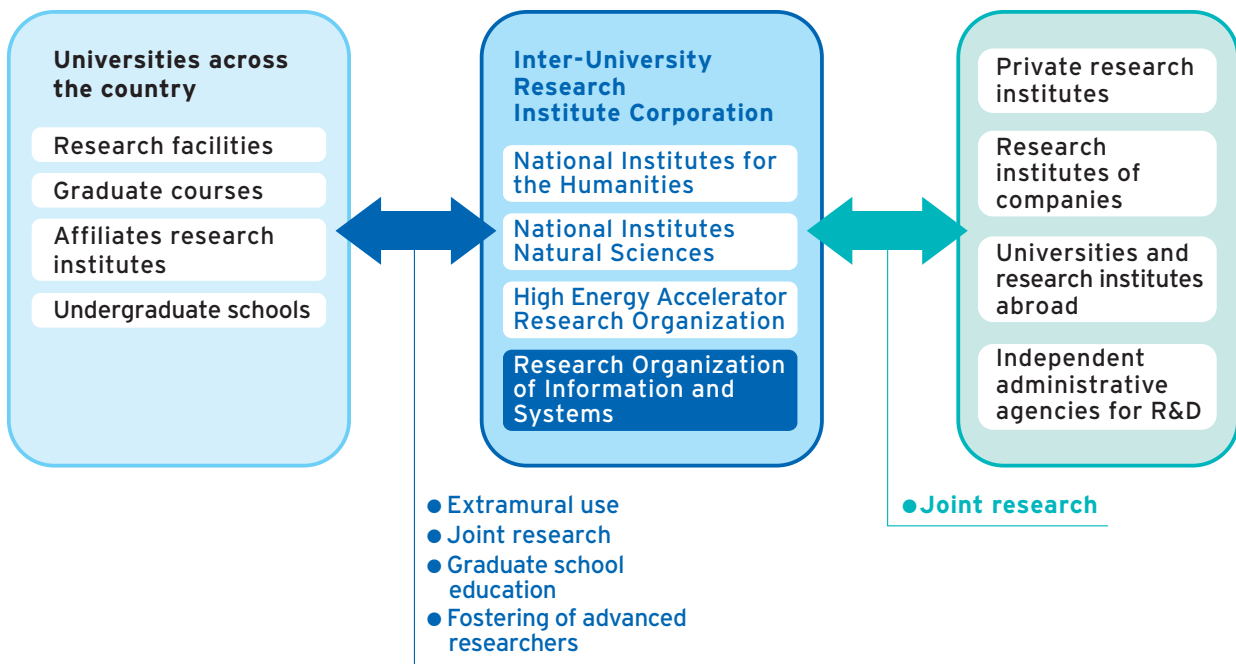


What are the Inter-University Research Institutes?

Inter-University Research Institutes are unique research organizations in Japan that seek to promote joint research across disciplines among universities. The institutes offer large-scale and cutting-edge facilities, large volumes of academic data, and valuable materials, which a single university would find it difficult to create and maintain, making them available free of charge to researchers in Japan as institutes shared by universities in different disciplines.

Given this situation, close collaboration with universities is essential. Inter-University Research Institutes have been established as research bodies that address areas outside the reach of any single university, to pursue world-class studies. Their most fundamental characteristic is to offer the infrastructure needed to facilitate university-led research, and they have made significant contributions to the academic world. Inter-University Research Institutes are likely to become even more important in the years ahead. Inter-University Research Institutes will continue to play an important role in supporting education and research at universities, and in advancing the academic research that is principally conducted by universities. Features of Inter-University Research Institutes includes Cutting-edge research, Joint use and joint research and Graduate education. (Abstract from ROIS HP)

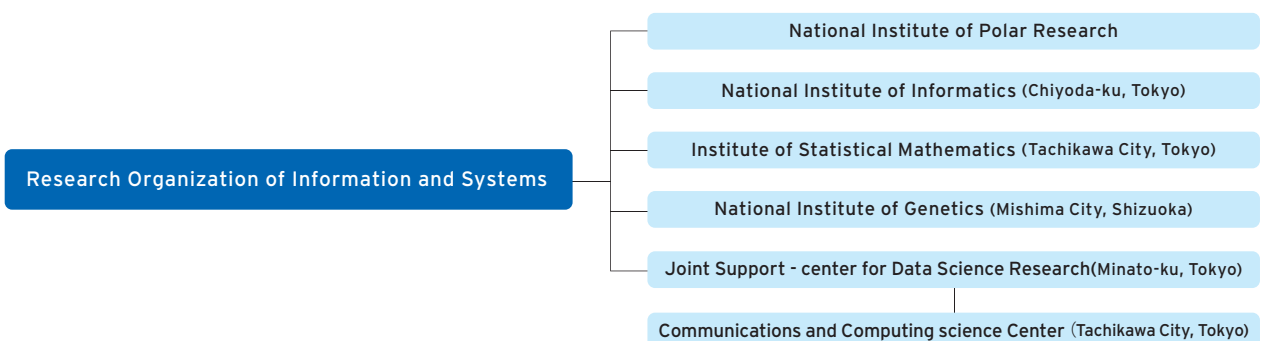
As “centers of excellence” in Japan



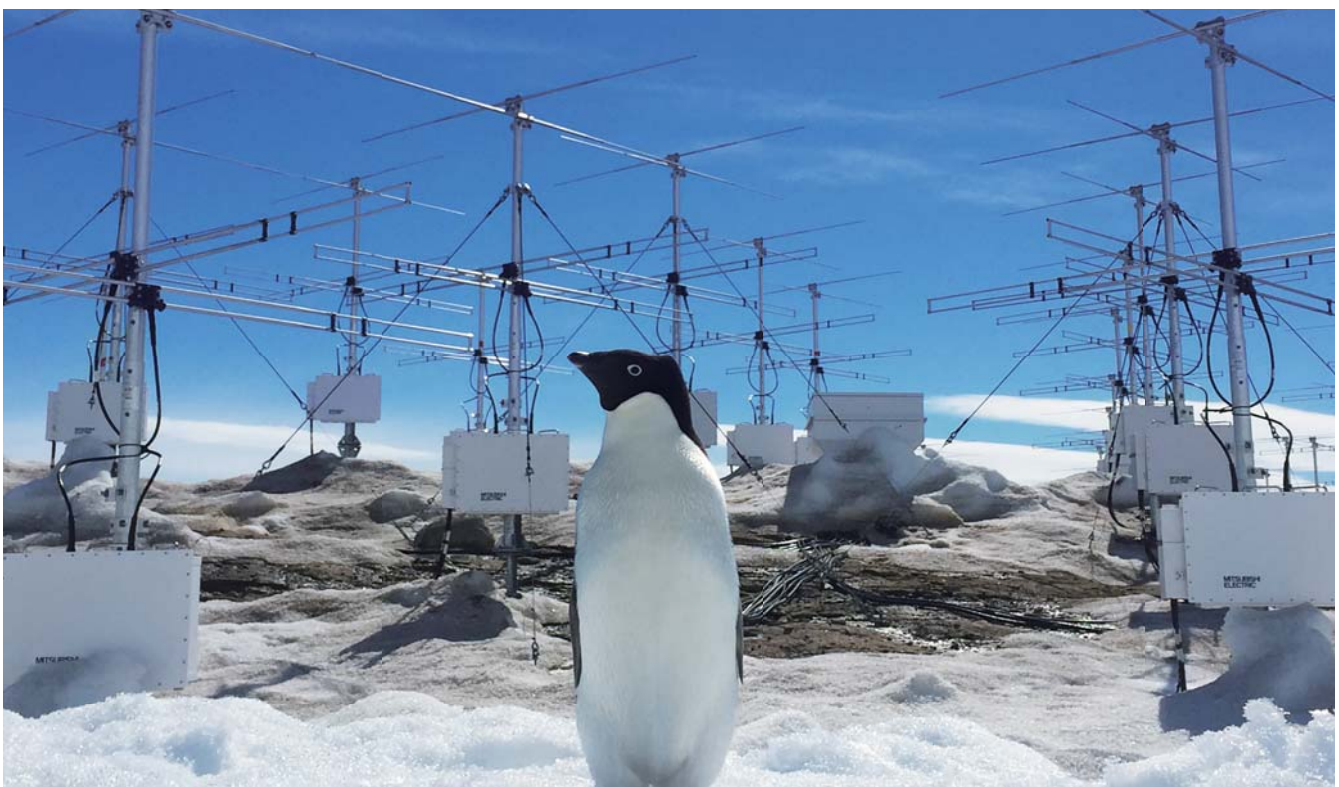
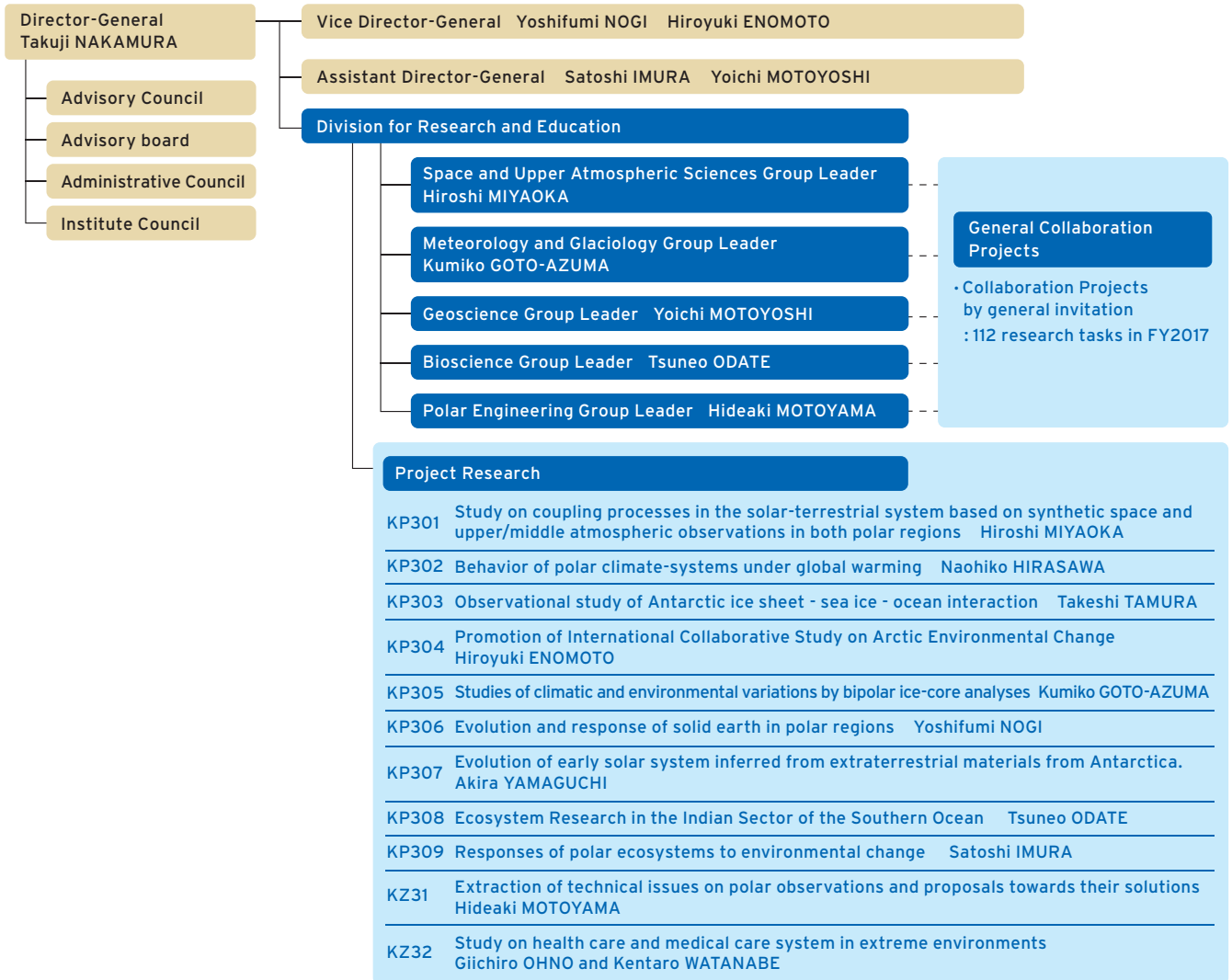
About Research Organization of Information and Systems

Conducting research that crosses the borders of traditional disciplines is becoming essential to solve important issues in the fields of life, environmental and information sciences that greatly impact our lives in the 21st century.

The Research Organization of Information and Systems (ROIS) is a parent organization of four national institutes (the National Institute of Polar Research, the National Institute of Informatics, the Institute of Statistical Mathematics and the National Institute of Genetics) and the Joint Support-Center for Data Science Research. It is our mission to promote integrated, cutting-edge research that goes beyond the barriers of these institutions, in addition to facilitating their research activities, as members of inter-university research institutes. (Abstract from ROIS HP)



National Institute of Polar Research Organization Chart





Collaboration Projects

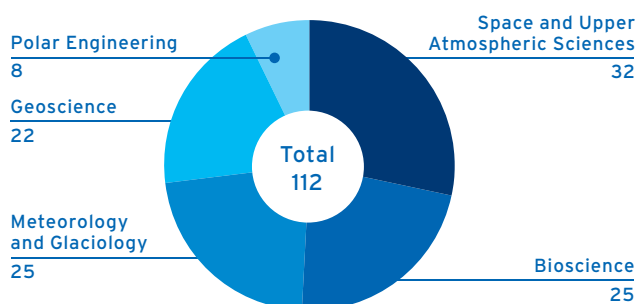
Research projects

These are projects are led by NIPR faculty in cooperation with universities and research institutions to promote polar science in a focused and planned manner. Approximately 250 researchers from NIPR and other organizations are involved in 11 other project research.

General Collaboration Projects

This refers to Collaboration Projects conducted through an open call for applications. NIPR researchers serve as research team leaders for these projects which are the foundation of the Institute's research. The Research Groups within NIPR correspond to the fields of general Collaboration Projects. In FY2017, approximately 300 outside researchers will participate in 112 research tasks.

General Collaboration Projects tasks by field



Collaboration Projects based on agreements

In an effort to advance research and education and cultivate human resources, NIPR has concluded agreements with several research institutes in Japan. The Institute conducts Collaboration Projects with these partners to ensure the mutual exploitation of R&D capabilities and resources and close, effective execution.

Symposia

NIPR began hosting the interdisciplinary Symposium on Polar Science in 2010 in an effort to communicate polar science research results worldwide. This symposium is held concurrently with the annual symposia on Antarctic Meteorites, Space and Upper Atmospheric Sciences, Polar Meteorology and Glaciology, Polar Geosciences and Polar Biology to discuss the situation surrounding the latest research and field activities in these disciplines. NIPR also hosts the Symposium on Antarctic Facilities, where proposals concerning Antarctic research base operations are issued and discussed (Topics include natural energy, the environment, information and communications, inland bases, transportation etc.).

Research Workshops

As part of its efforts to promote polar science research, NIPR holds research workshops to examine research policies, methodologies and results. In FY2017, the Institute plans to issue a public call for research on 24 topics and hold workshops for each.

Links between space and the Earth observed by remote-sensing techniques



Leader Hiroshi MIYAOKA

The target of the Space and Upper Atmospheric Sciences Group ranges from the stratosphere (above 10 km) to the interplanetary space of the solar system.

Study on aurora and the link between solar wind, magnetosphere, and ionosphere

Auroras, the most majestic and beautiful phenomenon in the polar region, remain puzzling and of great interest to researchers. An aurora is excited by electrons and protons precipitating from space near the Earth (geospace) to the polar atmosphere along the geomagnetic field lines and reflects variations in the geospace environment, which changes dynamically due to interaction between the solar wind, the magnetosphere and the ionosphere.

We have been conducting ground-based network observations in the Antarctic and Arctic regions with radars, magnetometers, and auroral imagers. Such observational data are used to study the mechanisms of various auroral phenomena and solar wind-magnetosphere-ionosphere coupling.

Study on middle and upper atmosphere

The transient region between the middle (10-100 km) and the upper (100 km -) atmosphere is a boundary region between space and the Earth. The upper atmosphere is partially ionized and acts as plasma particles, whereas conditions



Polar mesospheric cloud (PMC) observed at Syowa Station (Y. Takeda)

are more like fluid and neutral in the middle atmosphere. In contrast to the aurora in the upper atmosphere, notable phenomena in the polar middle atmosphere are the ozone hole, polar stratospheric clouds (PSC) and polar mesospheric clouds (PMC). In order to precisely measure the polar middle and upper atmosphere, which vary in response to meteorological disturbance from below, solar activities from above, and global meridional circulations of the atmosphere, we are carrying out various ground-based measurements in the Arctic and the Antarctic regions.

Aurora observed above Iceland, which is the geomagnetic conjugate point of Syowa Station



We study the climate and environmental system of the Earth from the polar regions



Leader Kumiko GOTO-AZUMA

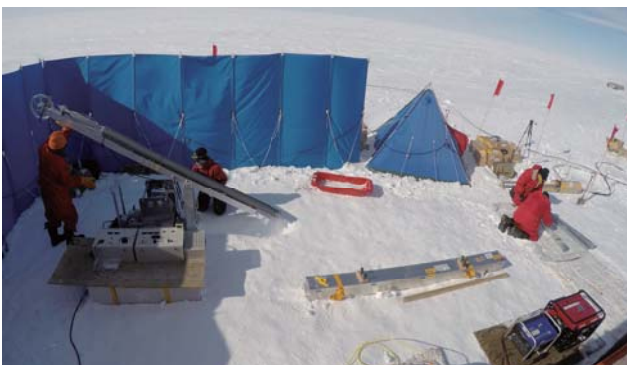
Climate change in the polar regions: past, present and future

Most of the fresh water on the Earth exists in the polar regions in the form of snow and ice. These regions also play an important role in the global water cycle and sea level changes. The sea ice area undergoes considerable seasonal fluctuations, and sea ice contributes to the exchange of heat and energy between the atmosphere and the ocean.

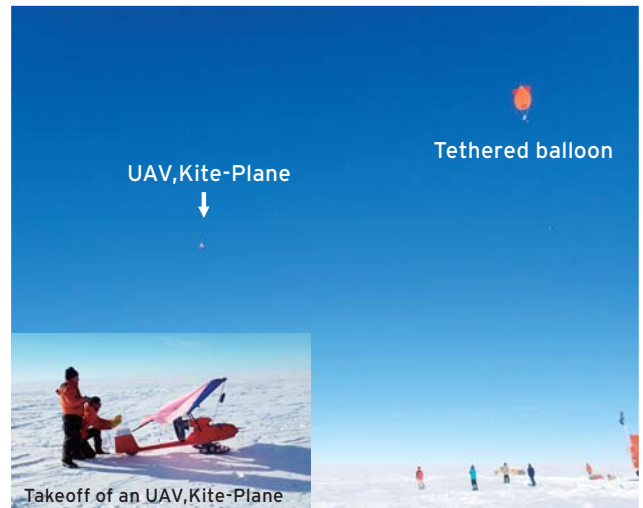
The Meteorology and Glaciology Group conducts research on topics from the fields of atmospheric science, meteorology, glaciology, sea ice, oceanography, and paleoclimatology; in particular, the group studies the atmosphere (i.e., the troposphere and stratosphere), cryosphere, and ocean in the polar regions. What phenomena are taking place now? How did the global climate and environment appear in the past? Studies on change mechanisms of the Earth's system to clarify the future are conducted mainly by field observation and remote sensing. In Antarctica, in particular, the influence of human activity is extremely low. Therefore, changes in the



Multi-year ice observation near Syowa Station



ice core drilling at the Antarctic ice sheet



Atmospheric observation above the Antarctic ice sheet with unmanned aerial vehicle (UAV) and tethered balloon

Earth's systems can be studied from this remote area.

Research for clarifying phenomena and mechanisms of the atmosphere in polar regions: atmosphere and aerosols; trace gases; geochemical and water circulation; radiation property of aerosols; the influence of aerosols on climate; radiation budget; continuous observation of the greenhouse gases, including carbon dioxide and methane in the polar regions; and surface and aerological observations.

Study of the polar cryosphere: paleoenvironmental study based on ice cores of ice sheets and glaciers (for example, two deep ice cores at Dome Fuji, Antarctica, provided in-depth information on global environment change over the past 720,000 years). An ice core study of the Greenland ice sheet, located in the northern hemisphere is important for understanding the global climate and environmental change mechanisms. In addition, study of ice sheet dynamics and surface mass balance and depositional mechanisms along with interdisciplinary observations of the Arctic and Antarctic cryosphere are being conducted.

Study of polar oceans: the formation mechanism of polynyas and Antarctic Bottom Water; sea ice growth and melt processes; the influence of sea ice on ocean structure and circulation; sea ice and climate change; the influence of fast ice and ice shelves on ocean; carbon dioxide exchange between atmosphere and ocean in the polar regions; and ocean acidification.

Study of the evolution of the Earth for 4.6 billion years



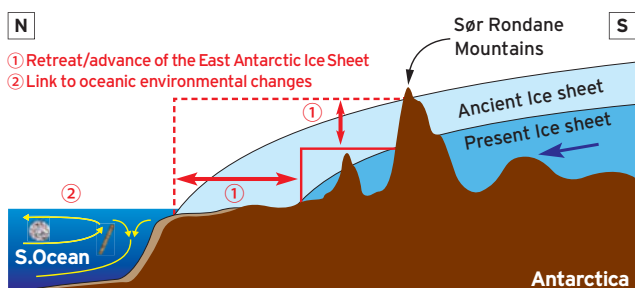
Leader Yoichi MOTOYOSHI

From advanced study of geology, geomorphology and solid earth geophysics

The Antarctic Continent, which is mostly covered by the Antarctic ice sheet, is comprised of a substratum that formed over a period of 4 billion years. The face of this rock is exposed on the outer edges of the ice sheet. The exposed rock and surrounding sea areas contain glacial geomorphology and deposits that hold records of the retreat and advance of the ice sheet. The land mass and ice sheet interact with each other, allowing the observation of unique solid earth geophysics phenomena. Traces of the Gondwana supercontinent breakup can be found on the seafloor of the Antarctic Ocean and the Indian Ocean that surround the Antarctic continent. Moreover, meteorites containing clues to the creation of our solar system can be found in the Antarctic ice sheet. These events and phenomena are studied with geology, mineralogy, geomorphology, quaternary research, geodesy and solid earth geophysics to reveal the history of the universe, changes in the historical evolution of the Earth's crust, and changes in the quaternary environment accompanying the retreat and advancement of the ice sheet, as well as changes in the Earth's crust and sea surface today.

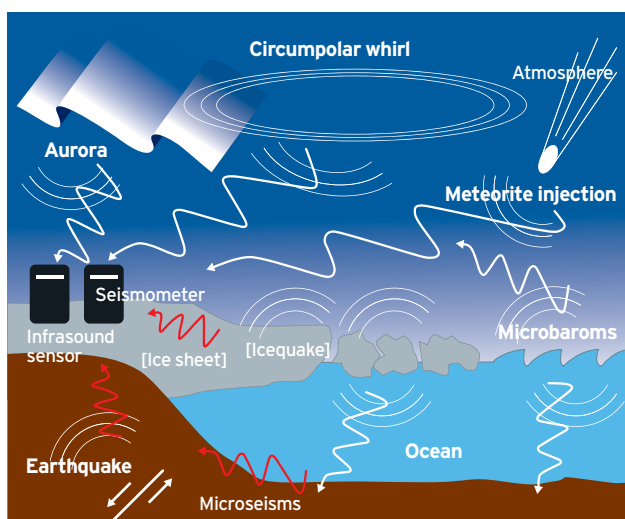


Geological survey at Botnnuten, East Antarctica



Geomorphological and geological surveys of the Sør Rondane Mountains. Our objectives are to reconstruct a detailed history of the retreat/advancement of the East Antarctic Ice Sheet based on geomorphological and geological surveys, and to understand its response to the Southern Ocean and changes in the global climate.

Inter-disciplinary physical phenomena within the multi-spheres in polar region



Several kind of seismic, infrasonic and hydro-acoustic waves from various surface environmental sources have been detected, indicating time-space variations in polar region.

Study of the present and past to identify future changes in polar ecosystems



Leader Tsuneo ODATE

Biological research in three fields

The fundamental task of this group is to establish how organisms have adapted and survived in the extremely harsh environments of the polar regions. It also studies the

sensitive response mechanisms of marine and terrestrial communities to global environmental changes. Its studies extend to the production process in marine lower trophic levels, behavior of marine predators and terrestrial biology.

1

Biological oceanography

Research focuses on mechanisms of ecosystem variability in association with environmental change in the Antarctic Ocean using in situ and satellite observations. With particular focus on plankton variability in the Indian Sector, we have been conducting corroborative research on analysis of long-term data with Australian scientists.



Plankton sampling in the pack ice

2

Vertebrate ecology

Research focuses on the behaviour and ecology of polar marine animals, especially seabirds and marine mammals. We have been developing small data loggers with sensors (GPS, camera, acceleration etc.) that can be attached to animals. Using these instruments, we obtain detailed information about at-sea behaviour and ecology that is critical to assessing the effects of environmental changes on the animals.



Adélie penguin with data logger

3

Terrestrial biology

Research focuses on the origins and establishment of Antarctic lake biota, paleo-environmental reconstruction from lake sediment samples and response mechanisms in lake ecosystems to global environmental change. Research on the Arctic ecosystem in particular has been conducted for more than ten years and accumulated ecophysiological data on soil microbial respiration and photosynthetic production.



Limnological survey in an Antarctic lake

Follow-up of supporting technology for polar science observation

Leader Hideaki MOTOYAMA



Function of Polar Engineering Group

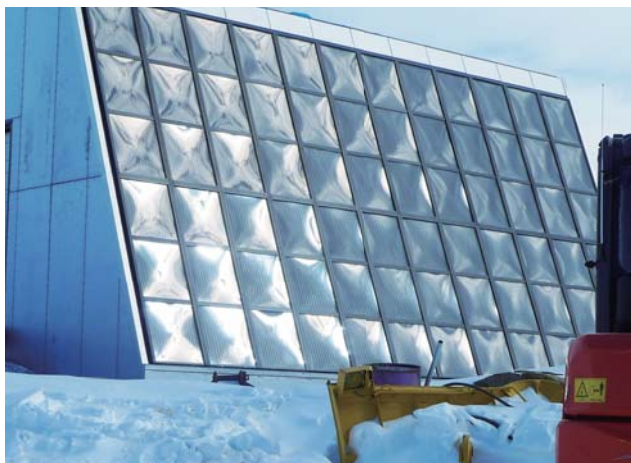
There are many technical challenges to overcome when we implement some researches in polar region. Also it is very important to use limited fuel, food, material etc. effectively because the means of transportation is hampered in polar zone. Nowadays it is required to reduce the impacts on the environment. In our group we address technical challenges associated with scientific observation and logistic activities.

Study of logistical problems for future inland operations

To carry out inland operations in the Antarctic, we need to solve several logistical issues, such as transporting large quantities of goods, ensuring safe transport routes, minimizing the physical vibration in transportation of precision equipment, and building and construction on the ice sheet etc. one by one. To do so, information collection and test development through the introduction of new policies and technology are essential, in addition to taking advantage of accumulated data and experience.

Investigation for on-site energy production

The fuel consumption at Syowa Station is increasing year after year due to expansion of the station and scientific observations. Hereafter, the stockpile of fuel is expected to be shaky as a tightrope because there is a limit on fuel transportation by ship. In order to improve that situation,



Solar panels for room heating installed on the wall of a building at Syowa Station

we are making efforts to increase production of renewable energy like wind and solar power without depending only on fossil fuels. As part of the study, investigations like effective array and surface deterioration of PV panels are carried out.

Study on interconnected power system between diesel and renewable energy

The electricity generated by wind turbine and PV is fluctuant depending on wind speed and insolation condition. Technologies of interconnected power system between diesel and renewable energy are of great interest, and we are exploring the methods considering conditions of polar region.

Study on storage and utilization system of surplus power

When we obtain surplus power derived from renewable energy, we could harness the energy effectively if the redundant energy was not racked up and stocked. Organic hydride is one of the method of hydrogen storages and an appropriate technology for polar region because the substance is stocked hydrogen as an antifreeze liquid. On the other hand, heat storage technologies of sustainable energy are developed and close to practical use in the nation. We are searching those technologies in cooperation with researchers of universities and private companies.

Study on making water

Snow melting is employed for domestic water supply at Syowa Station now, but requires an enormous amount of energy. On the other hand, employment of reverse osmosis membrane method by utilizing sea water near Syowa Station offers two big benefits. The energy consumption decreases and work force of casting snow blocks into water tank is excluded. Studies on temperature control of water pipeline and sea water pumping are conducted.

Development of unmanned observation system

The unmanned operations save impact of CO2 and energy in polar region compared with manned operation. We have developed high reliability robot observation system based on satellite system. We will try to use unmanned aerial vehicle and small energy generator systems.

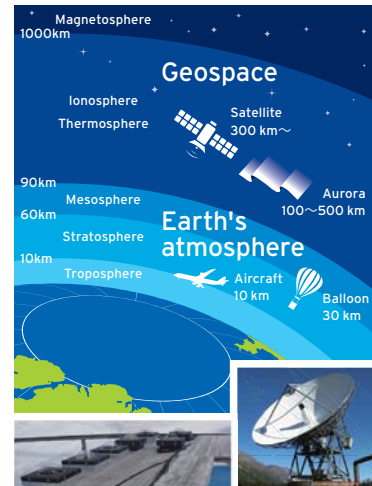
Understanding the linkage among the Sun, geospace and Earth's atmosphere

Principal Investigator Hiroshi MIYAOKA



Mechanism of the solar-terrestrial system variation clarified from both polar regions.

This project aims for studying the coupling processes among the Sun, geospace and Earth's atmosphere in polar regions. For this purpose, we strengthen national and international collaborative studies using facilities in both polar regions, such as the innovative Antarctic atmospheric radar (PANSY) at Syowa Station, the European Incoherent Scatter (EISCAT) radars in northern Scandinavia and Svalbard, the SuperDARN HF radar network, and ground-based networks of optical imagers and magnetometers. In addition to collaborative studies with modeling and simulation of the solar-terrestrial coupling system, we are also working toward developing new observation systems using optical imagers, lidars, and the next-generation geospace/atmospheric radar called 'EISCAT_3D'. Based on these remote-sensing/ satellite observations and theoretical/simulation studies, we will pursue quantitative understanding and future prediction of the coupling processes among the Sun, geospace and Earth's atmosphere.



Earth's atmosphere and geospace studied in this project, with pictures of EISCAT radar and optical domes for imagers.

Behavior of polar climate systems under global warming

Research Project KP302

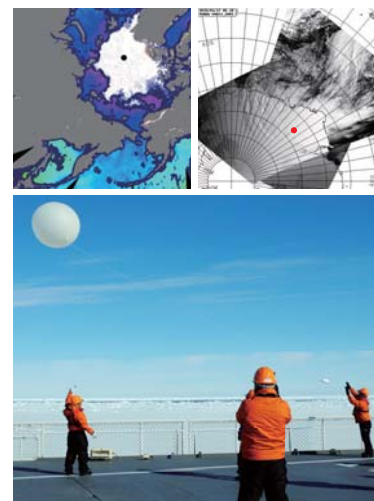
Detect climatic changes in the polar regions and specify the mechanisms

Principal Investigator Naohiko HIRASAWA



Diagnose the current climatic states of the polar regions to obtain a better future trajectory

The rapid decrease in sea ice and the retreat of the Greenland ice sheet are progressing in the Arctic region, and the West Antarctic warming proceeds at a higher pace than the global average. On the other hand, warming has not been detected clearly in East Antarctica, but large amounts of snowfall and warming events, which may relate to global warming, were observed in the last decade. This study diagnoses the current climatic states of the polar regions based on synoptic-scale atmospheric systems, meteorological and glaciological surface processes, precipitation and moisture circulation, and radiative processes, involving aerosols, clouds and greenhouse gases, and then offers a view of the future trajectory of the polar climate. To achieve the goal of this study, in situ observation such as comprehensive radiosonde campaigns and long-term employment of automatic weather stations in a wide range of areas are planned in combination with numerical modeling, satellite data analyses, and laboratory experiments.

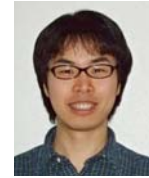


Comprehensive in-situ observation to study the current climatic states of the polar regions.

Upper left photo: ©NIPR/JAXA

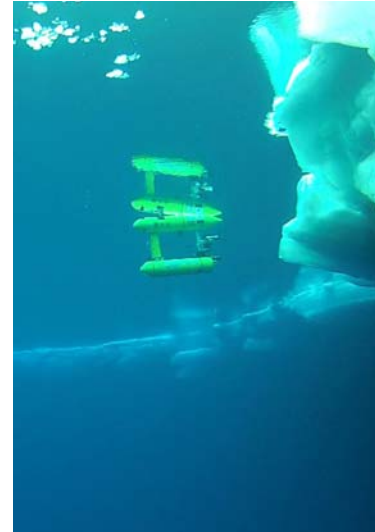
Research of Ocean-ice BOundary INteraction and Change around Antarctica (ROBOTICA)

Principal Investigator **Takeshi TAMURA**



For a better understanding of the Antarctic climate system

Antarctica and the surrounding Southern Ocean are changing. Acceleration of ice mass loss and warming of the coastal ocean in West Antarctica are problems that substantially impact the global climate system. In East Antarctica, which has been considered stable and has attracted relatively less attention, regional characteristics of interactions among climate subsystems have been recently revealed, and evidence of variations on different time scales from decades to millennia has been accumulating. Despite the growing awareness on the importance of ice-ocean interaction and long-term variabilities off the East Antarctic Coast, quantitative descriptions and understanding of the mechanisms are still insufficient. Given the global impact of the coastal variability through the bottom water export, investigations of the mechanisms and variabilities in East Antarctica are indispensable.



Ocean under the ice:
uninvestigated research area

Promotion of International Collaborative Study on Arctic Environmental Change

New approaches to Arctic Environmental Research

Principal Investigator **Hiroyuki ENOMOTO**



Looking at the Arctic problem from various perspectives

The Arctic has been experiencing rapid environmental changes. Monitoring these changes and more precise forecasting of future changes are strongly requested internationally. The Arctic Environment Research Center (AERC) is working for involvement in international research planning and cooperative efforts. AERC will continue its atmospheric monitoring and meteorological research, and attempt to establish new Arctic research activities through collaborative efforts with different research groups. Atmospheric monitoring at Ny-Ålesund provides new knowledge on long-term trends and also on seasonal variations. Clouds and aerosols observations at Ny-Ålesund will provide useful information on aerosol conditions and changing cloud properties. The Arctic Data archive System (ADS) will validate the synoptic background conditions of weather, sea ice and ocean by visualizing satellite information. AERC hopes to expand its research collaborations through discussion of relationships between air-ocean- sea ice and marine/terrestrial ecosystems. AERC also seeks new research possibilities through discussions on the connections between the troposphere and middle-upper atmosphere.



Cloud observation by all-sky camera
at Ny-Ålesund research station.

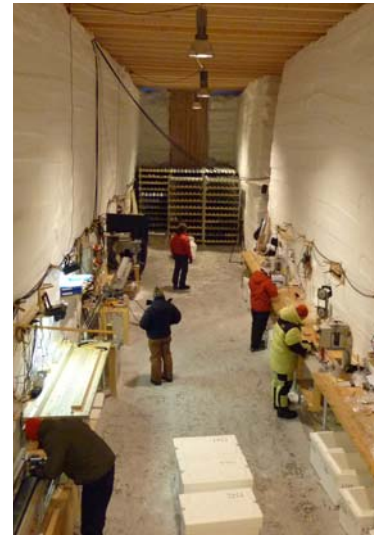
Reconstruction of the past climate and environment from Antarctic and Arctic ice cores



Principal Investigator Kumiko GOTO-AZUMA

Uncovering the mechanisms of climatic and environmental changes

Snow deposited onto ice sheets/ice caps in Antarctica and the Arctic endures summers without melting, and accumulates over countless years. By drilling through ice sheets/ice caps, the past snow and atmosphere preserved within the ice cores can be retrieved. To reconstruct climatic and environmental changes that have happened during the past decades to hundreds of thousand years, we plan to analyze the ice cores obtained from different sites, such as Dome Fuji in Antarctica and Greenland in the Arctic. The information retrieved from the ice cores will greatly contribute to improving projections of the future climate and environment. The ice cores will be analyzed with cutting-edge analytical methods developed at the Ice Core Research Center, National Institute of Polar Research. Furthermore, we plan to participate in an international deep ice coring project in Greenland and to carry out a new deep ice coring project near Dome Fuji aimed at retrieving the oldest ice core in the world.



Ice-core processing and analyses in Greenland

Evolution and response of solid earth in polar regions

Investigation of changes in solid earth and surface environment from the polar regions



Principal Investigator Yoshifumi NOGI

To elucidate changes in solid earth with various time and space scales from the polar regions

Phenomena in solid earth span various timescales, from the present time to several billions of years, and space scales, as the coupling of the surface environment changes, and amalgamation and fragmentation of continents. In the polar regions, a wide range of solid earth phenomena can be observed, such as the present crustal movement controlled by changes in ice sheet mass, and the formation and dispersion of continents. The polar regions are, therefore, ideal areas for understanding the evolution and response of solid earth based on the integrated research of diverse disciplines related to solid earth science and multidisciplinary studies concerning environmental changes to Earth's surface..

This project aims to investigate: (1) the response of solid earth related to environmental changes to Earth's surface ranging from the present to several million years ago, and (2) the evolution of solid earth over a geological timescale, from several million to billion years, based on the scientific research in polar regions.



Geomorphological and geological surveys in the central Dronning maud land to explore changes in solid earth.

Formation and evolution of planetesimals and planet in the early Solar System

Principal Investigator Akira YAMAGUCHI



Petrologic and geochemical study of Antarctic meteorites and micrometeorites

Approximately 70% of meteorites have been recovered from Antarctica. Moreover, micrometeorites (tiny meteorites < 1-2 mm) have been found on snow, ice sheets and moraines. Meteorites and micrometeorites are derived from hundreds of asteroids and comets, which are remnants of planetesimals. Small numbers of meteorites came from the Moon and Mars. Thus, the study of Antarctic meteorites helps us understand the origin of the solar system and the evolutionary history of planets. We perform mineralogical, petrological, geochemical and experimental studies of meteorites and micrometeorites to better understand the geological history of planets and planetesimals existing in the early Solar System.



A meteorite on ice

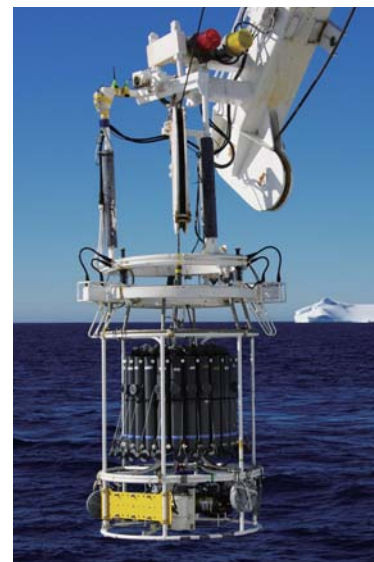
Focusing on how the Indian sector of the Southern Ocean is changing and implications for the global system

Principal Investigator Tsuneo ODATE



Process study involving cooperation with several survey ships

Monitoring of the Antarctic Ocean is necessary in order to detect signs of change in the global environment and evaluate the effects of the change on the Antarctic marine ecosystem. Because accessing West Antarctica is easier, most systematic approaches aimed at detecting changes in the environment have been taken in that region, especially in the Antarctic Peninsula region. The results of these studies indicate that the climate is changing rapidly and that the amount of winter sea ice has been decreasing around the Antarctic Peninsula region. However, the Japanese Antarctic Research Expedition has routinely conducted oceanographic and biological surveys on the way to and from Syowa Station of East Antarctica during every austral summer since 1972. It also cooperates with survey ships from Japan and other countries, and carries out process studies concerned with environmental change in the Indian sector of the Antarctic Ocean. The aim of this project is to promote analysis of samples and publication of observational data that were acquired from such observations, with a view to clarifying the features of the Indian sector of the Southern Ocean.



Mysteries of east Antarctica

Ecological processes of organisms in response to the environmental change in polar regions



Principal Investigator **Satoshi IMURA**

Intensive field-based research on polar ecosystems

In polar regions, limited numbers of flora and fauna such as mosses, lichens, and tardigrades, live in the harsh terrestrial environment, and some marine animals including seals and penguins breed on land. These simple but unique ecosystems are home to organisms adapted to the extreme environment of the regions with low temperature, desiccation, intense ultraviolet rays, etc. The aim of this project is to understand how the organisms in these regions respond to the changing environment and thus how the ecosystems will be altered. The biodiversity and material cycle in the terrestrial ecosystem, and behavior ecology of marine animals are the principal targets of this project.



Limnological survey on an Antarctic lake

Technical issues with polar observations and proposed solutions

Research Project KZ31

Resolution of technical issues to support polar observations



Principal Investigator **Hideaki MOTOYAMA**

Feedback on research results to the observation sites

To successfully carry out observations in the polar regions, we need to solve a variety of technical issues. We also need to create a safe and efficient environment on the station, which is a platform for expeditioners' daily life. In recent years, promoting the introduction of renewable energy and minimizing the use of fossil fuels have also been important. In this project, we set the following themes as the immediate tasks, and are attempting to find solutions by gathering information, developing and testing ideas, and researching ways to provide feedback on the results to the observation sites in polar regions. Themes for the immediate future: 1) proposal of an efficient snow melting method at Syowa Station, 2) research on the smart energy system at Syowa Station, 3) development of an effective sewage treatment method at Syowa Station, 4) solving issues regarding transportation, construction, communication, and sharing information for future inland operations. These challenges will be met proactively by polar researchers and engineers thanks to the collaboration with private companies.



20kw wind turbine installed at Syowa Station

Exploring the improvement of medical care in extreme environments of the Antarctic program



Principal Investigator **Giichiro OHNO and Kentaro WATANABE**

Study on measures and medical care system of Syowa

Expedition personnel conduct field surveys and logistics projects in harsh conditions in Antarctica. They endure large seasonal variations of the day-night rhythm, including polar nights and 10-month long physical isolation from society. It is not uncommon that expedition personnel experience abnormalities in their diurnal rhythm and experience physical and mental disorders and stress under these extreme conditions. Because of the relatively high incidence of dental disease seen during overwintering, medical doctors have initiated attempts to improve the oral hygiene of expedition personnel as a part of health management to prevent dental diseases. On the other hand, the medical care system of Syowa Station is quite poor, with a limited supply of materials delivered once a year, a medical staff comprising only two doctors, and no medevac available from March to November. This study aims at improving the medical care system of Syowa Station that will contribute to better health management of expedition personnel, by examining the current medical care system, and exploring ways to improve the health of expedition personnel.



Collection of house dust at Syowa Station (upper image) and investigation of seasickness aboard Shirase with exhaust CO₂ gas measurement. (lower image)



Terminus of Monaco Glacier, Spitsbergen Island

Linking up Antarctic observations between Japanese and international communities

Director Yoshifumi NOGI



The Center for Antarctic Programs (CAP) came into being in 2009 by merging research staff group and administrative/technical staff group in order to support every operations and activities of the Japanese Antarctic Research Expedition (JARE) go smoothly and efficiently. CAP covers such tasks as arrangements of planning and projects with research communities, maintenance of Antarctic stations, recruitment and nomination of expedition members, preparation of medical examination and training, transportation to Antarctica, and issues of environmental protection, etc.

JARE invites foreign scientists from many countries every year to perform scientific collaboration in Antarctica. Recently, Asian Forum for Polar Science (AFoPS) was established, in which Japan, Korea, China, India, Malaysia and Thailand organize annual meeting every year to exchange information among member countries and to encourage other Asian countries' involvements in polar research.

In addition to the sea borne transport by "Shirase", JARE recently installed an air network system DROMLAN (Air consortium supported by 11 countries working in Dronning

Maud Land) to organize chartered flights to Novolazarevskaya Station, and Troll Station from Cape Town, and feeder flights covering other stations and activity areas in Antarctica. In the Southern Ocean, "Shirase" and "Umitaka-maru" of Tokyo University of Marine Science and Technology conduct collaborative observations on marine sciences. Such air and sea operations contribute to expand the activity area of JARE in the Antarctic.

● Syowa Station

Syowa Station was established on East Ongul Island, Lützow-Holm Bay, on January 29 in 1957 by the 1st Japanese Antarctic Research Expedition. At present, it also acts as an observation site for world meteorological network in addition to various scientific observations. 30 members spend whole year to conduct observations and maintain facilities there.

● Dome-Fuji Station

Dome-Fuji Station was established in January, 1995 to conduct deep ice-core drilling at the highest dome of Dronning Maud Land, some 1000 km away from Syowa Station. After completing 3035 m deep drilling, the station is being closed temporarily.

● Mizuho Station

Mizuho Station was established in July, 1970 on the Mizuho Plateau, 270 km south-east of Syowa Station. The station is being closed temporarily at present.

● Asuka Station

Asuka Station was established in March, 1985 in Dronning Maud Land, 670 km southwest of Syowa Station. The station is being closed temporarily at present.



Dome-Fuji Station

Syowa Station



As a bridge between Japanese and international Arctic research



Director **Hiroyuki ENOMOTO**

The Arctic Environment Research Center (AERC) was established in June 1990 at NIPR to promote the study of sea ice, oceanography, marine ecology, terrestrial ecology, atmospheric sciences, glaciology, and upper atmospheric sciences. Since April 2015, AERC has experienced greater involvement in international research planning and efforts. The AERC is currently gathering and providing information on Arctic observations and arranging for use of Arctic observation facilities, as well as securing and enhancing facilities for international collaborative observations with major institutes in the Arctic region. We also lead the Arctic Challenge for Sustainability (ArCS) project as a core institute (see right page).

● Facilities for collaborative observation

The Ny-Ålesund Research Station, an office space in Norway's University Centre in Svalbard (UNIS) and the International Arctic Research Center (IARC) of the University of Alaska, Fairbanks, along with the facilities of the Greenland Institute of Natural Resources (GINR), the Spasskaya Pad Scientific Forest Station in Russia and the Czech Arctic Research Infrastructure in Svalbard are open for cooperative research. We are currently planning to deploy more research and/or observation facilities in other Arctic regions, including northern Canada.

● International Collaborations

AERC pursues a wide range of international joint research, such as the Antarctic-Arctic aurora conjugate observation point in Iceland, the European incoherent scatter (EISCAT) radar project, and the East Greenland Ice Core Project (EGRIP). We also assist in collaborative research using stations maintained by the Centre d'études nordiques (CEN), which is a research centre involving three academic institutions; the Université Laval, the Université du Québec à Rimouski and the Centre Eau, Terre et Environnement of the Institut national de la recherche scientifique.

● Japan Arctic Research Network Center (J-ARC Net)

AERC is working with the Arctic Research Center at Hokkaido University and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) as partners of the Japan Arctic Research Network Center, J-ARC Net. Established in April 2016, J-ARC Net seeks to strengthen interdisciplinary studies on the environment and human activity, as well as to find approaches for solving problems through the collaborative efforts of industry, government, and academia. AERC also provides facilities for researchers.

● Japan Consortium for Arctic Environmental Research (JCAR)

JCAR was established in May 2011 as a nationwide network for promoting Arctic environmental research. The JCAR office is located in AERC. JCAR coordinates future research plans by means of the 'Long-term Plan for Arctic Environmental Research' (<http://www.jcar.org/english/longterm/>), the development of research infrastructure, and the promotion of early career development. JCAR also gathers and distributes information on domestic and international activities and research on the changing Arctic environment. JCAR co-organized the Arctic Science Summit Week (ASSW) in April 2015, and hosts the fifth International Symposium on Arctic Research (ISAR-5) in January 2018.

Ny-Ålesund Research Station



Integrate Arctic Environmental Study with Social and Human Sciences

New Arctic Science Project of Japan

Worldwide attention on changes in the Arctic is growing. One reason is the fact that the Arctic plays a special role in the global climate. Other reasons include the prospect of an Arctic passage and new exploitation of natural resources. Given these circumstances, how do scientists studying the Arctic engage the public? How do they disseminate the information obtained through their research? With this in mind, a new Arctic science project "Arctic Challenge for Sustainability (ArCS)" was launched in September 2015. NIPR, as a core institute, leads the project with JAMSTEC and Hokkaido University. The ArCS project aims to elucidate the changes in the climate and environment, clarify their effects on society, and provide accurate projections and environmental assessments for internal and external stakeholders so they can make appropriate decisions on sustainable development of the Arctic region.

Four Programs of the ArCS

● Program for Overseas Visits by Young Researchers

ArCS supports the development of young researchers by sending them to overseas research organizations promoting Arctic studies. This will advance our expertise on Arctic research through the acquisition of techniques and the co-production of knowledge.

● Dispatch of Experts to Arctic-related Meetings

ArCS dispatches experts in the natural and social sciences to Arctic-related international frameworks and meetings.

● Establishing Research and Observation Stations

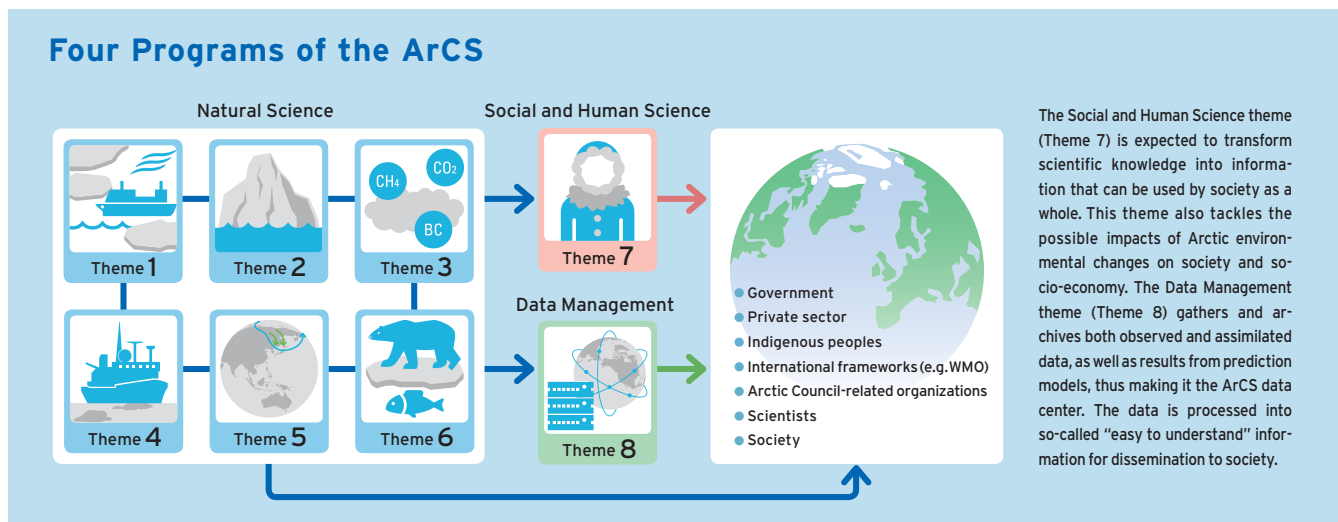
ArCS promotes closer international cooperation through securing research and observation sites for Japanese researchers and students conducting observation or monitoring on a long-term basis.



● International Collaborative Research

ArCS engages in international collaborative research based on the following eight study themes. The unique feature of this program is that it includes a theme for humanities and social sciences in order to clarify the social and economic impact from changes occurring in the Arctic.

- Theme 1 Predictability study on weather and sea-ice forecasts linked with user engagement
- Theme 2 Variations in the ice sheet, glaciers, ocean, climate and environment in the Greenland region
- Theme 3 Atmospheric climate forcers in the Arctic
- Theme 4 Observational research on Arctic Ocean environmental changes
- Theme 5 Study on Arctic climate predictability
- Theme 6 Response and biodiversity status of the Arctic ecosystems under environmental change
- Theme 7 People and Community in the Arctic: Possibility of Sustainable Development
- Theme 8 Arctic Data archive System (ADS)



Science information infrastructure and network for the polar sciences



Director Masaki OKADA

Sharing and high-level utilization of the data and information from polar regions

Various observations on a range of research fields are now being carried out in both the Antarctic and Arctic regions. Many of the data obtained by the observations are transferred via a network and stored in digital form. The quality and amount of the data are continually growing, as the observation methods and technologies become more sophisticated and network speed grows faster. The primary task of the Communications and Computing science Center (CCC) in the National Institute of Polar Research (NIPR) is to operate facilities for supporting the scientific activities in the polar regions. At present, NIPR and Syowa Station in Antarctica are constantly networked via an Intelsat satellite link, and the data from Syowa are directly transferred to NIPR through this network via a high-speed LAN.

The "Multipurpose Satellite Data Receiving System" at Syowa is operated by CCC, and data from various earth

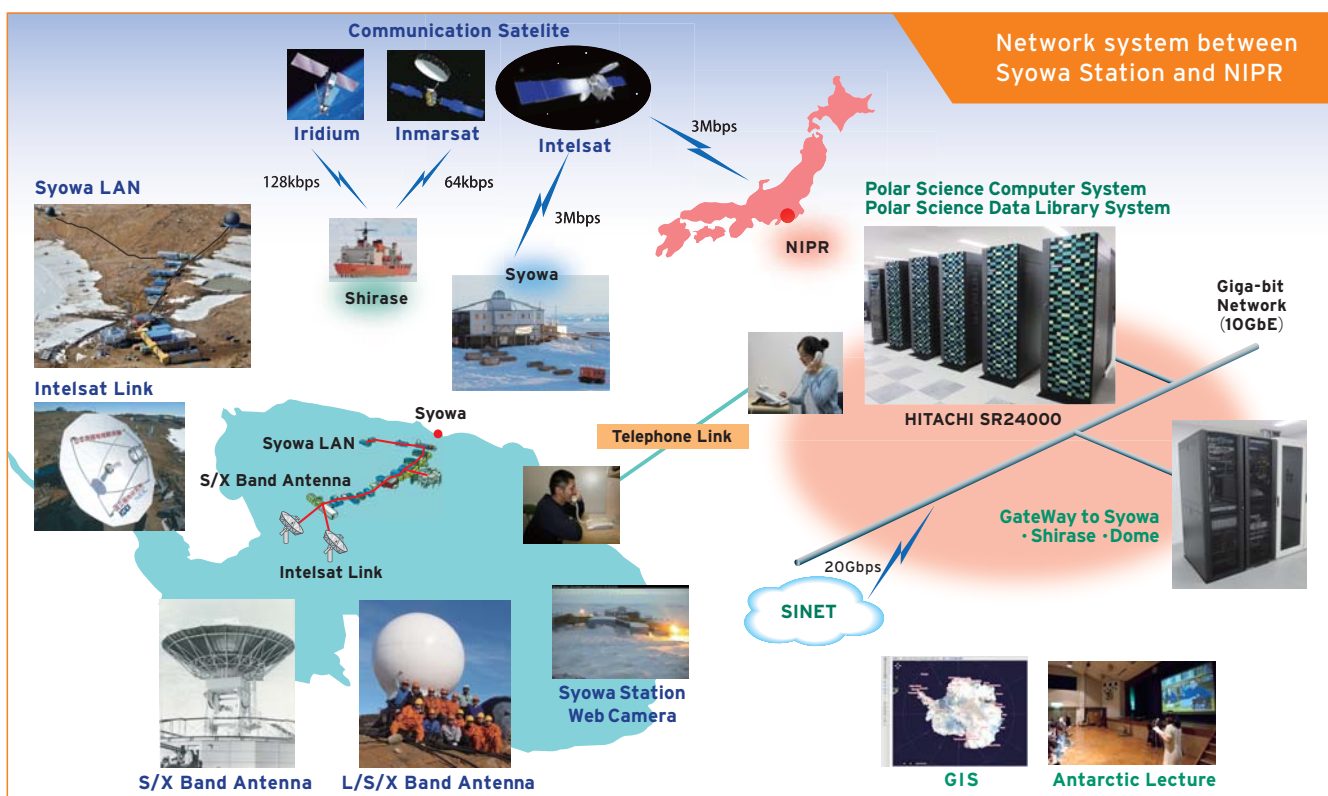
observation satellites are received and transferred to NIPR.

The transferred data from Syowa are archived in the "Polar Science Data Library System (POLARIS)" in NIPR, and transferred to researchers in collaborating universities and institutes via the Science Information Network (SINET). Many of the observation data in the Arctic region are also transferred to NIPR directly via the Internet.

The "Polar Science Supercomputer System" is also operated in CCC for processing and analyzing observation data and for performing large-scale numerical modeling and simulations for polar sciences.

Other facilities supporting various activities of the Antarctic expedition and NIPR, such as the teleconference system, the telecommunication system between the icebreaker "Shirase" and NIPR, the "Antarctic GIS system", and the database for research and management information, are also operated by CCC.

Collaborative Research



Scientific resources from polar regions -Key materials to uncover the global changes and mystery of Earth's evolution

Director Tomokazu HOKADA



Antarctic Meteorite Research Center

The main task of the center is curation of Antarctic meteorites recovered since 1969, which includes naming and initial classification of meteorites, allocation to researchers, permanent storage, and overall management of Antarctic meteorites. Annually, the center publishes the classification of meteorites in the Meteorite Newsletter.



The Yamato 790448 meteorite classified into LL3, which is one of the unequilibrated ordinary chondrites.

Rock Specimen Archive

The Rock Specimen Archive has collected and preserved some 20,000 rock and mineral specimens since the first Japanese Antarctic Research Expedition (JARE). The archive stores rocks and minerals not only from Antarctica but also Sri Lanka, India and Africa as part of its international scientific research. Its collection is important for geological correlations and studies of the earth's crust and mantle materials constituting the Gondwana supercontinent. Specimens are organized according to year and region of collection and are updated in a database.



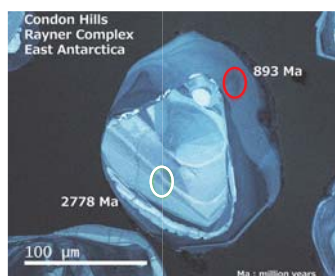
Ruby crystals (red) found around Syowa Station in Antarctica.

SHRIMP Laboratory

The laboratory maintains and operates 2 sets SHRIMP (sensitive high resolution ion microprobe) as inter-university collaborative research infrastructure for isotopic analyses and dating of earth and planetary materials.



Sensitive high resolution ion microprobe (SHRIMP) for age dating of minerals.



Results of age dating on zircon. The white circle at the center yields 2778 million years old, and the red circle at the outer rim yields 893 million years, respectively.

Biological Specimen Archive

NIPR collects and manages biological specimens obtained from scientific studies in polar regions. These specimens are provided for research or exhibitions. Approximately 40,000 plant specimens (mainly moss) and 2,500 animal specimens are archived. Searches for archived specimens can be made through the 'Database of Polar Biodiversity' in the NIPR website.



Biological specimen



Uncovering the history of climate change from ice cores

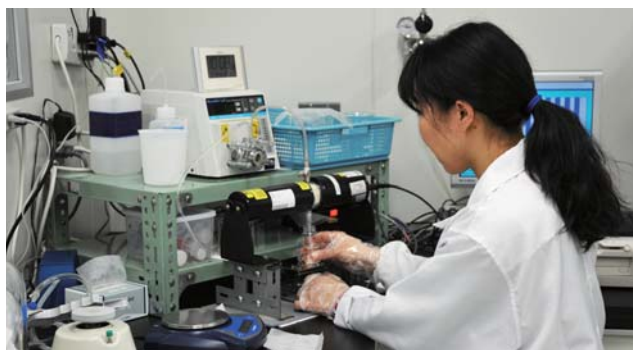


Director Kumiko GOTO-AZUMA

Ice core drilling and analyses

Ice sheets such as the Antarctic ice sheet and the Greenland ice sheet are composed of strata of snow accumulated over as long as hundreds of thousands of years. When we sample such ice by taking ice cores, we use drills designed for ice sampling, and by analyzing the cores, we can get a picture of the past environmental conditions of the Earth when the snow was deposited. Ice core research provides very important data for predicting future climatic changes. The Ice Core Research Center was established in the National Institute of Polar Research to reinforce and promote ice core research comprehensively over the long-term.

NIPR holds cutting-edge ice drilling equipment. NIPR has conducted very deep ice coring twice at Dome Fuji, located on an inland plateau of East Antarctica, and has succeeded in recovering ice cores from depths of up to 3035 m (covering more than 700,000 years). NIPR has also conducted shallow ice core drilling at many sites in Antarctica and the Arctic. For these reasons, NIPR is characterized by its distinguished abilities in ice core research and ice core drilling. In addition, NIPR has set up laboratories where we can rapidly produce high-quality ice core data by using a number of advanced analytical instruments. Under the lead of the Ice Core Research Center, we aim to further advance interdisciplinary ice core research domestically and internationally. NIPR will acquire substantial data and publish research papers on ice cores. NIPR also plays an organizing/planning role in future ice coring projects. We expect the Ice Core Research Center to be utilized by many researchers and serve as the center for inter-university research collaborations.



Chemical analysis of ice cores in a clean room.



Pre-processing for ice core analysis in the cold room.



Ice drilling site at Dome Fuji station, Antarctica.

● Guide to cold room facilities

NIPR has modern facilities for cold rooms, for measurements and analyses, to promote scientific research, and advanced technology related to polar research. The cold room facility has nine rooms that serve as low temperature laboratories, six rooms that serve as low temperature storage rooms, and two rooms that serve as room-temperature laboratories. These facilities are available to researchers who require a low temperature environment for their experimental studies. The Ice Core Research Center is in charge of managing these cold room facilities. For a more detailed description of the facilities and information on application/approval procedures for research use, please visit our website.

Developing international research collaborations in polar regions



Head **Satoshi IMURA**

International exchange office for polar research

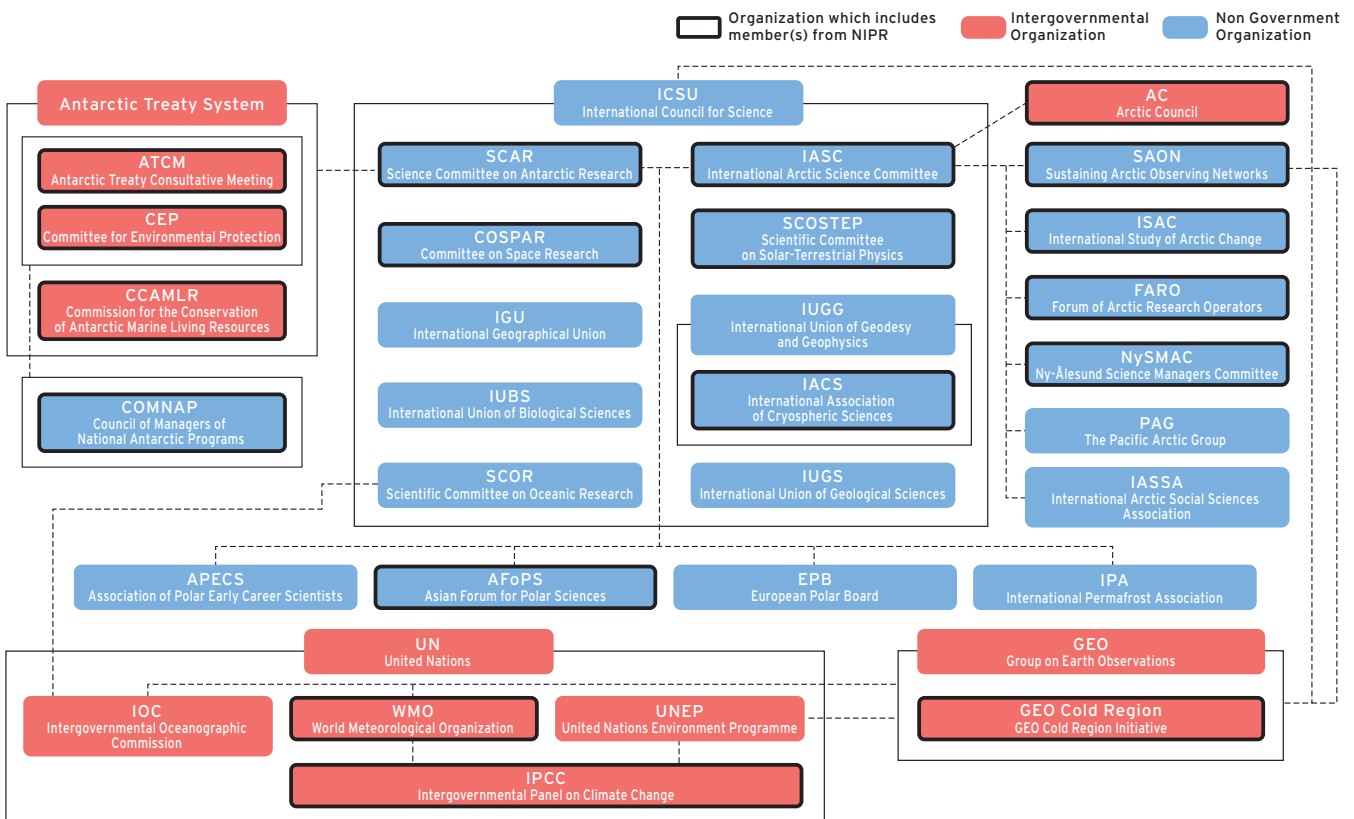
The International Affairs Section deals specifically with international issues relevant to scientific research in polar regions. Any matters relating to (1) international treaties and conferences, (2) cooperative research and scientific agreements with overseas institutions, and (3) international research exchanges are handled by the Section with the assistance of the International Affairs Committee in NIPR. Because polar research is conducted overseas, international frameworks are indispensable. The Section prepares reports on the Japanese Antarctic Research Expedition that are required by the Antarctic Treaty in collaboration with governmental bodies and relevant scientists. It also deals with issues and deposits documents relating to CCAMLR as well as various international bodies, such as SCAR, COMNAP, IASC and AFoPS (refer to the figure below for the full names of the acronyms).

Currently, NIPR conducts collaborative projects for polar

research and logistics by implementing MOUs with overseas polar research institutions and universities in Australia, Belgium, Chile, China, Denmark, Finland, France, Germany, Iceland, South Korea, Malaysia, Norway, Russia, Sweden, Thailand and U.S.A. Today, there is a growing need for international exchange among scientists and activation of research, with greater emphasis placed on the globalization of research institutes. The Section offers assistance in these areas by working together with relevant organizations and scientists.



40th Antarctic Treaty Consultative Meeting (ATCM-XL) held in Beijing (May, 2017)



Research Support

Our Polar Collection is one of the best collections in the world



Library Director **Tsuneo ODATE**

NIPR Library has one of the best Polar Collections in the world. Our Polar Collection includes expedition records, essays, and research reports that do not exist in any other library in Japan.

The Library also contains many scholarly books and journals written in several languages (Japanese, English, Russian, and so on). These collections included in the Polar Collection can be searched via the NIPR Online Public Access Catalog (OPAC).

● Facilities

The Library is located on the ground floor (first floor) of a six-story building. The floor is composed of four areas and one room: the reading area, book area, bound journal area, current journal area, and rare book room. There are reading tables in each area, equipped with power supply. You can use our networked PCs (for study and research purposes) and copy machine. For more information, please visit our website: <http://www.nipr.ac.jp/library/en/index.html>

Collections		Number	Total
Books	Japanese	10,176	27,605
	Other languages	17,429	
Booklet	Japanese	1,947	3,560
	Other languages	1,613	
Bound journals	Japanese	3,644	27,777
	Other languages	24,133	
Digital Data		12,782	12,782
Total			71,724

As of April 1, 2017

Book shelves in the library



● Publications

The Library publishes two scholarly journals, "Antarctic Record" and "Polar Science". Articles to be accepted cover all fields of polar science. These journals have a strong reputation internationally.

The Library also publishes "Polar Data Journal" and "JARE Data Reports", which are obtained from Arctic and Antarctic observation. Our journals are available for download from the following website:

"Antarctic Record" and "JARE Data Reports":

<https://nipr.repo.nii.ac.jp/>

"Polar Science":

<http://www.sciencedirect.com/science/journal/18739652>

"Polar Data Journal": <https://pdr.repo.nii.ac.jp/>

- Antarctic Record (Japanese and English)
- Polar Science (English) (Distributed for a charge)
- Polar Data Journal (English)
- Memoirs of National Institute of Polar Research
- JARE Data Reports
- Antarctic Geological Map Series
- Special Map Series



● Academic Publications

There are many kinds of publications issued/edited by NIPR, including but not limited to academic articles, on a wide range of research topics.



KYOKUCHIKEN Library' series (Only in Japanese)

(See: <http://www.nipr.ac.jp/library/NIPR-library/index.html>)

Archives Section

Documents and records that tell the history of JARE and NIPR

Head Tsuneo ODATE



The Archives Section was established in April 2010 when the National Institute of Polar Research (NIPR) moved to the Tachikawa Campus. The materials collected, arranged, and kept in the section's custody include non-official documents (documents that are no longer in official use), publications, photographs, figures, audio materials, films, digital records, instruments, equipment, clothing, and personal items. These records support historical evaluation of institutional activities and help NIPR fulfill its social responsibilities.



Our goal is to intensify research activity and output



Director **Satoshi IMURA**

As an Inter-University Research Institute Corporation, the National Institute of Polar Research is required to intensify research activities in a way similar to that of universities. Created in April 2014, the Research Development Office (RDO) has two research administrators who work in close cooperation with the head office of the Research Organization of Information and Systems (ROIS). The RDO aims to reinforce research activities as secretariat of the "Research Strategy Meeting," which is chaired by the Director General. The RDO will work to strengthen both international research cooperation and publicity, build research strategies, and increase the research budget. The NIPR is characterized by polar observations and related international collaboration, which will be used to the full extent to intensify research and foster the next generation of young scientists.

as research management personnel, and has established a URA station at the head office (Figure). Two URAs from among the team for supporting research field strengthening at the station are assigned to the NIPR.

● Activities of the Research Development Office (RDO)

The RDO is a team comprising two URAs as well as the teaching and administrative staff. One of the URAs has experience with field research in the Arctic, while the other has participated in an Antarctic wintering observational expedition. The RDO is expecting to work closely with researchers. The URAs belong to the URA station and are working on reinforcing research activities to fulfill the ROIS's 5- and 10-year targets. The RDO is also cooperating with the International Affairs Section and the Arctic Environment Research Center to bolster international collaboration, and with the Public Relations Section to strengthen academic public relations. With URAs, the RDO is serving to connect administrations and researchers.

● Project for Promoting the Reinforcement of Research Universities and URAs

From FY 2013, the ROIS is taking part in the "Project for Promoting the Reinforcement of Research Universities," which aims to enhance the research capabilities of our country through the reinforcement of its research institutions. This project supports reform of the research environment and the securing of human resources for research management. The ROIS has employed University Research Administrators (URAs)

Support for performance improvement of researchers

Acquisition of external funds, publicity of research results.

Strengthening the international cooperation

Cooperation with the Arctic Environmental Research Center, the International Affairs Section.

Strengthening the academic publicity

Cooperation with Public Relations Section.

Research Support

The goals of the project

The goal of the 5th year

- 1 Establishment of best practice by the data-centric scientific research foundation and transdisciplinary research integration.
- 2 20% increase in total number of peer-reviewed paper in the entire organization (Ratio to five years before FY2012).
- 3 20% increase in number of inter-university use and research collaboration, increase in (international) Partnership Agreement.
- 4 17% or more female faculty, 30% or more younger faculty, 10% or more foreign faculty.

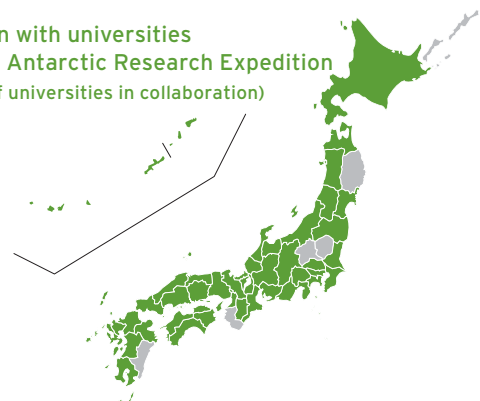
The goal of the 10th year

- 1 Establishment of a new research community, by the acceptance of data-centric research in the wide range of academic disciplines.
- 2 30% increase in total number of peer-reviewed paper in the entire organization (Ratio to five years before FY2012).
- 3 30% increase in number of inter-university use and collaboration projects, increase in (international) Partnership Agreement.
- 4 20% or more female faculty, 30% or more younger faculty, 12% or more foreign faculty.

Number of publications (peer-reviewed paper)



Collaboration with universities by Japanese Antarctic Research Expedition (Distribution of universities in collaboration)



Intellectual Property Section

Protecting intellectual property rights arising from research results



Head **Hiroyuki ENOMOTO**

The Intellectual Property Section was established in April 2008. The section mainly deals with discoveries and research results, in other words, intellectual property, acquired through polar expeditions, Collaboration research activities and other projects.

Its duties include filing patent and trademark registration applications for claiming and utilizing research results as well as releasing and publicizing intellectual properties and their copyrights.

Office for Gender Equality

Promote gender equality together with the ROIS



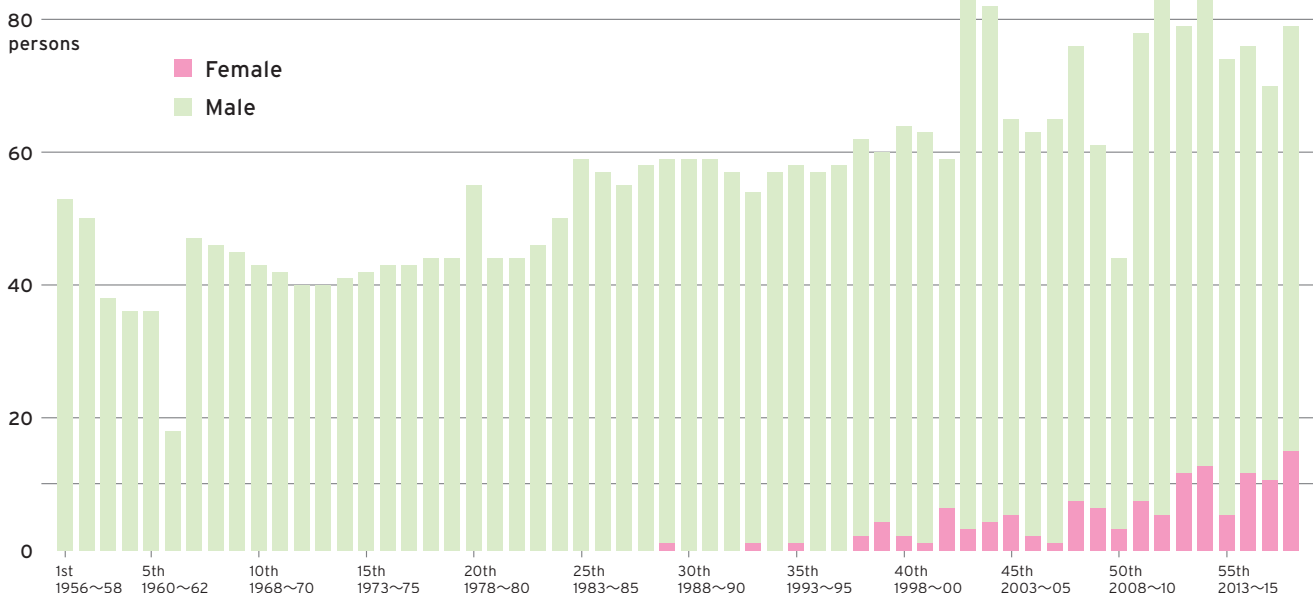
Head **Hiroyuki ENOMOTO**

The Research Organization of Information and Systems (ROIS) has recently carried out the "ROIS Program of Female Researcher Progress" in order to support life events and research activity of female researchers, with support provided by "Project of Supporting Activities for Female Researchers" of MEXT. As part of this project, ROIS and four underlying institutes established the "Office of Female Researcher Development (OFRD)", and

promoted various types of support for female researchers because their development and promotion is very important for the future of our country.

During this year, the OFRD was reorganized as the "Office for Gender Equality (OGE)". At the National Institute of Polar Research, the OGE is operated by three members: vice director-general (head), the director of administrative office, and a URA (University Research Administrator).

Number of JARE expeditioners



Providing the public with information on polar science and polar research findings



Head Yoichi MOTOYOSHI

The Public Relations Section conducts a wide range of public relations and spreading information of PR activities to public.

● Open House

We host an open house once a year welcoming anyone to visit our facility and enjoy exhibitions and interactive programs offered by all research groups in our institute. Check out our Science Café, and get to know our research activities and outcomes along with the various initiatives that are being carried out during observations at the Antarctic and Arctic site. We also provide consultation about entry to the Department of Polar Sciences, SOKENDAI, at a booth.



● Junior High and High School Polar Science Contest & Antarctic and Arctic Junior Forum

The Junior High and High school Polar Science Contest invites research and experimental proposals from junior high and high school students. The most outstanding proposals are carried out by researchers at the polar site. Their results and findings are feed-backed to the students who made the proposals.

At the Antarctic and Arctic Junior Forum, their prizes are given to the students. They give oral/poster presentations of their proposal. Also, Antarctic team report of their research result here in live from Antarctic.

It is original and unique collaboration among polar researchers, students and instructors.



Antarctic and Arctic Junior Forum



● Teachers' Antarctic program

School teachers visit Antarctica and give special lectures from Syowa Station to their school using satellite system.



● Antarctic study program

The Antarctic Class is a live chat session between Syowa Station and elementary, junior high, and high schools from all parts of Japan. Wintering team introduce the outdoor scenery and Antarctic nature using videos and slides. We host this event almost twenty times a year through satellite connection. It is a part of our Public Relations Section mission to familiarize public with the Antarctic.



Various questions from students rise in this enthusiastic class



Science Café

● “Science Café” & “Become a Polar Scientist!”

The Science Café is a lecture-style event held regularly where our researchers talk about the latest research outcomes to audience in plain language. The “Become a Polar Scientist!” is a fun experiments filled event for elementary and junior high school students, with its experience they can get to know Polar research.

● National Institute of Polar Research, Polar Science Museum

Our museum has a partnership with many other science and natural history museums throughout Japan. We aim to develop public interests and deeper understanding in Polar Science and Antarctic Observation. For more details of the museum, see page 32.

Our partner organizations
Wakkanai Youth's and Children's Science Museum
Rikubetsu Space Science Museum
The Shirase Antarctic Expedition Memorial Museum
Tsukuba Expo Center
Nagoya City Science Museum
Uemura Naomi Memorial Museum
Ehime Prefectural Science Museum
Saga Prefectural Space and Science
Tateyama Caldera Sabo Museum
Nishibori Eizaburo Memorial Explorer Museum
Tamarokuto Science Center
Port of Nagoya Public Aquarium / Fuji Antarctic Museum
WNI WxBunka Foundation



National Institute of Polar Research, Polar Science Museum



Become a Polar Scientist!

● “Kyoku (Poles)” and “Pre-Kyoku (“Kyoku” for kids)” magazine

“Kyoku” magazine is written for public. The friendly contents include our research outcomes, Antarctic research history manga, and essays.

“Pre-kyoku” is a brother magazine to “Kyoku” targeted at elementary and junior high school students. It introduce the latest research outcomes in a simple and fun contents, so the young reader can be fascinated with the Polar research.



Kyoku

Pre-Kyoku

Research Support

● Open Lecture

With the cooperation of Tachikawa city, NIPR host “Polar Science Research Series”, the series of open lectures.

● Providing Polar Data and Materials

We provide expedition video footage and other data and materials to events, exhibitions, also to former Antarctic expedition members for their Off Site lectures.

● Off Site Lectur

NIPR Doctors and professors give lectures on polar science and expeditions upon request.

Contact: National Institute of Polar Research, Public Relations Section

E-mail: kofositu@nipr.ac.jp

Providing the public with information and topics on "An

The National Institute of Polar Research Polar Science Museum provides information on historical as well as current state-of-the-art research activities and results in an easy-to-understand forum. Here, visitors can touch and experience objects from 4.6 billion years ago to the present day. Brief descriptions on our more popular exhibits are provided below.

History Heading for Antarctica

In 1910, Nobu Shirase launched his expedition with the aim of reaching the South Pole. Forty-six years later, the first Japanese Antarctic Research Expedition (JARE) left for Antarctic research ship Soya and landed on Ongul Islands on January 29, 1957. The expedition named the surrounding area as "Syowa Station". This marked the beginning of JARE.



"KD604 Snow Vehicle", employed for Japanese South Pole travel in 1968, and certified as a Mechanical Engineering Heritage in 2014

TACHIHI Aurora Theater

The theater shows full-color images of auroras filmed in Antarctica and the Arctic on a four-meter-diameter domed screen. Experience the wonder of auroras dynamically dancing across the whole sky for yourself. Experience our new TACHIHI Aurora Theater.



Here is the world's only permanent exhibition featuring images of Arctic and Antarctic auroras!



Atmosphere & Ice

Exploring the earth's environment

Antarctica is covered with ice sheet made of snow. Buried within this ice is a record of the earth's climate and environment in the distant past.

The impacts of man living on are so small in Antarctica, that this area is an ideal location to study global environments in the past and present.



Drilling into deep layers of the ice sheet

Aurora Exploring the wonders of mysterious lights

Why does an aurora glow? Are the auroras in the Antarctic and the Arctic the same? Where can we see auroras? Auroras are not only beautiful, but full of wonder and mystery. Plenty of information about the universe is contained in their colors, shapes and movements.



Bronze Statues of Sakhalin Dogs

They have worked for the First JARE(1956-1958) and Left at Syowa Station.



Antarctic and Arctic Research Today

Syowa Station

Established in 1957 on East Ongul Island, Syowa Station started with 11 expedition members overwintering in four buildings that were little more than mountain lodges. A half-century later, Syowa Station has become a world leading scientific station made up of more about 70 buildings with internet connections, floor heating, private bedrooms, bathrooms, and flush toilets.



Syowa Station Live Cam

Rocks & Meteorites

Exploring the solar system's 4.6 billion-year history

Meteorites are rocks fallen to earth from outer space. Meteorites can be discovered in Antarctica and many have been collected by JARE. Rocks, unlike meteorites, are formed here on earth. Studying rocks can tell us how the continents were formed and provide information about environmental changes in the past.



Martian meteorite

Wildlife

Exploring life and ecology in extremely low temperatures

Polar marine ecosystems are very rich. In addition to ice algae growing in sea ice, there are krill, fish, birds, and mammals living in Antarctic waters. The environments on land are much harsher than those in the sea. Plants such as moss and lichen, as well as tardigrada and other microorganisms, live in special habitats where liquid water can be obtained. Let's explore this mysterious life surviving in such hard environments.



The Arctic

A four-dimensional digital globe shows changes in the Arctic environment caused by global warming and other elements of climate change. Visitors can also enjoy video footage from the Ny-Ålesund Station and exhibitions of Arctic fox, Arctic moss, and other living unique to the Arctic region.



Also, there are exhibits for children such as "Become a Polar Researcher!" as well as "Science Café" and special exhibition and live chat from Antarctic Syowa Station.



Museum hours : 10:00-17:00 (no entry after 16:30)
Closed : Sun/ Mon/ National holidays/
New Year's
Admission : Free
<http://www.nipr.ac.jp/science-museum/>

Developing field scientists for the next generation of polar research

Graduate Education

NIPR accepts students for 5-year full-term and 3-year second-term doctoral courses through the Department of Polar Science in the School of Multidisciplinary Sciences of SOKENDAI (The Graduate University for Advanced Studies.) Twenty students are currently enrolled in the course. The objective of the Department of Polar Science is to identify the primary causes of individual environmental changes within Earth's overall system and the interactions between them. The department fosters researchers who have the ability to carry out a broad range of earth science studies in a flexible and creative way, especially as the field scientists.

SOKENDAI was established in October 1988 as Japan's first national graduate school to exclusively offer doctoral courses. Juxtaposed 5-year doctoral courses were added in 2006. The university currently consists of 6 schools that receive the assistance of 19 parent institutes.

Special Collaborative Research Fellows

In accordance with the Article 29-1-3 of the National University Corporation Law, the Inter-University Research Institute Corporation accepts graduate students at the request of universities and cooperates with university education.

Every year since 1981, NIPR has accepted graduate students in polar science and related fields as special collaborative research fellows. In 2016, NIPR accepted 12 students.

Joint Graduate School

In 2006, NIPR and Kyushu University entered into the Agreement on Partnership and Cooperation in Education and Research. The two institutes have joined hands in offering graduate education in the field of polar environment studies.



Sampling of zooplankton in the Antarctic Ocean



Collecting rock sample in Brattnipene, Sør Rondane Mountains, Antarctica

Organization

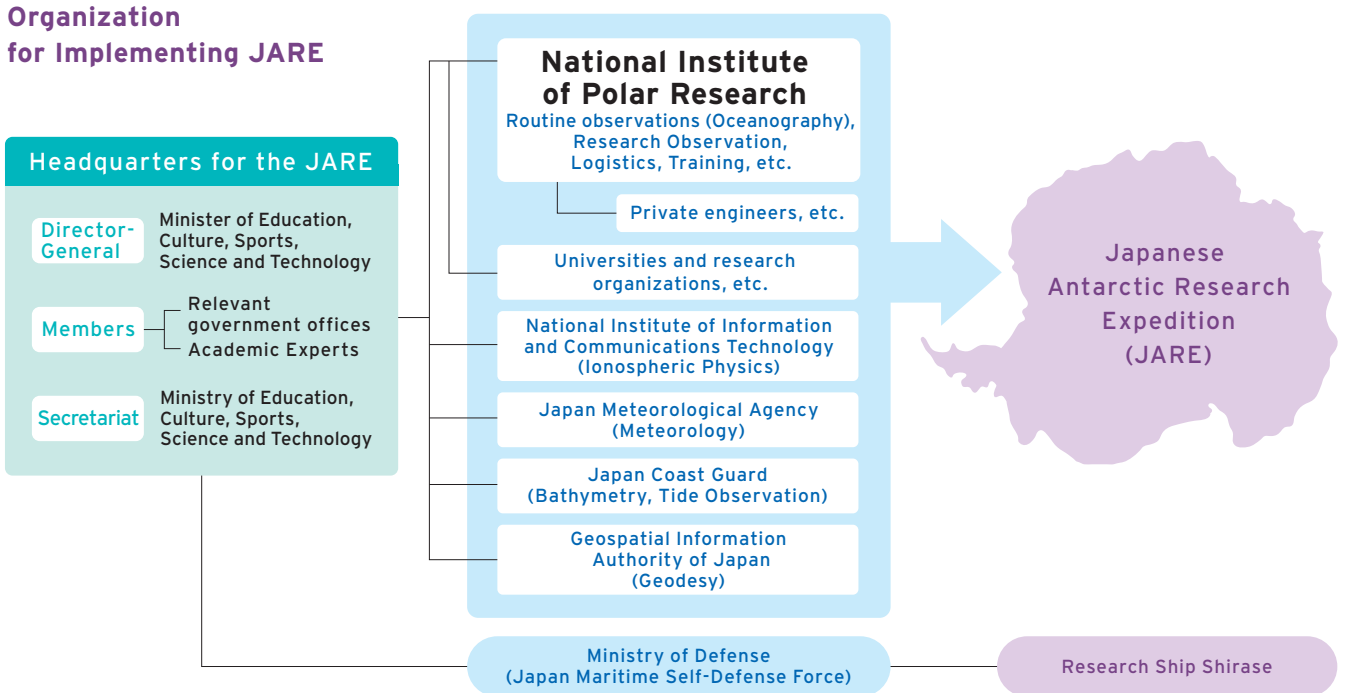
Organization(As of October 1, 2017)

Director-General	Takuji NAKAMURA	Deputy Director (for Supporting research)	Minemasa SUEHIRO		
Vice Director-General	Yoshifumi NOGI	Manager	Kojiro KAKIMOTO		
	Hiroyuki ENOMOTO	Polar Science Resources Center	Director Tomokazu HOKADA		
Assistant Director-General	Satoshi IMURA	Ice core Research Center	Director Kumiko GOTO-AZUMA		
	Yoichi MOTOYOSHI	Communications and Computing science Center	Director Masaki OKADA		
Division for Research and Education	Space and Upper Atmospheric Sciences Group Leader	Hiroshi MIYAOKA	Public Relations Section	Head Yoichi MOTOYOSHI	
	Meteorology and Glaciology Group Leader	Kumiko GOTO-AZUMA	Library	Director Tsuneo ODATE	
	Geoscience Group Leader	Yoichi MOTOYOSHI	International Affairs Section	Head Satoshi IMURA	
	Bioscience Group Leader	Tsuneo ODATE	Intellectual Property Section	Head Hiroyuki ENOMOTO	
	Polar Engineering Group Leader	Hideaki MOTOYAMA	Archives Section	Head Tsuneo ODATE	
Center for Antarctic Programs	Director	Yoshifumi NOGI	Research Development office	Head Satoshi IMURA	
	Deputy Director (for Research)	Gen HASHIDA	Office for Gender Equality	Head Hiroyuki ENOMOTO	
	Deputy Director (for Business)	Minemasa SUEHIRO	NIPR/ISM Joint Administration Office	Director Kazuhiko HASEGAWA	
	Manager of Planning Unit	Makoto TSUMURAYA		Director of General Service Center	Atsushi MATSUO
	Manager of Logistics Unit	Kazuo HIGUCHI		Vice Director of General Service Center	Tatsuya NAKANO
Arctic Environment Research Center	Director	Hiroyuki ENOMOTO	Head of Planning Section (NIPR)	Akiyoshi KOJIMA	
	Deputy Director	Hiroshi MIYAOKA			

Advisers

Takao HOSHIAI	Prof. emeritus, NIPR	Zenkichi HIRAYAMA	Prof. emeritus, Nihon University
Atumu OHMURA	Prof. emeritus, Swiss Federal Institute of Technology Zurich	Takeo HIRASAWA	Prof. emeritus, NIPR

Organization for Implementing JARE



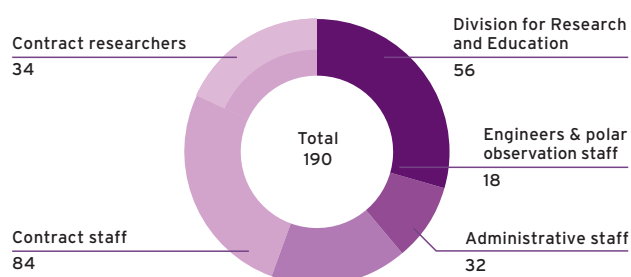
Organization

Research Organization of Information and Systems, National Institute of Polar Research.
Administrative Council member. Term of office: April 1, 2017 - March 31, 2018 (As of October 1, 2017)

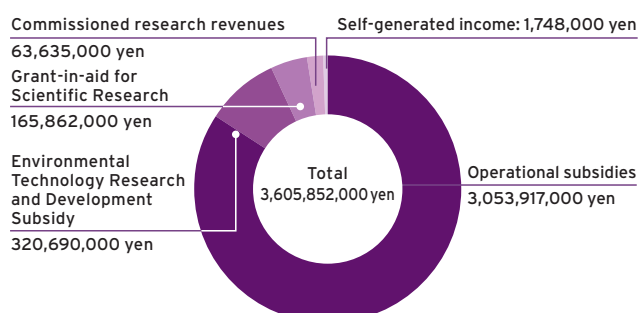
Name	Institution	Title
Shuji AOKI	Center for Atmospheric and Oceanic Studies, Graduate School of Science, Tohoku University	Professor
Mitsuo UEMATSU	The University of Tokyo	Director of Center for International Collaboration, Professor of Atmosphere and Ocean Research Institute
Naoto EBUCHI	Hokkaido University	Director-General / Professor
Toshio TAKEUCHI	Tokyo University of Marine Science and Technology	President
Keisuke SUZUKI	Shinshu University	Professor
Hiroko NAGAHARA	Japan Society for The Promotion of Science, Research Center for Science Systems	Vice Director-General
Yoichi FUKUDA	Kyoto University Graduate School of Science and Faculty of Science	Professor
Toshio FUKUSHIMA	National Astronomical Observatory of Japan	Director / Professor
Kazuo SHIOKAWA	Institute for Space-Earth Environmental Research, Nagoya University	Professor
Ken FURUYA	Soka University Graduate School of Engineering	Professor
Hajime YAMAGUCHI	Department of Ocean Technology, Policy and Environment Graduate School of Frontier Sciences, University of Tokyo	Professor
Mamoru YAMAMOTO	Kyoto University Laboratory of Radar Atmospheric Science	Professor
Yoshifumi NOGI	National Institute of Polar Research	Professor / Vice Director-General / Director of Center for Antarctic Programs
Hiroyuki ENOMOTO	National Institute of Polar Research	Professor / Vice Director-General / Director of Arctic Environment Research Center / Head of Intellectual Property Section / Head of Office for Gender Equality
Satoshi IMURA	National Institute of Polar Research	Professor / Dean of School of Multidisciplinary Sciences, SOKENDAI / Head of International Affairs Section / Head of Research Development Office
Yoichi MOTOYOSHI	National Institute of Polar Research	Professor / Assistant Director-General / Head of Public Relations Section
Tsuneo ODATE	National Institute of Polar Research	Professor / Library Director / Head of Archives Section
Akira KADOKURA	Research Organization of Information and Systems	Professor / Head of Communications and Computing science Center, Joint Support-center for Data Science Research
Kumiko GOTO-AZUMA	National Institute of Polar Research	Professor / Director of Ice core Research Center
Kentaro WATANABE	National Institute of Polar Research	Professor
Hiroshi MIYAOKA	National Institute of Polar Research	Professor/Deputy Director of Arctic Environmental

Institute Data

Number of employees
 (as of April 1, 2017; including prospective polar observation staff)



Funding for operations (as of April 1, 2017)



Research Staff (As of July, 2017)

Director-General

Takuji NAKAMURA	Atmospheric Dynamics
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Division for Research and Education Space and Upper Atmospheric Sciences Group

Professor	Hiroshi MIYAOKA	Plasma Physics
Professor	Akira KADOKURA	Magnetospheric Physics
Associate Prof.	Masaki TSUTSUMI	Atmospheric Physics
Associate Prof.	Akira YUKIMATU	Magnetospheric Physics
Associate Prof.	Masaki OKADA	Plasma Physics
Associate Prof.	Ryuhō KATAOKA	Space Physics, Solar Terrestrial Physics
Associate Prof.	Yoshihiro TOMIKAWA	Middle Atmosphere Science
Associate Prof.	Yasunobu OGAWA	Ionospheric Physics
Assistant Prof.	Mitsumu EJIRI	Upper Atmosphere Physics
Assistant Prof.	Takanori NISHIYAMA	Upper Atmosphere Physics
Project Prof.	Natsuo SATO	Aurora Physics
Project Associate Prof.	Koji NISHIMURA	Instrumentation Engineering
Project Associate Prof.	Yoshimasa TANAKA	Upper Atmosphere Physics
Project Associate Prof.	Katsuhiko TSUNO	Cosmic Ray, X-ray Astronomy, Space Engineering
Project Assistant	Yuko SUZUKI	Atmospheric Electricity
Project Researcher	Yuka SATO	Magnetospheric Physics, Ionospheric Physics
Project Researcher	Toru TAKAHASHI	Upper Atmosphere Physics

Division for Research and Education Meteorology and Glaciology Group

Professor	Kumiko GOTO-AZUMA	Glaciology
Professor	Hideaki MOTOYAMA	Snow Hydrology, Glaciology
Professor	Hiroyuki ENOMOTO	Glaciology, Climatology, Remote Sensing Engineering
Professor	Shuji FUJITA	Glaciology, Ice Core Studies, Remote Sensing, Applied Physics
Associate Prof.	Shuki USHIO	Polar Oceanography
Associate Prof.	Kenji KAWAMURA	Paleoclimatology
Associate Prof.	Gen HASHIDA	Polar Marine Biogeochemistry
Associate Prof.	Takeshi TAMURA	Polar Oceanography
Associate Prof.	Masataka SHIOBARA	Atmospheric Physics
Associate Prof.	Jun INOUE	Polar Meteorology
Assistant Prof.	Naohiko HIRASAWA	Climatology
Assistant Prof.	Teruo FURUKAWA	Glaciology
Assistant Prof.	Daisuke GOTO	Atmospheric Physics

Assistant Prof.	Yutaka TOBO	Atmospheric Physics and Chemistry
Assistant Prof.	Fumio NAKAZAWA	Glaciology
Project Researcher	Kyohei YAMADA	Radiation and Climate Physics
Project Researcher	Haruhiko KASHIWASE	Polar Oceanography, Sea Ice
Project Researcher	Alimasi NUERASIMUGULI	Glaciology
Project Researcher	Kotaro MURATA	Atmospheric Aerosol Science

Division for Research and Education Geoscience Group

Professor	Yoichi MOTOYOSHI	Geology
Professor	Yoshifumi NOGI	Solid Earth Geophysics
Associate Prof.	Koichiro DOI	Geodesy
Associate Prof.	Keiji MISAWA	Cosmochemistry
Associate Prof.	Tomokazu HOKADA	Geology
Associate Prof.	Hideki MIURA	Quaternary Geology
Associate Prof.	Akira YAMAGUCHI	Meteoritics
Associate Prof.	Yusuke SUGANUMA	Quaternary Geology, Paleomagnetism, Rock magnetism
Associate Prof.	Masaki KANAOKA	Seismology, Solid Earth Geophysics
Assistant Prof.	Yuichi AOYAMA	Geodesy
Assistant Prof.	Naoya IMAE	Meteoritics
Assistant Prof.	Hiroshi KAIKEN	Mineralogy, Meteoritics
Assistant Prof.	Kenji HORIE	Isotopic Geochemistry
Assistant Prof.	Jun'ichi OKUNO	Geophysics
Assistant Prof.	Masakazu FUJII	Marine Geology and Geophysics, Rock Magnetism
Project Prof.	Kazuyuki SHIRAISHI	Geology
Project Researcher	Mami TAKEHARA	Isotope geology
Project Researcher	Genevieve HUBLET	Geochemistry/Cosmochemistry
Project Researcher	Xiangyu ZHAO	Geophysics (Paleomagnetism)

Division for Research and Education Bioscience Group

Professor	Tsuneo ODATE	Biological Oceanography
Professor	Kentaro WATANABE	Marine Ecology
Professor	Satoshi IMURA	Plant Ecology
Associate Prof.	Sakae KUDOH	Aquatic Ecology
Associate Prof.	Akinori TAKAHASHI	Animal Ecology
Associate Prof.	Yuuki WATANABE	Marine Zoology
Associate Prof.	Masaki UCHIDA	Microbial Ecology
Assistant Prof.	Kunio TAKAHASHI	Marine Ecology

Research Staff (As of July, 2017)

Assistant Prof.	Nobuo KOKUBUN	Marine Ecology
Assistant Prof.	Yukiko TANABE	Plant Eco-physiology, Limnology
Assistant Prof.	Kozue SHIOMI	Animal Behavior
Assistant Prof.	Ryosuke MAKABE	Biological Oceanography, Marine Ecology
Assistant Prof.	Shintaro TAKAO	Ocean Optics, Satellite Oceanography
Project Researcher	Jean Baptiste Pierre Marie Dominique THIEBOT	Marine Ecology
Project Researcher	Megumu TSUJIMOTO	Ecology
Project Researcher	Masaharu TSUJI	Mycology, Fungal Ecophysiology
Project Researcher	Masayoshi SANO	Marine Ecology
Project Researcher	Alexis Prostel WILL	Biology

Division for Research and Education Polar Engineering Group

Professor	Hideaki MOTOYAMA	Snow Hydrology, Glaciology
Assistant Prof.	Masayuki KIKUCHI	Plasma Physics

Center for Antarctic Programs

Professor	Yoshifumi NOGI	Solid Earth Geophysics
Professor	Shuji FUJITA	Glaciology, Ice Core Studies, Remote Sensing, Applied Physics
Associate Prof.	Gen HASHIDA	Polar Marine Biogeochemistry
Associate Prof.	Sakae KUDOH	Aquatic Ecology
Associate Prof.	Koichiro DOI	Geodesy
Associate Prof.	Masaki TSUTSUMI	Atmospheric Physics
Associate Prof.	Hideki MIURA	Quaternary Geology

Arctic Environment Research Center

Professor	Hiroyuki ENOMOTO	Glaciology, Climatology, Remote Sensing Engineering
Professor	Hiroshi MIYAOKA	Plasma Physics
Professor	Kumiko GOTO-AZUMA	Glaciology
Professor	Satoshi IMURA	Plant Ecology
Associate Prof.	Yasunobu OGAWA	Ionospheric Physics
Associate Prof.	Masataka SHIOBARA	Atmospheric Physics
Associate Prof.	Jun INOUE	Polar Meteorology
Associate Prof.	Masaki UCHIDA	Microbial Ecology
Assistant Prof.	Daisuke GOTO	Atmospheric Physics
Project Prof.	Masao FUKASAWA	Oceanography

Project Prof.	Yutaka KONDO	Global Atmospheric
Project Prof.	Tetsuo OHATA	Glaciology
Project Associate Prof.	Tetsuo SUEYOSHI	Glaciology, Paleoclimatology
Project Associate Prof.	Hironori YABUKI	Glaciology
Project Researcher	Takeshi TERUI	Marine Ecosystem
Project Researcher	Takeshi SUGIMURA	Numerical Fluid Dynamics
Project Researcher	Takuya NAKANOWATARI	Physical Oceanography
Project Researcher	Kazutoshi SATO	Meteorology
Project Researcher	Ryo KANEKO	Environmental Microbiology, Microbial Ecology

Polar Science Resources Center

Associate Prof.	Tomokazu HOKADA	Geology
Professor	Yoichi MOTOYOSHI	Geology
Professor	Satoshi IMURA	Plant Ecology
Associate Prof.	Akinori TAKAHASHI	Animal Ecology
Associate Prof.	Akira YAMAGUCHI	Meteoritics
Assistant Prof.	Naoya IMAE	Meteoritics
Assistant Prof.	Kenji HORIE	Isotopic Geochemistry
Project Prof.	Yoshikuni HIROI	Geology, Petrology
Project Prof.	Makoto KIMURA	Environmental Science Meteoritics, Mineralogy

Polar Data Center

Associate Prof.	Masaki OKADA	Plasma Physics
Assistant Prof.	Yuichi AOYAMA	Geodesy
Assistant Prof.	Masayuki KIKUCHI	Plasma Physics
Assistant Prof.	Naohiko HIRASAWA	Climatology

Ice Core Research Center

Professor	Kumiko GOTO-AZUMA	Glaciology
Professor	Hideaki MOTOYAMA	Snow Hydrology, Glaciology
Professor	Shuji FUJITA	Glaciology, Ice Core Studies, Remote Sensing, Applied Physics
Associate Prof.	Kenji KAWAMURA	Paleoclimatology
Assistant Prof.	Fumio NAKAZAWA	Glaciology
Project Assistant	Motohiro HIRABAYASHI	Analytical Chemistry

Public Relations Section

Professor	Yoichi MOTOYOSHI	Geology
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Library

Professor	Tsuneo ODATE	Biological Oceanography
Project Prof.	Takashi YAMANOUCI	Atmospheric Science

International Affairs Section

Professor	Satoshi IMURA	Plant Ecology
Professor	Kentaro WATANABE	Marine Ecology

Intellectual Property Section

Professor	Hiroyuki ENOMOTO	Glaciology, Climatology, Remote Sensing Engineering
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Archives Section

Professor	Tsuneo ODATE	Biological Oceanography
Project Prof.	Takashi YAMANOUCI	Atmospheric Science

Research Development Office

Professor	Satoshi IMURA	Plant Ecology
URA	Yasuko ISONO	Atmospheric Science
URA	Yuji KODAMA	Glaciology

Office for Gender Equality

Professor	Hiroyuki ENOMOTO	Glaciology, Climatology, Remote Sensing Engineering
URA	Yasuko ISONO	Atmospheric Science

Visiting Staff

Visiting Prof.	Giichiro OHNO	Antarctic Medical
Visiting Prof.	Naomasa NAKAI	Astronomy
Visiting Prof.	Kaoru SATO	Atmospheric Dynamics, Middle Atmosphere Sciences
Visiting Prof.	Makoto ABO	Laser Remote Sensing
Visiting Prof.	Seiji TSUBOI	Seismology
Visiting Prof.	Hiroyuki KONISHI	Precipitation Physics
Visiting Prof.	Hitoshi FUJIWARA	Upper Atmosphere Physics
Visiting Prof.	Masahiko HAYASHI	Meteorology
Visiting Prof.	Makoto TAGUCHI	Planetary Atmosphere Physics
Visiting Prof.	Shinya OBARA	Energy System, Microgrid, Cold Region Energy

Visiting Prof.	Hiroshi TANAKA	Atmospheric Science, Meteorology, Climatology, Atmospheric General Circulation
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Visiting Prof.	Jouta KANDA	Marine Biochemistry
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Visiting Prof.	Dapeng ZHAO	Seismology
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Visiting Prof.	Masayuki YAMAMOTO	Upper Atmosphere Physics, Ionospheric Physics
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Visiting Prof.	Tetsuo IWAMI	Ichthyology, Marine Ecology
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Visiting Prof.	Yutaka WATANUKI	Marine Ecology
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Visiting Prof.	Shogo NISHIKAWA	Power and Energy
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Visiting Prof.	Taro ICHII	Marine Ecology
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Visiting Prof.	Takayuki NAKATSUBO	Plant ecology, Ecosystem ecology
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Visiting Prof.	Hajime YAMAGUCHI	Naval Architecture and Ocean Engineering
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Visiting Associate Prof.	Ayako ABE	Paleoclimatology, Climate and Ice Sheet Modeling
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Visiting Prof.	Takaaki NOGUCHI	Mineralogy, Petrology, Meteoritics
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Visiting Prof.	Shigeru FUJITA	Magnetospheric Physics
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Visiting Associate Prof.	Yasunobu MIYOSHI	Middle-Upper Atmosphere Physics, Upper Atmosphere Physics
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Visiting Associate Prof.	Masato MOTOKI	Ichthyology
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Visiting Associate Prof.	Satonori NOZAWA	Upper Atmosphere Physics
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Visiting Associate Prof.	Toru HIRAWAKE	Satellite Oceanography, Marine Optics
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Visiting Associate Prof.	Tomoyuki HOMMA	Diffraction Physics, Physical Metallurgy, Strength in Materials Science, Light Metals
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Visiting Associate Prof.	Makoto KOIKE	Atmospheric Chemistry and Physics
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Visiting Associate Prof.	Takanobu SAWAGAKI	Physical Geography, Glacial Geology
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Visiting Associate Prof.	Shigeru AOKI	Polar oceanography
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Visiting Associate Prof.	Nobuhiko KIZU	Meteorology, Geochemistry
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Visiting Associate Prof.	Shin-ichiro OYAMA	Upper Atmospheric Physics; Space Physics, Solar Terrestrial Physics
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Joint Support-Center for Data Science Research

Professor	Akira KADOKURA	Magnetospheric Physics
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Associate Professor	Masaki KANAO	Seismology, Solid Earth Geophysics
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Project Associate Pro.	Yoshimasa TANAKA	Upper Atmosphere Physics
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Project Associate Pro.	Koji NISHIMURA	Instrumentation Engineering
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Project Associate Pro.	Hironori YABUKI	Glaciology
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JSPS Postdoctoral Fellow

Naoko NAGATSUKA	Glaciology
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Takehige ISHIWA	Geophysics, Paleoclimatology
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Ikumi OYABU	Glaciology
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Partnership Agreements

NIPR concludes research agreements and memoranda of understanding with foreign universities and research institutes for the sake of promoting collaboration projects, academic exchange and graduate university education.



Visit of the Canadian Senior Arctic Official (SAO) and her delegation for the development of research collaborations in November, 2017



Signing ceremony of polar research collaboration agreement with the Polar Research Institute of China, on the occasion of the annual general meeting of the Asian Forum of Polar Sciences (AFoPS) held in Shanghai in September, 2017

● Domestic partner institutions

1	Collaboration Projects	Institute of Low Temperature Science, Hokkaido University
2	Collaboration Projects	National Museum of Emerging Science and Innovation (Miraikan)
3	Collaboration Projects	Tokyo University of Marine Science and Technology
4	Collaboration Projects	Kitami Institute of Technology
5	Collaboration Projects	Solar-Terrestrial Environment Laboratory, Nagoya University
6	Collaboration Projects	Research Institute for Sustainable Humanosphere, Kyoto University
7	Collaboration Projects	Faculty of Pure and Applied Sciences, Tsukuba University
8	Collaboration Projects	Graduate School of Science and Faculty of Science, Tohoku University
9	Collaboration Projects	Japan Aerospace Exploration Agency
10	Graduate school education	Kyushu University Graduate School of Integrated Sciences for Global Society
11	Collaboration Projects	RIKEN Center for Advanced Photonics
12	Collaboration Projects	Center for advanced Marine Core Research, Kochi University
13	Collaboration Projects	National Institute of Japanese Literature
14	Collaboration Projects	Tokyo Zoological Park Society
15	NIPR Polar Science Museum	Wakkanai Youth's and Children's Science Museum
16	NIPR Polar Science Museum	Rikubetsu Space Science Museum
17	NIPR Polar Science Museum	The Shirase Antarctic Expedition Memorial Museum
18	NIPR Polar Science Museum	Tsukuba Expo Center
19	NIPR Polar Science Museum	Tateyama Caldera Sabo Museum
20	NIPR Polar Science Museum	Tamarokuto Science Center
21	NIPR Polar Science Museum	Nagoya City Science Museum
22	NIPR Polar Science Museum	Uemura Naomi Memorial Museum
23	NIPR Polar Science Museum	Ehime Prefectural Science Museum
24	NIPR Polar Science Museum	Saga Prefectural Space and Science Museum
25	NIPR Polar Science Museum	Nishibori Eizaburo Memorial Explorer Museum
26	NIPR Polar Science Museum	Port of Nagoya Public Aquarium / Fuji Antarctic Museum
27	NIPR Polar Science Museum	WNI WxBunka Foundation

● Collaboration Projects ● Graduate school education ● NIPR Polar Science Museum





Memorandum of Cooperation was signed at Chilean Embassy in Tokyo with Dr. José Retamales, Director of the Chilean Antarctic Institute in July 2013.

International exchange agreements

1	Argentina	The National Directorate for Antarctica of the Argentine Republic
2	Australia	Australian Antarctic Division
3	Australia	Bureau of Meteorology
4	Australia	Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC), University of Tasmania
5	Australia	Geoscience Australia
6	Australia	Macquarie University
7	Belgium	Vrije Universiteit Brussel
8	Belgium	Université Libre de Bruxelles
9	Belgium	Royal Belgian Institute of Natural Sciences
10	Canada	Canadian High Arctic Research Station
11	Canada	Centre for Northern Studies, Laval University
12	Chile	Chilean Antarctic Institute
13	China	Polar Research Institute of China
14	China	China Research Institute of Radiowave Propagation
15	Czech	University of South Bohemia
16	Denmark	Greenland Institute of Natural Resources
17	Denmark	Niels Bohr Institute, University of Copenhagen
18	Finland	Suomen Akatemia
19	Finland	Finnish Meteorological Institute
20	Finland	University of Helsinki
21	France	Centre national de la recherche scientifique
22	France	Centre national d'études spatiales
23	France	Institut national de l'information géographique et forestière
24	France	Institut Paul-Emile Victor
25	Germany	Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research
26	Germany	Deutsche Forschungsgemeinschaft

27	Iceland	Science Institute, University of Iceland
28	Italy	Consiglio Nazionale delle Recherche
29	Korea	Korea Polar Research Institute
30	Korea	Korea Institute of Construction Technology
31	Malaysia	Universiti Sains Malaysia
32	Malaysia	Universiti Kebangsaan Malaysia
33	Norway	Norwegian Polar Institute
34	Norway	University Centre in Svalbard
35	Norway	Norwegian Meteorological Institute
36	Norway	UiT The Arctic University of Norway
37	Norway	Norges forskingsråd
38	Norway	Bjerknes Centre for Climate Research
39	Norway	"Nansen Environmental and Remote Sensing Center"
40	Poland	Institute of Geophysics, Polish Academy of Sciences
41	Russia	Institute for Biological Problems of Cryolithozone, Russian Academy of Sciences
42	Russia	The Melnikov Permafrost Institute, Russian Academy of Sciences
43	Spain	Basque Centre for Climate Change-Klima Aldaketa Ikergai
44	Sweden	Vetenskapsrådet
45	Sweden	Swedish Institute of Space Physics
46	Sweden	University of Stockholm
47	Thailand	National Science Museum, Thailand
48	UK	British Antarctic Survey
49	UK	Natural Environment Research Council
50	USA	International Arctic Research Center, University of Alaska
51	USA	SETI Institute

The national Institute of Polar Research established

September 29, 1973

At 1-9-10 Kaga Itabashi-ward Tokyo



Number of employees **267**

Faculty / researcher **86**
 Administers / engineers **137**
 Engineers & polar observation staff **44**

(As of October 1, 2017)



SOKENDAI has become base research organization

April, 1993

Department of Polar Science in The Graduate University for Advanced Studies, School of Multidisciplinary Science

Number of enrolled students **20** Number of degree recipients **68**
 (As of April 1, 2017)



Polar Science Museum

Opened on

July 24, 2010

Total number of the visitors **200,000** (As of July 15, 2017)



Open house of NIPR 2017

It was held on

August 5, 2017

Number of the visitors **1,982**



The Seventh Polar Science Symposium

Participants

Nov 29-Dec 2, 2016

479 (includes overseas **39** participants)



History

History of the National Institute of Polar Research

- December 1959** Japan joined the Antarctic Treaty
- May 1961** The Science Council of Japan advised the establishment 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 29, 1973** The National Institute of Polar Research established
- April 1993** NIPR became an infrastructure institute of the Graduate University for Advanced Studies (SOKENDAI)
- July 1998** Antarctic Environmental Protection Law became effective
- April 2004** NIPR was reorganized a part of ROIS
- May 2009** NIPR relocated to new campus in Tachikawa-shi, Tokyo
- August 2009** "Open house" of NIPR started
- July 2010** NIPR Polar Science Museum opened
- September 2013** 40th anniversary since the establishment of NIPR
- February 2014** Over 100,000 visitors recorded at Polar Science Museum
- July 2017** Over 200,000 visitors recorded at Polar Science Museum

History of Antarctic Expeditions

- January 1912** Mr. Shirase Antarctic Expedition team reached in lat. 80°C
- November 1956** First Antarctic expedition team departed with the ice-breaker 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** First observation by rocket
- June 1970** "Mizuho Station" (observation base) established
- October 1979** Large number of Antarctic meteorites collected
- October 1982** "Ozone hole" was discovered
- November 1983** Research vessel "Shirase" launched
- March 1985** "Asuka Station" (observation base) established
- February 1989** Multifunctional antenna installed
- February 1995** "Dome Fuji Station" established
- December 1996** Polar ice sheet drilled down until 2,503 m
- January 1999** Large number of Antarctic meteorites collected
- January 2001** Large number of Antarctic meteorites collected
- February 2002** Specialized ship was added for South Pacific expedition
- February 2004** Intelsat satellite communication system came alive
- January 2005** Aircraft observation base established on the land of Antarctica
- 2006-2007** 50th anniversary of Antarctic research project
- January 2007** Polar ice sheet drilled down until 3,035 m
- November 2009** New "Shirase" launched
- 2010** "Umitaka-Maru" Tokyo University of Marine Science and Technology's training ship joined Antarctic research project
- February 2010** Over 17,000 of Antarctic meteorites has collected
- March 2011** "PANSY" large-scale atmospheric radar started recording data
- August 2014** Snow Vehicles Type-KD60 has certified as Mechanical Engineering Heritage
- 2016** Japanese Antarctic Research Project Phase IX has started
- April 2017** 60th anniversary of "Syowa Station" established

History of Arctic Researchers

- June 1990** Arctic Environment Research Center established
- January 1991** Ny-Ålesund Research Station established
- Joins International Arctic Science Committee (IASC)**
- April 1996** Joins European Incoherent Scatter Scientific Association (EISCAT)
- March 1998** Japanese-German airborne Arctic expedition
- April 2004** Arctic Environment Research Center reorganized
- April 2008** North Greenland Eemian Ice Drilling (NEEM) began
- July 2011** GRENE - Arctic Project started (closed on March 2016)
- April 2015** Arctic Environment Research Center reorganized to enhance international collaborations
- "Arctic Science Summit Week" was held in Toyama**
- September 2015** ArCS (Arctic Challenge for Sustainability) Project has started
- April 2016** J-ARCNet started

Arctic

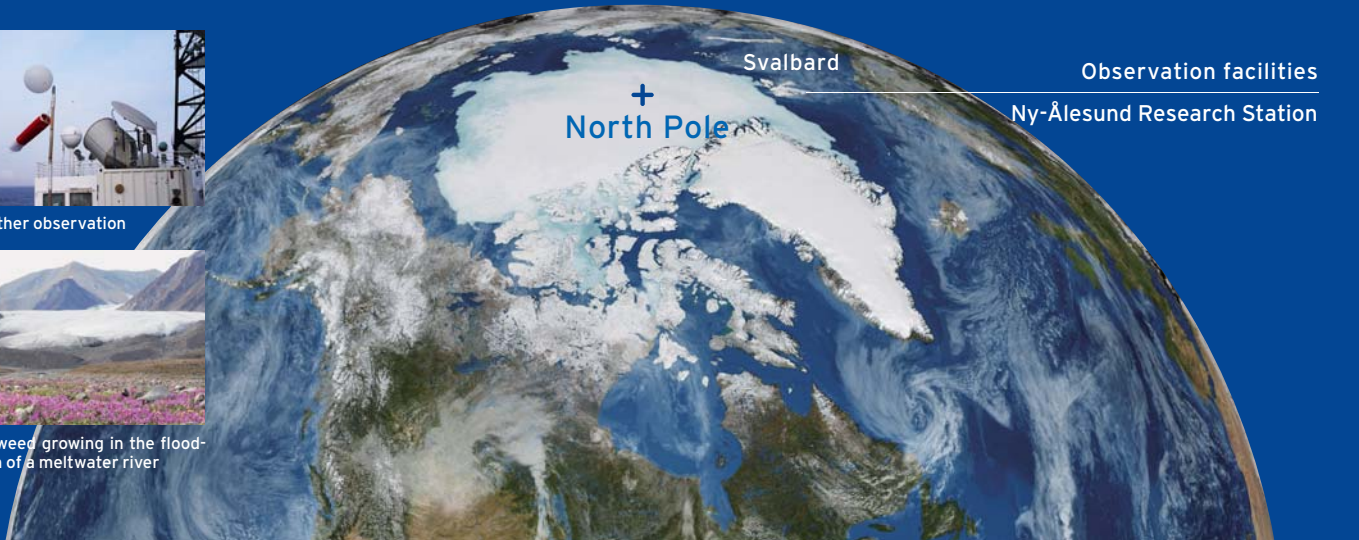
The North Pole refers to a point at 90 degrees north, and the region above 66.5 degrees north latitude is called the Arctic Region. There is no land at the North Pole. The Arctic Ocean and marginal sea area is surrounded by the Eurasian, North American continents and Greenland. They covers an area of about 12 million km². There are inhabited with many settlements within the Arctic Circle. The region has more vegetation than Antarctica. The Arctic is one of the most sensitively affected area on the Earth by the global warming.



Weather observation



Fireweed growing in the flood-plain of a meltwater river



Observation facilities
Ny-Ålesund Research Station



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Photo Front cover photo: Akira Sessai Yukimatu



Midnight sun: The sun drops down until just above the horizon at nightfall.



An astonishing site of iceberg near Syowa Station

Antarctic

Antarctica is an isolated continent surrounded by the Antarctic Ocean. Snow accumulation would hardly melt all year long. It becomes compressed ice covering the continent. The Antarctic ice cap, a massive sheet of ice, has an average thickness of approximately 1860m. The continent and ice shelves together makes a size approximately 37 times that of Japan. Located far from civilization, Antarctica functions as both an environmental monitoring center that allows us to assess the impact of human activity on the planet, and a time capsule that gives us a glimpse into the global environment of the past.