INFORMATION BULLETIN

IPY 2007/08 NEWS

THE INTERNATIONAL POLAR YEAR 2007/08 IN THE RUSSIAN FEDERATION AND AROUND THE WORLD

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FEATURING:

ROSHYDROMET DIRECTOR A.I. BEDRITSKY RE-ELECTED AS PRESIDENT OF THE WORLD METEOROLOGICAL ORGANIZATION

At the 15th World Meteorological Congress which was held in Geneva (Switzerland) in May, the Permanent Representative of the Russian Federation was unanimously re-elected to the post of President for the World Meteorological Organization (WMO). The Permanent Representative, Alexander Bedritsky is the director of the Federal Service for Hydrometeorology and Environmental Monitoring.

WMO is one of the UN's specialized organizations which unites the meteorological and hydrometeorological services from 183 and five territories around the globe.

In 2003–2007, A.I. Bedritsky held this high international position, his reelection for another four year term is evidence of the respect held for him by the international meteorological community and also of his huge personal contribution in WMO activities, as well as the contribution of the Russian Federation in international cooperation to warn and lessen the consequences of natural disasters with a hydrometeorological component, in establishing action plans for adapting the global economy to the negative consequences of climate change.

PRESS RELEASE FROM THE FEDERAL SERVICE FOR HYDROMETEOROLOGY AND ENVIRONMENTAL MONITORING, 17.05.07

ARCTIC DAYS IN RUSSIA

21 June, Moscow: In the Column Hall at Union House a formal ceremony was held dedicated to the Arctic Days in Russia, which have been organized as part of IPY-2007/08 which began in March.

The ceremony was held in accordance with a decision of the Naval College attached to the Government of the Russian Federation with the purpose of further strengthening Russia's image as a leading sea power, attracting the attention of business, manufacturers and investors to developing polar research, to scientific and economic conquering the Arctic and Antarctic, publicizing maritime activities and informing the general public.

In the foyer of the Column Hall an exhibition was arranged (photographs, historical items, stands, mock ups, videos etc.), on the history of research and the development of the Arctic and Antarctic, as well as the handicrafts of the indigenous people in the North.

The opening greeting which was written by the Chairman of the Government M.Ye. Fradkov was delivered by the Director of Roshydromet and the President of the World Meteorological Organization, A.I. Bedritsky.

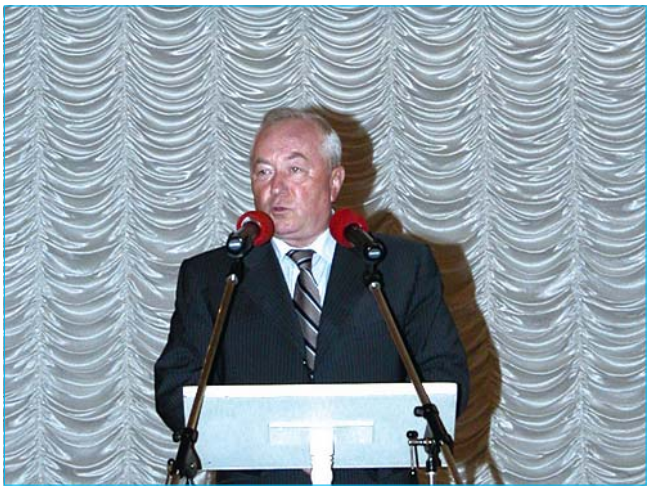
The co-chairmen of the Organizing Committee for the participation of the Russian Federation for preparing and participating in the International Polar Year, the Special Representative of the President of the Russian Federation for holding the International Polar Year, the Deputy Chairman of the State Duma, A.N. Chilingarov and the Director of Roshydromet, A.I. Bedritsky, opened and ran the formal meeting.

A.N. Chilingarov talked about the activities of the Committee for Preparing and Participating in the International Polar Year and noted the high level of attention that was being given by the State Duma and the Administration of the President of the Russian Federation. In his speech A.N. Chilingarov considered questions concerning the development of a North Sea Route with the increased role of arctic territories in strengthening the economic potential of the country and providing for security and geopolitical interests.

The Arctic Days were held at Union House

The speech made by the Governor of Murmansk Region, Yu.A. Evdokimov was listened to with great interest. Arctic veterans received a particularly warm welcome. The governor talked about the importance of developing a northern route with the increased role of Arctic territory in supporting the economic potential of the Rus-

Opening the meeting



Speech by Governor of Murmansk Region Yu.A. Evdokimov

sian Federation, providing for its security and geopolitical interests in the Arctic.

Great interest was shown to a report made on behalf of the Russian Association of Indigenous Peoples of the North, Siberia and Far East by the president, S.N. Kharyuchi. He placed special emphasis on the problems of indigenous groups in the Arctic in contemporary economic conditions.

Leaders and representatives of Arctic regions around Russia participated in the event, including those from the Komi, Sakha (Yakutia), Krasnoyarsk, Arkhangelsk, Kamchatka, Murmansk Regions, Koryak, Nenets, Khanty-Mansi, Chukotka and Yamal-Nenets Autonomous Districts; representatives from ministries and departments, general public, and polar veterans were also present. No less than a thousand people participated in the event.

Address by the Director of Roshydromet, A.I. Bedritsky to Participants of the Arctic Days in Russia Forum 21 June 2007

The Arctic takes up an area of 21.3 million km^2. It is a region of great geographical discoveries, made by researchers from different countries, an invaluable contribution to the history of research and development in the Arctic has been made by Russian, Austrian, Norwegian, Swedish, English, American and Canadian scientists. The history of the conquest of Arctic territory by Russia begins in the 9th century, when people from Novgorod started to move north in the direction of the 'Cold Sea', which is how they referred to the Arctic Ocean. Thanks to Russian navigators, mankind discovered the Svalbard Archipelago, Novaya Zemlya and Severnaya Zemlya, the New Siberian Islands, Chukotka and Kamchatka. Russian polar seafarers were the first to travel on the northern seas, penetrating the Arctic basin. It was they who proved that Asia and America were divided by a strait, they made a home out of Alaska in the interests of the Russian State. The contribution of Russian explorers in conquering the Arctic is undeniable. The names of Semen Dezhnev, Vitus Bering, Georgy Sedov, Boris Vilkitsky, Admiral Makarov, Alexander Kolchak are known not only in Russia but far beyond our borders.

In the 1930s the youthful Soviet state established a large organization *Glavsevmorput* (Chief Directorate of the North Sea Route). The term 'arctic explorer' became synonymous with courage. The title Hero of the Soviet Union was established specifically for exploits in the Arctic, and the first people to be awarded them were polar aviators. The polar explorers Otto Schmidt, Ivan Papanin, Georgy Ushakov, Evgeny Fedorov, aviators Mikhail Vodopyanov, Mark Shevelev and many others became true national heroes.

Since 1954, two drifting ice stations, known as *Severny Polus* (North Pole), have been simultaneously maintained in the central Arctic. Following a twelve year break these stations have been re-established with 32nd, 33rd and 34th polar drift stations already successfully carried out. Preparations are underway for *North Pole-35*.

The Arctic is an integral part of the Russian economy with significant fossil fuels, metals, biological and other resources.

At present, in Arctic territory belonging to the Russian Federation approximately 80% of Russia's gas is extracted and processed, more than 90% nickel and cobalt, 60% copper, 96% platinoids, 100% barytes, and represents 22% of Russia's exports.

The North Sea route is the shortest maritime route between European ports and the Asia-Pacific region, and is the only practical route to the natural resources of Russia's North, Siberia and the Far East. A significant growth in shipping operations for fossil fuels is expected in the west Arctic by 2015. The volume of shipping along the North Sea route may be increased in this region with a greater provision of icebreaking and navigational

support systems and by improving observations and hydrometeorological services. According to predictions it may reach 40 million tons. In connection with this we must look at actively developing the arctic transport system, take measures for preserving the ecological balance of this region, and solve issues ensuring the strategic economic, scientific and defensive interests of Russia in the Arctic.

The continued social and economic development of the country must be carried out taking into account the necessary requirements for the sustained development of the Russian north as a key region for forming Russia's national economic policies. Strengthening the Russian Arctic is a guarantee for the future of Russia.

The distinguishing feature of the 21st century from previous ones, is global environmental change, which has a noticeable impact on the social-economic processes in the Arctic. Human influences on the vulnerable Arctic environment and the development of economic activities threatens polar eco-systems.

On the whole changes in the higher latitudes could affect the interests of many countries actively operating in the Arctic.

In the last few years foreign nations have shown great interest in partnerships concerning the Arctic. The Third International Polar Year-2007/08 is an effective form of cooperation, enabling us to increase our knowledge of the Arctic, develop systems for observation, increase protection for the polar environment, animals and people living there from poor weather conditions.

It is possible to say that the scientific program which has been undertaken and the cooperation required to implement it is a reliable foundation for developing polar science and for educating new generations of polar researchers.

Many people and organizations have expressed a great deal of interest that we should participate in the events of the International Polar Year, including the President of the Russian Federation, organs of executive authority on both federal and regional levels, local governments as well as business circles working in practically every sphere.

The significance of the work that has begun in the first International Polar Years is hard to reevaluate.

The work has been important not only for polar science, but also in the lives of each and every polar explorer, the International Polar Year playing an important role in the choice of specialty and future work.

I am certain that the courageous scientists-polar explorers, specialists of the polar stations, expedition members, who work in the most severe climatic conditions will successfully deal with the missions assigned to them. The participation of young scientists and specialists will help renew scientific vigor and development of the science.

Extremely serious work in the Arctic stands before the country and we will apply all our resources to achieve the intended course.

I wish the forum delegates successful work!

Prepared by V.G. DMITRIEV (AARI)
from material at Roshydromet's official site
(http://www.meteorf.ru/default.aspx),
Murmansk Information Agency Bi-port
(http://www.b-port.com/news/archive/2007-06-22-24/)
and the Russian Association of Indigenous People site
(http://www.raipon.net)

MEETING OF THE ORGANIZING COMMITTEE FOR THE INVOLVEMENT OF THE RUSSIAN FEDERATION IN PREPARING AND RUNNING IPY-2007/08

5 June: at Roshydromet under the chairmanship of A.I. Bedritsky and A.N. Chilingarov the sixth meeting of the Organizing Committee for the Russian Federation's involvement in IPY-2007/08 was held. The Director of AARI A.I. Bedritsky and the special representative of the President of the Russian Federation for matters concerning IPY-2007/08 A.N. Chilingarov informed all those present of the preparations for running *Arctic Days in Russia,* planned for 21 June 2007.

The Director of the Scientific Information Analysis Center IPY-2007/08 A.I. Danilov presented the *Plan for Expedition Research in 2007 as Part of the Russian Federation's Participation in Running the International Polar Year*. The plan for expedition research was put together on the basis of the Action Plan, the Scientific Program, Implementation Plan for the Scientific Program for Preparing and Running IPY-2007/08 in the Russian Federation, and also constant clarification of details from organizations and departments. The financial support of the research is being undertaken as part of a federal and departmental holistic program and international programs as well as with additional funds provided by the state budget and other sources.

The expeditions which have been planned come under two categories: Arctic research and work in Antarctica. Work in the Arctic involves 21 maritime and 40 land expeditions, and in the Antarctic 7 and 19 respectively. Altogether there are 87 field expeditions planned as part of IPY-2007/08.

A significant place is taken up by Arctic sea expeditions. These large scale research expeditions will be carried out in the seas of the Arctic Ocean: the Barents, Kara, Laptev, East-Siberian and Chukchi Seas. To carry out the work scientific vessels belonging to Ros-

hydromet, Russian Academy of Sciences (RAS), Ministry of Natural Resources and Environment (vessels *Ivan Petrov*, *Professor Shtokman*, *Nansen*, *Dalnie Zelentsy*, *Akademik Nikolai Strakhov* and *Mikhail Somov*), the atomic icebreaker *Yamal* and others on which eleven expeditions will be carried out.

Land expeditions include those on the Svalbard Archipelago, researching hydrological and climatic indicators. A significant number of expeditions will be devoted to studying the cryosphere. Many expeditions will focus on resolving environmental problems. Geological, geophysical and social-economic problems will also be studied.

Work for IPY-2007/08 in Antarctica has already been done as part of the 52nd season of the Russian Antarctic Expedition, much of it carried out even before the official opening of IPY-2007/08. Out of this work, the most important has been comprehensive research on the sub glacial lake Vostok. After a year's break, during the 52nd Russian Antarctic Expedition to *Vostok* station, drilling work was renewed in the deep borehole 5G-1.

Expedition research as part of IPY-2007/08 will become better known by means of press releases, press conferences and also on the website *Russia in IPY-2007/08* and separate expeditions (PAICEX). Publications are appearing in periodicals, and exhibits are being presented at exhibitions such as *Okean* and *Neva* among others. The information bulletin *IPY News 2007/08* regularly publishes information about expeditions which have been prepared or carried out. Along with this, all participants of IPY need to actively inform society about events connected with IPY-2007/08.

The secretary for the Interdepartmental Scientific Coordination Committee for the Participation of the Russian Federation in Preparing and Running Events as part of the International Polar Year-2007/08 (ISCC) V.G. Dmitriev talked about the work of the ISCC in coordinating Russian research in the Arctic and Antarctic within the IPY framework. On the whole, ISCC working groups have participated in developing plans

for expedition research for 2007 in the Arctic in accordance with the annual work plan, and have developed proposals to manage data for the period of IPY-2007/08 and their presentation before the Organizing Committee for IPY, clustering Russian projects taking into account their scientific goals, geographic location to the areas being studied, possibility of cooperation and field logistics.

The working groups (WG) presented their proposals to the Organizing Committee on priority research and coordination during IPY on established research areas and also plans of events for awareness of population about polar research during IPY-2007/08. Plan was developed and presented to the Organizing Committee to attract young people to participate in IPY-2007/08. An information schedule was developed and approved which will take the form of a monthly bulletin *IPY News* which will support the activities of IPY-2007/08.

Furthermore, the working groups regularly carry out analysis of projects for their inclusion in the Plan for the Implementation of the IPY Scientific Program. Russian research in the Arctic and Antarctic within the IPY-2007/08 framework is being coordinated in the following manner:

– selection of projects for the implementation plan based on the criteria in accordance with the scientific

program for the participation of the Russian Federation in running IPY-2007/08 (WG 1-10);

– formation of a consolidated nuclei of the leading scientific projects and other work in the preview of the activities of the working groups (WG 1-9);

– agreement of the participation of researchers from various scientific organizations in expedition work (WG 1-10);

– standardization of information forms and methods for different disciplines (WG 7);

– organization of scientific cooperation and exchange of scientific information as part of symposiums, conferences, seminars, meetings, etc. (WG 1, 2, 4);

– organization of general information cooperation based on the regular publishing of *IPY-2007/08 News* (ISCC, WG1-10).

At the inter-institutional level negotiations and consultations are being carried out about joint activities in the Arctic, seminars are likewise being held, joint applications are being submitted to various foundations, articles are being published, etc.

The following scientific conferences can also be viewed as an active way of cooperating and exchanging scientific information:

– *Polar Oceans and Marine Cryosphere*, taking place on 25–26 October 2007 at AARI;

– *Russia in the IPY-2007/08*, planned for 2–7 October 2007 (Sochi, organizer – WG 2);

– *Large Marine Ecosystems of Russia during Global Change (Climate, Resources, Leadership)*, taking place in October 2007, Rostov-on-the-Don;

– *Comprehensive Environmental Research in the Svalbard Archipelago*, planned for 30 October – 2 November 2007, Murmansk, etc.

The last two conferences are international.

According to the opinion of the Organizing Committee, interdepartmental and interdisciplinary work can make a significant contribution in coordinating Russian research in the Arctic and Antarctic as part of the International Polar Year-2007/08 providing scientific information and technical conditions enhancing the quality of planning and management in the areas of administrative, economic, environmental, scientific, educational and any other activities taking into account the impact of global climate change on society, the economy and biological diversity and for defining ways for how society and the economy can adapt to these changes on the basis of material gathered during IPY-2007/08.

The Director of the Department for Eurasian Arctic (EASO), S.M. Pryamikov, delivered a report on the activities of the Eurasian arctic division for IPY-2007/08 about coordinating Russian and foreign research in the Arctic. The main task of IPY's Department for the Eurasian Arctic (EASO) – jointly with the international IPY program office was supporting the planning and implementation of IPY projects in the Eurasian Arctic, including the Russian section.

The department's activities are mainly aimed at strengthening cooperation and coordination of scientific research (for example, by establishing close relations between IPY participants), development of an internet portal for information and consultation etc., carrying out preliminary research for evaluating the expected environmental and climatic conditions during IPY, gathering and distribution of metadata as possible according to infrastructure support, logistics, monitoring programs and determining whether infrastructure meets IPY requirements.

The department's activities are closely connected with international and national institutes and programs, Forum of Arctic Research Operators (FARO), European Polar Consortium and others, which operate in the Eurasian Arctic.

The department is located in the Arctic and Antarctic Research Institute of Roshydromet in St. Petersburg and uses AARI infrastructure, including the Schmidt Russian-German Laboratory for Polar and Marine Studies and the Russian-Norwegian AARI/NPI Fram Laboratory for Studying Arctic Climate.

The Organizing Committee highly valued the active role of the department and drew attention to the quality of the website.

Also at the meeting information was given about the participation of the Yamal-Nenets Autonomous District in preparations and running IPY-2007/08 and the situation of an additional ISCC for coordinating regional activities during IPY.

In the process of discussing the reports, the Organizing Committee placed attention on resolving issues on the gathering of data received as a result of expedition work, attracting the press for wider audience of IPY activities and broadening international collaboration.

At the sixth meeting of the Organizing Committee of the Russian Federation for IPY-2007/08 the director of Scientific Information Analysis Center IPY-2007/08, A.I. Danilov explained the plan for expedition research in 2007 as part of Russia's involvement in IPY.

For more information about the meeting of the Organizing Committee, see www.ipyrus.aari.ru.

V.G. DMITRIEV (AARI)
(Photos of the meeting in progress S.M. Pryamikov)

PLAN FOR EXPEDITION RESEARCH IN THE ARCTIC DURING 2007 AS PART OF THE RUSSIAN FEDERATION'S INVOLVEMENT IN IPY-2007/08

Expedition Name	Expedition period	Location of work	Expedition coordinator and participating organizations
1. Marine research in high latitudes of the Arctic			
Carrying out comprehensive observations of a wide area from drift ice in the Arctic at the ice station PAICEX	March–April 2007	Arctic Basin	Polar Foundation, AARI, Institute of Oceanology of Russian Academy of Sciences (IO RAS), Pole Center Association of Polar Explorers of Russia
Geological and geophysical work, hydrological and glacial work on the atomic icebreaker *Rossiya*	April–June 2007	Arctic Basin	Okeangeologiya All-Russian Research Institute, Sevmorgeo, Polar Marine Geosurvey Expedition (PMGE), AARI, IO RAS
Seasonal ice drift station for spring (as part of the *Rossiya* trip)	April–August 2007	Arctic Basin	AARI, IO RAS
Carrying out a sea expedition on the *Akademik Fedorov*	July–October 2007	Arctic Basin and Arctic Sea	AARI, IO RAS, Institute of Atmospheric Physics of RAS, Main Geophysical Observatory (MGO), Okeangeologiya ARI, PMGE, Nansen-Center Foundation, Research and Production Association Typhoon, Woods Hole Oceanographic Institution (USA), Université Pierre et Marie Curie (France)
High Latitude Arctic Deepwater Expedition	July–August 2007	Arctic Basin	Polar Foundation, AARI, IO RAS, Murmansk Shipping Company
Oceanographic work by the flying group on board *Akademik Fedorov*	July–October 2007	Arctic Basin and Arctic Sea	AARI, Research and Production Association Typhoon, IO RAS, Woods Hole Oceanographic Institution (USA), Université Pierre et Marie Curie (France)
Work on the drift station *North Pole-35*	September–December 2007	Arctic Basin	AARI, AWI (Germany)
2. Research in the Arctic Seas			
Carrying out marine geological and geophysical research work in the northern part of the Barents Sea onboard the *Akademik Nikolai Strakhov* Research Vessel. Carrying out land-based geological work	22006–2008	Norwegian-Greenland Basin, northern part of the Barents Sea, Svalbard Archipelago, Franz Josef Land, Novaya Zemlya	Geological Institute of RAS (GI RAS), Okeangeologiya ARI, PMGE, IO RAS, NPD, Oslo University, University of Bergen, University of Tromsö
IO RAS Expedition on board the *Professor Shtokman* Research Vessel in the northern part of the Kara Sea and the Barents Sea	July–September 2007	Kara and Barents seas	IO RAS
Carrying out additional observations en route onboard the scientific expedition vessel *Mikhail Somov* in the seas of the Russian Arctic in spring (March–May) and Summer (August–October)	August–October 2007	Barents, Kara and Laptev seas	IO RAS, Polar University and Russian State Hydrometeorological University
PINRO Expedition onboard *Nansen* Research Vessel	August–September 2007	Kara and Barents seas	PINRO, Nansen Center (Norway)
The Russian-American Sea Expedition onboard the *Yamal* icebreaker as part of the NABOS-AVLAP	August–September 2007	Arctic Basin, East Siberian Sea and the Laptev Sea	AARI, Institute of Atmospheric Physics of RAS, St. Petersburg State University, State Research Navigation and Hydrography Institute of the Ministry of Defense, Pacific Oceanological Institute of RAS (POI RAS), IO RAS, IARC, University of Miami and Florida State University (USA), AWI and IFM-GEOMAR (Germany), LAVAL University, University of Manitoba Winnipeg and OM LTD (Canada), IO PAN (Poland)
Carrying out sea expedition research in the seas of the Russian Arctic onboard *Ivan Petrov* Research Vessel and others. (Barklav – 2007)	August–November 2007	Laptev Sea and East Siberian Sea	AARI, State Oceanographic Institute, Northern HMS, Okeangeologiya ARI, PMGE
Russian-German sea expedition to the Laptev Sea as part of a program to study the frontal zone and ice free areas onboard the *Ivan Petrov* Research Vessel	August–September 2007	Kara and Barents seas	AARI, AWI and IFM GEOMAR (Germany)
Expedition onboard an atomic icebreakers belonging to the Murmansk Shipping Company along the North Sea Route	February–March, May–June, September–October, December 2007	Barents Sea	Murmansk Marine Biology Institute of the Kola Scientific Center of the Russian Academy of Sciences
Studying the coastal marine environment of the Kola Peninsula onboard the *Dalnie Zelentsy* and *Pomor* Research Vessels	March, May–June, September, November 2007	Kola Peninsula	Murmansk Marine Biology Institute of the Kola Scientific Center of the Russian Academy of Sciences
Expedition along the inlets and bays of the Kola Peninsula	April–May 2007	Murmansk coast of the Barents Sea	Murmansk Marine Biology Institute of the Kola Scientific Center of the Russian Academy of Sciences
Expedition to study the biology of the red king crab (Paralithodes camtschaticus)	July–August 2007	Bering and Chukchi Seas	AARI, IO RAS, Pacific Institute of Geography of RAS, Far Eastern Regional Hydrometeorological Research Institute (FERHRI), Alliance Group, State Research Navigation and Hydrography Institute of the Ministry of Defense (SRNHI MD)
Russian-American *Rusalka* expedition	August–September 2007–2008		

Expedition Name	Expedition period	Location of work	Expedition coordinator and participating organizations
3. Land Expedition to the Arctic			
3.1. Research in the Svalbard Archipelago			
Development of a Hydrometeorological Observatory and carrying out comprehensive research on the Svalbard Archipelago (during the course of a year)	April–May, July–August 2007	Svalbard Archipelago (region of Barentsburg)	AARI, Murmansk AHEM, IG RAS, NPI
Carrying out joint measurements using standard Russian and foreign radiometric sensors (intercalibration) at the base of the zonal hydrometeorological observatory (Svalbard Archipelago, MTAHEM)	April–May 2007	Arctic basin, Svalbard Archipelago	AARI, MAHEM, St. Petersburg State University, NPI
Geological study of the Svalbard Archipelago as a control point at the junction of the North Atlantic Ocean and the western sector of the Arctic	June–September 2007	Svalbard Archipelago: Barentsburg, Pyramiden, Nordaustlandet	PMGE, Arktikugol
Comprehensive research of the Svalbard Archipelago	May, June–August, September 2007	Svalbard Archipelago	Murmansk Marine Biology Institute of the Kola Scientific Center of the Russian Academy of Sciences
Comprehensive research into the atmosphere on the Svalbard Archipelago	January–December 2007	Svalbard Archipelago	PGI KSC RAS
3.2. Hydrometeorological and Climatic Research			
Expedition research to measure cosmic rays in the Arctic atmosphere and at sea level	January–December 2007–2009	Murmansk Region	Physical Institute of RAS (PI RAS)
Research into the distribution and movement of gases including aerosol gases which are present in the atmosphere over Northern Eurasia using a portable laboratory	June 2007, July 2008	Moscow-Vorkuta -Moscow, Moscow-Vladivostok-Moscow	IAP RAS, VNIIZHT Karpov Institute of Physical Chemistry (KIPC), NILU (Norway), Helsinki University (Finland)
Organization and development of work at the Hydrometeorological Observatory in Tixi	March–December 2007	Tixi, Yakutia	AARI, Yakutsk Regional Administration of Hydrometeorology Roshydromet, Association of Russian Polar Explorers, Polar Foundation, NOAA (USA)
Subsatellite analysis of microwave photos from space for determining the nature of the snow layer	March–April 2007	Arctic Urals	IG RAS
Sazha-2007 (Impact of a polluted snow layer on albedo)	May 2007, 2008	Vorkuta, Narian-Mar, Norilsk, Dickson, Khatanga	AARI
3.3. Research into cryolite zones			
Studying the origins and dynamics of underground ice in Yenisei North	June 2007, August 2008	Lower reaches of the Yenisei River	Permafrost Institute of the Siberian Branch of the Russian Academy of Sciences
Research into the thermal field and cryolite zones in oil, gas and ore rich areas of the Yenisei North	June 2007, December 2008	Polar region of the Yenisei North	Permafrost Institute of the Siberian Branch of the Russian Academy of Sciences
Research into geothermal fields and cryolite zones on the Yano-Oimyakonskoe Plateau	June 2007, September 2008	Polar part of the Yana river basin	Permafrost Institute of the Siberian Branch of the Russian Academy of Sciences
Research into the reaction of cryolite zones to climate change in the Asiatic sector of the Arctic	June 2007, December 2008	North-East Russia	Permafrost Institute SB RAS, Yakutsk State University, Geophysics Institute of the University of Alaska (Fairbanks, USA)
Lena-New Siberian Islands-2007. Permafrost-geological research on the coastline of the eastern Arctic seas of Russia	May–September 2007	Coast of the Laptev Sea and East Siberian Sea	Permafrost Institute SB RAS, AARI, Moscow State University, AVI (Potsdam), University of Hamburg
Research into the evolution of the cryosphere in the coastal areas and shelf of the Russian Arctic	July–September 2007, 2008, 2009	West Yamal, Yugorsky Peninsula, West Taimyr, Pechora Bay	Permafrost Institute SB RAS, Moscow State University, St. Petersburg State University, Okeangeologiya ARI
Climate change dynamics of cryolite zones in the Russian Arctic	July–September 2007, 2008, 2009	Central and South Yamal, Urengoi	Permafrost Institute SB RAS, University of Alaska (Fairbanks, USA)
International educational training in field research into permafrost in the north of West Siberia (Urengoi, Yamburg)	July 2007, 2008	Urengoi, Yamburg	Moscow State University, Tyumen State Oil and Gas University (TSOGU), University of Hamburg, University of Delaware (USA)
International educational training in field research into permafrost on the coast of the Yenisei Gulf	July–August 2007, 2008, 2009	West Taimyr coastline	Moscow State University, St. Petersburg State University, Okeangeologiya ARI, Permafrost Institute SB RAS
3.4. Study of Ecosystems			
Nizhnekolymsk expedition	January–December 2007–2009	Sakha Republic (Yakutia), Lower-, Central- and Upper Koluma regions	North-West Scientific Station for the Institute of Geography of the Russian Academy of Sciences
Phytobenthos coastal expedition	January, April–May, July–October 2007	Murmansk coast of the Barents Sea	Murmansk Marine Biology Institute of the Kola Scientific Center of the Russian Academy of Sciences

Continuation of table

Expedition Name	Expedition period	Location of work	Expedition coordinator and participating organizations
Estimate of population conditions of key species of marine bird in the Arctic	July 2007	Franz Joseph Land, Severnaya Zemlya	AARI
Research into the quality of surface water, condition of aquatic organisms and sedimentation in water bodies and watercourses in Murmansk Region	April 2007, October 2008	Lovozersky, Monchegorsky, Kola, Tersky districts	Institute of North Industrial Ecology Problems (INEP) of RAS
Beringiya comprehensive paleo-ecological expedition	April–October 2007	Lena Delta, Kolyma and Yano-Indigirsk plains	Institute of Physicochemical and Biological Problems in Soil Science of RAS
Comprehensive integrated distributive observations into the condition of the environment	May–October 2007	Kola Peninsula, Fennoscandia, Barents region	INEP RAS
Comprehensive research including satellite and ground based observations into the state of surface ecosystems in tundra, forest-tundra and forests in connection with climate change and human impact in the environment	May 2007, October 2008	Kola Peninsula, Northern Norway	INEP RAS
Research into the migratory routes of caribou in West and East Taimyr	May 2007, October 2009	River basins of Pyasino, Kheta, Khatanga (Taimyr), north of the Putarana Plateau	Agricultural Research Institute for the Far North of the Russian Academy of Agricultural Sciences
Establishment of a Testing Station on Samoilovsky Island at the mouth of the Lena River to carry our comprehensive research in the region	June–December 2007	Samoilovsky Island (mouth of the Lena River, Yakutia)	AARI, St. Petersburg State University, Lena Mouth Reserve, AWI (Germany)
3.5. Geological-geophysical research			
Geological expedition to the New Siberian Islands to reconstruct the tectonic evolution of the Eastern Arctic Shelf in the late Paleozoic Mesozoic period	June 2007, September 2007	New Siberian Islands, Stolbovoi Island	GI RAS
Systems of metamorphic nuclei in the Arctic area of the Verkhoyan-Kolyma region	July–August 2008	Coast of the Laptev Sea	Institute of Diamond and Precious Metal Geology (IDPMG) SB RAS
Seismic-tectonic research into pleistoseist regions of the Kharaulakh group of catastrophic paleolithic earthquakes (trenching, carbon dating)	July, September 2007, 2009	Littoral-shelf zone of the Laptev Sea and Northern Verkhoyan	IDPMG SB RAS, Earth Crust Institute of RAS
Carrying out a land based geological expedition for research into the northern area of the Barents Sea	2006–2008	Svalbard Archipelago, Franz Josef Land, Novaya Zemlya	GI RAS, Okeangeologiya ARI, PMGE, IO RAS, NPD, Oslo University, University of Bergen, University of Tromsö
3.6. Socio-Economic Research			
Comprehensive work into the socio-economic development of polar regions, the increase of educational and scientific potential in the sphere of polar exploration and promotion of knowledge in society	June–October 2007	Yamal-Nenets Autonomous District (including Yamal), Yakutia, Franz Josef Land, Dickson, Severnaya Zemlya	AARI, St. Petersburg Medical Academy, Research and Production Association Typhoon
Ethno-ecological and socio-economic research into the coastal zone of the Arctic. Evaluation of the adaptability of populations in coastal settlements to changes of both a natural and human cause	July–September 2007	East Murmansk, Tazovsky and Yamalsky regions, Yamal-Nenets Autonomous District, East Chukchi	ISA RAS, IO RAS, Likhachev Research Institute for Cultural and Natural Heritage

PLAN FOR EXPEDITION RESEARCH IN THE ANTARCTIC DURING 2007 AS PART OF THE RUSSIAN FEDERATION'S INVOLVEMENT IN IPY-2007/08

Name of Event	Location of work	Expedition period	Main Observational Platform	Main Organi-zation
1. Sea Expeditions to the Antarctic				
Oceanographic research in the Antarctic region of the Southern Ocean	Southern Ocean: 2007 and 2009 – East Antarctic Sea, the section between Africa and Antarctica; 2008 – circumnavigation of Antarctica, section between Australia and Antarctica	February–March, January–April	*Akademik Fedorov*	AARI
Executing sectors SR1 and SR2 through Drake Strait between Africa and Antarctica	Drake Strait and the area between Africa and Antarctica	October–December 2007, 2008	*Akademik Vavilov*, *Akademik Ioffe*	IO RAS
Studying the history of geodynamic development of precipitation growth and environmental change in the area of the Collaboration Sea	Collaboration Sea – Kerguelen Plateau, East Antarctica	Summer 2007 and 2008	*Akademik Alexander Karpinsky*, *Polarshtern* (Germany) with onboard helicopter	PMGE
Geological and geophysical research into the natural Antarctic seas: mountainous regions of MacRobertson Land and Princess Elizabeth Land (as part of the 53rd RAE)	D'Urville Sea	November 2007	*Akademik Alexander Karpinsky*	PM GE
Ecosystems of the Antarctic Sea Ice	*Progress* Base (coastal observations)	February–March 2007–2009	From the shore fast sea ice by *Progress* Base and from *Akademik Fedorov*	IO RAS
Research into biota in the Southern Ocean (ecology of benthal and pelagials in the Antarctic)	Prydz Bay, Antarctic seas	February–March 2007–2009	*Akademik Fedorov*	ZI RAS
2. Ground Expeditions				
Comprehensive monitoring of the meteorological patterns in Antarctica (cluster)	Southern polar region	2007–2009	Meteorological station at *Bellingshausen* Station, *Novolazervskaya*, *Progress*, *Mirny*, *Vostok*, *Leningradskaya*, *Molodezhnaya*, *Russkaya*, and bases belonging to other countries	AARI
Comprehensive research into the changeability of the contents of small gas particles in the atmosphere above Antarctica	East Antarctica	2007–2009	*Mirny*, *Vostok* and *Novolazarevskaya* stations	Research and Production Association Typhoon
Observation of optical greenhouse gases characteristics and particles in the Antarctic atmosphere	East Antarctica	2007–2009	*Mirny* Station	AARI
Monitoring the energy balance of particles	King George Island	March 2007 and 2008	*Bellingshausen* Station	IAP RAS
Expedition research to measure cosmic rays in the Antarctic atmosphere and at sea level	East Antarctica	2007–2009	*Mirny* Station	PI RAS
Research into the effects and nature of pulsing cosmic radiation according to data from high precision measurements at *Novolazarevskaya* Station	Princess Astrid Coast	2007, 2009	*Novolazarevskaya* Station	AARI
Environmentally friendly penetration and comprehensive study of the subglacial lake *Vostok*	*Vostok* Station	2007–2009	Laboratory and deep bore hole at *Vostok* Station	AARI
Glacio-geophysical study along the ice flow running through the subglacial lake *Vostok* (Antarctica)	Lake Vostok – Iceshed at (76–78° S, 95–110° E)	2007–2009	Portable laboratory mounted on caterpillar	AARI
Studying the ice flow of continental ice in East Antarctica	Queen Maud Land, Enthusiasts' outlet glacier	2007–2009	Ground base	IG RAS
Location and temporarity of snow-ice characteristics and dynamics in Antarctica during climate change	King George Island and Princess Astrid Coast	2007–2009	*Bellingshausen*, *Novolazervskaya* stations	IG RAS

Continuation of table

Name of Event	Location of work	Expedition period	Main Observational Platform	Main Organi zation
Age of permanent ice in Antarctica and its relevance to Earth sciences and astro-biology	Antarctic Dry Valleys	2007–2009	Fieldcamp	IPP and BPS RAS
Comprehensive monitoring of permanent ice and soils in Antarctica and Sub-Antarctic	King George Island (Waterloo), Schirmacher Oasis, Region of *Progress* Station	2007–2009	Geo-cryological sampling station at *Bellingshausen*, *Novolazervskaya* and *Progress* stations	AARI
Comprehensive monitoring of the natural ecosystems in the area of the Antarctic Peninsula	King George Island	2007–2009	*Bellingshausen* Station	AARI
Evaluation of the condition of key populations of sea birds in Antarctica	East Antarctica	2007–2009	*Mirny* Station	AARI
System testing for remote monitoring participants' health	Coastal areas by Russian stations	2007 and 2008	*Bellingshausen*, *Novolazervskaya*, *Mirny*, *Progress*	AARI
Research into subglacial environment and lithosphere of Eastern Antarctica	Sector between 75 and 90° E Princess Elizabeth Land, Wilhelm II Earth)	2007–2009	DC-3 Aircraft (with ski landing gear) ALCI company	PMGE
Setting up and servicing of permanent, automatic satellite receive in summer seasons	King George Island	Season 2007-2008	*Russkaya* and *Leningradskaya* field bases	Aerogeo-deziya
Geological and geophysical research into MacRobertson Land (as part of the 52nd RAE)	MacRobertson Land	2007	Aviation	PMGE
Geological and geophysical research into MacRobertson Land and Princess Elizabeth Land (as part of the 53rd RAE)	MacRobertson Land and Princess Elizabeth Land	2008	Aviation	PMGE

PAN ARCTIC ICE CAMP EXPEDITION (PAICEX-2007)

Climate change in the Arctic for the last 20 years has been more noticeably in the Canadian sector of the Arctic Ocean, where there have been changes in the physical, chemical and biological properties of the sea ice and surface water. It is important to understand whether the changes in the Canadian sector are typical of a local pattern or whether they are connected with the processes of global warming and the salination of surface water as a whole for the entire ocean?

The area near the pole was chosen for carrying out an expedition for two reasons. Firstly, multiple season sea ice, forming in the Arctic Ocean is carried away from the Central Arctic basin, mainly via the North Pole to the Fram Strait, therefore by organizing a medium scale observation in the circumpolar region it may be possible to receive information on the typical processes in the water-ice system formed earlier in the central basin. The thickness of the layers of snow and ice, their physical-chemical properties, information on the specific structure of the ice biotae and plankton as a whole might be indicators of change and tell us about the state of the ecosystems in the sea ice and the water stratum under the ice in the Arctic Ocean with current climate change. Secondly, for carrying out a large scale, for example, hydro-physical survey of this area it is necessary to have not just one but several ice stations where it would be possible to carry out multifunctional oceanological research. It is specifically the use of several stations which enables us to receive statistically significant information about medium scale processes in the central region of the Arctic Ocean.

In order to run the research in April 2007 *Barneo* Ice Station was used as the drift station, organized in the circumpolar territory by the expedition center, *Polus*, which has a great deal of experience in organizing and supporting ice camps in the Arctic, starting with the organization of drift station *North Pole-32* in 2002.

The scientific program for the expedition is completely detailed at the site (www.paicex.ru). Here the main types of observations have been enumerated, which were included as part of the priority research work for the project while in operation.

A group photograph of members of the PAICEX-2007 expedition at the *Ivan Papanin* camp (10 April 2007)

In order to conduct research in the circumpolar area a medium sized testing area was organized in the shape of a cross. The base camp was located in the center where the axis intersect, and at the end of the axis points there were three drifting ice camps, orientated on the meridian directions of east, south and west: the base (central) and three camps – E, S and W – are stationary; in addition to the stationary camps special mobile groups are planned, with the goal of being able to carry out ice-survey work from base camp in the directions of north, east, south and West. Since research for the PAICEX program is taking place during IPY, each of the four ice camps have been named after leading arctic pioneers: the central camp has been named in honor of Ivan Dmitrievich Papanin, *Ivan*; the eastern camp has been named in honor of Evgeny Konstantinovich Fedorov, *Evgeny*; the southern in honor of Pyotr Petrovich Shirshov, *Pyotr*; and the western camp in honor of Ernest Teodorovich Krenkel, *Ernest*. The mobile camp has been named in honor of the famous polar researcher Fridtjof Nansen, *Fridtjof*. Scientific groups worked in each stationary camp, carrying out synchronized field work on an identical program for scientific research. Below is detailed a step-by-step description of the technical and scientific processes undertaken.

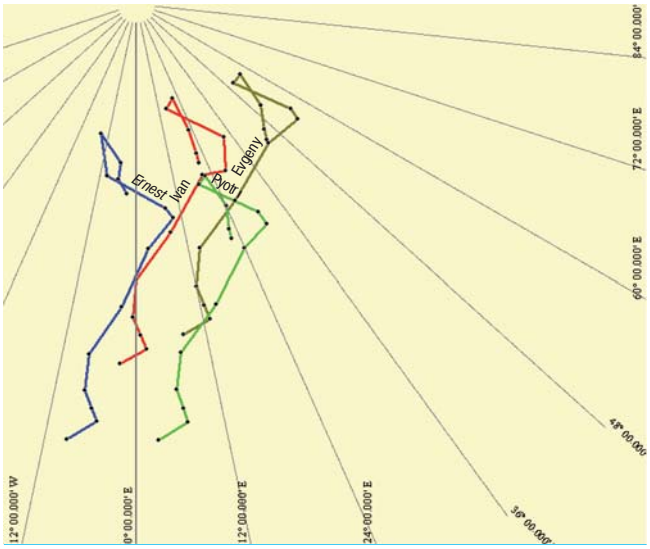
Initial Stage. 30 March 2007 all expedition members met at the base of the Shirshov Institute of Oceanology of the Russian Academy of Sciences (IO RAS), where they discussed the logistics and scientific goals of the expedition, and on 1 April flew from Moscow via Longyear (Spitsbergen) to drifting ice station *Barneo*.

Preparation Stage. The main task at this stage is adapting to the conditions, testing and intercalibrating hydrographic probes and equipment, testing hoists and equipment, training work with motorized ice equipment and core samplers, instruments etc. The idea behind such training is to be 100% certain that personnel and all necessary equipment are ready for expeditions to locations where field work will be carried out according to the PAICEX program. By evening 10 April all preparation work was complete, and on 11 April the drift stations were organized sequentially: East (*Evgeny*), South (*Pyotr*) and West (*Ernest*). Photographs were taken of all participants of PAICEX-2007 in front of flags for IPY, the Institute of Oceanology of the Russian Academy of Sciences and AARI.

Carrying out Scientific Observations. All work of the drift stations began on 12 April and was carried out synchronously in accordance with the scientific program of the expedition. The coordination of work was performed at the operation's headquarters, which maintained on a daily basis (at 9.00 am and 9.00 pm Moscow Time) satellite communication and received all information concerning the condition of the personnel, the condition of the ice, drift coordinates, weather, observations which had been carried out etc.

The mobile *Fridtjof* group, equipped with three *Buran* snowmobiles with sleighs and necessary equipment to provide for life support and to carry out scientific observations, began observing the thickness of ice and snow. From 12 to 25 April this group carried out field work in sectors to the north, south, east and west of Base Camp *Ivan*. On 26 April 2007 personnel and equipment were evacuated from the drift stations to base camp and the flags for IPY, IO RAS and AARI were taken down, signaling an end to the field stage of the PAICEX.

Several results from the observations. Drift Observations. Each of the ice stations had their own GPS navigation system from Garmin to record drift coordinates. The picture shows daily drift as measured at 9 am at each of the stations.



The drift of ice stations *Ivan* (red), *Evgeny* (brown), *Pyotr* (green) and *Ernest* (blue) on 11- 26 April 2007 in the circumpolar region of the Arctic Ocean

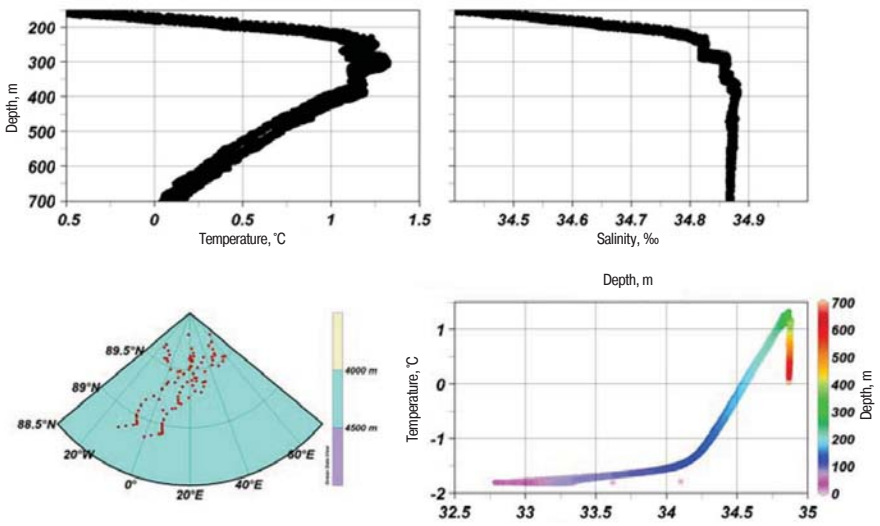
Meteorological Observations (carried out by A. Bezgreshnov and O. Andreev, AARI). As a whole the weather system in the polar region during the stipulated period was characterized by cyclonic weather patterns. In the Icelandic energy zone powerful cyclogenesis took place which is characteristic of this time of year. A trough of low pressure stretched out from Iceland along Greenland through the Svalbard Archipelago to the Novaya Zemlya Islands. A series of cyclones came in this direction. The movement of cyclones and their development was of a pulsing character. A sharp increase in speed and a reduction of movement within the center of the vortex, their deepening or filling out were noted.

An expedition snow survey was carried out twice in the area of base camp *Ivan*. The average properties of the snow during the expedition period were: snow thickness – 26 cm, density – 330 kg/m^3, Albedo of surface snow – 90%.

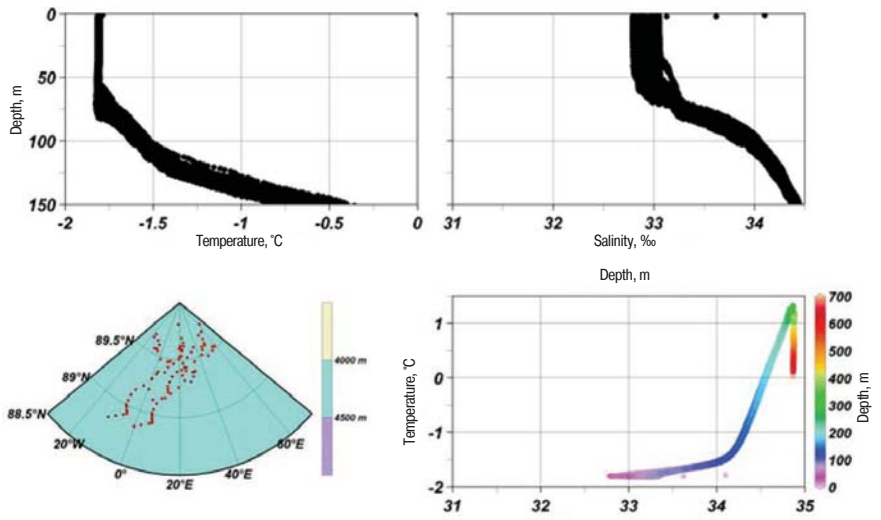
Hydrographic Observations (carried out by S. Pisarev, S. Kremenetsky and S. Dikarev, IO RAS, S. Kuzmin, AARI). To measure the vertical temperature profile and salinity profile the expedition used precision CTD sounding by Sea-Bird Electronics (USA). During the expedition 138 vertical temperature profiles and salinity profiles were collected over a total of approximately 12 days of records on changing temperatures and salinity simultaneously on several horizons for a period no longer than three minutes, four series of measurements for the vertical profile of current speed with a total duration of 16 hours were carried out, one 5-hour recording of current speed variability and salinity variability in the layer of density contrast was received.

The temperature of transitional Atlantic waters in the polar region continues to remain higher on average with the medium "climatic" characteristics, received for the winter season (November-May) during 1950–1990. The maximum temperature of Atlantic water in the area of work according to climatic data is no greater than 0.8°C, and the average maximum temperature during our measurements was 1.2°C. The average depth of the stream for the upper boundaries for Atlantic water during our measurements was 190 m, and according to climatic data this is exactly 220 m. All this is evidence of an increase in the warmer temperature of Atlantic water in the polar region of the Arctic Ocean in comparison with climatic data.

The second indisputable difference in the results of the hydrographic measurements from climatic data is the relative increase in the salinity of the upper 40–50 m. The observed increase in salinity of the upper layer and the constancy of the horizon of the basic halocline leads



The temperature and salinity distribution in the layer of Atlantic water according to all CTD-soundings on PAICEX. On the map red dots show the location of all active stations, in the graphs – measurements are indicated in black and colored lines.



The distribution of temperature and salinity in the surface area of Arctic water according to information from all CTD-soundings performed during PAICEX. On the map red dots show the location of all active stations, and in the graphs – measurements are indicated in black and colored lines

to the significant reduction of the salinity gradient in surface arctic water. A reduction in the salinity gradient determines the reduction of density gradient, and consequently, is responsible for the conditions enabling a relative intensification of the increase of warm Atlantic water into area with ice.

Ice research (carried out by T. Petrovsky and A. Klenov, AARI; Yu. Evdokimov, IO RAS). Measurements of the thickness of snow and ice were carried every 100 m in northern, southern, eastern and western directions. Drilling was carried out using the Tanaka drilling rig with a Kovaks auger. The average thickness of the ice on the north-south segment was 172 cm (8,700 m, 72 measurements), and on the east-west segment 179 cm (7,400 m, 72 measurements). On the geographical pole the thickness of the ice according to three measurements was 188 cm. It is important to note that from the 147 samples for ice thickness, the thickness of the ice only exceeded 2.5 m on three occasions!

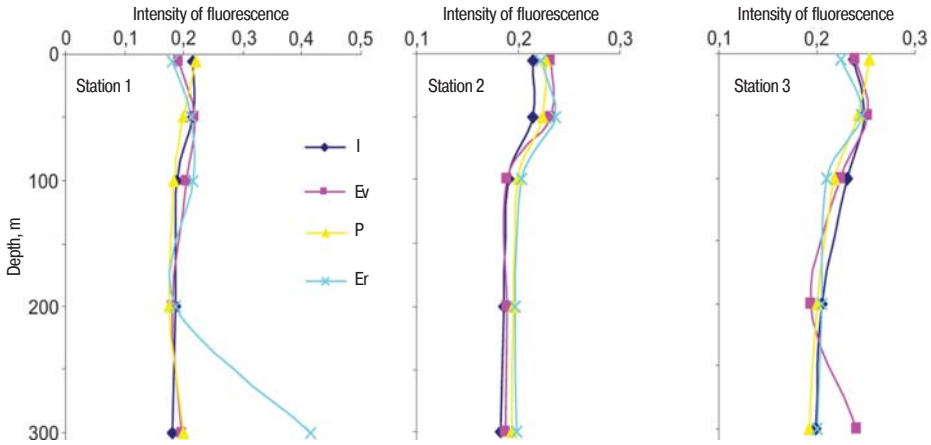
Hydrochemical Research (carried out by P. Khlebopashev, IO RAS). During the field work bathymetric sampling was taken of water in the layer from 0–300 m in depth. The depth points for the samples were chosen after hydrographic sounding and receiving profiles for the distribution of temperature and salinity in the area of the drift camps. The samples were taken in coordination at the same depth, and at the same time in accordance with the distribution of the hydrographic parameters. It was important to receive data on the hydrochemical properties for the entire profile from the surface ice to the upper layer of the Atlantic water mass.

Graphs have been drawn up with the distribution of the intensity of fluorescence in the water from 0–300 m at the bathymetric station 1, taken on 13.04.07 at each of the drift stations: *Ivan*, *Evgeny*, *Pyotr* and *Ernest*. The readings for the distribution of fluorescence have an identical tendency to increase insignificantly from the depth of 50 (pycnocline) to 300 m. In both cases the increase, probably, is determined by the accumulation of organic chlorophyll bearing particles on the boundaries of the layers of water with different density. The overall magnitude of the fluorescence is small, within the boundaries of 0.90–0.22 units, which is most likely connected with the low photosynthesis activity of phytoplankton in this time of year.

Biological Research (carried out by I. Melnikov, IO RAS). Research work into plankton was performed once every four days. All catches were done using a Juday net with an opening aperture of 37 cm; the speed of lift in the net at the moment of sampling was 20 cm/sec. The depths and sequence of takes were as follows: 50–0, 200–0 and 300–0. Apart from sampling at the ice stations, on 22 April 2007 a vertical sample of plankton was taken at the standard depths and locations of the previous samples.

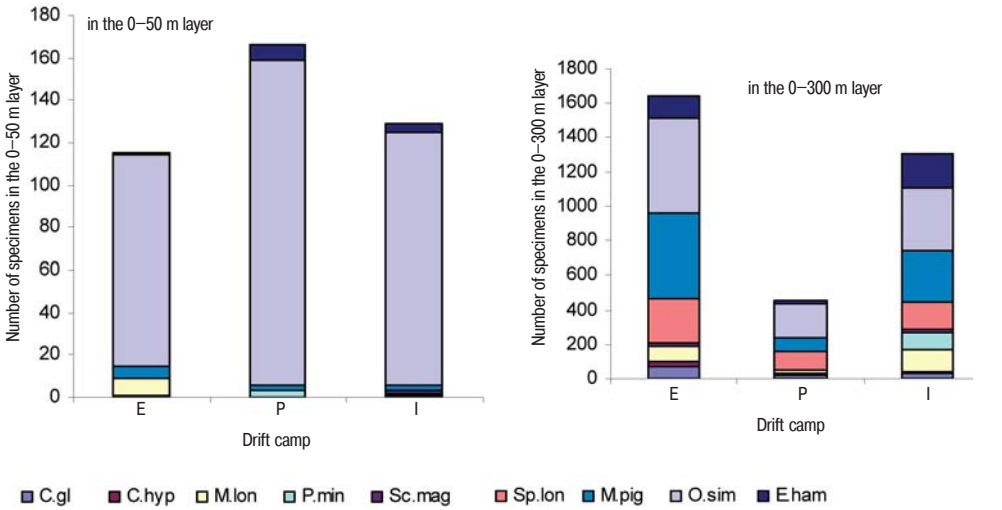
The number of specimens of dominant plankton species was ascertained for the depths of 0–50 and 0–300 m according to the data of the vertical samples at station 1 (13 April 2007), at the camps *Ivan*, *Pyotr* and *Ernest*.

A graph has been drawn up to show the interdependence of the number of specimens from dominant



The intensity of fluorescence as an indicator as to chlorophyll in the water at depths from 0–300 m according to the observations at the camps *Ivan*, *Evgeny*, *Pyotr* and *Ernest*

species of zooplankton in the layer 300–0 and 50–0 m at each of the stations. In total 25 taxons have been identified, of which 13 types come under the category of *Copepoda*. Data concerning the ratio of zooplankton species (*Calanus glacialis*, *Calanus hyper-boreus*, *Calanus spp.*, *Metridia longa*, *Pseudo-calanus minutus*, *Scap-hocalanus magnus*, *Spi-nocalanus longicornis*, *Microcalanus pygmaeus*, *Oithona similes*, *Eukrohnia hamata*) demonstrates that the interspecies correlation is more or less preserved throughout all the measuring points, but in the 0–300 m layer they change significantly, especially at station *Pyotr*, which may be a reason for the spatial heterogeneity in the distribution of zooplankton along depth. The information for the 0–50 m layer demonstrates that in this time of year the surface of the Arctic water is inhabited by almost one species – *Oithona similes*, other species, for example *Calanus glacialis*, were only ever encountered as 1–2 specimens.



The number of specimens of dominant species of zooplankton in the 0–50 and 0–300 m layers as per results of the vertical catches at Station 1 (13.04.07), "*Ivan*", "*Pyotr*" and "*Ernst*" camps

The collection of ice cores to study the species making up the flora and fauna of the ice, salinity measurements, concentration of minerals such as silicon and phosporus, and also the make up of chlorophyll (according to the intensity of flourescence) was carried out at all drift camps, including collection of core samples from the North Pole.

Cryopelagic Research (carried out by I. Melnikov and Yu. Evdokimov, IO RAS). Measurements were taken for salinity, temperature, pH photosynthetic active radiation in the contact layer of water and ice using a hydrographic sounder. The timetable was made for T/S-distribution on 6–25 April.

Excitation of the subglacial layer clearly took place in both the temperature and salinity between 12 and 17 April, when a powerful atmospheric cyclone with gusts of wind up to 20 m/sec came through the area of the drift station and air temperature fell to -25°C. The force of the wind, probably, enabled the dispersal of the ice mass, on which ice station Ivan was located with the hydrographic sounder, and this mass of ice boar the brunt of the wind's energy and caused the disturbance in the surface water in contact with the ice.

25 April during diving beneath the ice samples were taken of the cryopalagic fauna with a net for collecting plankton samples from the under surface of the ice. Preliminary analysis of the plankton taken shows that in the sample young amphipodal plantlife is predominant with a body size of 2–3 mm (thought to be *Apherusa glacialis*). In addition to the dominant species as far as quantity in the sample (the sample contained more than 200 specimens) single specimens of *Oithona similes* and *Calanus glacialis* were found. In the 200 ml sample of water the measured salinity came to 16‰, which indicates the beginning of the thawing season this year in the circumpolar region of the Arctic Ocean.

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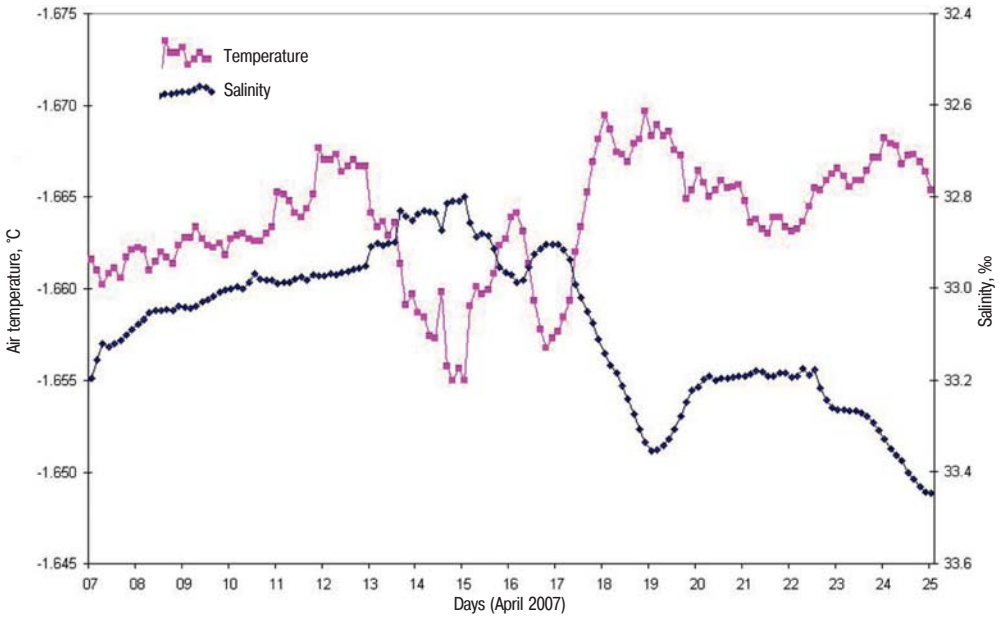


Dynamics of temperature distribution and salinity in subglacial water on 6–25 April 2007(PAICEX-2007)

INTEGRATED HYDROMETEOROLOGICAL RESEARCH BY AARI OF ROSHYDROMET ON WESTERN SPITSBERGEN ISLAND IN 2007

In 2007 AARI of Roshydromet continues research on the project for the Study of Meteorological Systems and Climatic Changes in Svalbard Archipelago, taking part within the framework of a government contract for the financing work (services) carried out by Russian organizations on the Svalbard Archipelago and paid for out of the federal budget of 2007. The emphasis on 2007 is because the research is taking place as part of IPY-2007/08 which assumes the strengthening of international, scientific cooperation. As part of this cooperation and coordination during the execution of research programs, intercalibration of equipment and agreement of forms and procedures for information management etc. take on a significant importance.

Expedition research takes place in two stages: spring and summer.

From 15 April to 4 May the spring stage of the expedition to Svalbard Archipelago took place, going to the outskirts of Grenfjord Bay. In the process of carrying out expeditionary work meteorological and glacio-hydrological research will be carried out. The expedition team is made up of six people, specialists in the field of geomorphology, meteorology and hydrology.

Precipitation during the winter period in the Arctic is accumulated in the form of snow. Therefore researching the annual dynamics of the snow cover during the period of its maximum gain will enable us to evaluate the changeability of its role and interaction in the ocean-atmospheric zone of the Spitsbergen current (a current of warm Atlantic water) as a climatic indicator, and also to get some idea of the quantity of fresh water which enters the fjord during the shrinkage of ice, influencing the balance of freshwater.

In order to receive information which would characterize the quantity, structure, density, physical and mechanical properties of the snow cover in the outskirts of Barentsburg, the expedition hydrological group carried out work measuring snow on the catchment basin of large rivers in Grenfjord Bay.

The distribution of precipitation throughout the catchment basin of Grenfjord Bay was highly uneven. According to the average seasonal volume of catchment in the basin of Grenfjord Bay it is possible to divide it into two types of water catchment: glacial and valley. The differences in the character of the distribution of snow in these catchments are caused mainly by differences in the average altitude of the water catchment. The majority of the volume of the catchment is characteristic for the West Grenfjord glacier and equal on average to 743 mm (water equivalent) with the average altitude of the basin of 350 m. The smaller volume of water catchment in the snow cover (on average 214 mm) was noted on the water catchment basin of Grenfjord, with an average altitude not exceeding 100 m. It is necessary to observe that for the entire period of observations concerning the snow cover of the catchment basin of Grenfjord (2002–2007) the amount of snow this year falls within the normal range.

The maximum catchment of snow on the Bering glacier is being studied with the purpose of determining the volumes required for the replenishment of the fresh water lake Biende-Stemme, which provides drinking water for Barentsburg. The average statistic value for the total catchment area of snow cover for spring 2007 on the Bering Glacier was 656 mm (water equivalent). It is possible to suggest that this will be sufficient for the normal provision of water to the settlement.

Studying the chemical composition of the snow cover will enable us to determine any basic pollutants in the current region, their sources and trace of their movement.

Special meteorological observations were taken during the expedition by the meteorological team in the area of the *Barentsburg* hydrometeorological observatory, which will enable us to receive representative information on the quantity of solid atmospheric precipitation and carry out methodical adjustments to the data received from the Tretyakov precipitation gage. Also with the purpose of developing methods for comparative measurements between Russian and foreign made instrumentation during the expedition solar radiometry observations were carried out.

On 1–31 July the second stage of the field research will be undertaken. The main goals for the expedition at the second stage are:

– studying the water balance in Grenfjord Bay;

– determining the make up of the balance of departing ice mass from the glaciers of Aldegonde, West Grenfjord and Vering;

– receiving information on the changeability as regards to time and space of water characteristics in the coastal zones of Svalbard Archipelago;

– research into the reflective qualities of the surface snow of the Aldegonde glacier during the period of thaw;

– reconstruction of the changes of the paleo-geographic condition of the coastal region of Gren-fjord at the end of the Holocene.

The expedition will include S.M. Pryamikov (project leader), I.Yu. Solovyanova (expedition leader), V.A. Gorovoi (engineer-hydrologist), D.I. Golub (student, Russian State Hydrological University, engineer-hydrologist), V.O. Plekhanov (student, St. Petersburg State University, engineer-hydrologist), M.V. Tretyakov (engineer-hydrologist), O.F. Golovanov (engineer-hydrologist), G.A. Medvinsky (student, St. Petersburg State University), G.A. Ragulina (student, St. Petersburg State University, engineer-meteorologist), M.V. Dorozhkina (engineer-geographer).

S.M. PRYAMIKOV,
I.Yu. SOLVYANOVA (AARI)
Photo S.M.PRYAMIKOV

COMPARATIVE RADIOMETERSONDE OBSERVATIONS AS PART OF IPY-2007/08 PROGRAM FOR THE SVALBARD ARCHIPELAGO

The international practice of comparison and joint analysis of historical and contemporary data from radiometersonde observations, received in various countries, indicates the necessity of carrying out important procedures associated with comparison of readings from instruments used, in particular, at Russian and Norwegian meteorological stations.

From the beginning of regular Russian radiometersonde readings in the Franz Josef Land archipelago (Heiss Island) and in the Svalbard Archipelago (Barentsburg) until today (only on Svalbard Archipelago) the observation program is based on the use of standard Russian sensors (the Yanishevsky-Savinov pyranometer M-80 or M115-M). At present at the base of scientific stations from a series of countries from Europe, America and Asia (Norway, Germany, Italy, UK, France, the USA, Japan, South Korea and China), compactly located in the Norwegian settlement of Ny-Alesund, all radiometersonde measurements are combined into a single measurement network as part of an international program the *Large Scale Facility of Ny-Ålesund*. Furthermore the shortwave and longwave balance of the underlying surface is to be registered separately.

As a rule, the countries listed make use of the universally accepted Epply and Kipp&Zonen instruments. The inclusion of Russian observations in this network at Barentsburg is an extremely rational and necessary inclusion. The preliminary negotiations with representatives from the Norwegian Polar Institute (NPI) and the Norwegian Meteorological Institute (NMI) have shown promise in carrying them out. This was expressed by a proposal to include Russian observations in the network and carrying out observation as part of the calibration research program with the use of Russian and Norwegian equipment.

The technical possibility of carrying out comparative measurements was approved in May 2002 when, at the Norwegian research station, *Sverdrup*, at Ny-Ålesund the first Russian pyranometers were installed to operate side by side with the Norwegian ones. The proposed research will enable us to receive representative data for joint analysis, to detect (in event of their presence) the consistent divergences between Russian and foreign sensors and to take into consideration these corrections when analyzing contemporary and historical data aimed at comparative research as to the radiation climate of the current region. In particular, in the capacity of more representative and long term stations to serve as bases for comparative climatic research it is suggested to use the radiometersonde data from the Russian station at Heiss Island (Franz Joseph Land), *Barentsburg* (Svalbard Archipelago) and the Norwegian stations in Ny-Ålesund, Longyearbyen, Icefjiorden Radio (Svalbard Archipelago).

In an application by AARI to the IPY program Researching Radiation Climatic Factors and Meteorological Systems of the West Arctic, based on data received from Observations in the Svalbard Archipelago (Barentsburg, Ny-Ålesund), Franz Joseph Land Archipelago (Heiss Island), Novaya Zemlya (Malye Karmakuly) (N 729 by classification) providing for "carrying out, during IPY,

The site for comparative meteorological observations at *Barentsburg*

a series of joint measurements, using standard Russian and Norwegian radiometersonde sensors, evaluation and analysis of possible divergences". As a result of carrying out these experiments it is planned to receive "quantitative evaluations of possible discrepancies in readings from standard Russian and Norwegian radiometric sensors", to develop "methods and recommendations for comparative climatic analysis".

Unfortunately, we do not have available precise historical data about the time and content of radiometersonde observations in *Barentsburg* in the second half of the twentieth century. The station has changed its position several times as a result of the increasing size of the settlement and its manufacturing structure.

At present the meteorological-radiometersonde site is located in the south-east section of the settlement on one of the terraces of the Olaf Ridge, at a height of 73 meters above sea-level. This took place in February 1984 based on an instruction from Roshydromet No. 134 from 6 June 1983. The station records the hourly total of solar radiation with the help of the integrator X-607, and from February 2006 to the present day using the Peleng system (manufactured by the Republic of Belarus).

As part of an integrated AARI expedition which has been carried out in Svalbard Archipelago since 2001, in *Barentsburg*, the first calibration measurements were carried out with the participation of Russian and foreign standard, radiometersonde sensors (pyranometer M115-M and Dutch sensors CM6 and CM11 from Kipp&Zonen). The pyranometer CM6 was kindly provided by researchers at the Voeikov Main Geophysical Observatory, L.V. Lutsko and S.A. Sokolenko, and the CM11 arrived from the Norwegian station *Sverdrup*, belonging to the NPI. Also, for measuring Albedo, we have set up a pyranometer M115-M in a drive shaft (a mobile albedometer) in close proximity to the station. To record the readings a multi-channel analog-digital converter BTsA-8 from the Central Construction Bureau for Hydrometeorological Inventions, Obninsk (now Typhoon, developer V.A. Malyshev) is used. The data, with a 10 second increment, is recorded in real time for use on a personal computer set up in the zonal hydrometeorological observatory. Development and critical oversight of incoming data is maintained. The specialists at the Zonal Hydrometeorological Observatory are a great help in carrying out the measurements, in particular: the station chief A.V. Grablenko and the hydrometeorologist S.V. Kashin. The preparation and organization of work within the IPY program were carried out with the constant support of the management of the Murmansk AHEM especially from Director A.V. Semenov and Deputy Director A.A. Davydov.

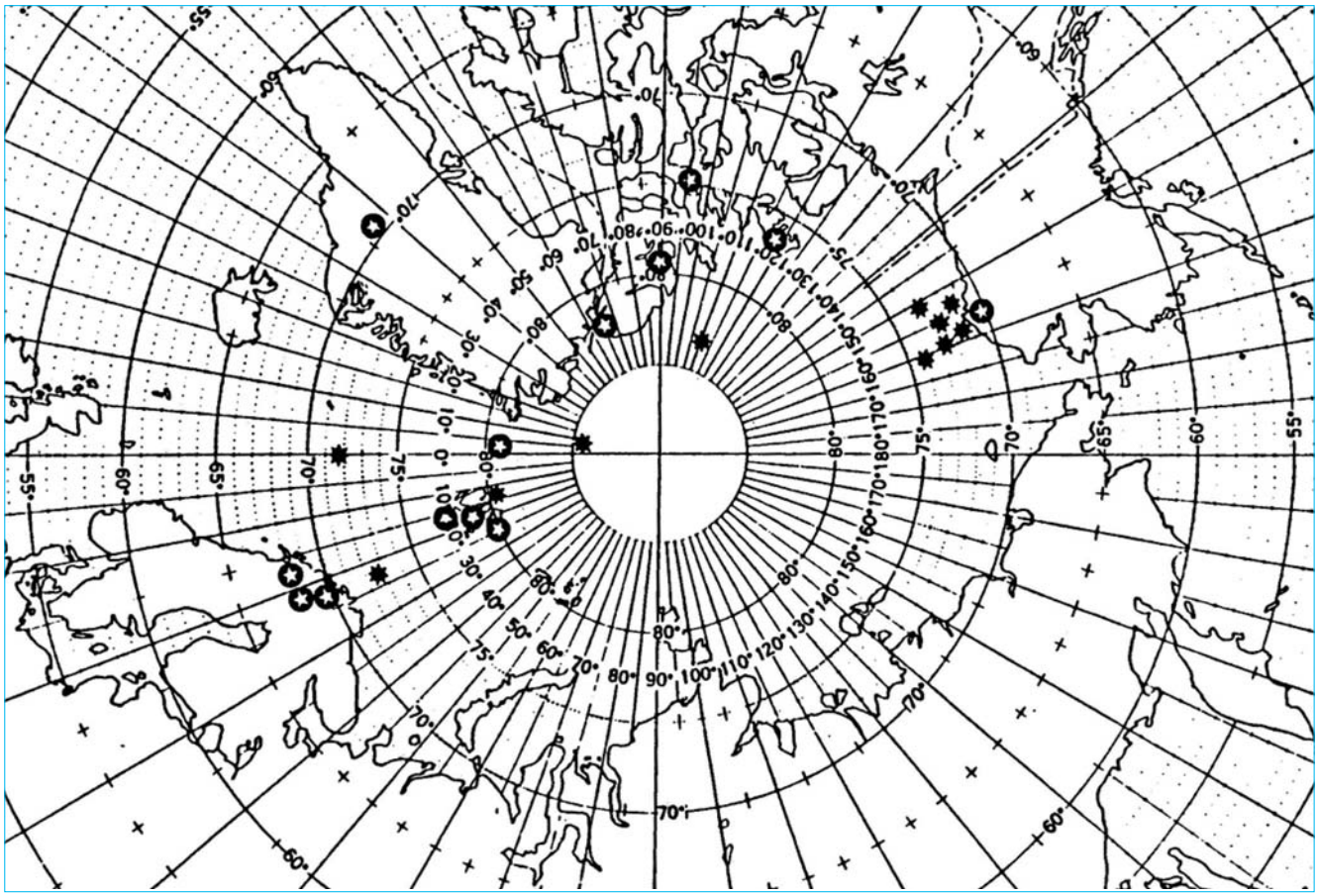
Apart from the work being carried out at the Norwegian settlement of Ny-Alesund other actinometric research is being done at the Polish station in Hornsund (the southern part of Western Spitsbergen). In April 2007 with the support of researchers from the Institute of Geography attached to the Russian Academy of Sciences a Russian pyranometer M-80 was installed for analog comparative measurements with sensors from Kipp&Zonen, used by Polish researchers. In this way, with the successful conclusion of preparation the calibration of measurements is an integral part of Roshydromet's international activity during IPY and will be significantly enhanced.

We believe that broadening the series of standard actinometric tests in Barentsburg is absolutely necessary. It is the western most Russian station in the Arctic. It is located in one of the key regions in western Arctic, in the Fram Strait, in terms of the interaction between ocean and atmosphere. Long-term meteorological observations in this location enable the objective analysis of previous and current climate in the polar latitudes. Extending the current observations and corrective analysis (and often simply searching) for historical data is the key to understand complex, climate shaping processes, objective analysis and rational interpretations of the processes behind global warming on the planet as a whole and in the Arctic in particular.

B.V. IVANOV (AARI)

EXPEDITION RESEARCH INTO THE LEVEL OF POLLUTION OF THE SNOW COVER IN THE ARCTIC

Since the beginning of the 1980s a large amount of attention has been focused on the phenomenon known as Arctic fog. During winter and spring in the Arctic the levels of greenhouse gases in the atmosphere are comparable to those in more moderate latitudes. Furthermore, analysis of results from measuring greenhouse gases in the atmosphere demonstrated a steady increase in the amount of human caused greenhouse gases in the atmosphere, starting from the mid 1950s. They are carried into the Arctic by air masses from moderate latitudes. A significant portion of these consist of carbon dioxide. Precipitating on the surface they build up during the winter in the snow. In this manner, the contents of CO_2 in the snow cover can be one of the characteristics of the overall impact of anthropogenic sources of pollution located beyond the Arctic on the

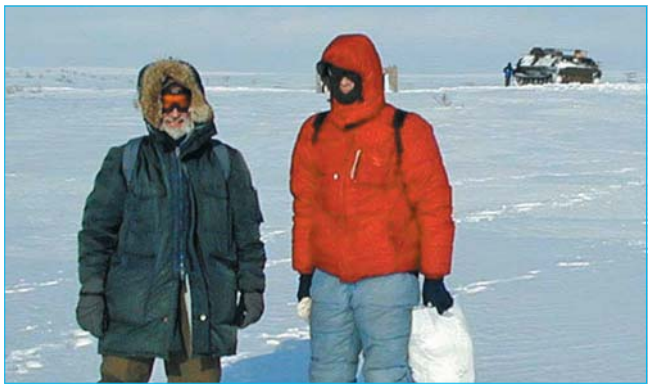


Locations for taking air samples (dots) and snow samples (circles) in 1983–1984

Arctic environment. Furthermore, snow pollution changes its reflective properties – albedo. Consequently, the amount of albedo determines the amount of reflected energy, and thereby the amount of solar energy absorbed by the snow surface. That is to say that the level of pollution in the snow surface directly effects such important factors for creating the climate as albedo and the quantity of reflected and absorbed solar energy. In 1983–1984 in the territory of Alaska, the Canadian Archipelago, Greenland Icefield, Lapland, Svalbard, and also on the sea ice of the Fram strait, specialists from University of Washington, USA, carried out research into the pollution levels of snow and ice by CO_2 particles. Measured more than 20 years ago, the concentrations of CO_2 in the snow cover in the Arctic varied within the range of 5– 50 ppb. On Russian territory such observations have not been carried out.

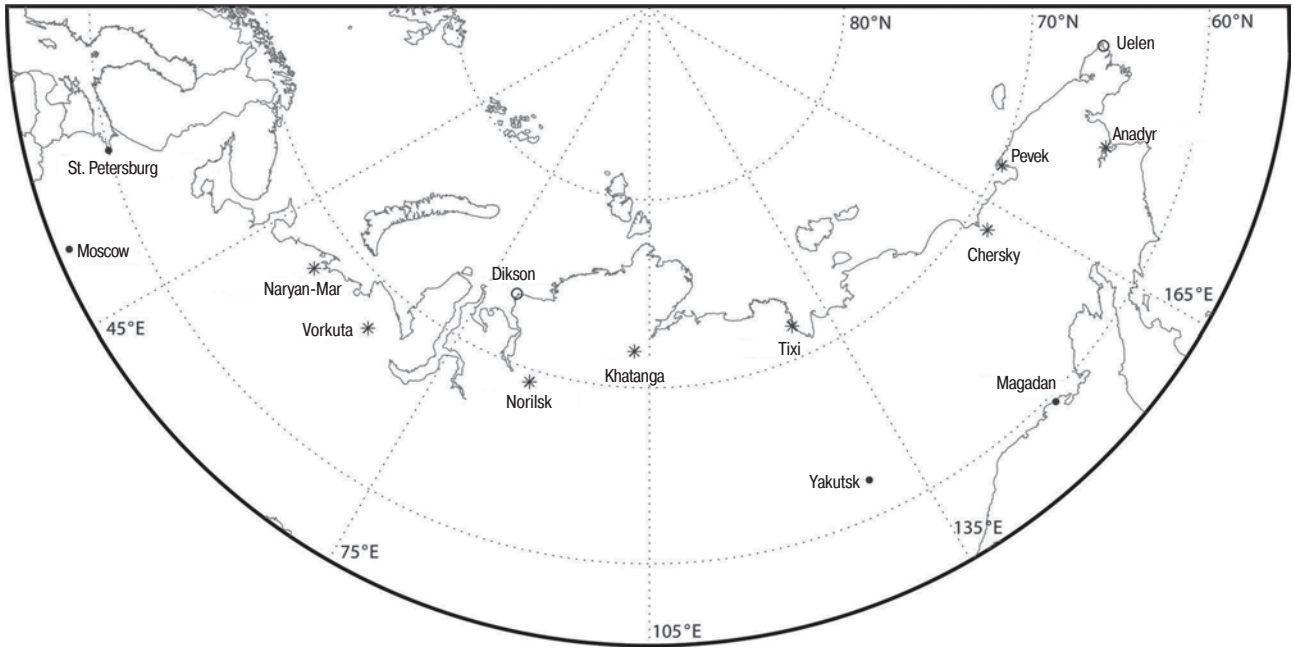
In the last two decades the circulatory system of the atmosphere has changed, determining the amount of particulates carried from moderate latitudes to the Arctic. During this time there has been a significant reduction in the quantity of waste discharge from anthropogenic sources. However, from the beginning of the 1990s the data from direct and circumstantial observations for the levels of greenhouse gases in the atmosphere and the surface of the Russian Arctic has been absent.

At the suggestion of scientists from the University of Washington (Seattle, USA) a joint project was developed



Our team. Thomas Grenfell and Mikhail Lamakin near Naryan-Mar

Steven Hudson and Valery Ippolitov at a snow sampling site in Khatanga



Locations for taking samples of the snow cover in the Russian Arctic during IPY

along with AARI to measure the pollution levels of the snow cover and glaciers in the Arctic. The plan included a scientific program which would be implemented as part of the Russian Federation's involvement in IPY-2007/08 under the name of *Black carbon in Arctic snow and ice, and its effect on surface albedo*. The project intends to study the pollution levels of CO_2 in the snow cover during the maximum period for snow fall (March-May) on the coast of the Russian Arctic, Greenland, Central Arctic Basin, Alaska and northern Canada, Canadian Arctic Archipelago, Iceland. Its goal is to receive objective data on the pollution levels of CO_2 on the snow and ice surfaces and evaluate their impact on the reflective properties (albedo) of the surface and the properties of solar and thermal radiation of the underlying surface-atmosphere in the Arctic.

Specialists from AARI will participate in project implementation, as well as researchers from the Russian State Museum for the Arctic and Antarctic and the University of Washington. The joint Russian-American research in the Russian Arctic assumes that snow samples will be taken from Russia's Arctic coast and the following analysis will be carried out jointly with samples from other regions of the Arctic. It is thought that volunteers from different countries will take snow samples in the Arctic zones of Canada, Greenland, Iceland and Norway, in the Svalbard Archipelago and in the Central Arctic Basin.

In April–May 2007 specialists from AARI and the Russian State Museum for the Arctic and Antarctic along with scientists from the USA carried out field work to collect snow samples in the western region of the Russian Arctic. The Americans were represented by Professor Tomas Grenfell and Ph.D student Steven Hudson from the Department of Atmospheric Sciences, University of Washington, Seattle, Washington, USA.

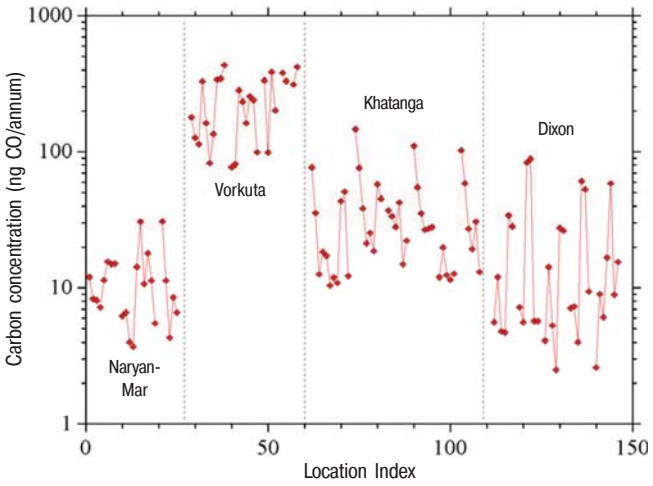
Taking snow samples

Steven Hudson filters snow samples

Typical filters, Naryan-Mar. A high level of blackness indicates extremely high levels of pollution

Samples were taken not far from Naryan-Mar, Vorkuta, Dikson, Khatanga. In each region we worked in five-six locations at a distance of 20–50 from populated locations. This enabled us to reduce as much as possible influence from local sources of pollution and receive information on the levels of pollution for a sufficiently large region. The samples were taken from three to four levels of thickness from the snow cover. The density of the snow was immediately determined at this depth. The snow samples were quickly thawed in a microwave oven and the water was filtered through policarbon filters with a size of 0.4 microns. Each filter with greenhouse gas particles was compared with standard filters with well-known carbon content. In this way the general carbon and particulate levels were determined.

The preliminary results of the measurements are shown on the graph. It is clear that in each region there was significant fluctuation in the levels of pollution. The lower levels of the results are characterized by changeability associated with annual factors and the occasional movement of transport in the proximity of the areas where samples were taken. They changed from between 5 to 20 ppb in the outskirts of Naryan-Mar, Khatanga and Dixon. In the region of Vorkuta the minimum readings were near 100 ppb. It is clear that in the region of Vorkuta all locations where samples were taken had been contaminated by local sources of pollution, although the samples had been taken more than 30 km from the city.



Preliminary results of the effective concentration of pollution in the snow for all samples. Samples were taken from three to four layers of snow

The filters with greenhouse gas particulates from the collected snow samples on them will be further examined using photometry and an electrical microscope at the University of Washington for a more precise analysis of the actual scale of pollution in the snow cover and also the size and type of the particulates.

The results from the observations from the project will make it possible, in the first place, to determine the current level of greenhouse gases in the region of the Russian Arctic and compare that with the pollution in other parts of the Arctic.

The results of similar studies in different regions of the Arctic are shown on the website www.atmos.washington.edu/sootinsnow.

It is suggested to continue this research in the eastern, coastal section of the Russian Arctic in 2008 in order to get a complete image of the level of pollution in the Arctic environment in general. All data from the research will be available to all participants of the project.

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T. GRENFELL, S. HUDSON
(UNIVERSITY OF WASHINGTON, SEATTLE, USA)

HEALTH PROTECTION FOR THE POPULATIONS WITHIN POLAR REGIONS OF THE RUSSIAN FEDERATION AS PART OF THE FRAMEWORK FOR THE TELEMEDICAL SYSTEM FOR PREVENTING ILLNESS

Health protection for people working and living in polar regions is one of the main direction of research for the scientific program included as part of Russia's participation in IPY-2007/08. It is specifically mentioned in the section of the program entitled "Quality of Life for the Population and Social Economic Development of Polar Regions" that an important goal is the improvement of life quality of indigenous populations and those living in remote, inaccessible regions of the Far North and other such regions by providing full medical services and reducing risks from negative environmental factors on the health of citizens. It is impossible to achieve such a goal without providing a functioning system for medical examinations which at present are practically absent in Russia's polar regions. Therefore it is necessary to start with restoration of a system for general, preventive examinations.

Prophylactic treatment would play a great role in reducing illness and death among the population and increase life expectancy. International experience demonstrates that the main non-infectious diseases can largely be prevented by preventative measures aimed against the main risks. Prophylactic care for illnesses is included in priority programs for health protection in all countries around the world. Evidence of this can be seen by the constant participation of states in prophylactic programs run by the World Health Organization (*Fact Sheet for surgeon-generals. WHO Documents and International Projects*, July 2005).

In Russia the activities of medical organizations for matters concerning prophylactic treatment are regulated by such documents as the Order by the Ministry of Health of the Russian Federation N 455 from 23 September 2003 "On the Improvement of the Activities of Health Care Agencies and Organizations for Prophylactic Treatment of Illnesses in the Russian Federation" and the Framework for Health Protection for the Healthy in the Russian Federation (appendix to the Order by the Ministry of Health of the Russian Federation N 113 from 21 March 2003 "On Confirmation of the Framework for Health Protection of the Healthy in the Russian Federation"). The framework, in particular, specifies that: "An analysis of the problems in health protection for healthy citizens of the Russian Federation demonstrates that it is extremely relevant as a factor in the national security and strategic aims of the Russian health system".

An especially acute problem is foreseeing illnesses in polar regions, where qualified, fully effective medical assistance is practically inaccessible on account of the large distances to medical and prophylactic facilities. In such conditions there is a high risk for members of polar expeditions, operating in the Arctic and Antarctic as well as residents on islands and along the coastal regions of the Arctic Ocean. The protracted isolation and extreme climatic conditions intensify the complexity of providing assistance to these regions even when there are medical specialists present. The limited medical equipment and medicines available and the narrow specialization of medical personnel or the complete absence of any of the above make the task of providing full medical support extremely difficult. However, if it is impossible to provide medical treatment, then at least it is possible to reduce the risk of illness to a large extent. For this it is necessary to resolve three issues:

1) increase the quality of medical selection commissions,

2) establish a monitoring system for adaptation process and main health indicators during visits by specialists on expeditions,

3) provide highly qualified professional help as soon as symptoms or illness are noticed.

The enumerated tasks can be resolved as part of a single technical solution for remote prophylactic treatment. Before describing the concept of such a system, it is sensible to examine the existing problem of developing a medical information system at regional and federal levels.

The delay in providing prophylactic health care treatment could be compensated for by the installation of IT communication technology. This suggestion has been confirmed by the trial of pilot projects within Russia. For example, the System for Prophylactic Measures and Health for Russia's Population, which was carried out in 1997–2001 with the support of the European Community, gave us, in particular, experience of adopting new methods for monitoring the health of regional populations (http://zdravinform.ru/ dev/html/rus/projects/pr_passport.php). However, practically all known Russian projects connected with prophylactic treatment of populations can be classified as organizational and do not touch the possibility of technical support and solutions which are logical given the nature of the task. Examination of numerous sources on the internet and in print on the subject of medical information systems shows that there are practically no publications accessible concerning system analysis for technical approaches for prophylactic treatment using contemporary information technology. In particular, a large amount of information available on the internet concerning Russian development of a medical information system does not include a way of providing prophylactic treatment or includes it as an optional function (for example the GLOBUS project for the Global Fund to Fight AIDS 2004–2009; Medical Information

System: Monograph. A.V. Gusev, F.A. Romanov, I.P. Dudanov, A.V. Voronin – Petrozavodsk: PetrGU Press).

An interesting experiment in theoretic research and practical informatization of medicine with the inclusion of personal questions for prophylactic treatment of illnesses was presented by the research center for Medical Information Technology at the Institute of Program Systems attached to the Russian Academy of Sciences in the form of a description of an integrated medical information system called Interin (http://www.interin.ru or in the book by G.I. Nazarenko, Ya.I. Gulyaeva, D.E. Ermakova *Medical Information Systems: theory and practice* / editors G.I. Nazarenko and G.S. Osipova. Moscow: FIZMATLIT Press, 2005).

A review of the materials concerning the theory and practice of information systems for prophylactic treatment of illness and disease as an area of applied science for health shows that there has been insufficient study of this question. This fact has been stressed by specialists of the St. Petersburg Institute of Information Technology and Automatic Systems of the Russian Academy of Sciences for the development of a trial project which would be aimed at developing a theoretical base for creating a medical information system for prophylactic treatment in polar regions and to perfect algorithms for remote diagnosis. As part of the events of IPY-2007/08 it is suggested to work through the following tasks:

– carry out a system analysis of medical information systems, compare and simplify the main structural features of medical information system, models of remote medical observation and consultation;

– determine principles for establishing a system for remote prophylactic treatment;

– develop an objective model for a system of remote medical examination for patients in the interests of providing prophylactic care;

– develop the main procedures for the functioning of a medical information system and evaluating the state of health for groups within the population;

– develop a procedure for optimizing administration of the medical information system for prophylactic treatment in control conditions;

– develop procedures for carrying out telemedical consultations in real-time mode using channels with different properties;

– develop criteria for measuring the effectiveness of the medical information system in providing prophylactic treatment;

– develop the theoretical framework for printing information as consequential diagnostic data;

– develop a method and process to identify logical consistency for consequential clinical measurements;

– develop a method and algorithm to identify multilayered connections between the aggregate for logical consistency for consequential clinical measurements;

– research the applicability of an express diagnostic method based on an algorithm for multilayered connections between the aggregate for logical consequential clinical measurements as part of the architecture of the medical information system for prophylactic treatment.

The research focuses on the solution of practical problems and is of significance for the development of applied medicine in polar regions, and on the level of health protection for the citizens of the Russian north. The work reflects a new perspective on the problem of providing prophylactic treatment for the population. It is aimed at establishing on a theoretical level for a rational information system for prophylactic care as a government institution, describe research in the field of developing a medical information system for prophylactic treatment which will be a new way of implementing special tasks processing data in the interests of achieving the optimal solution for administration and provision of services to maintain health.

The basis for the suggested research is work which has been carried out as part of the special federal program World Ocean (subprogram Study and Research of Antarctica, chapter 2, section 5 Medical Research; chapter 5 section 2 Refitting of Antarctic Basis with Contemporary Communication Systems, http://south.aari.nw.ru/). The first stage has already been concluded (1999–2002) and the second stage continues (2003–2007) resulting in numerous studies and experiments to develop a telemedical system for the Russian Antarctic Expedition. Scientific research and experience using components of the system over the course of eight years has enabled us to formulate some basic ideas which are presented in the current paper.

The continuation of the research at present is taking place as part of the second stage of the federal program and will be continued at the third stage until 2012. In this time it is thought to develop and establish a working model for a medical information system for prophylactic treatment, which will also include a telemedical system for the Russian Antarctic Expedition "Ambulance-Consultant AARI/RAE" as the technological basis for the system to control the adaptation of polar researchers, and remote monitoring of their basic functions and living conditions. The planned research, particularly, has as its principle goal finding ways to integrate and develop methods for prophylactic treatment using telemedical systems, which can be used by the medical services of the Russian Antarctic Expedition.

Today telemedicine, or to be more precise, telemedical systems can become the foundation of a whole new scientific field – telemedical prophylactic treatment. This suggestion is a founding concept. Such cha-

racteristics for telemedical systems as remote monitoring of important health indicators, built up experience for connecting to expert services, immediacy of information exchange, integration of multimedia with the internet make telemedicine the ideal platform for developing a technical platform for a system of prophylactic treatment. By making telemedicine the basis of modern prophylactic treatment, health protection will gain a powerful instrument supported by the capabilities of communications technology and ideally suited for ensuring remote, medical assistance.

The basic results of the project will be the aggregate of the theoretically developed material of which we have already received some material concerning the system analysis for a medical information system for prophylactic treatment, including results from mathematic modeling and practical experiments which have been confirmed by tests from the leading organizations in St. Petersburg.

During research a series of computer programs will be developed, including a data base for prophylactic examinations and storing results of prophylactic monitoring, a program for evaluating the population's state of health based on the aggregate results of basic clinical observations, a program for determining the general sort of people with ill health for specific nosological groups, programs for using various medical equipment and gathering a full range of medical information etc.

The virtual prophylactic network should be the main practical outcome of the research. The network should encompass polar expeditions and settlements in the north of the Russian Federation as clients with a service center in St. Petersburg bringing together by the expert tasks medical institutions for providing special consultative assistance of St. Petersburg – Baltic Center for Telemedicine of the Dzhanelidze Scientific Research Institute for Ambulance Services, the All-Russian Center for Special Radiation Medicine of EMERCOM, which has expressed its consent to participation in the joint project.

As a result of the research planned within the IPY-2007/08 framework the following results are expected:

– integrated Arctic system for prophylactic monitoring, which will become part of the social monitoring system;

– evaluation of the economic and social efficiency for implementing the framework for providing medical assistance to territories with low population density using visiting groups of doctors and the latest medical technology;

– comprehensive evaluation of automatic systems for diagnosis and system for telemedical satellite communication;

– practical implementation of the framework for providing medical aid to the territories of the Far North with low population density by increasing modern technology;

– automatic system for prophylactic monitoring, aimed at reducing risks to the population's health.

YU.I. SENKEVICH
(St. Petersburg Institute for Informatics and Automation of the Russian Academy of Sciences, St. Petersburg)

ARCTIC ARCHAEOLOGY. THE START OF THE INTERNATIONAL POLAR YEAR

On 2–4 April 2007 at the Arctic Center of the University of Groningen (Netherlands) a symposium took place for representatives of scientific organizations – participants of the LASHIPA project. The project is associated with studying historical memorials in the Arctic and Antarctic. The symposium laid the framework for the carrying out joint international work as part of IPY. The work involved the participation of 20 representatives from Russia (Institute of Archaeology from the Russian Academy of Sciences), Netherlands (University of Groningen), Sweden (Royal Institute of Technology), the USA (Michigan Technological University), England (Cambridge University, The Royal Commission on the Ancient and Historical Monuments of Scotland), Germany (Society for the History of Mining and Industry), Norway. Papers were heard and information was given on the five main points for scientific research:

1) The American Coal Industry in High Latitudes: Problems and Perspectives,

2) Whaling, Russian Hunting Trade and Polar Politics in the 22nd Century in Svalbard Archipelago, the Example of Kokerineset,

3) Economics and Politics of Whaling in the Antarctic: Problems and Perspectives,

4) Science, Industry and Tourism in the polar regions: Ceremony, Symbolism and Information,

5) Trade, Industry and Politics in the polar region.

The main theme for the papers was the Svalbard Archipelago. Among the main areas for research were: 1) search and visual examination of monuments dating to the early industrial development of the archipelago (known as the industrial archipelago). The main area for the research is the eastern coastline of Grenfjord Bay. Work will be carried out by: Royal Institute of Technology (Sweden). Work here will be aimed at continuing the search for monuments of Russia's coal extraction industry in the Barentsburg region from 1932 until the start of World War II. Furthermore, registration will be carried out of historical sites on the southern shore of Isfjord Inlet.

Other groups from the Michigan Technological University and the Royal Commission on the Ancient and Historical Monuments of Scotland will make records of monuments from this period in different areas of the archipelago.

2) Studying sites dating the original development of the archipelago. The area for the studies will be Cape Kokerineset on the western shore of Grenfjord Bay where a Russian settlement in the 18th century was established

and the site of what remains of an English or Dutch whaling station of the 17th century.

Participants of the excavations have carried out a large amount of preliminary work to find sites with monuments and to learn about their peculiarities. Studying foreign and Russian literature and archive material from the 19th to the beginning of the 20th century, surveys have been carried out along with aerial photography to fix the location of the settlement. The information has enabled us to talk about Kokerineset as an unusual site from the period of Russian development of the archipelago. Two residential buildings are laid out with an area of 120 x120 m, with a drainage system in the form of a shaft and ditch with a width of up to 1.5 m. There is an angular point at the outlet to the sea. This is the first time such a system has been encountered to prevent flood waters.

On the western outer area there is a cemetery with approximately ten burials.

Of particular interest are the remains of a vessel near the sea. The remains show the full contour of the body of the vessel with typically exaggerated sides, a relatively blunt prow and a straight cut-off transom stern. This is the first find of its kind in Svalbard.

In the coastal area Dutch archaeologists in 2004 found the remains of whaling pots from the whaling period. These are connected with the activities of English or Dutch whalers in the 17th century.

The excavations of the Kokerineset settlement are essential as a result of the damage caused by both natural and human factors. Permission to excavate the site and historical monuments was received in 2007 from the Directorate for Cultural Heritage from the Norwegian Administration.

V.F. STARKOV, V.V. PROKURNOV
(Institute of Archaeology,
Russian Academy of Sciences)

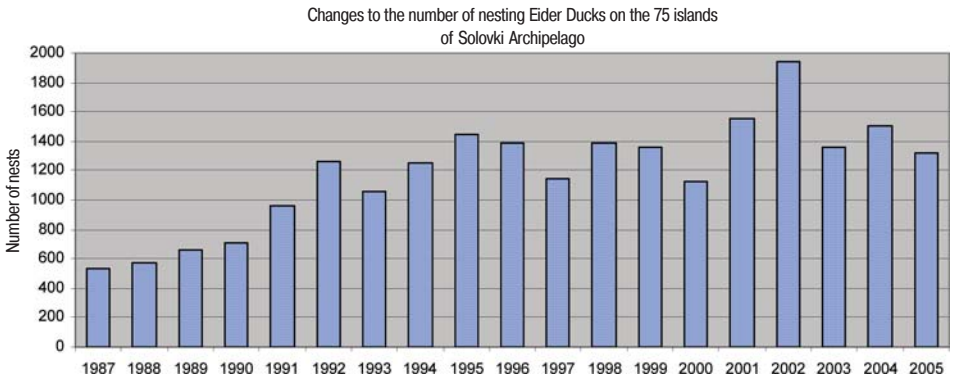
RESEARCH INTO CHANGES IN THE DIVERSITY AND POPULATION OF MARINE BIRD SPECIES IN THE WHITE SEA FOR THE PAST 50 YEARS

The Institute of Geography of the Russian Academy of Sciences (IG RAS) together with the Solovki branch of the White Sea Biological Station of Moscow State University and the Solovki State Historical, Architectural and Natural Museum-Reserve are carrying out field surveys and drawing on the results of many years' observation of bird populations on the islands of the White Sea as part of the project on Changes in Diversity and Populations of Sea Birds in the White Sea Over the Past Fifty Years (headed by G.M. Tertitsky, IG RAS). The project will include populations in Kandalaksha Gulf, Onega Bay and Dvinsky Bay. T.M. Tertitsky, V.Yu. Semashko, A.E. Cherenkov and others will participate in the project.

The results will analyze the population dynamics of about 20 species of sea and coastal birds in the Onega Gulf over the past fifty years (see table). The numbers of the Eider duck have grown and become relatively stable

General data on the numbers of sea and coastal birds in the Onega Gulf

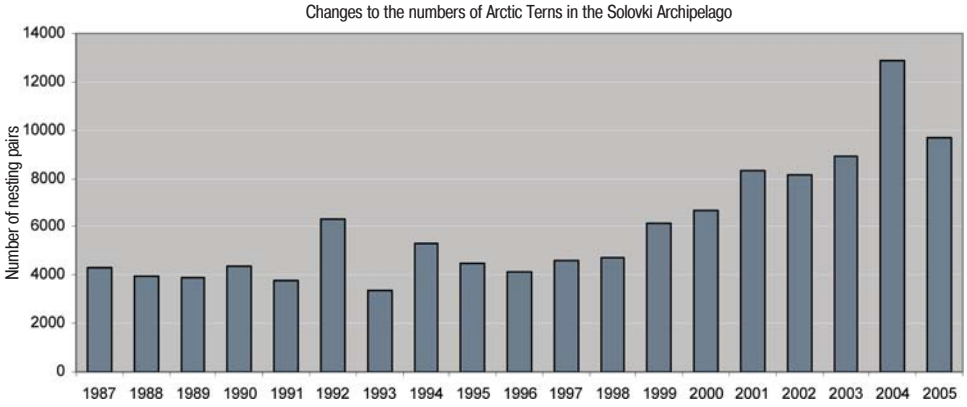
Species	Number recorded in the 1960s (Bianki, 1963)	Average number recorded by the authors in the 1990s	Preliminary estimate of numbers in 2006–2007 (including estimates from regions not covered in the survey)
Great Cormorant (*Phalacrocorax carbo*)	Not observed	271	320
Common Shelduck (*Tadorna tadorna*)	Not observed		25
Eider Duck (*Somateria mollissima*)	2,000	4,876	5,500
Common Merganser	–	–	270
Ringed Plover (*Charadrius hiaticula*)	25	–	25
Little Ringed Plover (*Charadrius dubius*)	Not observed	–	15
Turnstone (*Arenaria interpres*)	200	391	450
Pied Oyster Catcher (*Haematopus ostralegus*)	250	802	1,100
Short-tailed Skua (*Stercorarius*)	–	112	170
Great Black-backed Gull (*Larus marinus*)	Not observed	103	120
Herring Gull (*Larus argentatus*)	650	4,939	5,200
Lesser Black-backed Gull (*Larus fuscus*)	300	1,899	2,100
Common Gull (*Larus canus*)	500	4,313	4,800
Arctic Tern (*Sterna paradisaea*)	9,000	18,388	21,000
Atlantic Alcidae	1,200	2,084	2,400
Razorbill (*Alca torda*)	1,600	2,965	3100
Atlantic Puffin (*Fratercula arctica*)	1	1	1–2
Total	15,726	41,144	46,595



as well as the Arctic Tern on the Solovki Islands. A significant reduction of human activities in the 1990s in the habitats for birds in the Onega Gulf has led to a sharp increase and stabilization of their numbers, subject to insignificant fluctuations associated with climatic conditions of particular years, localized pollution of the marine zone and also intrapopulation changes in age related structures. Over the last years the influence of new environmental (climate change, condition of ice, hibernation conditions etc.) and anthropogenic (transport of oil etc.) factors have occurred which might have a negative consequence on sea bird populations of the current region.

Research as part of IPY-2007/08 enables us to evaluate the influence of climate change on marine ecosystems and compare the roles of environmental and anthropogenic factors on the populations of sea birds, determine the degree, direction and temporal parameters of the changes to their relative population characteristics and the cumulative effect of environmental and anthropogenic factors.

G.M. TERTITSKY (IG RAS)



PARTICIPATION OF THE STATE POLAR ACADEMY IN RUNNING IPY-2007/08 EVENTS

From the beginning of 2007 the State Polar Academy (SPA) has been actively involved in IPY work. It has been responsible for coordinating the subdivisions of the SPA according to the order of the rector of the main Department for Ecology and Environmental Management, V.M. Makeev, a specialist at the Inter-organization Scientific Coordination Committee for Russia's organization and participation in IPY-2007/08 events.

The events related to IPY-2007/08 will be held according to the basic plan established by SPA. The plan intends to have a broad range of events to popularize, educate, inform and publish events connected with IPY as well as scientific and research work to be carried out at tertiary institutes and schools in St. Petersburg and other territories.

At the moment the *Vestnik GPA (SPA Herald)*, dedicated to IPY, is being prepared for publishing. A permanent information stand has been prepared for the International Polar Year. A paper has been produced dedicated to IPY as well as illustrative material entitled: "Our Lecturers – Polar Explorers".

Simultaneously lecturers and students have been preparing for an expedition onboard the *Mikhail Somov*, which is planned for August–September 2007 on the coastal territory of Yamal-Nenets Autonomous Region while the polar stations are having various equipment installed. One of the main events for this preparation is coming to an agreement with the regional administrations, including the Department for Indigenous Peoples' Affairs in the specific regions and locations where it will be necessary to carry out comprehensive medical and ecological research work.

From among the students of the second and fourth year classes at the Faculty of Economics and Environmental Management there are representatives from various regions of the North, including Siberia and the Far East (Kamchatka, Chita and Murmansk regions, Nenets, Yamal-Nenets, Chukotka Autonomous Districts and Sakha, Altai, Buryatiya and Tyva republics) which have been formed together as a group to work on State Polar Academy (SPA) projects for the implementation of the Russia's program for IPY-2007/08. A number of students have done course work in which they have carried out preliminary analysis of climatic variables for many years from the stipulated territories and examined its impact on particular environmental components and branches of the agricultural industry.

Another group of students have carried out experiments on biochemical processes in tundra lakes contaminated with hydrogen sulfide.

Several students have collated materials for evaluation of the impact of pollutants through the Arctic on the local population.

On 18–19 April at SPA the Third Student Conference was held for the Faculty of Economics and Environmental Management, dedicated to IPY, at which students talked about the results of their research. The best assignments received recommendations for inclusion in the collection of SPA research work. Over the summer holidays it is planned that some of these students will visit their homes where they are to gather additional material on the dynamics of environmental and socio-economic factors. For collecting additional material in different institutions and from old residents the Faculty has provided several types of survey forms to insure that an appropriate approach is adopted.

All students involved in the work are extremely enthusiastic, they appreciate the importance for both Russia and the international community of such an ambitious project as the International Polar Year.

SPA wanted to recruit even more lecturers and students to carry out an even more thorough gathering of broader array of data for its programs, however, financial issues had not been resolved concerning expedition research, team expenses, chemical analysis and processing of samples until the very last minute.

V.M. MAKEEV (SPA)

PARTICIPATION OF THE GEOLOGICAL INSTITUTE OF THE KOLA SCIENTIFIC CENTER OF THE RUSSIAN ACADEMY OF SCIENCES IN IPY-2007/08

The Geological Institute of the Kola Scientific Center is located within the Polar Circle and actively participating in Presidium research programs and Earth Science programs of the Russian Academy of Sciences entitled "Environmental and Climate Change: An Environmental Disaster – Part II. The Geological History and Lithosphere of Polar Regions" and "The History of the Formation of the Arctic Ocean and Current Environmental Processes".

Sampling ground deposits of lakes in depressions of the White Sea

The Kola Peninsula can be considered as one of those key regions for studying the relationships between integumentary and mountainous glaciers, as well as glacial cover and marine transgressions in the recent geological past. The results of research enable us to suggest a possible scenario for future developments in climate change, precipitation and sea level change. These problems have been developed at the Geological Institute over the course of several years and will be continued as part of IPY-2007/08.

Already in April surveys were underway studying the sedimentary rock in lake hollows along the shore of the Kandalaksha Gulf of the White Sea. Interesting material has been found on the sequence of marine sedimentation. Thanks to this work it will be possible to establish the movement of the seaboard in the late ice age and post ice age period in connection with glacial and eustatic events.

The second state of the work involves studying glacial forms in the relieves of the Khibinskie and Lovozerskie tundras, where traces remain of integumentary and mountainous glaciers. The results of the research will enable us to determine the scale and the specific features of the creation of glaciers in higher latitudes in cases of degrading integumentary glaciation and also in inter-glacial conditions.

The third step of the expedition work is connected with the study of sedimentation and stratigraphy from the Pleistocene and Holocene periods on the shores of the Barents Sea and the White Sea in the area of Svyatonos Gulf and the valley of the Varzuga River.

Layered snow sedimentation at Khibini above Akademicheskoye Lake

The new sedimentary and geochronological information will enable us to determine periods of warming and cooling, the development of glaciers and marine transgression on the Kola Peninsula. These geological objects will be accessible to specialists as part of field work following the 33rd International Geological Congress which will take place in August 2008.

Yu.P. VOITEKHOVSKY, V.V. KOLKA (Geological Institute KSC RAS)

LOADING OPERATIONS RENEWED ONTO FAST ICE IN KHARASAVEI

From February to April 2007 the scientific operation group of AARI carried out work for preparing and unshipping equipment on the fast ice of Kharasavei region (Kharasavei 2007 Expedition). One should observe that similar operations in the Kharasavei Region have not been undertaken since the mid 1990s.

Despite the poor weather conditions from a hydrometeorological point of view (the fast ice broke up in January 2007, the size and thickness of the ice was equivalent to those of spring), AARI researchers led by N.V. Kubyshkin carried out all of the tasks which they had intended to do. The fortunate location for the chosen loading sites and transport routes for the freight along the ice enabled the researchers to efficiently ferry across to the shore monitoring and forecasting equipment on vessels. The expert organization for monitoring the condition of the ice and in particular its cracks enabled the unloading of four dry cargo ships and a tanker without any accidents. During the winter of 2007 Kharasavei Region received more than 22,000 tons of general cargo and 10,000 tons of fuel.

M.N. MALYKH, A.A. PRITULA
(Trest Yamalstroigazdobycha)

BAIDARA 2007 EXPEDITION

From 26 April to 27 May 2007 at Baidaratskaya Bay in the Kara Sea an expedition was carried out as part of an agreement between Eco-Systems Consulting and AARI. The purpose of the expedition is to carry out field ice surveys as part of an engineering hydrometeorological survey for the System for a Main Gas Pipeline from Bovanenkovo to Ukhta. The Route through Baidaratskaya Bay Project. The expedition included ten specialists from AARI, the expedition leader was a senior scientific researcher from the Department of Ice Processes and Predictions, A.B.Turkov.

The main task of the expedition is to study the ice processes in the marine and coastal environment of Baidaratskaya Bay and receive new environmental data necessary for planning an underwater gas line from Bovanenkovo to Ukhta.

The work will be carried out on drift ice in the central part of the bay and also on fast flow ice in the coastal zone of the Yamal shore. The morphometry and physical-mechanical properties equal to those of deformed ice, ice hummock ridges and grounded hummocks will be studied using thermal drilling, ice core samples, drill sounding.

Furthermore, the dynamics of flow ice and grounded hummocks is conditional on the tide and fluctuations in the sea level. An echo sounding image was also taken of the sea floor in order to see the relief and depth for fixing the ice hummocks to the soil together with getting information for thermal boring.

The processing and analysis of the field data will enable scientists to be more precise and detail the characteristics of ice and ground hummocks which will then be used for modelling exaration parameters of the seabed with ice formations and ice piles on shore, which is necessary for such a project.

E.U. MIRONOV (AARI)

GEOLOGICAL AND GEOPHYSICAL RESEARCH IN TRANSARCTICA 2007

On board the *Rossiya* atomic icebreaker a large scale research project has just been completed studying the geological and geophysical field of the central part of the Arctic Basin, including seismic depth soundings along the Lomonosov Ridge with a profile of 600 km. Detailed geophysical survey work was also carried out along this profile too, receiving results of a very high quality.

A large number of soil samples were taken with tubes of up to 10 meters in length, dredges and buckets in combination with seismo-acoustic and video observations. Fourteen comprehensive monitoring stations were undertaken and completed. All core samples were preserved, with them being thoroughly used for lithological descriptions, samples were taken for geochemical and paleomagnetic study.

SPARK aviation from St. Petersburg was a huge help in carrying out the research by providing helicopter support.

The processing of results for research will enable us to receive a lot of new information on the structure of the geological and geophysical field in this part of the Arctic Ocean.

V.D. KAMINSKY (Okeangeologiya)

MAIN RESULTS FROM AARI TRANSARCTICA-2007 EXPEDITION ON THE *ROSSIYA* ATOMIC ICEBREAKER MAY–JUNE 2007

During the journey organized by Okeangeologiya under the leadership of the institute's director, V.D. Kaminsky, a broad range of oceanographic work was carried out as part of a joint program.

Oceanology. During the expedition in the Arctic Basin, the Kara, the East-Siberian and the Laptev Seas 105 oceanological stations were established and carried out, from which 36 soundings were taken with CTD (SBE19+) hydrophysical sounder. The maximum depth was 2,700 m. Two 24-hour stations were established with measurements taken every four and six hours (taking five soundings at both stations). A helicopter flew on four occasions to carry out hydrological sectors (16 stations).

Atmospheric monitoring. The optical gas analyzer type OPTOGAS3-500.4 was used to take continuous measurements of carbon dioxide concentration along the vessel's route.

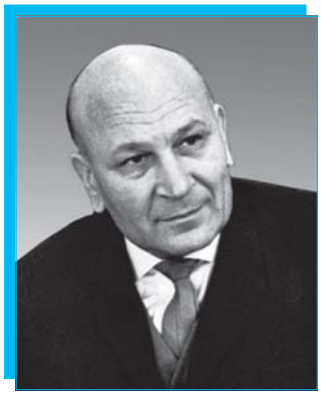
Meteorology. For the duration of the entire journey standard meteorological observations were taken.

Provision of hydrometeorological information. Daily analysis was conducted of collated information, its interpretation was then presented to the pilot and captain of the vessel and the expedition leadership. Information was provided for the automatic *Sudno* system version D Kart Navigator. Navigational recommendations were made. Round the clock ice observations were maintained. Ice thickness was constantly measured throughout the journey of the icebreaker using a digital video system. Ice survey work was carried out to steer the icebreaker to the location for geophysical research and for finding the ice field. Aviation surveyance work was carried out with three flights to find a disembarkation point for an ice station. The found ice field was studied and locations were chosen for loading area and the camps. Hydrological sectors were carried out by helicopter including landing on the drift ice. Reserve areas were also chosen for landing the helicopter near the icebreaker for geophysical work. Furthermore, the helicopter was able to land on drift ice for taking geophysical readings.

The establishment of an ice station on 4 June 2007 was an important step in carrying out the IPY program. Over the course of three months nine polar explorers, led by A.A. Visnevsky, will carry out integrated research work on the meteorological, ice and oceanographic conditions.

24 June 2007, on conclusion of AARI's work the *Rossiya* icebreaker arrived back in Murmansk.

V.T. SOKOLOV (AARI)



90 Birthday of Academician Alexander Vasilevich Sidorenko

This year Academician Alexander Vasilevich Sidorenko celebrates his 90th birthday. In honor of this portentous date an all-Russian scientific conference was held on the Geology and Minerageny of the Kola Region, taking place at the Geological Institute of the Kola Scientific Center of the Russian Academy of Sciences (Apatity) 4–6 June, focusing on six subjects and including 80 scientific papers. The conference was held under the auspices of the Presidium of the Kola Scientific Center of the Russian Academy of Sciences and the Presidium of the Russian Mineralogical Society with financial support from the Russian Foundation for Basic Research (grant 07-05-06026).

Such a conference is fully in keeping with the personality of Academician Sidorenko, the chairman of the Kola Branch of the Academy of Sciences, later he became Minister for Geology of the USSR, and Vice-president of the USSR Academy of Sciences and President of the Mineralogical Society. In 1956–1958 he was responsible for the broad development on the Kola Peninsula of the corrosion of ancient core outcrops and synchronized them with continental sediments, and also came up with two important discoveries:

1) glacial exaration on the peninsula occurred to a much smaller extent than had previously been thought,

2) deposits of useful fossils can be found in corroded cores as well as in overlapping quaternary sedimentary layers.

Further research supported these suppositions with actual material. As a result the principal questions concerning the paleogeography of the Kola Peninsula were resolved and another tool was added to the arsenal for fossil deposits. To a significant degree this was done by researchers at the Laboratory for Quaternary Geology established by Academician A.V. Sidorenko. It now exists as part of the Geological Institute of the Kola Scientific Center of the Russian Academy of Sciences. Its collective take part in essential research for the 16th Presidium of the Russian Academy of Sciences (project known as The Evolution of the Relief and Sedimentation of the Kola Region in the Holocene) and the program of the 14th Department of Earth Sciences of the Russian Academy of Sciences (project known as The Evolution of the Barents and White Seas – the Outskirts of the Arctic Ocean). Along with a series of research programs as part of IPY-2007/08, researchers are preparing for field excursions for members of the 33rd International Geological Congress (Oslo, 2008).

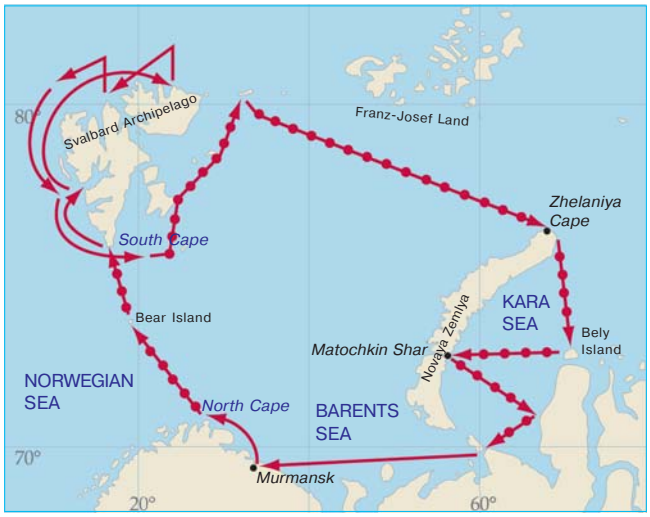
Yu.P. VOITEKHOVSKY, V.Ya. EVZEROV
(Geological Institute of the Kola Scientific Center of the Russian Academy of Sciences)

MARITIME EXPEDITIONS OF THE SECOND INTERNATIONAL POLAR YEAR. 40TH EXPEDITION OF THE STATE OCEANOGRAPHIC INSTITUTE ONBOARD THE *PERSEUS*

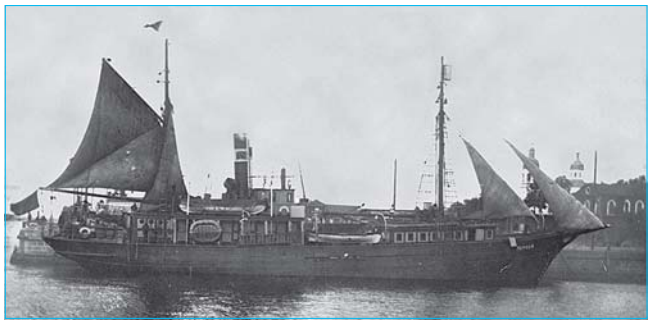
One of the most dramatic and interesting events from the pages of the 2nd International Polar Year were the maritime expeditions. In 1932 the Soviet Union held eleven expeditions and sixteen in 1933. The favourable ice conditions in the Arctic seas during the navigational period of 1932 enabled scientists not only to carry out the IPY program but also to significantly increase the area of research.

The maritime program for the 2nd IPY was suggested by the Soviet delegation at the first session of the International Committee for the Polar Year, which was held on 26–30 August 1930. According to this program the maritime expeditions of various countries would carry out oceanographic research in specific sectors. The main Soviet maritime research was to be carried out in two sectors crossing the North Cape current, following the warm waters of the Gulfstream from the Atlantic to the Barents Sea: on the sector from North Cape to Bear Island – South Cape (southern part of Spitsberegen Island) and on the section along the Kola meridian (33° 30' E). The commission also recommended all countries participating in IPY to organize en route observations on all vessels working in Arctic and Antarctic waters.

The maritime expeditions of the 2nd IPY can be divided into three groups according to their nature. The first group consists of expeditions whose aim consisted of oceanographic research as part of the IPY program. This included the SOI expeditions onboard the Perseus and *Nikolai Knipovich* in 1932–1933 and expeditions on the fishing vessel *Dalnevostochnik* in 1932 by SOI and the Pacific Fishing Institute. Of the foreign expeditions one should mention the German expedition on the research vessel Meteor, in summer 1933 carrying out research in the East Iceland current and the Sea of Greenland.



Route of the 40th SOI expedition onboard the *Perseus* in 1932. Areas with points showing hydrological sectors



Perseus expedition vessel

The second group included expeditions which were to carry out other research but make observations en route according to the IPY program. Among them was the expedition of the Main Hydrographic Directorate of the Red Army on the *Taimyr* icebreaker in August–November 1932 and the North-East Polar Expedition of the Peoples' Commissariat of Water Transport on several vessels, including the *Fyodor Litke* icebreaker. The expedition of 1932 onboard the steam powered icebreaker *Alexander Sibiryakov* has an important place for one of its routes through the North Sea. Among the foreign expeditions one may mention Englisn expedition working in Antarctic waters onboard *Discovery II*. An important contribution was made by Norway in the exploration of Antarctica, having organized observations onboard ten whaling vessels as part of IPY.

The third group included expeditions whose mission was to open and equip polar station as well as carry out research according to the IPY program. Among these were expeditions of the Arctic Institute on the *Malygin* and *Rusanov* vessels in 1932. Foreign expeditions included the Canadian expedition onboard *Nascopie*, and the French expedition on *Pourquoi Pas?* and *Pollux* and the Dutch expedition on *Heemskerck*.

The State Oceanographic Institute (SOI), formed in 1929 from Navigation Marine Science Institute which itself had been founded by the decree of the Peoples' Commissariat in 1921, actively participated in the maritime expeditions of the IPY. The organizer and first director of the Navigation Marine Science Institute was one of the forefathers of Soviet Oceanology, Ivan Illarionovich Mesyatsev. Among the institute's first researches was Vsevolod Apollinarevich Vasnetsov. The son of the artist Apollinary Mikhailovich Vasnetsov from his early years was interested in the Arctic and it came as no surprise that when he graduated from the Advanced School for Aerial Photography of the Red Army Air Force he came to work at the new institute.

In 1922 the Navigation Marine Science Institute was given the schooner *Perseus* – a steam and sail powered

sealer which had not been completely constructed. The body of the *Perseus* had special contours (similar to the *Fram*), which enabled it to operate in ice. Over the course of a year the schooner was reequipped in Arkhangelsk as a scientific, research vessel. The first scientific instruments onboard the *Perseus* were of amateur manufacture. For example, the bathometer was made from copper sheet and based on drawings found in a German publication on Nansen's work. With these bathometers researchers onboard the *Perseus* worked for the next ten years. In 1923 the oceanographic, research vessel left on its maiden voyage. It was then that the *Perseus'* flag was first raised: the seven star constellation of Perseus on a naval background.

Vsevolod Apollinarevich Vasnetsov, leader of a series of expeditions onboard the *Perseus*

From 1923 to 1932 researchers at the Navigation Marine Science Institute (or State Oceanographic Institute) participated on 39 expeditions onboard the *Perseus*, carrying out oceanographic research in the Kara, Barents and Greenland Seas, worked in the Svalbard Archipelago, Franz Josef Land and Novaya Zemlya. V.A. Vasnetsov participated in many of the trips to the Arctic: initially as a scientific researcher, later as an expedition leader.

He also led the 40th anniversary expedition of SOI in August-September 1932. This expedition was held as part of the IPY program and was to carry out several sectors from North Cape to South Cape. Should the ice conditions be favorable it was planned to sail for Svalbard and to try to go round on the north and then do a sector along the 15th meridian and a series of sectors to the east of Svalbard. There were 18 scientific researchers as part of the expedition including several students gaining practical experience.

On 27 August 1932 the *Perseus* left Arkhangelsk and took a course towards the Norwegian coast. On 30 August the vessel approached North Cape, whence it began a sector to the southern end of Spitsbergen – South Cape. From South Cape the *Perseus* followed the west coast of Spitsbergen along to Grumantbyen in Ice-fjord. Restocking on fresh water and coal at the settlement, the *Perseus* dropped in on Barentsburg and then went north continuing its oceanographic program. To the north of Svalbard Archipelago the route of the vessel was blocked by thick ice.

The 40th expedition team of SOI on the *Perseus*

Having reached latitude of 81° 19' N the *Perseus* turned south and this point fixed the record for the vessel, the *Perseus* had never been further north and would never again go so far north.

The situation east of Svalbard Archipelago was complicated on account of ice. It was necessary to decide whether the *Perseus* would continue to the East or whether they should turn west. Supporters for continuing east were the young expedition members and the senior scientific researcher for the *Perseus*, Professor Vladimir Stepanovich Butkevich, its opponent was Vasnetsov. The commander made the decision and the *Perseus* turned back. As it turned out later, Vsevolod Apollinarevich's intuition did not betray him. Sometime later a fire broke out amongst the coal in the hold. In the *Perseus* there were also kerosene tins and at any moment an explosion could occur and a serious fire develop. On 12 September the *Perseus* was made fast in Barentsburg harbour, where they unloaded the coal themselves. Inside the hold the hull had been burnt, the burnt areas were reinforced with plates. On 16 September the *Perseus* left Barentsburg and continued its oceanographic work on the sector from South Cape to Hope Island.

On 24 September the expedition concluded all planned work. There only remained the trip back to Arkhangelsk, and then… a new expedition to the Kara Sea. At a scientific council Vasnetsov suggested that they join two expeditions and simply go straight to the Kara Sea around Zhelaniya Cape. Participants of the expedition supported him and the *Perseus* approached Zhelaniya Cape on 1 October. In the Kara Sea the vessel carried out sections from Zhelaniya Cape to Bely Island and back to Matochkin Shar, then to Yamal, and then to Yugorsky Strait. On 9 October the oceanographic work was completed and on 16 October the *Perseus* moored in Murmansk.

Thus ended the 40th expedition onboard the *Perseus*, during which the vessel covered 4,000 miles, 350 of which were through ice, and carried out work at 76 stations and made 260 depth measurements.

(To be continued...)

A.O. ANDREEV,
M.V. DUKALSKAYA
(Russian State Museum for the Arctic and Antarctic)

Dear Colleagues!

If you have information about IPY-2007/08 events your organizations and regions, you can present them here in a bulletin of IPY News 2007/08.
Send texts with photographs and diagrams to:
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for the participation of the Russian Federation
for preparing and participating
in the International Polar Year (2007/08)
(www.ipyrus.aari.ru), Tel. (495)252-4511.

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