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Commentary: Arctic Research in Russia

The Russian Republic has an arctic zone of 2.5 million km², including vast territories to the north of the Arctic Circle, the seas of the Arctic Ocean and many archipelagoes. Russian arctic research dates back to the 18th century and today is more important than ever, covering a broad spectrum of activities in the physical and biological sciences, economics, political science, defense and external affairs and involving the participation of many institutions of the Russian Academy of Sciences. Their primary immediate concerns are 1) the existence of rich natural resources and their importance in the developing market economy; 2) ecological problems; 3) national security; and 4) establishing domestic legislation and international agreements to regulate development in the Arctic.

The arctic regions and their marginal seas have always been extremely important in the economy of Russia because of the rich supply of natural resources — hydrocarbons, non-ferrous metals, gold and diamonds, as well as bio-resources. The richest reserves of oil and gas in Russia are found in the northern and arctic territories, as are the greatest amounts of known reserves of nickel, copper, tin, gold, diamonds and other minerals. The arctic zone also occupies a special place in the defense strategy of the country.

The Arctic Research Center (ARC) of the Russian Academy of Sciences was established in 1991 to coordinate and implement arctic-related research programs in virtually all disciplines. The Center, with a staff of 50 supplemented by consultants engaged on a contract basis, consists of four departments: 1) social, economic and ecological studies; 2) research in the natural sciences; 3) international cooperation; 4) information services and public relations. ARC's scientific specialists oversee major regional, state and international arctic programs, maintaining close ties with over 120 scientific organizations in Russia and 14 other arctic states. ARC also represents Russian institutions on the International Arctic Science Committee and participates directly in many IASC research programs, as well as in other international organizations and projects, such as the International Geosphere-Biosphere Program, World Climatic Research Program and Solar-Terrestrial Energy Program.

ARC's mandate is to 1) define the present state and future prospects of Russia's arctic regions; 2) create a comprehensive national program for arctic research; 3) establish a new research strategy and develop research programs within the framework of national and international programs; 4) develop a strategy for the exploitation of natural resources; 5) provide scientific expertise on large-scale projects concerned with social and economic development and environmental protection; 6) analyze proposals from foreign states and international organizations regarding arctic matters; and 7) provide information and analytical support to Russian government bodies dealing with policy development on the Arctic.

The Russian Academy of Sciences has created a special program to study the economic and social problems of all of Russia, and within this program there is a focus on the arctic and northern regions. The designing of economic and social development programs from the nationwide to the regional level allows us to ensure a balance of interests at the federal and local levels, to bring together the interests of different industries and regions, and to develop an adequate policy for social affairs as well as science and industry.

In 1991 a joint interagency program called "the Arctic" was started. This program, involving the participation of 140 different research bodies in 17 departments, covers the priority directions in basic and applied sciences. The Arctic Research Center leads the research on economic and social problems within this "Arctic" program, collaborating with more than 35 institutes in working on the concept of arctic development. I would like to stress that practically all research is done in the framework of academic, regional, republic, federal and international programs.

During the last three years we have had an unusual situation in the research and development of our arctic and northern regions. The social, economic and political problems there arose quite a long time ago and are accumulating. The ecological situation in the Arctic and North is particularly difficult. Scientists and other specialists are seeking solutions to the urgent problems of dumped radioactive materials present in the Kola Peninsula, Novaya Zemlya and other regions (Norilsk, Chukotka, Yamal). We are seeking to learn from international experience and to get international support. We think that the majority of scientists of other countries understand our problems and share our belief that ecological problems do not have national boundaries.

Because of the Arctic's rich natural resources, the world community is especially interested in this region. The Arctic is the richest source of fuel, energy, minerals and unique, ecologically pure biological matter in the Northern Hemisphere (maybe even on the whole planet). The Arctic may even be one of the last sources available, but we should always have in mind that the utilization of its natural resources demands enormous financial expenditures.

The importance of this region, with its not yet exhausted natural resources, will obviously increase. The Arctic is also of great importance as a relatively incompletely explored region that strongly influences the climate and weather of the Northern Hemisphere. Many unexplained natural phenomena are connected with the atmosphere, hydrosphere and lithosphere of the Arctic.

The research and development of arctic and northern regions require great financial, material and intellectual resources. Now we are considering these regions as a good field for international cooperation in both science and industry. It gives us all an opportunity to gather our scientific and financial resources and exchange knowledge and technology.

Analysis of international experience shows that the study of the Arctic is mainly determined by two factors: by the demand of the society to delve into the new processes and phenomena in this region, and by the level of science itself — its methodology, methods and equipment. These factors influenced the formation and organization of arctic research in our country. Undisputed priority was given to research into global processes in various spheres of the Earth: the lithosphere, hydrosphere, cryosphere, atmosphere, magnetosphere and ionosphere.

In recent years attention to practical applied research directly connected with industrial exploration of the Arctic and human activity in extreme conditions increased sharply. This includes utilization of modern technology to increase labor productivity (particularly in mining), to maintain an ecological balance, to decrease the negative effects of both humans and technology on nature and to improve the living standards of the population.

These problems are the focus of newly formed research centers within the system of the Academy of Sciences. In recent years some new institutes were organized dealing with specific regional, ecological, economic, social and technological problems connected with arctic development. Several new centers were created in the northern part of European Russia, in Siberia and in the Far East. There are about 2000 specialists now studying the Arctic.

The measures undertaken have produced important scientific and practical results. I should mention the geophysical research on the coastline of the shelf zone carried out to support energy and construction activities. Another example is the study of less hospitable regions, which broadens the knowledge of not only physicians, but also of specialists in development design and construction. It is also necessary to mention the research of biologists, which extends our understanding of the resource potential of arctic and northern regions.

In 1992 the Joint Scientific Council of Arctic and Antarctic Research was established. The main task of this council is to coordinate scientific research in these regions, to consolidate the efforts of scholars and establish priorities, to provide a common methodological approach to the elaboration of state research programs and to increase the efficiency of international scientific cooperation in the Arctic and Antarctic.

There are great changes in the old system of financing in our country at present because of the transition to a market economy. The proportion of centralized sources is decreasing, while the share of decentralized financing based on specific contracts is increasing. This opens new possibilities for cooperation on specific projects with scientists and specialists from foreign countries on a contract basis. At the first meeting of the International Arctic Science Committee in Oslo in January 1991, Russia presented a package of proposals for cooperation among the world scientific community in arctic research, including social and economic matters, as well as in the physical and biological sciences.

The democratization of our society, the deepening of *glasnost* and openness, and the conversion of the defense industry also create new opportunities for cooperation in different fields. We are ready to have the infrastructure of Barentsburg and Piramida on Spitsbergen used on an international basis for arctic research in this region. We are also ready to open our scientific bases and research ships to international expeditions.

It is obvious that Russian cooperation with other countries should not be confined to bilateral government agreements, but should also involve researchers, institutes and universities in each country. Such cooperation will promote scientific links and joint research projects on the problems related to the Arctic and the North. To further such international cooperation, it is useful to have exchanges of information, publications and experts themselves and to engage in concrete joint projects. Among the areas of mutual interest are: 1) monitoring the environment, ecology and meteorology of the Arctic, including dealing with the problem of radioactive waste; 2) studying the dynamics of the ecosystems and forecasting the course of natural processes near islands and the coastal arctic shelf; 3) studying the geology of the Arctic Ocean basin and its environs, as well as the geology of particular arctic regions, doing a comparative study of their mineral resources; 4) developing facilities, hardware and expertise suitable for arctic research; 5) developing technology and expertise for geophysical exploration in an ice-covered environment; 6) undertaking economic development and rational management of natural resources; 7) analyzing the socio-economic implications of arctic exploration; 8) facilitating the socio-economic development of native peoples; and 9) conducting comprehensive medical and ecological studies of human adaptation to arctic conditions.

Russian scientists hope that through international cooperation we will strengthen our mutual interests in arctic research and development.

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