

## **SERGEY IVANOVICH ISAYEV**

(on the centenary of his birth)



The 20-th of September, 2006 is the centenary of the birth of Sergey Ivanovich Isayev - the founder and the first (1960-1976) director of the Polar Geophysical institute of the Kola Science Center of the Russian Academy of Science, the prominent scientist in the field of aurora studies and the magnetic field of the Earth, one of the organizers of geophysical research in the Kola peninsula, an active participant in the Great Patriotic War.

Sergey Ivanovich was born in Smolensk in 1906, in the same place he graduated from the physics and mathematics department of the local university and started working at the physics department. His life is connected to Leningrad from 1931 to 1941. While working at the Main geophysical observatory, he left twice for a long time to work for the Arctic regions: in 1932-1933 for studying auroras and the magnetic field of the Earth under the program of the Second International Polar Year at the observatory of Matochkin Shar (Novaya Zemlya), and in 1935-1936 - for Kolyma region to establish a new magnetic observatory. In the same years he took part in the implementation of the program "General Magnetic Survey of the USSR ". He was awarded for these merits in 1940 with a decoration of "Honorable polar explorer". Then Sergey Ivanovich worked at the Arctic institute, where he prepared his master's thesis devoted to the morphology of auroras.

All his further plans were prevented by the war. In July, 1941 S.I.Isayev together with the fellow workers voluntarily left for the Leningrad national home guard corps. He began the war at the Oranienbaum "bridgehead", which protection was one of the most glorious pages in the history of defense of Leningrad. He was heavily wounded, fought in the western front as an officer-gunner, participated in the forced crossing of Dnieper and, finished the war in Germany. For Sergey Ivanovich the war ended near Berlin. The first important award was the Order of Lenin with which the commander of the battery captain Isayev was awarded in 1942. For courage and valour in the Great Patriotic war, S.I.Isayev was also awarded with "the order of Red Banner", orders of "Patriotic war" of the first and second degree, and numerous medals.

Right after demobilization in 1946 Sergey Ivanovich returned to his former work, but already within the framework of the Moscow Scientific Research Institute of the Earth Magnetism. In 1948-1949, NIIZM (under the initiative of professor N.V.Pushkova) as well as the Leningrad State University (under the initiative of professor A.I.Lebedinsky) organized expeditions for studying auroras in the Kola peninsula. Sergey Ivanovich also participated in these expeditions. As a result, the unique material for those times was obtained, and Sergey Ivanovich subsequently in 1954 protected his master's thesis on the theme: "The Geographic distribution of auroras and the relation of this issue to geomagnetic and ionospheric disturbances ".

In 1952 in Murmansk a small department of NIIZM was established, which was the start of the establishment of the permanent geophysical institution in the Kola peninsula and which was headed by Sergey Ivanovich. Due to the International Geophysical Year (1957-1958), by this time NIIZMIR already, authorized the Murmansk department to carry out researches in the framework of the maximum possible program, which included the sounding of ionosphere, measurements of the magnetic field of the Earth and of the parameters of auroras. For implementation of this program NIIZMIR organized a small base in Loparskaya. After the termination of the IGY-IYGC it became obvious that it was impossible either to close the Murmansk department or to reduce the amount of research in the

Kola peninsula. Due to the rapid development of researches of the outer space and the necessity in more in-depth studies of radio communication in the high latitudes, a need arose in the further development of all types of geophysical operations near the zone of auroras at one research center, which could set and solve independently the problems connected to studies of physics of the upper layers of atmosphere. After acquaintance with the state of geophysical research in the Kola peninsula in the spring of 1960, the main scientific secretary of the Presidium of the Academy of Sciences academician E.K.Fedorov suggested to establish the Polar Geophysical Institute (PGI), within the structure of the Kola branch of Academy of Sciences and on October, 11 the same year there was a decision made by the Presidium of the AS of the USSR about the organization of the PGI, headed by Sergey Ivanovich Isayev. The PGI was entrusted with the tasks of studying the earth magnetism, auroras, cosmic rays and ionosphere, as well as conditions of distribution of radiowaves in the high latitudes, playing an important role for radio communication.

The tasks of the institute should have included the implementation of laboratory experiments, which could be involved for explanation of the nature of physical and chemical processes proceeding in the upper atmosphere, the development and improvement of methods of studying of the electromagnetic phenomena in the upper atmosphere as applied to peculiarities of the high latitudes. The PGI had to organize the overland, air and sea expeditions connected with studies proper to the type of the institute, to provide opportunities for wide involvement in joint studies of central institutes and separate scientists. The PGI was entrusted with rendering services to national economy institutions with radio-forecasts and other geophysical data in line with its main activity. The institute should have possessed a powerful experimental base, where the new scientific equipment could be upgraded and developed. Sergey Ivanovich had to deal with all the above tasks and he not only perfectly coped with the tasks set for him he also managed to expand the possibilities of the institute he had created.

In the beginning of 1957 in connection with the forthcoming opening of the International Geophysical Year, under Sergey Ivanovich initiative all-Union courses for preparation of auroras observers, who then should leave for different polar stations for carrying out observations of auroras using C-180 and C-180-S cameras were organized. The 5-th General Assembly of CSAGI, in which Sergey Ivanovich also participated was held in August, 1958. It summarized some scientific results of the IGY and decided to prolong the program of researches for one year more. Since 1961 the PGI, due to Sergey Ivanovich Isayev's high authority, was involved in the participation in a number of important scientific activities, including those of applied character. So, the Polar Geophysical institute was entrusted together with IZMIRAN to carry out studies of auroras during the season of 1961-1962 at magnetically-conjugated points jointly with the National Center of Scientific Research of France (Prof. J.Blamont). As a result, the carried out studies provided some interesting enough scientific material, which was further subjected to careful analysis.

The PGI on behalf of its director carried on diversified activity in the international scientific organizations. So, Sergey Ivanovich, takes an active part in the conference of the subcommittee of Association of Geomagnetism and Aeronomy of IGGU on issuing a new Atlas of auroras in Edinburgh (England). In 1960 at a meeting of the workgroup on auroras of the IAGA during the XII General Assembly of IGGS in Helsinki, a decision was put forward to revise the classification of auroras forms and to issue a new Atlas, which would take into account the vast experience of researches accumulated by different countries, especially in the period of IGY and IYGC. The committee for revising the classification and preparation of the new Atlas issuing was elected. The staff of the committee included also Sergey Ivanovich from the USSR participants. So the newly developed Atlas of auroras forms was published in 1963.

Being the chairman of the section "Auroras and the airglow of the night sky" at IGC, Sergey Ivanovich, nevertheless, developed, and where it was necessary, actively promoted the development in the PGI of ionospheric, magnetometric, radar, balloon and other methods of research of the upper layers of atmosphere.

Starting from 1968, within the "INTERCOSMOS" Council, a number of international balloon experiments was carried out. One of first "OMEGA" projects was carried out in 1968-1971. "OMEGA" was a joint Soviet-French project, which purpose consisted in studying disturbances of the near-Earth space by complex simultaneous measurements using ground-based methods and balloons in the magnetically-conjugated areas of the Arkhangelsk region – Kerguelen island. Sergey Ivanovich actively promoted the progress of this project.

A natural continuation and development of "OMEGA" project was "SAMBO" project. During these experiments from the territory of Sweden, French high-altitude balloons carrying Soviet and French scientific equipment were launched, the equipment was intended for the research of the braking x-ray radiation, auroral luminosity and electrical field variations. The radio-telemetric information from the balloons was received at 5 receiving points, including some in the PGI. Flights of balloons passed during the operation of "Aureol - 2" satellite, which provided at this time the measurements of proton and electron flows, which registration was also carried out at the PGI

receiving point in Apatity.

In 1974 -1975 the grandiose international project named "Araks" was carried out. In Kerguelen Island in the high layers of the atmosphere, there were launched 2 rockets, onboard which accelerators had been placed, "shooting" electrons upwards. Following the magnetic power lines these electrons should have reached the Northern hemisphere in the Arkhangelsk region and cause optical and radio-physical effects in the upper atmosphere. Sergey Ivanovich warmly supported the idea of experiment and sent to settlements of the Arkhangelsk region optical and radar groups of geophysicists from the PGI for registration of these effects. Despite of the unfavorable meteorological conditions during these experiments, the employees of the PGI managed to register the effects of the artificial impact on the ionosphere of the northern hemisphere which was later reported at the international conference in Toulouse (France).

Under Sergey Ivanovich initiative in the PGI all-Union scientific conferences on problems of physics of the upper atmosphere and the outer space were frequently held. After the war, Sergey Ivanovich published about 100 scientific papers and prepared 3 monographs.

He was repeatedly given for his significant merits in the organization of geophysical science in the Kola peninsula money awards and gratitudes of the Central Administration of the Hydrometeorological service under the Council of Ministers of the USSR, of the Ministry of Communications of the USSR, of the Presidium of the Academy of Sciences of the USSR, of the Presidium of the Kola Branch of AS of the USSR. In 1974 for the development of geophysical research he was awarded with the most important decoration in the Soviet Union – his second Order of Lenin.

Sergey Ivanovich Isayev died on 10 May 1986 in Moscow.

Remembering Sergey Ivanovich Isayev, we want to recall once again this surprisingly modest, fascinating person and to estimate at our true worth his difficult job in the organization and carrying out of geophysical research in the Far North.

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