

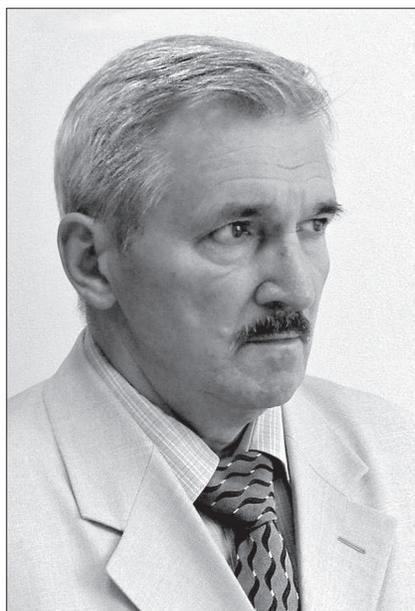
DMITRY MIKHAILOVICH SHESTERNEV
(22.04.1946–13.04.2019)

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The article provides an overview of the life and scientific career of Dmitry Mikhailovich Shesternev, a well-known specialist in the area of general and engineering geocryology.

Permafrost science (geocryology), permafrost zone, cryogenesis, frost weathering



On April 13, Professor Dmitry Mikhailovich Shesternev, Doctor of Technical Sciences, Academician of the Russian Academy of Natural Sciences, the well-known specialist in the area of general and engineering geocryology, principal researcher of the engineering geocryology laboratory of the Melnikov Permafrost Institute (MPI) SB RAS, and member of the Russian Writers' Union, passed away at the age of 72 after a long illness.

Dmitry Mikhailovich Shesternev was born in the Poltava region in a working-class family. After finishing the secondary school in 1963, he worked at the Murmansk shipyard. From 1965 to 1968, he served in the air force of the Baltic Navy.

In 1969, Dmitry Shesternev entered the mathematics department of the Moscow State University, and in 1971, he chose to study geology at the geology department of the MSU, from which he graduated in 1976 specializing in geology-hydrogeology, with a focus on permafrost.

The lectures of G.P. Gorshkov, I.F. Yakusheva, N.P. Kostenko, E.M. Sergeev, V.M. Shestakov,

B.N. Dostovalov, V.A. Kudryavtsev, N.N. Romanovsky, G.V. Porkhaev, B.A. Savelyev, E.D. Ershov and other outstanding researchers and lecturers of the MSU opened the way to the world of science for him. Already in the student years, Dmitry Shesternev often participated in the expeditions of the permafrost (geocryology) chair of the geology department conducted in Western Siberia, and in the expeditions of the cryolithology and glaciology chair of the geography department carried out in the BAM railway area. He reported the results of those works at the student conferences of the geology department of the MSU and at the Moscow city conference of young scientists and graduate students. As a result, Dmitry Shesternev was recommended by the head of the geocryology chair of the geology department of the MSU to enter the graduate school.

Dmitry Shesternev displayed his ability to find a common language with his co-workers, to pose and solve scientific problems in the years of his studies in the graduate school. In the South-Yakut expedition of the geocryology chair of the geology department of

the MSU held in 1977–1979, he conducted unique theme studies to identify the geological and genetic features of forming the composition, structure and characteristics of masses of large detrital rocks in the permafrost zone. The main results of those studies were morphometric classification of the cryogenic textures of the large detrital rocks, revealed changes in the structure of the rocks in cross section, development of empirical and statistical models for evaluating and predicting changes in the thermal physical characteristics of freezing large detrital rocks and their distortion in thawing. That allowed Dmitry Mikhailovich to defend a candidate's thesis in 1980 on the methodology of predicting changes in the thermal physical and physical and mechanical characteristics of frozen, freezing and thawing large detrital rocks by the example of the Chulman depression, with specialization in engineering geology, permafrost studies and soil engineering.

The new phase in the scientific activity of Dmitry Mikhailovich Shesternev was related to his work in the Chita Polytechnic Institute in the chair of hydrogeology and engineering geology. Here, in 1980–1986, Dmitry Mikhailovich Shesternev, first under guidance of V.G. Kondratyev and then on his own, in accordance with the program of the Ministry of Geology of RSFSR “Monitoring of Cryogenic Processes and Phenomena in the Permafrost Zone”, carried out a large complex of works to study the kinetics and mechanics of development of cryogenic physical and geological processes and phenomena in Transbaikalia.

In 1986–2003, Dmitry Mikhailovich Shesternev worked in the Chita division of the Melnikov Permafrost Institute SB RAS (Fig. 1). He headed the laboratory of engineering cryodynamics, and after the division was reorganized, he headed the Chita laboratory of engineering geocryology of the institute. The studies of the laboratory headed by Shesternev were



Fig. 1. The International Symposium on Permafrost Engineering. A field trip to Baikal Lake (1993).

Left to right: R.V. Zhang, Zhang Pei-Zhu, M.M. Dubina, Dmitry Shesternev.

included into the Program of the State Science and Technology Committee of the USSR (1988–1991) “Development of the Methodological Recommendations for Observing Geomorphological Conditions for Permafrost in Erection and Operation of Facilities in the Permafrost Zone” and into the subprogram “The Ore Gold of Siberia” (1991–1995) of the program “Siberia”. The results obtained became the basis for designing the Udokan mining and processing plant and the Lensk gold ore plant. In this period, Dmitry Mikhailovich proposed a new concept for investigating the mountainous areas of the permafrost zone. It consisted in considering the masses of rocks in the mountainous areas of the permafrost zone from the upper to the lower boundaries as the frost weathering crust. In this regard, structuring of the rock composition, its structure and the characteristics of the rocks in the cross section was proposed to be carried out considering transformation of the physical fields in those masses caused by the climatic fluctuations and the history of their geological development. The results obtained in implementation of this concept allowed Dmitry Shesternev to defend in 2000 a doctorate thesis “The Scientific and Methodological Foundations of Evaluating the Impact of Frost Weathering on the Physical and Technical Characteristics of Rocks” (specialization in physical processes of mining).

Due to restructuring of the Russian Academy of Sciences, a decree was passed in 2004 on joining the Chita Institute of Natural Resources SB RAS by the Chita laboratory of engineering geocryology of the MPI SB RAS, to be followed by its renaming for the Institute of Natural Resources, Ecology and Cryology SB RAS. In this institute, Dmitry Mikhailovich Shesternev worked as the head of the general geocryology laboratory and the deputy director for scientific work from 2005 to 2010. Under his guidance, together with the cryolithology and glaciology chair of the geography faculty of the MSU, massive investigations were conducted under the INTAS program “Evaluation of the Current and Future Climate Changes and Behavior of Glaciers in the Mountains of Southern Siberia”. In addition, he was the supervisor of Rosstroyzyskaniya geological survey organization and one of the authors of the scientific and methodological foundations for building the Eastern Siberia–Pacific Ocean pipeline in the permafrost zone of Yakutia. Later, a complex of geocryological studies was conducted aimed at implementation of the program of the State Committee of the Russian Federation “Deployment of the Transport Infrastructure for Developing the Mineral Resources of the south-eastern parts of the Chita Region”.

The studies of Dmitry Mikhailovich Shesternev in the area of cryohypergenesis and cryogenesis of the larger and smaller rocks in the permafrost zone presented at the 4th Conference of the Geocryologists of Russia in 2011 were evaluated as the beginning of development of the new scientific direction in geocryo-

logy, cryopetrogenesis. Besides, they became the basis for creating a new scientific direction by Shesternev's followers at the interface of mining and geocryological sciences – mountainous geocryology, meant to solve the fundamental problems of geocryological support for developing resource- and energy-saving environmentally safe technologies in production and processing of natural deposits in the permafrost zone.

In 2010, Dmitry Mikhailovich Shesternev was elected the principal researcher of the Melnikov Permafrost Institute SB RAS, and in 2012 he was appointed the head of the engineering geocryology laboratory (Fig. 2, 3). From that time to 2018, he led the studies of evaluating the impact of urbanization on the geocryological conditions of the developed territories of continental Arctic and Subarctic. He paid special attention to ensuring the effectiveness of design, construction and operation of motor roads and railways in Eastern Siberia. To solve these tasks by the example of the Amur-Yakut railway (AYR), he developed a system of multi-level monitoring to study the impact of the permafrost zone on the linear structures during anthropogenic impact under conditions of the climate change.

During the last 30 years of his life, Professor Shesternev was a constant participant and leader of scientific expeditions, the results of which were used in construction of the Baikal-Amur railway, Amur-Yakut railway, Southern Yakutia territorial production complex, and the Lensk gold ore plant, in the design and construction of the Eastern Siberia–Pacific Ocean pipeline, renovation of the damaged parts of the Amur federal highway and of the other infrastructure objects. During the last years, he was the



Fig. 2. A group of the workers of the engineering geocryology laboratory of MPI, SB RAS (Yakutsk, 2011).

In the first row in the center is the head of the laboratory Dmitry Shesternev.

scientific supervisor of the principal project of the SB RAS “Formation of the Geocryological Environment and its Role in Functioning of the Natural Technical Systems”.

Having large experience of scientific and organizing work, Dmitry Mikhailovich Shesternev made a significant contribution to establishment of the hydrogeology and engineering geology chair of the Chita Polytechnic Institute, the Chita branch of the Melnikov Permafrost Institute SB RAS, and to organization of the Institute of Natural Resources, Ecology and Cryology SB RAS. He paid serious atten-



Fig. 3. Congratulations extended to Dmitry Shesternev on his 70th anniversary by the institute workers (Yakutsk, 2016).

tion to preparation of specialists of higher qualifications, being the scientific supervisor of graduate school students and aspiring candidates of sciences. There are five candidates of sciences and one doctor of science among his followers. In 2013, he was assigned the title of a professor.

Dmitry Mikhailovich Shesternev was the author of more than 250 works, including 20 foreign publications, with 3 monographs and 12 co-authored works among them. The most significant works are: "Cryohypergenesis of Large Detrital Rocks and Rocks in the Permafrost Zone" (1997), "Cryohypergenesis and the Geotechnical Characteristics of Rocks in the Permafrost Zone" (2001), "Cryogenesis and Mercury-containing Compounds in the Mining Dumps in the Mountains" (2003), "The Cryogenic Processes of Transbaikalia" (2005), "Frost Heaving in Areas of Degrading Permafrost" (2012). He authored 5 books for bachelor's and master's student of universities and authored and co-authored 11 patents of RF. His scientific papers were often published in journals and popular science magazines, and his poems were published in books of poetry. They were appreciated by the Union of the Russian Writers, the member of which he became in 2015.

Dmitry Mikhailovich Shesternev was the Academician of the Russian Academy of Natural Sciences

and of the International Academy of Ecology and Life Protection Sciences (MANEB), a member of the Council for the Earth's Cryology of RAS, a member of the Supreme Engineering Council of the Head of the Sakha Republic (Yakutia) and an expert of the of the Sakha Republic (Yakutia) in construction and operation of buildings and structures in the permafrost zone.

For his large contribution to development of the permafrost zone, Dmitry Mikhailovich Shesternev was awarded the certificates of honor of RAS and of SB RAS, the sign of honor of the Siberian branch of RAS "Silver Sigma" and was conferred the title of the honored veteran of the Siberian branch of the Russian Academy of Sciences. The International Academy of Ecology and Life Protection Sciences awarded him the Lomonosov medal for solution of environmental problems during development of the permafrost zone, and the Governor of the Chita region awarded him a letter of gratitude for his personal contribution to preparation of the Encyclopedia of Transbaikalia. In 2006, by a decree of the Chita Regional Duma and the decision of the Governor of the Chita region, Dmitry Shesternev was conferred the title of the honored scientist of the Chita region.

We will keep the memories of this talented scientist and a man of a great soul in our hearts.

Received April 30, 2019