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CHRONICLE

ANDREY GEORGIEVITCH SKVORTSOV
(*on the 75th anniversary***)**

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The article reflects the main milestones of the scientific activity of A.G. Skvortsov, Candidate of Technical Sciences, a renowned specialist of the ECI TyumSC of SB RAS. Andrey Georgievich is a specialist in the field of seismoacoustic researches of shallow sections. He is the author of original methods of seismic exploration, successfully used both in the cryolithozone and beyond it.

Key words: *seismic survey, inverse-velocity section, geophysical monitoring.*

Skvortsov Andrey Georgievich, Candidate of Technical Sciences, Leading Researcher of the Laboratory for Cartographic Modeling and Forecasting the State of Permafrost Geosystems at the Earth's Cryosphere Institute of the Tyumen Scientific Center of the Siberian Branch of the Russian Academy of Sciences, was born on July 24, 1946 in the city of Noginsk, Moscow Oblast, into a family of teachers. After graduating from high school, he entered the Sergo Ordzhonikidze Moscow Geological Prospecting Institute and graduated in 1970 with a degree in geophysical methods of prospecting and exploration of mineral deposits.

Immediately after graduation, A.G. Skvortsov was assigned to the All-Union Scientific Research Institute of Hydrogeology and Engineering Geology (VSEGINGEO) in the laboratory of geophysical methods. In 1970–1980, the circle of scientific interests of Andrei Georgievich had been formed: the application of seismoacoustic methods in engineering geology, hydrogeology, geocryology and ecogeology. He was directly involved in theoretical and expeditionary research, participated in scientific conferences, writing articles and monographs.

During those years, with the participation of A.G. Skvortsov, the works have been published which

are still in demand as scientific and methodological manuals for specialists in the field of seismic acoustics:

– Study of frozen sandy-clayey soils using a complex of borehole geophysical methods. Skvortsov A.G. In: Proceedings of VSEGINGEO, 1977, issue 116: Geophysical methods for solving hydrogeological problems, pp. 76–86.

– Seismoacoustic methods for engineering geocryological research. Goryainov N.N., Skvortsov A.G. In: Engineering permafrost: Proceedings of the III International Conference on Permafrost. Novosibirsk, 1979, pp. 267–272.

– Study of landslides by geophysical methods. Goryainov N.N., Bogolyubov A.N., Varlamov N.M., Nikitin V.N., Matveev V.S., Skvortsov A.G. Nedra, Moscow, 1987, 157 pp.

– Artificial Activation of Landslides. Postoev G.P. et al. Nedra, Moscow, 1989, 134 pp.

– Application of Seismoacoustic Methods in Hydrogeology and Engineering Geology. N.N. Goryainov (Ed.). Nedra, Moscow, 1992, 264 pp.

In 1985, A.G. Skvortsov was awarded the VDNKh bronze medal for the development of a methodology for seismic studies on landslides, and in 1987, he has successfully defended his Ph.D. thesis on "Seismic methods of studying landslides" and was given the degree of Candidate of Technical Sciences.

Since 1996 to the present, A.G. Skvortsov has been working at the Federal State Budgetary Institution, the Earth's Cryosphere Institute, SB RAS, as a leading researcher. His scientific interests are connected with the study of the propagation patterns of seismic waves in the upper part of the geological environment, both in the permafrost zone and beyond it. In the course of research, based on the analysis of a representative series of experimental data, A.G. Skvortsov has established the basic fundamental regularities of the propagation of shear SH-waves in inverse seismic-geocryological and seismic-geological sections. As a result, for non-lithified permafrost deposits, the typification scheme for seismic-geocryological sections according to their inversion-degree has been proposed. It has been found that similar types of inverted seismic-geological sections are quite common outside the permafrost zone.

By means of theoretical calculations and their comparison with actual experimental data, significant differences in the kinematics of reflected SH-waves in the conditions of inverse velocity sections in comparison with normal velocity sections have been revealed. Those differences turned out to be so significant that, by analogy with the term "low-velocity zone" for normal velocity sections, the concept of "high-velocity zone" for inverse velocity sections has been introduced. As a result of his studies, he has created and successfully introduced into the practice of geophysical work a unique technique of high-resolution seismic exploration on shear waves (HSSW), intended for a detailed study of the structure of the upper part of the geological section in conditions of inverse velocity sections. Especially noteworthy is the high efficiency of that technique within urbanized areas, as evidenced by the numerous positive examples of its use in the cities of Moscow, Norilsk, Novorossiysk, Mirny, etc. The performed studies correspond to the world level, and in a number of fundamental positions they have no analogues in our country and abroad.

For the study, monitoring and spatial-temporal forecasting of slope processes, under his leadership at the ECI of Tyumen Scientific Center of the SB RAS, the method of multi-wave various-azimuth seismic prospecting (MWVASP) has been developed and successfully introduced.

When carrying out his experimental studies, A.G. Skvortsov pays much attention to the used technical base. He has developed a number of three-component borehole seismic probes. The probes are used to perform vertical seismic profiling (VSP) surveys in wells. Studies by the VSP method are an important part of the developed HSSW technique. In addition, in recent years, he has been in constant contact with the developers of modern high-frequency seismic equipment. The purpose of that work is to optimize and improve the technical requirements for equipment, to participate in field-testing of modernized versions of seismic stations in various natural and seismic geological conditions, as well as to participate in the development of technical specifications for the creation of new generations of seismic equipment.

The results of many-years research by A.G. Skvortsov are reflected in more than 160 scientific publications, including several monographs. We can distinguish only a small fraction of the main publications of recent decades:

– Features of the structure of the field of elastic vibrations in non-lithified permafrost. Skvortsov A.G. Kriosfera Zemli [Earth's Cryosphere], 1997, I (3), 66–72.

– Monitoring of the stress-strain state of the coastal slope at the Bolvansky geocryological station using seismic exploration. Skvortsov A.G., Drozdov D.S., Malkova G.V., Smetanin N.N., Ukraintseva N.G. Kriosfera Zemli [Earth's Cryosphere], 2006, X (2), 46–55.

– Informative value of geophysical research in engineering surveys in permafrost zone. Zykov Yu.D., Skvortsov A.G., Koshurnikov A.V., Pogorelov A.A. Engineering Surveys, 2009, No. 12, 57–63.

– Results of studying the geocryological conditions of the Arctic territories using geophysical methods. Melnikov V.P., Skvortsov A.G., Malkova G.V., Drozdov D.S., Ponomareva O.E., Sadurtdinov M.R., Tsarev A.M., Dubrovin V.A. Geology and Geophysics, 2010, 51 (1), 169–177.

– Seismic microzoning of the territory of Kaliningrad. Aleshin A.S., Anosov G.I., Bessarab F.S., Drobiz M.V., Dementyev Yu.V., Pogrebchenko V.V.,

Rogal L.A., Skvortsov A.G., Tsarev A.M., Chugaevich V.Ya. Engineering Surveys, 2014, No. 9–10, 68–79.

– The use of seismic and ground-penetrating radar methods in geocryological research. Sadurtdinov M.R., Skvortsov A.G., Sudakova M.S., Tsarev A.M., Malkova G.V. Bulletin of the NESC of FEB RAS, 2017, No. 4, 75–86.

The most important advantage of A.G. Skvortsov's research is the organic combination of solving theoretical problems with experimental observations and testing various methods and technologies in the field. A.G. Skvortsov actively participates in the organization of full-scale modeling, implementation and popularization of research results. The developed methods are in demand in production, as evidenced by numerous contractual and scientific-methodical works carried out by the Earth's Cryosphere Institute of the Tyumen SC SB RAS throughout Russia from Kaliningrad to Blagoveshchensk.

A.G. Skvortsov successfully conducts pedagogical and educational work. He lectures regularly at international scientific and practical conferences and seminars on the topic of "High-resolution shear wave seismic (HRSW) – physical foundations, technology and application experience".

He is a guest-lecturer for geophysics students at the M.V. Lomonosov Moscow State University. Andrey Georgievich takes an active part in the organization, management and implementation of field geophysical research, transfers his knowledge and vast experience to the undergraduate and graduate students.

Andrey Georgievich enjoys the well-deserved respect of the institute's staff. He is distinguished by high professionalism, great diligence, integrity, dedication, scientific intuition and practical skills, inexhaustible optimism and love of life.

We wish the Hero of the Day health, long happy years of life and further creative success!

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