

Abstracts

Prospects of Sea-Floor Seismography in the Russian Federation

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The Arctic region is a unique ‘depository’ of mineral resources, primarily, of oil and natural gas. Thanks to efforts of many generations of Russian citizens, the Russian Federation has inherited a favorable geographical and geopolitical situation in the Arctic sector, and the Russian Government has more than once emphasized special importance of economic development of this region. The key issue consists in the development of a concept for exploration of northern-sea resources, in particular, in the engineering-and-technology implementation of geological survey in the Arctic Seas. Innovative solutions that may be called for during further exploration of the Arctic and the whole Russian shelf are discussed in the paper. The technology of sea-floor seismography that provides for installation of recording instruments at sea bottom is addressed. The implementation of this advanced technology in the Russian Arctic is possible through either the use of foreign technologies or the development of Russian intellectual products and appropriate logistics. Positive and negative sides of each option are examined in the paper in detail. Historical examples are cited, and the current level of domestic achievements in the sea-floor-seismography area is considered.

Greenland Climate: Modern Changes

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Modern change in the Arctic climate is a substantial factor influencing both the environment and the economic prospects of the Arctic region.

Greenland is one of the most vulnerable elements of the Earth’s climate system, and it is very sensitive to global warming. Modern (i.e., from the 1980s till present) changes in the Greenland climate are assessed in the paper on the basis of simulation and reanalysis data as well as using data of instrumental measurements. Statistical analysis of these data showed a dominant trend toward warming of the Earth’s surface in the region. An increase in the long-wave radiation flux absorbed by the Earth’s surface and its relation to short-term and long-term surface temperature changes are found as well.

Prospects of Basic Research in the Arctic Region

A. Nekipelov, A. Makosko

The key lines of basic research activities enabling implementation of the Russian state policy when conducting investigations in the Arctic region are addressed in the paper. The proposed lines of investigations justify scientific solution of major problems of the Arctic region including: determination of the outer continental-shelf boundary; generation of a resource base for carbohydrates; acceleration of the transport-and-communication system development, etc.

Safe and Secure Use of Nuclear Power at Civil Nuclear Fleet as a Basis of FSUE ATOMFLOT'S Environmental Policy

*M. Kashka, S. Golovinsky,
O. Antonov, V. Vorobiev,
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V. Yarosh*

The paper focuses on the justification of modernization and enhancement of the use of subsurface resources in the Russian Arctic via establishment of competitive clusters and advanced, complex and environmental processing of extracted raw products followed by production of strategic materials with a high value added that will be competitive at the world market.

Studying Changes in the Tazovsky Peninsula Vegetation Cover Based on Satellite Images

S. Kornienko, K. Jakobson

The possibility of quantitative estimations of man-caused vegetation disturbances in the regions of oil-and-gas field development in the Russian subarctic zone using satellite images of different years is considered and justified in the paper. Based on analysis of NOAA and Landsat archive satellite data of 1988 and 2001, variations in the area of dominant types of natural tundra and forest-tundra vegetation cover were estimated for the first time for Tazovsky Peninsula (at a small scale) and for the Urengoy oil-and-gas condensate field (at a large scale). The investigation was based on surface-type ranking as well as on variations of spectral indices (NDVI and SWVI) and the radiation temperature. As established, the natural tundra-type vegetation (burnt reindeer moss) is mostly replaced by the following secondary species: grasses, low shrubs and green mosses, such disturbed zones being principally found close to oil-and-gas fields and gas-main pipelines. According to the results achieved, in 2001 the area of transformed (secondary) vegetation equaled about 14% (10 000 km²) of the Peninsula surface. The developed procedure may be used when drawing different-scale maps of man-caused transformation of the vegetation cover in the Arctic and subarctic regions of active economic development.

**On the Topicality of Midget
Nuclear Power Plants for
Long-term Development
of Coastal Regions in the
Russian Arctic and the
Russian Far East**

F. Mitenkov

The topicality of developing serial production of equipment for midget nuclear power plants is envisaged in the paper as one of the key activities when solving industrial and social issues during exploration of the Russian Arctic coast as well as of still unused lands in the trans-Ural region, Siberia and the Russian Far East. As emphasized in the paper, such activities should be only implemented under the relevant national target programs.

**Key Problems of Economic
Development of the Russian
Arctic**

*D. Dodin, V. Kaminsky,
O. Suprunenko, V. Pavlenko*

The paper addresses the key problems determining the lines, the specialization and the scale of economic development of various regions in the Russian Arctic being very rich in mineral resources. The abundance of various natural resources is the key prerequisite and the governing factor of their long-term development.

**From M.V. Lomonosov
to Major International
Research Projects –
the Historic Path
of Comprehensive
Investigations
in the Russian Arctic**

L. Vedeshin

The history of comprehensive investigations in the Russian Arctic is considered in the paper. Such integrated approach put forward by M.V.Lomonosov even in the 18th century was then fully implemented via the participation of our country in major international research projects such as: the Second International Polar Year, the International Geophysical Year, etc. Key achievements of most important research projects in the Arctic, including recent ones, with the participation of the Russian scientists are addressed.

**The Northern Sea Route
Development in the Literary
Heritage of M.V. Lomonosov**

V. Fomin

The paper shows the activity of M. V. Lomonosov related to the possibility of “see shipping to the East along the Siberian Ocean”, i.e. via the Northern Sea Route as it is named nowadays. The contribution of the great scientist in studying of natural regularities of the Arctic Ocean being necessary for ice navigation including set of the currents, formation and moving of ice floe, etc. as well as his activity concerning the organization of sea expedition to Kamchatka in Russia is also characterized.