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Abstracts

The Legal and Methodological Problems of Strategic Planning of Development of the Arctic Regions of Russia

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The strategic and geographical approaches to study and exploration of the Arctic, to definition of the boundaries and to zoning of the Russian Arctic are considered. It is emphasized that existing Russian system of strategic management of the Arctic development needs further enhancement taking into account the challenges and threats of the modern world.

Keywords: *Arctic zone of the Russian Federation, strategic planning of development of the arctic regions, the Northern Sea Route.*

Geodynamic Model of the Amerasian Basin of the Arctic (to the justification of belonging of the Lomonosov Ridge, the Mendeleev Elevation and Podvodnikov Trench to the Russian continental margin)

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A geodynamic model of the Amerasian Basin for Aptian-Paleocene time, based on two main sources of geological and geophysical data, is presented. The first group of data connects with the results of seismic profiling in the Arctic region obtained in recent years. These data showed that throughout the Amerasian Basin and adjacent land, stretching conditions existed for the whole period of the early-mid Cretaceous - Quaternary period with a maximum in the Aptian-Albian. The second group of data is the materials of seismic tomography on crust and mantle structure of the Arctic and East Asia. From the standpoint of hydrodynamics, the seismotomographic picture of the upper mantle structure indicates clearly the existence of upper mantle convection, which leads to stretching of the continental lithosphere, rifting and associated magmatism. This approach allows eliminating the contradictions in the known paleotectonic reconstructions of C. Scotese by their modification in accordance with the proposed geodynamic mechanism.

Keywords: *geodynamics, seismic tomography, tectonics, the Arctic, regional geology, geodynamic model.*

Arctic Gold Resources in Global Prospect

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The mineral sector occupies a central place in economy of the Arctic countries, which leads to the high importance of conditions of mineral resources and dynamics of their development. In a global prospect, there has been outlined a steady trend to development of resources of nonferrous and noble metals in the Circum-Arctic zone. Russian Arctic is the largest supplier of these metals on the domestic and foreign markets. Comparative analysis of trends in the development of mineral resources of nonferrous and precious metals of the Arctic zone of Russia and other countries is of great interest to develop the areas of research and exploration work.

Keywords: *Circum-Arctic zone, source of raw materials, gold, resource regions, mining.*

Stratigraphic and Paleogeographic Background of Oil and Gas Exploration in the Upper Jurassic-Lower Cretaceous Sedimentary Sequences of Marine Origin of the Framing of the Laptev Sea

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The features of profiles of the White Jura — Lower Cretaceous bottom of the framing of the Laptev Sea are considered. The data on composition and thickness of the deposits and their age (to the level of zones and subzones) are given. Despite significant differences in the thickness and fullness of profile in the different parts of the region, the common elements of profile structure can be identified. The most significant feature is the almost universal distribution of the Volgian, Ryazan and Nizhnev-lanzhinsky sediments composed mainly of clay or mudstone in the Volgian part, of sands and sandstones in the Valanginian part, and sediments of transitional character in Ryazan interval. Together with the results of the interpretation of seismic profiles, these data allow one to suppose the presence of Upper Jurassic and Lower Cretaceous sediments on the continental shelf of the Laptev Sea and their potential oil and gas content. The features of paleogeography and paleoclimatology of the north of Central Siberia in the Late Jurassic and Early Cretaceous are briefly describes.

Keywords: *the White Jura, Lower Cretaceous, the Laptev Sea, oil and gas content, biostratigraphy, paleogeography, paleoclimatology.*

Emergency Situations in Developing Oil and Gas Resources in the Arctic and the Ocean

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The causes of accidents and disasters during production and transportation of hydrocarbons in the Arctic and the ocean are given on the basis of database developed at the Institute of Oil and Gas of RAS. The manmade, natural and natural-technological causes are considered. The measures taken in Russia and other countries on the prevention of accidents and disasters, early detection of hydrocarbons spills and mitigation of their consequences are described.

Keywords: *the Arctic and the ocean, hydrocarbons development in water areas, oil and oil products spills, gas hydrates, explosion crater in Yamal, accidents and disasters, emergencies.*

The Problems of Environmental and Industrial Safety of Natural and Man-Made Marine Facilities during Development of the Arctic Shelf

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The results of the study of decomposition of gas hydrates around the production wells during hydrocarbons production are given. The physical and mathematical model of the environmental consequences of emergency spouting of gas wells on the shelf.

Keywords: *gas hydrates, emergency spouting, the Arctic.*

Development of Models for Express Computation of Oil Spills in the Barents Sea

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The issues of oil spills forecast in the Barents Sea are discussed. In addition to the traditional ideas that the forecast is based on mathematical model of oil spill, it should be taken into account that both hydrometeorological forecast and information about accident source are often known with a certain error or unknown at all. It is proposed to introduce the errors of weather forecast into consideration as artificial dispersion of path(s) to consider the traditional «one-path» approach as calculation of the most likely spread of oil spill with simultaneous evaluation of area of probable detection of oil pollution. In addition, the forecaster actions under the conditions of insufficient and incomplete information about oil spill.

Keywords: *the Barents Sea, mathematical simulation, oil spill, weather forecast error, area of probable spill.*

The first assessments of quality of the systems for early warning of weather threats to the Murmansk region

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The problems of creation of an early warning system for meteorological hazards are considered. The indicators of quality of early warning of possible high wind and heavy snow, got by two different technologies, are first obtained and analyzed. The first technology is based on the interpretation of the results of the regional hydrodynamic WRF-ARW model; the second one is based on the MOS corrected by forecasters on duty of the Hydrometcenter of Russia for the Murmansk Region. It is shown that the better warnings of degree of high wind hazard are obtained by the system based on interpretation of the results of WRF-ARW model, and the warnings of heavy snow of both compared technologies need improvement.

Keywords: *warning of weather threats, forecast using numerical regional hydrodynamic WRF-ARW model.*

The System of Basic Research in the Arctic and the Geopolitical Interests of Circumpolar Countries

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The article provides a brief description and analysis of the mechanisms of formation, arrangement and implementation of national policies of circumpolar countries in the field of basic research in the Arctic, as well as generalization and systematization of research areas and subjects of scientific institutions of the circumpolar countries.

Keywords: *basic research, geopolitical interests, national research interests, circumpolar countries, area of knowledge.*

North Futurology: Next Twenty Years

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The article shows the directions of moving of circumpolar countries since the 1990s, the factors defining these directions and their impact on the current development of the Arctic region at both the State and the regional and municipal levels. A new concept of the northern futurology as a special research field and a platform for consolidation of expert efforts in predicting the development of northern and arctic areas of the world is suggested. A positive role of international cooperation in economic forecasting is shown.

Keywords: *North futurology, socio-economic development of the arctic regions, international cooperation in the Arctic.*

The Methods for Determining of Shares in Rental Income during the Development of Tomtorsk Deposit of Rare-Earth Metals in the Republic of Sakha (Yakutia)

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A specific economic mechanism and ideology of creating of strategic Russian company of rare and rare-earth metals is first considered. The options are suggested to determine the shares of rental income of the Governments of the Russian Federation, the Republic of Sakha (Yakutia), the municipality «Olenek Evenk National District», municipality «Zhilindinsky national nasleg» and community «Chymara» from the Tomtorsk deposit of rare-earth metals.

Keywords: *Tomtorsk deposit of rare-earth metals, license agreement, rental income.*

55th Anniversary of the Russian Nuclear Icebreaker Fleet and Development of the Northern Sea Route

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In connection with the 55th anniversary of the nuclear icebreaker fleet, its significance for navigation in the Arctic region is considered. The new prospects for economic development of the northern territories and the state as a whole are represented in connection with the adoption of the federal laws aimed at strengthening of state administration of the Northern Sea Route — the national transport communications of Russia in the Arctic.

Keywords: *nuclear icebreaker, the Northern Sea Route, icebreaker steering, transit steering, cargo traffic.*