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Abstracts

Legal framework and methodological features of development of draft state program «Socio-economic development of the Arctic zone of the Russian Federation up to 2020»

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The basic approaches to development of the draft state program «Socio-economic development of the Arctic zone of the Russian Federation up to 2020» focused on the efficient and environmentally safe use of the resource potential of the Arctic zone of Russia in the interests of long-term economic and social development of the country, as well as the regions and municipalities. The methodological features of forming of the state program, its structure, certain subprograms and activities are disclosed.

Keywords: *state programs, resources, industrial and social infrastructure, transport and logistics system, critical infrastructure, integrated safety.*

Development of geophysical monitoring systems in the Arctic

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The current state and prospects of development of regional system for seismoinfrasonic monitoring of geodynamic processes in the lithosphere and cryosphere endangering the industrial safety in the areas of oil and gas production and sea lanes in the western Arctic are discussed.

Keywords: *the Western Arctic, security of maritime activities, the Arctic shelf, outlet glaciers, iceberg formation, seismicity, seismoinfrasonic monitoring system.*

Research of the Yakut Scientific Center of the Siberian Branch of the Russian Academy of Sciences to study the Arctic territories of the Republic of Sakha (Yakutia) and the shelves of the Laptev and East Siberian Seas

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Activities of RAS Yakut Scientific Center on geological survey and mineral exploration and on research of climate, flora and fauna, ecology, as well as the lifestyles of indigenous peoples of the Arctic are analyzed. The ways and specific measures for the study and exploration of mineral resources of the Arctic part of the Republic of Sakha (Yakutia), tourism development, identification and careful conservation of unique geological monuments of the Arctic.

Keywords: *research, the Northern Sea Route, Arctic station, environmental test, integrated programs.*

The need to create a common database on the properties of seabed structure

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Development of space and resources of the oceans connects with the urgent need to develop new hardware and advanced technologies for the study of geological, hydro-acoustic and hydrographic properties of seabed structure including systematization and typification of existing disconnected data with the possibility of further integration into digital models on the basis of geoinformation system. Database on the seabed characteristics is an essential component of the global multi-layer shell of such system. Experience of maritime activities demonstrates the need for comprehensive analysis of seabed parameters for both basic research and applied research including defense activities.

Keywords: *database, digital relief model, relief, seabed, acoustic properties.*

The submarine K-27: echo of the past

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The results of acoustic sensing of nuclear submarine K -27, flooded in the Stepovoy Bay of Novaya Zemlya archipelago in 1981, are presented and analyzed. The authors found the disturbance signs of water environment above the submarine surface that can be caused by gas or heat fluxes from the hull.

Keywords: *flood, radiation hazardous facility, spent nuclear fuel, sonar sensing, gas emission from seabed, heat flow.*

The problems of modeling of hydrological fields in the Arctic seas

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Some shortcomings of physical process modeling in the Arctic seas are analyzed in the article. The shortcomings connect with calculations of sea water density, parameterization of density convection processes and neglect of water mass conservatism influencing the formation of hydrological frontal zones. The issues of comparison of simulation results for thermohaline fields of Arctic waters with observed field data, as well as options for their possible solutions outside and inside areas of thermohaline fronts, are considered.

Keywords: *arctic sea, water mass, frontal zones, modeling, mixing, water circulation.*

Development of floating nuclear power sources – one of the ways to increase the economic efficiency of the Northern Sea Route

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Given Russia's integration into the world community (the European Union, BRICS, Asian-Pacific region) in the field of energy, space, aeronautics, railway, economic and social development, it should be a priority to develop marine transport along with others. Development and improvement of economic efficiency of the Russian Arctic can be achieved by improving of existing infrastructure of the Northern Sea Route and creation of energy systems with promising floating lower-power nuclear power plants.

Keywords: Northern Sea Route, nuclear-powered icebreakers, lower-power nuclear power plants, the Far North and the Arctic, fuel, transport.

Drilling vessel for the Russian Arctic. The concept of design, construction and operation

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When creating an Arctic drilling vessel, the nature and terms of financing, design and construction, concept of operation and infrastructure support, administrative and technological capabilities of the shipyard, need for localization and competitive counteraction, etc. have an effect on its architectural and constructive shape along with the engineering and design aspects. The article shows only technical side of the problem, i. e. drilling vessel project. Technical parameters of the vessel are not final and are in the process of updating in accordance with the requirements of promising members of the business project.

Keywords: arctic drilling vessel, turret anchor-mooring system, ship parameters, dynamic positioning, emergency evacuation system, ice class, winterization.

The effects of energy storage use in isolated power systems of Russia Эффекты применения накопителей энергии в изолированных энергосистемах России

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Assessment of the technical and economic effects of energy storage use in a single package with mono-generating units (for example, diesel power plants) in isolated power systems, which are a distinctive feature of the Arctic zone of Russian are presented. The effects of unloading of generating capacity and reducing the specific fuel consumption under full or partial transfer of the functions of daily maneuvering on energy storage that allows operating the power plant in the modes close to the nominal.

Keywords: diesel power plant, isolated energy system, capacity factor, energy storage, cost-effectiveness.

The issues of operation of large groups of various radio-electronic equipment in the process of creation of modern information and telecommunications infrastructure in the Russian Arctic

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The conditions and problems arising in operation of large groups of electronics in the Arctic regions are analyzed. Organizational and technical proposals are prepared to optimize the use of radio frequency resources in the Arctic and ensure the electromagnetic compatibility of tools and communication systems of state-of-the-art information and telecommunication systems.

Keywords: *radio frequency resource, electromagnetic environment, electromagnetic compatibility, radio electronics, atmospheric optical communication lines, meteor-burst communication, long-range ionospheric scattering, protected antenna-feeder devices.*

Environmental safety ensuring in the use of nuclear energy for civilian nuclear fleet

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The most important areas of environmental activities of FSUE «Atomflot» in 2013 are described. The documented data on impact of industrial activity on the environment, on industrial environmental control and measures to reduce the negative impact of production processes on population and environment are given in the article.

Keywords: *environmental policy, impact on the environment, radioactive waste, environmental safety, industrial and environmental control.*

How it was. The history of discovery of Prirazlomnoe oil field

O. A. Zalivchy, participant of work on the Arctic shelf

The article presents the memoirs of the participant of oil and gas exploration in the Arctic shelf and tells about the specialists of production association «Arcticmorneftegasrazvedka» whose selfless work in difficult Arctic conditions and high level of professionalism has allowed our country to develop oil and gas resource base in the Soviet (Russian) part of the western Arctic.

Keywords: *oil and gas exploration in the Arctic shelf, field geophysical and geological and technological research, well productivity test.*

«Chelyuskin»: Tragedy and Triumph in 1934

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The article describes the history of through voyage of the steamship «Chelyuskin» along the Northern Sea Route and rescue of Chelyuskin team after wreck of the ship in 1934. Generalization and historical analysis of the events is carried out on the basis of primary sources.

Keywords: *the Arctic, the Northern Sea Route, the steamship "Chelyuskin", Otto Schmidt, Vladimir Voronin.*