

## Abstracts

### Studies of the Kara Sea in the modern stage of development of the Russian Arctic

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The state and prospects of the Kara Sea and adjoining land researches are considered in the context of the changes of the socio-economic situation and climatic background. The largest projects of the oil and gas extraction are developed in the Kara Sea area. The demand on the sea transportation is growing. It is accompanied by favorable meteorological and ice conditions but the conservation of this situation is not guaranteed. The necessity of system organization of researches and coordination of scientific programs in the Kara Sea area is substantiated.

**Keywords:** Kara Sea, field studies, climate, ice cover, Northern Sea Route, shelf, mineral resources, environmental safety

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### Feedback modeling of the climate forming processes in the Arctic Ocean

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The calculations of the model of joint circulation of the Atlantic (from 200 S), the Arctic Ocean and the Bering Sea have been conducted, with latitude and longitude resolution of 0.250, for the period of 1958-2006. The results are compared with observation data and with simulations from other models. The analysis of the mode structure of the fields of movement and masses in the Norwegian and Greenland Seas allowed for a first time to obtain a feedback system, which is responsible for regulating the exchange of waters of the Arctic and the Atlantic. The main dynamic mechanism of the marked feedback is the combined effect of baroclinicity and the floor relief (SCEBFR). There is an inverse relationship between the barotropic and the baroclinic components of the flow velocity, which stabilizes water exchange between Atlantic and the Arctic in long time periods and holds them at a certain climate level. A positive feedback has been found between the thickness of fresh water and the anti-cyclonic vorticity in the circulation of the Beaufort (CB). Three periods of increased values of the thickness of fresh water, combined with enhanced anti-cyclonic vorticity in CB are marked: 1960, 1980 and the period from 1999 to the present. The evolution of anticyclonic flow vorticity outpaces the changes in the thickness of fresh water in CB by 1.75 years.

**Keywords:** Arctic Ocean, ocean circulation, sea ice, climate system, the North Atlantic Oscillation, the diagnosis-adaptation method

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### On the stability of freshwater reservoirs of East Fennoscandia to the deposition of $^{137}\text{Cs}$ : the radiological aspect

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The radioecological situation of the East Fennoscandia lakes concerning their  $^{137}\text{Cs}$  pollution has been reconstructed, acceptable levels of  $^{137}\text{Cs}$  deposition on the impounded-water levels in which fish contamination meets the hygienic regulations have been defined.  $^{137}\text{Cs}$  levels in the lake water have been projected using the sorption-diffusion model of the bottom sediments absorption, in fish fauna objects these levels have been projected based on the dependency of  $^{137}\text{Cs}$  accumulation in fish on the concentration of potassium in water. The results of the reconstruction of  $^{137}\text{Cs}$  levels have been verified by field observations for global and "Chernobyl"  $^{137}\text{Cs}$  in the monitored objects. Accumulation coefficients (AC) of  $^{137}\text{Cs}$  in predatory species of fish from the lakes varied from 840 to 16210. Transfer coefficients (TC) of "Chernobyl"  $^{137}\text{Cs}$  in fish were  $5.0 \cdot 10^{-3}$ — $137 \cdot 10^{-3}$  Bq kg $^{-1}$ /Bq·m $^{-2}$ . For the radioecological assessment of lakes a delineation scale of  $^{137}\text{Cs}$  AC in fish for water bodies has been proposed, based on the connection between AC and Quale content in the water, where Quale is a chemical analogue of  $^{137}\text{Cs}$ . The upper limit of  $^{137}\text{Cs}$  deposition on the surface of brackish oligotrophic lakes in Fennoscandia is between 7 and 4 kBq/m $^2$ .

**Keywords:**  $^{137}\text{Cs}$ , accumulation factor, fish, lakes, trophic chain

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### Physical and geographical features of the aquatic ecosystems of the White Sea-Kuloy Peninsula (Arkhangelsk region)

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There are geographical characteristic of Zimnyaya Zolotitsa, Megra and Soyana river pools are presented. These water ecosystems locate in the diamondiferous province and get influence when developing mining works.

**Keywords:** orographic environmental factors, aquatic ecosystems, territory of the Arkhangelsk region, assessing the negative effects of human activities

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### Characteristics of Arctic gas-and-oil resource strata, paleogeographic and geodynamic aspects of their formation

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This article characterizes oil source and gas-and-oil source strata (OSS and GOSS) of the sedimentary basins of the three most-studied oil and gas sectors: the Norwegian, West-Russian and North-American. Among them, these strata are regionally discontinuous. High quality OSS of the Upper Devonian - Lower Carboniferous domanik formations have a strong position in the stratigraphic scale. Close to them in quality and productivity are the less common OSS of the Upper Triassic, Lower Jurassic and Neocomian of North Alaska and Beaufort-Mackenzie basin and Upper Jurassic bazhenovit formations of South Kara basin. Mismatch of the OSS and GOSS locations on a stratigraphic section is due to a not ubiquitous and not always synchronous development of tectonic phases. The obtained patterns of GOSS distribution in the sedimentary cover of the Arctic can be used in their forecasting in the territories of the East-Russian sector.

**Keywords:** oil source and gas-and-oil source strata, Norwegian, West-Russian, North-American sectors of the Arctic, geodynamic and paleogeographic situations

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### Sustainable development of the marine segment of the BEAR (priorities, realities, compromises)

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Role and contribution of the Barents Euro-Arctic cooperation (BEAR) territories in the area of marine nature management cooperation are considered and assessed. Main factors contributing effective international partnership of state and provincial participants of this strategically important project are described. Ways of BEAR enhancement in the aim of economical and ecological safety of European Far North providing and region's sustainable development increasing are introduced.

**Key words:** *Barents Euro-Arctic cooperation, marine nature management, economical and ecological safety, sustainable development*

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### Russian Emergencies Ministry measures for prevention and emergency response in the Arctic

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The paper analyzes the Arctic zone of the Russian Federation, describes its features and existing threats, as well as a set of measures taken by the Ministry of Emergency Situations of Russia together with other departments and agencies to ensure the safety of the population and territories.

**Keywords:** *Arctic zone, emergency, vulnerability, projecting, damage, potential threats, forces and capabilities, emergency rescue formations, search and rescue, exercises*

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### Russian nuclear icebreaker fleet and development prospects of the Northern Sea Route

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The importance of the nuclear icebreaker fleet to shipping industry in the Arctic region is discussed. The economic outlook of the northern regions and the state as a whole is identified regarding the passage of federal legislation to strengthen state control of the Northern Sea Route waters - the national transport communications of Russia in the Arctic.

**Keywords:** *waters of the Northern Sea Route, atomic icebreakers, ice-routing of the ships, Arctic navigation, cargo traffic, cargo transit routing*

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### Methodology for justification of the selection of complex manufacturing processes on the example of the salvage of the submerged object in the Arctic

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The assessment has been made of the possible technologies of the salvage of the nuclear submarine K-27, submerged at a depth of 30 m in the Gulf Stepovaya of the Kara Sea. Evaluation has been performed using methodology for justification of the selection of complex manufacturing processes, developed by experts of the Research Institute of Salvage and Underwater Technology of the MERC of the Navy "Naval Academy", which is based on the theory of choice justification.

**Keywords:** *salvage of the sunken objects, technological process of the salvage, selection justification procedure, criteria for comparison, options of the salvage, risk management*

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### On the sea information network systems in the Arctic

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The main principles of creation maritime information systems, which provided decide of different applied problems is characterized with emphasize on Arctic regions and based on abroad experience. Difference kinds of monitoring and explorations providing maritime security, ecology and resource management are among such problems. Sensor networks as distributive surveyor is considered as a common structure of information systems for different applications.

The main features of sensor networks is discussed as a common ones for different applications. Different sorts of information networks system and contemporary technologies is consider including sensors, network communications, fusion and processing of data. Wireless sensor networks is considered as a most important case among different sorts of sensor networks.

There take some attention on sensor network using as an information source in ocean environment monitoring case in frame of data assimilation in operational oceanography system. Several new problems in physical oceanography in this content are formulated.

**Key words:** *Maritime information systems (MIS). Distributive netted systems (DNS). Sensor networks. Underwater surveillance systems. Ocean observing systems. Operational oceanography*

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### The activities of the Arctic and Antarctic Expert Council under the Chairman of the Federation Council in 2012

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Activities of the Arctic and Antarctic Expert Council under the Chairman of the Federation Council have been examined. This body was formed for a better implementation of the "Principles of State Policy of the Russian Federation for the period up to 2020 and beyond". To date, the development of the Arctic zone of the Russian Federation continues to be one of the main priorities of the state.

**Keywords:** *Arctic, Arctic zone of the Russian Federation, Arctic and Antarctic Expert Council under the Chairman of the Federation Council, the Northern Sea Route, Russian state policy in the Arctic, national interests of Russia in the Arctic*

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