An increase in the number and intensity of dangerous natural phenomena (storms, tornadoes, floods, droughts, etc.) observed in recent decades is associated with the ongoing changes in the Earth climate. This problem is one of the global modern challenges for the mankind. The effects of climate change are having an growing impact on geopolitics, business, governance and national security. With this in mind, special attention is paid to the Arctic region, where the rate of warming is more than two and a half times faster than the average one over the planet, and the continuation of this trend, with a high degree of probability, is predicted in the current century.

For Russia, the largest Arctic country, the emergence of new threats to the sustainable development of the northern territories, including: an increase in the risk of damage from dangerous hydrometeorological and ice phenomena, human-made accidents and disasters, pollution of fragile Arctic ecosystems is a serious challenge. The solution of this problem largely depends on comprehensiveness and quality of hydrometeorological information on the state of the Arctic environment and its probable changes in the foreseeable future. One of the most effective ways to obtain such information is to conduct high-latitude multidisciplinary research expeditions. Such endeavors are of fundamental scientific and practical importance and fully meet the national interests of the Russian Federation.

The great historical experience of polar expeditions has been accumulated at the State Scientific Center “Arctic and Antarctic research institute (AARI)” of Roshydromet. In 1937 — 2013 the institute organized drifting stations “North Pole”, from 1941 to 1993 — high-latitude air expeditions “North”. The outcome of these field studies provided the basis of modern knowledge about the Arctic environment. Other countries also show great interest in conducting polar expeditions. In the fall of 2020, the annual international MOSAiC expedition, organized by the Alfred Wegener Institute of Marine and Polar Research (AWI, Germany) will terminate. This expedition brought together scientists from 19 countries, including Russia, which was represented by AARI.

In 2019, the Russian Government set the task of implementing a large-scale scientific and technical project - a multidisciplinary scientific expedition “Transarktika-2019”. Its implementation fully complies with the provisions of the updated Strategy for the development of maritime activities of the Russian Federation until 2030: “Main priorities for the development of maritime activities of the Russian Federation on a long-term basis” — in terms of “conducting regular scientific expeditionary research of the marine environment, resources and areas of the World Ocean, the Arctic and Antarctic with the use of modern tools and technologies”. The objectives of the “Transarktika-2019” expedition were:

– to carry out multidisciplinary scientific research in the high-latitude Arctic Ocean;

– to restore monitoring studies of the environmental conditions and pollution in the Russian Arctic seas;

– to carry out the seasonal drifting station “North Pole”;

– to develop technologies and methods of scientific expedition work for subsequent use at the North Pole ice-resistant self-propelled platform (IRSPP), which is currently under construction at the Admiralty Shipyards in St. Petersburg.

The expedition was carried out by four research vessels (R/V) of Roshydromet and included four stages, at each of which interdisciplinary field studies of the Arctic environment were fulfilled.

The first stage was conducted from February 26 till June 8, 2019 on the R/V "Akademik Tryoshnikov" under the guidance of the State Scientific Center AARI of Roshydromet and with the involvement of scientists from 14 Russian and foreign scientific institutes. Within this stage, interdisciplinary studies were carried out in the Barents Sea and the adjacent part of the Arctic Basin. On a specially selected ice field, a seasonal drifting research station of a new type was organized: the "North Pole-2019", carried out in the "ship — ice" logistics. The research was carried out from the ship, in the ice camp and at remote points where the scientists were transported by helicopters based on the ship.

At the second stage (April 15 — May 14, 2019), the Federal State Budgetary Institution "Severnoe UGMS" of Roshydromet at the R/V "Mikhail Somov" implemented a program of integrated monitoring of the environmental conditions and pollution in the Barents and White Seas.

The program of the third stage of the "Transarktika-2019" (July 16 — August 2, 2019), also carried out under the direction of the Severnoye UGMS of Roshydromet on the R/V "Professor Molchanov", envisaged two main tasks. The task of the research work included carrying out field studies of the ecosystems of the Barents, White and Pechora seas. The educational task (within the framework of the innovative scientific and educational project "Arctic Floating University" of Roshydromet and the Northern Arctic Federal University) was to train students of Russian universities in practical skills of marine expeditionary work.

At the fourth stage (July 25 — October 23, 2019) under the leadership of the FGBI "Far Eastern Research Institute of Hydrometeorological Research" on the R/V "Professor Multanovsky", scientists from 11 research organizations, including two German institutes, carried out monitoring work. This cruise was unique in terms of geographic coverage: the ship route covered all Russian Siberian seas from the Chukchi Sea to the Barents Sea and back. The state and pollution of the natural environment under changing climate conditions were studied. During this stage the focused geological studies in the East Siberian Sea were also done.

The proposed special issue of the journal "Arctic and Antarctic Research" (*Problemy Arktiki i Antarktiki*) presents scientific papers prepared on the basis of materials obtained at the first stage of the expedition "Transarktika-2019". The papers cover a wide range of scientific disciplines, including physical oceanography, hydrochemistry, atmospheric research, ice and geological research.

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