FOREWORD

The Proceedings contain papers presented at the science and technology conference "Tasks and problems of the monitoring of the Ob' Bay natural conditions in the era of changing climate and intensive economic activity", which took place at AARI on October 25–26, 2022. The conference brought together experts from different fields: oceanographers, hydrologists, meteorologists, ecologists, representatives of oil and gas companies and engineering companies dealing with issues pertaining to the Ob' Bay area. All the papers were interesting and met a high professional standard.

In recent years, the Ob-Taz region has been under intensive anthropogenic impact due to the rapid development of the hydrocarbon resources on the Yamal, Gydan and Taz peninsulas, as well as the development of the oil and gas fields located in the Ob' Bay water area (Kamennomysskoe-Sea Deposit). The economic activity is accompanied by a growth in logistics routes, construction of facilities for various applications, including hydraulic structures. Just 10–15 years ago the main supplies to the temporary and permanent settlements located in the areas around the Ob' Bay were delivered in the short period of summer-autumn navigation, and in the long cold season only by helicopters and winter roads. Ships entering the Ob' Bay during the ice season was a very rare occurrence and did not happen every year. At the present time all year-round navigation takes place on a regular basis at three sites of the Ob' Bay: the Sabetta port, the Salmanovsky berth and the Novoportovsky terminal, where oil is loaded all the year round, and the list is growing. The major part of the maritime shipping along the Northern Sea route is carried out between the ports of the European part of Russia and these sites in the Ob' Bay. A ship canal was constructed in the relatively shallow northern part of the Ob' Bay to provide safe navigation.

In recent years, researchers in different fields have noted radical changes in the natural conditions in the Ob' Bay water area. The most obvious indicator is the southward displacement of the flaw polynya boundary in the period of the seasonal maximum of the fast ice development in the Bay. Some of the changes are recorded only by means of special observations. In particular, compared to the long-term observations of the past years, a change in the tide characteristics during the ice season has been noted in recent years. The influence of climatic changes and the progressive increase in navigation on the fast ice formation in the Ob' Bay is discussed in the paper by R.A. Vinogradov and co-authors. These authors note a decrease in the fast ice area and attribute it to the anthropogenic factor.

The application of modern methods to the Kara Sea water area, including the Ob' Bay, is presented in the article by V.V. Kirillov and co-authors. Remote estimation of the age of different types of ice cover is performed on the basis of satellite data of CryoSat-2 and SMOS.

For the first time in many years, a review of the physical and mechanical properties of ice in the Ob' Bay is presented. A large volume of data on the physical and mechanical ice characteristics of the Ob' Bay, obtained in numerous field studies in the last 30 years, is analyzed in the article by O.M. Andreev and co-authors. The paper considers the characteristics of fresh-water ice, which covers the most part of the Bay in the winter season, and salt ice in the northern part of the Bay and at the boundary with the Kara Sea.

At the present time, the digital transformation has led to the necessity of solving methodological problems in the estimation of the river catchment based on GIS data rather than traditional methods using paper maps. The article by E.V. Rumyantseva and co-authors discusses the understanding level of the hydrological characteristics of small rivers flowing into the Ob and Taz Bays. A review of the research activities starting with the expedition by B.M. Jitkov is presented, the Soviet period is considered, information on relatively recent expeditions organized in this century is also given.

The decline of the observation network in the Russian Arctic at the turn of the XXI century led to the loss of reliable sources of data on water level fluctuations. The paper by G.N. Voinov et al describes the activity of the tide gauge performing all year-round water level measurements in the area of the cape Kamenny. The tide gauge has been operating since 2017, supporting navigation, and it is the only source of hourly observations data on the water level in the Ob' Bay. A method of data processing and short-term level forecast with 12 hours' lead time is presented. The paper identifies changes in the tide characteristics in the ice season compared to long-term data of the past years.

The article by A.A. Dobrodeev and K.E. Sazonov describes studies conducted in the ice tank of the Krylov State Research Centre in the last 20 years, supporting the design and exploitation of various technical facilities intended for the industrial development of the Ob' Bay. Given the increased pace of natural resources development in the Ob' Bay area, this article will definitely be of interest to specialists in the field.

We expect that the articles published in the Proceedings will be a useful addition to the vast research literature dealing with the natural conditions of the Ob' Bay and Taz Bay, and the materials presented will be used for the development of a new program of comprehensive monitoring of hydrometeorological and ecological conditions, corresponding to the great economic significance of the region. We hope that our proposal to hold such a conference every two years will receive response and support from relevant state bodies and private companies.

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