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Ice and Thermal Variability in Bospor-Vostochny Strait in Last Years

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ABSTRACT

The construction of the piers between Novosilsky Cape and Nazimova Peninsula decreased the width of the Strait of Bosphor-Vostochny by about 200 m. In winter 2009-2011, the formation of ice in the Straits of Bosphor-Vostochny took place more intensively than in years with hard ice cover. In January and February in the strait the water area from fast ice occupied much wider area than in cold winters past years. The destruction of the ice in March was the same as during the cold winters. Despite of low temperature, the intensive north wind causes lead formation in the northern part of the strait and makes the 9/10 ice in the southern part. Construction of the piers on the Novosilsky Cape and Nazimova Peninsula causes an increase in the width of the fast ice. This point requires clarification in the future.

KEY WORDS: Ice; seawater; temperature; distribution; currents; fast ice; Bosphor-East.

INTRODUCTION

The width of the Strait of Bosphor Vostochny was reduced almost by one third because of the construction of the bridge to the Russky Island. It undoubtedly had an impact on the hydrological and ice regime of the Straits.
Three-year study, the aim of which was to identify the possible consequences of the constriction of the Strait between Nazimova Peninsula and Novosilsky Cape showed that the change of the water exchange of the adjacent bays, as well as currents in the Strait was not too significant.
The most severely narrowing of the Strait should have an impact on the ice, so the main aim of the research was to evaluate the changes of ice regime of the Straits of the Bosphor-East and adjacent bays: Ayaks, Paris.

MATERIALS OF OBSERVATIONS

The most severely narrowing of the Strait should have an impact on the ice, so the main aim of the research was to evaluate the changes of ice regime of the Bosphor-Vostochny Straits and adjacent bays: Ayaks, Paris.
The main materials for researching of the ice distribution in Boshor-Vostochny Strait were the data from aircraft sources and full-scale maps of ice of Peter the Great Bay, made by meteo-station "Cape Tokaryvsky", fishing ships and others (Yakunin, 2012). The most detailed information was collected for the period 1916 - 1991. The map with an information about fast ice distribution were formed, the probability of the ice collision supposed to be about 0, 25, 50, 75 and 100%. Values 0, 25, 50, 75 and 100% mean the probabilities to meet the ice in this point in different years. Line 50% corresponds to the average long-standing position of the boundary for each ten days. The boundaries 0 to 100% show extreme values fast ice distributions. Line 0% means absence of ice in these ten days in all years. Line 100% shows the area where there was ice every year.

DRIFTING ICE

The strait is bounded Muraviev-Amursky Peninsula in the north, Russky Island with Ayaks and Paris bays in the south; the special observations of ice were not carried out here. The nearest the observation point is located on a Nazimova Peninsula, the Strait is well seen from this point. The generalization of the obtained data allows us to make the maps of drifting ice distribution and make some conclusions. The ice formation and decay of the bays Ayaks and Paris is researched. First ice forms at the end of November. The surface of bays is covered by ice to the middle of December in almost 50% of winters. By the end of December the ice covers all the bays on 100%. Bosphor Vostochny strait east side is covered by ice from the beginning to end of December. Ten days after drifting ice covers all strait from the Zhitkov Cape to meridians for 75% of winters. In warm years the strait surface can stay clean during all December. In the middle of February the ice growth is maximal. At that moment all west part of the strait up to Novosilsky Cape is covered by drifting ice for all winters. But the ice condition is changing because of the constriction of the strait under the bridge which causes reducing the ice transferring from west side to east side of the strait.
If the ice would not be broken by the ships or strong northern winds, the strait will be completely frozen with 30 cm ice.
Only Zolotoy Rog Bay will not freeze because the warm water from Vladivostok thermal power plant (TPP-2) heats the bay.