

A01-P23

SEA ICE PREDICTION AND CONSTRUCTION OF ICE NAVIGATION SUPPORT SYSTEM FOR THE ARCTIC SEA ROUTE

Hajime Yamaguchi (*Graduate School of Frontier Sciences, The University of Tokyo, Japan*)

h-yama@k.u-tokyo.ac.jp

With reduction of the sea ice in the summer Arctic Ocean, it is tinged with a touch of reality to use the Arctic Ocean as a commercial sea route. To attain this goal, the cooperation across the boundaries among science, engineering and economics is indispensable through understanding of ice condition and its prediction, understanding of influence on ship hull during ice navigation, planning of effective transportation, and so on. Therefore, as one of the research projects (<http://www.nipr.ac.jp/grene/>) under the Ministry of Education, Culture, Sports, Science and Technology, we are executing a 5-year research project "Sea ice prediction and construction of ice navigation support system for the Arctic sea route" since fiscal year 2011. 12 experts participated in this research project from 11 organizations.

The aim of this research is to create a forecast system and a criterion of judgment required for use of the Arctic sea routes. The research is being performed with the following 4 subthemes:

1. Development of the prediction technique of sea ice distribution: put emphasis on the short-term forecast of the one-week scale using a high resolution numerical model, and the middle-term forecast of several-month scale using satellite data and a statistics model. This subtheme is being executed with the results of the following three subthemes taken into account for the practical ice prediction to support the ship navigation.
2. Ice monitoring along the routes: develop an ice monitoring methodology using the sea ice information including ice area, thickness, convergence, divergence, etc., acquired from satellite remote sensing. The research for navigation support is being executed to lead to ice navigation and cruise safety index.
3. Understanding of the influence of cold region sea conditions on vessels: study the dynamics ship-ice contact and hull icing.
4. Design of navigation scenario with the economics taken into account.

By collecting the results of these subthemes, we will develop the navigation support system for the propriety judgment and efficient use of the Arctic sea route.