SEA ICE OUTLOOK

2023 August Report

By ASIC, NIPR

Contributor

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Contributors

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Executive summary

Monthly mean ice extent in September will be about 4.616 million square kilometers. Our prediction is based on a statistical way using satellite microwave sensor data and reanalysis data. We used the ice thickness (accumulated ice convergence), ice age, and mean ice divergence on June 30. Predicted ice concentration map from July 1 to September 20 is available in our website: https://www.nipr.ac.jp/sea_ice/e/forecast/2023-07-31-1/

Type of Outlook method:

Statistical

Dataset

Ice velocity: Daily sea-ice velocity of Kimura Dataset (Kimura et al., 2013), between June 30 2003 and June 30 2023 except for between September 28 2011 and July 2 2012 for AMSR-E/AMSR2 and Daily sea-ice velocity from TOPAZ4, between September 28 2011 and July 2 2012.

Ice concentration: 10km grid data distributed by Arctic Data Archive System (https://ads.nipr.ac.jp)

Prediction of September pan-Arctic extent as monthly average in million square kilometers.

4.616 million square kilometers

Short explanation of Outlook method.

We predicted the Arctic sea-ice cover from coming July 1 to September 20, using the satellite microwave sensors data, AMSR-E (2002/03-2010/11), AMSR2 (2012/13-2022/23), and reanalysis data, TOPAZ4 (2011/12). The analysis method is based on our research (Kimura et al., 2013). First, we expect the ice thickness distribution on June 30 from redistribution (divergence/convergence) of sea ice during December and June. Additionally, ice age distribution and mean ice divergence distribution which represents how much area of young ice is contained in the old ice on June 30 were estimated from the backward tracking of sea ice. And then, by using the mean sea ice drift velocity since July over the past four years, effects of sea ice transport from July 1 to the prediction date was considered. Finally, we calculated the summer ice concentration by multiple regression analysis based on the derived ice thickness, ice age, and mean ice divergence.

Pan-Arctic sea ice extent anomaly million square km.

+0.149 (4.616-4.467)

Reference

Kimura, N., A. Nishimura, Y. Tanaka and H. Yamaguchi, Influence of winter sea ice motion on summer ice cover in the Arctic, Polar Research, 32, 20193, 2013.

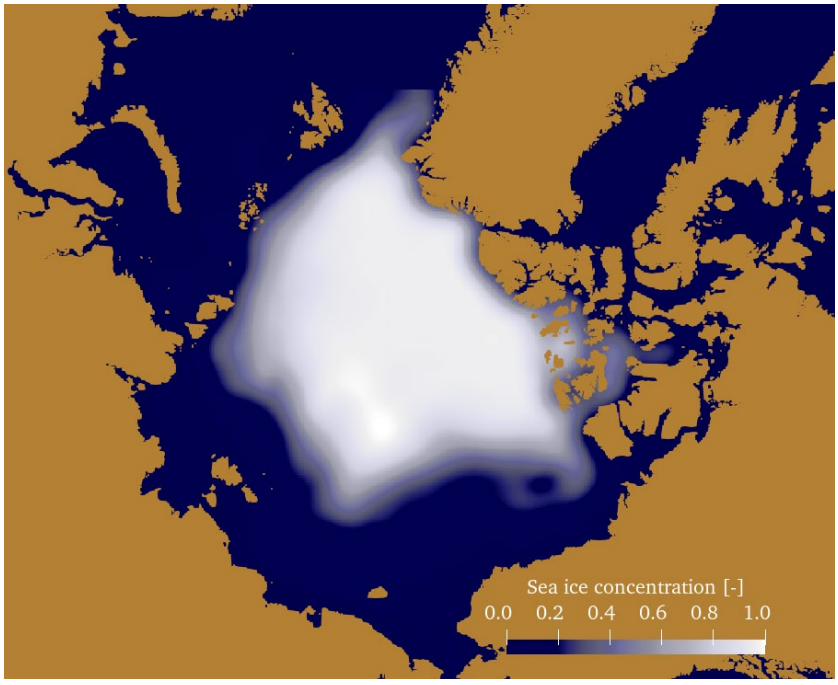

Fig: Predicted monthly-mean ice concentration in September 2023.