Sea Ice Outlook

2021 June Report

Individual Outlook

Name of contributor or name of contributing organization:

SYSU/SML-MLM

Is this contribution from a person or group not affiliated with a research organization?

No

Name and organization for all contributors. Indicate primary contact and total number of people who may have contributed to your Outlook, even if not included on the author list.

SYSU/SML-MLM

Do you want your June contribution to automatically be included in subsequent reports? (If yes, you may still update your contribution via the submission form.)

Include this submission in this month's report ONLY

What is the type of your Outlook projection?

Statistical

Starting in 2017 we are accepting both pan-Arctic and pan-Antarctic sea ice extent (either one or both) of the September monthly mean. As in 2016, we are also collecting Alaskan regional sea ice extent. To be consistent with the validating sea ice extent index from NSIDC, if possible, please first compute the average sea ice concentration for the month and then compute the extent as the sum of cell areas > 15%.

a) Pan-Arctic September extent prediction in million square kilometers.

4.63

b) same as in (a) but for pan-Antarctic. If your method differs substantially from that for the Arctic, please enter it as a separate submission.

c) same as in (b) but for the Alaskan region. Please also tell us maximum possible extent if every ocean cell in your region were ice covered.

0.71

"Executive summary" of your Outlook contribution (using 300 words or less) describe how and why your contribution was formulated. To the extent possible, use non-technical language.

A multivariate linear Markov model is used to predict monthly sea ice concentration (SIC), from which sea ice extent prediction of monthly September 2021 in Artic is calculated to be 4.63±0.51 million square kilometers, and the Alaskan regional SIE is predicted to be 0.71±0.25 million square kilometers.

Brief explanation of Outlook method (using 300 words or less).

The multivariate linear Markov model is a statistical model that combines principal component analysis and linear Markov model together, it can identify the large scale atmospheric and oceanic variability through principal component analysis and make linear Markov predictions based on its results (Yuan et al., 2016). To make predictions, first we extract time and space component from the data matrix, and we use linear Markov model to predict the target time component, which will be multiplied with space component to make a final prediction. Besides the parameters used in Yuan et al. (2016), e.g., sea ice concentration (SIC), sea surface temperature (SST), surface air temperature (SAT), here we further use monthly surface net radiation flux (NR) data from 1979 to 2019 to train our model. For this attempt, we use 2021 May monthly mean SIC data to initiate our model and make monthly SIC and SIE prediction.

Tell us the dataset used for your initial Sea Ice Concentration (SIC).

NA

Tell us the dataset used for your initial Sea Ice Thickness (SIT) used. Include name and date.

NA

If you use a dynamic model, please specify the name of the model as a whole and each component including version numbers and how the component is initialized:

null response

If available from your method.
a) Uncertainty/probability estimates:

Median

4.63

Lower error bound

4.12

Lower error bound

5.14

Standard Deviation

0.51

b) Brief explanation/assessment of basis for the uncertainty estimate (1-2 sentences).

We estimate our uncertainty with root-mean-square-error(RMSE) calculated from 1979-2019 hindcasts.

c) Brief description of any post-processing you have done (1-2 sentences).

No post-processing.