Sea Ice Outlook

2022 August Report

Individual Outlook

Name of contributor or name of contributing organization:

KOPRI (Chi et al.)

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

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.

KOPRI (Chi et al.)

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.)

[Do you want your contribution for this month to automatically be included in subsequent reports?]

What is the type of your Outlook projection?

Statistical/ML

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.

5.18

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.

"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.

KOPRI's prediction model uses the past 12-month data as inputs for the six-month predictions of Arctic sea ice concentration (SIC). The predicted September extent for 2022 is 5.18 million square kilometers using data from August 2021 to July 2022.

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

KOPRI's fully data-driven model was trained on historical NSIDC's daily SIC data from 1979 to 2021 using a combination of convolutional and recurrent neural networks. Since we observed a large visual discrepancy according to the neural network's loss functions, a new loss function was developed to improve both statistical accuracy and visual agreement. The 6-month prediction model is currently tuning up to improve predictability. Please find our recent published paper: Chi J, Bae J, Kwon Y-J. Two-Stream Convolutional Long- and Short-Term Memory Model Using Perceptual Loss for Sequence-to-Sequence Arctic Sea Ice Prediction. Remote Sensing. 2021; 13(17):3413. https://doi.org/10.3390/rs13173413

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

NSIDC NASA Team, https://nsidc.org/data/nsidc-0051, https://doi.org/10.5067/8GQ8LZQVL0VL, https://nsidc.org/data/nsidc-0081, https://doi.org/10.5067/YTTHO2FJQ97K

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:

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

Median

5.22

Lower error bound

5.05

Lower error bound

5.37

Standard Deviation

0.1

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

We selected ten most accurate models in the training process and then use them for the uncertainty estimate.

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

Negative SIC predictions over ocean pixels were set to 0% and SIC predictions over 100% were set to 100%. We also used land and coastline masks from NSIDC's SIC data