Sea Ice Outlook

2021 September Report

Individual Outlook

Name of contributor or name of contributing organization:

Metservice (Yizhe Zhan)

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.

Metservice (Yizhe Zhan)

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.)

Repeat this submission in all future monthly reports

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.

4.38

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.

Our prediction is based on the strong correlation between detrended June top-of-atmosphere (TOA) reflected solar radiation (RSR) and September Sea Ice Extent (SIE) anomalies, as proposed by Zhan and Davies [2017]. This method is telling because the main contributor of TOA RSR anomaly in June is from the change of underlying surfaces and the sea ice state in early summer (June) largely determines the total absorbed shortwave solar radiation during the whole melt season.

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

Our contribution is formulated by adding the main contribution part from the September SIE trend (2002~2020) with the anomalous part from the June TOA-RSR (2021) anomaly. The detailed description of the calculation is as follows:
1. Calculate the detrended pan-Arctic June RSR anomaly (2021): 3.56 W/m2.
2. Estimate the corresponding September SIE anomaly: 0.27 (3.56 * 0.0759) million km2.
3. Calculate the trending anomaly of September SIE: -0.08 million km2 per year.
4. Calculate the 2021 September SIE (from the trending line): 4.11 million km2.
5. Estimate the predicted September SIE of 2021: 4.38 (4.11 + 0.27) million km2.

Note that the coefficient of 0.0759 is estimated from the detrended anomalies of June TOA-RSR and September SIE between 2002 and 2020.

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:

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

Median

0.3

Lower error bound

4.08

Lower error bound

4.68

Standard Deviation

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

The uncertainty range is estimated from the standard error of the correlation between June TOA-RSR and September SIE.

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

NA