Sea Ice Outlook

2023 July Report

Individual Outlook

Name of contributor or name of contributing organization:

FIO-ESM

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.

FIO-ESM

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?

Dynamic Model

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.

4.51

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 FIO-ESM (the First Institute of Oceanography-Earth System Model) with data assimilation. The prediction of September pan-Arctic extent in 2023 is 4.51 (+/-0.35) million square kilometers. 4.51 and 0.35 million square kilometers is the average and one standard deviation of 10 ensemble members, respectively.

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

Our prediction is based on a climate model named FIO-ESM v1.0 (Qiao et al., 2013). Ocean and sea ice data are assimilated to initialize the model (Chen et al., 2016; Shu et al., 2021). Satellite observed daily sea surface temperature (from OISST), sea level anomaly (from CMEMS), sea ice concentration (from OSISAF), and PIOMAS sea ice thickness are assimilated to initialize the model.

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

OSISAF, OSI-430-b, https://osi-saf.eumetsat.int/products/osi-430-b-complementing-osi-450

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

PIOMAS,
http://psc.apl.uw.edu/research/projects/arctic-sea-ice-volume-anomaly/data/model_grid

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:

FIO-ESM1.0
Atmosphere CAM3 2000-2023 integration
Ocean POP2 ocean data assimilation
Ice CICE4 sea ice data assimilation
Wave MASNUM-wave model 2000-2023 integration

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

Median

0.35

Lower error bound

Lower error bound

Standard Deviation

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

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