Sea Ice Outlook
2019 August Report
Individual Outlook

Name of contributor or name of contributing organization:

University of Washington/APL

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.

Jinlun Zhang and Axel Schweiger

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 the July report only.

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.

3.35

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.

Driven by the NCEP CFS forecast atmospheric forcing, PIOMAS is used to predict the total September 2020 Arctic sea ice extent as well as ice thickness field and ice edge location, starting on July 1. The predicted September ice extent is 3.35± 0.40 million square kilometers. The predicted ice thickness fields and ice edge locations for September 2020 are also presented.

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

The PIOMAS forecasting system is based on a synthesis of PIOMAS, the NCEP CFS hindcast and forecast atmospheric forcing, satellite observations of ice concentration and sea surface temperature (SST), and CryoSat2 observations of sea ice thickness. The CFS forecast ranges from hours to months: there are a total of 16 CFS ensemble forecast runs every day, of which four ensemble runs go out to 9 months, three runs go out to 1 season, and nine runs go out to 45 days (Saha et al., 2014). These ensemble runs all create 6-hourly forecast atmospheric data that are widely accessible in real time, thus ideal for forcing PIOMAS forecasts on daily to seasonal time scales. Here we used four CFS forecast ensemble members to drive the PIOMAS ice–ocean ensemble seasonal forecasts. Ensemble mean values from these four members are considered to be the prediction. To obtain the “best possible” initial ice-ocean conditions for the forecasts, we conducted a retrospective simulation that assimilates satellite

ice concentration and SST data through the end of May 2020 using the CFS hindcast forcing data. We also assimilated CryoSat2 ice thickness available to April 2020. After the retrospective simulation (hindcast), four ensemble PIOMAS forecast runs were conducted using atmospheric forecast forcing from four CFS ensemble runs. Additional information about PIOMAS prediction can be found in Zhang et al. (2008).

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

Satellite sea ice concentration data (NASA team) for data assimilation in hindcast.

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

CryoSat2 sea ice thickness up to 4/2020 for data assimilation in hindcast.

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:

[DynamicModelType]

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

Median

Ranges

Standard Deviations

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).