Name of contributor or name of contributing organization:

NASA GISS/McGill University

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.

James Williams1,2*, Charles Brunette3, Erik Johnson3, Bruno Tremblay3

1: Massachusetts Institute of Technology, Boston, USA

2: NASA Goddard Institute for Space Studies, New York, USA

3: McGill University, Montreal, Canada

*: primary contact

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.)

From June Submission

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.

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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.

It has been shown that the September sea-ice extent anomaly is significantly correlated with the mean Arctic Oscillation (AO) index during the previous winter. The mean AO provides a characterization of the mean atmospheric circulation pattern which in turn drives the sea-ice circulation during the winter. In other words, the wind patterns associated with the positive phase of the AO (mainly increased number and strength of cyclones penetrating deep into the Arctic region) lead to enhanced sea-ice export through Fram strait, and an anomalously younger / thinner ice cover in the Siberian shelf seas. These two processes provide a preconditioning effect which sets the stage for additional ice loss when compared to a typical melt season. We, therefore, use the winter mean AO index as a predictor for the September sea-ice extent anomaly. This anomaly forecast is then superimposed on the longer term trend of September sea-ice loss to form a seasonal forecast of the Pan-Arctic September sea-ice extent.

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

We perform a linear regression between the detrended September mean SIE and the winter mean (DJFMA) AO index during the period 1993-2018. This allows us to form a prediction for the 2019 September sea-ice extent anomaly using this past year's AO index, derived from SLP observations. For this year, the winter mean AO index was 0.481, which translates into a Sept SIE anomaly of -0.14 million km2. This anomaly forecast is then added to an extrapolation of the linear trend line from 1993-2018. The linear trend forecast for 2019 is 4.14 million km2. Summing it up, we get a par-Arctic forecast for the September mean SIE of 4.00 million km2.

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

NSIDC Sea Ice Index Version 3: https://nsidc.org/data/G02135/versions/3

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

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:

Not Specified

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

Median

Ranges

Standard Deviations

0.44 million sqr km

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

An error analysis of a hindcast using this method was done in Williams et al (2016)

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