Sea Ice Outlook
2019 July Report
Individual Outlook

Name of contributor or name of contributing organization:

UCL (Gregory 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.

William Gregory, University College London - primary contact

Michel Tsamados, University College London

Julienne Stroeve, University College London/NSIDC

Peter Sollich, Kings College London/Georg-August-University GÃ¶ttingen

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.)

This is a new 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.

4.021

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.

0.2

"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.

This statistical model computes a forecast of pan-Arctic and regional mean September sea ice extents (regions were defined based on NSDIC's data mask (Fetterer et al., 2010)). Monthly averaged June sea ice concentration fields between 1979 and 2019 were used to create a climate network of June sea ice concentration data. This was then utilised in a Bayesian Linear Regression in order to forecast September extents. The model predicts a pan-Arctic extent of 4.021 million square kilometres. Sea ice concentration data were taken from NSIDC (Cavalieri et al., 1996; Maslanik and Stroeve, 1999).

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

Monthly averaged June sea ice concentration (SIC) data between 1979 and 2019 were used to create a June SIC climate(complex) network. Individual SIC grid cells were first clustered into regions of spatio-temporal homogeneity by using a community detection algorithm. Links between each of these network regions (covariance) were then passed into a Bayesian Linear Regression to derive an estimate on the prior distribution of the regression parameters. Subsequently a posterior distribution of the regression parameters was then derived in order to generate the forecast of September sea ice extents.

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

NSIDC NASA Team Sea Ice Concentrations:

1979 - 1987: Nimbus-7 SSMR

1987 - 2007: DMSP F-8, F-11, F-13 SSM/Is

2007 - 2017: DMSP F-18 SSM/I

2017 - 2019: Near-real time SIC

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

Pan-Arctic = 0.076, Beaufort Sea = 0.059, Chukchi = 0.037

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

Forecast method produces estimates which are Gaussian. Therefore each forecast is presented with a mean and standard deviation.

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