Name of contributor or name of contributing organization:

APPLICATE Benchmark

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.

UCLouvain (Francois Massonnet and Leandro Ponsoni), BSC (Juan Acosta), CNRM-GAME (Lauriane Batte and Virginie Guemas), MetOffice (Ed Blockley) and the APPLICATE (https://applicate.eu/) consortium

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 June report only.

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.

4.51

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.

18.54

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.

We forecast that September 2020 monthly mean Arctic sea ice extent will be between 3.22 and 5.8 million km² (95% confidence interval), with 4.51 million km² as our best estimate. We estimate that the 2012 minimum is very unlikely (7.5% chance) to be broken, that the September mean extent is very likely to lie in the first tercile of the observed record (76.3% chance) and that it is exceptionally unlikely to line in the upper tercile of the observed record (all medium confidence statements).

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

The APPLICATE-benchmark outlook is a simple statistical forecast based exclusively on the knowledge of past daily Arctic sea ice extent. It is produced in three steps:

Step 1:
Sea ice extent is forecasted for each day between the initial time (June 1st, 2020) and December 31st, 2020, as the June 1st sea ice extent anomaly (calculated with respect to the quadratic trend line computed over 1979-2019) added to the relevant day background estimate. The background estimate itself is calculated as the 1979-2019 quadratic trend of extent for that day extrapolated to 2020. A weight is applied to the anomaly term, equal to the correlation between the relevant day and June 1st anomalies estimated over 1979-2019 so that more weight is put on the anomaly term when the autocorrelation of the time series is high, and more weight is put on the background term when the autocorrelation tends to zero.

Step 2:
The September mean of daily forecasts is then estimated and is used to produce an initial 2020 forecast.

Step 3:

The 2020 forecast is finally recalibrated by linearly regressing the 1991-2019 forecasts onto the verification data. A 95% confidence interval is calculated around the recalibrated value and provided as an uncertainty estimate.

The code used to produce this APPLICATE-benchmark is publicly available, see the detailed outlook report.

Tell us the dataset used for your initial Sea Ice Concentration (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:

[DynamicModelType]

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

Median

4.51

Ranges

3.22 - 5.8 million km² (95% confidence interval corresponding to 1.96 standard deviations assuming a Gaussian distribution)

Standard Deviations

0.66 million km²

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

The forecasting procedure is done retrospectively for each year between 1991 and 2019, providing 29 hindcast values. These 29 hi

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

See b)