Sea Ice Outlook
2019 June Report
Individual Outlook

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**Name of contributor or name of contributing organization:**

IARC (Brettschneider 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.**

Brian Brettschneider: International Arctic Research Center (IARC) at the University of Alaska Fairbanks (UAF)

John Walsh: International Arctic Research Center (IARC) at the University of Alaska Fairbanks (UAF)

**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.**

4.441

**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.**

The International Arctic Research Center has developed a prototype model to estimate Arctic sea ice extent using an analogs approach. The analogs approach looks at prior years and finds the best matches that most closely represent the current state of the atmosphere in 2018. The model run in early June 2019 indicates September sea ice will be nearly identical the extrapolated linear trend of the previous four decades. We estimate a monthly extent of 4.441 million square kilometers.

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

Our statistical model uses the NCEP/NCAP (R1) Reanalysis data sets to develop analog matches of atmospheric variables that correlate with sea ice extent. The R1 data covers the time period of 1948-present. The model generates an estimated deviation from the 1979-2018 September sea ice linear trend line by identifying the top match years for a number of oceanic and atmospheric variables using the June through July time periods of each year, and then follows the seasonal decline in sea ice through the following September. The variables used are: 1) sea level pressure, 2) 500 mb heights, 3) 2-meter temperatures, 4) 925 mb temperatures, and 5) sea surface temperatures. A composite forecast is developed from a regression-weighted model.

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

Our model assumes no a priori knowledge of the current extent of Arctic sea ice. It does, however, rely on the NSIDC published monthly September sea ice extents to estimate the

long-term trend line. We use the same linear trend that NSIDC adds to their published monthly extent graphics.

Data source: Chapman, W. L. and J. E. Walsh. 1991, updated 1996. Arctic and Southern Ocean Sea Ice Concentrations, Version 1. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center

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

Our model does not utilize sea ice thickness.

**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**

4.441

**Ranges**

Upper: 4.965 million sq. km.  Lower: 3.876 million sq. km.

**Standard Deviations**

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

The range assessments represent 95th and 5th percentile confidence intervals.

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

We use the unaltered R1 Reanalysis data sets. No adjustments were made internally.