

Sea Ice Outlook  
2019 August Report  
Individual Outlook

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

UIUC (Zhan)

**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.**

UIUC, Yizhe Zhan

**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.**

4.04

**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.**

Our prediction is based on the strong correlation between detrended June top-of-atmosphere (TOA) reflected solar radiation (RSR) and September Sea Ice Extent (SIE) anomalies, as proposed by Zhan and Davies [2017]. This method is telling because the main contributor of TOA RSR anomaly in June is from the change of underlying surfaces and the sea ice state in early summer (June) largely determines the total absorbed shortwave solar radiation during the whole melt season.

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

Our contribution is formulated by adding the main contribution part from September SIE trend (2002~2018) with the anomalous part from the June TOA-RSR (2019) anomaly. The detailed description of calculation is as follows.

The detrended June RSR anomaly (2019) is  $-3.25 \text{ W/m}^2$ .

The corresponding September SIE anomaly is  $-0.25 (-3.25 * 0.0781)$  million  $\text{km}^2$ .

The trending anomaly of September SIE is  $-0.08$  million  $\text{km}^2$  per year.

The 2019 September SIE (from the trend) is  $4.29$  million  $\text{km}^2$ .

The predicted September SIE of 2019 is  $4.04 (4.29 - 0.25)$  million  $\text{km}^2$ .

Note that the coefficient of 0.0781 is estimated from the detrended anomalies of June TOA-RSR and September SIE between 2002 and 2018.

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

We do not use SIC dataset. Instead, we use sea ice index (Version 3.0) product (NSIDC, NASA Team, <https://nsidc.org/data/G02135>, doi: <https://doi.org/10.7265/N5K072F8>).

**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**

+/- 0.2 million km<sup>2</sup>

**Standard Deviations**

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

The uncertainty range is estimated from the standard error of the correlation between June TOA-RSR and September SIE.

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