Sea Ice Outlook
2019 June Report
Individual Outlook

Name of contributor or name of contributing organization:

RASM

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.

1. Wieslaw Maslowski (Naval Postgraduate School; primary contact)

2. Younjoo Lee (Naval Postgraduate School)

3. Anthony Craig (Contractor)

4. Mark Seefeldt (University of Colorado)

5. Robert Osinski (Institute of Oceanology, Polish Academy of Sciences)

6. John Cassano (University of Colorado)

7. Mathew Watts (Naval Postgraduate School)

8. Jaclyn Clement Kinney (Naval Postgraduate School)

9. Xingren Wu (NOAA/NCEP)

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?

Dynamic Model

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.

4.91

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.

0.324

"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 used RASM2_1_00, which is a recent version of the limited-area, fully coupled climate model consisting of the Weather Research and Forecasting (WRF), Los Alamos National Laboratory (LANL) Parallel Ocean Program (POP) and Sea Ice Model (CICE), Variable Infiltration Capacity (VIC) land hydrology and routing scheme (RVIC) model components (Maslowski et al. 2012; Roberts et al. or 2015; DuVivier et al. 2015; Hamman et al. 2016; Hamman et al. 2017;

Cassano et al. 2017). The model uses CFSR/CFSv2 reanalysis output for RASM-WRF lateral boundary conditions and for

nudging winds and temperature starting above 500 mbar. This model initial condition for

ensemble forecast was derived from a hindcast, forced with CFSR/CFSv2 reanalysis for September 1979 through May 2019. The ocean and sea ice initial conditions at the beginning of the hindcast were derived from the 32-year spin-up of the ocean-sea ice model only (RASM G-case) forced with CORE2 reanalysis for 1948-1979.

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

As explained in the "Executive summary", RASM is used for dynamic downscaling of the global NOAA/NCEP CFSv2 7-month forecasts. The initial conditions for the June Sea Ice Outlook were derived from the RASM 1979-2018 hindcast and are physically and internally consistent across all the model components. Neither data assimilation nor bias correction was used. Each of the 30 ensemble members ran forward for 6 months using outputs from CFSv2 reanalysis. The CFSV2 forcing streams used for the ensemble members were initialized every day (at 00:00) between May 1st and May 31st (except 18th of May because of no input data available) and used for RASM forcing at 00:00 on June 1st, 2019.

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

Self-generated from a 39-year hindcast run.

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

Self-generated from a 39-year hindcast run.

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:

Coupled

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

Median

4.95

Ranges

4.17 -- 5.38

Standard Deviations

0.305

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

The uncertainty of pan-Arctic sea ice extent was estimated from the 30 ensemble members.

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

Sea ice with concentration<=15% and thickness<=20cm was not included in our analysis.