Sea Ice Outlook
2017 August Report
Individual Outlook

Name of contributor or name of contributing organization:

BSC-ES (Fučkar 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.

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Do you want your June contribution to automatically be included in subsequent reports? (If yes, you may still update your contribution via the Google form.)

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.

3.08

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.

21.5

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 produced September 2017 forecast of Arctic and Antarctic sea ice conditions using coupled climate model (EC-Earth2.3) initialized on May 1st, 2017. This state-of-the-art coupled general circulation model includes dynamic-thermodynamics model of sea ice, LIM2, embedded in NEMO2 ocean model with horizontal resolution of about 1 degree (ORCA1L42). We employ a coupled dynamical model for seasonal forecast because it has capability to resolve and predict many key aspects of global sea ice cover in non-stationary and physically consistent manner.

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

First we used ocean-sea-ice NEMO2-LIM2 setup forced by the ERA-Int surface forcing fields with ocean nudged to ORAS4 5-member reanalysis (by restoring temperature and salinity to reanalyzed data) to produce 5 members of sea ice initial conditions (IC) on May 1st, 2017, as described in Guemas et al. (2014). These five sea-ice IC along with five associated ORAS4 oceanic IC were used to initialize seasonal forecast with the state-of-the-art coupled climate model EC-Eath2.3 on 05/01/2017. We employed five atmospheric IC on selected May 1st in the first decade of 21st century: 2001, 2004, 2007 and 2010, so that each ocean and sea ice IC is coupled with atmospheric IC from 4 different years. Finally, we produced 19-member forecast of Arctic and Antarctic sea ice concentration and thus sea ice extent in September of 2016 (1 ensemble member did not finish on time).

Tell us the dataset used for your initial Sea Ice Concentration (SIC). Include name and date (e.g., "NASA Team, May 2017"). We also encourage you to submit initial fields to the dropbox, see https://www.arcus.org/sipn/sea-ice-outlook/2017/june/call in the section on

"Submitting Figures and Gridded Data of Full Spatial Fields (Optional) of Forecasts and Initial Conditions" for detailed instructions. Required if sea Ice concentration is used.

SIC from sea ice reconstruction method using ERA-Int surface forcing fields as described in Guemas et al., Clim Dyn. 2014 doi:10.1007/s00382-014-2095-7

Dataset of initial Sea Ice Thickness (SIT) used (include name and date):

SIT from sea ice reconstruction method using ERA-Int surface forcing fields as described in Guemas et al., Clim Dyn. 2014 doi:10.1007/s00382-014-2095-7

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:

EC-Earth2.3 coupled climate model:

Component	Name	Initialization (e.g., describe Data Assimilation)
Atmosphere	IFS	IC based on ERA-Interim
Ocean	NEMO2	ORAS4 IC
Ice	LIM2	IC produced as described in Guemas et al. (2014)

If available from your method for pan-Arctic extent prediction, please provide

a) Uncertainty/probability estimate such as median, ranges, and/or standard deviations (specify what you are providing).

NH Median = 3.04, NH Stand. dev. = 0.59, NH lower quartile = 2.66, NH upper quartile = 3.37; SH Median = 21.48, SH Stand. dev. = 0.25, SH lower quartile = 21.36, SH upper quartile = 21.71

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

Uncertainty estimate is based on 19-member ensemble spread.

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

This is raw forecast of 19-member EC-Earth2.3 ensemble.