SEA ICE OUTLOOK
2016 August Report

By UTokyo (Kimura et al.)

1. *Name of Contributor

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2. * Contributions submitted by a person or group not affiliated with a research organization, please self-identify here:
      No

3. * Do you want your contribution to be included in subsequent reports in the 2016 season?
      Yes, use this contribution for all of the 2016 SIO reports

4. *"Executive summary" of your Outlook contribution: in a few sentences (using 300 words or less) describe how and why your contribution was formulated. To the extent possible, use non-technical language.

    Monthly mean ice extent in September will be about 4.65 million square kilometers. Our estimate is based on a statistical way using data from satellite microwave sensor. We used the ice thickness in December, ice motion from December to April, and ice concentration during July 20-25. Predicted ice concentration map from August 1 to November 1 is available in our website: http://ccsr.aori.u-tokyo.ac.jp/~kimura_n/arctic/2016_e.html
    On the Russian side, sea ice in the Laptev Sea is expected to retreat quickly. On the other hand, ice retreat in the East Siberian Sea will be late compared with the last year because the area is covered by thicker ice that was piled up by the winter convergence of sea ice.

5. *Type of Outlook method:
   statistical

6. *Dataset of Sea Ice Concentration (SIC) used (include name and date; e.g., "NASA Team, May 2016"):
   JAXA (Bootstrap), July 20-25 of all AMSR-E/AMSR2 years (2003-2016).

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

SIT dataset distributed by distributed by Arctic Data archive System (ADS, https://ads.nipr.ac.jp/index.html), December 1 of all AMSR-E/AMSR2 years. SIT is calculated by an algorithm of Krishfield et al. (2014)

8.   Dataset of Sea Ice Velocity
   Kimura Dataset (Kimura et al., 2013), during December 1 and April 30 for all AMSR-E/AMSR2 years.

9. *Prediction of September pan-Arctic extent as monthly average in million square kilometers. (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%.)

   4.65 million square kilometer

10. Prediction of the week that the minimum daily extent will occur (expressed in date format for the first day of week, taking Sunday as the start of the week (e.g., week of 4 September).

   Week of 3 September

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

   We predicted the Arctic sea-ice cover from coming August 1 to November 1, using the data from satellite microwave sensors, AMSR-E (2002-2011) and AMSR2 (2012-2016). The analysis method is based on our recent research (Kimura et al., 2013). First, we estimated the ice thickness distribution on April 30 from redistribution (divergence/convergence) of sea ice during December and April, and initial ice thickness on December 1. We also considered the mean ice concentration during July 20-25. We predicted the summer ice cover by the multiple regression analysis based on the estimated ice thickness on April 30, and average sea-ice concentration during July 20-25.

Reference

Kimura, N., A. Nishimura, Y. Tanaka and H. Yamaguchi, Influence of winter sea ice motion on summer ice cover in the Arctic, Polar Research, 32, 20193, 2013.

Krishfield, R. A., Proshutinsky, A., Tateyama, K., Williams, W. J., Carmack, E. C., McLaughlin, F. A., and Timmermans, M. L., Deterioration of perennial sea ice in the Beaufort Gyre from 2003 to 2012 and its impact on the oceanic freshwater cycle, J. Geophys. Res., 119, 1271-1305, doi:10.1002/2013JC008999, 2014.
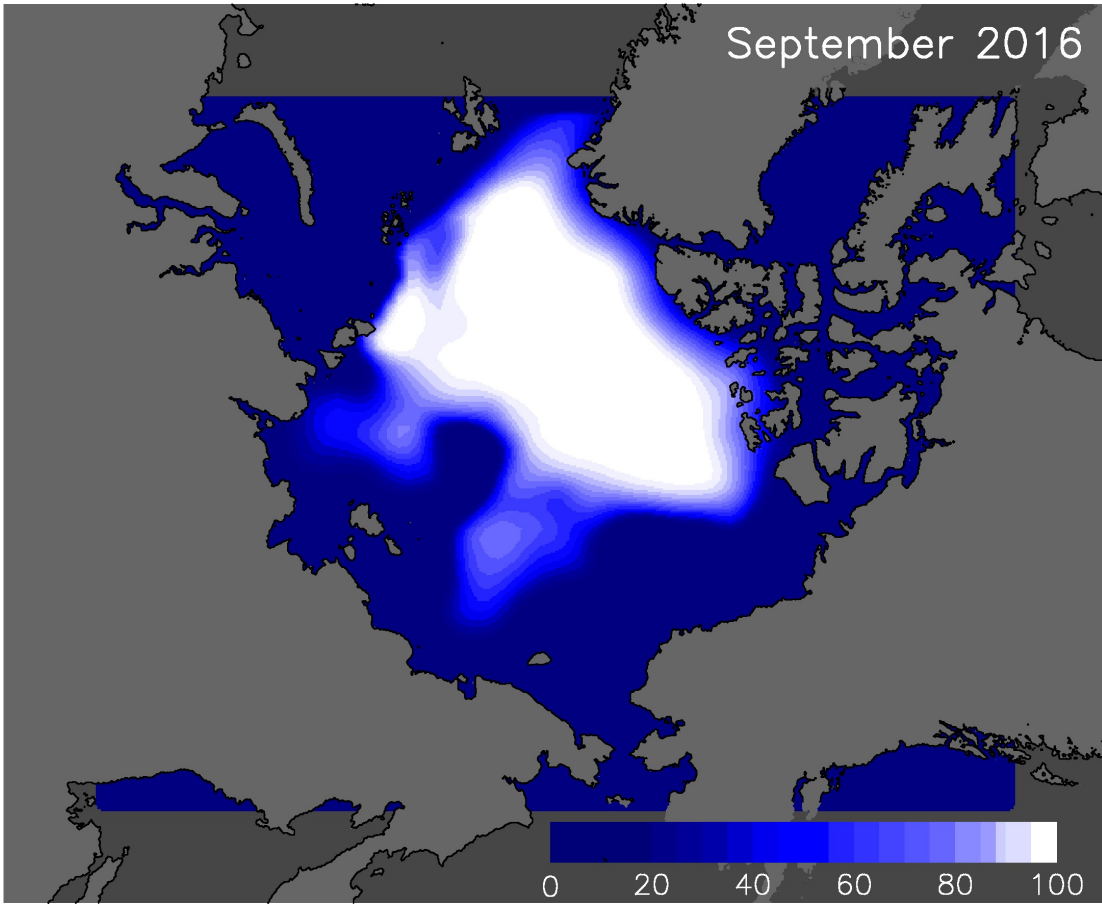
Fig: Predicted monthly mean ice concentration in September 2016.