Sea Ice Outlook for September 2015
June Report - NASA Global Modeling and Assimilation Office

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*Please note that these predictions are experimental and are produced for research purposes
only. Use of these forecasts for purposes other than research is not recommended.*

1. Contributor Name.
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2. Executive summary.
    The GMAO seasonal forecasting system predicts a September average Arctic ice extent of
5.03 ± 0.41 million km^2, about 4.7 percent less than the 2014 value. The forecast suggests
reductions in ice extent along the Eurasian coast, but cooler near-surface air temperatures over
the Canadian Archipelago. A positive summertime sea level pressure anomaly over the central
Arctic Basin is featured. A significant aspect of the forecast is an exuberant prediction for
strengthening of the current El Niño/Southern Oscillation (ENSO) warm phase and its
accompanying interaction with the Pacific-North American mode at higher latitudes. This aspect
and the proximity of the ENSO spring predictability barrier to the forecast initial time implies
some additional uncertainty in this year's sea ice prediction.

3. Type of Outlook projection
    dynamic model

4. September monthly average projection (in million square kilometers)
    5.03 million km^2

5. Short explanation of Outlook method.
    The GMAO seasonal forecast is produced from coupled model integrations that are
initialized every five days, with ten additional ensemble members generated by coupled model
breeding and initialized on the date closest to the beginning of the month. The main components
of the AOGCM are the GEOS-5 atmospheric model, the MOM4 ocean model, and CICE sea ice
model. Seasonal forecasts are initialized with GEOS-iODAS, MERRA-Land, and MERRA
atmospheric fields.

6. Projection uncertainty/probability estimate.
    0.41 million km^2

7. Short explanation/assessment of basis for uncertainty estimate.
    An uncertainty of 0.41 million km^2 denotes the ensemble standard deviation, which is
slightly less than for the corresponding forecast for 2014. This does not account for other sources

of uncertainty inherent in the forecasting system. September hindcasts initialized from this time explain 48 percent of the variance using this system, which indicates marginal skill.

Additional Items for Pan-Arctic Contributions

1. Spatial forecast/map for September mean ice extent.
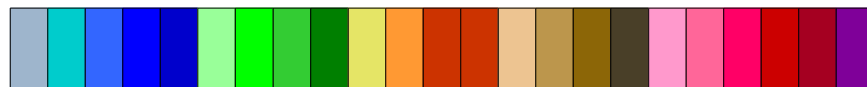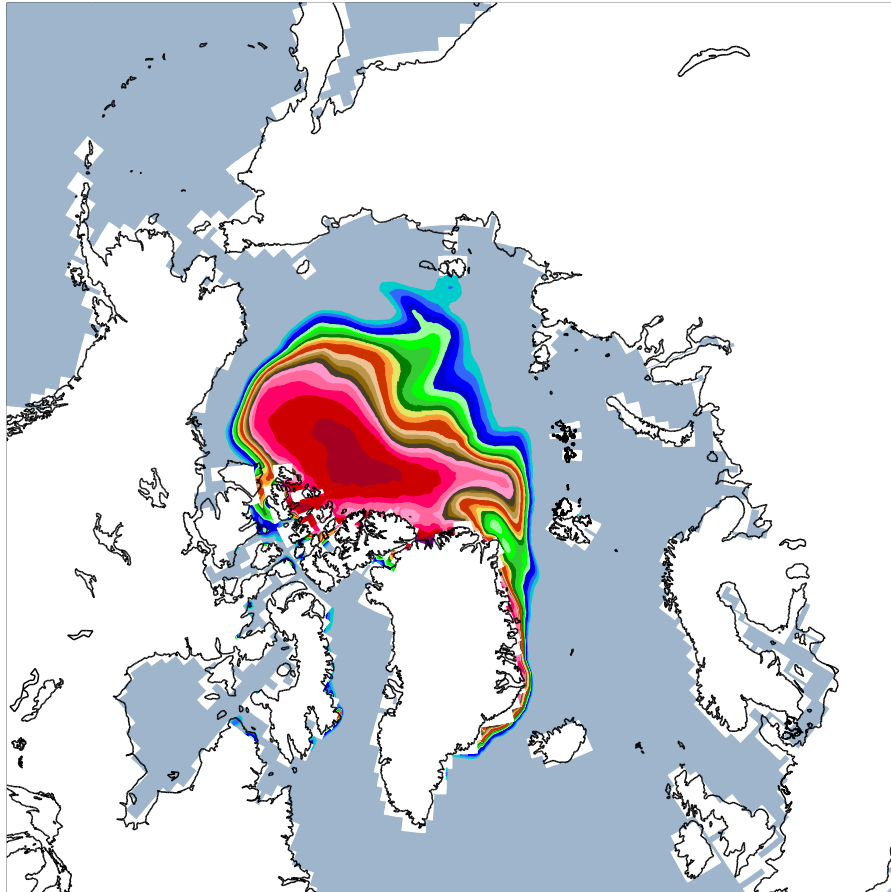
This figure shows the uncorrected ensemble-average forecast of sea ice concentration (area fraction) for September 2015.

2. Hindcast validation statistics for a set period.

    Hindcasts have been run for the previous 30 years, but issues with earlier integrations indicate degraded skill prior to 1999. Forecasts for the period 1999-2013 are correlated with NSIDC values at a value of $r = 0.69$.

3. Estimate for the week that the minimum daily extent will occur (expressed in date format using Sunday to denote the week).

    Both the ensemble average and the median date for the minimum occur on the week of 6-September. This is also indicated by 9 of the 14 ensemble members.