

SEA ICE PREDICTION NETWORK (SIPN)
Template for Pan-Arctic Sea Ice Outlook Core Contributions
June 2015 Report

***REQUIRED**

1. *Contributor Name(s)/Group – how you would like your contribution to be labeled in the report (e.g., Wiggins et al.)

Frank Bosse

2. *"Executive summary" about your Outlook contribution (max 300 words)
Say in a few sentences what your Outlook contribution is and why. To the extent possible, use non-technical language.

My outlook on September Extent is 5.6+-0.4 Mio km². The main forcing of the arctic melting is the heat content of the ocean (OHC) and the amount of melting sea ice in the beginning of the season. The volume is modeled with "Piomas". For the OHC my outlook takes the OHC data northward 65N of the last summer (JJAS). This heat is conserved under the winter sea ice and works in this season as melting heat.

3. *Type of Outlook projection
x dynamic model statistical heuristic mixed or other: (specify)

If you use a model, please specify:

Model Name _____

Components of the model: Atmosphere , Ocean Ice , Land____,

For models lacking an atmosphere or ocean, please describe the forcing: _____

The atmosphere of year n-1 heats the ocean and this OHC is working in year n.

4. *September monthly average projection (extent in million square kilometers. To be consistent with the validating sea ice extent index from NSIDC, if possible please first compute the average concentration for the month and then compute the extent as the sum of area of all cells > 15%.)

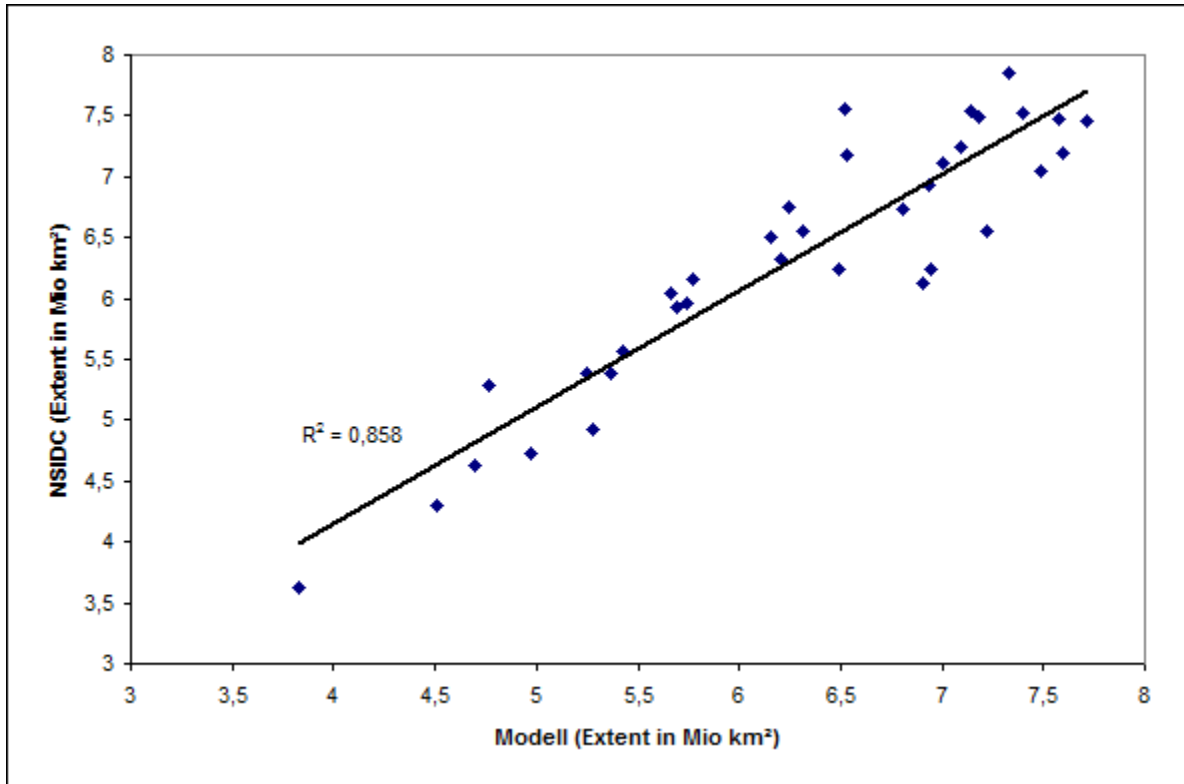
5.6 +- 0.4 Mio km²

5. *Short explanation of Outlook method (max 300 words)
In addition, we encourage you to submit a more detailed Outlook, including discussions of uncertainties/probabilities, including any relevant figures, imagery, and references.

If this is a model contribution, please include method of method of initialization and variable used.

The model works with the OHC (0...700m) of the year n-1 for the year n and the volume of sea ice (PIOMAS) of the year n in the end of wintertime (28.02.). The method is linear regression of the extent-data of the Septembers 1979...2014 (NSIDC) with the OHC-data of 65...90N and thereafter the regression of the residuals of this regression to the volume of the existing sea ice in the end of winter of the year n. The uncertainty is +-0.4 Mio km² as the standard deviation of the remaining residuals model- observed data.

The skill of the model:



The year 1996 is the only outlier.

In an actual paper (<http://www.pnas.org/content/112/15/4570.short>) , summary :

<http://www.gfdl.noaa.gov/news-app/story.110> is mentioned a very good agreement of the Sea Ice Extent of the Atlantic part of arctic with the AMOC when AMOC leads by one year (see part 3 of the figure). This could confirm the used one year lag to OHC in this contribution. The prediction can't change in the following month because the model says: The Extent is defined to 86% in the beginning of the melting season.

Physical explanation: The heat content measured in year n-1 remains in the arctic basin during winter, it's conserved due to the isolating ice-layer over the winter and works in the following year as melting heat. The other variable is the existing ice volume in the end of winter. If it's under a defined threshold it's influence on the September extent is growing.

6. Projection uncertainty/probability estimate for September extent (only required if available with the method you are using)
+-0.4 Mio km²

7. Short explanation/assessment of basis for the uncertainty estimate in #6 (1-2 sentences)
It's the standard deviation of the errors 1979...2014.