

## **NCAR ensemble guess for the 2013 September mean Arctic Sea Ice Extent.**

### **1. Extent Projection**

Provide a sea ice projection for the September monthly mean arctic sea ice extent (in million square kilometers). Please also include any relevant information on ice thickness (or age), if available.

3.80 million sq. km. (stdev. 0.66, min. 1.06, max. 4.53)

### **2. Methods/Techniques**

Provide the type of estimate (heuristic, statistical, ice-ocean model ensemble runs, etc.).

heuristic/statistical

The method is an informal inquiry of 26 climate scientists in mid June 2013. While some people used statistical analysis of observed sea ice trends to inform their estimate, most predictions were based on information provided by the organizer about recent sea ice conditions, lunch time discussions, and other heuristic methods.

### **3. Rationale**

Include a short paragraph on the physical rationale for the estimate.

This is the sixth year that I have assembled estimates for the September ice extent motivated by lunch-time discussion amongst climate scientists working at NCAR. Our discussion generally include both researchers intimately involved in sea ice research, and researchers who have no specific knowledge of sea ice processes but experience in climate research.

Discussion this year has focused on the vulnerability of the ice pack due to long-term thinning, the record-low ice extent minima set in recent years (especially 2012), and on the importance of the unpredictable summer weather conditions.

Although our methods are very different than those used for other groups participating in the sea ice outlook, we think that they provide an interesting contrast and emphasize that there are many unpredictable factors in seasonal sea ice prediction that make a reasoned guess of the mean September Arctic ice extent competitive with much more

sophisticated methods.

#### 4. Executive Summary

Provide a short paragraph that summarizes your outlook contribution in two or three sentences.

An informal pool of 26 climate scientists in mid June 2013 estimates that the September 2013 ice extent will be 3.80 million sq. km. (stdev. 0.66, min. 1.06, max. 4.53). Our informal pool estimate of the mean September ice extent has been competitive with much more sophisticated prediction efforts based on statistical methods and ice-ocean model ensemble runs. During 2008 and 2010, our ensemble mean prediction was within the observational uncertainty.

#### 5. Estimate of Forecast Skill (if available)

If possible, please include any estimates of forecast skill, uncertainty, or error associated with your prediction. Error estimates are included in the summary bar chart of outlook estimates, as appropriate.

The standard deviation, min, and max of our guesses serve as our uncertainty estimate.

stdev. 0.66 million sq. km, min. 1.06 million sq. km, max. 4.53 million sq. km

We have compared our ensemble mean predictions in previous years to the values reported in the NSIDC press releases. During 2008 and 2010, our ensemble mean prediction was within the observational uncertainty (or at least the significance level reported by NSIDC, 0.01 million square km).

During 2011, we were within 0.1 million sq. km. Last year, we predicted significantly more (1.06 million square km) sea ice than was observed. In 2009, we predicted less (0.63 million square km) sea ice than was observed.