

2008 Outlook

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1. What will the sea ice extent for the Arctic as a whole be at the September 2008 minimum? Quantitative estimates in square kilometers are preferred (the value for 2007 was 4.3 million square kilometers), but qualitative estimates are also accepted.

This estimate is for the AVERAGE September 2008 Arctic sea ice extent, NOT the extent on the particular day when the absolute minimum occurs.

Estimate: 5.56 million square kilometers
Standard deviation: 0.22 million square kilometers

2. A short summary of a few lines that gives the basis of your assessment, and that can be abstracted into a larger synthesis.

I believe it's important to include an estimate based on linear persistence. The degree to which this estimate is wrong is a measure of the degree to which the sea ice extent is not following a linear trend.

This estimate is based on linear extrapolation of the average sea ice extent for the 10 Septembers 1997-2006. For those years, the slope of the trend line is about -0.1 million sq km per year. Extrapolating the trend line to 2008 gives an estimated extent of 5.56 million sq km.

The standard deviation of the residuals from the trend line is about 0.22 million sq km. I purposely did not include 2007 in the calculation of the slope, because (statistically) 2007 was an extreme outlier: in terms of the standard deviation of the residuals, it was more than 6 standard deviations below the trend line. If 2008 proves to be 5.56 million sq km plus-or-minus one or two standard deviations, then we will say that 2007 was indeed an outlier. But if 2008 falls close to 2007, we will be in a good position to reject linear persistence.

3. A supporting paragraph and possible figures that expand and help explain the basis for your outlook.

I started with 1997 because before that, the variability of the September sea ice extent was much larger (see attached figure). 1995 was a record low up to that point, and it was followed by a record high in 1996. In contrast, the variability during 1997-2006 about the trend line was relatively small. In the figure, the trend line for 1997-2006 is shown in red, and the extrapolation of the trend line to 2007 and 2008 is shown as red dots.

4. A brief statement of what type of additional information would help to improve your outlook, if any.

This is obviously a very crude statistical estimate, and is not based on physical factors. This estimate is not a starting point for improved estimates of sea ice extent. Rather, it is a benchmark against which to gauge linear persistence of the ice extent, and against which to judge the skill of other estimates. No additional information is necessary to "improve" this outlook.

