***Public Contribution***

# 2010 Sea Ice Outlook
# July Report

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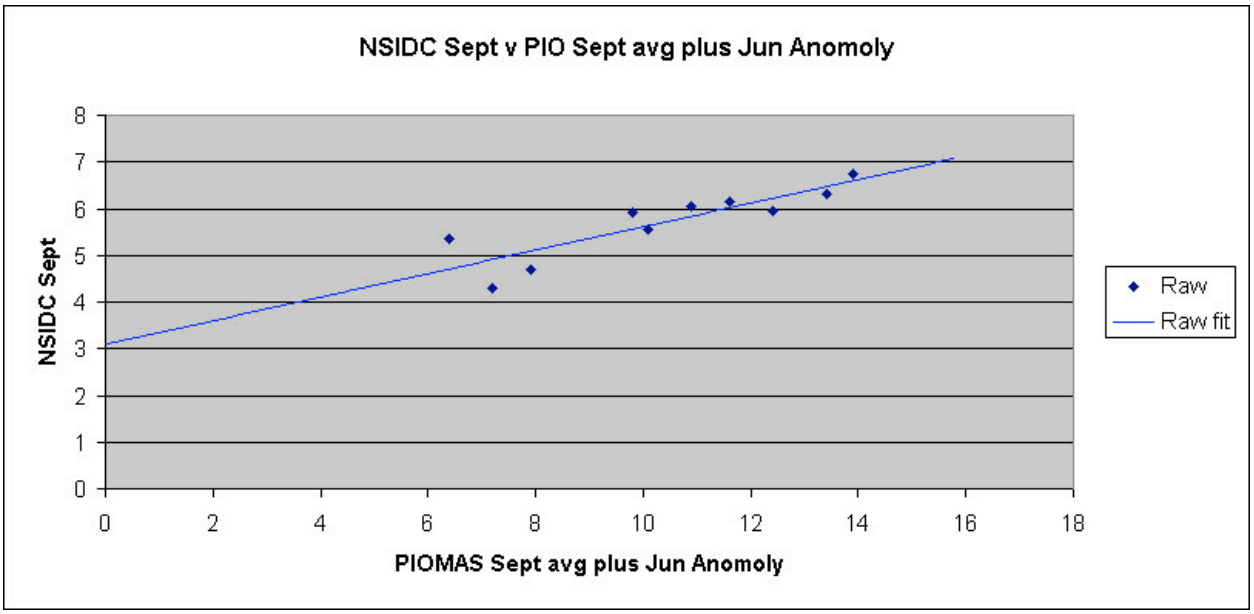
## Extent Projection

4.2 Million square kilometers for the 2010 September average.

## Method

I plotted the NSIDC September average extent against the Spring/Early Summer PIOMAS volume anomaly for each year 2000 to 2009. This produced, a scatter plot with 10 points that strongly suggested the possibility of a linear fit. Taking a linear fit and extrapolating to the 2010 PIOMAS volume anomaly, gave 4.2 million km2.

It should be noted that while the NSIDC numbers were easily available, I unfortunately eyeballed the PIOMAS values off their public volume anomaly vs time graph. That could introduce error, particularly when the modeled volume is changing rapidly. There are other possible sources of error or different ways to treat the data that I'll discuss under Rationale, but I ultimately decided that the simple linear fit was the most justified.




In the plot, the PIOMAS anomaly has had 14.4 (thousand km3) added to each point, which is basically estimating the September volume assuming the anomaly remains at the June level.

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Rationale
The rationale is that pre-conditioning is the most important factor in September ice extent. PIOMAS appears to be the best estimate of pre-conditioning available.

Possible sources of error: Not correlating against other variables like total solar irradiance (TSI), various current strengths (e.g. East Greenland current), surface water temperature, etc. Each of those has real physical effects on melt rates. However I was going for something simple.

Probable systematic error: It is generally agreed that the weather patterns of 2007 were statistically unusual in that the arctic had less cloud cover and persistent warm winds from Asia. Arguably then, the 2007 data point in my scatter plot should be given less weight. But I had no rationale for any given weighting so I left all weightings equal. As it stands 2007 and 2009 are roughly equal and opposite outliers.

Other possible data treatments
1. Including data earlier than 2000 would probably reduce the slope of the fitted line. Including enough such data would appear to give a curved fit rather than a straight line. Ultimately I decided that going further back was to enter a different regime from the present.
2. Forcing a "zero intercept". That is to say that one would expect that a PIOMAS anomaly of -14.4 (thousand km3) should lead to zero ice extent as 14.4 is the baseline September volume in that model. However, again, I consider that a different regime. The approach to zero volume may be very non-linear with respect to extent, as the ice appears to thin out faster than it shrinks in area.
3. Fitting a pre-chosen power law. Naively one might expect area to scale as volume to the 2/3 power. But in practice that does not appear to be the case.