

## AUGUST PAN-ARCTIC OUTLOOK - Morison and Untersteiner (Same as July)

### 1. Extent Projection

4.8 million km<sup>2</sup>

### 2. Methods/Techniques

Heuristic

### 3. Rationale

Our June estimate of average September, 2011 Arctic sea ice extent is 4.8 million square kilometers. We believe that prediction in the typical sense of the word is impossible because weather predictions are not sufficiently accurate. Simple extrapolation from the present state is not supported statistics, which a recent study suggests give sea ice extent anomalies a decorrelation time of less than 3 months. Consequently, our estimate this year, as in past years, is an impression based on comparison of a few variables over the last few years. So far this year, ice conditions seem to be similar to last year, and indeed considering the Northern Sea Ice Anomaly plot from David Chapman's Cryosphere today Website, the annual cycles of extent since 2008 have been similar. The ice in the central Arctic Ocean in April during this years North Pole Environmental Survey (NPEO) deployment was again dominantly first year ice, but seemed more deformed than usual suggesting greater average thickness, a positive factor in extent. The Winter 2010-2011 AO was negative at least initially, a positive factor for ice extent in September, but over the whole winter not as negative as 2010. So far, the ice and snow seen in the North Pole Environmental Observatory web cams have not displayed any melt this year, but that doesn't typically start until the first week in June. Snow cover was again limited , positive for extent. Ocean structure is also similar to 2010. Overall, our impression is that September ice extent will be similar to but a little less than 2010 (4.9 mil km<sup>2</sup>) and similar to but a little more than 2008 (2.7 mil km<sup>2</sup>). We would need to see how melt ponds and other conditions develop over the next month or two to feel there will be big departures from the previous couple of years.

### 4. Executive Summary

Conditions from Winter 2010-2011 to the present (May) have not been sufficiently different from 2010 at this time to project a big departure from the minimum ice extent in 2010. The AO was a little less negative suggesting a slight reduction, and the ice extent so far this year has been a little greater than in 2008. Consequently, our June projection for September 2011 is 4.8 million km<sup>2</sup>, between 2010 (4.9 M km<sup>2</sup>) and 2008 (4.7 M km<sup>2</sup>) Overall it seems like the average extent may have leveled off for a time after the sharp decline in 2007, but of course it all depends on the weather this summer.

### 5. Forecast Skill

?

## 6. Ice Thickness

This is anecdotal only but around the North Pole in April, the undeformed ice wasn't any thicker, but our impression was that the ice was more deformed and there wasn't a lot of open water. Therefore, the average thickness likely is a little greater than in the last couple of years. We aren't sure if this has a significant effect on minimum extent, but it probably shouldn't hurt.