

2013 PAN-ARCTIC OUTLOOK June Report based on May Data

James Morison, Polar Science Center, APL-UW

1. Extent Projection

3.7 million km²

2. Methods/Techniques

Heuristic

3. Rationale

My June projection of average September 2013 Arctic sea ice extent is 3.7 million square kilometers.

My estimate this year, as in past years working with Norbert Untersteiner, is an impression based on comparison of a few variables over the last few years. Our observations during the 2013 North Pole Environmental Observatory (NPEO) deployment suggest that the snow cover is at an all time minimum in the central Arctic Ocean. Early reports from the spring 2013 NASA Ice Bridge experiment are that the snow cover is thin in the Canada Basin as well. This is consistent with the reduced snow cover in the spring of 2008 following the previous record minimum sea ice extent in 2007. This is a factor that helps increase September ice extent by allowing for more sea ice growth in winter and reducing melt pond formation and associated melt in summer. The NPEO web cameras suggest the snow has remained intact, but images of the NP-40 ice camp break up suggests melt may have begun elsewhere.

On the negative side, though the sea ice thickness where we landed our hydrographic survey aircraft in the central Arctic seemed pretty typical of the last few years, 1.8-2.0 m, there have been major storm-induced openings in the ice this winter and spring. Ice has returned to these areas. If this ice has simply grown in place, it will still be thin when summer melt begins leading to rapid declines in the Canada Basin ice extent. Also on the negative side, there continues to be increasing ocean heat below the mixed layer.

4. Executive Summary

On balance I think the ice declines will be similar to last year. Present ice thickness, extent, and ocean heat observations suggest a new record might be possible. However, the negative feedback of reduced snow cover will help extent rebound a little from the 2012 minimum when the September extent reached 3.6 million km².

5. Forecast Skill

As we (Norbert Untersteiner and I) always maintained, we can't really call our outlook a forecast. Projection is even pushing it. The final sea ice extent is so sensitive to summer weather, which we do not forecast, that we can not assign it a meaningful skill, other than to see the "heuristic" approach has worked pretty well so far.