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2008 Sea Ice Minimum Summary Report

Comments, in Retrospect, on the 2008 Arctic Summer Sea Ice Outlook

Example of ice observed at 83N and 150W, September 5th 2008. Photograph was taken by Alice Orlich.

2008 saw the lowest ever ice extent in the Beaufort Sea. Alice Orlich on the Louis S. St. Laurent, in July and August 2008, observed a heavily melted ice pack up to 83N along 150W (the furthest north the ship achieved this summer).

The preconditioning of the ice pack in the previous winter, and the 10 years prior, probably played a role in this event. The Beaufort ice pack has been getting younger, and therefore thinner, since the 1990s. A shift in the Beaufort Gyre, towards less recirculation of ice within the Arctic Basin is partly responsible for the younger pack in the southern and western Beaufort Sea.

At the start of summer I predicted that the ice was preconditioned for an exceptionally low end of summer ice extent. We saw that ice was retreating early from the regions close to Banks Island, which was the forbearer of a much reduced ice pack in this region. We anticipated that the northward transport of ice from the Beaufort during winter 2007-2008 would create a younger and therefore more vulnerable to melt ice pack in the Beaufort. As predicted, we did see

an exceptionally low end of summer ice extent in the Beaufort. I did extend this prediction to the rest of the Arctic, as the ice drift patterns over the last 3 years have been anomalous, pushing ice towards the Canadian Archipelago and into the Transpolar Drift, and increasing the extent of young first, second and third year ice in the Siberian Arctic. It appears that this preconditioning was not so important for predicting the end of summer ice extent in the Siberian Arctic.

Although the winter (and previous summer) preconditioning of the ice pack in the Beaufort is important for predicting end of summer conditions, I would like to point out that extended weather forecasts during summer are important for predicting ice drift that may interfere with shipping. Northerly winds this summer pushed the eastern tongue of old ice into the south-eastern Beaufort. Such drifts of ice are an impediment to shipping in the region. In terms of the utility of an ice forecast for enhancing shipping operations, medium range (one to two weeks out) forecasts that employ numerical weather prediction models might be a good place to focus some effort.

Summer ice conditions in the Beaufort are clearly dependent on the decadal history of ice drift, deformation and summer melt in the region. Hence support of sea ice monitoring is imperative in the preparation of accurate summer forecasts. Satellite passive microwave does not provide information about the age and thickness of ice, so is not useful by itself in a monitoring system, or in analysis of the state of the Arctic ice pack. Ice drift must be monitored. Ice thickness information, either from satellite or in-situ observations is useful, though this should resolve the ice thickness distribution as the thinner ice melts out sooner and can accelerate summer melt. A goal for accurate summer forecasts should be an accurate map of ice type, age, thickness distribution and ridging at the end of winter. There are several tools that could be developed to provide this, though each has its limitations. Models require validation, and hence a supporting monitoring system. Blended data-modeling methodologies require data that resolves ice drift and type adequately. Building maps from observations requires skilled ice observers and a high density of data. Sea ice monitoring is the foundation of any forecast system. The monitoring system will be a blend of remote sensing, autonomous data stations (drifting buoys), in-situ, airborne and under-ice data.