

Summary on the prediction of 2010 minimum sea ice extent

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1. The results of this year's outlook - how well your Outlook and others estimated the minimum.

Our predictions for the August outlook were 5.0 million km². The actual September minimum sea ice extent is 4.6 million km² (Fig.1). There is a difference of 0.4 million km² by comparison. We did not consider the influence of the weather and ocean. Nevertheless, our predictions are consistent with the actual variation of the Arctic sea ice extent.

2. What were the main factors driving the 2010 summer sea ice dynamics and minimum?

In this report we focused on sea ice thickness in April when sea ice most grows up. The distribution of sea ice thickness at the spring seems a critical factor as shown in Fig. 1. In this September, after ice extent started to climb, a change in atmospheric conditions caused sea ice reduction again. It is difficult to predict such variation occurred in a short period from the only sea ice thickness because these peculiar tendencies seem to be relativity with the weather and the ocean.

3. Additional data or data products that would be useful for improving outlooks in the future, including any critical gaps in field observations.

In this report, it is difficult to analyze changes in regional areas because we didn't consider vector (ice motion). Additional analysis using vector will enable us to predict regional ice change. Also, when we estimated the September minimum ice extent from spring sea ice thickness, we had a bias between prediction value and actual value in this analysis (predictions are always lower than actual value, see our August report). Possible causes of the bias are the followings,

In East Siberian Sea and Laptev Sea, we melted sea ice excessively from distribution of sea ice thickness at spring because assuming that same amount of sea ice was melted in the Beaufort Sea.

We decrease sea ice of amount that sea ice melted and flow from the Fram Strait overlap in East Siberian Sea and Laptev Sea.

4. Implications, based on this year's results, for the future state of arctic sea ice.

Also prediction of sea ice extent retrieved from distribution of sea ice thickness in Arctic Ocean, sea ice extent is in the decreasing tendency from 2002 to 2010. (Fig.1). Recent year, it is in the situation which thin sea ice is widely distributed.

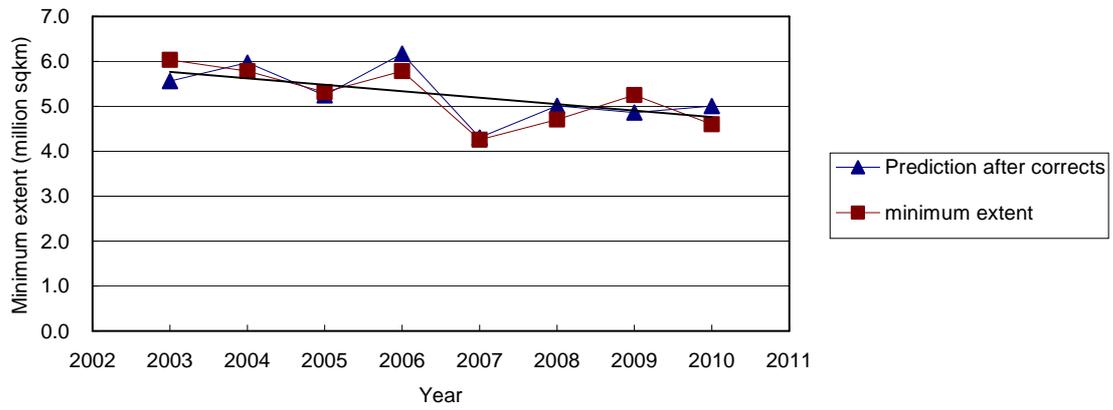


Fig.1 Prediction of sea ice in Arctic Ocean after corrects. Black line shows linear approximation of predictions. Linear approximation shows the decreasing tendency