

2013 PAN-ARCTIC OUTLOOK

September 2013 Sea Ice Extent Projection
June Report Based on May Data

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NOTE: This prediction was generated as an exercise in using the GMPL toolkit, rather than with the intention of making a serious prediction of sea ice extent, which would have involved performing diagnostics tests and greater investigation of modeling assumptions etc.

1. Extent projection:

4.1449 million square kilometres

2. Methods/Techniques

The projection is purely statistical, using Gaussian process regression on the September average sea ice extent time series. A squared exponential covariance function was used, with all hyper-parameters found by maximising the marginal likelihood for the model.

3. Rationale

There is no physical rationale for the prediction, it is purely statistical. Likewise there is little statistical rationale for this particular methodology (Gaussian process regression), I just wanted to experiment with the technique. The projection looks subjectively reasonable.

4. Executive Summary

The projection is purely statistical, using a Bayesian technique known as Gaussian process regression (similar to Krigging). A nice feature of this model is that the credible interval on the projection widens as the projection extrapolates away from the data.

Note that the sea ice extent is likely to be higher than the record September minimum in 2012 simply due to "regression to the mean", but it would not imply that there had been any "recovery".

5. Estimate of Forecast Skill:

A Bayesian 95% credible interval is given by 4.1449 (+/- 1.0656) million square kilometres