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Extent Projection: 4.2 +/- 0.2

Methods/Techniques

Estimates are based on multiple regression of a wide variety of publicly available monthly arctic data.

The June submission included data on:

- sea ice extent and area (from NSIDC)
- various arctic climate data (NCEP/NCAR Reanalysis)
- various climate indices (NAO, AO, AMO, PDO)

For this July Report, I have added sea ice volume data (the newly-update PIOMAS data).

This PIOMAS data has proved the most effective data set for making predictions.

At the time of the analysis, data for area, extent, and volume were available from June, 2011, but the NCEP/NCAR Reanalysis data and the NAO, AO, AMO, and PDO were not available.

Consequently, analyses based on extent, area, and volume were done for data up thru June, while separate analyses were done for all data up thru May

Rationale

It is only logical that there would be a strong statistical correlation between past conditions and future conditions. Several individual predictors from June or earlier provide correlations from $r^2 = 0.4$ up to $r^2 = 0.7$. Various multiple regression fits can push the correlations up over $r^2 = 0.85$. (Of course, care must be taken not to over-fit the data, since there are well over 100 potential sets of data that are analyzed).

Executive Summary

Various single and multiple regression results with $r^2 > 0.6$ suggest that the September extent will be close to, or perhaps below, the minimum value set in 2007.

Estimate of Forecast Skill (if available)

Each regression analysis will, naturally provide a different prediction. By taking an aggregate of the various estimates for September Extent, a general range can be determined. The best fits tended to predict values from 4.0 to 4.4, so 4.2 +/- 0.2 was chosen. This is considerably smaller than my previous estimate, primarily due to the inclusion of the PIOMAS volume data this month.