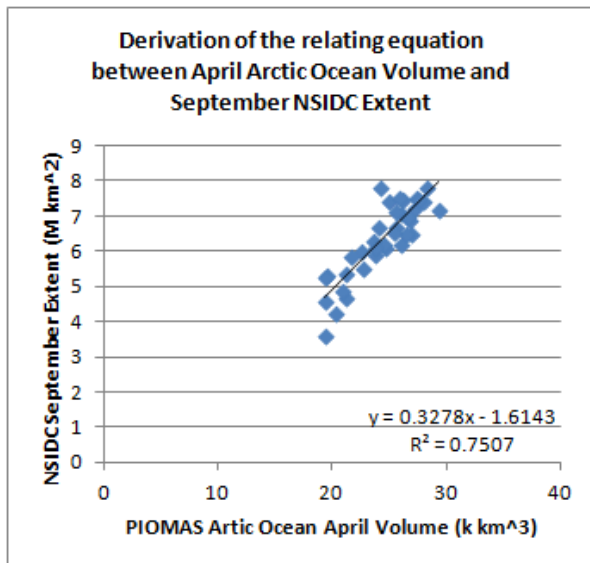


**SEA ICE PREDICTION NETWORK (SIPN)**  
**Template for Pan-Arctic Sea Ice Outlook Core Contributions**  
June 2015 Report

1. Reynolds
2. The long term loss of extent in summer is largely driven by volume decline of ice in the Arctic Ocean mediated by the resulting increase in open water formation efficiency. Based on this hypothesis the PIOMAS April average volume is calculated from PIOMAS gridded data and the relationship between April volume and September extent is used as a predictor. The resulting prediction is 5.15 million km<sup>2</sup> +/- 0.64 million km<sup>2</sup>.
3. Statistical.
4. 5.15 million km<sup>2</sup> +/- 0.64 million km<sup>2</sup>.
5. The relationship between April Arctic Ocean PIOMAS volume and September NSIDC extent is derived from a scatter plot of the two variables.

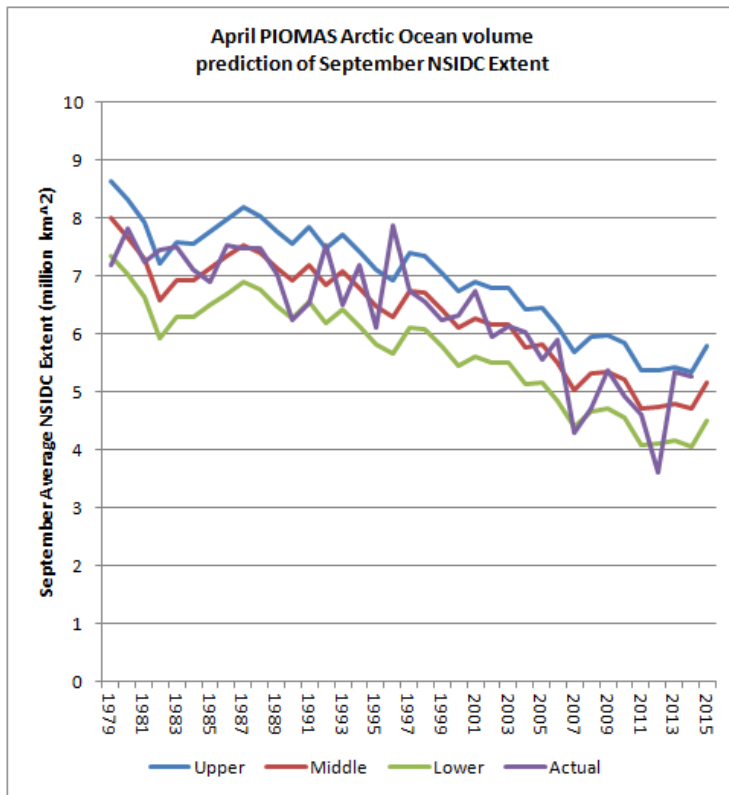


This equation is used to make central values of prediction for hindcasts, and a prediction for 2015 using the April PIOMAS volume data released in mid May. Gridded data are used to calculate the volume for the Arctic Ocean, using the same regions as Cryosphere Today my definition of the Arctic Ocean is Beaufort, Chukchi,

East Siberian, Laptev, Kara, Barents, Greenland Seas, Central Arctic, and the Canadian Arctic Archipelago. Ice conditions in these regions define the extent in September.

6. Estimated 80%, likelihood of the 2015 September extent being in the range 4.51 to 5.80Mkm<sup>2</sup>.
7. The standard deviation ( $\sigma$ ) of the difference between hindcast and actual NSIDC September extent from 1979 to 2014 is calculated and is used to provide upper and lower bounds of hindcast. A coverage factor (k) is selected such that  $k \cdot \sigma$  gives upper and lower bounds of the hindcast and forecast, the coverage factor used was 1.20 as a trade-off between success rate and bound width.

Hindcast performance.



Upper (blue) is upper bound, Middle (red) is central estimate, Lower (green) is lower bound. Actual (purple) is the actual NSIDC September extent for the respective years.

\*\*\*\*\*

Note for July/August - I hadn't intended to submit for July and August, but my expectation is now lower than my June submission (bottom half of my range, possibly

lower). This is largely based on ice state (PIOMAS/US Navy model thickness, and extent, area, compactness anomalies) in the peripheral seas of the Arctic Ocean Basin (Beaufort round to Laptev). However the prediction based on April volume is intended as a test of April thickness/volume role in September extent. As such it can stand for both July and August without amendment.

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