APPOSITE Sea Ice Prediction 2013 – June contribution to SEARCH

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Simplest statistical forecast for Extent:

1. Fit a LOWESS curve to NSIDC September sea-ice extent (smoothing set to 0.7).
2. Find the lag-1 autocorrelation of the residuals (r = –0.19 for 2013 forecast)
3. Forecast: LOWESS extrapolated one-step ahead plus damped persistence of previous year anomaly
4. Then bias correct using 13 hindcasts, generated as above but only using data before forecast year (hindcasts are on average 0.32 million km^2 too large).
5. Uncertainty (5-95%) estimates use 1.645× the standard deviation of the residuals from the LOWESS fit

   Forecast for 2013: **4.07 ± 0.75** million km^2 (5-95% range)

   Historical RMSE: **0.51** million km^2 (not fully cross-validated)

Spatial forecast version:

1. As above, but performed at each grid point independently, and then spatially summed.
2. Bias corrected to official NSIDC September extent timeseries as above
3. Uncertainty estimates as for pan-extent above

   Forecast for 2013: **4.04 ± 0.75** million km^2 (5-95% range)

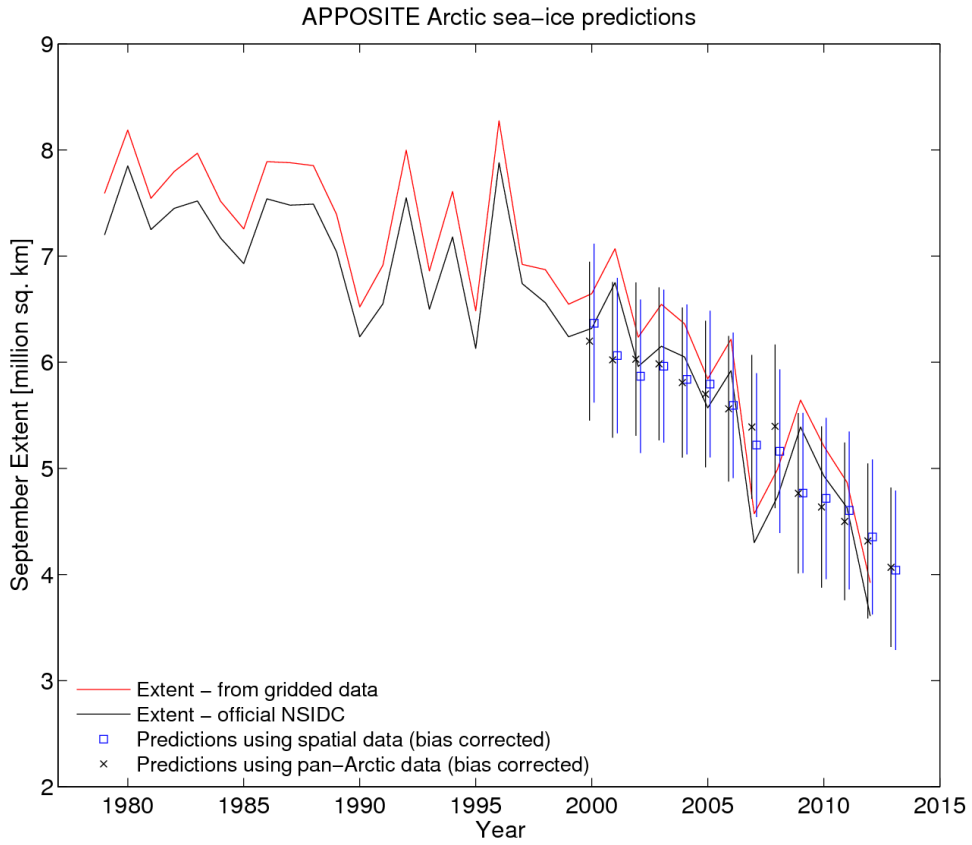
   Historical RMSE: **0.46** million km^2 (not fully cross-validated)

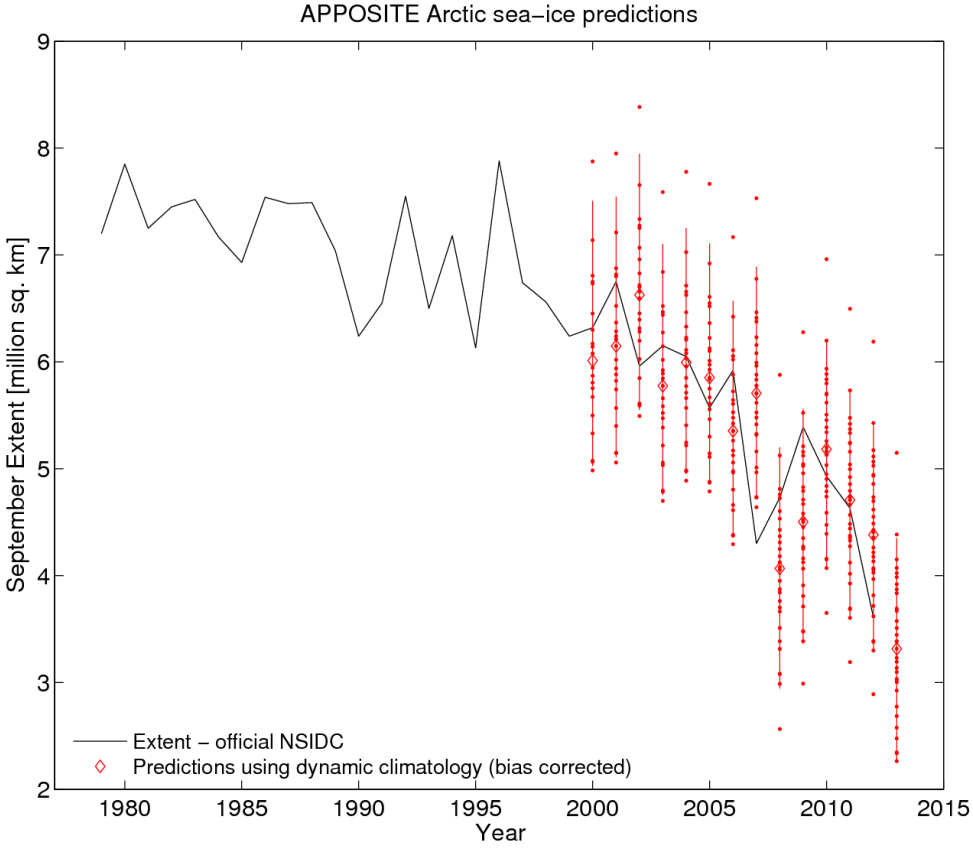
Dynamic Climatology:

1. Fit a LOWESS curve to NSIDC September sea-ice extent (smoothing set to 0.7).
2. Forecasts: LOWESS extrapolated one-step ahead plus all previous *changes* from year to year in the residuals.
3. Then bias correct using 13 hindcasts, generated as above but only using data before forecast year (hindcasts are on average 0.11 million km^2 too large).
4. Uncertainty derived from range of previous changes.

   Forecast for 2013: **3.31 ± 1.04** million km^2 (5-95% range)

   Historical RMSE: **0.64** million km^2 (not fully cross-validated)


APPOSITE Arctic sea–ice predictions
September Extent [million sq. km]
Year
Extent – from gridded data
Extent – official NSIDC
Predictions using spatial data (bias corrected)
Predictions using pan–Arctic data (bias corrected)


APPOSITE Arctic sea–ice predictions
September Extent [million sq. km]
Year
Extent – official NSIDC
Predictions using dynamic climatology (bias corrected)