Pan-Arctic Sea Ice Outlook
st Update

Randles

Extent Projection 4.23 M Km^2 +/- 95% confidence interval of 0.70 based on past forecast performance of this technique.

Methods/Techniques - Statistical

Rationale

I use an average of two methods. One is as used in my previous submissions this year of a linear regression to predict t expected residual from a gompertz fit of September Extent using the residual from a gompertz fit of Cryosphere Today a

The other method is to calculate a weighted average of Cryosphere Today area and NSIDC Extent giving 1.5 weight to a The difference between this and the NSIDC September average extent is calculated and estimated with a linear trend.

How each method would have performed with data only to 31 July of the year being estimated is used by weighting the average with the reciprocal of the RMSE.

Several different methods produced estimates that are very similar to the second method. These have been considered duplicates and not used.

Executive Summary

Two statistical methods have been averaged.

Estimate of Forecast Skill

The standard error arising in the linear regression fit of gompertz residuals is 0.29. However, standard error of a method tends to underestimate the errors likely in practice. So I have used only information up to 30 July of the year being predi to predict each of the last 10 years. As shown in the table this gives RMSE of .42 M Km^2.

The RMSE on the fit of the difference between the weighted average of extent and area and the September average ext
0.28. When used to predict the last 10 years the RMSE is 0.38.

The average of the predictions has a RMSE of 0.35 which has been doubled to arrive at the 0.70 95% confidence interv

Estimates at 31 May of year concerned

ear	Actual	Est Extent Residual by Area Residual		Area&Extent Average - Extent Min trend		Weighted average of tw methods	
		Estimate	Error	Estimate	Error	Estimate	Error
2002	5.96	6.51	0.55	6.39	0.42	6.44	0.48
2003	6.15	6.24	0.09	6.37	0.22	6.31	0.16
2004	6.05	6.20	0.15	6.47	0.42	6.34	0.29
2005	5.57	5.73	0.16	5.71	0.14	5.72	0.15
2006	5.92	5.44	-0.48	5.69	-0.23	5.57	-0.35
2007	4.30	4.86	0.56	4.93	0.63	4.89	0.59
2008	4.73	4.81	0.08	5.44	0.71	5.14	0.41
2009	5.39	4.65	-0.74	5.26	-0.13	4.97	-0.42
2010	4.90	4.43	-0.47	4.88	-0.02	4.67	-0.23
2011	4.61	4.36	-0.25	4.79	0.18	5.48	-0.03
2012		4.02		4.41		4.23	
		RMSE	0.42	RMSE	0.38	RMSE	0.35

Discussion of thickness

I have attempted to predict PIOMAS volume minimum and Cryosphere Today area minimum using similar techniques. L month's predictions for volume now seems badly out and this could be as a result of overfitting. So this month I have use single predictor for PIOMAS volume decline from 31 July to minimum residual from straight line fit. The predictor is Exte minus area at 31 July. This gives a prediction for PIOMAS volume of 2.9 K Km^3 +/- standard error of 0.41. This predicti may still be a little low for a statistical scheme with other methods giving higher answers. However, the storm currently (Aug) in progress might make this appropriate.

I predict fall in Cryosphere Today area from 31 July to minimum residual from gompertz fit. The predictor in the linear regression is area residual from gompertz fit of 31 July areas. This gives a prediction for minimum area of 2.5 M Km^2 + standard error of 0.22.

There is little difference in timing of minimum area and minimum volume so dividing one by the other to get an average thickness gives 1.18m to compare against previous years:

2009 2.01m
2010 1.44m
2011 1.38m