

1. Extent Forecast

My forecast for the mean September 2013 sea ice extent is: $5.03 \times 10^6 \text{ km}^2 (\pm 0.35 \times 10^6 \text{ km}^2)$

This forecast is comprised of a projection of the NASA-Team data of $4.7326 \times 10^6 \text{ km}^2$ and the addition of an offset to bring it in line with the NSIDC estimate. The difference is comprised of the “pole hole” and a couple of other tweaks (though I don’t know the exact details). For a sample of dates between June and August, the mean of the offset between NASA-Team and NSIDC is $0.30 \times 10^6 \text{ km}^2$, with a standard deviation of $0.11 \times 10^6 \text{ km}^2$, thus I add $0.3 \times 10^6 \text{ km}^2$ to my calculated number.

$$4.7326 + 0.30 = 5.0326 \times 10^6 \text{ km}^2$$

2. Method/Technique

These results are based on a 50-day lead time probabilistic forecast. The probability distribution is integrated to provide an extent value. Hence, it is a statistical method.

3. Rationale

The probabilities are built up over multi-year windows of concentration data from prior years. (The paper is being written at the moment so details should be available shortly.)

4. Executive Summary

My method provides sub-seasonal range (50-day lead time) probabilistic forecasts of daily sea ice extent; i.e. all days were forecast 50 days out; see Table 1 below. The system can run all year but has better skill in the melt months. During the melt season updates are made using observed sea ice concentration.

5. Estimate of Forecast Skill

Over the years 1995-2012 the Brier Skill Score (BSS) for the month of September is about 0.80 compared to climatology (BSS calculations are done using daily data and climatology is a 365 day time series) - the system has some skill. August and October possess similar BSS skill levels. Given the performance of my scheme in hindcast mode (see Figure 1 below), I would expect the current year to be somewhere amongst that range – but it’s difficult to see into the future! RMSE on NASA-Team September mean extent is $0.35 \times 10^6 \text{ km}^2$ for the period 1995-2012.

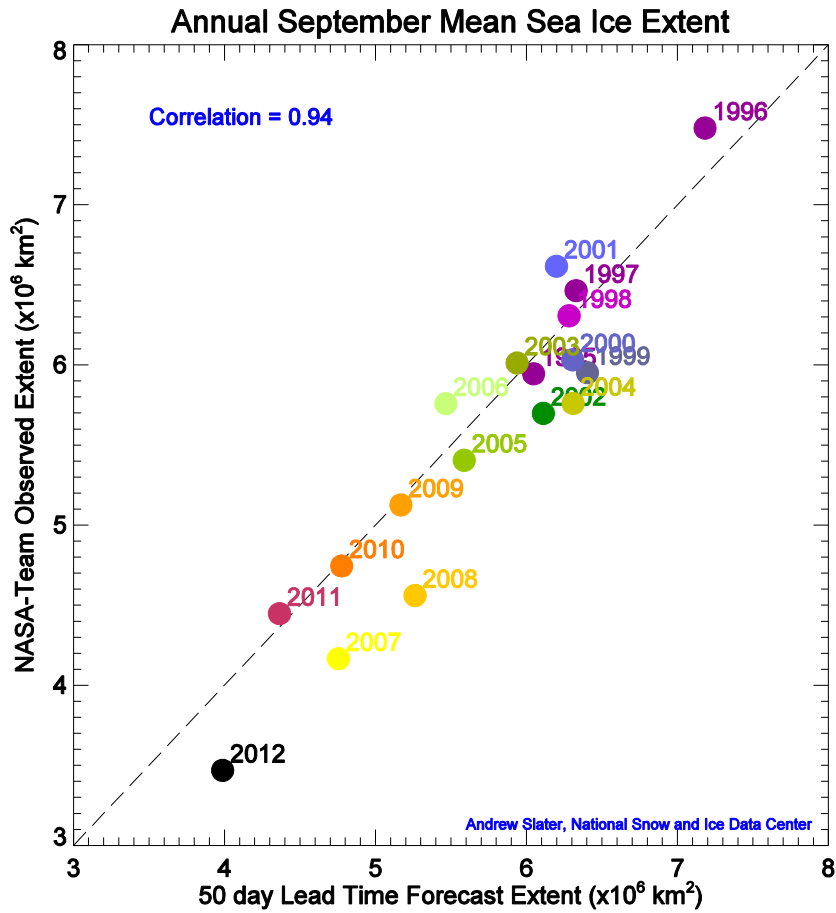


Figure 1 : Hindcasts of mean September sea ice extent for years 1995-2012. The NASA-Team observed extent (which is the quantity being forecast) is different from the “official” NSIDC extent values. All hindcasts are run in operational mode, that is, for each year no data from the future is used in deriving probabilities or the integrated value.

The daily values in the Table 1 below are, up to the 16th Sept., the same as those that were posted at: http://cires.colorado.edu/~aslater/SEAICE/forecast_2013.html, but all of the month is now within the 50-day window.

Table 1: 50-Day lead time forecast values of NASA-Team daily sea ice extent

Index	Year	Month	Day	NASA-Team Extent Forecast
0	2013	9	1	4.9814
1	2013	9	2	4.9377
2	2013	9	3	4.8633
3	2013	9	4	4.5040
4	2013	9	5	4.3852
5	2013	9	6	4.4265
6	2013	9	7	4.4286
7	2013	9	8	4.4438
8	2013	9	9	4.3249
9	2013	9	10	4.1721
10	2013	9	11	4.2678
11	2013	9	12	4.1811
12	2013	9	13	4.4092
13	2013	9	14	4.5665
14	2013	9	15	4.5957
15	2013	9	16	4.6715
16	2013	9	17	4.7200
17	2013	9	18	4.7943
18	2013	9	19	4.9586
19	2013	9	20	5.0077
20	2013	9	21	4.9939
21	2013	9	22	5.0140
22	2013	9	23	5.0144
23	2013	9	24	5.0541
24	2013	9	25	5.0695
25	2013	9	26	5.0184
26	2013	9	27	5.0220
27	2013	9	28	5.0436
28	2013	9	29	5.0482
29	2013	9	30	5.0598
Mean for September 2013				4.73259