Sea Ice Outlook:
Use Dipole Anomaly (DA) index to predict Arctic summer ice minima

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- DA is defined as the second SLP mode in the Arctic; the first mode is Arctic Oscillation (AO)
- Using winter-spring mean DA index and summer DA index, we have proven ice minima in 1995, 1999, 2002, 2005, 2007, and 2008
- Using 2009 winter-spring (+0.61) and summer (+1.06) DA indices, now we can project that 2009 summer ice was projected to be 4.5 million sq. km (in the 2009 Sea Ice Outlook)
- Reference: Wang et al. 2009, GRL, “Is the Dipole Anomaly a major driver to record lows in Arctic summer sea ice extent?”
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EOF Analysis and Regression

- Conduct EOF analysis of SLP north of 70N
- Plot the 2010 DA index into the scatter plot (Fig. 1)
- Regress the SIA to summer DA indices on the 4^{th} quadrant to obtain a regression equation
- Using this equation to project the SIA in September 2010

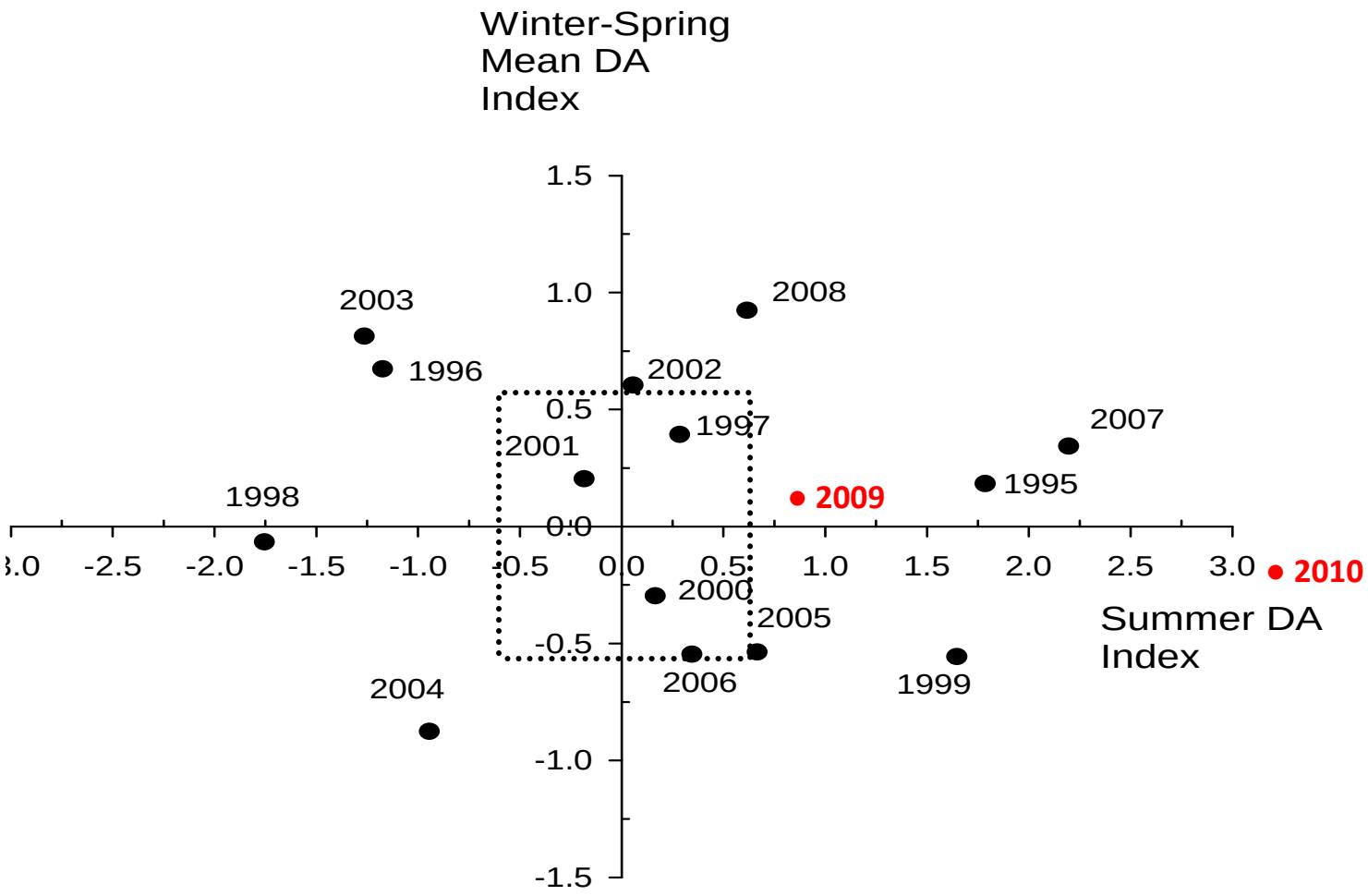

Figure 1. DA predicts record lows: 1995, 2002, 2007, 2008, and 2009 (+DA persists from Win-Spr-o Sum); 1999 and 2005 (-DA in Win-Spr, but +DA in summer). So, summer DA is the key! The 2009 DA is similar to 2007 and 2008, while 2010 DA is similar to 1999 and 2005.

Regression of September ice area to summer DA index if DA is negative during winter-spring, and positive in summer:

SIA_DA sep=6.4399-0.47xDA_sum (million sq. km)

Since summer DA (so far using June and July) index is 3.218, the projected SIA in September 2010 will be 6.4399-0.47x3.218=4.9274 million sq. km.

However, this projection may vary depending on August's DA index (sign and magnitude) that will change the magnitude of the summer DA index, since summer is defined as June, July, and August.