June Pan-Arctic Outlook
Adrienne Tivy

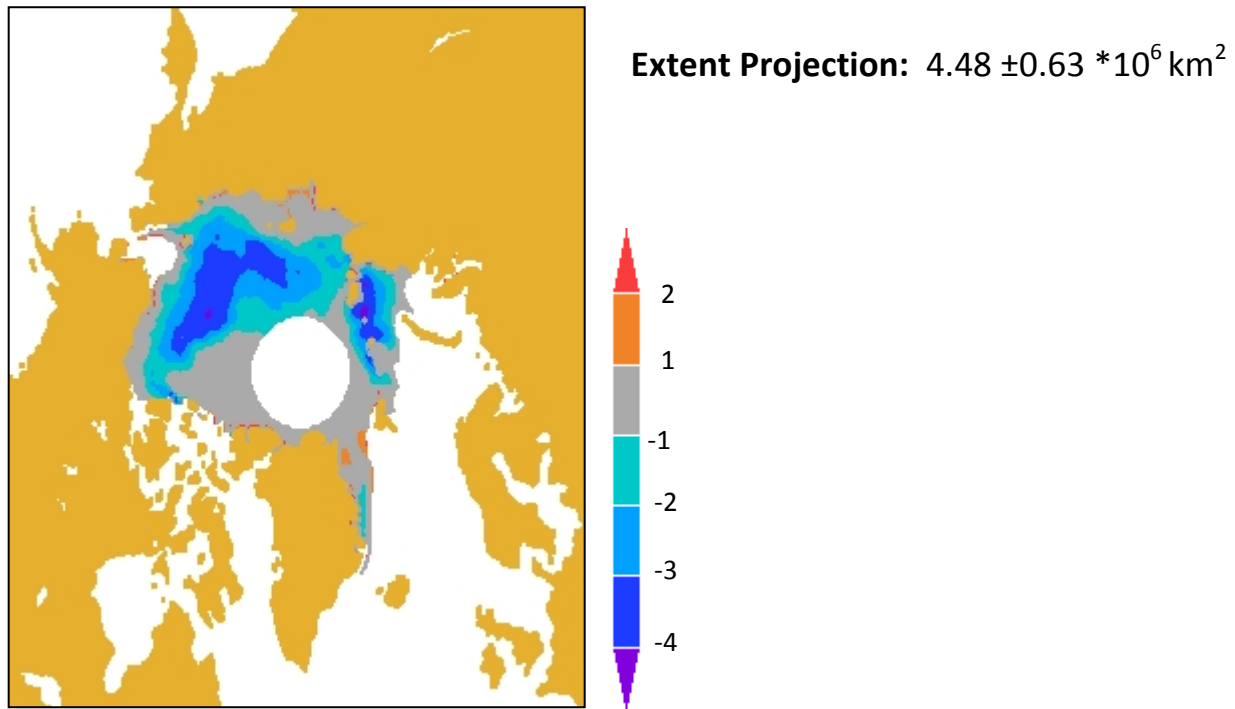**Extent Projection:** $4.48 \pm 0.63 *10^6 \, km^2$

Figure 1. September 2011 ice concentration anomaly map based on the 1981-2010 climatology. The model domain is in grey.

Method: Statistical – canonical correlation analysis (CCA). A persistence forecast based on February ice concentration anomalies is generated using CCA. February is chosen over May because the correlation with September extent is higher (Table 1). The model is trained on the 1980-2010 period using the passive microwave derived data set (nasateam). CCA is a commonly used statistical forecasting technique for generating seasonal predictions of precipitation, temperature and ENSO. It is expected that the skill will be lower than a forecast based on the February extent time-series, however, the benefit of CCA is that it yields the spatial distribution of September ice concentration anomalies (Figure 1).

Rationale: CCA is a commonly used seasonal forecasting technique and persistence is a good benchmark for more sophisticated techniques.

Executive Summary: The CCA forecast for the September 2011 ice extent based on February ice concentration anomalies is $4.48 \pm 0.63 *10^6 \, km^2$. The lagged correlation between September ice extent and prior months is highest in February.

Estimate of Forecast Skill: The correlation between modeled and actual extent, 1979-2010, is 0.62 and the rms is 0.63. The correlation is lower than the correlation with actual February extent (Table 1, 0.74). CCA does not improve the skill of a persistence forecast but it provides spatial representation.

Table 1. Lagged correlation values for September ice extent with previous months, 1980-2010. Between the previous September and May, the correlation is highest with February extent.

Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
0.51	0.59	0.67	0.67	0.69	**0.74**	0.69	0.68	0.58	0.73	0.91	0.96