

Canadian Ice Service Contribution

to the

September 2013 Sea Ice Outlook (July Update)

No Change from the CIS forecast issued in June.

Environment Canada's Canadian Ice Service (CIS) is predicting the minimum Arctic sea ice extent to again be near or just below 4.0 million square kilometres in September, 2013. A value of ~3.8 million square kilometres is predicted, which will make the Arctic sea ice extent in September, 2013, the second lowest in the 1979-2012 record. This value lies well below the 1979-2013 average September extent of 6.4 million square kilometres based on the NSIDC sea ice index.

As with previous CIS contributions the 2013 forecast was derived by considering a combination of methods: 1) a qualitative heuristic method based on observed end-of-winter Arctic ice thicknesses and extents, as well as an examination of Surface Air Temperature (SAT), Sea Level Pressure (SLP) and vector wind anomaly patterns and trends; 2) an experimental Optimal Filtering Based (OFB) Model which uses an optimal linear data filter to extrapolate NSIDC's September Arctic Ice Extent time series into the future; and 3) an experimental Multiple Linear Regression (MLR) prediction system that tests ocean, atmosphere and sea ice predictors.

Based on winter sea ice extents and thicknesses, a September 2013 minimum ice extent value of **3.6 million square kilometres** is heuristically predicted. The CIS experimental OFB model predicts a September 2013 average ice extent of **4.05 million square kilometres**. The CIS experimental MLR forecast system predicts a September 2013 average sea ice extent of **5.0 million square kilometres** (3 model runs with a range of 4.4 to 5.7). The average forecast value of the three methods combined is **4.2 million square kilometres**. However, although it has proven skilful and outperforms the OFB model in many regions of the Canadian Arctic, the MLR forecast system has considerably overestimated the pan-Arctic minimum ice extent for the past several years. For this reason, the CIS is excluding its contribution from the final estimate this year. Therefore, based on a combination of the heuristic and OFB model predictions only, the CIS is forecasting a 2013 pan-Arctic September sea ice minimum of **~3.8 million square kilometres**.