

# Canadian Ice Service Contribution

to the

## September 2011 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 less than 5 million square kilometres in September, 2011. **A value similar to or less than the average extents observed in September, 2008, and September, 2010, is expected. This value ( $4.5 \leq x \leq 4.9$  million square kilometres) will make the Arctic sea ice extent in September, 2011, either the second or third lowest in the 1979-2011 record.** This value lies well below the average September extent for 1979-2010 of 6.6 million square kilometres based on the NSIDC sea ice index.

As with CIS contributions in 2009 and 2010, the 2011 forecast was derived using a combination of three methods: 1) a qualitative heuristic method based on observed end-of-winter Arctic Multi-Year Ice (MYI) 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.

For July, all 3 models were revisited and the forecast remains unchanged. Based on end-of-winter MYI extents and SAT patterns, a September 2011 minimum ice extent value of  $4.5 \leq x \leq 4.9$  million square kilometres is heuristically predicted. The CIS experimental OFB model predicts a September 2011 average ice extent of 4.8 million square kilometres. The CIS experimental MLR forecast system predicts a September 2011 minimum sea ice extent of 5.6 (the average of 5 model runs) million square kilometres. **The average forecast value of the three methods combined is 5.0 million square kilometres. As in 2010, this average does not represent the official CIS 2011 forecast but rather represents the extreme maximum of the 2011 forecast range described in the first paragraph above.**

### **Method 1 - Heuristic Forecast: some additional notes for July**

A reduced spring 2011 MYI pack has left the bulk of the Arctic Ocean covered in FYI, indicating that well below normal end-of-melt season ice extents can be expected in September 2011 ( $\leq 5$  million square kilometres). **However, note that the ice in Nares Strait consolidated and became land-fast in mid-February as per normal in 2011, something it has not done since 2006.** The ice in Nares Strait, as of the first week of July, is heavily fractured and the strait is expected to clear in mid-July as per the 1968-2000 normal. The formation and clearing of fast ice from Nares Strait is an important

factor in the annual blockage, and hence the annual duration of free passage and volume loss of MYI from the Arctic Ocean to Baffin Bay. **Since Arctic MYI did not experience free passage through Nares Strait throughout the winter of 2011 as it did in 2007 and 2010, a normal concentration of MYI currently exists in the Lincoln Sea area and north of Ellesmere Island at the beginning of July, 2011.** This factor may be just enough to prevent record-breaking minimum ice concentrations and extents in the Arctic Ocean in 2011.