

SEARCH Regional Sea Ice Outlook 2010 June Report

Region of Interest: Western Parry Channel region of the Northwest Passage

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Clearing of the Northwest Passage:

As the melt season begins in the Western Parry Channel region of the Northwest Passage, multi-year ice (MYI) conditions are well below the historical 1968-2000 average (Figure 1; Figure 2). What's more is that they are only slightly above the record low conditions of 1999 and less than 2007 when the region cleared for the first time during the satellite era (Figure 2). However, light ice conditions at the start of the melt season within the Western Parry Channel are not a precursor to complete clearing – 1999, 2008 and 2009 are evidence of this. The spatial distribution of MYI in the surrounding regions and the flux of MYI from Queen Elizabeth Islands into the region are both vital to its clearing. Given these factors and particularly the spatial distribution of MYI in the M'Clintock Channel (Figure 1) it seems the region will not clear during 2010.

Method:

The method is based on the distribution of MYI at the start of the melt season. Since MYI is harder to melt than first year ice, much of MYI will likely survive the melt season and cause difficulties for marine transportation. This of course will also depend on the severity of the summer melt so the forecast is updated each month based on the previous month's distribution of MYI. There are key locations in the Canadian Arctic Archipelago where the presence of MYI will make it more likely that Northwest Passage routes will be blocked with ice.

Rationale:

If MYI concentrations are high in the M'Clintock Channel this limits the flux of MYI from the Queen Elizabeth Islands but it also means less sea ice will be transported southward hence, concentrations remains high in the central Western Parry Channel during the melt season – this was the case in 2009. Conversely, if the M'Clintock Channel contains little MYI then sea ice can be transported southward but the flux of MYI from the Queen Elizabeth Islands directly across the Western Parry Channel increases – this was the case in 2008. Indeed, there is very little MYI present in the Western Parry Channel but within the M'Clintock Channel, MYI conditions mirror the 1968-2000 historical average (Figure 3). The latter will likely delay breakup in the central region of the Western Parry Channel in a similar process to 2009.

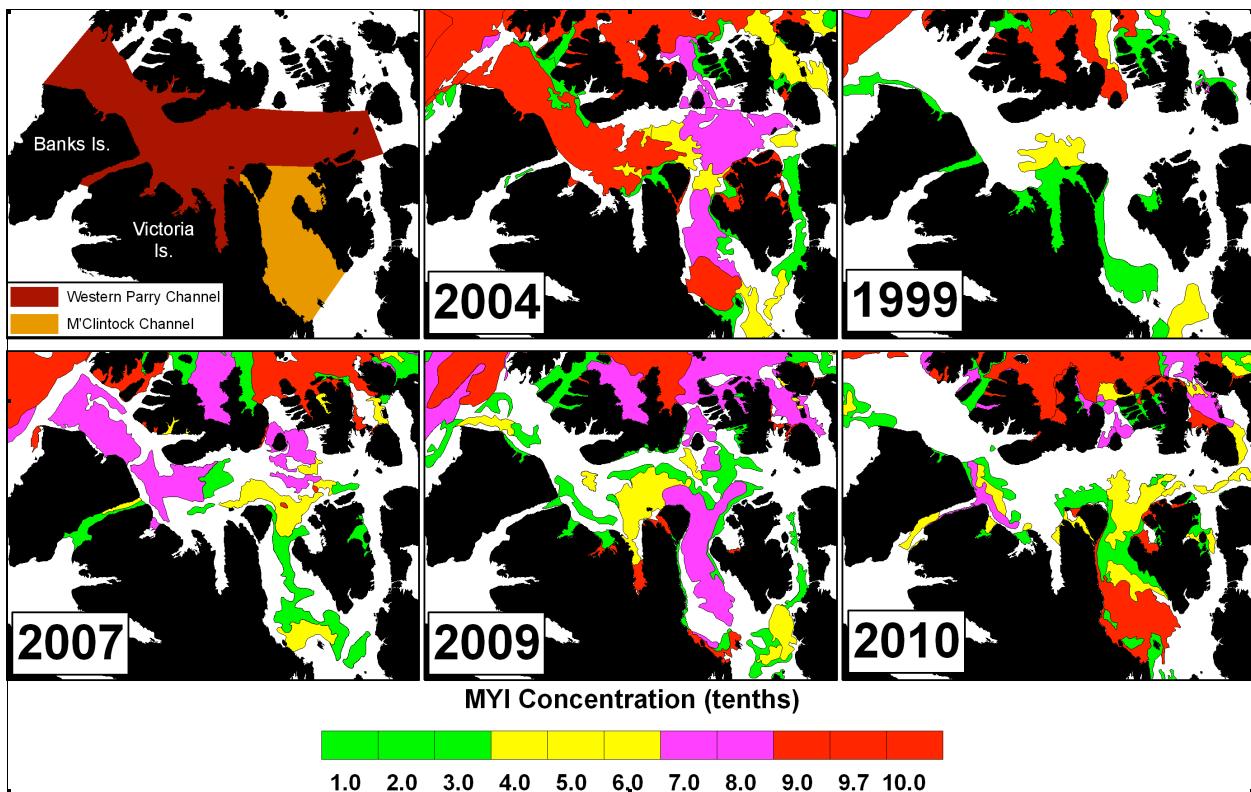


Figure 1. Spatial distribution of multi-year ice (in tenths) within the Western Parry Channel region of the Northwest Passage on May 1st for a heavy ice year (2004), a light year ice (1999), clearing year (2007), last year (2009), and 2010. Data is from the Canadian Ice Service.

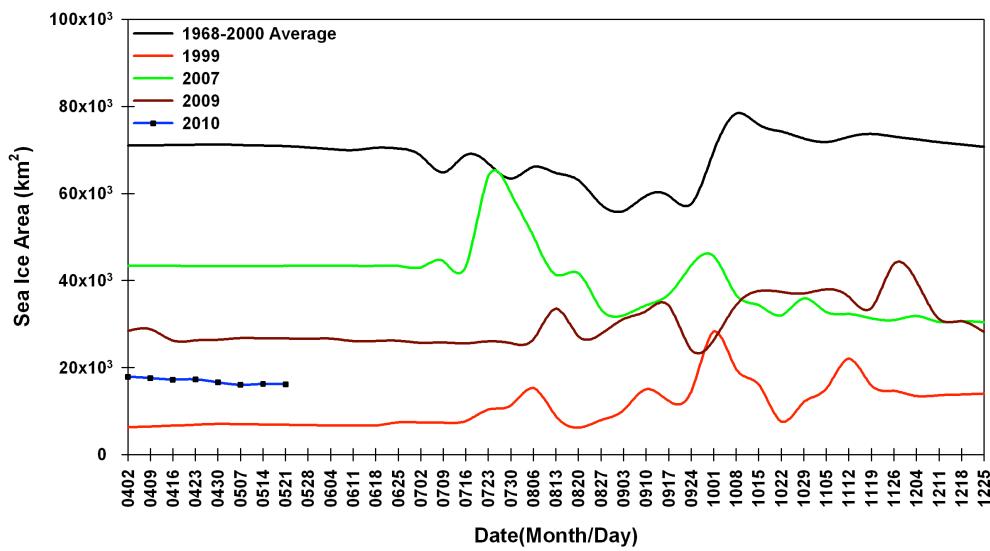


Figure 2. Time series of the evolution of multi-year ice (MYI) for selected years within the Western Parry Channel. Data is from the Canadian Ice Service.

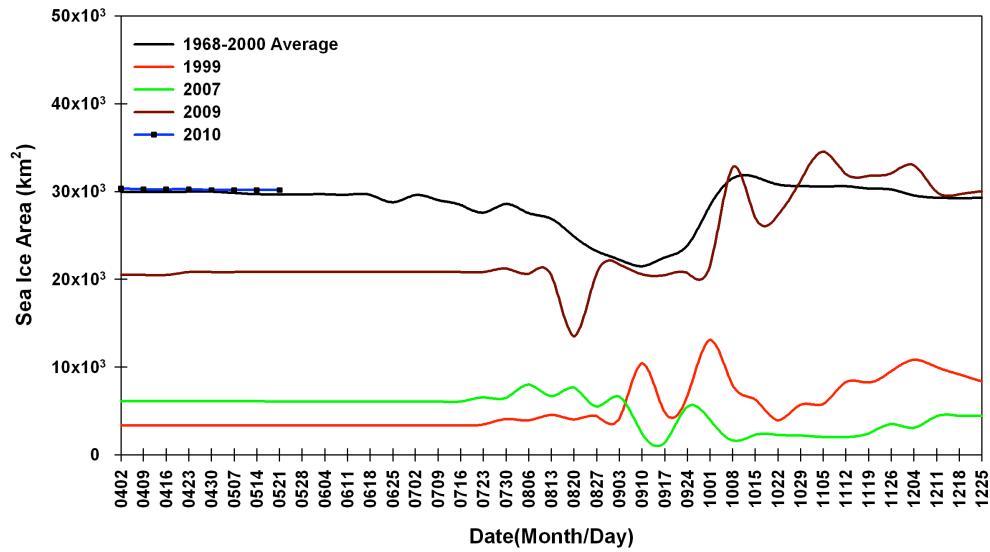


Figure 3. Time series of the evolution of multi-year ice (MYI) for selected years within the M'Clintock Channel. Data is from the Canadian Ice Service.