Geophysical Research Abstracts
Vol. 16, EGU2014-1801, 2014
EGU General Assembly 2014

Recent changes in the multi-year ice area budget of the Canadian Arctic Archipelago

Stephen Howell (1), Larissa Pizzolato (2), Chris Derksen (1), and Michael Brady (3)

(1) Environment Canada, Climate Research Division, Toronto, Canada (Stephen.Howell@ec.gc.ca), (2) University of Ottawa, Ottawa, Canada , (3) University of Waterloo, Waterloo, Canada

The Canadian Arctic Archipelago (CAA) is intricate collection of islands and channels located on the North American continental shelf. The deep-water route of the North West Passage crosses through the CAA near 75°N connecting the Atlantic and Pacific Oceans. The major challenge to safe navigation of the North West Passage is the presence of multi-year sea ice (MYI). In recent years, MYI conditions within the CAA during September have begun to decrease considerably with 2011 and 2012 being the lightest MYI years on record since 1968. Recent light MYI years within the CAA are associated with recent openings of the North West Passage (i.e. 2007, 2008, 2010, 2011 and 2012). MYI within the CAA is either imported from the Arctic Ocean or grown in situ and therefore in order to understand the processes contributing to these recent reductions in September MYI within the CAA we derived the first estimates of the MYI area budget of the CAA using RADARSAT-1 and RADARSAT-2 imagery from 1997-2012. Overall, there has been a reduced amount of Arctic Ocean MYI inflow into the CAA during the summer months since 2007. The latter process can be attributed to more frequent high sea level pressure anomalies over the Beaufort Sea and Canadian Basin. The amount of MYI grown in situ within the CAA has also reduced because of longer melt seasons reducing the survivability of seasonal ice over. MYI outflow to Baffin Bay from the CAA has been relatively consistent over the period. Interestingly, the recent reduced amount of MYI within the CAA, particularly noticeable since 2007, was found to be quantitatively linked with a step change increase in observed Arctic marine shipping activity following the dramatic summer sea ice reductions that began in 2007.