



Observed and Projected Variability of Snow Cover and Sea Ice in the Canadian Arctic

Stephen Howell (1), Chris Derksen (1), Paul Kushner (2), Frederic Laliberte (1), Lawrence Mudryk (1), Reinel Sospedra-Alfonso (3), and Chad Thackeray (4)

(1) Environment and Climate Change Canada, Climate Research Division, Toronto, Canada (stephen.howell@canada.ca), (2) University of Toronto, Toronto, Canada, (3) Environment and Climate Change Canada, Climate Research Division, Victoria, Canada, (4) University of Waterloo, Waterloo, Canada

Rigorous comparisons of climate model simulations with observations over the past century and robust projections into the coming seasons, years and decades are essential in order to determine the impact of a changing cryosphere on the global climate system. The Canadian Sea Ice and Snow Evolution Network (CanSISE) is a climate research network focused on developing state of the art observational data for comparison with earth system models to advance observation, prediction, and understanding of seasonal snow cover and sea ice in Canada and the circumpolar Arctic. Here, we summarize variability and trends in the historical record of snow cover (fraction, water equivalent and duration) and sea ice (area, concentration, type and thickness) in the Canadian Arctic. We also provide an assessment of snow cover and sea ice future variability and change, likely to occur by mid-century, as simulated by the Coupled Model Intercomparison Project Phase 5 (CMIP5) suite of climate models. To put regional conditions in a larger context, the observed and projected changes over the Canadian Arctic are compared to the pan-Arctic. Finally, we discuss how these observed and projected changes in the snow cover and sea ice components of the Canadian cryosphere have important implications for human activity including the close ties of northerners to the land, access to northern regions for natural resource development, establishing new up-to-date shipping routes, and the integrity of northern infrastructure.