Snow Measurements from the First Two Years of the Coastal Labrador Climate and Weather Monitoring Program

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ABSTRACT

Snow indices are key inputs for numerical weather prediction and are critical for understanding the impacts of climate change on Subarctic and Arctic environments. In Canada, recent government-led changes to snow monitoring infrastructure have reduced the availability of long-term snow cover records. Diminished snow monitoring in northern Canada can be particularly challenging for residents of remote Indigenous communities who rely heavily on suitable snow conditions for safe winter travel. The Labrador region of northeastern Canada (294,330 km^2) has been disproportionately impacted by recent changes to snow monitoring, having lost snow measurement equipment at three (Cartwright, Churchill Falls, Wabush) out of the five stations that were previously recording snow depths in 2010. In summer 2019, the Coastal Labrador Climate and Weather Monitoring Program (CLCMWP) was launched through a partnership between Queen's University, the Labrador Institute, the Government of Newfoundland and Labrador, the Nunatsiavut Government, the NunatuKavut Community Council, and the Mushuau Innu First Nation in response to community needs for improved climate and meteorological monitoring in coastal Labrador. CLCMWP's main contribution has been the installation of six remote automated weather stations (RAWS) in the communities of Postville, Rigolet, North West River, and Black Tickle-Domino, and at two locations along the Trans Labrador Highway (near Cartwright Junction and the community of Red Bay). Each RAWS is equipped with sensors for air temperature, barometric pressure, wind speed, wind direction, relative humidity, precipitation, snow depth, soil moisture, soil conductivity, soil temperature, and solar irradiance. Monitoring over two full snow seasons (2019-2020 & 2020-2021) and disparities with currently available snow monitoring products highlight the importance of having dense networks of RAWS in northern coastal regions. Finally, we offer some brief perspectives on the cryospheric and community impacts of the anomalous weather conditions of winter 2020-2021 as observed at CLCMWP stations throughout Labrador.

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