

## **Assessing the Impact of Transition from Single Alter-Shielded Geonor T-200B to Double Alter-Shielded Pluvio<sup>2</sup>L Gauges on Winter Precipitation Measurements in the ECCC Operational Network**

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### **ABSTRACT**

As a key component of network modernization, Environment and Climate Change Canada (ECCC) is replacing single Alter-shielded Geonor T-200B (Geonor-SA) precipitation gauges with double Alter-shielded OTT Pluvio2L (P2L-DA) precipitation gauges. Geonor-SA gauges have been used in the ECCC climate network since the early 2000s. The replacement program with the P2L-DA configuration began as early as 2016. The number of P2L-DA gauges in the ECCC climate network was approximately 215 at the end of 2021. Following years of precipitation gauge intercomparisons, it is well recognized that more extensive shielding (i.e. double vs. single Alter-shields) results in a higher gauge catch efficiency (CE), especially for solid precipitation, increasing the probability of detection of light events and decreasing the measurement uncertainty. However, introducing this configuration into the network creates a measurement inhomogeneity, especially at cold and windy sites where the double shield will substantially increase the relative amount of observed winter precipitation as compared to the previously installed single shield. A universal transfer function (UTF) to adjust wind bias is currently available for single Alter-shielded gauges including the Geonor-SA configuration and has been applied to ECCC network measurements, with adjusted data published in the Government of Canada Open Data Portal. Unfortunately, a similar universal transfer function does not yet exist for double Alter-shielded gauges such as the P2L-DA configuration and therefore those measurements are not adjusted.

This analysis assesses the impact of two scenarios that may result in precipitation time series inhomogeneity: 1) transition from the unadjusted Geonor-SA to the unadjusted P2L-DA (realized by using the observations from the ECCC public archive); and 2) transition from the UTF adjusted Geonor-SA to the unadjusted P2L-DA (realized by using the current version of the published bias-adjusted data). The implications and solutions for these scenarios are explored using intercomparison data from the Bratt's Lake (SK) supersite, including overlapping data with the official ECCC climate station.

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