



## **On the development of homogenized hourly surface wind speeds data for Canada**

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This study aims to homogenize hourly near-surface wind speeds recorded at 150 long-term stations in Canada for the period from 1953 to 2015. First, metadata and a logarithmic wind profile were used to adjust hourly wind speeds measured at non-standard anemometer heights to the standard 10-m level. Further, effort was made to identify and adjust for frequency discontinuities in hourly wind speed data. Then, the statistical homogeneity tests in the RHtestsV5 software package were applied to the monthly mean surface wind speed series derived from hourly wind speeds that have been adjusted to the standard 10-m anemometer height, using monthly mean wind speed series from nearby stations and homogenized monthly mean geostrophic wind (geo-wind) speed series as reference series (but it was noticed that geo-wind series is not a suitable reference series for surface wind over complex terrain). All available metadata were used to verify the statistically detected change points. Finally, the quantile-matching (QM) adjustment method was used to adjust hourly wind speed data for the change points found in the monthly mean wind speed series, to produce homogenized hourly wind speed data. As shown in our previous study, beside anemometer height change, station relocation is the main cause for discontinuities in the wind speed series, followed by instrumentation problems or changes, and observing environment changes. The effects of artificial mean shifts on the results of trend analysis are shown to be remarkable, with the homogenized wind speed series showing better spatial consistency of trends.