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Verification of NWP models at high resolution using a block bootstrapping method

M. Vallee (1), S. Bélair (2), and P. Vaillancourt (3)

(1) Environment Canada, RPN, Canada (marcel.vallee@ec.gc.ca), (2) Environment Canada, RPN, Canada (stephane.belair@ec.gc.ca), (3) Environment Canada, RPN, Canada (paul.vaillancourt@ec.gc.ca)

Researchers have become more aware of the fact that parameter estimation error and data dependency play a crucial role in test statistic limiting distributions, a role which had hitherto been ignored to a large extent. Ideally, when the verification period is a valid representation of your verification population and each event is independent and part of the same distribution then bootstrapping your verification sampling period is equivalent to estimating your verification population. This procedure is based on drawing observations with replacement. Unfortunately, meteorological data is spatially and temporally correlated which forces the use of bootstrapping in blocks to capture the dependence structure of neighbouring observations. The width of the confidence interval provides an estimate of the uncertainty inherent in the process of population sampling.

This poster will present an application of the latest version of a verification package of surface weather variables developed at the Environment Canada's Meteorological Research Division based on the bootstrapping technique with confidence intervals. Verified variables are temperature, dew point, wind, cloud amount and precipitation.

One of the goals of this system is to evaluate the improvement of a new numerical model compared to the current operational model running at the Canadian Meteorological Centre. One difficult aspect shown is that the error displays a clear diurnal signal, highlighting the difficulty of models to capture this essential feature of the atmospheric boundary layer.