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Comparison of data-driven methods for downscaling ensemble weather forecasts

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Abstract. This study investigates dynamically different data-driven methods, specifically a statistical downscaling model (SDSM), a time lagged feedforward neural network (TLFN), and an evolutionary polynomial regression (EPR) technique for downscaling numerical weather ensemble forecasts generated by a medium range forecast (MRF) model. Given the coarse resolution (about 200-km grid spacing) of the MRF model, an optimal use of the weather forecasts at the local or watershed scale, requires appropriate downscaling techniques. The selected methods are applied for downscaling ensemble daily precipitation and temperature series for the Chute-du-Diable basin located in northeastern Canada. The downscaling results show that the TLFN and EPR have similar performance in downscaling ensemble daily precipitation as well as daily maximum and minimum temperature series whatever the season. Both the TLFN and EPR are more efficient downscaling techniques than SDSM for both the ensemble daily precipitation and temperature.

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