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Spatial models for soil water retention: Does the addition of PTF generated data improve predictive performance?

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Machine learning algorithms are a powerful tool for digital soil mapping. Their predictive performance is limited by the quality and size of the input data. To train spatial models for soil water retention, datasets are often small. However, the available data could be expanded through the application of pedotransfer functions (PTFs). This was investigated for a Páramo landscape dominated by organic soils under volcanic influence, involving uncertainty propagation. Model tuning was implemented by optimisation with the differential evolution algorithm, resampling was applied to avoid overfitting. Results confirmed that extending training datasets by PTF application improves the models. RMSE values of spatial models trained on the enlarged dataset were up to 19% smaller than RMSE values of models based on water retention measurements alone.