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The importance of soilscape stratification for the effective deployment of digital soil assessment models.

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Landscape stratification through analysis of terrain attributes and soil distribution are common tools used to determine terrestrial morphology and function as a product of landscape scale processes. Supervised classification schemes assume soil-terrain relationships can be systematically predicted in space but commonly the relationship between terrain variables and soil distribution is not linear. Thus segmentation is necessary to improve the development and deployment of digital soil mapping models for appropriate landscape units to account for complexity in soil-landscape relationships. We present a number of methodologies for the delineation national scale soilscapes. Expert-based pedological stratification was deployed in areas with good spatial soil information. Several automated methodologies were also tested to stratify on the basis of terrain. These delineations formed the training datasets for the extrapolation of soilscapes in data poor areas using supervised classification. Feature space and several inference models (Bayesian Belief Networks, Artificial Neural Networks and Random Forests) were developed to extrapolate based on environmental covariates representing SCORPAN factors. Deployment accuracy and thematic assessment indicated BBN and Random Forests were the most effective methods for extrapolation of the soilscapes. In some cases where deployment accuracies were low the misclassifications were dependent on the resolution of the environmental covariates, initial spatial extent of the soilscapes in the training space and representativity of the training data in predicted areas.