**Probability Forests for Accuracy Estimation and Multi-Precision Level Predictive Soil Mapping**

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The Canadian Boreal Forests are important to the global forest ecosystem, accounting for 21-27% of boreal forests and 8% of all forests globally. Soil management is a key concern in northern boreal forests, as they store over 80% of their total carbon belowground. Extensive portions of the Canadian Boreal Forest (54%) are managed; Canadian Boreal forest and soil managers depend on accurate spatial information to mitigate impacts of forest harvesting and oil and gas activities, in addition to other management decisions. Using publically available soil point data collected as part of environmental impact assessments, this study aimed to investigate the use of random forest model class probabilities to predict soil types with defined levels of confidence. First and second order digital elevation model derivatives were used as terrain covariates along with Sentinel time series median values obtained using Google Earth Engine. Overall, accuracy ranged from 0.48 for a minimum class probability of 0.25 to 0.97 for a minimum class probability of 0.95 at the soil subgroup level. At the median tree agreement of 0.6, the accuracy was 0.86 at the soil subgroup level. Based on this study it appears that the utilization of class probabilities from random forests can be used successfully to quantify uncertainty and enable user specified trade offs between accuracy and precision.