**Assessing the Transferability of Forest Volume Estimation Models between Hokkaido and Kyoto, Japan**

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***ABSTRACT***

Accurate forest biomass and volume estimation have become crucial for effective forest management and conservation efforts. This study explores the application of Random Forest models to estimate forest volume in two distinct regions in northern and central Japan: Hokkaido and Kyoto. Utilizing multi-platform remote sensing data, including LiDAR, multispectral, and SAR imagery, together with other climatological and proximity factors, we developed Random Forest models to predict forest volume. A particular focus was placed on the transferability of models between these regions. Furthermore, SHAP (SHapley Additive exPlanations) analysis was conducted to understand the contribution of various features to the model predictions. Our findings reveal significant differences in feature importance between the regions, particularly regarding distance-related variables, which could indirectly reflect the difference in the forest management practice. This study highlights the potential of integrating diverse remote sensing datasets for robust forest volume estimation and emphasizes the need for region-specific model calibration to enhance prediction accuracy.

**Keywords:** Stem Volume, Forest, Random Forest, SHAP, Model Transferability