

상대생장식과 기계학습 접근법 결합을 통한 수고 추정 신뢰도 향상

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Combining Allometric Equation and Machine Learning Approach for more Reliable Tree Height Estimation

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Tree height is one of fundamental measurements in forest inventory, but due to difficulties in field measurement, allometric relationship with diameter at breast height (DBH) is widely used for tree height estimation. Although allometric equation which currently used in national forest inventory (NFI) shows good performance, some bias in tree height estimation are still present. In this study, the bias are corrected by machine-learning approach (random forest) and the causes of bias are explored. We selected total 50 main tree species from 5th NFI data, and used stand characteristics (stand density, mean and deviation of DBH, and species richness) and topographical characteristics (altitude, distance from forest roads, and slope) for bias estimation. This approach reduced the bias in tree height at almost every selected species. On average, root mean square error reduced by 8% (-4 - 29%) and correlation coefficient increased by ~3% (-2 - 15%). Among the variables, distance from forest roads had highest correlation with the bias, and stand characteristics like stand density and variation in DBH distribution also explain much of the bias. Because tree height is a key component in forest biomass storage, the results from this study can contribute for accurate prediction for aboveground biomass and improve the reliability of forest carbon balance estimation.

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