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LiDAR data analysis with Fusion/LDV for individual tree measurement

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Introduction: In recent years, many analyses have been conducted on the vertical structure of the forest using airborne LiDAR data. To analyze LiDAR data, analysis software is developed in Europe and USA. The forest conditions are quite differences between these countries and Japan. In this study, we used Fusion/LiDAR Data Viewer (LDV) software that developed in the USA, as a tool to analyze LiDAR data. The purpose of this study is to verify the efficacy of Fusion/LDV in Japanese forest management, in terms of function, accuracy, and type of output obtained using this software.

Methods: The verification parameters used in this study were tree height, crown base height (CBH), and crown width (CW). We used three data sources-automatically extracted Fusion/LDV data, manually measured Fusion/LDV data, and field survey data. In order to compare the obtained data, we used scatter diagram analysis, root-mean-square error (RMSE), and differences from three different types of field survey data.

Results: The study findings confirmed relatively high precision of both the automatic and manual measurements by Fusion/LDV in estimating tree height. The inclination of linear regression was over 0.9 in two survey areas. The results of R square were over 0.7. But while neither the measurement of CBH nor that of CW had such precision. The inclination of linear regression was near zero or minus values.

Conclusion: For individual tree height measurement Fusion/LDV was very useful when a tree has a clear peak, it was available enough in Japanese forest environment.

Biography

Hiromi Shiota has started his research for forestry management for 4 years after retirement from an IT vender. He is interested in Airborne Laser Scan of Remote Sensing technology. He is now trying to measure average tree height in wide area by using large size ALS data with Area Based Approach. To operate large data, for example, merge or divide data, change data format, or smoothing like these. He thinks, Fusion/LDV that developed by USDA is an excellent tool to analysis LiDAR data. However, he is 65 years old now, but he keeps studying with the will.

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