

Mapping of canopy area of deciduous broad-leaved forest using aerial orthophotos and LiDAR data

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The study site was selected at an old growth beech forest in Oshirakawa, Gifu Prefecture. The high resolution aerial orthophotos provide us forest canopy images in a large area. The airborne LiDAR (Light Detection and Ranging), also provides fast, accurate and 3 dimensional canopy height information. Resolution of aerial orthophotos 2003 (summer) and 2008 (autumn) was 50cm pixel and point density of LiDAR data (2003) was 1 point per square meter. We aimed at understanding of usefulness of aerial orthophotos by canopy area interpretation and LiDAR data through level slicing. We used software ERDAS ver.2010 and ArcMap ver.10 for data processing, and conducted ground measurements to validate the accuracy of canopy area interpretation of the aerial orthophotos. The canopy area increased 418.4 m² from 2003 to 2008 in interpretation of aerial orthophotos with accuracy around 80%. The canopy area within shadow and the number of trees were not identifiable on aerial orthophotos, and the individual canopy area by interpretation was smaller than that of ground measurements. However, the individual canopy area appeared larger in the DCHM than corresponding canopy area of ground measurements. The DCHM projected the bottom branches and small trees well which were shaded by higher trees on the aerial orthophotos. We feel that the aerial photos are a better choice than LiDAR data, if we consider accuracy, time and cost.