



Light environment modeling in Populus plantations using Voxel-based Light Interception

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3D light interception by three uniform Populus canopies was studied using the Voxel-Based Light Interception Model (VLIM) in combination with ground-based LiDAR measurements. As the VLIM was developed and validated in a virtual environment to ensure reference data availability, the objective was to test the consistency of the measurement and analysis protocol in real forest canopies. The commercially available LMS200 (SICK AG) mounted on a dynamic hemispherical measurement platform was used to acquire the LiDAR data. An automated pre-processing of raw LiDAR scans delivered high quality structure information which was imported into a ray tracing algorithm for modelling of light/canopy interactions. The low within plot variability (mean standard deviation < 6%) and significant differences between light interceptions modelled for the separate forest stands demonstrated the capacity of the procedure to repeatedly reproduce detailed representations of canopy/light interactions.