Geophysical Research Abstracts
Vol. 15, EGU2013-3655, 2013
EGU General Assembly 2013

Spatial variability of throughfall and raindrops under a single canopy with different canopy structure

Kazuki Nanko (1), Yuichi Onda (2), Akane Ito (2), and Hiromu Moriwaki (3)

(1) Forestry and Forest Products Research Institute, Tsukuba, Japan (nanko-kazuki@gi.main.jp), (2) University of Tsukuba, Tsukuba, Japan, (3) National Research Institute for Earth Science and Disaster Prevention, Tsukuba, Japan

To evaluate the spatial variability of throughfall amount, raindrops, and erosivity under a single canopy during calm meteorological conditions, indoor experiments were conducted using a 9.8-m-tall transplanted Japanese cypress (Chamaecyparis obtusa) and a large-scale rainfall simulator. Drop size distribution, drop velocity, and kinetic energy of throughfall varied spatially under a single canopy as did throughfall amount and rain rate. Compared with throughfall rain rate, the variability was similar in drop size distribution, lower in drop velocity, and higher in kinetic energy. The results suggest that the spatial distribution of throughfall amount was dominated by the canopy shape and position of branches inside the canopy, and thus the spatial distribution was correlated with the radial distance from the trunk. Throughfall amount and rate were lower at the midway point between the trunk and the canopy edge. Throughfall drop size indices (drop size distribution, drop velocity, and unit kinetic energy) varied spatially while did not differ significantly. On the other hand, time-specific throughfall kinetic energy was correlated with the radial distance from the trunk. The dependence the throughfall kinetic energy on the radial distance from the trunk was dominated by the spatial distribution of throughfall amount. The trend in the spatial distribution of throughfall revealed in this study will aid in modelling canopy water processes and in predicting soil erosion on the bare forest floor.

The part of this study is published in Nanko et al. (2011, Agric. Forest. Meteorol. 151, 1173-1182).