Geophysical Research Abstracts
Vol. 14, EGU2012-12295, 2012
EGU General Assembly 2012

Hot spots of canopy drainage in a semiarid cloud forest

A. Hildebrandt (1,3), A. Bawain (), and J. Friesen ()

(1) Institute of Geoscience, Friedrich Schiller University Jena, Jena, Germany, (2) Department Computational Hydrosystems, Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany, (3) Max Planck Institute for Biogeochemistry, Jena, Germany

We investigate the heterogeneity of below canopy fluxes and particularly the sources of enhanced canopy drainage fluxes (stemflow versus throughfall dripping points) in a semiarid cloud forests in Oman. Our results are probably applicable to other ecosystems. We used measurements of stemflow from two wet seasons and small-scale measurements of throughfall (0.5 m grid spacing) over 21 individual days covering typical precipitation events. We investigated, which of these sources creates more likely points of high infiltration rates, how stable this pattern is in time and what is the return probability of outliers of stemflow and throughfall. Generally, throughfall contributes more to overall water arriving below the canopy, but intensities of stemflow are always larger. The overall time stability is comparable, and also outliers had a tendency to re-occur at the same spot for throughfall as well as in stemflow. However, the return probability of an outlier in one event to become an outlier in the next was much higher in stemflow, indicating that certain individuals had properties specifically conducive for producing stemflow. Thus, the same place would repeatedly receive extremely enhanced fluxes. Outliers in stemflow contributed much more to total received flow (20-30%), than outliers in throughfall (10-20%). In this cloud-influenced environment, throughfall was enhanced (and interception loss reduced) under denser canopy, probably due to enhanced capture of small droplets from clouds or wind driven rain. Dripping points also occurred only in denser canopy. The most intensive below canopy fluxes in this region are to be expected from specific tree individuals, where intensities were more than 8.5 times larger than rainfall, compared to dripping points, where the intensity was only about 3 times larger.