Geophysical Research Abstracts
Vol. 15, EGU2013-3069, 2013
EGU General Assembly 2013


# Capturing heterogeneity: The role of a study area's extent for estimating net precipitation

Hannah L. Scheckenbach, Beate Zimmermann, and Alexander Zimmermann

University of Potsdam, Institute of Earth and Environmental Science, Potsdam, Germany
(alexander.zimmermann.ii@uni-potsdam.de, +49 331 977 2047)

Accurate and precise estimates of net precipitation are required for many hydrological applications. For instance, most interception models require high quality estimates of the canopy storage capacity and the free throughfall coefficient. Good estimates of these parameters, in turn, critically depend on the quality of throughfall estimates. Previous attempts to guide throughfall sampling focused on the selection of an appropriate receiving area, number, and arrangement of throughfall sampling devices. Comparatively little attention has been given to the role of the extent, i.e. the size of the area under study. In this contribution we investigate the influence of the extent on the representativeness of mean throughfall estimates for a given forest ecosystem. We based our investigation on stochastic simulations which we derived from large empirical throughfall datasets. Using the simulated throughfall fields, we conducted virtual sampling experiments using a number of typical extents. We ran these tests for a simply structured and a heterogeneous tropical forest both for a range of event sizes and for accumulated data. Our findings suggest that the size of the study area should be carefully adapted to the required temporal resolution (i.e. event-based versus long-term) and to the complexity of the system under study. For instance, our calculations indicate that studies solely relying on empirical estimates of mean throughfall for long periods (e.g. months, seasons) may use relatively small study areas (e.g. 20 m by 50 m plots), particularly if the forest is simply structured. In contrast, studies which require high quality estimates of mean throughfall of individual events should consider sampling larger plots because too small extents run the risk to under- or overestimate the true mean throughfall in the forest type of interest. Particularly the sampling of small events in heterogeneously structured forests requires comparatively large study areas.