Geophysical Research Abstracts, Vol. 8, 01244, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01244

Water budget of three microcatchments under tropical montane forest in Ecuador - experimental and modeling approach

K. Fleischbein (1), Wolfgang Wilcke (2), Carlos Valarezo (3), and Wolfgang Zech (4)

(1) GeoForschungsZentrum Potsdam, Section 5.4 – Engineering Hydrology, Telegrafenberg, 14473 Potsdam, Germany (Katrin.Fleischbein@gfz-potsdam.de / Fax: +49 331 2881512 / Phone: +49 331 2881560), (2) Professorship of Soil Geography/Soil Science Geographic Institute, Johannes Gutenberg University of Mainz, Germany (3) Institute of Soil Science and Soil Geography, University of Bayreuth, Germany (4) Universidad Nacional de Loja, Ecuador.

The water budget of forested catchments controls the local water supply and influences the regional climate. To assess anthropogenic impact on the water cycle we constructed a water budget for three ∼10 ha catchments under lower montane forest on the east-facing slope of the Andes in south Ecuador at 1900-2150 m elevation. We used field hydrological measurements and modeled surface flows with TOPMODEL, a semi-distributed catchment model. We measured incident precipitation, throughfall, stemflow, and surface flow between May 1998 and April 2002 in hourly to weekly resolution, and determined all variables needed to parameterize TOPMODEL. On average of the four monitored years and three catchments, incident precipitation was 2504±s.d.123 mm, throughfall 1485±208 mm, and stemflow 25±2 mm yr^{-1}. Fog water input was negligible. Mean annual interception loss in the forest was 995±287 mm, and mean annual surface flow, calculated with TOPMODEL in an hourly resolution was 1039±48 mm. The resulting mean annual evapotranspiration was 1466±161 mm of which 33% (=471±162 mm) was transpiration if evaporation from the soil was neglected. Our study catchments show a high evapotranspiration attributable to the strong solar insolation near the equator, the small impact of fog, the generally low intensity of incident precipitation and additional wind-driven advective energy input.