Geophysical Research Abstracts,
Vol. 11, EGU2009-4702, 2009
EGU General Assembly 2009

Possibilities and limitations of the WEPP model in a steep Alpine environment

N. Konz, D. Baenninger, and C. Alewell

Institute of Environmental Geosciences, University of Basel, Basel, Switzerland (Nadine.Konz@unibas.ch/+41-2670479)

We chose the WEPP model (Water Erosion Prediction Project) to describe soil erosion in the Urseren Valley (Central Switzerland) as it seems to be one of the most promising models for steep mountain environments. Crucial model parameters were determined in the field (slope, plant species, fractional vegetation cover, initial saturation level), by laboratory analyses (grain size, organic matter) or by the WEPP manual (rill- and interrill erodibility, effective hydraulic conductivity, cation exchange capacity). The quantification of soil erosion was performed on hill slope scale for three different land use types: meadows, pastures with dwarf shrubs and pastures without dwarf shrubs. Erosion rates for the vegetation period were measured with sediment traps between June 2006 and November 2007. Long-term soil erosion rates were estimated by measuring Cs-137 redistribution, deposited after the Chernobyl accident. In addition to the erosion rates, soil moisture and surface flow was additionally measured during the vegetation period in the field and compared to model output. Short- term erosion rates are simulated well whereas long term erosion rates were underestimated by the model. Simulated soil moisture has a parallel development compared to measured data from April onwards but a converse dynamic in early spring (simulated increase and measured decrease in March and April). The discrepancy in soil water during springtime was explained by delayed simulated snow cover melting. The underestimation of simulated long term erosion rates is attributed to alpine processes other than overland flow and splash. Snow gliding processes might dominate erosion processes during winter time. We assume that these differences lead to the general simulated underestimation of erosion rates. Thus, forcing erosion processes which dominate erosion rates in mountainous regions have to be implemented to WEPP for a successful application in the future.