Geophysical Research Abstracts
Vol. 12, EGU2010-10369, 2010
EGU General Assembly 2010

Surface runoff for heavy rainfall events: results from rainfall simulations versus natural rainfall events

Christian Newesely (1), Georg Leitinger (1,2), Erich Tasser (2), Martin Hollomey (1), Ulrike Tappeiner (1,2)

(1) Institute of Ecology, University of Innsbruck, Innsbruck (Austria) (christian.newesely@uibk.ac.at), (2) Institute for Alpine Environment, European Academy Bolzano (EURAC), Bolzano (Italy)

Rainfall simulations are recognized as a state-of-the-art method that enable identification and quantification of different runoff types, such as surface runoff, subsurface flow, and deep percolation, as well as the analysis of rainfall-runoff transformations. However, ongoing discussions on accuracy and contact with reality impede results' interpretation – especially comparability of different studies is often questioned.

In a study in the Eastern Alps, Stubai Valley, Austria, surface runoff was analyzed for abandoned areas and pastures by rainfall simulations and collecting surface runoff from natural rainfall events using a rain simulator and surface runoff collectors, respectively. Runoff formation was monitored by accompanying soil water content and soil water tension measurements as well as soil physical analyses in different soil depths. The plot size covered by both the rainfall simulator and the surface runoff collectors was $10m^2$ and surface runoff was recorded every minute. Each simulation per land-use type was replicated on at least three different plots and three surface runoff collectors were installed nearby the simulated plots. Simulated rainfall intensity and duration was 90 mm^{-1} in one hour, corresponding to a return period of 100 years in the study area. However, by focusing on specific duration periods, surface runoff coefficients could be compared with surface runoff coefficients from natural precipitation events recorded by the surface runoff collectors.

Preliminary results show varying accordance, although we tried to limit analyses to comparable soil water content and soil water tension. However, simulated rainfall seems to meet characteristics from a natural precipitation event and conducted rainfall simulations turned out to be suitable and close to reality.

Our results further prove the necessity to monitor soil water content, soil water tension as well as to analyze soil physical properties to interpret results from both rainfall simulations and surface runoff collectors.