

soil hydrological processes in an israeli limestone area

A. Steinmann (1), Dr. J. Lange (1), Prof. Dr. Ch. Leibundgut (1), Dr. T. Grodek (2), Dr. J. Lekach (2), Y. Zakai (2)

- 1. Institut of Hydrology, University of Freiburg, Freiburg, Germany (astrid.steinmann@hydrology.uni-freiburg.de)
- 2. Department of Physical Geographie, The Hebrew University of Jerusalem, Jerusalem, Israel

In winter 2002/2003 experimental fieldwork was carried out near the city of Modiin, Israel. The objective of this investigation was to study runoff generation processes in a Mediterranean limestone area under natural circumstances. A rocky hillslope and a less rocky but terraced slope, covered densely with vegetation, was selected. It was possible to obtain a detailed picture of runoff generation, infiltration and drainage processes combining soil moisture measurements which were recorded every five minutes by nine Frequency Domain Reflectometry (FDR) sensors with air temperature, intensity of precipitation, humidity, runoff (on the rocky slope and in the channel) and a special artifical tracer experiment. The results pointed out differences between uncovered rocky slopes and vegetation covered areas.

On the rocky slope infiltration rates ranged between 0,1-6 mm/h while on the vegetation slope it was significantly higher, approximately between 0,1-50 mm/h. Preferential flow over 100 mm/h could be recorded on the vegetated slope directly behind or in front of terraces. Drainage was only possible when moisture increased to approx. 30 vol% in the upper soil layers. While on the rocky slope saturation overland flow started when soil moisture reached 43-45 vol% simultaneously with an quickly infiltration decreased to 0,1-1 mm/h, dense vegetation seemed to delay or completely prevent runoff generation.