



## **Topographic Effects on Spatial Distribution of Soil Moisture**

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Rainfall-runoff process can be simplified and disassembled as the vertical process (ex-/infiltration, evapotranspiration) and the horizontal one (surface/subsurface flow). In most hydrological modeling practices, studies are focused on the horizontal process and the ex-/infiltration part of the vertical process, while the spatial difference of evapotranspiration are neglected or only roughly evaluated with empirical methods. In fact, evapotranspiration besides infiltration has a vital effect on soil moisture, which in turn determines the runoff generation. According to the Penman-Monteith approach, ET depends on several factors including solar radiation, albedo, wind force, temperature, and vegetation. In this study the topographic effects on solar radiation is studied for different DEM resolutions (from 30m to 500m) using 3 different models (Solar Analyst, SRAD, WaSiM-ETH), all of which have taken slope, aspect, and shading effect into account. Meanwhile the topographic effect on wind force is studied with a wind model.

Assuming other meteorological parameters (albedo, temperature, humidity, rainfall, etc) and hydrological parameters (LAI, soil, vegetation, etc) as identical over the catchment, both potential solar radiation and radiation adjusted by observed radiation are put into SWAP2.0 model to get the ET and soil moisture distribution. The results show a considerable topographic effect on ET and soil moisture.

In further study, the effect of spatial distribution of vegetation and soil on the ET will be investigated.