



The effects of vegetation dynamics and land-use change on runoff, suspended sediment and bedload flux generation in a mountainous Mediterranean catchment: A modelling study

E. N. Mueller (1), T. Francke (1), R. J. Batalla (2,3)

(1) Institute of Geocology, University of Potsdam, Germany, (2) Department of Environmental and Soil Sciences, University of Lleida, Catalonia, Spain, (3) Forest Technology Centre of Catalonia, Pujada del Seminari, Solsona, Spain
(eva.mueller@uni-potsdam.de / Phone: +49-331-977-2975)

Intense rainstorm events frequently generate substantial fluxes of water, suspended sediments and bedload fluxes in the headwater catchments of the Pre-Pyrenees. A multi-scale, process-based modelling framework, WASA-SED, was employed to study and quantify these fluxes for the meso-scale Ribera Salada Catchment in north-east Spain. The effects of land-use change, afforestation, land abandonment and seasonal vegetation dynamics were examined particularly with regard to the resulting partitioning of water components in interception, infiltration and runoff volumes and the propagating effects for sediment removal and transport. The modelling tool was employed to identify buffers and barriers that impede water and sediment conveyance as a function of vegetation cover and type. The modelling tool enabled to locate important landscape switches which turn on/off runoff generation and sediment delivery based on the spatial structure and seasonal variation of vegetation dynamics. The study showed that it is possible to reproduce the important linkage between the spatial and temporal patterns of vegetation and the runoff generation and sediment delivery for meso-scale dryland catchments.