Geophysical Research Abstracts
Vol. 17, EGU2015-15007, 2015
EGU General Assembly 2015

Assessment of soil erosion at the Brzava small watershed of Montenegro using the IntErO model

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Soil erosion and related degradation of land resources are highly significant spatio-temporal phenomena in countries of the Southern East Europe. These effects are often related to changes in land use involving sedimentation, ecological degradation, and nonpoint source pollution. Understanding the processes of soil erosion, can help in identifying the erosion prone areas and the potential measures to alleviate the environmental effects. Most of the studies focus on small spatial units, while little attention has been given to the amount of sediment yield at the catchment scale. A small spatial unit approach neglects the transfer of sediment through catchments as well as the scale-dependency of erosion processes. Furthermore, approaches focusing on small spatial units do not consider important off-site impacts of soil erosion, such as sediment deposition in reservoirs, flooding as well as ecological impacts. The erosion response of catchments to changes in land use or climate often differ strongly from the responses resulting from changes at the plot scale. This study aims to illustrate the possibility in calculating the sediment yield at the catchment scale using the model IntErO which is based on the Erosion Potential Method of Garilovic. We apply the mode in the study region, the Brzava watershed. Our results suggest that the calculated maximal outflow from the river basin was 296 m^3s-1 for the incidence of 100 years and the net soil loss was 738 m^3 per year, specific 111 m^3km-2 per year, what indicates, according to Gavrilovic classification, that the river basin belongs to the V category; it is a region of very weak erosion. The method we used in this study can also be of interest for sediment modeling in other basins, in deriving strategies for land planning and management, because of its simple and reliable identification of critical areas of soil erosion in watersheds.

Key words: Erosion, Soil erosion assessment, watershed, Land use, IntErO model.