Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03198, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03198
EGU General Assembly 2008

Overland flow in semi-arid catchments: the impact of terrace failure on hydrological connectivity

A. Meerkerk (1), B. van Wesemael (1) and N. Bellin (1)

(1) Department of Geography, Université Catholique de Louvain, Place Louis Pasteur 3, 1348 Louvain-la-Neuve, Belgium (andreas.meerkerk@uclouvain.be)

Terraces are a common feature of agricultural landscapes in the Mediterranean. In many places they are no longer maintained so that the number of intact terraces is in prolonged decline. The aim of this paper is to examine the effect of terrace removal and failure on hydrological connectivity (HCT) and peak discharge in an agricultural catchment (465 ha) in southeast Spain. The situation of 2006 is compared to 1956 and to a scenario (S1) where all terraces have become permeable to concentrated overland flow. The spatial distribution of concentrated flow was mapped after four events in 2006 and characterised using connectivity functions. The degree of HCT was related to storm characteristics, land use and topography. For 1956 and S1, connectivity functions and peak discharge to the river were determined for one of the events of 2006, which has a recurrence interval of 8.2 years. The results show that the decrease in intact terraces has led to a strong increase in HCT and discharge. The contributing area to the river system has increased by a factor 3.2 between 1956 and 2006. If all terraces were removed, the contributing area may further increase by a factor 6.0 compared to 2006. The area with concentrated flow, the HCT and peak discharge are strongly related to storm magnitude as expressed by the storm erosivity index (EI30). The spatial distribution of concentrated overland flow is primarily a function of land use, and 25-50% of the flow occurs on roads. The spatial distribution is not affected by topography at a scale $>=$ 100 m^2. Our results suggest that HCT can be modelled as a function of EI30. Finally, this study leads us to propose (quantitative) definitions of two distinct types of hydrological connectivity.