Geophysical Research Abstracts
Vol. 14, EGU2012-651, 2012
EGU General Assembly 2012

Exploring effects of rainfall intensity and duration on soil erosion at the catchment scale using OpenLISEM

J. Baartman (1,2), V.G. Jetten (3), C.J. Ritsema (2,4), J. De Vente (5,6)

(1) Land Dynamics Group, Wageningen University, Wageningen, The Netherlands (jantiene.baartman@wur.nl), (2) Land Degradation and Development Group, Wageningen University, Wageningen, The Netherlands, (3) ITC, Faculty of Geoinformation, Science and Earth Observation, University of Twente, Enschede, The Netherlands, (4) Alterra, Wageningen University, Wageningen, The Netherlands, (5) Department of Desertification and Geoecology, Estacion Experimental de Zonas Aridas, CSIC-EEZA, Almeria, Spain, (6) School of Geosciences, University of Aberdeen, United Kingdom

In semi-arid areas high-intensity rainfall events are often held responsible for the main part of soil erosion. Long-term landscape evolution models usually use average annual rainfall as input, making the evaluation of single events impossible. Event-based soil erosion models are better suited for this purpose, but cannot be used to simulate longer timescales and are usually applied to plots or small catchments. In this study, the openLISEM event-based erosion model was applied to the medium sized (∼50 km2) Prado catchment in SE Spain. Our aim was to (i) test the model's performance for medium sized catchments; (ii) test the ability to simulate four selected typical Mediterranean rainfall events of different magnitude, and (iii) explore the relative contribution of these different storms to soil erosion using scenarios of future climate variability.
Results show that due to large differences in the hydrologic response between storms of different magnitudes, each event needed to be calibrated separately. The relation between rainfall event characteristics and the calibration factors might help in determining optimal calibration values if event characteristics are known. Calibration of the model features some drawbacks for large catchments due to spatial variability in Ksat values. Scenario calculations show that, although ∼50% of soil erosion occurs as a result of high frequency, low intensity rainfall events, large magnitude, low frequency events potentially contribute significantly to total soil erosion. The results illustrate the need to incorporate temporal variability in rainfall magnitude-frequency distributions in landscape evolution models.