Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07951, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07951
EGU General Assembly 2008

Multi-process 50ka landscape evolution modelling of a valley in South Africa

A.J.A.M. Temme (1), A. Veldkamp (1)

(1) Chairgroup of Land Dynamics, Wageningen University, The Netherlands.

Landscapes are known to evolve in complex, non-linear ways over thousands of years. Holistic geomorphological studies, where in-depth analyses of landscapes and deposits are complemented by dating, remain indispensable to unravel this complex behaviour. Landscape evolution hypotheses resulting from such studies can be complemented with Landscape Evolution Models (LEMs) that predict or simulate the 3D development of landscapes over time. Consequently, LEMs have the potential to test and falsify landscape evolution hypotheses. For several reasons, especially a lack of simple and generic process descriptions, LEMs have hardly been used for this purpose. Instead, studies with LEMs have commonly been focussed on testing process descriptions, resolution effects, sensitivity analyses or dealing with sinks. LEMs have had some success in simulating ka-scale landscape evolution but rarely have they been used to examine evolution of an actual landscape. In this paper, we argue that a closer connection between geomorphological fieldwork and modelling studies can solve some of the problems that prevent LEMs from examining actual, multi-process landscape evolution. A LEM (LAPSUS) is adapted to include vegetation effects and simple descriptions of relevant landscape processes. LAPSUS is then used to explore if it is possible to detail and test the conclusions of earlier field- and laboratory work on 50 ka landscape evolution in Okhombe Valley, KwaZulu Natal, South Africa. Even though calculation constraints limited calibration efforts, results show that the model can predict (or rather postdict) crucial aspects of landscape evolution. The combination of model and fieldwork results allows for a more complete understanding of the landscape system in the case study area and hints at methodological advances for future studies of this type.