



## **Catchment scale simulation of weathering-erosion coupling by the soil evolution model mARM**

S. Cohen (1,2), G. Willgoose (1), and G. Hancock (2)

(1) The University of Newcastle, School of Engineering, Callaghan, Australia (sagy.cohen@newcastle.edu.au), (2) The University of Newcastle, School of Environmental and Life Sciences, Callaghan, Australia (sagy.cohen@newcastle.edu.au)

Soil properties are dynamic in both time and space. They have a significant impact on landform controlling processes such as soil erosion. Simulating soil development is challenging due to the complexities of the processes and their dynamics. We have developed a three-dimensional soil evolution model (mARM) which is capable of detailed simulation in both time (millions of years) and space (catchment scale). mARM simulates soil grading evolution in space and through the profile by the weathering process of bedrock and soil profile and its dynamics with surface armouring caused by erosion. It is an extremely computationally efficient model by using advanced matrices numerics. mARM is intended to be integrated in an existing landform evolution model. We use its stand-alone version as a virtual laboratory to examine a variety of soil processes and relationships. Here we present results from a study of the effect of weathering-erosion relationship on soil development and distribution over time.