



Rapid formation of rock armour for soil - rock fragment mixture during simulated rainfall

E. Poultney, G.S. McGrath, and C. Hinz

The University of Western Australia, School of Earth and Environment, Crawley, Australia (christoph.hinz@uwa.edu.au)

Preventing erosion is an important issue in disturbed semi-arid and arid landscapes. This is in particular of highest importance for mining companies while undertaking land rehabilitation. An onsite investigation of the impact of surface rock fragments on erosion was conducted at Telfer goldmine in the Great Sandy Desert, Western Australia. The study site is a waste rock dump designed to mimic the concave slope of a natural mesa to both discourage erosion and blend in with its natural surroundings. Four treatments were used to construct the slope: two are topsoil mixed with rock fragments, and two are unmixed topsoil. A field study investigating erosion rills, particle size distribution, rock fragment coverage surface roughness and vegetation was carried out to determine changes down and across slope. The treatments constructed by mixing topsoil and rock fragments are more stable and show rock fragment distributions that more closely resemble patterns found on natural mesas surrounding Telfer. A controlled study using trays of topsoil mixed with rock fragment volumes of 50%, 60%, 70% and 80% were used to investigate how varying mixtures of rock fragments and topsoil erode using rainfall intensities between 20 and 100 mm h⁻¹. Two runs of 25 minutes each were used to assess the temporal evolution of rock armouring. Surface coverage results converged for the 50%, 60% and 70% mixtures after the first run to coverage of about 90%, suggesting that fine sediment proportion does not affect rate and degree of rock armouring.