

Sediment source tracing in the Thina catchment, Eastern Cape, South Africa

KATE ROWNTREE, PEARL MZOBE & BENNIE VAN DER WAAL

Rhodes University, PO Box 94, Grahamstown, 6140, South Africa
k.rowntree@ru.ac.za

Abstract The Mount Fletcher Dam on the Thina River, South Africa, was completed in 2008; 33% of its storage capacity has since been lost to sediment deposition. Highly erodible soils developed from mudstones and shales that dominate the lower catchment lithology are a likely source of sediment. Soils developed from basalt located higher in the catchment are less erodible, but steep slopes increase the erosion potential. As these two soil types have distinctive magnetic signatures, the reservoir sediment should provide a record of its main source area. Magnetic signatures from a sediment core revealed a cyclical pattern of sedimentation, with alternating high and low values that may be linked to the passage of floods. These magnetic signatures do not match those of mudstone/shale-derived soils, and point to a significant but variable input of basaltic sediment. A number of hypotheses are proposed to explain this anomaly. Implications for catchment restoration are discussed.

Key words land degradation; gully erosion; sediment tracing; magnetic signatures; watershed restoration