

# The practicalities of suspended sediment load estimation in South Africa

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## Abstract

In many parts of South Africa, soil erosion rates are high, and likely to be exacerbated by the longer droughts and more intense rainfall that are predicted in long-term regional climate change scenarios. Suspended sediment loads (SSL) and yields (SSY) are accepted means of expressing and comparing sediment transport and soil erosion rates. Land care and water security initiatives in South Africa require these data to provide benchmarking, and trajectories of change. International researchers began in the 1970s to investigate SSL estimation approaches. These investigations typically used near-continuous turbidity data from installed probes as a surrogate for sampled SS, and auto-samplers to monitor SS concentration and develop sediment rating curves. Biophysical and socio-economic conditions in South Africa differ markedly from the northern hemisphere environments where foundational studies were conducted. SSL estimations in South Africa are associated with extreme hydrological regimes, remote study areas and lack the resources required to collect and analyse representative SS data. There is a dearth of measured SS data, and of observed SSL and SSY for South African catchments. Using measured SS data from the Tsitsa River catchment (Eastern Cape, South Africa) we found that a discharge-weighted interpolation estimator was more appropriate than regression estimators, and that SSY responses to biophysical factors were in some ways more similar to northern hemisphere norms than expected. Lack of technical, infrastructural, human and financial resources were our main constraints to monitoring and estimating SSY. Our findings highlight the challenges of, and provide some guidance for, estimating directly measured SSL in the southern Africa region and inform future research in resource scarce areas.

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