

Publication

Chapter 8 - Assessing Badland Sediment Sources Using Unmanned Aerial Vehicles

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Badland erosion is a major sediment source for river systems in drylands (Poesen et al., 2002). Identifying their relevance as sediment sources is critical for measures aimed at reducing reservoir siltation. However, the spatial resolution of commonly available data products on topography is usually not sufficient to calculate sediment losses accurately. Unmanned aerial vehicles (UAVs) can help to overcome the gap between traditional, expensive, time-consuming ground-based assessment and insufficient data availability or quality at aerial photography or satellite imagery scale levels. This study investigates the use of UAVs for generating high-resolution digital terrain models (DTMs) of badlands in a remote catchment in the Karoo highveld in South Africa, which is affected by severe soil erosion and reservoir siltation, but where the relevance of badlands as sediment source is unclear. The chapter describes UAV hardware, image capture, DTM and orthomosaic generation and a workflow for badland erosion estimation with the acquired imagery. The results show that erosion volumes in badlands accounted for only 17.2% of the reservoir storage capacity in the study area, which indicates that there are additional sediment sources within the catchment.

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