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A Tale of Two Rivers: Comparing erosion rates from two sides of the South African landscape

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Many classical models of landscape evolution in South Africa have previously relied on large-scale, predominantly qualitative, field observations. In recent decades, however, the development of the accelerator mass spectrometer (AMS) has allowed for greater use of cosmogenic nuclide analyses in landscape evolution studies to quantify rates of denudation and establish timescales of landscape development. In South Africa, various field areas and isotopes have been studied to understand the development of the landscape on Quaternary and longer timescales. The aim of our study is to use a cosmogenic nuclide (^{10}Be) to investigate the development of geographically separate parts of the South African landscape, and so contribute towards the growing database of landscape evolution rates across southern Africa. Samples of granitic bedrock have been collected along the Olifants River (local/original names: Lepelle, Obalule or iBhalule) in the Kruger National Park in the subtropical east and are being compared to samples of similar composition from the Orange River (local/original names: Gariep, Senqu,) near the Augrabies Falls National Park in the arid west. Both rivers have similar multi-channel morphologies (e.g. mixed bedrock-alluvial anabranching). A comparison of erosion rates along these otherwise similar rivers at opposite sides of the country will enable an investigation of the effects of climatic differences on erosion rates. Results will allow us to test previous, largely qualitative hypotheses of landscape evolution using state-of-the-art cosmogenic nuclide data analysed at the African continent's only AMS facility.