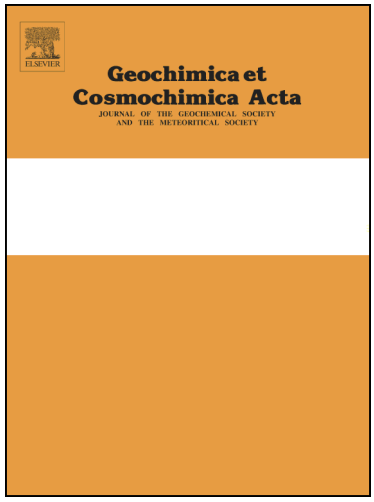


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# Erosion of Archean continents: The Sm-Nd and Lu-Hf isotopic record of Barberton sedimentary rocks

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**Abstract**

Knowing the composition, nature and amount of crust at the surface of the early Earth is crucial to understanding the early geodynamics of our planet. Yet our knowledge of the Hadean-Archean crust is far from complete, limited by the poor preservation of Archean terranes, and the fact that less attention has been paid to the sedimentary record that tracks erosion of these ancient remnants. To address this problem and get a more comprehensive view of what an Archean continent may have looked like, we investigated the trace element and Sm-Nd, Lu-Hf isotopic records of Archean metasedimentary rocks from South Africa. We focused our study on sandstone and mudstone from drill core in the Fig Tree Group (3.23-3.26 Ga) of the Barberton granite-greenstone belt, but also analyzed the 3.4 Ga Buck Reef cherts and still older (3.5–3.6 Ga) meta-igneous rocks from the Ancient Gneiss Complex, Swaziland.

Based on principal component analysis of major and trace element data, the Fig Tree metasedimentary rocks can be classified into three groups: crustal detritus-rich sediments, Si-rich sediments and Ca-, Fe-rich sediments. The detritus-rich sediments have preserved the Sm-Nd and Lu-Hf isotopic signatures of their continental sources, and hence can be used to constrain the composition of crust eroded in the Barberton area in the Paleoarchean period. Based on Sm/Nd ratios, we estimate that this crust was more mafic than today, with an