UNSTABLE ISOTOPES IN A STABLE LANDSCAPE? - UNTANGLING SOUTHERN AFRICA'S GEOLOGICAL HISTORY WITH FISSION TRACKS AND COSMOGENIC NUCLIDES

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In the absence of direct evidence for burial and subsequent exposure of the land surface in the interior of Africa, researchers have argued for surface ages of several hundred million years. The proposition that landforms may have persisted at the surface for these extensive periods of time has a number of important implications. It suggests that the processes of tectonics and geomorphic evolution have been essentially absent for a period of up to 500 Ma. As a consequence, the persistence of these landscapes would require extremely low rates of weathering and erosion. Although this view of continental evolution has been widely held for several decades, recent studies suggest that continental interiors in Africa, Australia, Brazil and north America, have been subject to denudation in the order of several kilometres during the last 60 Ma.

This study applies the complimentary techniques of apatite fission track and cosmogenic nuclide analysis, in an effort to measure both the long-term crustal-scale denudation and the short-term erosion rates, of which denudation is a function. We present preliminary data from the Zimbabwe Craton that illustrates the utility of such techniques in addressing both local and regional geological questions. The study provides a detailed picture of complex tectonic responses as well as large scale denudation over extended periods of time.