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# Tree-Ring-Dating of Millennial Climate Change Across Southern Africa with AMS

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High-resolution palaeoclimate records that might contribute to testing climate models are rare and often they are inadequately resolved in terms of their chronology or the precision of the proxy. Combining disparate evidence has yielded a rainfall record for the last 200 years that is suggestive but has large errors associated with it. This record reconstructs a drying trend that is contrast with the model reconstructions and forecasts for the region of Southern Africa. In addition the high-resolution rainfall record derived from tree rings in Zimbabwe does not reflect the same interannual variability for records from the Limpopo River Valley.
This research project has obtained 1000-year isotopic tree ring records that are duplicated in each of the major climate regimes in southern Africa. This was readily achieved as the existing inventory of trees that are immediately available for analysis offers high level of coverage. Tree ring analysis is a promising technique to accomplish this in terms of rainfall, but it emerges that most of the long-lived tree species in southern Africa form irregular rings that prevent the use of traditional ring analysis. It is possible to calibrate the tree isotope records at the level of precision that is required
Among the tree species that demonstrably proxy palaeoclimates through isotopes, there are key species that are both long-lived and their distribution covers the main target sampling areas. The A.erioloba trees cover the more arid part of the subcontinent and they have been shown to grow to more than 1000 years in age. The southern limit of the baobab distribution represents the East/West transect that is desired, and a recent study on the age of baobabs has demonstrated that they can achieve ages in the order of 2000 years. The Podocarpus trees are from wetter areas including coastal and mountain forests and they have also been demonstrated to grow in excess of 1000 years. The conclusion that may be drawn from this is that it is feasible that a stable light isotope palaeoclimate for the broader southern African landscape may be derived from isotopic analysis of tree rings. The ring structures have been identified and their chronology is under establishment through application of radiocarbon dating at iThemba LABS with the Accelerator Mass Spectrometry (AMS) facility. The ring counting and radiocarbon chronologies will be reconciled to provide the absolute dates for the individual isotope measurements.

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