

Inter-annual variability of Southern African rainfall from an early Pleistocene speleothem; implications for early hominin evolution

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An initial oxygen and carbon isotope study of the Buffalo Cave Flowstone [1] demonstrated precessional control over monsoon rainfall and vegetation (ratio of C₃ to C₄ plants) during the period of speleothem growth, 2.0 Ma to 1.5 Ma. We present a new high-resolution (~25 year interval) stable isotope record from this flowstone between 1.8 Ma and 1.7 Ma using an annual chronology. Automated annual band imaging and counting methods were used to produce a continuous 92,000 year long record of annual rainfall amount. Quazi-regular cyclicities at El Niño Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) frequencies give the first indications of how inter-annual variability in African rainfall changed over repeated precessional cycles. Intensification of the IOD signal at about 1.8 Ma coincides with the evolution and dispersal of early *Homo* at this time.

[1] Hopley *et al* (2007). *Earth Planet Sci. Lett.* **256**:419-432.