Speleothem archives of Cenozoic climate transitions

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Speleothems are now widely recognised as important archives of past climate change with many characteristics that are complementary to deep ocean cores, for example. Importantly speleothems are ideally suited to radiometric dating by U-Th methods allowing detailed time series to be established spanning annual to millenial timescales. Many important examples of speleothem records have been documented but their utility is typically limited to the last 600 ka, the effective upper limit of U-Th geochronology.

The recent expansion of interest in the speoleothem U-Pb geochronometer is beginning to change this landscape [1], offering the potential for construction of speleothem palaeoclimate records encompassing large periods Earth history. There remain, however, substantial difficulties in applying traditional proxy approaches to speleothems from Earth's Deep Time and it is likely that different methodologies will be required in the study of such samples.

Here we explore some of these approaches in the context of a large speleothem archive from SW Australia's Nullarbor karst covering a 10 million year period through the warm and wet Pliocene and documenting to the continent's ultimate descent into aridity.

[1] Woodhead & Pickering (2012) *Chem. Geol.* **322**, 290-299