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Speleothems in northeastern Namibia as archives of hydroclimatic changes

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The hydroclimatic variability of southern Africa during the Quaternary is comparatively poorly know, partly due to the scarcity of suitable terrestrial paleoclimate archives in this semi-arid to arid region. Speleothems offer great potential for filling these knowledge gaps, and carbonate units exhibiting karst features are present in several regions. One such area is the Otavi Mountains of northeastern Namibia, where caves have developed in Neoproterozoic carbonate rocks. However, despite encouraging early work, only two speleothems from one Otavi cave have so far been studied using state-of-the-at techniques.

As part of a research programme investigating the origin of caves in the Otavi Mountains, we were given permission to also sample speleothems, focusing on flowstones, which are locally abundant. Although most of these formations are currently inactive, there are local exceptions that allow to obtain proxy records covering also the Holocene. Most of the flowstones, however, were active during the late Pleistocene, with a marked growth pulse during the deglacial. Remarkably, none of the 70 dated subsamples formed during the Last Interglacial. The picture that emerges from this preliminary dataset suggests favoured speleothem growth (and higher average growth rates) during periods when the Intertropical Convergence Zone was shifted far to the south as a result of cold boreal conditions.

While other parts of Namibia, such as the Namib Desert, may be more sensitive to hydroclimate changes leading to complete growth stops during interglacials, the higher rainfall and cooler temperatures in the Otavi Mountains open the door to obtain longer proxy records characterized by fewer hiatuses.