Speleothem water content as a proxy for past moisture variability in stalagmites from Milandre Cave, Switzerland

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Speleothems are powerful archives able to gain relevant paleoclimate information on temperature, moisture source or rainfall. Specifically, there is a need for new proxy related to past moisture availability, which would allow reconstruction especially in Europe, where such records are lacking. Among speleothem-based records, quantitative estimation of the water content (hereafter WC) remains rare as it is generally a collateral result of more challenging analyses such as isotope determinations of fluid inclusions or noble gases. Using a recently developed method to analyse speleothem fluid inclusion water isotopes (Affolter et al., 2014), we obtained a record of more than 250 WC data covering the Younger Dryas and Holocene intervals with a decadal to multi-decadal resolution measured on two Swiss stalagmites from Milandre Cave, NW Switzerland. The crushing of samples in the measuring line resulted in a mean WC of 1.9 microlitre of water per gram of crushed calcite from both stalagmites. The comparison with other paleohumidity-related indicators from central Europe suggests that the WC is related to past moisture variability. In addition, trace elements strontium (Sr) and magnesium (Mg) measurements as proxies for the water residence time and growth rate respectively are ongoing at the Department of Environmental Sciences at the University of Basel, which will further help with the interpretation of the WC. New reconstruction of past moisture variability together with speleothem fluid inclusion temperature estimates (Affolter et al., 2019) would allow a better understanding of the central European climate variability during the Holocene.
