Modeling $\delta^{18}O$ in drip waters and recent speleothems: Implications for paleoclimate records in N Spain

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U-series dated, stable isotope series in speleothems are commonly studied in order to generate high resolution archives of climatic change. Despite the spectacular advances in identifying and dating major shifts in the climate system (e.g. glacial/interglacial transitions or D-O oscillations), the more subtle changes (as those that have occurred in the last millennia) cannot in many cases be interpreted unequivocally. This is due to the difficulty in separating the role of diverse atmospheric, soil, and karstic factors in the isotopic signal, a problem which is inherent to most mid-latitude caves.

With the aim of improving the interpretation of speleothem isotope records in three caves of N Spain (Cueva Mayor-Atapuerca, Kaite-Ojo Güareña, and Cueva del Cobre) a systematic multi-year study of oxygen isotopes in precipitation waters, cave waters of individual drip systems, and present-day speleothem precipitates is being carried out, with emphasis in the seasonal and interannual variations and their correlation with meteorological parameters. The study, completed with the calibration of recent speleothem records with the available meteorological series, suggests the interannual winter surface temperatures as the main factor in controlling changes of $\delta^{18}O$ in our recent speleothems. Other factors, such as precipitation amount and summer temperature seem to have a secondary role, although could notably contribute to changes in other proxies, as speleothem growth rate, elementary geochemistry, and $\delta^{13}C$.

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