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Developing coherent speleothem isotope proxy records for temperature and Northern Hemisphere ice sheet variability in NW Iberia Speleothem Archive (NISA) during MIS 6

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Carbon and oxygen isotopes remain the most widely measured proxies in stalagmites and within a given region, reproducibility among coeval stalagmites is often an important criteria confirming regional climatic significance of the signals. Correction for in-cave processes is emerging as a tool contributing to improved reproducibility and identification of primary climatic signals. We present a compilation of 2377 isotope analyses from a series of 6 stalagmites from caves in coastal NW Spain spanning 216 to 110 ka, providing replication in at least 2 stalagmites in over 85% of the studied interval. In this region the speleothem $d^{18}O$ signal is dominated by the $d^{18}O$ of the adjacent surface North Atlantic Ocean and hence reflecting northern Hemisphere ice volume, and the carbon isotope signal is dominated by temperature dependence of soil and epikarst respiration rates. We will illustrate how correction for in-cave degassing and PCP improves the coherency in time series among stalagmite isotope records, while describing the uncertainties and remaining challenges in achieving reproducibility. Over our long record, we identify significant precessional variations in speleothem $d^{18}O$. These are similar to structures observed in lower resolution surface North Atlantic $d^{18}O$ seawater and suggest a dynamic Northern Hemisphere cryosphere. Yet the mid-MIS 6 precessional structures are absent from the global benthic $d^{18}O$ stack. We review potential mechanisms for the discrepancy between benthic $d^{18}O$ and North Atlantic region speleothem records and the implications for the insolation response of the polar cryosphere.