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Editores:

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RELATIONSHIP BETWEEN ENVIRONMENTAL DYNAMICS AND ISOTOPO E COMPOSITION OF FARMED CALCITE EXPERIMENT ON WELL-VENTILATED CAVES IN CENTRAL BRAZIL

Vanessa Bohrer[1], Evandro Luiz Garcia Assumpção[2], Plácido Fabrício Silva Melo Buarque[3], Matheus Simões Santos[4], Hamilton dos Reis Sales[5], Francisco William da Cruz[6], Nicolás M. Stríkis[7]

[1]Universidade de São Paulo, Brazil, ne.bohrer@usp.br
[2]Dept de Geoquímica, Universidade Federal Fluminense, evluga@gmail.com
[3] Dept de Geoquímica, Universidade Federal Fluminense, placido_buarque@alumni.usp.br
[4] Instituto Federal do Norte de Minas Gerais (IFNMG), matheusanalytica@gmail.com
[5]Instituto Federal do Norte de Minas Gerais (IFNMG), hamiltonbioflora@gmail.com
[6]Universidade de São Paulo, Brazil, cbill@usp.br
[7]Universidade de São Paulo, Brazil; Dept de Geoquímica, Universidade Federal Fluminense, strikis@gmail.com

In Central Brazil the increase in potential evapotranspiration resulting from high temperatures, combined with the strongly seasonal hydrological regime, heightens the risk of drought and draws attention to the vulnerability of associated ecosystems. Therefore, expanding climate observational data is essential to understanding how climate variations related to the rise in global average temperature, driven by greenhouse gas emissions, may affect regional climate and water availability. Novel research findings from well-ventilated caves in Central Brazil, developed by the Paleoclimate Research Group at IGc-USP, indicate that variations in relative humidity and, consequently, in potential evaporation affects the isotope composition of speleothems calcite. This study continued the geochemical monitoring of well-ventilated caves in Central Brazil to assess the influence of environmental parameters—such as temperature, relative humidity, and dipping rates—on the C and O isotopic signatures recorded in speleothems from open-system caves. The selected site was the Lapa da Onça cave, located in the northern region of Minas Gerais. The results indicate that the deposition rate of $CaCO_3$ is not solely dependent on aquifer water availability but also on environmental conditions of the cave atmosphere, showing a strong correlation between calcite $\delta^{18}O$ with temperature at seasonal time-scale (intra-annual). Additionally, temperature and relative humidity directly influence the isotopic behavior of δ13C and $\delta^{18}O$ in speleothems. However, variations in cave atmosphere relative humidity are the primary driver of isotope variability at interannual timescales. The influence of humidity on the isotopic fluctuations observed during the monitoring of the Lapa da Onça cave is intensified by the high ventilation of the deposition environment, which exhibits seasonal variations of approximately 50%. The results of this research are essential for interpreting the isotopic variability of the speleothem records from Lapa Onça Cave and supports the application of carbon and oxygen isotopes from well-ventilated cave environment as proxyes of evaporative potential.