



Hydrogeochemical record of a recent severe drought at Kaite cave, Ojo Guareña Complex (N Spain): implications for paleoclimate series based on stalagmites

M.J. Turrero (1), A. Garralón (1), J. Martín-Chivelet (2), P. Gómez (1), L. Sánchez (1) and A.I. Ortega (3)

(1) Department of Environment, CIEMAT, Madrid, Spain, (2) Departamento de Estratigrafía, Instituto de Geología Económica (CSIC-UCM), Fac. Ciencias Geológicas, Universidad Complutense, Madrid, Spain, (3) Departamento de Geografía e Historia, Universidad de Burgos, Spain (mj.turrero@ciemat.es)

A range of parameters is analyzed from drip-waters and present-growing calcites at Kaite cave (Ojo Guareña Karst Complex, Burgos, N Spain) from mid-2002. The objective is characterizing of the linkage between the geochemical processes occurring in the drip-water/calcite system and the changes external to the cave. The selected site is Las Velas Hall, characterized by a stable cave climate and absence of significant air currents. Two seepage points (with “low” and “fast” drip-water rate) were chosen for the study, both with calcite growing at present time.

The “fast” drip-water point has a moderate-high and variable drip rate (8-45 drop/min). This point is largely influenced by rainfall patterns, reflecting the relatively high permeability of the host rock. However, dripping remains active during all the year, and therefore a certain storage component of the overburden has to be considered, the resulting water being a mixture of stored water/rain water. The “low” drip-water point is not so sensitive to seasonal changes and maintain a “low” and quite constant drip rate along the year (< 1 drop/min), independently of rainfall patterns. It could be explained by long water residence times in the aquifer, and negligible mixing effects. However, some chemical and isotopic signals also evidence some variability reflecting seasonal changes.

Intra- and inter- annual variations in the chemical and isotopic components of dripwaters and calcite precipitates are comparatively studied and contrasted with meteorological data and with the chemical and isotopic composition of rainfall. Growth rates are also compared between the two dripping points and their patterns of change through time analyzed. Cave waters and growing speleothems show changes that perfectly characterize the period of severe dryness that occurred in the 2003-2006 interval.

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