EGU21-15319
https://doi.org/10.5194/egusphere-egu21-15319
EGU General Assembly 2021

Elemental concentrations in two stalagmites from B7-Cave indicating environmental changes during the Holocene

Dana Felicitas Christine Riechelmann[1], Klaus Peter Jochum[2], and Denis Scholz[1]
[1]Johannes Gutenberg University Mainz, Institute for Geosciences, Mainz, Germany (d.riechelmann@geo.uni-mainz.de, scholzd@uni-mainz.de)
[2]Max Planck Institute for Chemistry, Climate Geochemistry Department, Mainz, Germany (k.jochum@mpic.de)

Two stalagmites (B7-1 and B7-7) were sampled from B7-Cave in western Germany. B7-Cave is located very closely (100 m) to the extensively investigated Bunker Cave. Both B7-Cave stalagmites were previously dated and analysed for stable carbon and oxygen isotope composition at low resolution by Niggemann et al. (2003). Both stalagmites were now redated more precisely using the MC-ICP-MS methodology at the Max Planck Institute for Chemistry, Mainz, and Mainz University. Furthermore, the elemental concentrations of Mg, Sr, Ba, Al, P, Y, Zn, Th, and U were determined by laser ablation ICP-MS (MPIC Mainz) at high resolution. Additionally, thin sections of both stalagmites were anaylsed for their calcite fabrics and detection of detrital layers.

The dating showed a growth phase from 10.9 to 6.6 ka BP for stalagmite B7-1 and three growth phases for stalagmite B7-7 from 11.2 to 6.3 ka BP, 3.2 to 2.9 ka BP, and 1.3 to 1.2 ka BP. This is improved to the dating from Niggemmann et al. (2003), who only detected one hiatus in stalagmite B7-7. Stalagmites B7-1 and B7-7 have a substantial overlapping period. During this period, both stalagmites contain frequent detrital layers, which probably represent short growth stops. However, these growth stops are too short and contain too much detrital material to resolve their timing and duration by ^{230}Th/U dating.

Phosphorus, Y, and Zn are correlated in both stalagmites and during all growth phases. These three elements are interpreted as proxies for vegetation activity. Magnesium, Sr, and Ba are difficult to interpret due to several factors potentially influencing them, such as prior calcite precipitation, growth rate, and soil processes. Furthermore, the detrital layers in stalagmite B7-1 and the oldest growth phase of B7-7 are indicated by high Al concentrations.

Niggemann, S., Mangini, A., Richter, D. K., Wurth, G., 2003. A paleoclimate record of the last 17,600 years in stalagmites from the B7 cave, Sauerland, Germany. Quaternary Science Reviews 22, 555-567.