



Visible, elemental and UV-luminescence lamination in a recent speleothem from Zoolithencave, southern Germany

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A 3 cm long stalagmite from the entrance chamber of the Zoolithencave (Burggailenreuth, Bavaria, Germany) was analysed for different types of lamination. The cave is located in the Franconian Jurassic dolomite. Due to its low U content and young age, the sample could not precisely dated with the $^{230}\text{Th}/\text{U}$ -method. Thus, its age was constrained by ^{14}C -dating of a charcoal piece deposited below the stalagmite and detection of the radiocarbon bomb peak at the top of the stalagmite. The visible lamination was analysed on thin sections, and the lamina thickness was measured on a scan of the thin sections with the software *analySIS pro* (Olympus). The elemental concentration was measured by LA-ICPMS (Element 2, ThermoFinnigan, combined with a 213 nm Nd:YAG Laser, Newave) at the Max Planck Institute for Chemistry, Mainz. Finally, an UV Spectral-Luminescence Scanning (UV-SLS) image of the stalagmite was obtained with an Avaatech core scanner at the NIOZ, Netherlands.

The dating results show that this stalagmite grew in recent times, and the age model was further improved by lamina counting. LA-ICPMS analysis and determination of lamina thickness was performed on the same tracks to construct an exact age model for the corresponding LA-ICPMS tracks. The green/blue (G/B) ratios of the UV-SLS were also taken along the same tracks allowing for direct comparison. The concentrations of the elements Mg, Sr and Ba correlate with each other and reflect annual lamination. The visible investigation shows bright and dark layers, with the brighter layers showing higher Mg, Sr and Ba concentrations than the darker ones. The concentration of P can be used as an indicator for soil activity and increases in the dark layers. Therefore, P concentration was compared with the G/B ratio of the UV-SLS, which is an indicator for humic acids from the soil. These preliminary results show that all three types of annual lamination (visible, elemental and UV-SLS) occur in this stalagmite.