



## **MOD-AGE – an algorithm for age-depth model construction; U-series dated speleothems case study**

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We present MOD-AGE - a new system for chronology construction. MOD-AGE can be used for profiles that have been dated by different methods. As input data, the system uses the following basic measurements: activities, atomic ratios or age, as well as depth measurement. Based on probability distributions describing the measurement results, MOD-AGE estimates the age~depth relation and its confidence bands. To avoid the use of difficult-to-meet assumptions, MOD-AGE uses nonparametric methods. We applied a Monte Carlo simulation to model age and depth values based on the real distribution of counted data (activities, atomic ratios, depths etc.). Several fitting methods could be applied for estimating the relationships; based on several tests, we decide to use LOESS method (locally weighted scatterplot smoothing).

The stratigraphic correction procedure applied in the MOD-AGE program uses a probability calculus, which assumes that the ages of all the samples are correctly estimated. Information about the probability distribution of the samples' ages is used to estimate the most probable sequence that is concordant according to the superposition rule.

MOD-AGE is presented as a tool for the chronology construction of speleothems that have been analyzed by the U-series method, and it is compared to the StalAge algorithm presented by D. Scholtz and D.L Hoffmann (2011).

Scholtz, D., Hoffmann, D. L., 2011. StalAge - An algorithm designed for construction of speleothem age models. *Quaternary Geochronology* 6, 369-382.