



Reconstruction of uncertain age-depth relationships

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Dating geoscientific records inevitably includes uncertainties, originating from systematic errors, such as dating errors, positioning errors during sampling, and from random errors (e.g., disturbances in the sediment). However, age models are frequently derived simply by linear interpolation, considering, if any, only the systematic dating error. Even though discrete dating points are presented with their errors, these uncertainties are often not discussed while interpreting the proxy record. Recapitulation of subjectively calculated age models is often hampered by insufficient reporting of the details of the interpolation procedure.

We present a new approach of estimating ensembles of age models by simple Monte Carlo simulation and non-linear interpolation, its potential in removing age reversals and in translating dating uncertainties into time series with uncertainties. We demonstrate the effects of dating uncertainties and the usability of our method in an application of palaeo-climate variation derived from stalagmites from the Asian monsoon region.