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sedproxy: an R package for forward modelling sediment archived climate proxies

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The R package *sedproxy* provides a user-friendly tool to forward model sediment archived proxies from climate model output. Climate proxies recovered from sediment cores are widely used to reconstruct past climate evolution on time-scales from centuries to millions of years. However, these proxies are an imperfect record of past climate because many processes modify the signal on the way from climate - to proxy - to proxy-based climate reconstruction. sedproxy numerically simulates the creation, archiving and observation of sediment-archived climate proxies, such as Mg/Ca in foraminiferal shells and the alkenone unsaturation index Uk'37. It includes the effects of bioturbation, bias due to seasonality in the rate of proxy creation, aliasing of the seasonal temperature cycle into lower frequencies, and error due to cleaning, processing and measurement of samples.

Pseudo-proxies generated by sedproxy can help us to better understand the uncertainties associated with true climate proxies, provide a basis for doing data-model comparison when validating climate models, and give a realistic impression of the kind of climate features we should expect to recover from proxies. sedproxy also provides a Shiny interface that allows the user to quickly experiment on sediment cores with different physical characteristics and to try alternative sampling strategies.

Code for sedproxy is archived here, bitbucket.org/ecus/sedproxy/, where there is more information about the package and a link to a hosted version of the Shiny app.