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MuReMo: Reconstructing from proxy records of multiple resolutions assuming monotonic transfer functions

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Most currently used multiproxy reconstruction methods require the proxy records to have the same temporal resolution. When records have multiple resolutions, this is achieved by either only including records of common resolution, or unifying the resolutions, e.g. by linear interpolation, and, by doing that, changing the interpretation of the data. Furthermore, the methods assume the transfer functions between proxy records and climate parameters are linear. This is often unasserted and sometimes even known to be violated.

A novel method, MuReMo, is presented that utilizes all proxy records in their original temporal resolutions. The transfer functions are assumed to be monotonic, which is arguably the most general assumption one can make about static transfer functions. The Bayesian method is based on the ideas of BARCAST, the Bayesian hierarchical model for climate reconstructions, and binary response regression with pairwise comparisons to produce samples of spatiotemporal fields.