

Limits of historical reconstructions using indirect evidence

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Abstract

We test how much variability at centennial timescales is lost when past climates are reconstructed from proxy data. We use data from an atmosphere-ocean climate model simulation of the last 1000 years, forced with estimates of natural and anthropogenic forcings, and the method of Mann et al. (1998) (1) to estimate Northern Hemisphere temperature from grid-point temperatures (with white noise added) in realistic locations. We find that the low frequency variability is greatly underestimated when the predictors contain 50% or more noise. The inclusion of more predictors from Africa and Asia results in only minor improvement.