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Influence of the length of calibration period and the presence of calibration trends in statistical reconstructions of North Hemisphere temperature in the past centuries.

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When reconstructing temperatures of the past centuries from proxy indicators, several options to calibrate the statistical model linking instrumental and proxy records are possible. In this contribution we focus on the influence of the length of the calibration period and on the use of detrended or non-detrended calibration. Both choices may bee driven by contradictory considerations: on the one hand, climate reconstructions should realistically represent the true low-frequency (LFV) variability of temperature. Therefore, a non-detrended calibration and a long calibration period would be the best choice. On the other hand, calibration trends in the proxy and observational records may not be physically related, and the calibration period is limited by the availability of the observations.

The influence of these two factors on reconstructions of northern Hemisphere temperature (NHT) in the past centuries is estimated using the pseudo-proxy approach in climate simulations of the past millennium driven by estimations of past external forcing. Several reconstruction methods are tested: a simple Composite plus Scaling, an EOF direct- regression method, and the climate field reconstruction method of Mann et al. (1998). It is found that in all of them underestimate the true low-frequency variability of NHT. The underestimation with longer calibration period and non-detrended calibration is, however, smaller.

Finally, the role of the spectral characteristics of the noise added to the pseudo-proxy indicators is also investigated. The presence of red noise contributes to a larger under-

estimation of the LFV than in the case of white noise pseudo-proxies.