Supplementary Material:

Correcting for signal attenuation from noise: Sharpening the focus on past climate

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Annual reconstruction and increased variance

All reconstructions shown in the main manuscript were performed at full annual resolution of the data, but Figure 2 was smoothed with a 10-year Gaussian filter for illustration of the excellent performance of the reconstruction with regard to bias. As indicated in the text, the trade-off is that the variance at interannual time scales is increased. Fig. S1 shows the raw annual reconstruction result for CPS (blue, panel A) and for the multiple regression (red, panel B) in comparison to the known truth from the NCAR CSM 1.4 simulation (Ammann et al., 2007). The increase in variance is clearly visible, albeit a generally excellent performance even at annual scales. In particular the amplitude of cold years caused by volcanism (see for example years 1258, 1453 and 1815/16) are well captured by the reconstruction, a skill not commonly achieved by many reconstructions (Rutherford et al., 2005; Ammann and Wahl, 2007).
References


**Figure S1:** CPS (blue) and multiple (red) regression reconstructions of NH mean temperature using ACOLS based on a network of twelve grid-points – comparable to Hegerl et al. (2006) – here subsampled from output of a coupled GCM (Ammann et al., 2007) where the true climate is known.