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Climate of the Past Discussions

Interactive comment on "Technical Note: Correcting for signal attenuation from noise: sharpening the focus on past climate" *by* C. M. Ammann et al.

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The paper explores a method to correct for variance loss (or amplitude attenuation) in regression based climate reconstructions. This is certainly a field of much interest and any progress is welcome.

Strangely the authors fail to cite our recent paper (Christiansen et al. 2009) which showed that variance loss is a serious problem for 7 different reconstruction methods including both direct and indirect regression methods as well as methods based on CCA regression and TLS. All the methods showed substantial underestimation of trends. low-frequency variability, and the pre-industrial level. Our study - based on a

pseudo-proxy method - is the most thorough comparison of reconstruction methods to date. In fact, the choice of references in the present paper is very selective - I missed also Zorita et al. (2003), Zorita et al. (2007) B\"{u}rger and Cubasch (2005) and B\"{u}rger et al. (2006). These are all papers that have been important for the recognition of the variance loss and other problems of reconstructions.

The method considered in the present paper seems to be closely related to the (simpler) inflation (or rescaling in B\"{u}rger and Cubasch 2005 and B\"{u}rger et al. 2006) which scales the reconstructions - either the final NH temperature or e.g. the individual reconstructed local temperatures or PCs - to their observed variances. The connection between the method of the present paper and inflation should be discussed.

Inflation was shown in Christiansen et al. (2009) to have only minor impacts on the results. In fact, the result in Christiansen et al. (2009) that all methods - both direct and indirect methods - underestimate the variance suggest that the problem also have other roots e.g. non-stationarity. If the type of noise-induced attenuation dealt with in the present paper was the only or dominant source one would expect overestimation of the variance in the indirect methods (where proxies are written as linear combinations of the temperature) similar to what is shown with the blue curves in Fig. 1b.

I don't find the explanation of how the residual variance is found very clear. Is ${{\tilde\Sigma}_{U,U}$ (p1648,line 2) diagonal? It seems that the j'th diagonal element is equal to the variance of \eps_{j*} (line 22). But how does this work in the multivariate case where the X's may be correlated?

References:

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