Refining error estimates for a millenial temperature reconstruction

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The statistical uncertainties in a 1000 year northern hemisphere mean temperature re-
construction obtained from 13 proxy chronologies are examined in detail by analysing
the spread of estimates obtained from all possible subsets of the with 7 or more prox-
ies. The study is motivated in part by the large spread of recently published reconstruc-
tions in the 15th and 16th centuries. Here, we do not find significantly larger uncer-
tainty in this period. Jackknife uncertainty estimates have been evaluated. These can,
however, be underestimates if the input data are correlated. An estimate of the proxy
error correlation is used to adjust for this effect. Finally, there is structural uncertainty
associated with the calibration algorithm. This produces an uncertainty which is pro-
portional to the signal and consequentally makes little difference to the error estimate
in the 11th century, when the signal (i.e. anomaly from the calibration period mean)
is weak, but increases the uncertainty estimate for the 15th and 16th centuries. The
resulting 95% confidence for the maximum annual temperature in the 11th century is
0.5K above the 1856 to 1980 mean.