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Millennial temperature reconstruction intercomparison and evaluation

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There has been considerable recent interest in paleoclimate reconstructions of the temperature history of the last millennium. A wide variety of techniques have been used. The interrelation among the techniques is sometimes unclear, as different studies often use distinct data sources as well as distinct methodologies. Recent work is reviewed with an aim to clarifying the import of the different approaches. A range of proxy data collections used by different authors are passed through two reconstruction algorithms: firstly, inverse regression and, secondly, compositing followed by variance matching. It is found that the first method tends to give large weighting to a small number of proxies and that the second approach is more robust to varying proxy input. A reconstruction using 13 proxy records extending back to AD1000 shows a maximum pre-industrial temperature of 0.25K (relative to the 1866 to 1970 mean). The standard error on this estimate, based on the residual in the calibration period is 0.142K. Two recent years (1998 and 2005) have exceeded the pre-industrial estimated maximum by more than 4 standard errors.