

Interactive comment on “Millennium-long summer temperature variations in the European Alps as reconstructed from tree rings” by C. Corona et al.

Anonymous Referee #1

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It is certainly crucial to provide more evidence of past summer temperature variability in Europe over the last millennium. In this regard this paper is a valuable contribution to past climate reconstruction and I appreciated reading it. The authors attempt to cover a vast variety of topics, in order to better understand their focus I raise the following questions for discussion, a more formal review will follow.

What is the added value of this paper from the authors' point of view?

Büntgen et al. have already published a European Alpine reconstruction covering past millennial summer temperature variability. Guiot et al. 2005 published a millennial long Western-European summer temperature reconstruction. You state your findings to be significantly similar with other alpine reconstructions. But what is new? This question

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is of particular importance looking at the data used in the study. A closer look reveals that most of the 36 (or 38?) series are shorter than 1000 years. Before 1400 AD there are actually only 10 series available, before 1200 AD only 5 series. Is that correct? Thus looking at Figure 2: Can you provide the percentage of missing values of each series considering your reconstruction period (1000 to 2000) as 100%. Where are the critical limits to fill in missing values (the thresholds) in your analogue technique? What is the maximal accepted amount of missing values in your technique?

Interestingly, with artificial neural networks a different method than used predominantly for climate reconstruction at the European and NH scale has been used. The authors compare their approach to the nested (due to decreasing number of proxies back in time), regression-based techniques of e.g. Mann et al. and Luterbacher et al. used in the past. However, the methodological discussions have developed considerably. Schneider et al. 2001, Rutherford 2005 and Mann et al. 2007 introduced with RegEM a technique, which also imputes/ infills missing values, thus allowing for missing values in the input data. Your methodological argument seems therefore rather obsolete. How do you further motivate the choice of your method? How do you bed in your approach into the methodological discussion on summer temperature reconstruction?

My final question addresses the part of the interpretation. The authors state a proper match with multi-decadal to centennial variations and solar forcings as well as the relation to volcanic eruptions. How have these findings been investigated methodologically?

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