

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, I appreciated reading it and suggest publication after major revisions.

General comments: 1. 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. Please, clarify and highlight more what is new in your study.

2. You mention 36 series in the abstract, however Table 1, Table 3, Table 5, as well as

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Fig. 1 and Fig. 2 display 38 series. Please, clarify.

3. Interestingly, with artificial neural networks a different method than used predominantly for climate reconstruction at the European and NH scale has been used. Please expand on what motivates the choice of your method and bed in your approach into the latest methodological discussion on summer temperature reconstruction.

Specific comments: p.1160, line 4 Is it 36 or 38? Clarify.

p.1160, line 17: with summers that are?

p.1161, line 25: method instead of methods

p.1161, line 26: Please, specify what you consider as novel about the approach.

p.1162, lines 20, 21: As the paper is about reconstructing the past millennium, please state more precisely how the series compare to the full reconstruction length back to the year 1000 AD and especially between 1000 and 1500 AD.

p.1163, line 17: applied to. p.1163, line 17: Replace various and state the exact number of the test you have carried out.

p.1164, line 22: Use a formal editor to display t as indices.

p.1165, lines 9 to 13: You compare your 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. 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. Please, adapt your argumentation and expand your motivation.

p.1165, line 26: 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?

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p.1165, lines 28: Why 20%? Please, explain.

p.1166, line 4: Please, state what truncation criterion you apply with regard to the choice of principal components.

p.1166, line 7: mentioned instead of mentionned?

p.1166, line15: 50 iterations are rather few. Please, state why you consider 50 iterations to be enough.

p.1167, lines 20, 21 It seems that there are actually only 10 series available before 1400 AD, and before 1200 AD only 5 series. Thus, be more precise about your statement here. Please, provide the percentage of missing values of each series considering your reconstruction period (1000 to 2000) as 100%.

p.1168, lines 1 to 4: Please explain what exactly you consider as interesting, and what might be the physical cause of this statistical relationship.

p.1169, lines 18 to 20: I do not understand your argument for your proof here. Please, clarify and explain.

p.1170, title: Discussion instead of Results?

p.1172 to 1174, 5.2 Alpine climate history: Please, improve the structure of the whole paragraph. I found it difficult to orientate. Maybe state how the paragraph is build up and how you proceed in the text.

p.1173, lines 14 to 16: Please, state more clearly how you investigated this findings methodologically.

p.1174, regional-scale comparisons: Would not it make much more sense to compare your result to Casty et al. 2005?

p.1174 line 24 to p.1176 line 13: I suggest to delete as rigorous as possible all information that is not absolutely needed in this part. The background information is rather

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a lot, and the explanations rather long. The section would improve being shorter.

p.1177, lines 1,2: There are considerable differences in scales between Luterbacher et al. 2004 and your reconstruction. To my knowledge the target in Luterbacher et al. is a highly resolved spatial grid composed of a couple of thousands of grid points. Thus, the spatial differences of the targets should be more highlighted here.

p.1178, hemispheric-scale comparisons This section is rather too short and seems a bit odd proportionally compared to the sections Alpine climate history and regional-scale comparisons. Please, balance the three sections more.

p.1179, line 10: Replace properly by a more precise statement about how you measured (and assessed quantitatively) this match.

Interactive comment on Clim. Past Discuss., 4, 1159, 2008.

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