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Climate of the Past Discussions

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

Anonymous Referee #2

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The topic of this paper is relevant and within the scope of Climate of the Past. Basically a new reconstruction of temperature variations in the Alps back to the 11th century, based on larch and pine ring width and density series, is presented. Nor the approach neither the aim of the paper can be said new as similar reconstructions have already been published. However, 1) only two of the published ones are a millennium-long (Buntgen et al., 2005, 2006) and 2) these long series are restricted to Switzerland and Austria. Corona et al's reconstruction is built from series widely distributed in the Alpine arcs. In particular, series from Western Alps are incorporated in the dataset. In that sense, the results presented here are original and deserve being published. As this paper has the potential to be a valuable contribution to the literature, I recommend publication after revisions.

Specific comments:

My knowledge of the analogue technique is limited but I wonder if it is possible to get the same confidence in the reconstruction in the time period before the XIVth century which is reconstructed from a limited number of series than in the following centuries?

Calibration: Why do you choose the JJA temperature anomalies as a target? Have all the possible combinations of regressors been tested? Justify. What is the proportion of calibration versus verification? (p 1168)

There should be a discussion about the fact that some of the 10-years drops in the smoothed reconstruction of temperature in the Alps are in phase with solar irradiance lows, but some are not. Therefore, there must be another natural forcing parameter contributing to the decadal variability of the temperature. This may be over the goal of this paper to clarify this point but it should be at least mentioned.

Line 2 p1168: 'Correlation before 1200...': I guess it is still about intra-species correlation? Please, guide the reader.

Line 19 p1168: high values at 1150-1170: Isn't the agreement between Larix and Pinus ARGC expected as this part of the Pinus chronology is built from Larix data?

Line 20: 'High values... at 1660-1675'. I do not agree with this description. For me after 1600 the two chronologies are out of phase, with Pinus lagging behind Larix by 20 years. They are back in phase by the end of the XIXth century.

Line 12 p 1169: Consider also the decoupling between 1819 and 1825.

Line 19 p 1169: 'which proves that the reconstruction is better in the high frequency domain than in the low frequency one'. why? It would need some explanations.

Line 27 p 1171: 'The proximity of these chronologies ...may explain these high correlations'. Following this logical statement, the chronologies located in Central Alps (20 a,b,c,d, 21 a,b,c) should have higher correlation coefficients...

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Line 22 p1172:'Summers 1639, 1627 and 1632 were the three coldest...'. They were shown to be also cold in Ile-de-France (Etien et al., 2008; CP).

Line 9 p 1173: The comparison of the mean levels of the centuries is not meaningful. This time slicing is artificial. I think it would be more interesting to identify periods of high or low temperature independently of the calendar, for instance the cold period spanning the second half of the XIIth century and the first half of the XIIth.

Line 11 p 1173: 'The last two decades of the XIIth century are clearly the warmest of the millenium'. The 1980-2000 period is clearly warmer!

Line 21: 'The MWP is characterised by significant interdecadal variations&'. Do you mean here? Or in general? If this is a general statement a reference is needed.

Line 23 p 1173: Note that the cooling begins in the mid-XVIIIth century in phase with the decrease of the solar irradiance.

Line 4 p 1174: You cannot say that the volcanic eruptions are in phase with the Dalton minimum as it implies a causal relation between the two.

Line 6-7 p 1174:'Recent anthropogenic impact further diminishes the proportion...'. What do you mean by 'further' here?

Line 8-10 p 1174: I guess that you compare some temperature records to each other. But specify what is instrumental / reconstructed, etc.

Line 27-28 p 1174: 'GI are bound on a high density of data'. What do you mean? Line 12 p1175: What is the resolution in the c of figure 6. The original data have a resolution of 3 years but a filtering is applied. Is the final reconstruction filtered with a 20-year filter as said, or 20-consecutive data?

Line 12 p1175: You could also compare your data to the reconstruction of April-August Temperature anomalies in Switzerland between 1480 and 2000 proposed by Meier et al. (2007, GRS).

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Line 19-30 p 1176: What are the correlation coefficients and p-values between your data and Mangini et al.'s? As a general comment, you should report errors bars on the lines of the figures when possible and accompany the correlation coefficient of their p-values in the text. Here, you can calculate a minimum error (to report as an error bar on the figure) using the original data. The discrepancy between your data and Mangini et al.'s may not only be due to the fact that they calculate yearly average temperatures while you report JJA temperature but it may also be related to their dubious calibration.

Line 25 p 1177 to 6 p 1178: This part is not written in a very logical way. Causes, consequences and comparison to present day are mixed. Consider rewriting.

Line 8 p 1178: 'comparison with large...considers...'. What do you mean?

Line 22: A reconstruction is hardly 'hot'.

Style, Tables and Figures:

You should check the spelling and grammar.

Sections 3.1, 3.2 and 3.3 have the same title!

A temperature is neither hot nor cold but high or low: modify in the text.

Figure 3 is cited in text on line 1 p1168 while figure 2 is cited only in line 9. In the caption of figure 3 : 'the alpine larch...original ((a), (d), grey) and infilled ((a), (e), black)...': b instead of the second a. Figure 4: '...and the high (low) temperatures (grey)'. You'd rather say :'JJA mean temperatures at high and low elevations'. You should mark years 1823 and 1976 on the figure.

Figure 6: c) 'Luterbacher et al. (2004)' You could add 'modified in Luterbacher et al. (2006)'

Line 18 p 1169: There is an inconsistency between the text and the figure. R2 is 0.81 between 1819 and 2000 on the figure while it is 0.45 in the text.

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Interactive Comment

I guess that the GI reported in figure 6 is the average value of June to August GI? It should be said explicitly.

P1162: Table 1: AGR in 1/100 mm. Shouldn't it be in mm/year?

The site numbers are not the same in Table 1 and 5. Ex: SWISS 2 (MXD) is 21 in Tab. 1 and 22 in Tab. 5. Check if there are other mistakes like this one.

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