

Interactive comment on “Long term January–March and May–August temperature reconstructions from tree-ring records from Bosnia and Herzegovina” by S. Poljanšek et al.

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Review of Poljanšek et al. Long term January–March and May–August temperature reconstructions from tree-ring records from Bosnia and Herzegovina. For *Climate of the Past*.

This is an interesting and very well written paper that presents new climate reconstructions from an area that is under-researched. Reliable long temperature reconstructions from this area would be a very valuable contribution. However, I have some concerns about the data analysis used in these reconstructions that the authors may wish to consider.

C1786

1. Why have you chosen to use the residual chronology? As you state on p.4407 this contains only high-frequency variations. In effect it is too flat. This is clear on figs 8 and 9 where you can see that the reconstructions fail to follow the recent rise in temperature. This may explain why you have temporal instability in the correlation with climate parameters. When the climate is flat the correlation will be ok but when climate has a trend you will have a low r -value just because the trends in the two data sets are different. The flat residual chronology will also severely limit your chances of finding the extreme years, because the real climate data is not flat at all. Perhaps you should have a look at the standard chronology and see if that contains more information? Do not forget that correlation with temperature is not the only factor to consider when choosing a chronology.

2. You have chosen to split your chronologies into two groups that carry different climate signals. I can see the logic of your argument but I am not convinced that it is the right decision. One or two outliers can change the correlation with a monthly temperature quite a lot, so it is important not to rely only on the r -values when making a big decision like this. Two things give cause for concern. First, on Figure 3 it is clear that for your Spring group the correlation with spring temperature is only marginally higher than that with summer temperature and there is a large overlap in the uncertainty. A simple z -test will confirm that there is no significant difference between those two correlation coefficients. The spring signal is not significantly better than the summer signal. Second, if you look at Figure 2 you can see that over the calibration period the Spring and Summer chronologies are actually near to identical. If you compare the correlation between these two chronologies with the correlation between the real Spring and Summer temperatures you will surely find that they are not carrying different signals at all. I suggest that you combine all of your data into a single chronology and use that. You will have a better EPS, maybe extending your usable record, and a stronger climate signal. If you use the standard chronologies you may capture a lot more of the real variation.

C1787

3. You cannot use one chronology to reconstruct both temperature and precipitation, so you need to decide which has the strongest signal. You use simple linear correlation and verification statistics, but because temperature and precipitation are strongly coupled in this region it would be better to use a multiple regression model to determine which is really dominant. A simple stepwise model would do this (easy in R, which I see you are familiar with).

4. To identify the hot/cold extreme years you use the thresholds method and correctly identify the effect of variance suppression on your signal. That is not wrong, but a much easier and visually more appealing method is to simply scale the variance of your reconstruction to fit the variance of the climate data over the calibration period. The thresholds in the climate data and reconstruction are then the same and it is much easier to see how successful your reconstruction has been.

5. You should check the calculations for the verification statistics. In three cases you have $CE > RE$ which is not possible (or I am reading the table the wrong way; in which case make it clearer).

Sorry to suggest so many changes. A long reliable temperature record from this area would be very valuable though, so it is well worth the effort (of course the Editor may just tell you to ignore me, since it is already a good paper!)

Good luck Danny McCarroll

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