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Climate of the Past Discussions

Interactive comment on "Climate signals in a multispecies tree-ring network from central and southern Italy and reconstruction of the late summer temperatures since the early 1700s" *by* Giovanni Leonelli et al.

Anonymous Referee #2

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I apologize for "over-reading" the 100-y length condition and comments regarding this topic. Sorry to hear that people are still so uncooperative regarding sharing data that have been published >5-10 years ago. This sure is a problem for advancing the science and has been recognized (or better finally publicly "criticized") recently in Babst et al. 2017 (Improved tree-ring archives will support earth-system science. NEE).

Regarding RCS: Yes, for retaining low-frequency it's superior - given that your dataset actually allows a robust regional curve - but prone to a lot of biases. I am not really concerned about the MXD data, because the slope in MXD is usually pretty flat, so you

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won't run in to big troubles there.

However, I would be still very interested to see to see the Italy-only MXD chronology detrended with a 150-year spline (if I remember correctly) for a direct comparison of the different oscillations against the Trouet reconstruction. I would consider the RCS application as a second and final step to investigate how much more low-frequency there actually is (or might be).

Additionally, I am still extremely cautious of the application of RCS on TRW at sites with n<10-15. If you use a "10% spline" (which in your case comes close to 15-20 years with the "younger" broadleaf samples) to build the RC, the RC is potentially very noisy (or wiggly). And if your 3-9 samples have a narrow age range you essentially take out most of the low frequencies you intended to retain and your RC at higher ages is probably more flexible at higher ages (due to only very few samples) than the stiff tail of a negative exponential curve.

Not giving an actual number, Esper et al. 2003 and Briffa & Melvin 2011 propose "the more samples the better", which between the lines is a minimum replication per year at 10 but coming from a population of >30 in total. Specifically Melvin (2004, Historical Growth Rates and Changing Climatic Sensitivity of Boreal Conifers, Section 6.3.3), stated you actually would need 62 samples per year for RCS to get the same per year standard deviation and confidence intervals as a 30-year spline chronology with n=10 (using Torneträsk and Finish-Lapland chronologies). "The cost for the inclusion of low-frequency variance is a requirement for greater tree replication in order to maintain similar confidence levels."

Although somewhat arbitrary it is common practice to set the EPS threshold to 0.85. The inclusion of EPS values down to 0.7 in your study tells me a lot about the "weak" coherence within your RCS chronologies (even the ones with "higher" replication of 16) during the common 1880-1980 interval. I assume the statistics would be higher (= more robust chronology) if you used a stiffer spline (∼150 years) or negexp detrending

instead. What are the statistics for the final RCS-HSTC-chronologies, are they >0.85?

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