Clim. Past Discuss.,
doi:10.5194/cp-2016-9-AC6, 2016

Climate of the Past Discussions
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Interactive comment on "Temperature variability of the Iberian Range since 1602 inferred from tree-ring records" *by* E. Tejedor et al.

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Received and published: 28 March 2016

Referee #1: Thank you for your interest and comments, which we aim to answer here.

1. In order to test the agreement between the tree-ring chronology and climate record in the high-frequency domain, and in line with Stefan Klesse's suggestions, we correlated the ArstanRES and ArstanSTD timeseries with the detrended (30-year spline) climatic data. The results show an increase in correlation with pSep21 temperature. For ArstanRES the correlation is r= -0.39, whereas for ArstanSTD the correlation increases to r=-0.56. These results validate correlation in the high-frequency domain and indicate that the reconstruction signal is not spurious. However, we intend to reconstruct both high and low frequency climate variations and prefer using the BasPois chronology as it enhances the climatic signal (r=-0.78) and reproduces the full vari-

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ance spectrum of the pSep21 variable very well. We performed a Durbin-Watson test, as suggested, to assess residual autocorrelation. The results were added to Table2. The Durbin Watson value for the period 1945-2012 is 1.45 ($p<0.001$) indicating no substantial autocorrelation in the residuals.

We believe that both the correlations after removal of low frequency variance as well as the insignificant autocorrelation in the residuals support the pSep21 reconstruction.

2. About chronology development, we did not merge site chronologies, but applied the standardization methods to all 316 individual TRW series to produce a regional chronology. Nonetheless, we added climate calibrations for each site to validate that the climate signal is regionally consistent. We developed a chronology for each of the 11 sites (detrended with the BasPois method) and correlated with the climatic variables. Highest correlations in the 11 sites appear for pSep20, pSep21 and pOct21. Since we chose to reconstruct pSep21 we also performed running correlations using a 30-year window to assess correlation stability within the calibration period. Results are shown in the Fig.1 and chronologies are sorted by elevation, VIN and CAV are Pinus uncinata, while the rest are Pinus sylvestris. The correlation never drops below r= -0.2. There are also periods surpassing r=-0.80. However, we would like to reemphasize that the aim of this study it is not to develop a local climate reconstruction, but to reconstruct the regional climate of the western Iberian Range.

3. We would like to remark that tree-ring growth it is not negatively influenced by temperature. It is, however, negatively correlated with temperature of the previous year using a cumulative monthly mean of 21 months. That would mean that within the environment in which trees are growing and with respect to the mean, they will grow more in cold years than in hot years. The negative temperature correlation is already shown for the previous September (r=-0.56) without any cumulative monthly mean. This negative temperature correlation has been reported in numerous dendroclimatic studies (i.e. Büntgen et al. 2006 or van der Werf et al. 2007) including the most recently developed climatic reconstruction for the Iberian Peninsula by Dorado-Liñán et al. 2014 showing

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a negative correlation with previous summer temperatures. One of the strengths of this paper is precisely adding the cumulative monthly mean to the climate variables which maximizes the correlation to r=-0.78. The ecophysiological explanation of previous year's influence on current's year tree-ring growth was already related with the storage of starch and sugar in parenchyma ray tissue and the remobilization of carbohydrates from root structures. Memory effects on TRW data have also been studied regarding the delayed response in TRW to post volcanic eruptions (1âĹij5 years) associated with a decrease in current's year temperature (D'Arrigo et al., 2013, Esper et al., 2014).

We agree on the need to conduct further studies to better understand the full range of ecophysiological processes of pine and other species. To this extend, we are aware of an experiment conducted by a colleague (Dr. Eustaquio Gil Pelegrin; ttps://www.researchgate.net/profile/Eustaquio_Pelegrin) in which they try to demonstrate that the generation of pinecones and needles in pine trees is very slow and it generally takes two years.

Please also note the supplement to this comment:
http://www.clim-past-discuss.net/cp-2016-9/cp-2016-9-AC6-supplement.pdf

Interactive comment on Clim. Past Discuss., doi:10.5194/cp-2016-9, 2016.

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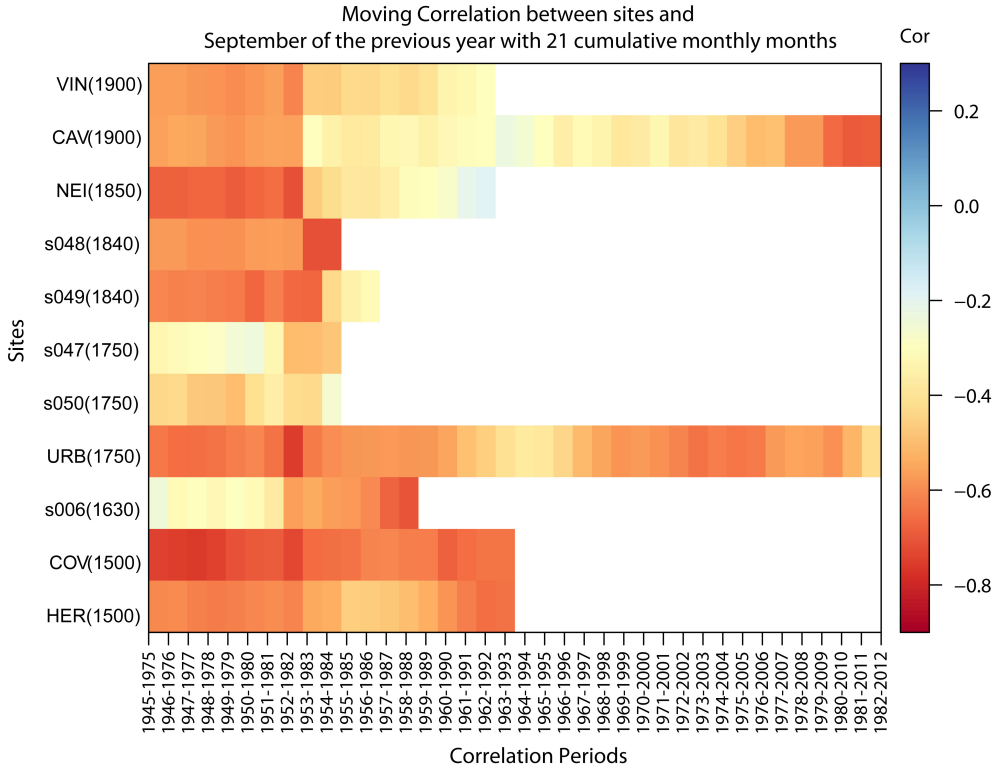

Fig. 1.

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