

## ***Interactive comment on “A universal error source in past climate estimates derived from tree rings” by Juhani Rinne et al.***

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Interactive comment on “A universal error source in past climate estimates derived from tree rings” by Juhani Rinne et al. Y. Markonis Received and published: 15 May 2016

In lines 32-33 the authors claim that: “In fact, Franke et al. (2013) succeeded in showing that many present day state-of-the-art reconstructions still tend to be biased in the low frequency part of the spectra.” However, more recent findings (Iliopoulou et al. 2016; Markonis and Koutsoyiannis 2016) suggest that this may not hold true. Following the approach of Bunde et al. [2013], in determining the low frequency bias by examining the long-term persistence behaviour of precipitation, it has been shown that the low frequency variability is evident in many different types of proxies and not only to the tree-rings. In addition, a simple explanation was provided for this behaviour based

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on the changing dependence structure of precipitation as the temporal scale increases [Markonis and Koutsoyiannis 2016].

Thank you for your comment. We will add a reference to your paper as follows (lines 4 and 5 of from "Reasons" to "strongly"):

Franke et al. (2013) observed that the low-frequency biases can be present in studies applying maximum densities of the tree rings as well as those studying tree ring widths. The bias can further be present both in estimates of precipitation and temperature. Reasons are currently a topic of scientific discussion, e.g. a link between record length and persistence has recently been proposed (Markonis et al. 2016). Our study strongly suggests that the paucities in the data are one explanation for such a general presence of the error. The approximate method derived here to estimate the degrees of freedom can be used to trace the potential impact of such paucities.

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