Clim. Past Discuss., 7, C1626–C1629, 2011
www.clim-past-discuss.net/7/C1626/2011/

Climate of the Past Discussions

Interactive comment on "Northern Hemisphere temperature patterns in the last 12 centuries" *by* F. C. Ljungqvist et al.

F. C. Ljungqvist et al.

fredrik.c.l@historia.su.se

Received and published: 18 October 2011

We very much appreciate C. Lemmen's constructive comments on our manuscript and we will here, briefly, comment on his suggestions for improving the article. It was a deliberate decision, as clearly stated in the article, not to include any elaborate discussions about the different proxy types and their relative advantages and weaknesses as temperature recorders. However, in light of all comments on our manuscript, we will certainly consider, as C. Lemmen suggests, including a section in the Supplement discussing the properties of the different proxy types more in-depth.

Concerning the article by Leduc et al. (2010), and the discussion about the Mg/Ca versus alkenone SST therein, we are well acquainted with it. We didn't refer to that debate in our article since we felt that this question about seasonality of the temperature sig-

nal is more relevant to studies of SST over longer time-scales of the Holocene where orbital forcing plays a significant role and, hence, the question of seasonal changes is more relevant.

We wish to thank C. Lemmen for drawing our attention to the article by Wirtz et al. (2010). The conclusions in this article about a $\sim$1500 km radius for the spatial coherence of climate variability certainly strengthen our chosen correlation decay length for centennial temperature variability, inferred from Jones et al. (1997), of 2000 km at the equator and decreasing to 1000 km at the North Pole. The study by Wirtz et al. (2010) will be incorporated and properly referred to in the final version of the article.

C. Lemmen brings up a good point when he suggests that we, for the final version of the article, change the colour scale so that values close to zero get a more neutral colour. We will consider giving values that lie in the interval $\pm 0.25\ \sigma$ a neutral colour. In Matthews and Briffa (2005), for example, values between –0.2°C and 0.3°C are given neutral colours and in Mann et al. (2009) values from $\pm$0.1°C are left white on their maps. (The latter approach is impropriate for us since we are marking regions without data coverage white.) Although we may change the colour scheme, we would like to stress that small and insignificant anomalies are not exactly the same thing: a small anomaly could still be significant if it is based on a sufficiently large number of observations, and conversely a large one could be non-significant of it is based on only a few (see, e.g., the sign test in Appendix B of our manuscript).

As requested by C. Lemmen we are also planning to make our data files available to other scholars after the final publication of the article. We will most probably use the data repository at the World Data Center for Paleoclimatology instead of www.pangaea.de since most other multi-proxy temperature studies concerning the last millennium are archived there.

Concerning the Small remarks:

p. 3358: "proves" is the wrong word, shouldn't we all rather "disprove"?

– We do not fully understand what is meant here. Possibly “proves” is too strong, and should be replaced by something like “shows”.

p. 3359 local => location

– OK!

p. 3359: qualify “systematically”.

– We will consider, for the revision, to describe in a little bit more in detail how we searched the literature.

p. 3365: assumption invalid, not “difficult” (as was shown by clustering analysis).

– Perhaps a more cautious phrasing of the sentence would be: “One of the assumptions underlying the sign test is that the observations are independent, a condition that need not hold in the present situation.”

We are grateful that C. Lemmen observed the omission of the reference to Wilson et al. (2010) in the reference list.

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Interactive comment on Clim. Past Discuss., 7, 3349, 2011.