**Climate
of the Past
Discussions**

Interactive
Comment

Interactive comment on "Climate of the last millennium: ensemble consistency of simulations and reconstructions" *by* O. Bothe et al.

O. Bothe et al.

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First of all, we want to thank the anonymous referee #2 for his comments and questions, which will help to strengthen our manuscript. Again this reply is only meant to acknowledge the annotations and to hopefully facilitate further discussions. A detailed full reply will be prepared later.

Next, we think, a short note is in place on the referee's question with respect to the reverse analyses (C1509, last paragraph). The reverse analysis depends on the availability of ensembles for both reconstructions and simulations. The reconstruction ensemble by Frank et al. (2010) for the hemispheric data is unique as such an ensemble although, of course, one could easily construct a comparable ensemble from the available hemispheric reconstructions (see e.g.

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http://www.ncdc.noaa.gov/paleo/recons.html). One could possibly even produce an ensemble for a seasonal central European temperature based on the data by Dobrovolný et al. (2010, DOB), Luterbacher et al. (2004, LUT) and the growing season temperature reconstruction by Guiot et al. (2010, GUI). We decided against such an approach because of the arbitrariness in defining a common seasonal and areal Central European coverage, the amount of common input to LUT and DOB and their general agreement as shown by Dobrovolný et al. (2010). On the other hand, constructing an ensemble of global or hemispheric field reconstructions is beyond our scope, as it ideally should include different sources and methodologies.

Further, we acknowledge the wish of the referee for supplementary material for Section 4 and the cumulative assessment, and his comment on a clearer link between the discussion and the earlier analysis. We are going to try to integrate the discussion with previous results as far as it appears to be possible. We think that a supplement easily becomes unwieldy, if we present the cumulative assessment, the further data sets, the results relative to individual hemispheric reconstructions and the surrogate ensemble. Editorial advice would be appreciated.

More generally, both referees emphasize that we have to improve the language and the general structure including clarifications on the details of our approach. We are going to follow these suggestions. We will also thoroughly deal with the terminology regarding the target data and the observable truth.

Thus, we are going to motivate the use of 'consistency' and its relation to the forecast verification terminology of reliability. This then will include a delineation of the information content of r-q-q plots and rank histograms in relation to climatological and probabilistic consistency.

With respect to the general structure, we are going to try to optimize it.

We will clarify which periods we refer to by dates.

We are going to present quantitatively our uncertainty estimates.

Further comments:

We will discuss the implications of the different approaches in Figure 2, which, in part, relates to the questions of referee #1 on the influence of considering the ensemble mean. This further relates to referee #2's comment on the results in Section 4.

We will describe how the mapped ranks are derived and clarify the caption of Figure 5.

We will consider the incidental remarks.

Interactive comment on Clim. Past Discuss., 8, 2409, 2012.

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