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Climate of the Past Discussions

Interactive comment on "Multi-periodic climate dynamics: spectral analysis of long-term instrumental and proxy temperature records" *by* H.-J. Lüdecke et al.

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I would like to thank the authors for their reply. However, it seems as if I hadn't made my point clear enough. I initially planned to leave it without further comment, but since some of my work along the line touched this issue in recent years, I decided to make use of it and to turn it into a rather lengthy reply. In actual fact, the analysis applied therein requires an in depth introduction which is the main reason for its volume. As this isn't usual commenting practice (extended comment have to be prepared and submitted as any other manuscript), I will instead upload the respective extended comment on my personal webpage. I hope this is in compliance with the commenting

regulations on CPD. The editors may notify me if they object my approach. Of course, I am fully aware that the authors are by no means obligated to reply. They don't even need to read it, though I am convinced it might be of help.

As my scientific duties are currently clearly specified, I won't find the time to prepare a fully-fledged manuscript which would meet the conventional submission criteria, neither from a qualitatively, nor from a quantitatively point of view (at least in my opinion, which is what counts in the end). Most importantly, at this stage I do not think, that it would be of great interest for the scientific community, as it does not contain anything but well known wisdom. In order to provide a more robust and publishable manuscript, a lot more work would have to be done before. It is planned, but has to be deferred for the time being. In any case, the full comment is online and could be downloaded (PDF format) if one wishes to do so. I cordially invite and encourage the authors to have a look (one may regard Fig.1 as a sneak preview):

[Extended Reply to Comment by Lüdecke]

Following, a few more general comments to clarify some aspects. With respect to their reply to my first comment, the problem I see is not that one needs to look for a distinct periodic forcing mechanism (which might merely be intrinsic system variability), but to make sure that well known non-periodic forcing mechanisms (solar cycle, volcanic eruptions) aren't messing up the applied statistics to begin with. It has already been shown by Bertrand et al. (1999), using the multi-taper Thomson spectral analysis method, that the spectral component of the random timing of volcanic eruptions can very well produce a quasi-periodic oscillation in the temperature record. Lean and Rind (2008) note, using FFT filtering, that over the NCEP epoch decadal power in solar irradiance and volcanic aerosols is approximately in phase during two of the last five solar cycles. In addition, Mann and Lees (1996) have demonstrated at length how various signals can be detected from background noise at any relevant

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climate time scale. I am taking the liberty to also point you to the work of Goosse and Renssen (2004), Taricco et al. (2009), Thompson et al. (2009), and Scholz et al. (2012) who all used spectral methods to identify cyclic natural climate variability.

Without having seen an elaborated analysis which attempts to estimate the potential effect of such random forcing mechanisms upon the results of the applied method in Lüdecke et al. (2012), I am afraid I still have to object its validity. By disregarding the attribution problem, in my point of view their analysis is lacking the required physical underpinning and is essentially bound to lead to a fundamentally wrong conclusion. This is particularly worrisome, as the authors have chosen to ignore alternative instrumental measurement data as well as to not test their methodology against a variety of available paleoclimate records. As it stands, none of my concerns regarding the publication of this manuscript have been dispelled yet, not even remotely.

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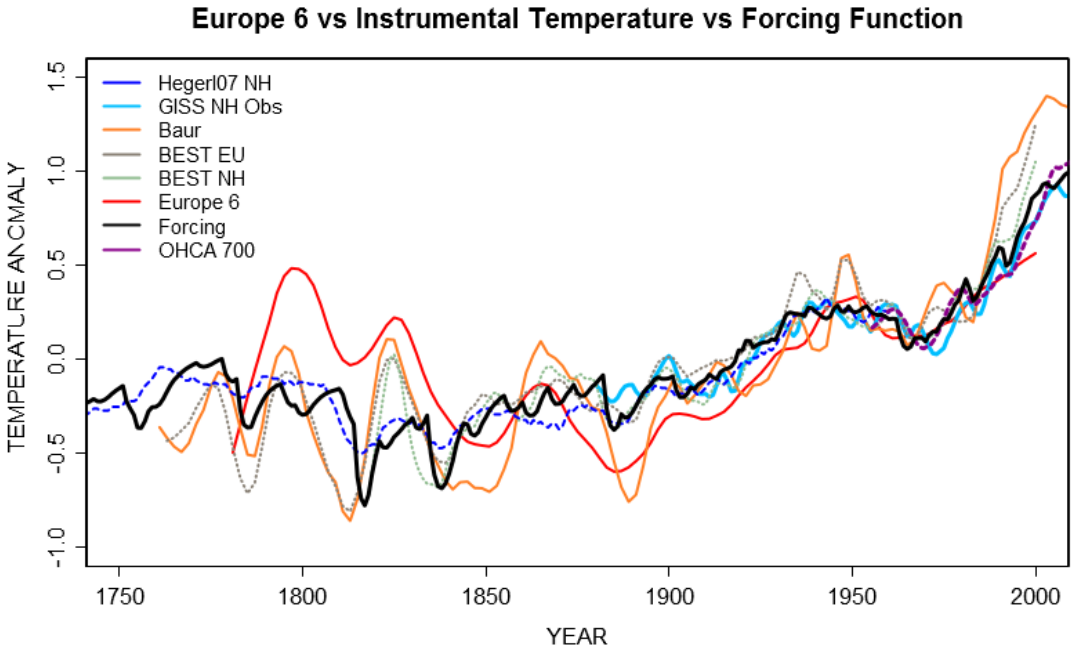

Fig. 1. Filtered and unfiltered paleoclimate reconstructions versus forcing response function (1750-2010).

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