Clim. Past Discuss., 8, C1676–C1678, 2012
www.clim-past-discuss.net/8/C1676/2012/

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.

H.-J. Lüdecke et al.

moluedecke@t-online.de

Received and published: 24 September 2012

We thank for the suggestions of O. Bothe. Concerning a more detailed discussion of the period doubling, we would prefer not to do this, to keep the paper short. The period doubling route to Chaos via period doubling is textbook knowledge with which every course in nonlinear physics begins. We think space in scientific publications should not be wasted on such commonplace knowledge. The uninformed reader finds everything necessary for understanding in the papers cited. Concerning caution about inferences of global temperatures from central European (CE) temperatures, we would think that it is clear from what is presented that we give no rock-solid proof, but rather evidence. (

the arctic temperatures appear to coincide well with the CE temperatures, so that correspondence of global and CE temperatures is plausible). Concerning the empirical reconstruction as a "fit“: This is a misunderstanding. If it were a "fit“, the reconstruction would be entirely meaningless. With 13 free fit parameters (6 frequencies, 6 phases, 1 DC level) ANY curve can be rather precisely reproduced. But it is no "fit“. The 6 frequencies including their phases, as they are determined from the FT of the measurements, are used in the reverse transform. Thus there is no free fit-parameter. We cut frequencies higher than 1/30 years because "climate“ is defined as the 30 year average over " weather“. Retaining higher frequencies in the reverse transformation would evidently only bring the reconstruction closer to the original temperatures. It has been suggested by referee1 that anthropogenic influence(s) might have been lost due to some low-pass filtering, possibly hidden in the algorithm. We state here that there is no low pass filtering (apart from the 30 year cut off, which, however, would bring the reconstruction only closer to the original data if not implemented, as explained above). There is one way in which the influence of CO2 might have been incorporated into the 250 year periodicity: If simultaneous with a warming due to CO2 a natural cooling of the same magnitude would have occurred,than the CO2 influence could have not been detected by our analysis. The reader may judge for himself how probable such a coincidence were.

A fact which could disguise a CO2 influence has been mentioned in the paper (and if wanted we would emphasize this): we have data only for 250 years. The FT interprets these date as containing a 250 year cosine as the strongest component. Now, FT is mathematically nothing more than a correlation with, or projection onto, trigonometric functions. In view of having only one period of cosine-shaped data, an artefact can not be excluded. We have pointed out that the stalagmite spectrum and wavelet diagram show a 250 year periodicity persisting for about 1000 years as the periodicity with the largest amplitude. Thus largely eliminating a possibility for an FT artefact. Admittedly this is no rock-solid proof of absence of CO2 influence, but collected evidence. We suggest to postpone the suggested hindcasts, which may give further support to our

CPD

8, C1676–C1678, 2012

conclusions, to a future paper, in order not to cause additional delays in the publication process.

Interactive comment on Clim. Past Discuss., 8, 4493, 2012.