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Interactive comment on "Comparison of simulated and reconstructed variations in East African hydroclimate over the last millennium" *by* F. Klein et al.

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This paper deals with a very important subject: Comparison of the simulated and reconstructed climate. Working out similarities and differences is key for a better understanding of the climate drivers and their quantification.

The authors have chosen four fairly high-resolution climate curves from East Africa which they compare with model results. Interestingly, some of the reconstructed climate curves differ markedly. In Figure 5 the Naivasha and Masoko lakes show a dry Medieval Warm Period (MWP) / Medieval Climate Anomaly. In contrast, Challa appears to be more humid, even though the record starts slightly later and the beginning is unclear. In the Lake Malawi climate curve the time 1000-1300 AD is ab-

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sent, therefore it is unclear if the MWP was dry or wet here. I suggest you add information from Johnson et al. 2004. According to those authors: “Diatom productivity was high during the Little Ice Age (LIA) and relatively low around 1 kyr, the time of the Medieval Warm Period (MWP)”. The low diatom productivity during the MWP may be linked to low river discharge, i.e. drought conditions. During this time the rivers may have supplied lower amounts of dissolved silica to the lake. During the wetter Dark Ages Cold Period and Little Ice Age, chemical weathering of bedrock intensified and increased the BSi concentrations and diatom productivity in the lake. http://link.springer.com/chapter/10.1007

I would like to draw your attention to an ongoing project in which I am mapping the climate characteristics of the MWP on a global scale, based on the large number of published case studies. The interactive online map is freely accessible here: http://t1p.de/mwp

In East Africa you see a large number of yellow points that represent studies which reported drought/arid conditions for the MWP time. When you click on the respective dot, key information from the paper appears, including a link to the key climate curve. Arid conditions seem to be the general pattern that existed 1000-1300 AD in East Africa.

The arid MWP belt appears to continue northwards along the coast of the Arabian Sea, including Ethiopia, Yemen, Oman, Pakistan and coastal northwestern India. There, the MWP climate regime seems to change. Southern and eastern India and the Bay of Bengal appear to be humid during the MWP. Mapping is still ongoing and many more studies will have to be integrated. It is also clear that in detail things are more complex. Nevertheless, I think it would be important to initially compare the models to these general, high-level patterns.

From your study and reference list I have gathered quite a few new publications that I will add to the MWP map in due course. Thanks for that.

Concerning the forcing of pre-industrial climate change, I am not comfortable with models that gain their simulated climate variability mostly from internal variability. There are clear MWP patterns and additional millenniums cycles (e.g. Bond et al. 2001) which point towards powerful external climate drivers. Numerous papers have highlighted the important role that solar activity changes play in the climate equation. I want to encourage you to also run models and scenarios with a solar radiative forcing higher than that assumed by the IPCC. If not for this paper, maybe in a future one. The current RF proposed by the IPCC does not honour the great number of studies which highlighted the intense coupling of climate with solar activity changes: http://chrono.qub.ac.uk/blaauw/cds.html

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