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Climate of the Past Discussions

Interactive comment on "Late Pliocene lakes and soils: a data – model comparison for the analysis of climate feedbacks in a warmer world" *by* M. J. Pound et al.

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General comments The paper by Pound et al. investigates the influences of soil and lakes on the output of global climate simulations (esp. surface air temperatures; annual precipitation) performed for the Late Pliocene. The new boundary conditions (Late Pliocene soils; Late Pliocene lakes) reveal regionally confined changes of local climate and vegetation in comparison to the PRISM3 control run for the here used HadCM3. The paper presents new results and offers a database of Late Pliocene soils and lakes to the scientific community which will be of great benefit also but not only for other

climate modelling groups working within this time period. The manuscript together with the database is certainly worth to be published in Climate of the Past as it is clearly within the scope of the journal and of overall good quality. However, some relevant points have been treated in the paper only marginally and probably need re-working and re-writing before the manuscript can be accepted. I would recommend the following suggestions.

Specific comments The information in the database (suppl. data) is very sketchy and additional explanations need to be documented and added: - how were the lake extents calculated? - is it possible to give (spatial and temporal) errors/uncertainties for the used calculations? - For Mega-lakes (with probably the highest influences on the results) it would be useful to add short comments on how the original references were interpreted; so that the authors calculations and interpretations are reproducible; also for further and steady completion and contribution by the scientific community to this data base The column "surface area" lacks settling the rounding differences to the relevant digit. This would then also account for data checking as these numbers should not be produced simply by unchecked calculations.

How were the other geological boundary conditions (f.e. elevation model; coast lines; what about the Black Sea?) etc.) for the modelling experiments defined? Even if these boundary conditions are described in Dowsett et al. 2010 some of the major points should be described in this paper to avoid questions or unclarities concerning e.g. tectonics, sea level and other mechanisms.

Some of the large differences between the control run and the presented data were not described and/or discussed: - changes on the ocean (f.e. mid-Pacific MAP /Pliocene soils: how can the soil data create these large changes over the ocean?) - some of the differences between the experiments are only marginally described: is it possible to quantify instead of using expressions such as "a small increase", "modest increase" etc.

Page 3183, line 16: surface type “urban” – why is this type used in a Late Pliocene simulation? Please explain or change and assign the urban surface type according to the fraction of the other surface types of the grid.

Page 3183, line 26: Table 1: add the albedo numbers to an additional column in Table 1. Page 3188, line 13: please specify “0.1% confidence level” and/or give example. Page 3191, line 9: to Fig. 2 a map of the present day conditions should be added.

Figures Figure 2: Please add a map of the present day conditions and a map of the used control run (standard Prism3 control) Figure 3, caption: change to: The differences of mean annual surface temperature for the soils and lakes experiments from the standard Prism3 control. Figure 4, caption: change to: The differences of mean annual precipitation for the soils and lakes experiments from the standard Prism3 control. Figure 5: the maps are very small; the suggestion of referee C. Contoux is appreciated to show only the changes to the Pliocene control.

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