Geoscientific
Model Development
Discussions

Interactive comment on "High-resolution hydraulic parameter maps for surface soils in tropical South America" *by* T. R. Marthews et al.

Anonymous Referee #2

Received and published: 12 February 2014

This paper describes the development of parameter values for common soil hydraulic models over a tropical South American domain. Experimental soil profile measurements from three sources were combined with soil polygons primarily from SOTER-LAC. Lack of data restricted the analysis to the topmost 30cm of soil. The final products were high resolution maps of parameters used by land surface and other models.

This paper is well written and acceptable for publication subject to (fairly minor) revisions.

Given that the paper is primarily about the data, the results section is rather brief in comparison to the discussion. But I found the discussion interesting and a good source of references and ideas for potential follow-up work. The PTFs (and possibly the hydraulic models) might also be given greater prominence - see my later comments on

the tables.

As a modeller I would have been interested in reading something about the impact of these new data on model results. The underlying premise is that better input data will result in better (more realistic) model simulations and although I agree that we should seek the best possible input data, in practice this does not guarantee better performance. Even when performance is improved, the improvement can be modest. I appreciate that quantifying any model improvement is not trivial and is perhaps reasonably left for subsequent studies, but I leave it as a suggestion that the authors could at least quantify the impacts of alternative parameter values on some model outputs (e.g. runoff, evaporation) even if they do not broach the more thorny issue of whether these constitute improvements. (Perhaps they could run at "representative points" to avoid running at all point across the domain.) I realise that any such results will strictly only apply to the one land surface and hydraulic models used (and slightly at odds with my later suggestion to remove the JULES-specific appendix!) but the authors might at least consider this work, and accept/reject it as they see fit.

The discussion mentions the need to include deeper layers (>30cm depth) but does not suggest any approaches. Presumably a first step could be to analyse the limited data available, to get some idea of the effects. Could maps of bedrock/parent material help? I am not expert in this area and it would be good to hear the authors' suggestions, not least because modellers will do something to estimate deeper parameters in any case!

There is little mention of issues related to the spatial scale of model grid boxes (e.g. a typical global climate model might represent the land surface in terms of cells of size O(100km).). I don't expect to see a detailed discussion of this complicated area which is beyond the scope of the paper, but I think some mention is warranted - even perfect "point-scale" parameter values are not enough if the important processes are different at the scale of model application.

Again, I'm not expert, but I was slightly surprised at the relatively small error (10%)

estimated by the authors and wonder if this could be elaborated further (although they already state that this is difficult)? Perhaps quote uncertainties as estimated in other studies? At the end of the day this is probably the authors' "expert guess" and might need to be better clarified as such.

Several captions were too long, particularly those for Tables 1 and 2, probably also Figure 2. Some of that material should be moved, possibly to the main text or an appendix. A separate table of variables used/notation could perhaps be used to streamline the presentation. The PTFs in Table 2 should be presented more clearly, especially given their importance to the study - perhaps move to an Appendix (not a table)? The hydraulic models of Table 1 might also be clearer in an appendix rather than squeezed into a table.

Fig.2 is too small when printed and I needed to magnify it via my PDF viewer. Even then the lighter grey text is rather faint.

Fig.4 I would prefer to see a range of colours (e.g. rainbow) rather than what are essentially several variations of one colour. Also a clearer colour bar, with intervals labelled. At present these are just "pretty pictures" and much of the information content is difficult to see.

Appendix A was obviously very specific to one model (JULES) and I don't feel that it added much value. That material is probably better removed and put in some sort of JULES model document (e.g.a a user guide).

Minor corrections and typos

p6751 line 17 "and others of which left" p6756 line 2 - I don't think "publicly-available" should be hyphenated. p6758 line 16 (App.A) - no full stop after "smcl()".

Interactive comment on Geosci. Model Dev. Discuss., 6, 6741, 2013.

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