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Discussions
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Interactive comment on "Global root zone storage capacity from satellite-based evaporation" *by* L. Wang-Erlandsson et al.

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This manuscript describes the application of a novel approach to infer root-zone water storage capacity from an evaporation data set derived from remote sensing and illustrates the consequences in a hydrologic model. The manuscript is generally very well written, novel and innovative, and should be accepted for publication after addressing a few minor comments.

I only have a few minor comments:

- page 4-6: The introduction contains a nice review of the different methodologies. I think for what you describe as the "root distribution modelling approach" is more appropriately labeled an "optimization/maximization approach", as it infers rooting properties from some ecological cost function. Also, Kleidon and Heimann 1998 did not use an

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Discussion paper

inverse approach, but an optimization approach, even though in a highly simplified way and without the use of an explicit root distribution, so it may be better to refer to such a class of “optimization” approaches.

- page 7, line 10: I think more relevant is here a link to cost-benefit type of analysis rather than evolution. It may be appropriate to refer to the classic book edited by Givnish “On the economy of plant form and functioning” by Cambridge University Press.

- page 10, line 14: “in any measureable way” sounds rather strong. Perhaps better to say that it only affects results to a small extent?

- page 12, line 12: It would be nice to see how well the two formulations of the stress function compare to each other. Can you show this in a figure?

- page 14, line 14: “electro-magnetic spectrum” âĂŤ do you mean different wave-lengths/bands?

- page 16, line 14: “wind speed in two directions” âĂŤ really? If so, why do you use both directions? Or do you use the two measurements to calculate wind speed?

- page 18, lines 4-11/Figure 4: the correspondence (or disagreements) between the data sets would be easier to see in a scatterplot, where the different data sets are compared at a grid-by-grid scale. How well they correspond is then reflected by the slope of the regression as well as the r2 value. It is probably not necessary to show all scatterplots (or add them as supplementary), but I think this type of analysis would really help to identify how well the different data sets compare to each other.

- page 18, lines 12-28: In the discussion of the differences, it is also important to note that these datasets may use different climate data sets, particularly precipitation. Also, Kleidon (2004) calculated evaporation in a quite simple way, which also is likely to result in differences. What this means is that the differences may not simply reflect on different ways to infer rooting properties, but there is also a component related to the forcing datasets which is difficult to quantify.

- page 25, line 2: Note that for the effect of climate change, it also depends on the ability of vegetation to adapt to altered conditions. This aspect should be mentioned.

- page 38, Figure 1: This figure nicely illustrates the concept. I think it could be made even better if you show the integrated fluxes of Fin-Fout over time in a separate plot above the panel where you show the bins.

- page 40, Figure 3: Start the caption more descriptive with something like “Estimates of root zone storage capacity of the ….”. You may also want to use the same color scale in panel (c) as in Fig. 4 to facilitate comparison?

- page 43, Figure 6: I find the differences difficult to see. It may be easier to attribute the differences when you use only a few discrete color values with less than 8 shadings so that one more clearly associate the differences in a region with the values. (also applies to other plots)

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