Geoscientific
Model Development
Discussions

Interactive comment on "Reduction of predictive uncertainty in estimating irrigation water requirement through multi-model ensembles and ensemble averaging" *by* S. Multsch et al.

Anonymous Referee #2

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The authors analyses the uncertainty in estimating irrigation water requirement by applying six models for ETpot and 5 Kc values (in total 30 simulations). They found that the uncertainty caused by different model approaches is much larger that uncertainty caused by Kc values. Furthermore, they state, that multi model ensemble prediction provide reliable estimates which can be used for management.

In principle the study this is an interesting, well conducted study. Nevertheless, I do have some concerns with respect to the general approach. Six different ETpot models were applied and tested against class A pan data although it is well known that class A pan data may not be the best method to measure ETpot and not for all stations pan-coefficients were available. Therefore, uncertain class A pan data were used in an

uncertainty study assuming that class A pan data are certain. Furthermore, all other uncertainties related to climate (radiation, temperature, rainfall, ...) and uncertainty related to regionalization of the punctual information are ignored.

The six ETpot methods differ in data demand and representation of the underlying processes. Some of them use empirical parameters (like PT). These parameters were taken as certain although they are also uncertain. One could have calibrated the empirical parameters of the ETpot equations using the class A pan and studying the effect on IRR. An interesting question would also how the selection of the ETpot method (there are much more in literature, see Bormann) do effect the findings. It seems that the authors assume that nothing is known concerning the applicability of different ETpot methods to specific regions like the MDB. For me the argument is not convincing that many models do use these approaches because in this case one has to train the user to apply only models applicable to specific questions and regions.

The data in Tab. 1 already show that the uncertainty related to ETpot is much larger than the uncertainty related to Kc. Kc,mid for example varies between 1 and 1.15 which is max. 15% compared to the range of 2.4 to 6.4 mm/d in ETpot data (nearly 100%). If this is the story, one cold have stopped here.

If the main message is that ensemble averaging improves the prediction of IRR than I wonder if all ETpot models should be considered although it is clear that some of them are not reliable. If the argument is that it is not clear for other regions which ETpot model is reliable (I would not agree with such a statement) then one has to consider much more approaches as used by Bormann.

I recommend repeating the uncertainty analysis but leaving out the two ETpot methods evaluated as poor. Furthermore, I recommend to "calibrate" the empirical parameters of the ETpot data using class A pan data and discuss regionalization as well as other uncertainties.

The paper is well written. I only wonder why the authors discuss CO2 dependency

(pages 7542-7543) because this is a very specific aspect not covered by the paper. I would delete this part

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