

## ***Interactive comment on “Simulation of the soil water balance of wheat using daily weather forecast messages to estimate the reference evapotranspiration” by J. Cai et al.***

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Reviews have been provided by referee #1 (also termed #3) and referee #2. An additional review (#4) is provided below.

The judgement of referees #1 and #2 is very different. Referee #1 is supportive of the paper and has only a small number of minor suggestions for improving the manuscript. Referee #2 has scrutinised the paper in more detail and is more critical of it. He/she notes that the material and methods section does not provide sufficient detail about the soils and that the model should be tested against the practical implications of irrigation scheduling such as irrigation water saved by using the model. He/she also states that

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the study is rather limited (a single soil and a single crop) so the claims of the general suitability of the method are unfounded. Referee #4 requests a justification of why weather messages are used in the first place and points to the limited applicability of the study.

Referee #2 is perhaps a little harsh but his/her points are fully valid. The comments have partly been addressed in the author comments. I would like to have them fully addressed in the revised paper. The study is indeed more limited than what is claimed, both in spatial scope and what it achieves in practical terms. Rmse does very little for the farmer. Extending the study to include irrigation scheduling based on the soil water model would perhaps go beyond the scope of the paper. I rather suggest that the authors are clearer about the limited scope of their analysis.

Moderate revisions of the paper are needed and the revised manuscript needs to be re-reviewed. I trust that the authors are able to fully address all the review comments in the revised paper, in particular those of reviewer #2.

Günter Blöschl

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#### REFEREE #4

Review of Simulation of the soil water balance of wheat using daily weather forecast messages to estimate the reference evapotranspiration

By Cai et al.

This is a very applied paper in which the procedure of Cai et al. (1999) is used to estimate reference evaporation from weather message proxies to drive a soil water balance model. The water content simulations are then compared with simulations that use weather station data as inputs. While the paper probably does not further the hydrological sciences much it may be useful for readers with an interest in soil water management in data scarce situations.

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The paper is reasonable well written and the overall message is clear.

There are two general concerns I have with the paper though. First, why use weather messages? Weather messages are generally prepared from the output of numerical weather forecast models. These forecast models resolve the land surface energy balance. Forecasts of the energy balance and evaporation hence exist. So why would one back calculate evaporation from the proxy information of the messages rather than directly use the weather model forecasts?

Second, the paper is overly optimistic about the usefulness of the results. If one takes the conclusions (p. 698 l. 24, p. 711 l. 14, p. 712, l. 3) at face value one gets the impression that the proxy information of weather forecast messages could replace the numerical forecasts of evaporation - world wide and at all times. This is not supported by the data and is hardly what is intended by the authors. The authors need to make clear that use of the proxies are a last resort if no quantitative forecasts are available. They seem to work well for the case examined but it is hardly a method that can be generally recommended. The way the usefulness of the results is promoted is not appropriate for a scientific paper.

The English needs some streamlining. I have highlighted a number of changes that are needed below, but there are many more instances in the text.

Minor comments (p=page, l=line)

p. 698 l. 6: Penman

p. 699, l. 5: irrigation is not predicted by the models - irrigation is a human decision.

l. 16: relative?

p. 700, l. 7: Goodness is not a scientific term. Avoid promotional phrases.

p. 701, l. 16: messages using daily

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p. 702, l. 19: be clear how they obtained kRs. Did they estimate the factors or assume them?

pp. 701-703: Importantly, be clear on whether any of the ET model parameters were calibrated for the Daxing station.

p. 703, l. 9: for the winter

l. 13-15: This is repetitive with p. 705, l. 14, so remove either of the two sentences.

p. 704, l. 3: dried in the

l. 5: use past tense

l. 6-13: This paragraph sounds as if it were lifted from another paper. Relate it to section 2.1 of this paper.

l. 19: in detail

p. 707, l. 14,15: forecast, lead

p.708, l. 16: 'may be used' is another example of a promotional, overly optimistic statement

p. 711, l. 1-2: Another example where the conclusion is not supported by the results of this paper. This is simply too general and clearly not always true.

p. 717: I had to guess what Table 2 means. The numbers in brackets are probably dates which should be explicitly stated. Say what W1, W2 etc. are. They are not treatments (which is the process of irrigating the sites), they are different plots, from what I see.

pp. 720 and 721: Replace treatment by plot (four times)

p. 722: Give units in right panel of Fig. 1

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