

I find the study interesting and relevant. A better account of irrigation impact and dynamics in LSM is definitely an area that needs investigation. I do miss more specific information on the actual linkage between the described irrigation routines and the so-called hyper-resolution LSM. An actual example on this would have been a particularly strong additional element. As a minimum, a more detailed description on the potential integration should be provided along with its feasibility (i.e., input requirements and sources, crop-specific calibrations, limitations etc) for largescale application. In addition some clarifications to the methodology and findings are needed as detailed below.

*Thank you for the thoughtful review.*

Specific Comments:

1) Hyper-resolution needs to be properly defined. For me hyper-resolution intuitively refers to something that is very fine and very well resolved (i.e. at the meter scale) but that is obviously not the case here.

*We adopted the language from Wood et al. 2011 but will clarify.*

2) L136 – 66: I think that the points made in these sections are valid but I do think that framing would benefit from a slightly more streamlined and ordered structure, if possible.

*Thank you for the suggestion. We will rework the section and streamline where possible.*

3) L67-68: How was the critical field scale established?

*This is the scale at which human-water decisions are made at due to the history of land partitioning. The inherent geometry is dictated in this landscape. We will clarify in the text.*

4) L91: Not sure what is referred to here in terms of the critical LSM scale.

*See comment above.*

5) L94-95: I would hope you could be a little more specific when talking about the next generation of hyper-resolution LSM and operational weather forecast models; what those this statement imply?

*We will try and clarify in revision.*

6) L100-102: I would save the specifics of the irrigation routines to the method section.

*We felt a brief description was helpful to introduce the overall framework of the paper.*

7) L113: I find Fig. 1 pretty poor and not that informative. As a minimum, you will need a meaningful background image for the field boundary overlay.

*Thank you for the suggestion. We will update with a 1 km grid along with a more meaningful background image.*

8) L117: Why the reference to alfalfa here the entire area is under maize production?

*Agreed, will update with referenced alfalfa here.*

9) L125-130: I think that you need to be more specific on the actual datasets used in this study. I see no description of the meteorological forcing data used.

*We will update with a description of the meteorological forcing data. HESS now requires a data availability section we will include.*

10) L134: The full names of the irrigation schemes should be given here as well.

*We will add this in.*

11) L135: Why is “(CM)” given here? Same issue with “(H)” in next sentence. The reference/link is not evident from the text.

*This is the abbreviation for the irrigation routine.*

12) Section 2.2.1: I’m a little confused about the differentiation between CM and HM. HM also seems to be linked to Hydrus but not CM? May need a separate description of HM if that is the case or use CM consistently throughout.

*CM and HM are linked. Hydrus uses the outputs from HM.*

13) L150-151: The inputs (e.g., meteorological data, crop biophysical parameters) to the model are not well described here or in Section 2.1.

*We will update with a description of the meteorological forcing data. Additionally, a crop coefficient table will be added. HESS now requires a data availability section we will include.*

14) L195: “was triggered”

*We will update.*

15) L208: How was daily ETr determined?

*From the meteorological dataset.*

16) L222: HM or CM? See previous comment.

*See previous comment.*

17) L243: So are you saying that you used a nondynamic (i.e., the same) LAI time-series for all years? Why not consider inter-annual variations in phenology? Does these descriptions of HM also apply to CM?

*No, just a single LAI time series for all irrigation routines. The LAI time series is on the daily time step and varies from year-to-year. The description will be updated for clarity.*

18) L244 and L250: The sentence “In addition, HM...” is repeated here.

*Will update and remove the repetition.*

19) L307: There’s an issue with the figure numberings. Fig. 5 referred to here is Fig. 6.

*Yes, will update the figure number.*

20) L317: This is not Fig. 6 but Fig. 5.

*Yes, will update the figure number.*

21) L317-323: I’m confused about these numbers, which seem somewhat conflicting. It is stated that both CM and PD are near the historical average. But then it is mentioned that CM is 80 mm lower, the same as ET. In addition, the percentages differ. I also find it difficult to verify these numbers based on the figure. These issues will need to be clarified.

*Agreed, this does need clarification. The slopes are similar but with an offset. The percentages will also be clarified.*

22) L323: Fig. 5?

*Yes, will update the figure number.*

23) Section 3.5: Why is ET and PD not mentioned here?

*The don’t have a soil consideration within the routine and so soil texture will not have an impact on their numbers. This will be mentioned in the text.*

24) Section 3.6: In Fig. 7, the CM and ET colors can’t be distinguished.

*We will update both colors and line weights for clarity.*

25) L353-354: The historically reported yield should also be plotted on the figure for comparison.

*We only have historical yield for years prior to the study.*

26) L371: Was the 30% reduced irrigation need described/mentioned in the results?

*We will try and clarify in revision.*

27) L401-413: This section is a little hard to follow and should be rewritten for better clarity.

*Agreed, this will be reworked for clarity.*

28) Section 4.4: This section is very brief and would benefit from a much more substantial and elaborate description of the feasibility and limitations associated with the integration of the routines in the LSMs.

*We will expand section in revision as suggested.*

29) L447: Isn't the 1 km scale often too coarse to resolve field-specific irrigation dynamics?

*Not necessarily for this landscape. The land is partitioned into 0.8 km sections. Often irrigation decisions are made for uniform conditions. Some sub field decisions using precision agriculture are now available but not widely used yet.*