

Comments:

Manuscript review for HESS-2013-444: “Irrigated plantations and their effect on energy fluxes in a semi-arid region of Israel - a validated 3D model simulation” by Oliver Branch et al.

The manuscript investigated the impact of a large-scale plantation on energy fluxes in a semi-arid region using the WRF/Noah LSM model. A three-month simulation was carried out, and the model was validated from different aspects based on extensive observations. However, the key conclusions and the model configurations still need further improvement. I would suggest a major revision of this manuscript before possible consideration in the publication of HESS.

General comments:

The total area of the actual plantation is 4 km^2 , not a “large scale” issue as claimed by the authors. In addition, the authors set up only one domain of WRF with the grid spacing 2 km, which is still coarse based on the purpose of this study. I would suggest the authors set up a finer domain or several nested domains, so as to get a better representation of the land surface properties. The 100 km^2 plantation in the IMPACT scenario might not be comparable to the 4 km^2 plantation in reality; the atmospheric impact might differ substantially. I noticed that the authors also realized this disadvantage (Line 307-316, Note: the line numbers refer to the submitted manuscript instead of the discussion paper published online). I would also suggest the language of the manuscript go through a further refinement.

Specific comments:

- 1) Line 6, “land surface atmosphere feedbacks” should be “feedbacks between land surface and atmosphere”
- 2) Line 6, “the 2012 summer season” should be “the summer season of 2012”
- 3) Line 36-39, please reconstruct that sentence.
- 4) I would suggest the authors provide a concise abstract. For instance, the statistics of validation results do not need to be mentioned.
- 5) Line 106-113, please provide necessary references for this paragraph.
- 6) Line 121-122, please rephrase the sentence.
- 7) Since the authors devised a new irrigation scheme within Noah LSM, I would suggest the authors provide more information or comment on the existing irrigation schemes in the Noah

model in the introduction part. The readers might find it difficult to capture the highlights of the paper in the present form.

8) Line 159-160, latitude/longitude, please save to only two decimal place.

9) The readers could not interpret the diurnal variations of T and RH from Fig 2. I would suggest the authors change the presentations of this figure. I would also suggest only show the “mean” curves.

10) Please modify the order of the subfigures in Fig 3, so as to match the text of Line 227-240.

11) Please specify how to obtain the albedo in Fig 4.

12) Line 263-265, this sentence is misleading. The ultimate goal for this paper is apparently not as what the authors said. Please reconstruct it.

13) Line 272, “Fig 2.” probably should be Fig 5.

14) Line 275, please specify what physics schemes were determined by sensitivity tests and how to determine that.

15) Line 286-287, please provide necessary references regarding to the spin-up period.

16) Fig 6. Where is cell X? Please clarify.

17) Line 307-316, the authors put forward the assumptions and also realized the uncertainty at the same time. This part is what I’m most concerned about, as stated in the general comments.

18) Line 320, I would also suggest the authors add more references, which might be useful and informative for the readers.

19) Line 405-407, according to the authors, only the soil moisture within 5*5 cells were modified, while the other surrounding cells kept the same. In that case, the soil moisture field might not be continuous any more, will that influence the results? Please clarify this.

20) Line 444-445, why the U is simulated well in CONTROL case, considering the “height” is not the same at all, 6m VS 10m? I would suggest weaken the validation of the wind simulation section.

21) Line 521, “see 5.1...”, please redirect. Similarly, Line 528, “see 5.1.1...”

22) Line 530-532, please rephrase the sentence.

23) Line 686-688, why not directly compare HFX over plantations and adjacent desert in the IMPACT scenario?

24) I would suggest merge section 6 and 7.

25) Fig 5. “care was taken...”, this sentence should be removed from the caption.