

Review of MS: The Land-Atmosphere Feedback Observatory: A New Observational Approach for Characterizing Land-Atmosphere Feedback by Späth et al.

### **General comments**

The Authors present some sensors integrated in a new experimental site aiming to better investigate the fluxes at the land-atmosphere (L-A). The Authors describes the sensors and the way they are operated. In addition, they discuss some results, as example. Overall, I think this manuscript could be a valuable contribution to the present journal. Despite that, I think the manuscript in the present form has some limitations and it should be improved in several parts. The message should be better conveyed, the structure is in some parts redundant, English should also be corrected to some extent. Below I list my main concerns. Specific comments and minor edits are also reported that I hope can help for further improvements.

### **Main concerns**

[1] as far as I have understood the added value of the new observatory is the integration of sensors to monitor ABL. And this integration can be done in any experimental sites e.g., Fluxnet, iCOS or TERENO sites. So, why not extending the existing network (L59) instead of advertising a new one with a new name? Personally, I would see more convenient (1) to show how to monitor ABL, (2) to explain the added value of these measurements, (3) to explain what to do to extend existing network to account for that. Revisiting the manuscript based on this structure would be, in my opinion, much more effective.

[2] The Authors have planned some intensive operation period (IOP). It is not clear which measurements are performed during these periods, how often these intensive periods are planned and how these activities will be operated when the project will be finished. In this sense I wonder if the operation of this new site will stop when founds are finished and the equipments running for longer term will be then similar to existing network (e.g., fluxnet etc.).

[3] Finally, the Authors argue that monitoring ABL is important to better understand L-A interaction. This is not well addressed in my opinion in the current version of the manuscript. The Authors present some results, as example, but it would help if they also show how these measurements improve our understanding of the L-A relation in comparison to more traditional sites, i.e, what would we have missed if the same site has been a more traditional fluxnet site? In addition, the discussion should be extended in my opinion considering the following questions: (1) how many sites should be equipped to have a better understanding of L-A interactions and (2) how much is feasible to extend the proposed approach to other sites? I do not expect that the Authors can fully address these questions, but I believe these are important issues to integrate in the discussion that could also strengthen the value of the proposed approach.

### **Specific comments**

L11-L16. There are three components. Atmosphere is related to lidar; soil and land-surface with eddy covariance stations and soil moisture and temperature network; what is performed for vegetation is not indicated in the abstract and should be integrated.

L22. I think the term “important” is too vague and the Authors should better show and explain what exactly the added value of these measurements is. See also general comment #3 above.

L56-57. not clear. Something wrong with the English grammar?

L59. Following Helbig et al, the question is how to extend existing network and it is not clear to me why to argue for a new experimental site with a new name (see general comment #1 above).

L111-L112. It sounds strange to have same titles. Please consider rewording, e.g., 2. Observation strategy 2.1. Targeted variables

L131-L145. In this text there is a mix between the description of the targeted variables and how they will be measured. But this is redundant as it should better fit into section 2.3. Please consider moving descriptions.

L140. What are agricultural measurements? What are soil probes?

L145-173. Objectives sounds better for me in the introduction part. In addition, these objectives should be, at least partially, addressed by the results and the analyses presented and discussed. This is well presented in the manuscript because these objectives are not reported in the discussion (see also general comment #3).

L269. Why field capacity and not higher values e.g., saturation? Please also note that field capacity is a debated parameter. I encourage to be more precise.

L302. How is LAI measured/estimated?

L369. “does not decrease” instead of “decreases not”

L399. What is measured for vegetation should be listed (same comment as L11-L16).

L392. In the conclusion section I would extend the acronyms for easy of interpretation (LAFO, GLAFO).

L414. Out? Database.

L414. How the connection is implemented could also be described.

Table 1 can be improved specifying temporal and spatial resolution, and extended to measurements conducted during the intensive operation period (see general comment #2)

Figure 1 shows much more instruments than what is actually described within the manuscript e.g., tensiometer, lysimeter etc. The description should be integrated in the main text.

Figure caption and legend should be more self-explained. E.g., figure 7, explain MLK, L0, S0, Qn