Comment on gi-2022-9

Manuel Helbig (Referee)

Referee comment on "The land–atmosphere feedback observatory: a new observational approach for characterizing land–atmosphere feedback" by Florian Späth et al., Geosci. Instrum. Method. Data Syst. Discuss., https://doi.org/10.5194/gi-2022-9-RC1, 2022

The present study describes the setup and goals of the Land-Atmosphere Feedback Observatory (LAFO). LAFO combines atmospheric, vegetation, and hydroloical measurements to address pressing questions on land-atmosphere feedbacks. The authors give a broad overview of the different components and how they are integrated in LAFO. In my opinion, the manuscript represent an important contribution to the literature outlining how to design an observatory that addresses multi-disciplinary questions at the interface of atmosphere and land.

Please see below some minor comments:

Line 78: Explain why these lidars were important.

Line 82: Do the authors target specific parameterisations in specific models? If yes, then it should be described here in more detail.

Line 84-87: Are the more LAFOs planned? How will this be achieved?

Line 88: Soil measurements?

Line 93: What is the spatial and temporal scale of the targeted feedbacks?

Line 119: Which instruments are used to measure these variables? What is the depth/extent of these measurements?

Line 121: How is the boundary layer height derived? Based on which measurement?

Line 130: When is most used and when is EC used?

Line 136: What is the spatial (and temporal) resolution of WaTSen?

Line 137: How can evaporation be determined? How is drainage accounted for?

Line 164: Unclear what this means. Please clarify.

Line 196: How often is LAI measured?

Line 239 and elsewhere: It is not always clear why some of the atmospheric instruments are not continuously deployed. Please explain why.

Line 274: A simple correlation approach might not be sufficient. Could a more complex model like Penman-Monteith be used to explore soil moisture controls?

Section 3.3: I find that this section is not well integrated. How are all these measurements used to better understand land-atmosphere feedbacks? This should be explained here.

Line 362: How much lower is the MLH?

Line 363: Are these daily averages? Please clarify? Reporting daily averages would be meaningful.

Line 369: This is not surprising. Sensible heat flux should be the main driver of ML growth.

Table 1: I would recommend to avoid as much as possible abbreviations in this table. Also, more information on what these variables can be used for would be helpful here.