

We thank the editor and reviewer for the re-evaluation of our work and appreciate the helpful suggestions.

## **Editor**

### **Specific comments:**

1. *Line 31 Abstract: Could you make it clear what is being compared between urban and rural areas in the first sentence of the abstract. Its obvious later but this is the first line of the abstract.*

Revised as follows:

To compare the impact of surface-atmosphere exchanges from rural and urban areas, fully vegetated areas (e.g. deciduous trees, evergreen trees and grass) commonly found adjacent to cities need to be modelled.

2. *Line 78: sentence is very long. Consider splitting into two.*

Revised as follows:

Parameters for different types of urban areas (e.g. land cover differences) and regions (e.g. high/mid-latitude) have been derived. However, both limited observations and lack of a standard workflow for deriving parameters remains a constraint. This is evident in the availability of conductance and storage heat flux related parameters (e.g. Järvi et al. 2011, 2014; Ward et al. 2016).

3. *Line 90: I assume you could specify that you mean model development or evaluations?*

Here we mean FLUXNET can be used for both development and evaluation. Revised as:

FLUXNET (Baldocchi et al., 2001) is a global network of sites that monitor surface-atmosphere exchanges (e.g. carbon, water, and energy using the eddy covariance technique for the turbulent fluxes). These data provide unprecedented possibilities to advance process-based land surface modelling, through both development (e.g. Stöckli et al. 2008) and evaluation (e.g. Zhang et al. 2017).

4. *Line 260: Sorry I didn't complete understand criteria 3 "model capacity" – does this mean there is something about the sites that means they are not suitable to be modelled?*

Yes, at sites LAI dynamics could not be captured by SUEWS with the current parameterisation. Revised as:

3) model capacity (38/56): the SUEWS v2020a LAI scheme is forced with only air temperature and not other variables (e.g., rainfall) which may strongly influence phenology at some sites (Appendix D). Hence, these sites are excluded.

5. *Line 850: Could you add the Zenodo links for the source code model data to this paper for completeness, obviously maintaining the citation to Sun et al. (2021).*

Added and revised the related text as follows:

All source codes, input and output data are archived at Sun et al. (2021) which can be accessed at: <https://zenodo.org/record/5519919>.

## **Reviewer**

### **General Comments:**

1. *Fig. 5 and 10: The lines are not appropriate. They indicate some kind of course between the different parameters. To use markers in this case would be more appropriate.*

In Fig. 5 and 10, parallel coordinates ([https://en.wikipedia.org/wiki/Parallel\\_coordinates](https://en.wikipedia.org/wiki/Parallel_coordinates), accessed on 26 Feb 2022) are used to link high dimensional datasets. The polylines link labelled features with different scales, removing lines make these linkages much less evident. Caption is also revised as:

Variation in LAI related parameters (12 labelled vertical lines, Sect. 2.2.1) within three land cover classes (colour) showing median (thick line), interquartile range (IQR, 25th and 75th percentiles, dashed lines), site-specific values (thin lines).

2. *Figure captions: Various figure captions refer to other figure captions. This decreases the readability of the manuscript. Sometimes they are even misleading, i.e. in Fig. 15 it is referred to Fig. 14, though figure 15 shows a scatterplot while Fig. 14 shows a boxplot. This is not the same and should be revised.*

Thanks for the suggestion.

The caption of Fig. 15 has now been revised as:

Figure 15: Relation between NOAH and FLUXNET of (rows) three evaluation metrics for (columns) three temporal scales (all,  $n = 38$  sites but different number of samples per site, Table 3; monthly,  $n = 456 = 38 \text{ sites} \times 12 \text{ months}$ ; and hourly,  $n = 912 = 38 \text{ sites} \times 24 \text{ hours}$ ). Data points are colour coded by land cover class.