

# ***Interactive comment on “Analysing surface energy balance closure and partitioning over a semi-arid savanna FLUXNET site in Skukuza, Kruger National Park, South Africa” by Nobuhle P. Majozi et al.***

**N. van de Giesen (Referee)**

n.c.vandegiesen@tudelft.nl

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**General** The article presents an impressive multi-year dataset of energy fluxes over an undersampled part of the world. The focus is on the energy balance closure.

**Major remarks** The article points out the difficulties of collecting valid data over long periods of time. My first question is if the cleaning procedures may have introduced any biases? For example, periods with rainfall often produce problems with sonic anemometers. Could you comment on this?

The second is a pet peeve of mine and concerns the ground heat flux. If I understand

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correctly (the text is not so clear, see also below under minor remarks), you report EBR per half hour. Over the period of half an hour, ground heat flux can typically play an important role. Ground heat flux is also not very well captured with ground heatflux plates, which basically measure the temperature difference between the top and bottom of a piece of plastic in the ground. Even if the plates would work as intended, they are clearly biased as  $\frac{2}{3}$  of the plates are under canopies while only 30% of the area has a canopy. I don't ask for you to go back and repeat the measurements with better measurements of G but a critical discussion is needed. A simple way to get some idea is to compare half hourly results with daily averaged EBRs. G will generally be negligible at daily scales while it can easily make up 50% of the energy balance at a half hourly basis.

Finally, the article would become ten times more valuable if you make the (cleaned?) dataset available online.

Minor remarks Line 29: Winter & summer are not so obvious terms for people not familiar with Kruger National Park. Either use months or, my preference, talk about dry and wet, as you do later under 2.1. Line 36: characterized by or rather correlated with? Line 41: Is the heat stored in the ground not the ground heat flux G? Line 47: Potential evapotranspiration is a problematic term. Better use "reference evaporation". Line 58: "measured" instead of "measurable" Line 92: Here you use Earth, elsewhere earth. I have no preference but best stick to one. Line 117: canopies instead of canopies Line 125: Did you use any software? Is code available? Line 126: You state that all upward fluxes are positive but later you clearly change this in Equation 1 and also when you state that daytime Rn is positive. Line 157: I surmised that you evaluated the dataset by looking at half hourly EBRs. The text here is, however, not very clear on that. Please make explicit. Line 198: Is the 0.81 the standard deviation in the estimate of the mean? Or is it the standard deviation? Also, with EBR always being larger than zero, perfect at one, and not upwardly bounded, would a logarithmic averaging scheme not make more sense? Lines 213 and further and in general throughout this part: You mix

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literature review with results. It is more common not to introduce too much additional information from outside the study past the introduction. Would probably be better to move this to intro (but don't make it too long!). Line 230 and further: The Results and discussion focus on EBR and other outcomes in a very descriptive way. Would be better to already include more physical insights here as to why you see what you see. Line 264: Why the hurry? Here also please expand on role of G as mentioned above. Lines 334 and further: In general, there is a bit of a mix between the focus on EBR and the more general and the probably more interesting general interpretation of results. The article is built up around EBR and only towards the end do general energy & water availability considerations come up. Perhaps point to these earlier in the text. In any case, please shift the perspective from starting with other studies, such as by Gu et al., and comparing those with your results to a perspective that starts with your results and then compares those, preferably a bit more systematically, with other studies.

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