

Interactive comment on “Investigating the impacts of biochar on water fluxes in tropical agriculture using stable isotopes” by Benjamin M. C. Fischer et al.

Anonymous Referee #1

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This work used stable isotopes to investigate soil characteristics after addition of biochar and the effects on water flux and rice water source. It is a very interesting study. The data need much hard work to get it. For me, however, there are three main concerns about this manuscript. Firstly, soil water taken by lysimeters were considered to be mobile water in the soil. This part of soil water was believed that it was not part of the water used by plants or crops (Brooks et al. 2010). For example, in dry days, the water can not be sampled by lysimeters. Is that mean there is no water could be used by plants? The authors also did not give a very clear description for the soil water sampling in the text (start time, duration, how to sample when it rain? how to sample when it was irrigated, and so on). Secondly, there are several methods to calculated

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the proportion of plant water from each water pools. However, the authors seems to judge it more subjectively. I suggest to use a quantitative method to calculate the proportion of various pools in the plant water such as SIAR. After that, a comparison of water use in biochar addition or control treatment should be conducted. Finally, one growing season field trial on the effects of biochar amendment on soil water, water uptake of rice plants at different growth stages did not well support the validity of the study and the observations. The effects of biochar on soil water changed over time. Minor comments: L220 applying an 800-mbar vacuum for 2 minutes. Please gave more information about soil water sampling. L221 waiting 1 hour before collecting the groundwater sample Whether 1 hour pumping will affect the ground water level? L273 method ($ET = Kc \cdot ET_{ref}$) What is the difference for Kc or ET_{ref} between BC and C? L298 $R < 1$ Should be “ $RR < 1$ ”? L393, 397 It seems that the minimum value of plant water of ^{18}O was smaller than the soil water’s? How to explain this? L409, 411-412 Please use the same order for the data. From low to high? e.g. -3.7 ‰ to -12.7 ‰ or -12.7 ‰ to -3.7 ‰ L527 there are two access? L554 we observed biochar amendments to create generally 2 % to 7 % higher soil. 2 % to 7 % should be calculated in the Results part. Brooks, R. J., Barnard, H. R., Coulombe, R. and McDonnell, J. J.: Ecohydrologic separation of water between trees and streams in a Mediterranean climate, *Nature Geoscience*, 3(2), 100–104, doi:10.1038/ngeo722, 2010.

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