Interactive comment on "Can canopy interception and biomass be inferred from cosmic-ray neutron intensity? Results from neutron transport modeling" *by* M. Andreasen et al.

Anonymous Referee #1

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The authors present an interesting study combining novel cosmic-ray neutron probe observations with MCNP modeling. The paper is well written and suitable for HESS. Moreover, the paper is a first attempt to better resolve the discrepancies between observed moderated and bare neutron counts and what is modeled with neutron transport simulations. The ability for the CRNP to detect smaller pools of hydrogen in the environment remains a challenging and exciting problem in this field. I have a few suggestions to help improve the manuscript.

Comments:

The Andreasen 2016 WRR article (i.e. pg. 7 L 18 and elsewhere) is not yet available to my knowledge. I suggest the authors remove the citations or include the manuscript

for the reviewers to investigate. Hopefully the WRR paper comes out before this paper, otherwise the reference is inappropriate in its current form or without the accompanying manuscript.

Based off my own unpublished observations of biomass detection with CRNP, I am curious if plotting moderated counts (corrected for water vapor) vs. bare to moderated ratio vs. standing biomass/water equivalence reveals a linear plane. This linear plane is very evident in soybean and maize data. Perhaps plotting the data in this manner will elucidate the biomass and or canopy interception signal?

Pg 3. L6. free parameters is relatively high...

Pg 4. L11. Should coordinates be in decimal degrees in stead of minutes and seconds? Not sure of HESS guidelines...

Pg 4. L23. How dynamic is the 45% vegetation water component over the year? Were repeated bole gravimetric water measurements made? This turned out to be very important in a study in ponderosa pine in AZ. Unfortunately, tree water content is very rarely reported (i.e. Jenkins 2003).

Pg 7. L 30. Despite the CRNP detector footprint mismatch and volume changes, techniques like eddy covariance have overcame these shortcomings to be established as the gold standard in surface energy balance. This is useful to remember when getting caught up into footprint details that may never be fully resolved. No action items but more of a comment.

Pg 9. L 31. Any idea about the effect of clustering or aggregation of trees in space? Probably beyond the scope of this paper but would be interesting to extend this sensitivity analysis to where the detector is located vs. the local aggregation of tree clustering.

Pg 11. L 29. The relative uncertainty for hourly time series is lower than 2-12 hr and daily? Is that true?

Pg 12. L1. Very different despite of similar soil? Sentence doesn't make sense, please

revise.

Pg 15. L9. As we from the calculation? Sentence doesn't make sense, please revise.

Pg. 16 L 30. Are highly variable. . .

Pg 18. L 7. A remarkable fit. . .