**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "Physical based retrieval of crop characteristics for improved water use estimates" *by* K. Richter and W. J. Timmermans

Anonymous Referee #2

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General comments:

By applying a lookup table for model inversion of the well established SAIL-PROSPECT radiative transfer model, the paper promotes a physical model to retrieve the crop characteristics (fCover and LAI) to improve the accuracy of fluxes estimation in two-source energy balance model. The validation results show the developed physical model has a better performance than the NDVI-relative empirical model for crop characteristics retrieving, and as the inputs for TSEB, the calculated fluxes have also been extracted and analyzed for all land uses over the test site. Based on the conclusion that the physical has advantages over empirical model, the authors recommend to apply physical model for estimating crop parameters as input for energy balance models. The idea of the work is innovative and paper itself is well constructed. All references in the main

text is consistent the afterwards reference lists.

Specific comments:

1) in 2.1.2, 2.1.3 and afterwords, RTM model, I understand it is the physical model developed in this paper, could you please to explain what RTM stands for? 2) Under 3 results and discussions, I think it is better to add a brief introduction of TSEB utilized in this work 3) From Fig2 (d), the measured LAI can reached about 6 for Onion, but the retrieved LAI value is only about 5, that means the model lower-estimated the LAI value, could you please explain what cause the lower-estimations possibly?

Technical corrections

Tilte: Physical based retrieval->physically based retrieval

Replace all "two-source energy balance model" or "tow-source model" by "TSEBB" after its first appearance

P1974 L5 the inputs of Leaf area index ->the inputs of the model, Leaf area index L6 the LUT was constructed using -» the LUT was constructed by using L20 in the last years describing → in the last years by describing P1976 L10 a physical based → a physically based L14 the estimation->the estimations P1977 L5 (set to 5 for): needs reference? L15 VI approach (means what?) L25 skyl, (?)

P1978 L9 the model estimates (which model?) L20 the optimization methods (needed reference) L25 parameterization load -> parameterization loading P1987 L 28 factor->factor in PROSAILH

P1989 L8 TSEBphys (and followings) (means what?)

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