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comment

Interactive comment on "EcH$_2$O-iso 1.0: Water isotopes and age tracking in a process-based, distributed ecohydrological model" *by* Sylvain Kuppel et al.

Anonymous Referee #3

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This review report is for the manuscript, entitled: "EcH2O-iso 1.0: Water isotopes and age tracking in a process-based distributed ecohydrological model" by Kuppel et al.. This study embedded the water isotopic tracers and age into an ecohydrological model, EcH2O and then applied this model onto a small catchment. This model, therefore, could simulate the spatio-temporal variation of water flux and water isotopic composition in soil moisture, plant xylem, and groundwater. Overall speaking, I enjoyed reading this study which, indeed, is a great and innovative work. The spatiao-temporal patterns of water isotopes can be demonstrated now and the hypothesis we have been concerned can be tested. The simulation is promising, which indicates that the present concepts and knowledge are tentatively correct. However, there are still

some concerns that should be addressed for completing the statements. First of all, this study simulated the hydrological processes without parameterization and calibration. Although the lack of calibration is a good way to test hypothesis comprehensively, it would lower the practical applicability for transferring this model to other catchments. This Aberdeen catchment with intensive observations is quite unique around the world. Therefore, it would be great to discuss the potential parameterization, particularly for the soil moisture, transpiration, and groundwater. The parameterization could not only increase the applicability for other catchments, but also help to introduce the landscape characteristics into the parameters, which is an important concern of critical zones where researchers attempt to incorporate the geophysical characterization into substance transport. Secondly, the water isotopic measurement in soil moisture is very difficult and tricky. As mentioned by Orlowski et al. (2016), it is intricate to determine the soil water isotopic composition. Presently, this model integrated all soil layers into one storage, which is acceptable, but can the authors explain more on what kind of soil water they simulated and what is their opinion about this issue in modeling work? Thirdly, the simulated and observed deuterium composition and lc-excess in forest sites exist large discrepancies. It was straightforwardly attributed to the dependency among species. It indicated that vegetation pumping has great differences among species (e.g. heather and forest). It will be great if the authors can give some suggestions for further parameterization. Finally, the observed lc-excess values of groundwater are higher than simulated ones indicating the exaggerated mixing across the soil profile. However, evaporation from shallow groundwater could raise the lc-excess variability as well. Can the authors explain more to this concern and provide some thinking for further modeling development?

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