

Interactive comment on “Identifying hydrological responses of micro-catchments under contrasting land use in the Brazilian Cerrado” by R. L. B. Nobrega et al.

Anonymous Referee #3

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The other reviewers already discussed many aspects and I agree with what have been written. The study focusses on soil moisture dynamic and some soil hydrological properties. Using classical approaches the water balance is computed and as a result, one third of the water is missing. The authors call that recharge/change in storage. Unfortunately, nothing is reported concerning the deeper soil and the geology. How important is the saprolite here? Assuming a specific yield of 0.1 a change in storage would result in an increase in water table by about 10 m in two years for pasture and crop land and still an increase of about 5 m in the cerrado. Is that realistic? I believe it is more realistic to assume that not all processes are determined. Considering the large gap

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in the water balance, I wonder if any specific conclusion can be drawn from this study. I would expect a schematic diagram showing the main processes and storages. Is this really groundwater or is this just an assumption because a simple baseflow filter was used for differentiating between baseflow and direct runoff. It seems that one needs more information about the underground system. Is there a deep aquifer draining the catchment? Does interflow play a major role? Can one compare two catchments with sandy soils (sand content >80%) with the cropland catchment with clay soils (clay content > 50%)? For me this is very difficult. Are the catchments so homogeneous that they can be characterized by one single soil profile? I found Ks values of 15000 mm/d extremely high even if this is a sandy soil. From many studies it is clear that land use change will result in changed soil physical properties like e.g. Ks. It seems that this was not analyzed here What has been measured within the gallery forest which can support the statement that it acts a main water retention area? It is clear that from measuring soil moisture dynamic one cannot conclude anything about water fluxes. Why have the soil moisture data been aggregated to one single profile although it has been measured along a transect?

The authors showed many figures which I found superfluous for answering the research question but they did not show where e.g. they measured soil moisture. Although the text is easy to follow, there are too many details given which are not required or not discussed in detail.

I am afraid that this study does not significantly contribute to the understanding of the system. I have doubts that one can compare the cropland catchment with the others. More important is that a significant part of the water balance was missing and that this part (groundwater) was not studied at all. Maybe there are interesting details if one analyses soil moisture dynamics in more detail. I recommend developing a conceptual model of the processes, applying dynamic simulation models and studying the effect of land use on soil hydrological processes and evapotranspiration.

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