

Interactive comment on “Hydrological trade-offs due to different land covers and land uses in the Brazilian Cerrado” by Jamil A. A. Anache et al.

Anonymous Referee #2

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The authors assess the impact of four different land uses (bare soil, sugarcane, pasture and wooded cerrado) on water balance components (mainly runoff and actual evapotranspiration) monitored in experimental plots (5 m width, 20 m length and 9% slope). The paper is potentially interesting for the readers of Hess, however it requires major revisions. In sub-Section 2.2 (“Experimental setting and instrumentation”), please clearly describe the monitoring infrastructure (refer to Fig. 2) by adding information on soil moisture probes, monitoring wells which are described in other parts of the manuscript. Please add the thickness of the unsaturated zone (40 m) in Fig. 2. Not clear Kc-values for sugarcane in Table 2. Do they refer to monthly values during the growing season? How do you obtain field capacity and saturated hydraulic conductivity? Please specify the root zone depth for sugarcane and wooded cerrado. In

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sub-Section 3.2 (“Groundwater table fluctuation”), the results are suspicious. The authors declare $K_s=10^{-3} \text{ m d}^{-1}$ for a sandy soil (very low if compared to tabulated values, see publications of Clapp and Hornberger, 1978; Schaap et al., 2001; Twarakavi et al., 2009 to mention a few). The main problem is the relationship between water storage change and water table fluctuation in Fig. 4. If $K_s=10^{-3} \text{ m d}^{-1}$, and hypothesizing full saturation of soil profile, we can apply the Darcy law with the unit gradient and water takes about 4000 days to bypass 40 m of soil and reach the water table. Please check if I am wrong. If I am approximately right, the relationship between soil water storage change and water table fluctuation should be influenced by a time lag. The main concern of this study is that the authors draw general conclusions on a small-scale, quite “homogeneous” test-site (experimental plots of 5 m width, 20 m length and 9% slope) by ignoring large-scale spatial heterogeneity of soil properties and topography. Hence this study can be considered as a preliminary survey for a more ambitious scientific investigation.

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