

Interactive comment on “Runoff formation from plot, field, to small catchment with shallow groundwater table and dense drainage system in agricultural North Huaihe River Plain, China” by S. Han et al.

Anonymous Referee #1

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This paper addresses known topic that subsurface soil moisture status influences significantly the runoff formation and provides nice evidence on man-made drainage system behavior in multiscale agricultural setup worth to be published. The paper should stress out that groundwater table as a wetness indicator is a proxy only to the soil-moisture status. Rough estimation of the available water storage towards the accumulation availability of the water in the vadose zone is advised based on simple tools as retention curve derived e.g. from particle size properties assuming equilibrium distri-

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bution of the soil water content along vertical axis, if measured data are not available. Site is described as relatively homogeneous and whole evidence is provided on one borehole anyway, so it is more of the conceptual rather than detailed spatial approach. That would nicely confront the available porous space and rainfall amounts for the listed rainfall runoff events and e.g. runoff ratios/ runoff thresholds. There are papers worth mentioning to complete the literature review regarding the rainfall runoff formation on the hillslope in recent decade. Hrnčir paper (Hrnčir et al., 2010) is incorrectly cited both in the text and references – this paper has three more authors. Page 4236, line 15 study makes classes of groundwater table of less than 0.5m, 0.5-2.3m and more than 2.3m however another threshold of 2.1m (e.g. p4244 line3, 26; p4247, line 25) is used sometimes during the text, please harmonize or explain this irregularity. Harmonize expression groundwater and ground water throughout the text. How are the rainfall runoff events separated from the rest of the time, esp. at the end of the event (e.g. by reaching certain flow threshold in the stream?) Page 4240, line 9: saturation conductivity: use saturated hydraulic conductivity, instead Page 4240, line 11: do not use approximate expression as “very little variability”, specify in statistical measures Page 4240, line 19: float method is mentioned, how do you achieve the integral result – is it manually measured during the whole event and if – how often?, please specify Page 4242: how do you justify discrepancies in amounts and dynamics of the runoff formation at three scales. Are there processes which are not captured at all three scales? : plot, field and catchment scale. Please make hypotheses in the results and discussion, the location of the three, where plot and field lie on the very edge of the catchment might explain different travel times and dispersion of the peak discharge in the hydrograph. Page 4244, line 5: is the word “interception” used in the meaning of the rainfall interception on vegetation? if the word is used in the meaning of soil moisture storage it is suggested to use different expression esp. when the next chapter relates to the crops on the study area. Page 4245, line 4 & Page 4247, conclusion 2: do not use expression as: “water table rose a lot”, provide the mathematical measures or relative to typical groundwater behavior Page 4246, line 12: ditch or ditches instead

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of ditches – 2x Page 4247, line 21: found instead of founded Page 4247: conclusion on: groundwater table is a proxy of soil moisture and it is not the factor, but consequence of the processes in the vadose zone. The relations to runoff formation and groundwater table can be found, but they do not prove the actual physical cause. Table 2: mistype: Category* v. Category* (in the heading and in the subtitle) Fig.7: legends: growth v. growth Fig. 8: average v. average If the research is to be continued, natural behavior of stable isotopes in the water molecule is advised to utilize in order to distinguish over-land flow and groundwater discharge processed forming the total runoff and precise the present findings

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