

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2020-659

Anonymous Referee #1

Referee comment on "Taking theory to the field: streamflow generation mechanisms in an intermittent Mediterranean catchment" by Karina Y. Gutierrez-Jurado et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2020-659-RC1>, 2021

General comments

This study is a follow-up of a 2019 research paper by Gutierrez-Jurado et al. where an integrated surface-subsurface hydrological model (ISSHM) was applied to explore the processes that lead to the transition from a dry streambed to a flowing stream in non-perennial streams. Here an adapted version of this ISSHM was applied to the Pedler creek catchment. The authors consider different streamflow generating mechanisms for three catchment areas based on the catchment topography and six detailed soil profiles. They use Hydrogeosphere to simulate a set of eight scenarios (3 of these are discarded because of high computation times) with different hydraulic conductivity parameters and an (un)incised river network. The results show that different flow generating mechanisms ensue in different catchment areas, based on the soil properties (or topography).

I strongly recommend for the authors to improve the readability of their manuscript. The sometimes odd sentences make it hard for the reader to grasp the content.

Specific comments

The introduction needs to be thoroughly revised (see technical corrections). It would be interesting to include a compact review of past modeling efforts of non-perennial rivers as in l40 the authors touch on that only briefly. Also, in the paragraph on using numerical models for this purpose (l39-l50), the dis(advantages) of such models can be more broadly addressed. Although the goal of the study is mentioned, a hypothesis or research question is missing here and should be specified.

In Sections 2.2.1 to 2.2.3 the authors state the most dominant streamflow generating processes for the different topographical areas they consider. It is unclear however where these hypothesis originate from as no references to existing literature are made.

If I understand the modeling setup correctly, different hydraulic conductivity parameters were chosen for sand and loam. The authors should mention clearly how these parameters were obtained and what parts of the model were calibrated. Also, I'm questioning the suitability of using a numerical model to look at the impact of subsurface hydraulics to stream flow generation, as the authors indicate in the discussion (1422-424) a conceptual model might be a better fit.

Technical corrections

See attachment

Please also note the supplement to this comment:

<https://hess.copernicus.org/preprints/hess-2020-659/hess-2020-659-RC1-supplement.pdf>