

***Interactive comment on* “Research on the initial abstraction – storage ratio and its effect on hydrograph simulation at a watershed in Greece” by E. A. Baltas et al.**

Anonymous Referee #3

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This article presents an application of the SCS model to an experimental catchment in Greece. The SCS model is coupled to a unit hydrograph to simulate runoff both at sub-catchment and catchment scale. The authors compare two methods to determine the catchment’s initial abstraction; a) based on observed rainfall/runoff data, b) assuming the empirical relation suggested in the SCS guidelines; and compare the errors made on peakflow time and rate using both methods. Despite the empirical nature of the SCS equations, they have been included in several widely used hydrological models (SWAT, HEC-HMS, AGNPS) and it is always interesting to see applications on new datasets, especially from Mediterranean countries. Although, from a theoretical perspective, this publication offers little novelty, its forte lies in the experimental data used. However, the

authors need to make important changes to the paper's structure and content before it can be accepted for publication. I strongly recommend changing the title of the paper and rewriting the introduction which in its present form does not indicate the objectives of the paper nor the purpose of the study. Similarly, the discussion and conclusion should be improved and the results presented by the authors should be compared to those of other studies, sites, and catchments.

General comments

1) The literature review presented by the authors is poor: 12 references of which 4 are MSc theses! The introduction fails to highlight the originality of the presented work or to give proper credit to recent work on the SCS model (e.g. Michel et al., WRR, 2005; Chahinian et al., Journal of Hydrology, 2005; Mishra and Singh, Hydrological processes 2004, Mishra et al., 1999; Peugeot et al., Journal of Hydrology 1997, Michaud and Sorooshian, WRR, 1994 etc..).

2) No justification is made as to the choice of the model or insight given on the whole purpose of the study. Why have the authors chosen the SCS? Why are they attempting to model this catchment? The authors have used various methods to determine the initial abstraction and storage ratio. However, in most modelling applications, the SCS model is calibrated. Why didn't the authors consider this possibility?

3) The section on the study area is well written. However, the authors fail to discuss the uncertainties related to the data (i.e. precision of streamflow and rainfall records) and to discuss their results in view of these uncertainties.

4) There are some repetitions regarding the methodology which can be avoided by shortening, deleting or relocating certain paragraphs (e.g. P. 2171 L11-L.28; P.2180 L.10-22).

5) The results should be compared more thoroughly to those presented in the literature. This can be easily achieved once the literature review is improved.

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6) The conclusions should be extended and improved. The reader has no possibility of knowing whether the conclusions are specific to this catchment or could be extended to others.

Specific comments

1) P.2172 L. 17-29. Which hydrologic soil groups do these formations correspond to?

2) P. 2173 L.26 and P.2174 L.4. Why were these two conditions imposed?

3) P. 2179 L. 2179; P. 2188 tables 3 and 4. Are the CN values consistent with regards to the soil types, landuse characteristics and soil moisture conditions? Is the variation of CN values between events to be expected? Is this span “logical”? What is it due to? If the authors do not intend on discussing the CN values, it would be advisable to delete equation 4 and remove the corresponding columns in tables 3, 4 and 5.

4) On page 2181 L.1 the authors state that “The time to peak flow is defined as the period of time from the beginning of the rainfall to the time of the peak flow”. For the multi-modal hydrographs (i.e. events of Nov. 25 and October 31), which peak was considered? The one with the highest value or the first one in time?

5) On page 2182 L.12 the authors state that the initial storage influence is greater on the time distribution of short-duration events. But given the fact that these events seem to have lower flow values, can it not also be due to measurement errors?

6) On page 2182 L. 20 the authors state that the low amount of initial abstraction is owed to the impervious areas of the Drafi settlement. Can't it also be related to the fact that all events are in nearly saturated conditions (P. 2173 L. 26) ?

7) P. 2198-2204 fig. 5-10. Please rescale the Y axis so that the readers can visualise the relative importance of each event. These figures could also be presented on a single page.

Suggestions

1-I would advise the authors to rewrite Sections 1, 3 and 4. Sections 1 and 3 would certainly benefit from additional literature review, focusing specially on recent publications.

2- I would also suggest regrouping everything related to materials and methods in paragraph 3. This means:

- a) Changing the title of section 3 to “Materials and methods” instead of “Data analysis”
- b) Regrouping paragraphs 3.2.1 and 3.2.2
- c) Moving equation 4 to paragraph 3.2.1
- d) Creating a new paragraph 3.2.2 “Model application” and moving the last two paragraphs of page 2175 (L. 15 to 25) and the paragraph before last on page 2178 (L. 16-20), plus the three first paragraphs on page 2180 (L. 10-22) to this paragraph.

Technical corrections

Although I am not a native English speaker, I couldn't help but notice a few mistakes in the use of prepositions and some oddly written sentences. Some language editing by a native speaker would be advisable.

Title: “..hydrograph simulation at a watershed in Greece”» “Ěhydrograph simulation of a watershed in Greece”

P. 2170 L.10, L. 18, P. 2171 L. 10, 15 and elsewhere “atĚevents”»”for Ěevents” P. 2170 L.16 “amount”» “amounts”

P.2171 L.2 “not impervious areas”» “no impervious areas”

P.2171 L.2, L.11, L.19 “ at the northern part”» “in the northern part” P. 2172, L. 15 “diet”» “regime”

P.2171, L. 14 weird sentence “The estimated by the SCS method time distribution of excess rainfallĚ”

P.2173 L. 5 weird sentence, probably a missing verb? “three gauges that are properly installed in order the complete picture of rainfall’

P.2172 L. 6. “located at the eastern side”» “located on the eastern side” P.2174 L.18 lt/s»L.s-1

P. 2178 L.1 “towards the final”»”towards the end”?

P.2179 L. 23 “ Low runoff coefficient ”» “ Low runoff coefficients ”

P. 2180 L.10 “Two simulated hydrographs were calculated”» “Two hydrographs were simulated”

P.2181 L.8 “with the exception at three out of eighteen events” » “With the exception of three out of eighteen events”

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