

The authors introduced a method to estimate the change of the root zone storage capacities after land use change in three experimental catchments. The topic of this paper is in the scope of HESS, and relevant. Overall the paper is well-written. Some corrections and suggestions for improvement are listed below.

### General comments

- In general, I find the paper too long. Maybe some details of the methodology can be moved into the Supplementary Material.
- I suggest to be more precise in the title. First, ending the title by “under change” seems quite strange to me. Is it still land use change, or climate change or other ? (same remark at line 10 of page 2). Then, “predictions” is too vague because it can be applied to many processes (prediction of discharge, of flood, of vegetation dynamics...). In addition, more discussion on the potential applications with this kind of method is needed in the conclusion and perspectives.
- The results and the figures, which include many hydrological signatures, are not always simple to read and to analyze. Then, the interest of the discussion can be lost during the reading of Section 4. Thus, I would recommend to split this section in 2 sections to distinguish Results and Discussion.

### Specific comments

#### Abstract

1/ “long-term data” => you can be more precise

2/ line 24 of page 2: “better representations of high flows and peak flows” => what about the low flows ?

#### Introduction

3/ To be more precise, the vegetation partitions first precipitation into interception, stemflow and throughfall. Then, the fraction of rainfall that reaches the surface is partitioned into evapotranspiration, drainage and also surface runoff.

4/ line 28 of page 3: the year is missing for Vose et al. and also in the References section.

5/ line 10 of page 4: interception/soil evaporation/transpiration and surface runoff/drainage

6/ line 21 of page 4: “system” is unclear. Please reformulate.

7/ lines 30-32 of page 4: The sentence is difficult to read. Please rewrite.

8/ lines 6-7 of page 5:  $S_R$  has already been defined in page 3, line 15. The best is to combine “sometimes also referred to as plant available water holding capacity” with the text in line 15 of page 3.

9/ lines 18-21 of page 5: the sentences are very unclear. Please reformulate.

10/ lines 3-4 of page 6: words are missing in the 2<sup>nd</sup> hypothesis formulation, please check.

#### Section 2

11/ In each sub-sections, the references to Table 1 for watershed characteristics should be merged and written once in the section, just before sub-section 2.1. Then, the references at lines 12, 19-20 of page 6 and lines 1-2 of page 7 can be removed.

#### Section 3

12/ lines 14-17 of page 9: For long-term mean variables:  $E_t \Rightarrow \bar{E}_t$ . The same for Q and  $E_p$ .

13/ line 5 of page 10: “obtained by equation 6” => “obtained by equation 7”

14/ lines 7-9 of page 10: this is a strong assumption, especially under climate change where the water storage changes. This point should be more discussed when the method based on the water balance is applied.

- 15/ line 11 of page 11: “FLEX-based model” => “The FLEX-based model”  
16/ line 1 of page 12: this process is not represented in Figure S2.  
17/ line 9 of page 12: what are the fluxes ? Moreover, transpiration is indicated in the text but “Evaporation” is written in Figure S3. Please, check the coherency between the text and the Figure.  
18/ line 11 of page 13: what is n ?  
19/ line 4 page 14:  $Z_{95}$  should be  $Z_{p95}$   
20/ line 2 page 16: “Table 2” => “Table 3”

#### **Section 4**

- 21/ lines 23-24 of page 17: this is not particularly obvious in Figure 2f.  
22/ lines 20-21 of page 24: I do not see this improvement on Figure 10, maybe due to the scale of the plots.

#### **Table/Figures**

- 23/ Table 1:
  - I would add a column for the abbreviations of each catchment, as used in figure 9 (see my comment hereafter for the whole text).
  - “Precip” should be “Precipitation”.
  - what is “Pot.” ? It is the potential evaporation?
  - remove “%” from 87% in the last line.
- 24/ Table 3: the reference for Jothityangkoon et al. (2001) is missing in the References section.  
25/ Figure 1: in the label of y-axis, “P” should be “ $P_E$ ”

#### **Supplementary material**

- 26/ Table S1: please check the  $I_{max}$  values (Min=Max=0 !)  
27/ Figure S2:
  - replace “Snow” term in the figure by “S”.
  - $P_{eff}$  and interception are not represented in the Figure.
  - $q_3$  should be replaced by  $q_2$  in the figure.
- 28/ Table S2: the wilting point cannot be higher than the field capacity. Please check the max values.  
29/ Figure S3:
  - replace “Snow” term in the figure by “S”.
  - $q_3$  should be replace by  $q_2$  in the figure.
  - Q should be replace by  $Q_f$ .
  - what is  $dq$  ?
- 30/ Figure S4: the surface runoff is missing.

#### **In the whole text**

- choose between “parameterization” and “parametrization”
- I suggest to use the abbreviations of the catchments in the text, as used in figure 9. It will facilitate the reading of the paper.
- there is a confusion all along the text when the term “evaporation” is used. The term “Evapotranspiration”, which is the sum of soil evaporation, interception evaporation and transpiration, is more adequate.