

Dear Dr. Nunzio Romano and Reviewer 1,

Many thanks for the additional technical notes on the manuscript entitled “Riparian evapotranspiration is essential to simulate stream flow dynamics and water budgets in a Mediterranean catchment” (hess-2017-735). We have considered them in the new revised version of the manuscript and the supplementary materials. Briefly, we have checked all the values along the manuscript to ensure that we provide the same results in the abstract, results, and discussion. Furthermore, we agree that some sentences needed further clarification, and we have rewritten them accordingly. Finally, your editing suggestions have been also included in the text.

We hope these changes correctly address your comments.

Sincerely,

Anna Lupon

CC: José L. J. Ledesma and Susana Bernal

Reviewer 1:

The authors have successfully revised the manuscript. Both the objective of the study and the model setup and functioning are much clearer now and all comments given by myself and the other two reviewers were addressed satisfactorily. I would recommend publication with some final minor technical corrections. **Answer:** Many thanks for the additional comments on the manuscript.

L25-L26: The given numbers refer to the calibration plus reference period (cf. L294-297). Add this information in the sentence (e.g. “... of annual water depletions over a 20 years reference period (1981-2000) ...”). **Answer:** Ok, we have changed the sentence accordingly (L25).

L26-L28: It should be clarified that the increase in the contributions to the water budgets is only small (cf. your statement in L.398-399). Maybe you could add a percentage (as done in the previous version) both here and in L398-399. In addition: “the driest years” are never mentioned explicitly elsewhere in the manuscript, so either remove the phrase here or add the information in the results/discussion (e.g. Fig. 5). **Answer:** We have clarified that “climate change scenarios suggest small increases in the contribution of riparian ET to annual water budgets” (L26-28). Moreover, we now specify the percentage of increase (i.e., 1–2%) both in the abstract and in the discussion sections (L28, L394). Finally, we have removed the sentence referring to the driest years.

L77-L79: I would suggest to mention here that you test the model with and without the riparian compartment. **Answer:** Ok (L82).

L92-L93: Rewrite to: Soils of heathlands, oak and beech forests are sandy with a 3 cm deep O horizon followed by a 5-15 cm deep A horizon and a > 100 cm deep B horizon. Rewrite L98-L99 accordingly. **Answer:** Ok (L95-96, L100-102).

L95: Remove the s of increases. **Answer:** Ok (L98).

L104 and L108: Replace at with in. **Answer:** Ok (L107).

L118/19, L123, Supplement 1: Recheck the formulations. It is a bit confusing if the riparian forests are a landscape unit (see supplement) or a catchment compartment (= “bucket”). **Answer:** We have rewritten the supplements to clarify this issue (Supplement 1).

L124-L125: This sentence is not very clear to me, try to rephrase it. **Answer:** We have clarified that “from the upper soil box, water can infiltrate to lower soil boxes (e.g. groundwater), move laterally to the riparian zone or the stream, or return to the atmosphere via ET” (L125-126).

L128: Maybe use the same parameter names in Tab S3 **Answer:** This sentence is no longer needed. Thanks anyway!

L128-131: Consider to remove or reformulate the two sentences. In the present form I only understood their meaning with the help of Tab. S3 **Answer:** Ok, removed.

L135: Remove calibration data (since you also use ET values for soft calibration, just mentioned in 3.3). You could even move the first two sentences of this paragraph to the next section (to L167) and avoid to mention “calibration” in this section. **Answer:** We have removed “calibration data” from both the subheading and the sentence. However, we decided to keep these two sentences here to clarify the data used (as suggested by reviewer #2).

L144: Supplement 2. **Answer:** Ok, thanks (L143)

L171-172: It would be great if you would mention which parameters for ET were adjusted here or if you at least mention it somewhere in Supplement S3 for Tab. S4 (cf. my former comment #17 and your reply to it). **Answer:** For soft calibration, all parameters were slightly modified to simulate realistic values of evapotranspiration (ET). Yet, it is true that some parameters had a major effect (e.g. “degree day ET”, “growing degree threshold”, “ET adjustment” and “retained water depth”). We now mention these “key” parameters in the Supplements (Table S3).

L215: Substitute text with test. **Answer:** Ok.

L227: Substitute 1933 with 1981? **Answer:** Yes, 1981. Thanks for noticing (L225).

L256: I think the precipitation data really help to understand the streamflow behaviour better (cf. former comment #24), showing that it is an interplay between precipitation input and the season (thus ET). Unfortunately I also wouldn't agree that the streamflow is lower during the vegetative period than during the dormant period and I would suggest you simply remove the sentence L255-256. **Answer:** We agree with the reviewer that the seasonal pattern of stream flow is an interplay between precipitation and ET. Accordingly, we have modified the sentence as follow: “The three sites showed the same seasonal pattern, characterized by high flows during rain events and low flows in summer” (L253-254).

L269: I would call “low flow period” the period between August and October (cf. L345-346). Therefore I would suggest to replace “even during low flow periods (June-September), especially 2012” with “except at the end of the vegetative period (August-October)” **Answer:** Ok, we now refer as “low flow period” the period between August and October (L267).

L300: You have to recalculate the percentage value. The lowest value you obtain is 826 mm/yr, which is lower than the value for your reference period and thus not 2% (which corresponds to the value of

879mm/yr, which you indicated in the previous version manuscript). Also adapt it in L396 and L425. **Answer:** That's right. We now state that climate change scenarios suggest relatively small changes in mean annual riparian ET (from -4% to +13%) (L297). Moreover, the discussion reads as follows: "The simulated increase in ET induced by the future lengthening of the vegetative period could be higher than the reduction of ET rates during summer, which ultimately could potentially increase annual riparian water use up to 13%" (L390-391).

L304: The value for scenario RCP 8.5 percentile 0.25 is higher (8.25%). **Answer:** Right, we have changed it accordingly (L301).

L306: It is not possible to see this increase of days with $ET > 0$ mm/d in Figure 5, since you only show the mean ET over the reference period (which never goes below 0 mm/d!) and not the ET for single years of the reference period. Either remove the cross-reference to Figure 5 or consider including some/all single years of the reference period in the figure. **Answer:** We have removed the cross-reference.

L326-L327: This is the only sentence in the manuscript where it is still confusing what you considered as the downstream site (because the 10% riparian zone refer to the local drainage area of 4.42 km², the model output at the downstream site integrates the flow of all the drainage area). I would suggest to rephrase it. **Answer:** That's correct. We have clarified that model simulations at the downstream site integrate all processes occurring at whole-catchment scale (L323-324).

L335: Add: at the downstream site. **Answer:** Ok (L332, L338).

L365: I would suggest to remove "saturated". **Answer:** Ok, removed.

L373: components instead of component. **Answer:** Ok (L369).

L378: Maybe remove "projected for later in this century" **Answer:** Ok, deleted.

L390: scenario and year (cf. L306) **Answer:** Ok, changed (L384).

L419-L420: You should give the same values here as in the abstract (L25-26); additionally consider to remove "dry". **Answer:** Ok, we now report the whole range of values (i.e, from 5.5 to 8.4%) (L415-416). Also, we have deleted "dry" from the sentence.