

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1  
<https://doi.org/10.5194/hess-2021-103-RC1>, 2021  
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## Comment on hess-2021-103

Anonymous Referee #1

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Referee comment on "Analysing river network dynamics and active length - discharge relationship using water presence sensors" by Francesca Zanetti et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-103-RC1>, 2021

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Review of the manuscript HESS-2021-103 "Analysing river network dynamics and active length – discharge relationship using water presence sensors" by Zanetti et al.

### General comment

This is an interesting work based on a relatively new technology that has the potential to offer new insight into the dynamics of stream network in small catchments. Streams are highly dynamic systems and characterizing such "liveliness" is important to move towards a better understanding of catchments' functioning.

Overall, this manuscript is well written, logically structured, and clearly illustrated. The introduction is solid and the results are well supported by the data. I have only some specific and minor comments that I would like the Authors to address (see below). Overall, I recommend a moderate revision but since the MODERATE grade is not available to HESS reviewers, I indicated minor review in the review form.

### Specific comments

L78-83. I think that the three research questions could be more appealing than the current ones. I understand that, as this is a relatively new measurement approach, aiming at providing the reader with some methodological observation is useful for possible further application of the methods. So, I like question 1. However, I would move it as last question because, in my opinion, it's more important to focus on processes that the method is able to describe and understand, rather than on the method itself. The second question is a bit too narrow because it implies a "yes" or "nor" and does not lead to much insight into hydrological processes. Similarly, question 3 sounds a bit too "methodological" and not so oriented towards process understanding. So, I suggest moving question 1 as third, and to rephrase question 2 and 3 and bit. Of course, the results and discussions should be reorganized to reflect these changes. Indeed, my overall impression is that this work is much technically- and methodologically-oriented and less prone to describe and understand hydrological processes, and I guess that reader of this journal are more interested in knowing how catchment works rather than know if some data can fit a certain model or no. So, I invite the Authors to consider revising the work to reflect this aspect.

L127. What are the criteria for the choice of the field deployment? Please, specify.

L145. This sounds a very short period to me. I understand that practical issues might be arisen but typically we need a longer time period to observe hydrologically processes that often highly variable in time. Si the average rainfall and streamflow in this period comparable to long-term rainfall and streamflow (or compared to the other years where observations are available, since this is aa relatively new experimental catchment). I think it's important for the Authors to discuss this issue, explain why (if) they reckon this is a suitable spell and why, and why (if) this is a representative period for derive information on the hydrological functioning of this catchment. Moreover, the should discuss how this short period of time can potentially impact on the results.

L184. Where was the sensor placed? In the grass in a convergent zone, I guess, where water was not flowing? Please, give more information on the aspect of sensors deployment in the field.

### **Minor comments**

L5. I suggest considering the term "customized" instead than "personalized".

L6. I suggest removing "analysed,".

L6. The expression "nodes' persistency" is not clear without reading the manuscript. Please, clarify.

L37. Perhaps here the citation to Godsay and Kirchner (2014) fits well. In any case, a more recent references would be a nice complement.

L129. "heterogeneous persistencies so as to avoid redundancy in the data." This is not clear to me, please specify.

L160. Which observations? Please specify. What does "some modelling" mean? Please, explain.

L176. Building a reliable flow rating curve, especially in mountain catchments, is a challenge. How many points were collected to build the FRC, and what was the range of streamflow values and the resulting goodness of fit measures? In other terms, is the FRC reliable to infer robust streamflow values? Please, explain.

L178-179. I understand that the Authors want to give light to the ERC project but this is not the right place. Please, remove.

L199. Did the Authors create a definition of "reliable" for their purposes? The distinction between reliable and not reliable data can be vague. Please, specify what you mean by "reliable".

L356. I suggest considering replacing "got" with "became".