

## Response to editor-in-chief

Dear Prof. Dr. Nadia Ursino,

Thank you very much for the feedback and the decision of considering accepting our manuscript after minor revision. We have revised our manuscript with point-to-point responses to the comments from anonymous referee # 3, and also addressed the question of the specific target of our study. The revised files, reply to comments and marked-up manuscript are uploaded.

We are looking forward to your further revision.

On behalf of all authors,

With best regards,

Min Lu

Corresponding author

## Response to anonymous referee # 3

Dear Anonymous Referee # 3,

Thank you very much for reviewing our paper and we are very grateful for your time and comments that help to improve the manuscript.

We have responded point-by-point to your comments and suggestions. Please check the detailed replies in the following sections, with your original comments in *italic* and our answers in **blue**. A revised manuscript which specifies the adjustments based on your comments is also provided in an attachment. The line numbers below refer to the revised manuscript.

We are looking forward to your further assessment.

On behalf of all authors,

With best regards,

Min Lu

Corresponding author

## 1. General comments

*This manuscript describes a study on three watersheds in low-lying areas of Belgium. The key interest is to describe how groundwater levels respond to weather (precipitation and temperature—a stand-in for evaporation rate), and seasonality, and then how groundwater influences or contributes to streamflow.*

*Various techniques are used to separate baseflow from runoff, and impulse-response models are used to model the links from precipitation to groundwater levels to baseflow. The impulse-response methods used have separate terms for slow and fast responses. In addition, time-series analysis is used to determine long-term trends and seasonality in key variables.*

*I found the methods used and the analysis to be interesting and worthwhile. However, the manuscript seems to be ambivalent about its purpose. That is, are the authors interested in these three watersheds, or in all similar watersheds? Are they looking for the techniques that work for these watersheds, or are they providing a specific example that can be followed for other watersheds? My impression is that it is a combination—specific techniques applied to characterize specific watersheds that can be used to characterize other watersheds as well. If this last combination is the intention of the authors, it would be helpful if they would make it more apparent.*

*The basic structure of the project—comparing results from baseflow separation to results from the impulse-response modeling—was a clever combination of empirical and modeling approaches that yielded important characteristics of the watersheds.*

- Thank you very much for your positive comments, support for the manuscript and addressing the novelty of the combined approach used in this study.
- Regards to the purpose of this study, your impression is right. It is indeed with a broader vision in potential applications. We wanted to develop a combined approach to reveal the close links between different components (precipitation – groundwater – baseflow – streamflow) in the lowland hydrological system, without initiating a complicated distributed model at the first step. By applying and testing the combined approach in three specific catchments, we would like to know whether it can work well in these catchments and whether it can be further applied in all similar catchments or not.
- We thank you for this suggestion and agree to make this point more apparent. In the introduction part, we added in Line 69 and 70 “If this combined approach can be successfully applied in these three specific catchments, it can potentially be applied to catchments with similar conditions worldwide.”. In the conclusion part, we recalled back to this point by adding the sentence in Line 578 and 579 “Based the performances of the combined approach in our study sites, we consider this approach has further potential to be applied to similar lowland catchments with small area coverages and under natural conditions or limited human impacts.”.

## 2. Specific comments

- Line 73—two watershed areas are given but there are three watersheds.

- Thank you for the comment. After checking this line, we think there is a misunderstanding of the decimal separator. In this sentence, comma is not used as a decimal separator but an element separator for digits 95 and 272, which are the areas of the first two catchments.

- Figure 11—Perhaps an intuitive explanation for the principal component time series?

- Thank you for the suggestion. We agree that it is necessary to explain more clearly the principal component time series. We added in Line 398 from “... to a relative elevation (in meter) ...” to “... to a relative elevation (in meter, dividing the scores of the first principle component by the sum of the loadings) ...” and a new sentence in Line 399-401 “This time series can be interpreted intuitively as the relative difference of the groundwater level across the catchment at a certain point-in-time, with the average groundwater level.”.