I am reviewer #2 in the first round of review for the manuscript of “key challenges facing the application of the conductivity mass-balance (CMB) method: a case study of the Mississippi River Basin”. The authors have addressed all reviewers’ comments and made a substantial improvement in the manuscript. However, I still have some minor suggestions, which will make this manuscript even stronger for this research theme. Therefore, I suggest a minor revision for this revised manuscript. Also, in my view, no further review is needed when the authors submit their revision only if the comments are carefully revised and figures in the manuscript are modified.

1. Sensitivity analysis for the conductivities of baseflow and surface runoff

In the manuscript, the takeaway messages from the sensitivity analysis I can get are that the baseflow index is more sensitive to the conductivity of baseflow sensitivity (BFsc) than the conductivity of surface runoff (SRsc). This conclusion has been mentioned in several case studies. The contribution of your study is to explain the uncertainty of BFsc and SRsc in the uncertainty of the baseflow index. However, when someone adopts the CMB method for baseflow separation, the concerns are how big the BFI errors are when BFsc and SRsc are over- or under-estimated by a certain percentage. For instance, in the sensitive analysis of Zhang et al. (2013), (which you labelled as 2012 in your paper, correct it for your next revision), if BFsc had been underestimated by 20%, BFI would have been overestimated by 26%. Overestimation of BFsc, however, would have less impact on BFI compared with the underestimation of the same parameter. In my view, your sensitivity analysis is good but still needs a step forward.

2. Groundwater pumping impacts on baseflow and conductivity should be discussed.

The authors did a great job in the revised version to provide sufficient discussion on the human impacts on baseflow. A short paragraph of the groundwater pumping impacts on baseflow and conductivity are needed. For instance, groundwater pumping can reduce groundwater discharge to stream and/or induce stream infiltration to the aquifer, leading to streamflow depletion (Gleeson and Ritcher, 2018).

Gleeson, T., & Richter, B. (2018). How much groundwater can we pump and protect environmental flows through time? Presumptive standards for conjunctive management of aquifers and rivers. River research and applications, 34(1), 83-92.

3. Editorial changes in the revised manuscript.
    a. Figure 1

Can you show the location in North American or the USA for the readers to locate the watershed as HESS is an international journal?

    b. 99th percentile

In your manuscript, you used different standards for ranking, i.e., increasing and decreasing. I understand that this is a more consistent expression and also related to the physical meaning of baseflow and surface runoff conductivity. However, this will also cause confusion as readers may think you are using the same ranking order. I suggest you use the 99th and 1st percentile.

    c. Figure 3,

Can you make your points bigger?

    d. Figure 6

Do not fill the boxes in figures as this overlaps the streamflow data.

e. Figure 7

No legend is provided in the figure.

Overall, thanks for your revision and nice work!