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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Can the two-parameter recursive digital filter baseflow separation method really be calibrated by the conductivity mass balance method?" *by* Weifei Yang et al.

Anonymous Referee #1

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The ECK method and CMB method are two widely-used baseflow separation methods. The ECK method only requires the stream discharge data as input, which is one of the most readily available methods for baseflow separation in longterm studies. However, the parameters for the ECK method are often subjectively determined, resulting in high uncertainties in the baseflow separation estimations. On the other hand, the CMB method is considered to be more objective because it is based on the direct measurements of streamflow conductivity. However, the data required for the CMB method may not be available for long periods. Using the baseflow data estimated with the CMB method to calibrate parameters for the ECK model can be a more accurate baseflow separation method. The manuscript compared the differences between

two baseflow separation methods (the conductivity mass balance method (CMB) and the two parameters filtering method (Eckhardt) constructed based on different theoretical assumptions. The manuscript examines the correction effect of the CMB method on the Eckhardt method by analyzing the deviation between the daily baseflow series. In addition, the effects of transient water sources on streamflow, conductivity, and baseflow separation results were discussed in detail. They attributed the difference between the two baseflow separation results to the inclusion of different transient water sources, which will provide future researchers with a reference when using and comparing different baseflow separation methods. In my opinion, there is no problem with the overall structure and content of this manuscript, and it can be published after some minor revisions: 1. The author mention many times that "surface runoff formed during the early stage of rainfall will flush out high-salinity wetland or depression water in the valley, forming a high-salinity pulse". However, not every region has such topographical conditions, but the rapid increase of base flow is a very common phenomenon, so more conditions should be discussed. 2. Lines 104-106: "Section 2 introduces these. . . . .conclusions". This sentence is not necessary here, so suggest to rewrite or delete it. 3. Lines 287-289: "These human activities. . . . .present study". As you discussed, human activities (reservoir construction, irrigation, sewage discharge) could disturb streamflow and conductivity. In my opinion, these activities will obviously change the original negative power function relationship between conductivity and streamflow. Therefore, it is possible to determine whether it is affected by human activities by analyzing the correlation between conductivity and streamflow. In fact, you have explained in Lines 173-174 that the negative correlation between streamflow and conductivity of the basins used in this study is less than -0.5, in other words, you have excluded those basins that are obviously affected by human activities. Therefore, I suggest to rewrite the sentence of Lines 287-289 to clearly explain the impact of human activities. 4. Lines 332-336: "high-salinity deep circulating groundwater", "low-salinity groundwater", "high-salinity surface water". What is the relationship between salinity and conductivity? There is no clear explanation in the article, which

may confuse readers. Therefore, I suggest that the “salinity” in the text should be replaced by “conductivity”, including the abstract, Figure 7, and conclusion. Or explain the relationship between conductivity and salinity in detail at an appropriate place. 5. The Figures should be replaced by more clearer pictures. 6. There are some problems in spelling, grammar, expression and format.

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