**Hydrology and
Earth System
Sciences**

Discussions

EGU

Open Access

HESSD

Interactive
comment

Interactive comment on "A nonparametric approach toward upper bounds to transit time distribution functions" *by* Earl Bardsley et al.

Anonymous Referee #1

Received and published: 17 August 2017

The paper proposes using a simple nonparametric linear programing approach as an optional method to obtain upper bounds of transit time. The study was done using a random input dataset of 200 unit steps of time. The subject of transit time of great relevance in hydrology, and searching for newer methods can bring rewards to the field. The paper was well written, but there are some points I would like to address on this review that concern me on the usefulness of the approach. General comments: 1. Even when there is a section called "discussion and conclusion" I found there was some discussion found on the earlier section Illustration, especially by the end of this one. 2. Assuming a constant value for the lost water to evaporation and others can lead to a biased result, especially in catchments with strongly defined seasons were evaporation is far from constant. 3. It was used a time variant dataset, however,

the aim of the results were time invariant as I understood. For 100 "days" there was only one cumulative probability curve and three different approaches of upper bound calculations. Knowing that many systems have a large span of transit time distributions throughout a year, what would be the contribution of knowing the upper bound of the whole year? Knowing that this bound could be pushed by only one extreme day and not be representative of the rest of the year. 4. Following the previous comment, could you calculate the upper bound continuously to each time step separately using LP? Specific comments: 1. Page 2 Line 9: Define what you mean with "1.0". 2. Page 3 Eq 1: So K = M + 1? If so, it should be said on the text to make the read easier. 3. Page 7: While discussing the results on Figure 4 there is no metric on how the figures changed rather than only visual. How can the reader measure the goodness? How was the fit changed from Fig 4a to Fig 4b? 4. Page 8 Line 16: "...has already been mentioned." When? Reference? Or earlier on the text? Technical corrections: 1. Page 6 Line 20: Delete the extra "the" on the sentence "...were set up such that the all the optimised..."

—————————————————————