My thanks to both referees for their comments.

Some specific comments from the referees are responded to below.

Referee #1

The aim is not to obtain a time-invariant result. The distribution function upper bound is with respect to a finite mixture of transit time distributions over some specific time period, which may or may not be representative of other time periods.
There is no suggestion of seeking to define an upper bound to the distribution function of a single transit time distribution among all others – probably an impossible task outside of a large tracer experiment.
In the simulation it happened that the simulated data using a time sequence of 100 different distributions could be approximated by a single transit distribution. This may or may not be a general result. As noted in the paper, it might simply be an artefact of the data simulation method.
The approach is to seek an upper bound to the distribution function of a finite mixture distribution comprised of some number of true transit time distributions. This finite mixture distribution can be thought of as an average of a sequence of transit time distributions, so will not be dominated by the effect of any one distribution. This averaging of course does obscure any distribution-to-distribution differences, but the upper bound still has potential to give some information specific to that catchment which might be compared to other catchments.

Referee #2

Almost by definition, nonparametric approaches have limited capability of physical interpretation. That is, nonparametric distributions here have ability to approximate any time sequence of transit time distribution forms, but can offer no explanation as to origin of forms. This is both a strength and weakness, as noted in the paper.
At this stage, my feeling is that it would not be helpful to use real data. The reason is that the approach is still only a suggestion for possible development. With real data we never know what the true transit time distributions are. The advantage of simulated data is we can measure against truth. There is in fact a need for considerably more simulations for the approach to be demonstrated as potentially useful. Hopefully this short paper as a technical note may encourage such further numerical work.
The method could be extended to multiple outputs, provided there are tracer time series of those multiple outputs to serve as reference.

Effect of time-varying p

Both reviewers raised the desirability of being able to allow for time-varying p. Effectively this means allowing for varying weights in the finite mixture distribution. There is no disagreement that this would better approximate reality, but would require reworking of the LP setup.

I this regard, I think referee #2 may have been a little too kind in requesting a major revision. I would like therefore to withdraw the paper at this point, and (if the Editor permits) submit a new paper at a later date, incorporating the effect of variable p.

Both referees also raised a number of other points. These are not explicitly responded to here but note would be taken of those various comments in working up any new paper for review.