

Interactive comment on “Technical note: Transit time distributions are not L-shaped” by Earl Bardsley

Anonymous Referee #1

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This technical note discusses the general form of pdf employed in transit time distribution analyses. The entire argument is based on the argument that because, on physical grounds, $f(t=0) = 0$, the frequently-used forms are inherently “wrong” because they have the property that $f(t=0) > 0$. The author therefore suggests that alternative pdf’s should be used, although the author does not offer concrete suggestions.

On a philosophical level, the author is correct – but as the statistician George Box wrote: “Essentially, all models are wrong, but some are useful.” So while we are all well aware that the property at $t=0$ is incorrect, I consider this a minor, irrelevant point. Many existing models “work” well, notwithstanding this point.

In principle, this Technical Note could be published, but quite honestly, I doubt that it will generate much interest. I leave this decision to the Editor. Two points below should

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be addressed, however, prior to potential publication.

First, the author uses the term “L-shaped probability density functions”, which I find somewhat misleading. Not all pdf’s that have $f(t=0) > 0$ – a single point property – look like an “L”.

Second, the author might note that not all currently-used pdf’s are “L-shaped” – for example, transit time distributions based on the continuous time random walk (CTRW) include the case for $f(t=0) = 0$ — see, e.g., Dentz et al., Transport behavior of coupled continuous-time random walks, Phys. Rev. E, 78, 041110, 2008 (see the coupled case). The CTRW has been applied frequently and successfully in analyses of a range of groundwater applications (e.g., the citations in the Phys. Rev. E paper). Thus, the author’s “call” for consideration of “correct” pdf’s has in some sense already been heeded.

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