

Responses to referee comments for “Technical Note: The use of an interrupted-flow centrifugation method to characterise preferential flow in low permeability media” (hess-2014-518) by R. A. Crane et al.

Many thanks to Anonymous Referee #1 for giving their time to provide comments on our manuscript. Please see below for our responses to your questions/comments.

Anonymous Referee #1

I am not sure of the usefulness of the method. Curve fitting numerical solutions of 2 PDE's with 3 available parameters is far from trivial and nothing is given to really help the user in doing it. My suggestion is that since the method would be used in practice only if curve fitting is easy and since they fit only the rising limb of the breakthrough curve it should not be too difficult to provide a good analytical approximation. Not only this would make the method useful it would also show the reader the physical influence of the parameters. As is I really learned very little physically.

Thank you for this comment on the modelling aspect of the paper. However, the central “thrust” of this research is in presenting the empirical methodology (i.e. the interrupted flow centrifugation technique), with the shape of the non-reactive tracer breakthrough curve alone being an indicator of dual porosity flow occurring in the geological media. The numerical modeling was therefore used as a complimentary technique to confirm whether the shape of curve was indicative of dual porosity behavior. As such, the whole breakthrough curve was fitted, not just the rising limb as the reviewer suggests but also the decrease in concentration during the resting phases, and an analytical solution is unfortunately not tractable for this case. Future work will seek to develop both the empirical and numerical elements of the research in order to improve the applicability of the technique and its physical inference.