

## ***Interactive comment on “Tracer test modeling for local scale residence time distribution characterization in an artificial recharge site” by C. Valhondo et al.***

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We thank the reviewer for his kind assessment of our work and for his added insights into the role of heterogeneity. We agree. Heterogeneity is an essential feature of most aquifers. In fact layering and/or channels should be expected in most sedimentary aquifers. This can be well reproduce using tools such as transition probability models (Carle and Fogg, 1997), which was beautifully demonstrated in the Orange County case (Thompson et al., 1999). Heterogeneity causes uncertainty (Park et al., 2006) and promotes a broad range of residence time distributions (Thompson et al., 1999). Moreover, this broad range, together with flux fluctuations (driven by variations in natural and artificial recharge) favors mixing of different waters. We contend that this mixing

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contributes to water quality improvement. In the revised version, we will expand the discussion on the effects of heterogeneity to acknowledge the reviewer's comments.

### References

Carle, S. F. and Fogg, G. E: Modeling Spatial Variability with One and Multidimensional Continuous-Lag Markov Chains, *Mathematical Geology*, 29, 891-918, 1997. doi: 10.1023/A:1022303706942.

Park, H., Cha, D., Fox, P.: Uncertainty Analysis of Mound Monitoring for Recharged Water from Surface Spreading Basins, *Journal of Environmental Engineering*, 132, 1527-1579, 2006. doi: 10.1061/(ASCE)0733-9372(2006)132:12(1572).

Thomson, A. F. B., Carle, S. F., Rosenberg, N. D., Maxwell, R. M.: Analysis of groundwater migration from artificial recharge in a large urban aquifer: A simulation perspective. *Water Resources Research*, 35, 2981-2998, 1999. doi: 10.1029/1999WR900175

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