



Contribution ID: 713

Type: **Poster (+) Presentation**

Simulating solute transport through saturated heterogenous medium using triple porosity non equilibrium model

Friday, 4 June 2021 09:40 (1 hour)

This study assumes complex saturated liquid phase volume to be a triple porosity medium consisting of macro, meso and micropore structure. This provides the Triple Porosity Non-Equilibrium (TPNE) model a higher capability of mimicking the physical and chemical non equilibrium present as per the field conditions. The method of finite difference for discretisation is used to solve the model. Semi-analytical solution of Dual Advection Dispersion Equation (DADE) (Leij et al. 2012) validates the model. Different unknown parameters are estimated using parameter estimation algorithm (PEST) and detailed sensitivity analysis is performed to delineate the behaviour of the model against various parameters. The behaviour of the model is studied for the wide range of Peclet number and Damköhler number with the help of temporal moments. The dataset from the experiments conducted on a heterogenous soil column by Huang et al., (1995) is used to calibrate the model and is compared with Mobile Immobile (MIM) model by van Genuchten & Wierenga, (1976b). TPNE emerges as better performer capturing the early breakthrough and skewed breakthrough curves (BTC).

Time Block Preference

Time Block A (09:00-12:00 CET)

References

- Leij, F. J., Toride, N., Field, M. S., & Sciortino, A. (2012). Solute transport in dual-permeability porous media. *Water Resources Research*, 48(4), 1–13. <https://doi.org/10.1029/2011WR011502>
- Huang, K., Toride, N., & Van Genuchten, M. T. (1995). Experimental investigation of solute transport in large, homogeneous and heterogeneous, saturated soil columns. *Transport in Porous Media*, 18(3), 283–302. <https://doi.org/10.1007/BF00616936>
- van Genuchten, M. T., & Wierenga, P. J. (1976b). Mass Transfer Studies in Sorbing Porous Media I. Analytical Solutions. *Soil Science Society of America Journal*, 40(4), 473–480. <https://doi.org/10.2136/sssaj1976.03615995004000040011x>

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Session Classification: Poster +

Track Classification: (MS8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media