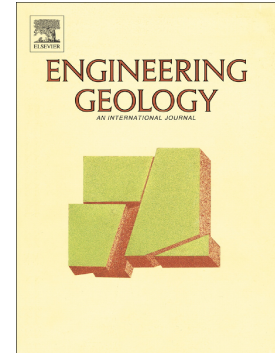


Accepted Manuscript

Scale effect on hydraulic conductivity and solute transport: Small and large-scale laboratory experiments and field experiments

Vanessa A. Godoy, Lázaro Valentin Zuquette, J. Jaime Gómez-Hernández



PII: S0013-7952(18)30157-1
DOI: doi:[10.1016/j.enggeo.2018.06.020](https://doi.org/10.1016/j.enggeo.2018.06.020)
Reference: ENGEO 4877
To appear in: *Engineering Geology*
Received date: 1 March 2018
Revised date: 24 June 2018
Accepted date: 25 June 2018

Please cite this article as: Vanessa A. Godoy, Lázaro Valentin Zuquette, J. Jaime Gómez-Hernández, Scale effect on hydraulic conductivity and solute transport: Small and large-scale laboratory experiments and field experiments. *Enggeo* (2018), doi:[10.1016/j.enggeo.2018.06.020](https://doi.org/10.1016/j.enggeo.2018.06.020)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Scale effect on hydraulic conductivity and solute transport: small and large-scale laboratory experiments and field experiments

Vanessa A. Godoy^{1,2*}, Lázaro Valentin Zuquette¹ and J. Jaime Gómez-Hernández²

¹ Geotechnical Engineering Department, São Carlos School of Engineering, University of São Paulo. Avenida Trabalhador São Carlense, 400, 16564-002, São Carlos, São Paulo, Brazil.

² Institute for Water and Environmental Engineering, Universitat Politècnica de València, Camí de Vera, s/n, 46022, València, Spain

* corresponding author: valmeida@usp.br (+55)16 35739501

Highlights

- Hydraulic conductivity increases with scale for the same measurement condition.
- Dispersivity increases with sample height following exponential functions.
- Partition coefficient increases with sample support following linear functions.
- The scale effect obtained can be explained by the soil heterogeneities.
- To improve predictions reliability and accuracy, scale effect should be considered.

Abstract

Hydraulic conductivity (K), dispersivity (α) and partition coefficient (K_d) can change according to the measurement support (scale) and that is referred as scale effect. However, there is no clear consensus about the scale behavior of these parameters. Comparison between results obtained in different support of measurements in the field and in the laboratory can promote the discussion about scale effects on K , α and K_d , and contribute to understanding how these parameters behave with the change in the scale of measurement, the main objectives of the present paper. Small and large-scale laboratory tests using undisturbed soil samples and field experiments at different scales were performed. Results show that for the same measurement condition K , α and K_d increase with scale, in all studied magnitudes. Caution should be taken when using K , α and K_d values in numerical models with no concern about the scale effect. The lack of consideration of the difference of scale between field and laboratory measurements and numerical model may compromise the reliability of the predictions and misrepresent the responses.

Download English Version:

<https://daneshyari.com/en/article/8915807>

Download Persian Version:

<https://daneshyari.com/article/8915807>

[Daneshyari.com](https://daneshyari.com)