

Your abstract submission has been submitted for the 2014 AGU Fall Meeting. You will receive an email confirmation.

Click [HERE](#) to print this page now.

Receipt of this notice does not guarantee that your submission was accepted for the 2014 AGU Fall Meeting. All submissions are subject to review and acceptance by the Program Committee. You may review or edit your abstract submission until the deadline of 7 August 2014 23:59 EDT/03:59 +1 GMT. After this date, no further edits will be made to the submission.

Evaluation of the performance of the van Genuchten equation using a large database on soil water retention of tropical soils in Brazil

Marta Vasconcelos Ottoni^{1,2}, Martinus Van Genuchten³, Maria Leonor Ribeiro Casimiro Lopes Assad⁴ and Achiles Eduardo Monteiro¹, (1)Geological Survey of Brazil (CPRM), Department of Hydrology, Rio de Janeiro, Brazil, (2)USDA, ARS, Environmental Microbial and Food Safety Lab, Beltsville, MD, United States, (3)Federal University of Rio de Janeiro, UFRJ, Department of Mechanical Engineering, COPPE/LTTC, Rio de Janeiro, Brazil, (4)Federal University of São Carlos (UFSCar), Department of Natural Resources and Environmental Protection, Araras, Sao Paulo, Brazil

Abstract Text:

The van Genuchten equation is used often to provide an empirical description of soil water retention data. The equation is commonly used for modeling hydrologic processes for environmental and agricultural applications, including irrigation. Most applications involved soils of temperate or arid climatic regions. Soils of tropical zones often have distinct textural compositions with a predominance of clay and sand, which may lead to multimodal pore size distributions that are not conducive to applications of the standard van Genuchten equation. This study aims to evaluate the performance of the van Genuchten equation using a large database on soil water retention of tropical soils in Brazil, where almost 6 million hectares are irrigated and responsible for about 70% of water consumption in Brazil. We selected 1058 undisturbed soil samples with water retention data covering a wide matrix potentials. The results show that the root-mean-squared error (RMSE) of the water retention estimates was larger than 4% for only 10 samples. For the remaining datasets, the RMSE distribution behaved as follows: 27 samples had an RMSE from 3 to 4%, 70 samples had an RMSE from 2 to 3%, 332 samples had an RMSE from 1 to 2%, and 619 samples had an RMSE from 0 to 1%. Because of the bimodal pore size distribution of many soils, a dual porosity retention model is probably more appropriate for samples having the higher RMSE values. Overall, the van Genuchten equation was found to be appropriate for Brazilian soil conditions. Work is underway to see if soil or landscape properties can be used to predict the presence of the bimodal pore-size distributions.

Session Selection: Advances in Measurement and Modeling Approaches for Improving Water Efficiency in Irrigated Agriculture

Title: Evaluation of the performance of the van Genuchten equation using a large database on soil water retention of tropical soils in Brazil

Submitter's E-mail Address: marta.ottoni@cprm.gov.br

Preferred Presentation Format: Assigned by Program Committee (Oral or Poster)

First Presenting Author

Presenting Author

Marta Vasconcelos Ottoni

Primary Email: marta.ottoni@cprm.gov.br

Affiliation(s):

USDA, ARS
Environmental Microbial and Food Safety Lab
Beltsville MD (United States)

Geological Survey of Brazil (CPRM)
Department of Hydrology
Rio de Janeiro (Brazil)

Second Author

Martinus Van Genuchten

Primary Email: rvangenuchten@hotmail.com

Phone: 2132647025

Affiliation(s):

Federal University of Rio de Janeiro, UFRJ
Department of Mechanical Engineering, COPPE/LTTC
Rio de Janeiro (Brazil)

Third Author

Maria Leonor Ribeiro Casimiro Lopes Assad

Primary Email: leonorrcla@gmail.com

Affiliation(s):

Federal University of São Carlos (UFSCar)
Department of Natural Resources and Environmental Protection
Araras, Sao Paulo (Brazil)

Fourth Author

Achiles eduardo Monteiro

Primary Email: achiles.monteiro@cprm.gov.br

Affiliation(s):

Geological Survey of Brazil (CPRM)
Department of Hydrology
Rio de Janeiro (Brazil)

If necessary, you can make changes to your abstract submission

- To access your submission in the future, point your browser to: [Full Menu Options](#).
- Your Abstract ID# is: 19360.
- Any changes that you make will be reflected instantly in what is seen by the reviewers.
- After the abstract proposal is submitted, you are not required to go through all submission steps to make edits. For example, click the "Authors" step in the Abstract Submission Control Panel to edit the Authors and then click save or submit.
- When you have completed your submission, you may close this browser window or submit another abstract <http://fallmeeting.agu.org/2014/Sessionviewer>.

[Tell us what you think of the abstract submission process](#)