

## **Performance evaluation of four-parameter models of the soil-water characteristic curve**

### **Abstract**

Soil-water characteristic curves (SWCCs) are important in terms of groundwater recharge, agriculture, and soil chemistry. These relationships are also of considerable value in geotechnical and geo-environmental engineering. Their measurement, however, is difficult, expensive, and time-consuming. Many empirical models have been developed to describe the SWCC. Statistical assessment of soil-water characteristic curve models found that exponential-based model equations were the most difficult to fit and generally provided the poorest fit to the soil-water characteristic data. In this paper, an exponential-based model is devised to describe the SWCC. The modified equation is similar to those previously reported by Gardner (1956) but includes exponential variable. Verification was performed with 24 independent data sets for a wide range of soil textures. Prediction results were compared with the most widely used models to assess the model's performance. It was proven that the exponential-based equation of the modified model provided greater flexibility and a better fit to data on various types of soil.