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Discussions

Interactive comment on "Physical pedotransfer functions to compute saturated hydraulic conductivity from bimodal characteristic curves for a range of New Zealand soils" *by* Joseph Alexander Paul Pollacco et al.

Anonymous Referee #2

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The intent of this paper is not very clear. On closer examination, even the title of the paper is problematic to me. My reasons are given below: 1. It is true that soil moisture release curve, theta(h), is still being measured in the laboratory despite being time-consuming. The hydraulic conductivity function K(h) is too expensive and time–consuming to measure and is typically reconstructed from the saturated hydraulic conductivity Ks and theta(h). Therefore what the authors seem to suggest in the paper is to use a bimodal theta(h) to compute Ks. The error involved will be too huge. In fact, it is common knowledge that an accurate K(h) can be obtained by measuring Ks and theta(h) rather than by estimating K(h) directly from theta(h). In fact, this is one

of the recommendations for future work in the paper. 2. Saturated Ks is not more time-consuming to measure compared to theta(h). 3. The approach chosen to determine Ks is strange as Ks depends on the voids in the soil. I can understand if one chooses the particle size distribution as providing the key parameters in a pedotransfer function to estimate Ks. Using theta(h) is an indirect process of getting the pore-size distribution but due to the time-consuming nature of the test, it is less suitable to be used as a proxy for pore-size distribution. 4. Even when using theta(h), it is expected that the matrix (micro) pores are the ones governing Ks but this is not evident from the paper. 5. The error for Ks shown in Figures 3 and 4, is about +/- one order. The errors in the measurement of Ks should be less despite the problems mentioned in Section 4.1.3. 6. Based on the above assessment, most of the equations presented in the paper have little value. In addition, none of the equations presented is a pedotransfer function in the traditional sense. 7. More relevant literature on estimating of saturated hydraulic conductivities should be cited e.g. Chapuis, R.P. (2004) Predicting the saturated hydraulic conductivity of sand and gravel using effective diameter and void ratio. Canadian Geotechnical Journal, 2004, 41:787-795, 10.1139/t04-022 Mbonimpa, M., Aubertin, M., Chapuis, R.P. (2002) Practical pedotransfer functions for estimating the saturated hydraulic conductivity. Geotechnical and Geological Engineering (2002) 20: 235. doi:10.1023/A:1016046214724

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