

Interactive comment on “Comparison of three measurement methods of saturated hydraulic conductivity” by C. Fallico et al.

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The approach of the Referee#1 to characterize the unsaturated soil is very interesting and we consider it very useful and appreciable. Nevertheless our paper doesn't take into consideration the characterization problem in itself, but, instead, the influence of the particular characteristics of a site on different measurement methods and the modalities with which it occurs. This concept is very important for us, because we don't direct the study only towards the choosing of the k_s measurement device, but, also and particularly, towards the comparison among different k_s measurement methods. We try to show the reasons of the particular result obtained by each method, in the light of a careful knowledge of the utilized measurement device, of the measurement method and of the interactions with the soil. Certainly that requires some knowledge of the unsaturated soil characteristics; but these are not specific, valid generally for

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the whole measurement site. We referred to a single structure and texture; while we showed the important role of the macroporosity for each measurement method, certainly in a descriptive manner, but excluding a few doubtful about its different influence on the considered methods. Only in this context we inserted the references to which the Referee #1 refers. On the contrary, to follow the approach to which the Referee #1 makes reference requires a careful soil analysis at each measurement location. This preliminary investigation, to characterize structure, texture and macroporosity at each measurement location furnishes certainly useful information about the measurement method to be used in each location, but it doesn't furnish some information on the reasons for which other methods aren't suitable. In this case even comparisons among different results are not possible to identify the aforesaid reasons. Moreover, the events referred in our paper have certainly increased the soil heterogeneity; that caused very different conditions and a large difference among the k_s values of data sets obtained by the considered methods. Therefore, the large number of carried out measurements (126 + 45 + 30), appreciated from the Referee #1 too, excluded a priori the possibility to perform a careful analysis for each measurement location. The large number of data, moreover, justifies, or better still, demands the statistical analysis, that allows to point out statistical-probabilistic indications by the available data sets. In any case, we retain reasonable to show that it is need to keep separated the application fields of the different approaches. We believe that the approach mentioned from the Referee #1, valid and appreciable, is useful to follow when the number of measurement locations is poor and only the measure of the k_s value is of interest. Instead, when it is need to investigate the positive and negative aspects of the different k_s measurement methods and their possible reasons, particularly if the measurement number is large, we don't believe suitable and often not feasible the above mentioned method, considering, on the contrary, necessary and topical more than ever the use of the statistical method. Finally, we believe that it shouldn't be contrast between the two approaches, but the choice is dictated from the aims of the investigation and from reasons of opportunity.

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