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Solid Earth
Discussions

Interactive comment on "On soil textural classifications and soil texture-based estimations" *by* Miguel Ángel Martín et al.

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General response: We are grateful to the reviewer for the positive evaluation of the work and for stimulating comments.

Response to specific comments:

- **Comment from Referee:** 1. when we use pipette method or sieve method to test the particle size distribution, we only get limited fractions. The authors used a self-similarity model to reconstruct the distribution of particle size distribution based on the limited fractions. However, I am wondering whether there are other models to do this job? Why the authors selected this model? Have you or other studies compared different models?

Author's response: The Comment 1 requests the information about models suitable to do reconstruct the detailed particle size distribution from a limited number of textural fractions contents. The self-similarity model of this work was chosen mostly because the authors have an experience of working with it, past applications of it appeared to be successful, and a hypothetical physical explanation of its applicability can be put forward (Martin & Taguas, 1998; Martin et al., 2005). There are other models of particle size distribution in soils based on scaling hypothesis (Posadas et al., 2001, Bird et al., 2000). There exists a line of studies in which the detailed particle size distribution is obtained by fitting various empirical non-linear equations to the data (Fredlund et al., 2000). It should be interesting to how this methodology may work with textural triplets other than standard 'sand-silt-clay'.. It may well be that the efficiency of using various triplets depends on/not only on the task at hand – reconstruction of the detailed particle size distribution – but also on the technique or model used to perform the task.

- **Comment from Referee:** 2. what kind of linear regressions were used in this study, as well as the other statistical methods, should be included in the M&M section.

  Author's response: Comment 2 indicates the need to clearly define the type of linear regression used in this work.

  Changes in Manuscript: The phrase "linear regession" was chaged to "least squares linear regression".

- **Comment from Referee:** 3. This manuscript tested the hypothesis for estimation bulk density. But people may be more curios about other properties like soil hydraulic properties. will this new law of particle size fractions will work fine for these parameters? maybe the authors should include this in the discussion.

  Author's response: This comment indicates that modified textural triangle may provide better inputs for pedotransfer functions to estimate soil hydraulic proper-

ties. This is definitely an exciting avenue for further research.

Changes in Manuscript: This was acknowledged in the article by changing page 6 paragraph to: “Usability of triplets other than standard ones indicate the opportunity of a more efficient use of existing results of textural analysis. Although these results traditionally consist of seven fractions including five fractions of sand, in the majority of applications all sand fractions have been lumped together. For example, the overwhelming majority of pedotransfer functions in soil hydrology use the elements of the standard triplet 'sand-silt-clay' (Pachepsky and Rawls, 2004). The use of different 'coarse-intermediate-fine' triplets in pedotransfer studies allows the use of available detailed data on fractions of sand and revisiting existing databases. Overall, application of nonstandard textural triplets in development of pedotransfer functions presents an interesting avenue to explore.”

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