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Hydrology and Earth System Sciences Discussions

Interactive comment on "Soil Infrastructure, Interfaces and Translocation Processes in Inner Space (Soil-it-is): towards a road map for the constraints and crossroads of soil architecture and biophysical processes" *by* L. W. de Jonge et al.

Anonymous Referee #1

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General comments: The manuscript portrays to suggest a new paradigm to investigate soil structure. The authors do a very nice job of outlining their "soil-it-is" framework, which I find an interesting framework and one that I had not given much thought too. Therefore, I find the manuscript a novel contribution. However, I would not see it is per se a new paradigm. I do have some suggestions with regard to improving the manuscript (see below), but I think that manuscript is acceptable with minor revisions.

Specific comments: P 2638 ln 13-15: you seem to argue further in the text that there is some use to isolating soil structural components (such as aggregates) to investigate the inner space. So, why do you say here that it is not useful? I agree that some measures should not be done on aggregates, but totally dismissing the approach seems a bit drastic.

P 2640 ln 23-25: I am surprised here and further in the text that you do not mention at all the papers by Hassink (1996; 1997), Six et al. (2002), and Baldock & Skjemstad (2000) in regard to carbon saturation.

P 2642 ln 9: Again I am surprised that this whole section is written without any reference to the saturation concept as described in Hassink (1997) and Six et al (2002). Furthermore a referring to the monolayer concept by Mayer (Mayer, 1994; Mayer and Xing, 2001) would be appropriate, I think.

P 2643 ln 4-6: I assume that was done on wet soil and not air-dried soil. Consequently, the process of slaking, which is directly related to OC content, was not induced. I think this is an important fact to consider in the interpretation given here.

P 2649 ln 5: are these primary or secondary particles that are isolated? This needs to be know for correct interpretation.

P 2649 ln 17: A paper of potential interest to this section is: Hallett et al. (2001)

P 2650 ln 3-5: this statement is based on the fact that only the clay content determines C saturation, but saturation also happens at other levels within the soil matrix. See Carter et al. (2003); Stewart et al. (2007); Six et al. (2002); Baldock and Skjemstad (2000).

P 2650 ln 15-20: Very nicely put!

P 2653 ln 3: should the reference here not be to figure 13 instead of figure 14?

References: Baldock, J.A., and J.O. Skjemstad. 2000. Role of the soil matrix and

minerals in protecting natural organic materials against biological attack. Organic Geochemistry 31:697-710. Hallett, P.D., T. Baumgartl, and I.M. Young. 2001. Subcritical water repellency of aggregates from a range of soil management practices. Soil Science Society of America Journal 65:184-190. Hassink, J. 1996. Preservation of plant residues in soils differing in unsaturated protective capacity. Soil Science Society of America Journal 60:487-491. Hassink, J. 1997. The capacity of soils to preserve organic C and N by their association with clay and silt particles. Plant and Soil 191:77-87. Mayer, L.M. 1994. Relationships between mineral surfaces and organic carbon concentration in soils and sediments. Chemical Geology 114:347-367. Mayer, L.M., and B. Xing. 2001. Organic matter-surface area relationships in acid soils. Soil Science Society of America Journal 65:250-258. Six, J., R.T. Conant, E.A. Paul, and K. Paustian. 2002. Stabilization mechanisms of soil organic matter: Implications for C-saturation of soils. Plant and Soil 241:155-176. Stewart, C.A., A.F. Plante, K. Paustian, R.T. Conant, and J. Six. 2007. Soil carbon saturation: Concept, evidence and evaluation. Biogeochemistry 86:19-31.

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