

Interactive
Comment

Interactive comment on “Pedotransfer functions for Irish soils – estimation of bulk density (ρ_b) per horizon type” by B. Reidy et al.

B. Reidy et al.

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Referee 2 - Response to comments.

Recommend that the paper will be accepted for publication after the changes detailed below have been addressed.

Response: We would like to thank the referee for their constructive comments. We agree with all their recommendations and have indicated the changes applied below, specific to each comment.

Referee 2: Text and Table1: Are the horizon designations in Irish SIS classification the same as according to WRB? If not, please add the WRB designations for those readers which are not familiar with the Irish classification.

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Response: The designations are the same in the Irish SIS and WRB, except for O, AB and Cr horizons, which are equivalent to H, BA and CR horizons in the WRB. A note will be added to Table 1.

Referee 2:P2.8 L1: The soil organic content have been analysed twice? 1. Corg via elemental analyser and 2. OM via the muffle furnace method?

Response: Rewritten “The soil organic matter content was estimated via loss on ignition (LOI) of any sample found to be over 10% organic carbon via the elemental analyser” will delete the confusing section of the sentence “ or if the sample was labelled organic from the field.” The soil organic content was measured via elemental analyser for all samples. The loss on ignition (LOI) was used on samples with greater than 10 % organic carbon (muffle furnace).

Referee 2: Why only samples with a carbon content over 10%?

Response: Samples containing below 10 % organic carbon content would not be ideal for the LOI methodology as errors would begin to occur as the analysis is based on weight difference.

Referee 2: For the other samples Corg was not analysed? Maybe it could be more clearly stated.

Response: The other samples from the old AFT survey were analysed using the Walkley-Black method. A comparison run was done to compare the Walkley-Black results to the Elemental analyser with samples from the soil archive. The results were comparable with a 97 % R2 value.

Referee 2: In general: The accumulation of secondary calcium carbonate could strongly influence the bulk density. How it was taken into consideration?

Response: In theory secondary calcium carbonate could influence the bulk density. However only 8 horizons of 1028 horizons were given the designation Ck, indicating secondary carbonates. In one case only were nodules seen. The effect of these

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carbonates in the Irish bulk density context appears limited. In cases of calcareous soils/horizons that have a HCl reaction within 40 cm of the surface, the increase in clay content due to illuviation appears to be a greater influence on soil bulk density in these cases. Perhaps in a more Europe wide context secondary carbonates will increase bulk density especially in drier climates and may have consequences for sampling in concretions or fragipans.

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