

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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Reviewer1 - I recommend that it be accepted for publication after the changes detailed below have been addressed:

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

Reviewer1 - Abstract L10 How can a PTF be used to predict a horizon type?

Response: Reworded, “Initially pedotransfer functions from the literature were used to predict different horizon type bulk densities, using local known bulk density datasets”

C634

Introduction Reviewer1 - The introduction gives an excellent overview of bulk density however the last paragraph needs revision so that the objectives can be more clearly stated.

Response: - Reworded, “The research presented in this paper used new data generated by the Irish SIS to provide primary data for the calculation of PTF at the soil horizon level. This was done using soil bulk density measurements that were available for 15.9% of the soil profiles described in Ireland in the last 40 years. In addition to this, PTF from the literature were used with known texture and organic carbon data, to develop the calculations for predicting bulk density. These PTF were then recalibrated for Irish soil horizons, where pb was measured. The PTF were then applied to the soil horizons with unknown pb. This allowed the calculation of soil bulk density to a depth of 50 cm for all soil profiles described. This had led to an indicative map of soil bulk density in Ireland being developed.”

Reviewer1 - P4 L20-27 The authors state that a total of 1028 horizons were identified but that due to the presence of coarse fragments only 470 were sampled. Given that bulk density is estimated for the entire country were the recalibrated PTFs used to estimate bulk density for the 528 horizons not sampled?

Response: - Bulk density was estimated for the 528 horizons. P5 L1-2 I indicate that these horizons require predictions. P14 L23 – makes reference to the gap filling of Irish SIS (the 528 horizons) and the AFT survey horizons from those recalibrated PTF.

Reviewer1 - I would like to see this addressed in the methods and the implications (if any) discussed.

Response: The implications would be the same for the 528 horizons from the Irish SIS or the AFT study. The study mirrored the AFT sampling for bulk density in every way. Therefore the noise of the AFT samples should be the same for the Irish SIS samples. This is also referred to in the conclusion P19 L22 – 25. Any implications for these 528 horizon predictions would be the same for all the AFT horizon predictions.

C635

Reviewer1 - P5 L5 Can references be provided for the AFT surveys?

Response: The 17 Soil Survey Bulletins from An Foras Talúntais will have their references added to the text and reference list.

Reviewer1 - Section 2.1.1 P10 How was the random selection made?

Response: The rows were sorted using the random function in the spread sheet software. The bottom 20% of the rows in this updated list were removed.

Reviewer1 - Was there any stratification to ensure that all horizons identified were represented?

Response: No stratification was used. Only values attributed to a particular horizon type were in a list that was then randomly sorted

Reviewer1 - Discussion P19 L10 Provide references to papers or reports rather than names of projects.

Response: These references will be added to the text.

CARBiFOR 1 Black, K.G. and Farrell, E.P. (eds).: Carbon sequestration and Irish forest ecosystems. COFORD, Dublin, 2006.

CARBiFOR II CARBiFOR II. Carbon Sequestration in Irish Forest Ecosystems, available at <http://www.ucd.ie/carbifor> (last access: 14 May 2015), 2015.

Interactive comment on SOIL Discuss., 2, 1039, 2015.