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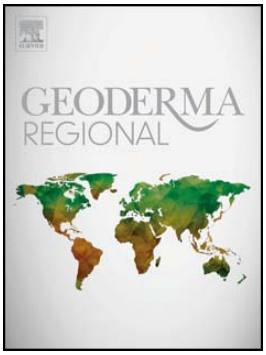

Validating digital soil maps using soil taxonomic distance: A case study of Ireland

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Validating digital soil maps using soil taxonomic distance: A case study of Ireland

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Abstract:

Recently, there has been a marked increase across the world in the demand for digital soil information, in which digital soil mapping research plays a key role. Methods to validate these digital soil maps are needed. Soil maps, and in particular soil taxonomic maps contain embedded information that represent an understanding of the functioning of the soil within its landscape and the contributing soil forming factors. These cannot be easily validated by a straight point-to-polygon comparison. Furthermore, the uncertainty associated with a misclassification is not binary, but rather a more complex measure that accounts for the degree of divergence between the point observation and map unit that takes into account these underlying relationships between soils, landscape and function. Here we present a map validation approach based on the soil taxonomic divergence and compare this to the outcome from validation based on a straight binary presence/absence evaluation of the map units. We do so for the newly generated soils map of Ireland at a scale of 1:250,000. We find that the overall accuracy calculated through the presence absence method was 69% accurate, whereas the minimum taxonomic distances concept, has an overall accuracy of 90.1%. In particular, soil map units with large spatial coverage tended to be assessed as being very uncertain using the presence/absence method, the confidence around these map units was significantly improved using the minimum taxonomic distances approach. Where large differences were observed between field observations and mapped soil units, we found the taxonomic distance measure a more informative diagnostic as why these differences were observed.

Key words: Taxonomic distance; 'presence / absence' method; soil mapping; validation; confidence; Irish Classification System; World Reference Base (2010). Histosol (Ombric); Regosol (Calcaric; Phaeozem (Calcaric); Leptosol; Fluvisol; Gleysol; Stagnosol; Podzol; Cambisol; Luvisol; Regosol.

1. INTRODUCTION

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