



Using Vis-NIR and Ancillary Data to Identify and Map Terron in Denmark

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Introduction

“Terroir” is a French word, originally developed for wine. It has been studied and demonstrated that terroir plays an important role for the determination of different agricultural areas, and their suitability to produce. The initial step of terroir zone establishment is normally landscape classification into relatively homogeneous areas that share similar environment features, such as soil, landform, geology, climate and their interactions. Hereafter, we refer to this landscape classification as “terron”. Terron, a soil-landscape entity which combines soil and landscape at the same time, was proposed by Carre and McBratney (2005).

Objectives

- To classify soil profiles into n terron classes based on various environmental factors including soil (Vis-NIR data), landform and climate information;
- To use digital soil mapping methods to map continuous terron classes in Denmark using soil and other landscape variables.

Materials and Methods

- A Danish national Vis-NIR spectral library based on 581 soil profiles with 7km national grid (0-30cm, 30-60cm, 60-100cm, 100-200cm);
- A taxonomic distance matrix was calculate based on spectral information between 34 Danish reference soil profiles and 581 soil profiles;
- Climate and landform factors were incorporated with distance matrix for further terron establishment through the use of a non-hierarchical fuzzy clustering algorithm (Fig.1);
- A Cubist model was used for predicting continues terron classes cross the country.

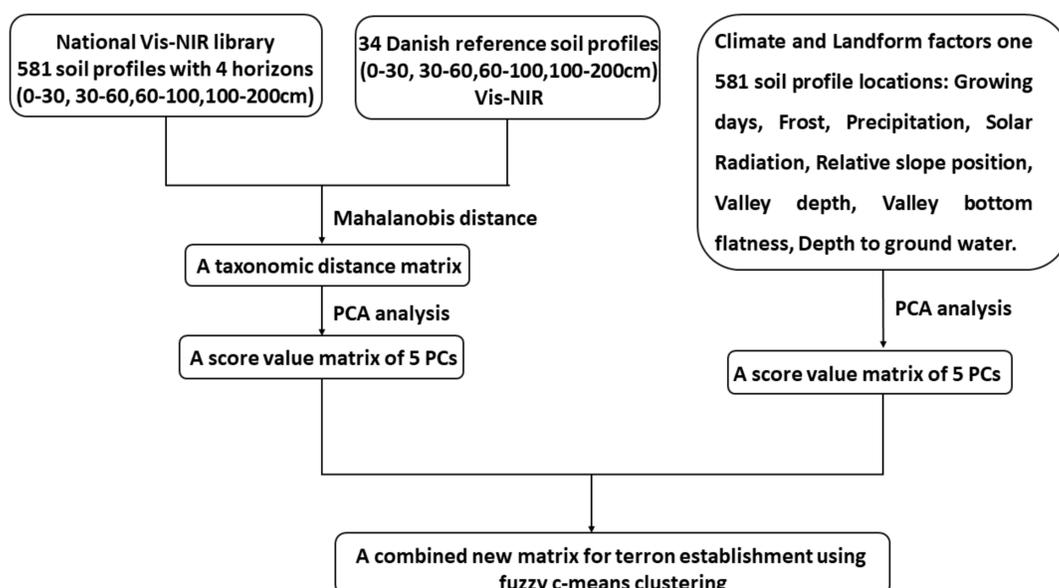


Figure 1: Flowchart of Danish terron classes classification procedure.

Results

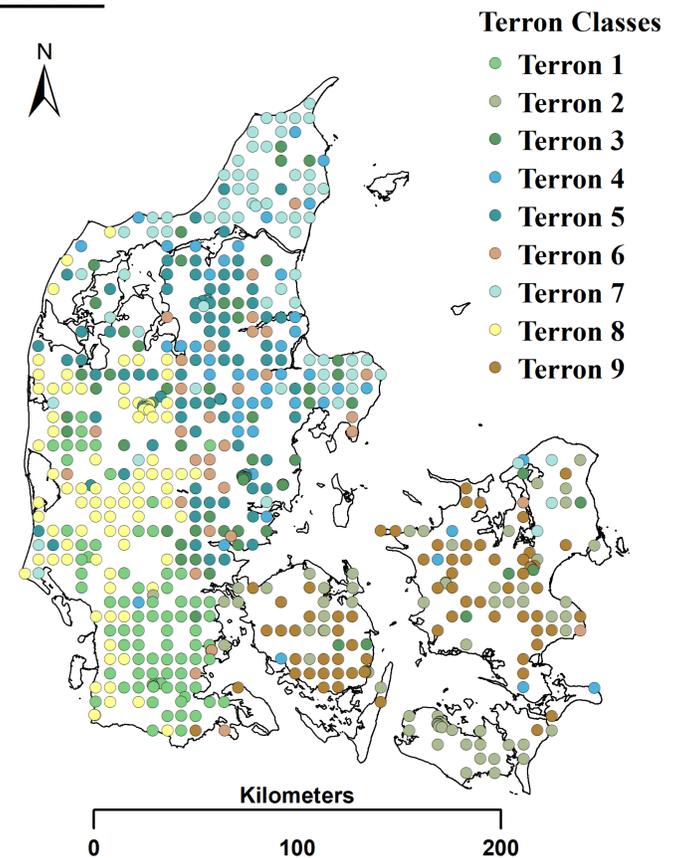


Figure 2: The geographical distribution of soil profiles and the location of terron classes across the study area.

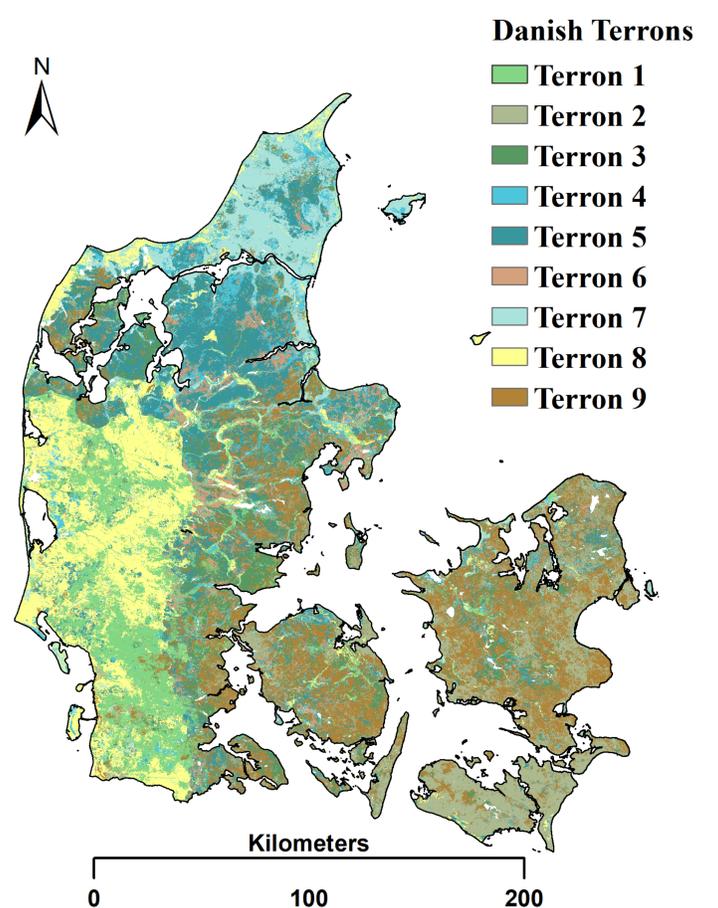


Figure 3: Map of Danish terron classes.

Conclusions

- NIR-Vis spectra is able to provide sufficient soil information for terron establishment;
- The map of terrons is an embodiment of soil, landscape and climate which provides a more complete picture of the natural environment;
- Danish Terron map is a preliminary outcome for the realization of terroir in Denmark.

