



Transect sampling for digital soil sensing and mapping

T. Behrens (1), K. Schmidt (1), R. Gerber (2), C. Albrecht (2), P. Felix-Henningsen (2) and T. Scholten (1)

(1) Institute of Geography, Chair of Physical Geography, University of Tübingen, Germany,
(2) Institute of Soil Science and Soil Conservation, University of Giessen, Germany
(thorsten.behrens@uni-tuebingen.de)

This study introduces two concepts for generating representative transects based on nominal spatial datasets in terms of stratified sampling which can be used as a basis for linear operated proximal soil sensing surveys. The aim is to cover all relevant feature combinations within an investigation area over the shortest possible distance, in order to obtain typical, valid and transferable datasets for spatial predictions in digital soil mapping. The first concept focuses on finding a single shortest transect whereas the second concept generates multiple transects and follows the idea of a more holistic information retrieval such that all relevant interclass transitions could be recorded – again over the shortest possible distance(s). The crucial step in computing transects is the location of the transect nodes. We compare and discuss an approach based on the centre point of each class-area in a map that is furthest from the boundaries and an approach where a centreline of points is generated for each class-area. A comparison reveals that the multiple transect approach returns longer transects, but covers the feature space in terms of the frequency distribution of underlying terrain attributes more comprehensive as it is closer related to the catena concept when applied on an existing soil map. In terms of computation time, transect length, and feature space description, a combination of the multiple transects and the centreline of points approaches must be recommended. However, there is a trade-off between transect length on the one hand and computation time and feature space description on the other hand which might lead to choose the single transects concept based on the centreline approach. Thus, the decision whether to use a single transect or multiple transects depends on comparing cost effectiveness and obtainable information.