Mapping Soil Texture at a Regional Scale using Pedometrical Techniques. (S05-vanmeirvenne063403-Oral)

Authors:

- M.Van Meirvenne * Ghent University,
- I.Van Cleemput Ghent University, Belgium
- M.Meul Ghent University, Belgium

Abstract:

Pedometrical techniques are numerical methods used to describe and analyze soil properties in a quantitative way. Frequently these are related to spatial inventory, space-time modeling and statistical survey. We used such techniques to map soil texture at a regional scale. The study area covered about 3000 km² and is located in Belgium. It was selected because it contains a large range of soil types with different geological histories. In total 4887 topsoil samples were analyzed for soil texture and a 1/100.000 choropleth soil texture map (based on the Belgian soil texture classification) was also available. However, an update of this map was required, as well as a reclassification according to the internationally accepted USDA texture triangle. Moreover, a quantitative map of the three major soil textural classes (clay, silt and sand) was needed as input for GIS linked models. To map the three textural fractions quantitatively we used compositional kriging, which is a version of ordinary kriging to which some conditions were added. One of these conditions is that the sum of the three fractions must equal 100, which is not ensured when each fraction is interpolated independently. The data set was stratified according to the delineations of the choropleth soil map. These delineations represent either crisp physical boundaries or transition zones. Therefore, different stratification and interpolation strategies were followed according to the nature of the map boundaries. The resulting maps were classified according the both the Belgian and the USDA textural triangles allowing for the first time a comparison between both classification systems. Finally a sensitivity analysis was conducted to explore the uncertainty related tot the textural classification. Therefore a Monte Carlo analysis was used based on the kriging variance of the predictions of each textural fraction. This information can be used in a GIS whenever the mapping quality of the classified maps is required.

Corresponding Author Information:

Marc Van Meirvenne Ghent University Coupure 653 Gent 9000 Belgium phone: +32 9 2646056 fax: +32 9 2646247 e-mail: marc.vanmeirvenne@rug.ac.be

Presentation Information:

Presentation Date: Tuesday, November 12, 2002 Presentation Time: 8:45 am

Keywords:

Pedometrics, Soil Texture, Mapping, Compositional kriging