Digital Soil Mapping – Menace, Myth or Miracle?

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ABSTRACT

Digital soil mapping has gained much attention over the last decades due to improvements in geographic information technologies (GIS and GPS), remote sensing, soil sensors, and development of advanced quantitative methods for upscaling of site-specific soil data. The demand for high-resolution and site-specific soil attribute data is enormous to address a variety of local, national, and global issues. These include, but are not limited to, precision agriculture, assessment of environmental quality, conservation management, soil carbon sequestration and global climate change, and more.

In this talk a brief overview of digital soil mapping methods utilized in Florida is given including: (i) Use of GIS environmental layers to complement field soil datasets; (ii) Use of soil information systems (Soil Data Mart and State Soil Geographic Database) to enhance mixed quantitative soil models;
(iii) Use of visible/near-infrared spectroscopy for inferential modeling of soil properties; (iv) Use of satellite imagery (Landsat, Aster, and Ikonos) and Light Detection and Ranging (LIDAR) in predictive soil models; and
(v) Statistical, geostatistical and mixed models to generate dense soil attribute grids. Applications of digital soil mapping methods are presented and their capabilities, accuracy, constraints, and potential use are discussed in context of specific soil-landscape conditions in Florida. Special attention is given to spatial variability and distribution patterns of soil properties as well as complex relationships between soil attributes and environmental landscape properties (environmental correlation). Based on findings, research gaps are identified and recommendations for future digital soil mapping projects in the south-eastern U.S. are provided.

No universal equation or model exists that fits all soil-landscapes. There is ample opportunity for more research to optimize digital soil models in the south-eastern U.S. in the future.

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