



Development of base maps' role in soil mapping

Brad Miller (1) and Eric Brevik (2)

(1) Leibniz-Centre for Agricultural Landscape Research (ZALF) e.V., Institute of Soil Landscape Research, 15374 Müncheberg, Germany. bradlemiller76@gmail.com, (2) Department of Natural Sciences, Dickinson State University, Dickinson, ND, United States

One of the ultimate goals of soil science is the production of accurate soil maps, but historically these thematic maps have relied upon base maps for positional reference and later for parameters that help predict soil properties. This presentation reviews the history of base maps and the dependence of soil mapping on them. The availability of geographic technology for producing these base maps has constrained and directed the geographic study of soil. A lack of accurate methods for determining location limited early geographic description of soils to narratives. The availability of accurate topographic maps in the late 18th century, fueled by governments' interests in documenting national boundaries and popular interest in world atlases, provided the first base maps for soil geographers. These soil maps primarily used the topographic maps as a spatial reference onto which the thematic details were drawn. Due to the late start of a systematic topographic survey in the United States, early Soil Survey maps depended upon plat maps for spatial reference. The adoption of aerial photographs in the process of soil mapping increased the role of base maps as predictive parameters. In the current geospatial revolution, global positioning systems and geographic information systems have nearly replaced the need for base maps to provide spatial reference. Today, base maps are more likely to be used as parameters in landscape models for predicting the spatial distribution of soil properties and classes. As model parameters for digital soil maps, base maps constitute the library of predictive variables and constrain the supported resolution of the soil map. This change in the relationship between base maps and the soil map is a paradigm shift that affects fundamental definitions of geography, such as scale, resolution, and detectable features. These concepts are the essential tools used to study the spatial characteristics of Earth Systems.