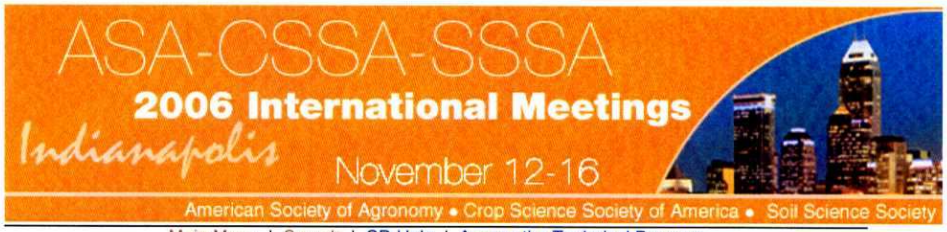

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Added Value of Using Climate Variability for Mapping Andean Volcanic Ash Soils.

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The high infiltration capacity of the volcanic-ash derived soils from the Ecuadorian Andes prevents runoff thus limiting topography as a soil forming factor in most parts of the area. This soil type covers most of the study area and the land use is mainly a rotation of potato and pasture. Given the limited variation in the above soil forming factors one can expect that soil variation is strongly correlated to climatic differences, which are large in the steeply dissected mountainous region. Spatial variation in digital soil mapping is described as a function of auxiliary information providing insight on the soil forming factors. The lack of reliable climatic data at high-resolutions has stimulated the use of climatic indexes based on topography such as the wetness index and altitudinal relationships. New process-based interpolations techniques of meteorological variables with emphasis in mountainous areas have been developed. In this paper we test their applicability to explain the distribution of soil organic matter and other soil characteristics through stepwise multiple regression models (SMRMs) using soil mapping units, topography, and climate parameters as independent predictors. The outcomes were compared with stratified linear regression and SMRMs, using respectively altitude and DEMs related parameters as predictors. Comparisons demonstrated a significant contribution of climate in predicting the spatial distributions of all soil characteristics. Different climatic variables explain the variations within the soil units, demonstrating the potential to use interpolated climatic maps for digital soil mapping.

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