Multi-scale Modeling of Soil Series using Remote Sensing

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Remote sensing provides rapid data collection and dense information grids which allow inference on various biophysical properties across large landscapes. To incorporate remote sensing in soil prediction models has been suggested to improve the predictive quality and spatial resolution of predictions. This is critical to capture complex and continuous variation of soil classes and properties in aquatic ecosystems. Our objective was to develop prediction models for soil series utilizing multi-resolution remote sensing images and environmental ancillary data. The study was conducted in Water Conservation Area-2A, Everglades, FL, which is a 41,773 ha wetland. We mapped soil series at 123 sites (Dania, Gator, Lauderhill, Okeelanta, Pahokee, and Terra ceia series) and employed tree-based modeling, Classification Trees to build predictive soil models. The spectral data and derived indices from different remote sensing images, which have different spatial resolutions, included: MODIS (250 m), Landsat ETM+ (30 m), and SPOT (10 m). Confusion matrices were derived to assess the uncertainty of predictions. The results suggest that integration of environmental ancillary data and the spectral data derived from remote sensing images have good predictive power to infer on soil series in complex aquatic ecosystems.

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