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dSSURGO: Development and validation of a 30 meter digital soil class product over the 8-million square kilometer contiguous United States

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An increase in computing resources and accessibility of high-resolution land data allows us to address many unresolved earth science challenges, such as the lack of high-resolution soil data at continental scales. This data would be helpful for agriculture, hydrologic modeling, and resource planning.

Current available continental soil datasets are mainly based on legacy polygon datasets built from surveys and local expert knowledge. These products are difficult to use at regional to continental scales due to surveyor biases (e.g. county boundary discontinuities), varying effective spatial resolution, and un-surveyed areas. A path forward is to use machine learning (e.g. DSMART) to harmonize and spatially disaggregate these products by relating high resolution soil covariates to available observations.

In this study, the DSMART algorithm is applied over CONUS at a 30 meter spatial resolution. The gSSURGO database provides the ground truth and the USGS NED, MLRC NLCD, and USGS aeroradiometric datasets the soil covariates. Using a moving window approach, random forests are fit and used to estimate the 50 most probable soil classes and their associated probabilities at each 30 meter grid cell over CONUS ($\sim$9 billion grid cells). We will discuss the value and accessibility of the new dataset, its potential applications, and preliminary validation results.