ESTIMATING CARBON IN FOREST SOILS OF THE UNITED STATES USING THE NATIONAL FOREST INVENTORY

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Abstract—Soil organic carbon (SOC) is the largest terrestrial carbon (C) sink on earth and management of this pool is a critical component of global efforts to mitigate atmospheric C concentrations. Soil organic carbon is also a key indicator of soil quality as it affects essential biological, chemical, and physical soil functions such as nutrient cycling, water retention, and soil structure maintenance. Much of the SOC on earth is found in forest ecosystems and is thought to be relatively stable. That said, there are a growing number of studies documenting the sensitivity of SOC to global change drivers, particularly in the northern circumpolar region where approximately 50% of the global SOC is stored. In the United States (US), SOC in forests is monitored by the national forest inventory (NFI) conducted by the Forest Inventory and Analysis (FIA) program within the United States Department of Agriculture, Forest Service. The FIA program currently uses SOC predictions based on SSURGO/STATSGO data to populate the national forest inventory. Most of the point samples used to obtain estimates of SOC in forests from the SSURGO/STATSGO data are from non-forested sites. The FIA program has been consistently measuring soil attributes as part of the NFI since 2001 and has recently amassed a nearly complete inventory of SOC in forests in the conterminous US and coastal Alaska. As an initial step towards developing a map of SOC in forests of the US we will 1) describe the inventory of soil variables in the NFI, 2) compare model predictions of SOC density with estimates from the NFI, 3) evaluate new estimation approaches to replace existing model predictions, and 4) describe next steps towards the development of data-driven visualization products that rely on existing and emerging remotely sensed data products, NFI measurements, and auxiliary environmental data sources.

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