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| **Towards a generative approach to estimating soil carbon distributions in subtropical forested environments** |
| Land use conversion is profoundly changing above- and belowground forest carbon cycling in the Hawaiian Islands. Contemporary drivers of forest change in Hawaiʻi contrast with historical and global patterns. For example, the abandonment of agricultural lands has facilitated the encroachment of woody species into areas previously void of forests. Tropical and subtropical forests, like those in Hawaiʻi, sequester a significant amount of carbon belowground in soils. To elucidate and spatially cluster the complex, interacting drivers influencing soil carbon dynamics across Hawaiʻi’s diverse climates and landscapes, we analyzed Forest Inventory and Analysis (USFS-FIA) and other Hawaiʻi-based forest soil carbon data, climate and geology, and landsat and GEDI data in a generative framework aimed at delineating regional distributions of soil carbon. Our approach highlights how land use and land use changes drive soil carbon processes differently across regions. Our findings offer a framework for the expression of multimodality in soil carbon predictions that better reflects the manifestation of soil carbon distributions across landscapes. The ability to include improved region-specific drivers in process-based carbon cycling models will enhance our ability to manage and conserve Hawaiʻi’s unique tropical forest ecosystems in the face of ongoing environmental change. |

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