BlueCarbon R package: Estimation of Organic Carbon Stocks and Sequestration Rates From Soil Core Data

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Summary

BlueCarbon facilitates the estimation of organic carbon stocks and sequestration rates from soil and sediment cores in depositional environments. It includes seven main functions to (1) estimate core compaction, (2) correct core compaction, (3) estimate sample thickness, (4) estimate organic carbon content from organic matter content, (5) estimate organic carbon stocks and (6) sequestration rates, and (7) visualize the error in stock extrapolation.

Statement of Need

Coastal blue carbon ecosystems have earned significant attention for their role as organic carbon sinks. Over the past decade, publications on blue carbon research have grown exponentially (Quevedo, Uchiyama, & Kohsaka, 2023). While soil samples can be collected by different methods, estimation methodologies remain fairly homogeneous, following the protocols published by the Blue Carbon initiative (Howard, Hoyt, Isensee, Pidgeon, & Telszewski, 2014). Despite the increasing use of R among blue carbon researchers, there are no specialized R packages dedicated to these calculations. *BlueCarbon* aims to standardize and automate the main estimations for calculating soil and sediment blue carbon stocks and sequestration rates from raw field and laboratory data.

Design

BlueCarbon contains seven main functions (Fig. 1) to deal with core compaction (to estimate and mathematically correct core compaction), transform laboratory data (to