New high-resolution carbon mapping techniques provide more accurate results

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A team of scientists from the Carnegie Institution for Science's Department of Global Ecology and the USDA Forest Service's Pacific Southwest Research Station (PSW) has developed new, more accurate methods for mapping carbon in Hawaii's forests. Their research appears in an online issue of the journal *Frontiers in Ecology and the Environment*.

The growing market for private and public entities to purchase carbon offsets has led to a need to find better monitoring techniques to accurately quantify the amount of carbon (C) held in our nation's forests. Combining field measurements, airborne Light Detection And Ranging (LiDAR)–based observations, and satellite-based imagery, the team developed a 30-meter-resolution map of aboveground carbon density spanning 40 vegetation types found on the one million-hectare Island of Hawaii. The team estimated a total of 28.3 million tons of carbon sequestered in aboveground woody vegetation on the island, which is 56 percent lower than estimates by the Intergovernmental Panel on Climate Change that were not intended to resolve carbon variation at fine spatial scales. The approach reveals fundamental ecological controls over carbon storage, including the role of climate, introduced species, and land-use change, and provides a fourfold decrease in regional costs of carbon measurement over using only those samples collected in the field.

This new approach moves well beyond merely sampling the carbon contained in forests of a given region and/or forest type with relatively few forest inventory plots. Now, these researchers can—by correlating

plot-based estimates of forest C mass with LiDAR measures of canopy structure—actually measure forest C across a wide diversity of environmental and forest conditions.

"This research demonstrates that ecosystem C stocks can be accurately assessed in highly variable environments across extensive geographic regions," says Dr. R. Flint Hughes, a PSW research ecologist with the Ecosystem Function and Health Program, who co-authored the study. "We are very excited about the prospects of applying this new approach to other regions of the world to facilitate faster and more accurate forest C assessments. It is a true leap forward in understanding the state and dynamics of the world's forests."

More information: To read the full article, go to: www.fs.fed.us/psw/publications … hughes(asner)001.pdf

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