

# Sizing up biomass from space

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The biomass stored in forests is thought to play a critical role in mitigating the catastrophic effects of global climate change. New research published in BioMed Central's open access journal *Carbon Balance and Management* has used Lidar data collected by the Geoscience Laser Altimeter System (GLAS) aboard the Ice Cloud and Elevation Satellite (ICESat) to accurately measure the biomass of California. When the ICESat2 is launched in 2016 this method will be able to monitor biomass and other global data changes.

As part of the global [carbon](#) cycle it is thought that global biomass acts as a carbon reservoir and consequently that deforestation and changes of land use contribute to global warming by liberating carbon from this reservoir.

Initiatives such as United Nations Collaborative Programmed on Reducing Emissions from Deforestation and Degradation in Developing Countries (REDD) are attempting to measure changes in forest [carbon storage](#). But many countries do not have national forest inventories, and for those that do, methods and definitions used to monitor vegetation differ.

Presenting a new method of interpreting GLAS data, researchers from the US Forest Service, NASA and Colorado State University, have been able to develop a randomisation protocol which allows accurate estimates of total biomass.

Dr Sean Healey from the Rocky Mountain Research Station explained,

"To sample the Lidar data we split the area to be evaluated up into a series of equal area, but not equal shape units, using a fractal-based approach. This provided us with a statistically solid base to our estimates. Each unit contained at least one GLAS shot and where there was more than one shot (on average each unit had 560 shots) only one was randomly chosen. We tested this method on California because the US Forest Inventory and Analysis program (FIA) maintains extensive forestry records including biomass which we could compare our method to."

The GLAS estimate of biomass for California was 211 Mg/ha - equivalent to the FIA estimate (based on 10 years worth of recordings). Global application of this method on the GLAS data, or on data provided by ICESat2, would provide a standardized, timed, snapshot of biomass.

Dr Sean Healey continued, "In fact, this method. has been adopted for just this purpose by a partnership between scientists participating in the NASA Carbon Monitoring System pilot project and the UN Food and Agriculture Organization (FAO). Co-editor in Chief of *Carbon Balance and Management*, Dr Burke Hales said, "The GLAS approach shows promise in standardizing global forest biomass inventory, and in improving spatial and temporal coverage more quickly, easily, and most likely cheaply than traditional methods. We will probably need to rely on 'boots on the ground' estimates to refine the GLAS method for some time, but the addition of this approach will reduce the uncertainty currently overshadowing the inclusion of forest [biomass](#) in global carbon budgets."

Provided by BioMed Central

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