New method can aid rainforest, help loggers

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Albert de Sousa (on ladder) and Augusto Maia, two students from Brazil's Federal University of Para, measure the circumference of an Amazon rainforest tree in order to estimate its carbon content. Part of a study on reduced-impact logging conducted by UAlbany's Scott Miller, this was but one of thousands of trees so assessed.

(PhysOrg.com) -- Reduced-impact logging (RIL) in an Amazon rainforest generated profits while emitting a small fraction of carbon compared with total forest clearing, a University at Albany study concludes.

The study, led by Scott Miller, Ph.D., at UAlbany's Atmospheric Sciences Research Center, was published this month in the official journal of the National Academy of Sciences, Proceedings of the National Academy of Sciences. Entitled "Reduced-impact logging minimally alters tropical rainforest carbon and energy exchange," the study was funded by the National Aeronautics and Space Administration as part of the Large Scale Biosphere-Atmosphere Experiment in Amazonia, a Brazilian-led project.

For decades, scientists and foresters have debated how best to reap economic benefits from tropical rainforests while maintaining their high biodiversity and critical roles in the global carbon, energy and water cycles. In an unprecedented comparison of a logged tropical forest with an intact forest ecosystem, Miller and researchers from several American and Brazilian universities measured the exchanges of carbon dioxide and water between forests and the atmosphere.

In RIL, loggers cut the heavy vines that connect trees and direct where harvested trees will fall. Applying this method, significantly fewer surrounding trees are damaged or killed when the target logs fall than in conventional selective logging.

Miller and the team monitored the air exchanges from two 213-foot towers that extended above the forest canopy. One tower was in an area of forest that was selectively logged, and the other was in area that was not logged. Detailed measurements of the carbon exchange and the carbon stocks in live and dead trees showed that the forest lost carbon to the atmosphere in the first year after logging but thereafter the forest carbon balance returned to pre-logging levels.

"We found that the net carbon emissions caused by RIL were just a few percent of what would have been released in deforestation," said Miller.

Similarly, RIL had a small, transient effect on forest-atmosphere water exchange. According to Humberto da Rocha, professor of atmospheric sciences at the University of Sao Paulo and collaborator on the project, "evaporation declined briefly, but forest-atmosphere water exchange returned to pre-logging levels within a year."

Logging is a profitable land use in the Brazilian Amazon. Using conventional methods, it can be highly destructive and degrade forest-functioning. Miller's study shows, however, that using RIL methods can be economically beneficial while having minimal impact on forest-atmosphere

carbon and water exchange.

Provided by University at Albany