Storm Killed Half Billion Trees in Amazon Rainforest, Tulane University Researchers Say

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A single, violent storm that swept across the whole Amazon forest in 2005 killed half a billion trees, according to a new study by Tulane University researchers.

While storms have long been recognized as a cause of Amazon tree loss, this study is the first to produce an actual body count. And, the losses are much greater than previously suspected, suggesting that storms may play a larger role in the dynamics of Amazon forests than previously recognized.

Amazon rain forests, which are thought to absorb a significant portion of carbon dioxide from the earth"s atmosphere, are an important bellwether for climate change researchers. Tree loss in the Amazon is considered one of a number of potential "tipping points" related to issues of rapid climate change. Previous research had attributed a peak in tree mortality in 2005 solely to a severe drought that affected parts of the forest.

The new study says that a single squall line of severe thunderstorms in January 2005 had an important role in the tree demise. This type of storm might become more frequent in the future in the Amazon due to climate change, killing a higher number of trees and releasing more carbon to the atmosphere, according to the paper"s authors, atmospheric scientist Robinson Negron-Juarez and forest ecologist Jeffrey Chambers of Tulane University. The article has been accepted for publication in Geophysical Research Letters, a journal of the American Geophysical Union. It is available online at: http://www.agu.org/journals/pip/gl/2010GL043733-pip.pdf

The researchers used a combination of satellite images, field-measured tree mortality, and modeling to determine the number of trees killed by the storm. By linking satellite data to field observations, the researchers were able to take into account smaller tree blowdowns (down to 7-10 trees per event) that otherwise

cannot be detected through satellite images. The researchers estimate that between 441 and 663 million trees were destroyed by the storms, representing a loss equivalent to 23 percent of the estimated mean annual carbon accumulation of the Amazon forest.

Chambers says that authors of previous studies on tree mortality in the Amazon have diligently collected dead-tree tolls, but information on exactly what killed the trees is often lacking, or not reported.

“It"s very important that when we collect data in the field we do forensics on tree mortality,” says Chambers, who has been studying forest ecology and carbon cycling in Amazon since 1993. “Under a changing climate, some forecasts say that storms will increase in intensity. If we start seeing increases in tree mortality, we need to be able to say what"s killing the trees.”