Researchers predict Cyclone Haiyan likely to release huge amount of carbon

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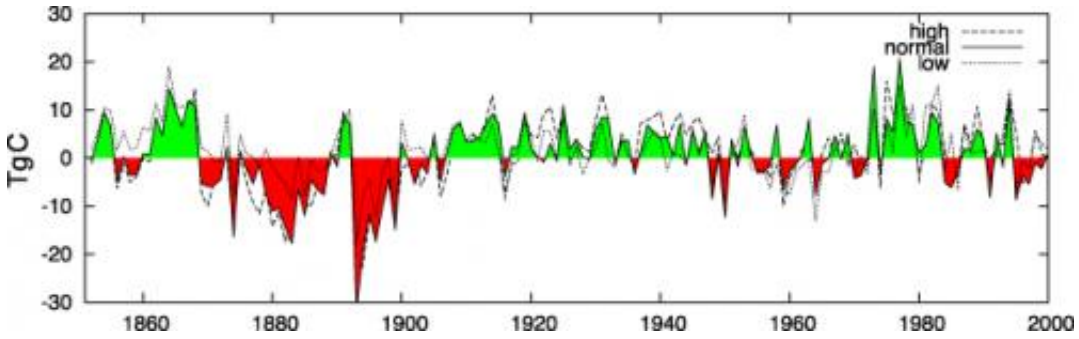

Net impact of tropical cyclones on net ecosystem flux for the period 1851–2000 as predicted by ED. A positive flux (green) is an accumulation of carbon in the ecosystem (carbon sink), negative flux (red) is a release of carbon from the ecosystem (carbon source). Dashed and dotted line show bracketed range of non-mortality damage from leaf stripping (low) to near complete live biomass loss (high). Credit: *Environ. Res. Lett.* 8 045017. doi:10.1088/1748-9326/8/4/045017

(Phys.org) —A team of researchers from several institutions working in the United States has published a paper in the journal *Environmental Research Letters*, outlining the atmospheric carbon impact caused by hurricanes and cyclones. Prior research suggests, they note, that the amount of carbon released into the atmosphere due to Cyclone Haiyan is likely to be huge.

Strong weather events such as hurricanes, tornadoes and cyclones can cause the release of carbon into the atmosphere by uprooting trees.

Uprooted trees almost always die and as happens with all trees when they die, stored carbon is released into the atmosphere.

In their paper the researchers note that Hurricane Katrina, for example, caused the release of approximately 100 tons of carbon into the atmosphere. The problem with Cyclone Haiyan is likely to be worse for two main reasons: it was a bigger storm covering a wider area and it struck a part of the world that has denser tree cover. The researchers aren't willing to try to predict how much carbon will eventually be released by all the downed trees, but suggest it could be huge—the carbon released by Katrina, equaled nearly half of all carbon sequestered by trees in the United States annually.

Perhaps even worse is that the team believes that carbon released by the destructive force of the cyclone may never be recovered. They note that past research has shown that new forest regrowth, such as has been occurring in the areas struck by Katrina, more than compensates for the loss of carbon due to dying trees. But, for places that are struck by such events that are not likely to see the trees grow back, the released carbon will never be stored in new tree growth. The Philippines experiences more cyclones than any other land mass and because of that (and population density in the area) it's likely the impacted areas will never again see the same amount of trees. Because of that, the released carbon will simply be added to the total amount that already exists in the atmosphere, leading to even more heating of the planet.

The researchers also noted that it's not always the strongest storms that cause the largest carbon release—sometimes larger storms that cover more area but have less strength wind up downing more trees.

More information: The impacts of tropical cyclones on the net carbon balance of eastern US forests (1851–2000), J P Fisk et al 2013 *Environ. Res. Lett.* 8 045017. DOI: 10.1088/1748-9326/8/4/045017

Abstract

In temperate forests of the eastern US, tropical cyclones are a principal agent of catastrophic wind damage, with dramatic impacts on the structure and functioning of forests. Substantial progress has been made to quantify forest damage and resulting gross carbon emissions from tropical cyclones. However, the net effect of storms on the carbon balance of forests depends not only on the biomass lost in single events, but also on the uptake during recovery from a mosaic of past events. This study estimates the net impacts of tropical cyclones on the carbon balance of US forests over the period 1851–2000. To track both disturbance and recovery and to isolate the effects of storms, a modeling framework is used combining gridded historical estimates of mortality and damage with a mechanistic model using an ensemble approach. The net effect of tropical cyclones on the carbon balance is shown to depend strongly on the spatial and temporal scales of analysis. On average, tropical cyclones contribute a net carbon source over latter half of the 19th century. However, throughout much of the 20th century a regional carbon sink is estimated resulting from periods of forest recovery exceeding damage. The large-scale net annual flux resulting from tropical cyclones varies by up to 50 Tg C yr−1, an amount equivalent to 17%–36% of the US forest carbon sink.

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