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Amazon Rainforest More Fragile Than Estimated

2-degree C rise would trigger 20-40% dieoff

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The Amazon rainforest, one of the planet's most precious and besieged natural resources, is even more fragile than realized. If the planet warms even a moderate amount, a new study predicts that as much as 40 percent of it could be condemned to vanish by the end of the century.

A crippled Amazon could hasten global warming. If a significant portion of its trees die off, their vast stores of carbon would be emitted back into the atmosphere as greenhouse gases, pushing the climate further into dangerous levels of warming.

Chris Jones of the United Kingdom's Met Office and a group of researchers ran a computer simulation of Earth's climate that focused on how vegetation reacts to warming. They found that warming doesn't immediately kill off tropical trees -- it can take up to a century for the forests to respond fully.

But even modest warming could have devastating effects. If the planet warmed just 2 degrees Centigrade (3.6 degrees Fahrenheit) above pre-industrial levels, they found that between 20 percent and 40 percent of the forest could die off.

"Our model predicts quite a severe drying in the Amazon, making trees more

vulnerable to fire," Jones said. "The additional heat causes stress, too, damaging their ability to grow fully."

The team's work was published yesterday in the journal Nature Geoscience.

The climate has already warmed 1 degree above pre-industrial levels, but rising carbon dioxide (CO₂) and other greenhouse gas concentrations promise to push that number higher in the coming decades, unless humanity changes its behavior.

Changes in the forest will not be immediate. The team's results suggest the rainforest may appear unaffected by climate change until around 2050, even if temperatures rise continuously for the next few decades. But the damage will pile up in the meantime, and huge tracts of rainforest may be reduced to grassy savannah by the end of the century.

All is not lost, though. If carbon emissions are sharply reduced in the coming decades, the climate may only stay above the 2 degree threshold for a short time, forest damage could be minimal.

The model the team used is also highly pessimistic, underestimating rainfall amounts in the region by as much as 25 percent, according to Oliver Phillips of the University of Leeds in the U.K.

Still, Phillips said that study's finding was worrying, and that it underscored the need for swift action to both curb greenhouse gas emissions, and to protect what forest remains from deforestation.

"The real question and danger here is going to be the interaction between climate change and human degradation and fragmentation of the rainforest," Phillips told Discovery News, "This study makes

controlling deforestation and slowing it down even more important."