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UNH Scientists Develop New Model to Study Fire in the Brazilian Amazon

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DURHAM, N.H. -- Scientists from the University of New Hampshire, the Brazilian Center for Weather Forecast and Climate Studies (CPTEC) and the University of Wisconsin have developed a new tool for researching fires in the Amazon.

The new "fire model" combines satellite information on fires with corresponding statistics on climate, land use and land cover and includes both natural and man-made (anthropogenic) influences. The model provides scientists with a comprehensive look at fire activity for the Brazilian Amazon.

Fires are commonly used in the Amazon as an effective and inexpensive tool to clear land and keep pastures open.

After applying the fire model to two different development scenarios for the future, increased fire activity was projected if the current relationships between fire and its causes hold true. The region is being actively developed, with more people having better access to the forest and plans underway to pave dirt roads and construct new roads.

Being able to model how fire will impact the Brazilian Amazon given these added pressures will give scientists and policy makers additional information by which to make decisions.

"These results are interesting from many perspectives, and have implications for ecological, atmospheric and development studies," says Manoel Cardoso, a Ph.D. candidate at UNH's Institute for the Study of Earth, Oceans, and Space (EOS).

Cardoso, who is from São Paulo, Brazil, is the lead author of a study about the new fire model published in the May issue of Global Change Biology. UNH professors George Hurtt and Berrien Moore co-authored the work. The study is affiliated with a Brazilian-led, international effort called "The Large Scale Biosphere-Atmosphere

Experiment" (LBA).

LBA scientists want to determine how changes in land use and climate will affect the biological, chemical and physical functions of the Amazon, including the sustainability of development in the region and its influence on global climate.

The Brazilian Amazon contains a large fraction of the world's biodiversity, stores a significant amount of carbon, and influences regional and, possibly, global climate conditions. In an area large enough to hold Western Europe, fires are important disturbances.

While effective for land clearing, says Cardosa, fires can have unintended consequences. For example, accidental burnings can affect neighboring forests, which, unlike boreal forests, have little capacity to survive fire. In addition, fires can affect nutrient and carbon fluxes, modify the growth stages of vegetation, and change the composition of the atmosphere.

"Vegetation accumulates and stores carbon over what can be a century time scale," Cardoso says. "With fire, in less than a day, you can reverse everything."

But the expectation of increased fire activity in the future is not, the study asserts, "a foregone conclusion." The study points out that two major non-exclusive options to avoid the projected increases in fire activity include slowing the rate of road expansion and deforestation, and implementing better fire management policies and techniques such as controlled burns, use of firebreaks to limit the accidental spread of fire, and increased enforcement.

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