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Senior Scientist Daniel Nepstad endorses the correctness of the IPCC's (AR4) statement on Amazon forest susceptibility to rainfall reduction

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The Intergovernmental Panel on Climate Change has been recently criticized in media coverage (e.g. Sunday Times) for presenting inaccurate information on the susceptibility of the forests of the Amazon Basin to rainfall reduction in its fourth assessment. The statement that has drawn the criticism reads as follows:

"Up to 40% of the Amazonian forests could react drastically to even a slight reduction in precipitation; this means that the tropical vegetation, hydrology and climate system in South America could change very rapidly to another steady state, not necessarily producing gradual changes between the current and the future situation (Rowell and Moore, 2000)." (IPCC 2007, Magrin et al. 2007)

The Rowell and Moore review report that is cited as the basis of this IPCC statement cites an article that we published in the journal *Nature* in 1999 as the source for the following statement:

"Up to 40% of the Brazilian forest is extremely sensitive to small reductions in the amount of rainfall. In the 1998 dry season, some 270,000 sq. km of forest became vulnerable to fire, due to completely depleted plant-available water stored in the upper five metres of soil. A further 360,000 sq. km of forest had only 250 mm of plant-available soil water left. [Nepstad et al. 1999]" (Rowell and Moore 2000)

The IPCC statement on the Amazon is correct, but the citations listed in the Rowell and Moore report were incomplete. (The authors of this report interviewed several researchers, including the author of this note, and had originally cited the IPAM website where the statement was made that 30 to 40% of the forests of the Amazon were susceptible to small changes in rainfall). Our 1999 article (Nepstad et al. 1999) estimated that 630,000 km² of forests were severely drought stressed in 1998, as Rowell and Moore correctly state, but this forest area is only 15% of the total area of forest in the Brazilian Amazon. In another article published in *Nature*, in 1994, we used less conservative assumptions to estimate that approximately half of the forests of the Amazon depleted large portions of their available soil moisture during seasonal or episodic drought (Nepstad et al. 1994). After the Rowell and Moore report was released in 2000, and prior to the publication of the IPCC AR4, new evidence of the full extent of severe drought in the Amazon was available. In 2004, we estimated that half of the forest area of the Amazon Basin had either fallen below, or was very close to, the critical level of soil moisture below which trees begin to die in 1998. This estimate incorporated new rainfall data and results from an experimental reduction of rainfall in an Amazon forest that we had conducted with funding from the US National Science Foundation (Nepstad et al. 2004). Field evidence of the soil moisture critical threshold is presented in Nepstad et al. 2007. In sum, the IPCC statement on the Amazon was correct. The report that is cited in support of the IPCC statement (Rowell and Moore 2000) omitted some citations in support of the 40% value statement.

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