

Press release:

Amazon forest-fire severity has been underestimated: Summary of Ramos et al. 2025

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The Amazon forest is rapidly being degraded by forest fires, and projected climate change is expected to greatly increase this threat to the forest. Fire intensity determines how many trees are killed and how much of the forest's biomass is lost. A new study finds that the most widely used method for estimating fire intensity from satellite images grossly underestimates the intensity of Amazon forest fires, suggesting that estimates of biomass loss and greenhouse gas emission from Amazon forest fires are underestimated. Fire intensity is usually estimated by calculating the Delta Normalized Burn Ratio (ΔNBR) and applying a set of threshold values to identify intensity levels, such as "unchanged", "low", "moderate", and "heavy". The threshold values usually applied are taken from a 2006 study of fire severity in coniferous forest in Canada, which is very different from Amazon rainforest. A study by Camila Ramos, Paulo Graça and Philip Fearnside at the National Institute for Research in Amazonia (INPA) in Manaus measured fire intensity in the field in central Amazonia and developed a new set of threshold values. Satellite images of fire scars interpreted with these values matched the field observations with a Kappa coefficient of 0.635, which represents an agreement considered "substantial", whereas applying the thresholds from the widely used Canadian study produced a value of 0.184, indicating only "slight" agreement. While the new study, published on 6 February 2025 in the journal *Land Degradation and Development*, is an important advance in providing a first set of threshold values for Amazonian forest, many more such studies should be done in other locations in Amazonia. Forest degradation affects a vast area and is a major

threat to Amazon forest. Various studies estimate recent emissions from forest degradation in Amazonia to be on a par with those from deforestation, but uncertainty is especially high for degradation estimates. Reliable estimates are a high priority because global efforts to mitigate climate change will be insufficient if emissions are underestimated. Even with full engagement of the world's countries, emissions reductions based on erroneous estimates would fail to prevent global warming from escaping from human control.

Reference:

Ramos, C.J.P., P.M.L.A. Graça & P.M. Fearnside. 2025. Adjusted Δ NBR index thresholds for forest fire severity mapping: A study in central Amazonia. *Land Degradation and Development*
<https://doi.org/10.1002/ldr.5466>