



## **Climate impacts of tropical forest degradation in Amazonia**

Jessica Baker and Dominick Spracklen

University of Leeds, Institute of Climate and Atmospheric Science, School of Earth and Environment, Leeds, United Kingdom  
(j.c.baker@leeds.ac.uk)

Tropical forests have an important regulating influence on local and regional climate, through modulating the exchange of moisture and energy between the land and the atmosphere. The climate impacts of deforestation have been analysed previously, though the subtler climate effects of tropical forest degradation have not previously been assessed. Remote sensing datasets of land surface and atmospheric variables were used to compare climate responses over Amazon evergreen broadleaf forests that experienced differing degrees of degradation between 2001 and 2013. Clear gradients in environmental change with increasing disturbance were observed. Leaf area index (LAI) showed progressively stronger reductions as degradation extent increased, with evapotranspiration (ET) showing a comparative decline. These changes in LAI and ET were related to observed changes in surface temperature, which increased along a degradation gradient. Notably, even forests that experienced relatively little disturbance over the analysis period, but had previously lost their intact status, showed significantly more warming than neighbouring intact forests ( $p < 0.001$ ). Seasonal analysis showed differences between intact and degraded forests were most pronounced at the end of the dry season, indicating that degradation may perturb the Amazon water cycle. Overall, these results show that intact tropical forests are more resilient to climate change than degraded forests, providing further evidence that protecting intact forests is of utmost importance.