Geophysical Research Abstracts,
Vol. 11, EGU2009-12646, 2009
EGU General Assembly 2009

Use of fires for tropical deforestation under current and projected climate conditions.

Y. Le Page (1), G. van der Werf (2), D. Morton (3), and J.M.C. Pereira (1)

(1) Instituto Superior de Agronomia, Departamento de Engenharia Florestal, Lisboa, Portugal (lepagey@isa.utl.pt), (2) Department of Hydrology and Geo-environmental Sciences, Faculty of Earth and Life Sciences, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands, (3) Department of Geography, University of Maryland, College Park, USA

Precipitation rates in tropical forests are relatively high year-round, which in general limits the occurrence of fires. However, two phenomena can result in significant fire activity. 1/ Prolonged droughts, typically under large scale climatic anomalies (i.e. El Niño). 2/ Cutting trees at the beginning of the dry season, to prevent their access to ground water and accelerate dessication. This practice is common in large-scale deforestation and shifting cultivation sites. Vegetation is typically piled and burned at the end of the dry season

At the arc of deforestation in the Amazon, fire is the main tool to remove biomass. At its current location, the dry season is relatively long and fires can be ignited several times throughout the dry season. Further towards the interior – where deforestation may ultimately happen- the dry season is shorter and fires may not burn easily, leading to lower efficiency in the land conversion process.

Here we present a study of the constraints of climate on fires in the Amazon forest, under present day and future climate conditions. A model of Fire Potential is developed, relating moisture conditions based on precipitation rates to the recently developed deforestation fire activity data. The model predicts a rapid decrease of the Fire Potential beyond the actual deforestation arc under current climatic conditions. Fire Potential under future climate reveals that a significant part of the projected deforestation could be hampered by climate conditions, due to relatively little precipitation changes in most IPCC projections. However, we show that turning large areas of the remaining forest sensitive to fires requires only a small reduction of precipitation if it occurs over the driest months.