



Fire-probability maps for the Brazilian Amazonia

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Most fires in Amazonia result from the combination between climate and land-use factors. They occur mainly in the dry season and are used as an inexpensive tool for land clearing and management. However, their unintended consequences are of important concern. Fire emissions are the most important sources of greenhouse gases and aerosols in the region, accidental fires are a major threat to protected areas, and frequent fires may lead to permanent conversion of forest areas into savannas. Fire-activity models have thus become important tools for environmental analyses in Amazonia. They are used, for example, in warning systems for monitoring the risk of burnings in protected areas, to improve the description of biogeochemical cycles and vegetation composition in ecosystem models, and to help estimate the long-term potential for savannas in biome models.

Previous modeling studies for the whole region were produced in units of satellite fire pixels, which complicate their direct use for environmental applications. By reinterpreting remote-sensing based data using a statistical approach, we were able to calibrate models for the whole region in units of probability, or chance of fires to occur. The application of these models for years 2005 and 2006 provided maps of fire potential at 3-month and 0.25-deg resolution as a function of precipitation and distance from main roads. In both years, the performance of the resulting maps was better for the period July-September. During these months, most of satellite-based fire observations were located in areas with relatively high chance of fire, as determined by the modeled probability maps. In addition to reproduce reasonably well the areas presenting maximum fire activity as detected by remote sensing, the new results in units of probability are easier to apply than previous estimates from fire-pixel models.