

Emissions from vegetation fires and their influence on atmospheric composition over the Amazon Basin (Invited)

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Over the past decades, several campaigns have been conducted in the Amazon Basin, during which the emissions from biomass burning were characterized. Other campaigns, as well as remote sensing studies, have produced clear evidence that the budget of trace gases (including CO₂) and aerosols over the Basin are strongly perturbed by vegetation fires. We will briefly review these studies and present some recent measurements made during the the Balanço Atmosférico Regional de Carbono na Amazônia (BARCA) aircraft measurement program, which consisted of two aircraft campaigns during November-December 2008 (BARCA-A) and May-June 2009 (BARCA-B). The measurements covered the altitude range from the surface up to about 4500 m, and spanned across the Amazon Basin. While our results confirm the importance of biomass burning for the atmospheric composition over the Amazon Basin in general, they also highlight some complexities. One is the influence of transatlantic transport: Amazonia is downwind of massive fire regions in Africa, and depending on season and locality, these can make an important contribution to the trace gas and aerosol burden over the Amazon Basin. Another difficulty arises from the fact that representative emission ratios for CO relative to CO₂ are difficult to obtain in the field, owing to the influence of biospheric exchange on the distribution of CO₂ concentrations. The consequences of these and other uncertainties for a quantitative assessment of the sources of trace gases over Amazonia and for the estimation of carbon exchange with the biosphere will be discussed.

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