

Chemical composition of the soilwater in the subsurface after the slashing and burning of a “Terra Firme” forest parcel in southeastern Amazonia (North Mato Grosso, Brazil)

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The evolution of changes in the chemical composition of soil solutions that percolated through the unsaturated zone, are studied after the slashing and burning of a “Terra Firme” Amazonian forest parcel. The site was located at Fazenda Caiabi (9°57'42.20"S, 56°20'52.05"W), near Alta Floresta, MT, Brazil. The solution was collected with zero tension lysimeters installed at the depth of 20 cm in the following sites: (i) a pristine parcel of the forest - G – used as reference, (ii) a forest parcel with the litter accidentally burned - ELB, and (iii) a slashed and burned forest parcel – ESB, this last one being the site E in a series of experiments reported by Carvalho Jr et al. (2001). The samples were collected from September 10, 1999 to January 1, 2000, corresponding to accumulated 682 mm of rainfall; the day of the burning was August 24, 1999. The concentrations of Na⁺, K⁺, Mg²⁺, Ca²⁺, NH₄⁺, Cl⁻, NO₃⁻, SO₄²⁻, Fe²⁺, Mn²⁺, Cu²⁺, Zn²⁺ and Al³⁺ in the soil solution were determined by liquid ion chromatography as shown by Forti et al. (2000). The ratios between the concentration of each chemical species after each collection at sites ELB and ESB, and the respective weighted (by the rainfall between collections) mean concentrations at the reference site G were determined. For the major cations and anions, a general decrease with time was found for the ratios, after initial peaks caused by the burning. These ratios fell below one, in general after a few months after the burning, meaning depletions of the ions in the soil solutions when compared with their concentrations at the reference site. Concerning the metals, oscillations in their composition, possibly due to mobilizations, were observed, followed by decreases similar to the ones of the other ions. This mobilization was particularly high for Al³⁺ at site ESB. Thus, the burnings introduced pulses in the soil solution composition, which decayed with time to values below the ones of the reference unburned site.

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