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LAND USE CHANGES IN AMAZON AND ITS IMPLICATIONS TO NITROGEN CYCLE: A ISOTOPIC APPROACH

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In order to understand the effects of land cover changes in the nitrogen cycle, we investigated the $\delta^{15}N$, C and N concentrations in soil, litter and vegetation, and N_2O and NO emissions from soil in an old growth forest and along a chronosequence of secondary forests (6, 20 and 40 year-old) placed in the municipality of São Francisco do Pará, Brazil (01,10 S; 47,45 W). This area has been settled for over a century and numerous cycles of slash and burn agriculture have occurred. Regardless the site, an increase in $\delta^{15}N$ and a decrease in N concentrations were observed in the first 50 cm deep of soil. There were significant increases in $\delta^{15}N$ and N concentrations in the vegetation along the chronosequence and a decrease in C:N ratio. Litter $\delta^{15}N$ increased but litter N content did not varied along the chronosequence. The emissions of NO + N_2O from the soil also increased with secondary forest age. These parameters have suggested an increasing N availability with stand age. The fact that the pattern of soil, litter and vegetation $\delta^{15}N$ is enriched in old forests compared to young forests indicates that annual losses of nitrogen relative to pools are greater in the older secondary forests. That is, nitrogen cycling is more closed due to N limitation during the first stages of secondary succession and becomes more open as the secondary forest ages and as rates of N cycling accelerate.

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CHANGES IN THE LITTERFALL PRODUCTION AND LEAF AREA INDEX IN A SELECTIVE LOGGED FOREST IN EASTERN AMAZON

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Carbon and water fluxes over ecosystem depend on the canopy architecture and the amount and distribution of biomass. Not much is known about the relationship between the dynamics of biomass and atmospheric fluxes for tropical forests. A complicating factor is that the Brazilian National Forests may be opened for exploration and logging, as little is known about the potential impacts arising from it. This work reports the temporal dynamics of litter production and leaf area index (LAI) over a primary tropical forest at the Floresta Nacional do Tapajós, before and after the selective logging of commercial species. Litter production before logging (September 2000 to July 2001) was 4.41 MgC ha^{-1}, after logging (August 2001 to August 2002) equal to 3.96 MgC ha^{-1}, which suggested a reduction of about 10%. The seasonality observed in the litter production was notable for having two maxima, a main one in July (at the end of wet season), and a secondary one in December (at the end of dry season), characterizing a bimodal distribution. Litterfall accumulated over a year before the logging showed the LAI equal to 5.3, which was reduced to 4.4 in the year after logging. These values are lower than the maximum expected at the site (6.3). Both reductions in LAI and litter production are expected after the clearings opened during the logging near the experimental area.