degrees of completeness in the components included. Other critical portions of the calculation include the growth of secondary forests in deforested areas and the inclusion of inherited and/or committed emissions (or neither). Inclusion of all relevant factors results in estimates for emissions double those of some prominent estimates.

New data indicate that commonly used wood density estimates need to be adjusted downward by 12.1%. Adjustments to biomass and emissions are sufficiently large to be significant for the global carbon balance. For example, an estimate of net committed emissions of 231 × 106 Mg CO2-equivalent C/year for Brazilian Amazonia in the 1990, of which 204 × 106 Mg CO2-equivalent C/year was from net removal of biomass, would be reduced by 38 × 106 Mg CO2-equivalent C/year (14.9%: more than the 12.1% adjustment to gross emissions because regrowth estimates remain unchanged). Decreases of similar proportions would apply throughout the tropics. For the 1980s adjustments to net emissions total 240 × 106 Mg C/year for CO2 effects alone, or approximately 277 Mg CO2-equivalent C/year including trace gases. We emphasize that the revised density values will not reduce the discrepancies between the various published estimates for forest biomass and emissions in Amazonia and for the tropics as a whole; instead, all estimates will shift in parallel to a lower level.

S18: Sessões Especiais - Florestas Secundárias na Paisagem Amazônica: Estudos de Campo e de Sensoriamento Remoto que Aprimorem Nossa Compreensão da Dinâmica Espacial, Temporal e Biogeoquímica das Florestas Secundárias (*Secondary Forests in the Amazonian Landscape: Field Studies and Remote Sensing Studies That Advance our Understanding of the Spatial, Temporal, and Biogeochemical Dynamics of Secondary Forests*)

23.1: Changing enzymatic activities and mycorrhizal infections in a chronosequence of secondary and mature forests of eastern Amazonia

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The availability of nitrogen and phosphorus may limit rates of regrowth of secondary forests in Amazonia. The highly weathered soils are nutrient poor, and numerous cycles of slash and burn can further impoverish nutrient stocks and lead to site degradation. The mineralization of N and P from soil and litter by enzymatic activity and the acquisition of nutrients by mycorrhizae could be important for the recuperation of nutrient cycles during secondary forest succession. These processes were studied in a secondary forest chronosequence (5, 8, 12, 22, 42, and 72 years), a recently abandoned black pepper plantation, and a remnant mature forest in the municipality of São Francisco do Pará. At the end of the rainy season, samples of soil and roots were collected from the litter-soil interface and at 0-5, 5-15, and 15-30 cm depths in mineral soil. Available P, total N, extractable NH4+ and NO3-, urease and acid phosphatase activity, the number of fungal spores, and concentrations of total and readily extractable glomalin were measured. Infections of mycorrhizae were counted in roots. The number of spores and mycorrhizal infections decreased with increasing age of the forest, whereas the activity of acid phosphatase increased with forest age. The concentration of NH4+ and readily extractable glomalin tended to increase with forest age, and NO3- was significantly higher in the mature forest soil. The results indicate that some, but not all, of these indicators of nutrient mineralization and acquisition become similar to the mature forest within 8 years of secondary forest succession.

23.2: Caracterização de Estádios Sucessionais na Amazônia: Resultado do Mapeamento no Sítio Experimental da Floresta Nacional do Tapajós

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Este trabalho apresenta uma metodologia para a classificação semi-automática dos estádios sucessionais na região da Floresta Nacional do Tapajós, Pará. Baseado em imagens Landsat TM de 1988, 1997, 1999 e ETM+ de 2001, a região foi estratificada tematicamente em floresta (F), sucessão secundária (SS), solo exposto (S), pasto (P) e água (A), através da segmentação das bandas 3, 4, 5 e imagens fração solo, sombra e vegetação para cada data. As áreas de SS foram estratificadas em sucessão secundária inicial (SS1), intermediária (SS2) e avançada (SS3). O procedimento de classificação foi executado da seguinte forma: (1) classificação das categorias de S, P, SS e A, através da imagem mais recente (2001); (2) cruzamento entre SS de 2001 e as áreas de F de 1997, para a determinação das áreas de SS1; (3) cruzamento entre F de 2001 e as áreas de S, P e SS de 1988, para a determinação das áreas de SS3; (4) cruzamento entre SS de 2001 e as áreas de S e P de 1997, para a determinação das áreas de SS1, formadas sobre S ou P (áreas sob uso até 1997); (5) composição do mapa de cobertura vegetal através das classes de S, P, SS1 e SS3 (discriminados anteriores) e F e A da imagem mais recente (2001), onde as áreas não classificadas no mapa foram designadas como SS2. De acordo com as imagens utilizadas, as áreas de SS foram estratificadas em SS1 (13 anos). A comparação do mapa com os pontos observados no campo foi obtido o valor de 81% para o coeficiente de Kappa considerando todas as classes temáticas.