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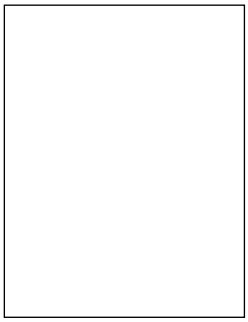

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Temporal Change of Ecosystem Carbon Stocks in Rubber Plantations in Xishuangbanna, Southwest China

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ABSTRACT

Rubber (*Hevea brasiliensis*) plantations have been expanded rapidly in tropical regions of Southwest China and cover more than 20% of land area in Xishuangbanna. Several studies have addressed changes of soil C stocks in rubber plantations; however, estimates of total ecosystem C stock and their temporal changes in rubber plantations have been inadequately studied. This study calculated C stocks in soil, biomass, litter, and dry rubber (latex), and estimated the total ecosystem C stock of rubber plantations in an age sequence of 3-, 7-, 9-, 21-, 27-, and 34-year-old in Xishuangbanna, Southwest China. The total C stocks in rubber plantations ranged from 150.3 to 283.7 Mg C ha^{-1}, with a mean of 213.4 Mg C ha^{-1}. The plantations ≤ 9-year-old had significant lower (P < 0.05) total C stocks than those older than 9 years. Carbon stocks in soil (mass equivalent) were between 107.1--170.5 Mg C ha^{-1} and in living biomass were between 2.8--95.7 Mg C ha^{-1}, representing the largest and the second largest C components in a rubber plantation ecosystem. Neglect of dry rubber C stock resulted in an underestimate of 7.8%--14.2% of the total C stock in the rubber plantations older than 9 years, which was much larger than the contribution of litter C stock (less than 2%).

Key Words: age sequence, carbon sequestration, carbon stock, dry rubber, *Hevea brasiliensis*, litter

INTRODUCTION

Destruction of tropical natural forests and their replacement by agro-ecosystems is a major source of C emissions to the atmosphere (Bolin, 1977; Detwiler, 1986; Pan *et al*., 2011), and can

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