Carbon sequestration potential of mangroves and their sediments in southeast coast of India

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Abstract

Mangroves are among the most carbon-rich forests in the tropics. We have studied the carbon sequestration potential of *Rhizophora mucronata* and *Avicennia marina* as influenced by age, season, growth and sediment characteristics as well as the impact of mangrove vegetation on seasonal carbon burial in southeast coast of India. The data reveals that *A. marina* performs better to display 75% more in rates of carbon sequestration potential, than *R. mucronata* does. In addition to biomass carbon, the mangrove sediment is also high in the levels of carbon, as compared to barren non-mangrove soil. The total carbon is 98.2% higher in mature mangroves and 41.8% in planted mangroves than that in non-mangrove barren soil; and the total organic carbon was as high as 2.5-fold in mature mangroves, 2-fold in planted mangroves as compared to un-vegetated soil. The levels of carbon do exhibit seasonal variation. In general, pre-monsoon and post-monsoon have high levels of carbons as compared to the extreme seasons do. Mangrove forest biomass and sediment is important sink of carbon within the tropical coastal zone, but increasing soil temperature due to global warming will have a negative impact on the carbon sequestration potential of the mangrove habitat as evident by the negative correlation between temperature and carbon sequestration potential of mangrove system. This work reveals that the carbon burial is rapid at the annual rate of 2.8% for total carbon, and 6.7% for total organic carbon in the mangrove-planted sediment. Clearing of mangroves can rapidly result in significantly reduced carbon stores and hence the present work has reiterated the importance of mangrove vegetation and its planting efforts for conserving the sediment carbon and as a counter-measure of mitigating the climate change in the tropical coastal domain.

Keywords
organic carbon, mangrove sediment, carbon burial, *Rhizophora*, *Avicennia*