Monitoring carbon stocks of two Brazilian Amazon REDD+ projects using UAV-LiDAR

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Accurate estimations of carbon stocks in tropical forests are a critical challenge for climate change mitigation and conservation projects. Conventional field-based carbon measurement methods are expensive and limited spatial coverage, hampering comprehensive and precise assessments in vast forested regions like the Brazilian Amazon. Remote sensing can overcome these limitations, potentially scaling up carbon stock estimates and enhancing transparency in carbon reporting. However, achieving reliable results necessitates the development of accurate regional models and the use of high-accuracy techniques. LiDAR (Light Detection and Ranging) remote sensing has emerged as a powerful tool for tropical forest monitoring. By generating detailed three-dimensional forest models, LiDAR complements satellite image-based models, enabling more precise and comprehensive estimates of carbon stocks while facilitating the monitoring of forest degradation and carbon fluxes. This technology enhances the accuracy, transparency, and reliability of carbon credit calculations. The Brazilian company BrCarbon has successfully employed LiDAR remote sensing and embarked on Unoccupied Aerial Vehicle (UAV) in two REDD+ projects in the Brazilian Amazon. The second project, the Brazilian Grouped Project (Verra ID 2551), encompasses 27,182.20 hectares of avoided deforestation, totaling 18,497,463 VCUs (2021-2030 para Brazilian Amazon, and 2022-2031 to Cauaxi / baseline period). AUV-LiDAR provides highly accurate and detailed data acquisition capabilities, facilitating identifying subtle changes in forest structure indicative of degradation, such as biomass loss. Furthermore, AUVs enhance monitoring efficiency, allowing for broader and more frequent coverage of forested areas. BrCarbon's implementation of this technology in REDD+ projects in the Brazilian Amazon demonstrates promising results in carbon estimation and ongoing forest degradation monitoring. Integrating LiDAR and drone-based remote sensing offers a comprehensive solution for obtaining precise and timely information on carbon stocks and forest degradation in tropical regions. This approach can potentially revolutionize forest monitoring practices, contributing to improved conservation and climate change mitigation efforts in the Brazilian Amazon and beyond.