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Book of Abstracts

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Title : Evaluating The Combined Use of Optical and Microwave Remote Sensing Techniques in The Carbon Stoke Estimation of Natural Forests in Thiruvananthapura District Kerala

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Abstract

Forest ecosystem plays a major role in managing carbon sequestration, reducing the impacts of climate change, and regulating the carbon equilibrium between sources and sinks. Assessing the spatial distribution, biomass and carbon stock of forest are crucial for monitoring the health of forest ecosystem. The use of remote sensing technology in carbon stock estimation has the potential to overcome difficulties faced by researchers in field-data collection like time, cost and labor, while adopting the traditional methods. The aim of the present study is to analyze the potential of the combined use of microwave and optical remote sensing data (Sentinel-1 and Sentinel-2) in forest carbon stock estimation of the natural forests in Thiruvananthapuram district, Kerala. Parameters from Sentinel-1, microwave C-band, and Sentinel-2 optical data along with the field measurements were utilized in this study. Backscattering coefficients for VH and VV polarizations were generated from Sentinel-1 GRD data and vegetation indices such as Normalized Difference Vegetation Index (NDVI), Simple Ratio (SR) and Normalized Difference Index 45(NDI45) were calculated from Sentinel-2 Level-2 data. Biophysical measurements including height and DBH and names of tree species were collected from the field to calculate plot AGB using allometric equation and was converted to carbon stock values. Correlation and Simple linear regression was used to develop the carbon stock prediction model. The model showed commendable performance with an R^2 value of 0.77 and RMSE of 33.26 t/ha. The study proves that the synergistic use of optical and microwave remote sensing data is significant in estimating forest carbon stock with high accuracy. In the present scenario of climate change, the study encourages the utilization of remote sensing technology for mapping and monitoring the dynamic changes in natural forests.

Keywords : Carbon stock, Climate Change, Remote Sensing, Backscattering coefficient, Vegetation indices

Presentation : Oral