**Above Ground Biomass Mapping using ALOS/PALSAR data in Support of Forest Carbon Monitoring : Study Case of Tropical Rainforest in Kapuas Hulu, West Kalimantan, Indonesia**

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**Abstract:** Various efforts to reduce carbon emission, including REDD+, tremendously have been made as a response to climate change issue. To address this scheme, it is required to quantify the remaining carbon stocks and change of the landscape. Over the time, the technological advances of using optical satellite imagery has been very helpful to measure the change of carbon stocks over a large area, however the cloud cover is always an issue to be encountered. This encouraged us to use the SAR imagery which is an versatile tool with its ability to penetrate thick clouds in all weather conditions. By using remote sensing based monitoring approach, a time series of ALOS/PALSAR in the year of 2010 were used for the analysis of tropical rainforest in the region of Kapuas Hulu, West Kalimantan Province of Indonesia, which has been degraded due to logging activities, forest fires, agricultural expansion, and local livelihood activities. Single, dual, and quad polarimetric of ALOS/PALSAR data were geometrically and topographically corrected then filtered to reduce speckle noise before assessing the comparison of Maximum Likelihood algorithm, Support Vector Machine (SVM), and Region-based segmentation for land cover classification. A set of polarimetric eigenvalue and eigenvector decomposition (e.g. entropy, alpha angle, and anisotropy), SAR backscatter data (e.g. HH, HV, VH ,and VV), and SAR backscatter texture were used to improve the accuracy of land cover analysis.An extensive ground truth data collection were carried out from September to October 2013 to train the classification model and validate the results. We measured sampling plots of tree diameter to estimate above ground biomass by using generic allometric equations. The spatial distribution and spatial patterns of carbon biomass are identified to quantify and monitor the remaining carbon stocks under different forest regimes.

Keywords: *ALOS/PALSAR, Above ground biomass (AGB), Carbon stocks monitoring, Polarimetric features, SAR backscatter*

Suggested topics: *Remote Sensing Application – Forestry/Ecosystem Destruction*