of combined HV and HH polarizations. Also, the saturation effect of radar backscatter for AGB estimation was established by determining the saturation level at which AGB prediction tend to level off. The satellite SAR data used for this study were representing a time series of SAR images acquired in two dates: September 2016 and September 2017 by the ALOS-2 PALSAR-2 sensor. A relationship between forest AGB and L-band SAR backscatter were established using the linear, logarithmic, and multiple regression approaches. For a single scene, the best results were observed with HV-polarized backscatter ($R2 \approx 0.82$, RMSE ≈ 79tons ha^{-1}) and ($R2 \approx 0.87$, RMSE ≈ 68tons ha^{-1}) using logarithmic regression for scenes acquired in September - 2016 and September - 2017 conditions respectively. SAR backscatter saturation was estimated at 270tons ha^{-1}, the point at which SAR backscatter response to AGB started to decrease by 0.02dB. The strongerachievement was observed in the estimation of the amount of carbon sequestration between September 2016 to September 2017. An estimated total of 3.62tons/ha of carbon was sequestered in Berkelah forest in one year. This study proved that combining temporal series of SAR scenes could be a better estimator of carbon sequestration.

High-resolution oil palm detection across South-East Asia

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Palm oil production has increased substantially over the last decade, from 10 to 21 Million hectares between 2000 and 2017, almost 90% of which is located in South-East Asia. Several studies have applied remote sensing techniques to estimate the extent of oil palm plantations in South-East Asia on a national scale or above. Most have deployed visual, expert-based interpretation methods or semi-automatic approaches with extensive field information. These approaches are very labor intensive, thereby limiting their utility for upscaling towards the development of a close to near real-time monitoring system. The availability of radar imagery has given rise to a new generation of remote sensing studies that benefit from robustness to cloud coverage and high revisiting frequency. Recent experimental studies have demonstrated the usability of free and open data from the Sentinel 1 mission for oil palm detection, particularly for detecting smallholder plantations and features such as plantation age. Against this backdrop, we present the first fully-automated remotely sensed oil palm map of South-East Asia based on free and open radar data processed using Google Earth Engine. Furthermore, using very high resolution imagery for independent validation, we will demonstrate the accuracy of our product and compare it to other existing remote sensing products. This new radar-based approach could be used to develop a close to near real-time oil palm monitoring system at a national scale or above, thereby bridging the gap between detection of land cover and land use.

Applicability of SAR Sentinel-1 data to distinguish drivers of deforestation in the Amazon

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The Amazon is the largest expanse of tropical rainforest globally and deforestation resulting from land use changes poses a major concern for sustainable resource management. Synthetic Aperture Radar (SAR) data have all-weather and all-day capability, and thus are well-suited for mapping land cover land use (LCLU) in tropical regions, which are seasonally influenced by cloud cover. Understanding drivers of deforestation is fundamental for the development of policies and measures to reduce emissions and for developing forest reference levels. Sentinel-1 data present unprecedented potential since the observations are free and openly available, providing for the first time dense and regular SAR data. This study analyzes the applicability of Sentinel-1 data to differentiate deforestation drivers, identified as a current need for early-warning deforestation systems. The study area covers a deforestation frontier in the Amazon where the landscape is characterized by a mosaic of LCLU. Collect Earth Online is used for reference LCLU data collection, and five classes are defined for this study: Forest, Secondary Vegetation, Agriculture, Pasture, Urban/Artificial, Mining, Water. Amplitude gamma-0 time-series spanning 2017-2019 are analyzed along with statistical metrics for each class, and a classification decision tree is developed in a cloud-based platform. Preliminary results show that water and artificial areas are easily distinguishable from other classes. The use of the polarization ratio VV/VH is suggested to be useful to distinguish agriculture from pasture. It is expected that these analysis' results will complement the current forest and land cover monitoring systems by providing additional actionable information for decision-making.

Forest growth dynamics of managed forests in the Southwestern Brazilian Amazon

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The objective of this work was to present the growth forest dynamics results obtained in two sites located in Acre and Amazonas states in the southwestern Brazilian Amazon. Both areas were submitted to selective logging following RIL technics. The harvesting intensity was low (around 10 $m^3 . ha^{-1}$) and the cycles length varied from 20 to 25 years. The results showed individual trees growth rates (annual mean DBH increment) similar to the observed in other studied managed forest sites with low species composition and none timber specific weight variation along the monitoring time. Annual ingrowth and mortality rates were always high and, as a consequence, turnover rates (estimated as the necessary time to observe the mortality of half of the original population) very fast. The peaks observed in the mortality rates were not always associated with forest logging and shall compromise the biomass and commercial timber stocks recovery on the prescribed cycle. Several studies on forest dynamics indicate that turnover rates are accelerating since the 50' and that this acceleration increased during the 80' in pantropical forests. The values we found for turnover in the studied sites (below 30 years) indicate a still greater turnover acceleration in the first decade of the 21first century in the region. These results indicate that forest management alone can not entirely explain the observed changes in the forest dynamics parameters and special care must be taken to the management and conservation of these forests.