EXTRACTION OF FOREST COVER AND FOREST COVER CHANGE DETECTION ANALYSIS USING ALOS PALSAR MOSAIC DATA

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ABSTRACT: The major problem of mapping forest cover using optical imagery for tropical countries is persistent cloud cover. In this study, Leyte Island of the Philippines experiences the same problem, especially with Landsat imagery. Thus, Synthetic Aperture Radar (SAR) data acquired by the Advanced Land Observing Satellite (ALOS) Phased Array type L-band Synthetic Aperture Radar (PALSAR) sensor system was used to produce forest cover information for years 2007 and 2010, and a forest cover change between the two years was also generated. Though radar data is cloud free and enabled researchers to establish a full forest cover for the entire island, separating coconut palm from natural forest became the next obstacle. With careful pre-processing and meticulous selection of regions of interests using Google Earth, a map with only three classes (coconut palm, natural forest and non-forest) was obtained using Maximum Likelihood Classification. The forest cover maps of 2007 and 2010 got an overall accuracy of 86.33% (kappa = 0.58) and 87.14% (kappa = 0.63), respectively. For the forest class, both maps had very high producer's and user's accuracy (90-92%). With the coconut palm class, its user's and producer's accuracy for 2007 were both below 60%; while in 2010, its user's accuracy was 89.66% and its producer's accuracy was only 68.22%. Two forest change detection scenarios were done in this study. One scenario was when the palm class was merged with the non-forest class, thus only two classes were left and compared – non-forest and forest. For this scenario, a deforestation rate of 2.68% and reforestation of 2.43% was computed, thus a net of 0.25% deforestation within the said period occurred. For the second scenario, all three classes were compared and an improbable change is seen in the results, where 2.08% (42,932 ha) of coconut palm changed back to forest in a span of 3 years. Based on the values of the error matrix and the results of the change detection analysis, coconut palm classification needs to be improved in order to acquire a better classification and change detection result.