Phenology and classification of abandoned agricultural land based on ALOS-1 and 2 PALSAR multi-temporal measurements

ABSTRACT

Agricultural crop abandonment negatively impacts local economy and environment since land, as a resource for agriculture, is not optimally utilized. To take necessary actions to rehabilitate abandoned agricultural lands, the identification of the spatial distribution of these lands must be acknowledged. While optical images had previously illustrated potentials in the identification of agricultural land abandonment, tropical areas often suffer cloud coverage problem that limits the availability of the imageries. Therefore, this study was conducted to investigate the potential of ALOS-1 and 2 (Advanced Land Observing Satellite-1 and 2) PALSAR (Phased Array L-band Synthetic Aperture Radar) images for the identification and classification of abandoned agricultural crop areas, namely paddy, rubber and oil palm fields. Distinct crop phenology for paddy and rubber was identified from ALOS-1 PALSAR; nonetheless, oil palm did not demonstrate any useful phenology for discriminating between the abandoned classes. The accuracy obtained for these abandoned lands of paddy, rubber and oil palm was $93.33\% \pm 0.06\%$, $78\% \pm 2.32\%$ and $63.33\% \pm 1.88\%$, respectively. This study confirmed that the understanding of crop phenology in relation to image date selection is essential to obtain high accuracy for classifying abandoned and non-abandoned agricultural crops. The finding also portrayed that PALSAR offers a huge advantage for application of vegetation in tropical areas.