Detecting Vegetation Changes in Lao Tropical Forests from 2006-2012

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Abstract: Deforestation is a major challenge for many developing countries. Tropical deforestation is responsible for about a quarter of the global greenhouse emissions. Information on forest clearance throughout space and time is essential for monitoring global terrestrial ecosystem carbon, climate and biosphere exchange and forest management. However, detecting and understanding the spatial and temporal characteristics of disturbances can be difficult, especially in tropical regions due to cloud covers and atmospheric effects. The purpose of this research was to demonstrate and evaluate the disturbance index (DI) algorithm to detect spatial changes in vegetation in tropical forests. We used the land surface temperature (LST) and enhanced vegetation index (EVI) of Moderate Resolution Imaging Spectroradiometer (MODIS) time series products from 2006-2012 in this study. It was found that the DI was capable to detect vegetation changes during seven-year periods with high overall accuracy (82%, Kappa=0.59); however it showed low accuracy to detect vegetation loss. This accuracy was assessed and confirmed by corresponding high resolution images from Google Earth. This research demonstrated the usefulness of using a combination of EVI and LST in the DI model to obtain information on vegetation changes. However, a short period of dataset and annual maximum composited data needs to be considered, when applying the DI. A further experiment on different landscapes and climate condition is required to test and evaluate the DI model.