

Monitoring deforestation in Malaysia between 1985 and 2013: Insight from South-Western Sabah and its protected peat swamp area

Abstract

Monitoring land cover changes provides an effective and accurate evaluation of deforestation rates that shed light on reducing emissions from deforestation and forest degradation (REDD) implementation. Located in Klias Peninsula, southwestern Sabah, Malaysia there lies a pristine peat swamp forest area. This type of ecosystem plays a significant role in global climate regulation. Despite its importance, the peat swamp forest is threatened and highly degraded, due to the increasing demand for agricultural expansion. This is where we monitored deforestation and land cover change between 1985 and 2013. Temporal changes were determined by means of supervised classification, using the maximum likelihood classification rule to observe changes in the area. Post-classification change detection techniques were applied in order to understand the change in forest coverage in the Klias Peninsula and inside the protected area boundaries. The overall accuracy for the Klias Peninsula and the protected area were more than 88% ($\pm 4\%$ margin of error) and 95% ($\pm 2\%$ margin of error), respectively. Based on these findings, it appears that more than half of the forest area in Klias Peninsula disappeared from 142,713 ha (± 6818 margin of error) to 73,403 ha (± 6796 margin of error) between 1985 and 2013. The annual rate of change in the protected area was 10.94% ($\pm 0.85\%$ margin of error) per year for deforestation and 0.86% ($\pm 5.19\%$ margin of error) per year for forest area. The result revealed that most of the peat swamp forest was converted to other stable non-forest areas, including agriculture which can be a threat to the already disturbed protected area. Therefore, we also conducted an accurate monitoring of the forest cover change and deforestation data in the protected area and its surrounding environs in order to promote sound political decision-making regarding the future protection and sustainability of the remaining peat swamp area.