

ASSESSMENT OF FIRE VULNERABILITY THROUGH HUMAN ACTIVITY BY USING ROAD DISTRIBUTION IN PEAT LAND OF INDONESIA

Haemi Park*, Sonidarmawan and Wataru Takeuchi

*Institute of Industrial Science, University of Tokyo, Ce-506, 6-1, Komaba 4-chome, Meguro,
Tokyo, 153-8505, Japan; +81-3-5452-6410, hmpark@iis.u-tokyo.ac.jp*

Abstract: Peat land is one of the largest CO₂ emission source due to the fires and decomposition. Especially, tropical region has 10% of global peat soil. However, ground water table of tropical peat lands is decreased drastically by human activity for converting to agricultural use. Fire events on peat lands are continued for land clearance. Moreover, dryness of peat promotes fire occurrence. For those reasons, the fire effect toward global warming through CO₂ emission is supposed to be huge. The burning event on peat forest is severe problem because of forest is the biggest carbon absorber and the peat soil stores large amount of carbon from dead plants. Therefore, the objective of this study is to reveal vulnerability against fire of Indonesian peat lands by using analysis of relationship between location of fire and road. First of all, MOD14 of MODIS hotspot was used with method of extraction high temperature of surface. The loss of biomass is calculated by sum of above ground biomass and soil organic matter. For above ground biomass, difference of leaf area index was used. Vegetation integrative simulator for trace gases model (VISIT) was used for estimating soil organic matter. Secondly, ground water table describing peat soil dryness was calculated by Keetch-Byram drought index (KBDI). We developed method for calculation of ground water table (GWT) by satellite-sensed data with precipitation (GSMaP) and land surface temperature (MTSAT). Thirdly, vulnerability against fire is revealed by road distribution and detection of fire location. The reasons of fire are dryness of peat or human activity. This study decided vulnerability at near from road is higher than inner peat area because human accessibility is considered as a possibility of fire. Finally, reason of fire is classified by two cases. The one is natural reason such as dryness. Another is artificial way. In case of that the fire was occurred under drought condition and was far from street, it is considered to natural burning event caused by dryness. If fire was occurred even under moist condition and location was close from street, it is supposed to human made fire. For reducing CO₂ emission from peat lands of Indonesia, not only rewetting ground water table but also control of human disturbance are important. Thus, fire vulnerability analysis can be useful data on reducing CO₂ emission of tropical peat lands.

Keyword: Ground water table, Fire emission, Human activity, Road analysis