

IMPROVEMENT OF CO₂ EMISSION MODEL BY MODIFICATION OF SOIL RESPIRATION FROM TROPICAL PEATLANDS IN INDONESIA

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Abstract: The carbon dioxide is an influential factor of global warming. Many researchers have been trying to reveal the emission of carbon dioxide from forest in natural. However, the character of the carbon emission from peat soil is not clear. The peatlands are formed on the wetland regions such as boreal forest and tropical forest. Especially, the tropical peat forests are distributed in Amazonian and Southeast Asian region. If the peat soil was disturbed, the ground water table will be decreased. Then CO₂ will be emitted by decomposition of peat soil which includes lots of organic carbon matter. Actually, in Indonesia, CO₂ is increasingly released to the atmosphere due to drainage and fires associated with plantation development by human and illegal logging from Mega Rice Project in 1999. Usually the emission is calculated by estimating the amount of photosynthesis and respiration. However, from some previous model simulations, the carbon dioxide emissions were underestimated in case of peatlands. The objective of this paper is to improve estimation of CO₂ emission from peatlands by modifying soil respiration parameter. Firstly, the GWT(ground water table) is estimated by KBDI(Keetch-Byram Drought Index). Secondly, the soil respiration is calculated with the model from observed data in previous study. Then the emission from fire events on peatlands is added. Accordingly, the emission from peatlands in Indonesia can be represented more accurately than current calculation through collaboration the fire emission as human impact and the soil respiration as natural emission. The carbon emission of peatlands will be applied to global area with FAO-soil classification which category is HISTOSOL. Finally, the estimation of global carbon budget from peat forest is increased by modifying soil respiration parameter of ecosystem models and adding fire emission parameter.

Keyword : carbon release, ecosystem respiration, ground water table, tropical peatland.