

2001年から2015年までのグローバルなバイオマスバーニングによる二酸化炭素放出量の推定
Estimation of global CO₂ emission by biomass burning from 2001 to 2015

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As a cause of global warming, CO₂ is most effective green house gas and many countries are trying to reduce emission of that. However, the report of quantitative description is few still because the amount of CO₂ emission is difficult to estimate for their complex process. This research is to devise a method to estimate the carbon dioxide (CO₂) emissions from biomass burning such as forest fires and field burning in croplands in Global scale. The methodology consists of mainly three types of bio-physical parameters including (1) fire hotspots and radiative power measurements by MODIS thermal anomalies, (2) above ground biomass changes calibrated by MODIS NDVI and LAI indices, (3) ground water table modeled by MTSAT thermal anomalies and GSMaP rainfall measurements. Field campaigns were carried out from 2012 April to September in four types of land covers in (1) mangrove forest in Thailand and Vietnam (2) grassland in Mongolia (3) rice paddy field in Indonesia and Thailand and (4) forested peatland in Indonesia. Above ground biomass mapping of mangrove forest was investigated by ALOS PALSAR HH and HV polarimetric backscatter coefficients and an allometric equations derived by in-situ measurement of biomass parameters. That of grassland in Mongolia was mapped by MODIS LAI and NDVI, grassland height by ICESaT GLAS supplemented by in-situ observations. Rice paddy fields cropping patterns were mapped by MODIS NDVI and AMSR-E land surface water coverage parameters. Ground water table (GWT) was mapped to represent dryness over forested peatlands and the number of peat fires and peat decomposition were modeled with satellite-derived GWT and that of in-situ measurement. The estimated CO₂ emissions from 2001 to 2015 were demonstrated and compared with Global Fire Emission Database version 4 (GFED 4) and EDGAR global database, and discrepancy between the models, challenges and technical problems were also discussed.

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