

**Topic:** Estimation of Emissions from Biomass Open Burning in Thailand using MODIS-MCD45A1 Product

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### **ABSTRACT**

This study estimates the emissions from open biomass burning in Thailand from 2009-2011 using country specific data and the 500-meter MODIS burned area product (MCD45A1) derived exclusively from MODerate-resolution Imaging Spectro-radiometer (MODIS). The spatial and temporal distributions of open biomass burning emissions are analyzed and displayed that base on MODIS satellite product and GIS database in the form of a grid density map. The MCD45A1 burned area data analysis distributed over validation with ground observation suggests that between 2009 and 2011, the actual fire was smaller than the burned area derived from MCD451. The adjusted factor for paddy field and sugarcane was about 0.87 and 0.77 respectively. In case of burned area of corn and forest which mainly occurred in the mountain, the terrain with slopes of area affect to the size of the burned area. The adjusted factor of the burned corn field with the lower than 5 percent of slope and in the range of 5-10 percent of slope was about 0.53 and 0.66 respectively. The adjusted factor of the burned forest with the lower than 15 percent of slope and the higher than 15 percent of slope was about 0.64 and 0.53 respectively. From the validation found that, the total burned area during 2009 to 2011 was about 887,778 ha, including 332,723 ha in 2009, 410,636 ha in 2010, and 144,419 ha in 2011. Considering the total burned area during 2009 to 2011 by the type of vegetation found, the largest of the burned areas was in the forest, which was about 520,488 ha (64.4 percent of total burned area), followed by the paddy field at about 233,167 ha (28.8 percent), corn at 39,241 ha (4.9 percent), and sugarcane at 15,665 ha (1.9 percent). The estimation of emissions of open biomass burning from 2009 to 2011 indicated that the amounts of CO<sub>2</sub>, CO, CH<sub>4</sub>, N<sub>2</sub>O, NO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, and black carbon (BC) emitted were approximately 2,150,077 tons, 163,175 tons, 7,704 tons, 221 tons, 2,841 tons, 10,469 tons, 16,571 tons and 1,014 tons respectively. In term of spatial distribution of gridded emission found the highest were located in the northern and the central part of Thailand.

**Keywords:** Emission inventory, Agricultural burning, MODIS product