

# High-resolution and multi-year inventory of mercury emissions from biomass burning in tropical continents during 2001–2017

\*Yusheng Shi<sup>1</sup>

1. Aerospace Information Research Institute, Chinese Academy of Sciences

Mercury emissions from biomass burning contribute significantly to the atmospheric mercury budget and the interannual variations of mercury concentrations in the troposphere. This study developed a high-resolution (0.1 deg) and multi-year (2001-2017) monthly inventory of mercury emissions from biomass burning in five fire types in the tropical continents (Central and South America, Africa, and South and Southeast Asia). The inventory estimates of mercury emissions from biomass burning are based on the newly released MCD61A1 version 6 Burned Area data product, satellite and observational data of biomass density, and spatial and temporal variable combustion factors. Results from the inventory demonstrated that during 2001-2017, the average annual mercury emissions from biomass burning in tropical continents was 497 Mg and ranged from 289 Mg to 681 Mg. Forest fires were the largest contributor, accounting for 61% (300 Mg) of the total mercury emissions from biomass burning, followed by fires in shrubland (30%, 151 Mg), savanna (7%, 35 Mg), peatland (1%, 6 Mg), and cropland (1%, 5 Mg). However, these proportions varied between the continents; in the Americas and Asia, the largest biomass burning emissions came from forest fires, and in Africa the largest emissions were from shrubland fires. Between the three continents, Africa released 41% of the mercury emissions from biomass burning (202 Mg year<sup>-1</sup>), Asia released 31% (154 Mg year<sup>-1</sup>), and the Americas released 28% (141 Mg year<sup>-1</sup>). The total mercury emissions from biomass burning in these tropical continents exhibited strong interannual variations from 2001 to 2017, with peak emissions in March and August to September, and forest fires were the primary land fire type controlling the interannual variations. Soil mercury emissions released during biomass burning was determined to be 495 Mg year<sup>-1</sup> during 2001-2017. The biomass burning mercury emissions data in this inventory agrees with results by other studies, which suggests that it could be used as an input for atmospheric transport models.

Keywords: biomass burning, mercury emissions, forest fires, tropical continents

