

Estimating PM_{2.5} Emission from Brick Kilns and Biomass Burning over Northern India with Numerical Model and Remote Sensing Observation

Ardhi Adhary Arbain*¹, Ryoichi Imasu¹

¹ Atmosphere and Ocean Research Institute, The University of Tokyo, Kashiwa, Japan

*Correspondence to: ardhi@aori.u-tokyo.ac.jp

This study examines contribution of brick kiln (BK) industry and biomass burning from agricultural crop residue to PM_{2.5} emission which is the major component of air pollution which is now choking India (Bond et al. 2013; World Health Organization (WHO) 2016). NASA's MODIS land-atmospheric products with 3887 BK locations over the region were analyzed in the period of the highest PM_{2.5} concentration during December 2016 to February 2017. Our preliminary results show that more than 60% of BK occupied silt-rich areas, with more than 80% of them were located over croplands on the outskirts of urban areas, indicating proxies for PM_{2.5} emission over Northern India. We also utilized land products of JAXA's GCOM/SGLI Visible and Near Infrared Radiometer (VNR) and Thermal Infrared (TIR) for identifying the burned croplands in the region. Initial WRF-Chem model (Grell et al. 2005) simulations using locations of BKs and burned croplands showed prominent diurnal variation of the pollutant with averaged peak concentration exceeding 1µg/m³ over the capital city of New Delhi. Future works will introduce the use of Google Earth Engine (GEE) cloud platform (Gorelick et al. 2017) for identifying BK locations and incorporate them into the model to improve the simulation results.

Keywords: Biomass burning, brick kiln, PM_{2.5}, WRF-Chem

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