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Title: Gridded Emissions of CO, NO_x, SO₂, CO₂, NH₃, HCl, CH₄, PM_{2.5}, PM₁₀, BC, and NMVOC from Open Municipal Waste Burning in India

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Abstract: Accurate emission inventories serve as critical inputs for air quality and climate models but are poorly constrained over India. We present a new municipal open waste burning emission inventory from India (OWBEI), at a resolution of $0.1^\circ \times 0.1^\circ$. Out of the 216 (201–232) Tg y⁻¹ of waste produced in the year 2015, 68 (45–105) Tg y⁻¹ was burned in the open. To determine emissions from waste burning, emission factors of 59 non-methane volatile organic compounds (NMVOCs), CH₄, CO₂, CO, and NO_x were measured from garbage fires in rural and urban sites in India. The NMVOC emissions from open waste burning of 1.4–2 Tg y⁻¹ increase India's total anthropogenic NMVOC budget by 8–12%, while BC emissions (40–110 Gg y⁻¹) increase the total anthropogenic BC emissions by 8–12%. Open waste burning in India emits 3–7 Tg y⁻¹ of CO and 58–130 Tg y⁻¹ of CO₂. Emissions increase the total anthropogenic CO and CO₂ in the MIX-Asia inventory by 4–11% and 2–6%, respectively. Open waste burning may affect atmospheric OH reactivity and ozone formation rates downwind of urban centers through the emission of other highly reactive compounds such as acetaldehyde (20–320 Gg y⁻¹), propene (50–170 Gg y⁻¹), and ethene (50–190 Gg y⁻¹) and is a source of carcinogenic benzene (30–280 Gg y⁻¹).

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