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Satellite observations of a seasonal cycle in NO_x emission factors from fires in African woody savannas

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Nitrogen oxide (NO_x) emissions from wildfires account for $\sim$15% of the global total, inducing large fluctuations in the chemical production and loss rates of O_3 and CH_4 and thereby affecting Earth's radiative balance. NO_x emissions from fires depend on fuel N content, combustion stage, and total biomass burned; sparse observations limit current understanding of the variability in these factors across biomes. Here we use NO_2 column measurements from the Ozone Monitoring Instrument (OMI) and fire radiative power retrieved from the Moderate Resolution Imaging Spectroradiometer (MODIS) to study emission coefficients (ECs), a value proportional to emission factors i.e. NO_x emitted per unit of biomass burned, from fires in African savannas and woody savannas. In woody savannas, NO_x ECs decrease steadily across the fire season, rather than remaining constant as is currently assumed; in constrast, no seasonal pattern is observed in (non-woody) savannas. We speculate that the observed cycle is due to reallocation of nutrients, including N, to plant roots after the growing season.