Title:	Large unexplained suite of chemically reactive compounds present in ambient air due to biomass fires
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Abstract:	Biomass fires impact global atmospheric chemistry. The reactive compounds emitted and formed due to biomass fires drive ozone and organic aerosol formation, affecting both air quality and climate. Direct hydroxyl (OH) Reactivity measurements quantify total gaseous reactive pollutant loadings and comparison with measured compounds yields the fraction of unmeasured compounds. Here, we quantified the magnitude and composition of total OH reactivity in the north-west Indo-Gangetic Plain. More than 120% increase occurred in total OH reactivity (28 s−1 to 64 s−1) and from no missing OH reactivity in the normal summertime air, the missing OH reactivity fraction increased to ~40 % in the post-harvest summertime period influenced by large scale biomass fires highlighting presence of unmeasured compounds. Increased missing OH reactivity between the two summertime periods was associated with increased concentrations of compounds with strong photochemical source such as acetaldehyde, acetone, hydroxyacetone, nitromethane, amides, isocyanic acid and primary emissions of acetonitrile and aromatic compounds. Currently even the most detailed state-of-the art atmospheric chemistry models exclude formamide, acetamide, nitromethane and isocyanic acid and their highly reactive precursor alkylamines (e.g. methylamine, ethylamine, dimethylamine, trimethylamine). For improved understanding of atmospheric chemistry-air quality-climate feedbacks in biomass-fire impacted atmospheric environments, future studies should include these compounds.
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