

Satellite-derived Constraints on Northern Temperate Hydrocarbon and CO Emissions and the Anthropogenic versus Biogenic Source of CO

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Recent studies have shown large discrepancies in current bottom-up estimates of anthropogenic and biogenic non-methane hydrocarbon emissions, leading to significant uncertainty in model predictions of secondary aerosol formation and the photochemical source for CO. Space-based measurements of formaldehyde and CO offer unique constraints on biogenic and pyrogenic reactive carbon emissions (in the first case) and on anthropogenic and pyrogenic reactive carbon emissions (in the second). Here we present initial results combining formaldehyde measurements from GOME-2 with CO measurements from MOPITT to exploit their complementary constraints on biogenic, anthropogenic, and pyrogenic emissions of NMHCs and CO over northern temperate regions. We evaluate the information provided by the combined satellite observations using a series of pseudo-observation experiments, and interpret our results in terms of the relative importance of biogenic and anthropogenic emissions for photochemical CO production over this part of the globe. Sensitivities to model uncertainty in OH and emissions speciation are also explored.