

## Comparison of Global Tropospheric Ozone Precursors from Measurements and the MACCity Global Emissions Inventory

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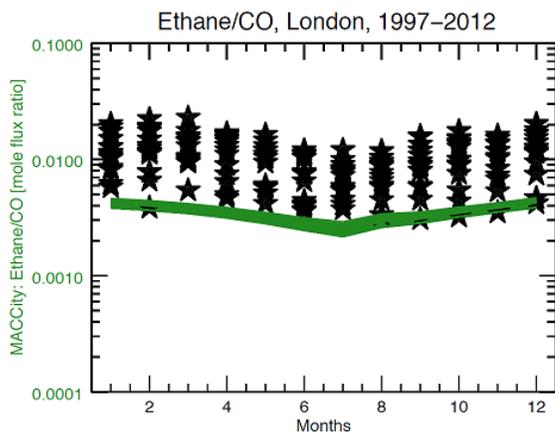
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Global chemistry-climate models generally have problems reproducing tropospheric ozone concentrations, seasonal cycles and interannual trends. Successful tropospheric ozone simulations require high quality information on the emissions of ozone precursors, including nitrogen oxides ( $\text{NO}_x$ ), carbon monoxide (CO), and volatile organic compounds (VOCs).

We analyzed CO and  $\text{NO}_x$  measurements from six megacities (Los Angeles, New York City, London, Paris, Hong Kong, and Tokyo). We compared the long-term evolution of the measured  $\text{NO}_x/\text{CO}$  ratio in each city to the ratio of the emissions of these two pollutants reported by the MACCity global emissions inventory at the inventory grid points nearest the city. The longest available measurement record (~50 years) is from Los Angeles, where the measured  $\text{NO}_x/\text{CO}$  ratios are consistently smaller than the emission ratio in the MACCity inventory and the slope of the long-term trend in measured  $\text{NO}_x/\text{CO}$  ratios is significantly larger than in the inventory. The other 5 cities do not have as long of a data record, but their  $\text{NO}_x/\text{CO}$  ratio evolution also imply that the MACCity  $\text{NO}_x/\text{CO}$  emissions trends are not large enough. However, the agreement between the measured and inventory ratios is better for the short time period where measurements are available in these cities.

We also analyzed measured and inventory ratios of selected VOCs with respect to CO. There are only a few long-term measurements of VOCs available (London, Los Angeles, Paris), so we included VOC data obtained in canisters in field campaigns carried out in several cities in China, Pakistan, Europe and South America. Overall, the MACCity inventory generally does not agree well with the VOC/CO measurement ratios.



**Figure 1.** Ratio of ethane to CO for London. Black stars represent monthly means of different year, based on roadside measurements. Green lines show the annual cycle as it is given in MACCity for the respective years of the measurements.