



GEIA NMVOC WG Side Meeting

WG Co-Chairs:

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Based on discussions at the GEIA Meeting in November 2015 & feedback from the steering committee, these were the initial proposed options:

- synthesis of previous work (published or unpublished) on the effect of EI representation of speciation and total NMVOCs on modeled air quality (ozone, or other parameters)
- **review of measurement-EI comparisons with information on sectoral allocation**
- overview of measurement trends* in urban areas (*trends can be a change...)

Key points:

- Should be global in focus
- Create an output
- Inform how we move forward

Initial proposal

- Review of measurement-EI comparisons with information on sector allocation

Scope

- focus on anthropogenic emissions; leave out biogenic emissions
- spatial variability/regional comparisons
- compare to a 'reference' value (EI), e.g. EDGAR
- initial focus on urban areas

Aim(s)

- compare the speciation using emission ratios, either for urban areas as a whole, or where possible by sector
- confirm/falsify dominant source sector contributions in urban areas globally -> does this agree or disagree with the emission inventories (using a global inventory as a basis, e.g. EDGAR)
- to provide guidance on key species for measurements/monitoring
- analyze differences between cities within a continent (possible patterns, generalizable?)
- analyze / highlight any differences across continents by aggregating city data at the continental scale
- identify the most pressing data gaps by continent / region [acknowledging that for a continent where no measurements are available the need is different from one where already substantial data is but that would still need significant refining or broadening]

Basis (examples)

- Warneke et al 2007

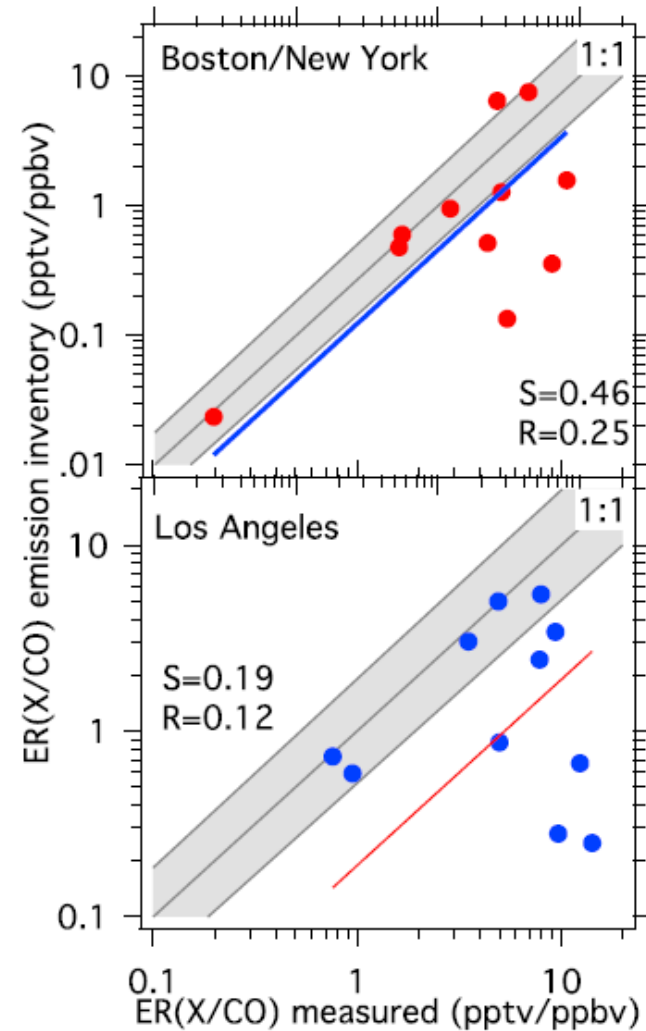


Figure 8. Comparison of the measured emission ratios with CO with an anthropogenic emissions database based on EPA NEI-99 data that is used in various air quality forecast models. Each data point represents one compound, and the solid lines are linear fits through the data. The grey shaded area shows an agreement within a factor of two.

Basis (examples)

- Warneke et al 2007
- Parrish et al 2009

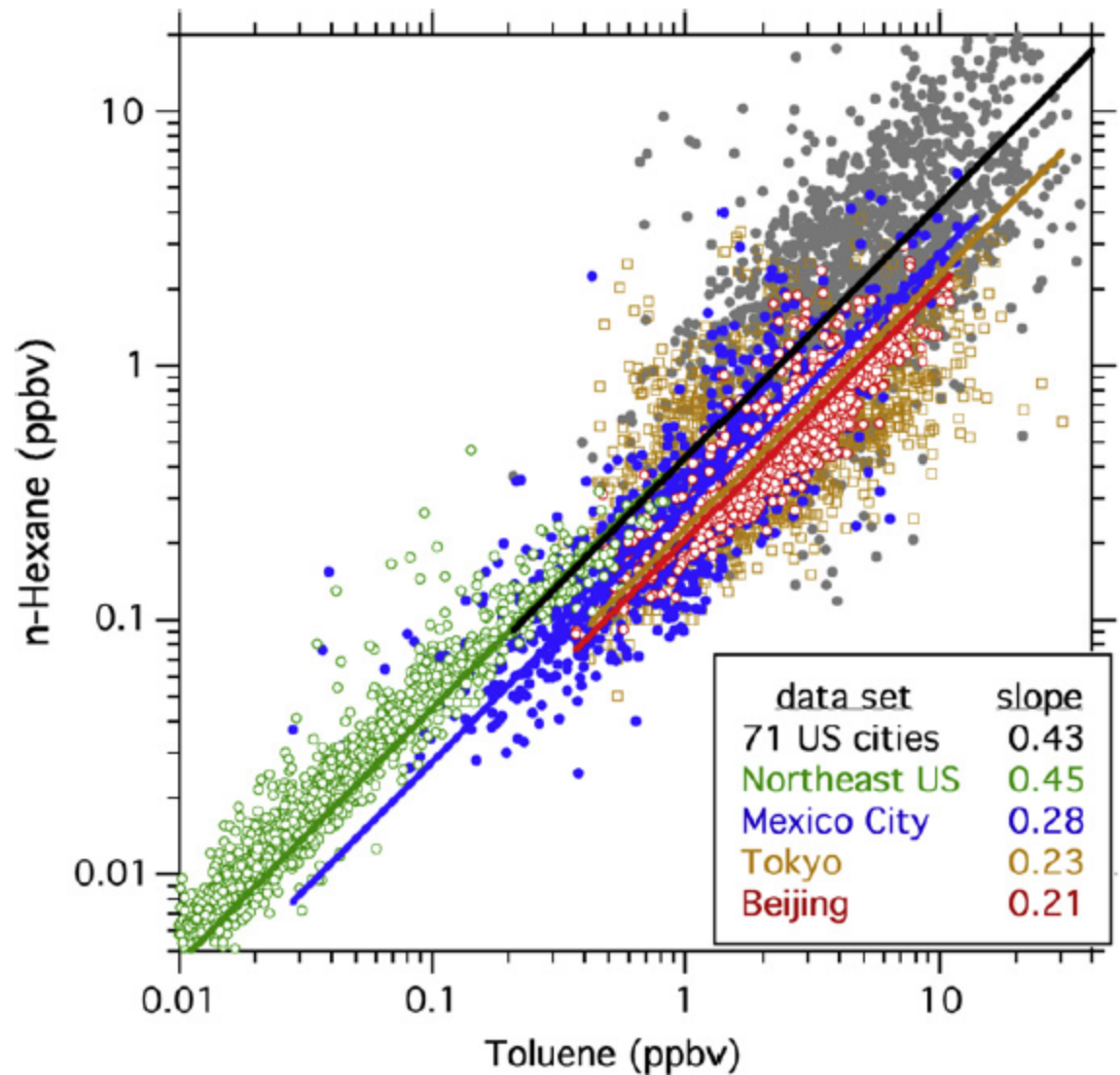


Fig. 3. Relationship between mixing ratios of n-hexane and toluene in the same format as Fig. 1. The “best” average molar ratios of n-hexane to toluene for three data sets are taken as the slope of the linear-least-squares fit to the measurements, with the y-intercept of the line forced through zero. The geometric mean ratio of the observations was taken as the “best” average ratio for the 71 US cities data and Tokyo.

Basis (examples)

- Warneke et al 2007
- Parrish et al 2009
- von Schneidemesser et al 2010

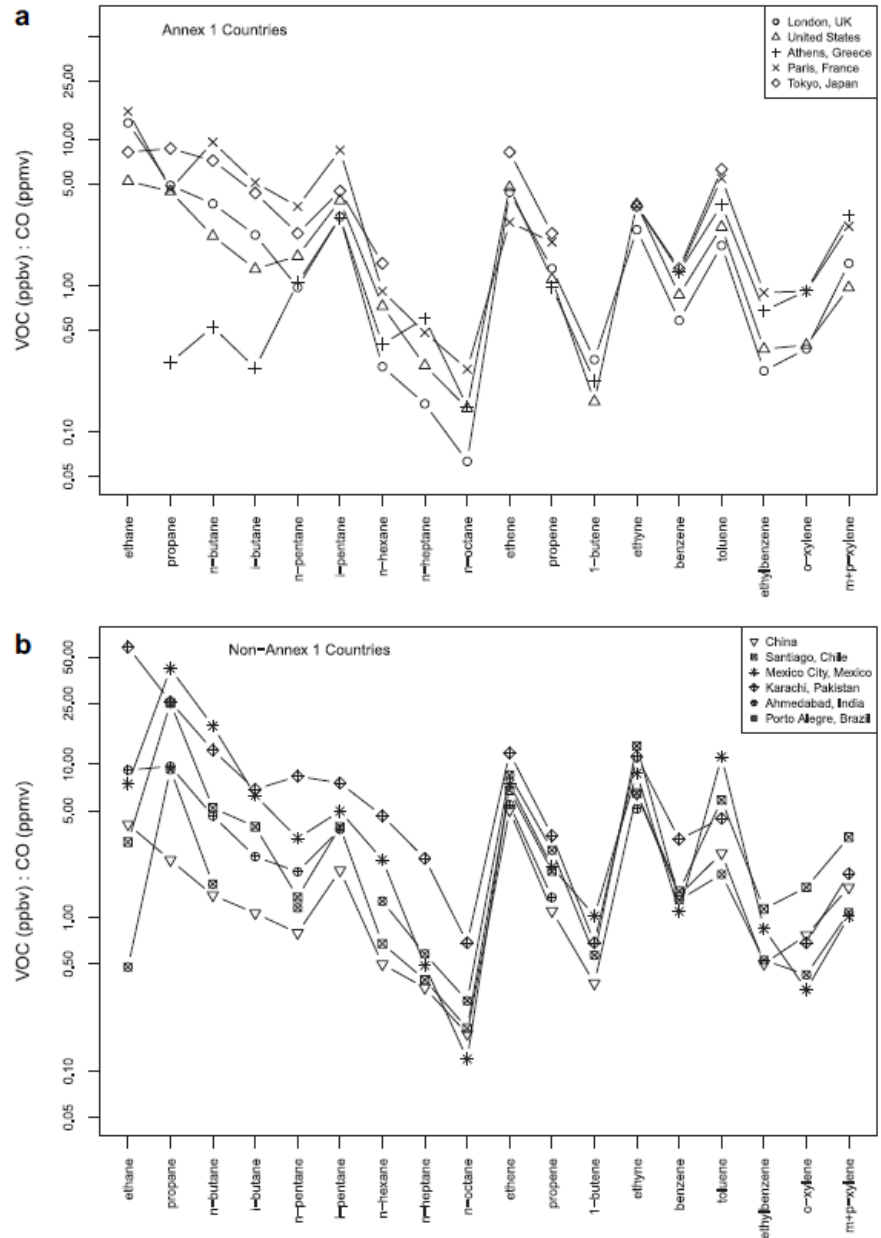


Fig. 6. VOC:CO (ppbv/ppmv) ratios by country. If a city is listed in the legend the $n \leq 2$, except for London which is the 2008 geometric mean of hourly data. United States ($n = 28$), China ($n = 54$).

Basis (examples)

- Warneke et al 2007
- Parrish et al 2009
- von Schneidemesser et al 2010
- Borbon et al 2013

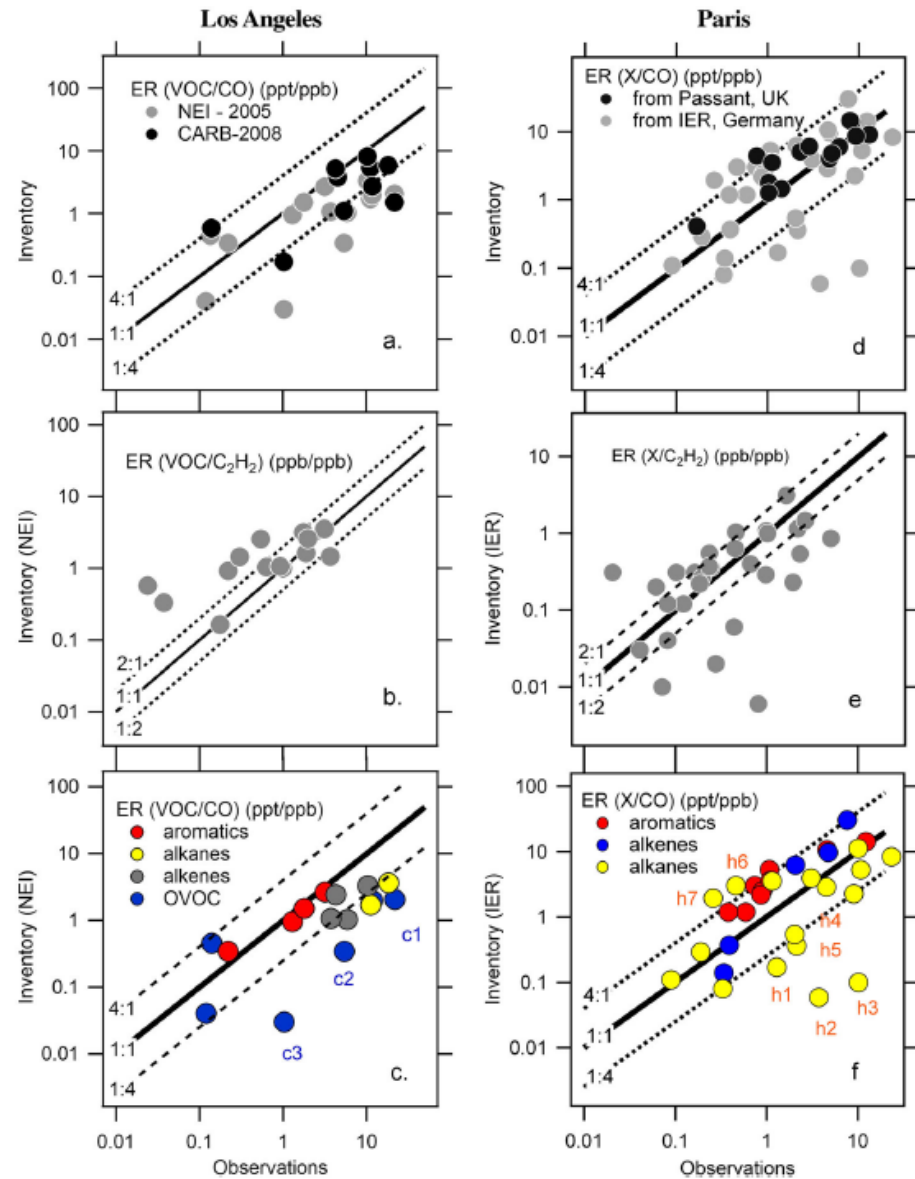


Figure 10. Comparison of the measured emission ratio relative to (a, c, d, f) CO and (b, e) acetylene to the ones in the anthropogenic VOC emission database currently used in Los Angeles and Paris (see text for details). Abbreviations are as follows: c1, methanol; c2, acetaldehyde; c3, benzaldehyde; h1, 2-methylpentane; h2, 2,3-dimethylpentane; h3, methylcyclohexane; h4, n-heptane; h5, 3-methylhexane; h6, n-nonane; h7, n-decane.

Summary

- Synthesize / review measurement-EI comparison using a comparable (global) baseline EI (EDGAR)
- Use emission ratios, either VOC:VOC (or VOC:CO(?))
- Focus first on urban areas, include sector information/comparisons where possible
- Initial test/scoping with ca. 5 cities

Next Steps

- Your feedback
- Initial scoping supported by student work until end of December

Something completely different:

- Strategic plan forward for the NMVOC community, laying out the grand challenges for the next 10-20 years