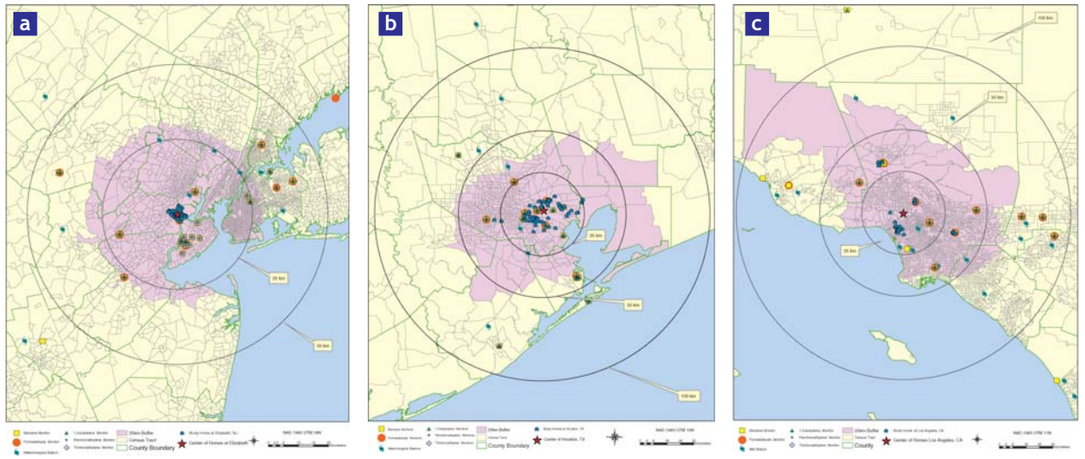
Distributions of Air Toxics Measurements Collected from the Relationships of Indoor, Outdoor, and Personal Air (RIOPA) Study

S.W. Wang, P.G. Georgopoulos • Computational Chemodynamics Laboratory (www.ccl.rutgers.edu)
Environmental and Occupational Health Sciences Institute, a Joint Institute of UMDNJ-Robert Wood Johnson Medical School and Rutgers University, Piscataway, NJ

Introduction

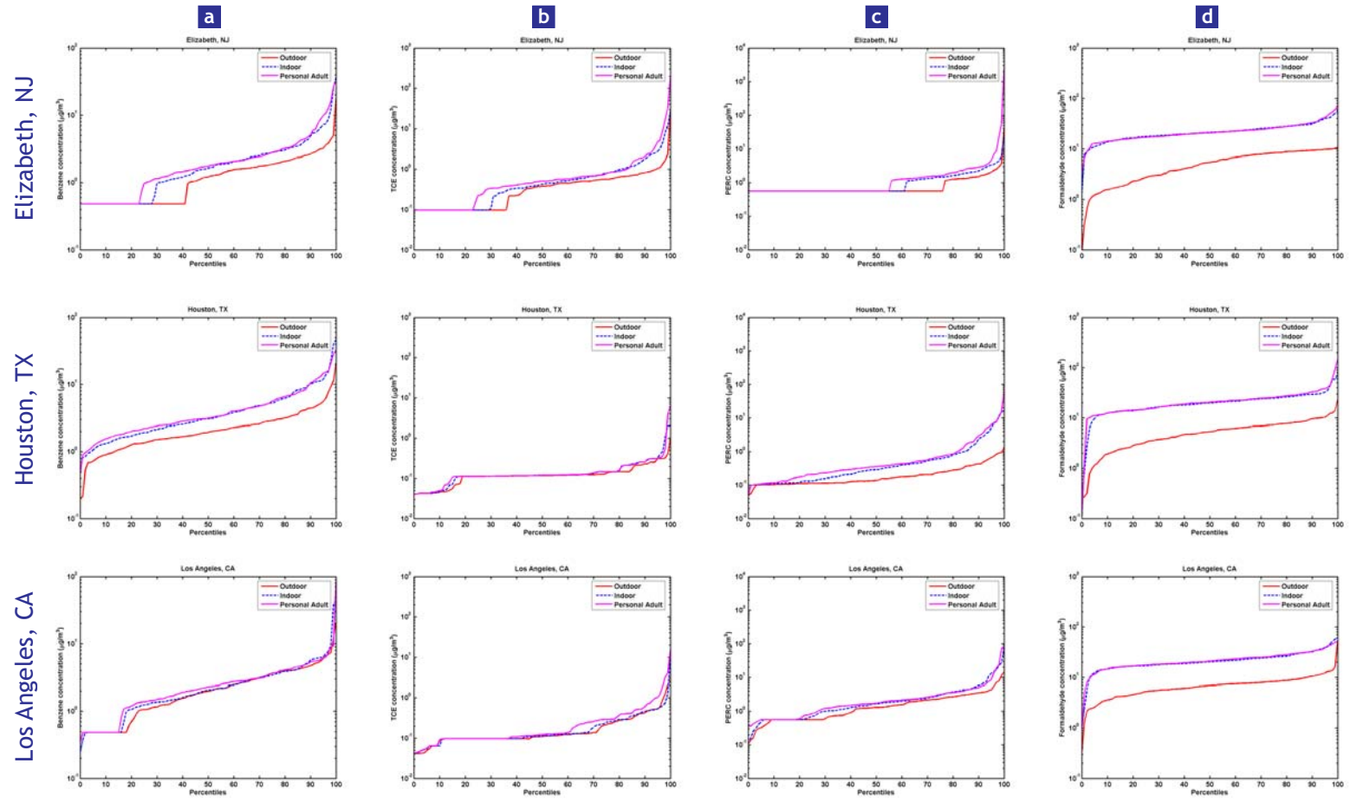
The Relation among Indoor, Outdoor and Personal Air (RIOPA) study took place between 1999 and 2001 (Weisel et al., 2004) to evaluate the contribution of outdoor sources of air toxics on personal exposure. The concentrations of eighteen volatile organic compounds, seventeen carbonyl compounds, and fine particulate matter mass (PM2.5) were measured with 48-hour outdoor, indoor and personal air samples collected simultaneously from approximately 100 homes with no smokers, each in Elizabeth, NJ ; Houston, TX; and Los Angeles, CA. Furthermore, air exchange rate, temperature, relative humidity, personal time-activity information, and home characteristic data were also collected for each of the homes. The three cities are in geographically distinct locations, with different climates, housing characteristics, and predominant types of ambient sources of air toxics. The samples were collected throughout the year in all cities. This poster presents cumulative distribution function (CDF) plots and boxplots for four selected air toxic species (Benzene, Formaldehyde, Trichloroethylene, Tetrachloroethylene) across the outdoor, indoor, and personal samples and the three RIOPA cities. The CDF plots of the ratios of the indoor versus outdoor samples for the four selected species are also presented to examine the relative contributions of outdoor and indoor sources to measured indoor concentrations on a home-by-home basis.



The RIOPA study areas in (a) Elizabeth, NJ (b) Houston, TX (c) Los Angeles, CA, showing the study homes and the "buffer zone" census tracts (i.e. all census tracts within a 25 km radius from the homes). The meteorological and air quality monitoring stations within a radius of 50 km from the geometric center of the homes are also shown.

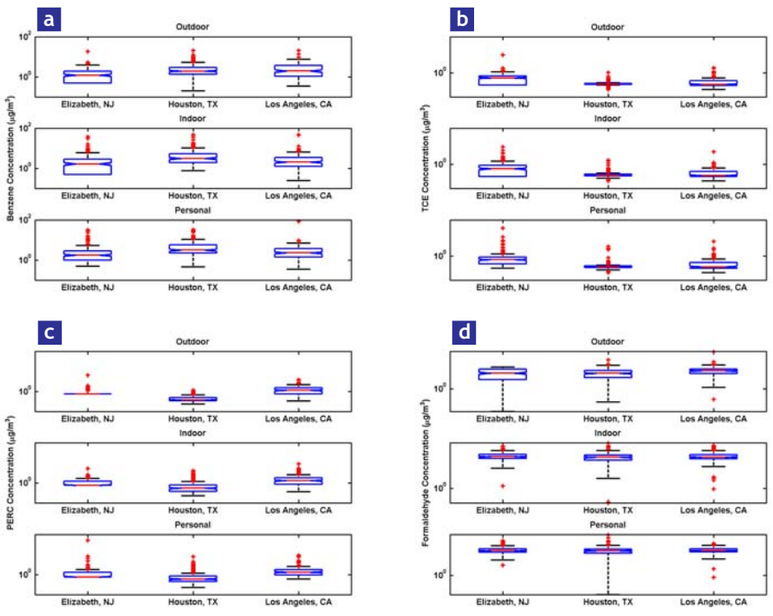
Cumulative DistributionFunctions (CDF) Plots

Cumulative distribution functions (CDF) of outdoor, indoor, and personal samples are shown for (a) Benzene, (b) Trichloroethylene, (c) Tetrachloroethylene, and (d) Formaldehyde in each of the 3 RIOPA cities (Elizabeth, NJ ; Houston, TX; and Los Angeles, CA).



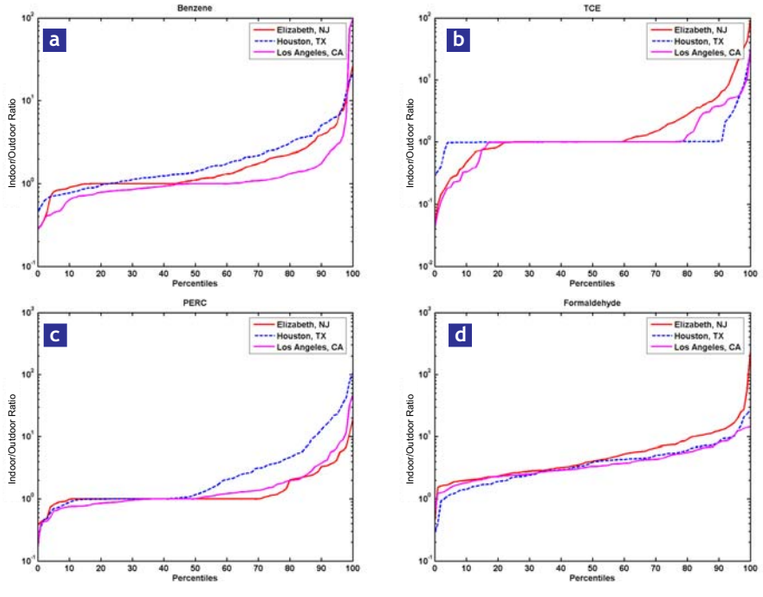
Boxplots of Indoor, Outdoor and Personal Samples

Shown are
(a) Benzene,
(b) Trichloroethylene,
(c) Tetrachloroethylene,
and
(d) Formaldehyde
across the three RIOPA cities of Elizabeth, NJ; Houston, TX;
and Los Angeles, CA



Ratios of Indoor/Outdoor Samples

Cumulative distribution functions (CDF) of ratios of indoor/outdoor samples are shown for
(a) Benzene,
(b) Trichloroethylene,
(c) Tetrachloroethylene,
and
(d) Formaldehyde
across the three RIOPA cities of Elizabeth, NJ ; Houston, TX; and Los Angeles, CA.



Acknowledgements

Base Funding for the Ozone Research Center is Provided by the State of New Jersey Department of Environmental Protection (NJDEP - Contract AQ05-011). The work presented here has been funded by the American Chemistry Council (ACC - Research Agreement 2488) and the U.S. Environmental Protection Agency (USEPA - Cooperative Agreement CR-83162501). The viewpoints expressed in this work are solely the responsibility of the authors and do not necessarily reflect the views of NJDEP, USEPA, ACC, or their contractors.

Reference

Weisel, C.P., Zhang, J., Turpin, B.J., Morandi, M.T., Colome, S., Stock, T.H., and Spektor, D.M. 2004. Investigators' Report: Relationships of Indoor, Outdoor and Personal Air (RIOPA). Health Effects Institute.