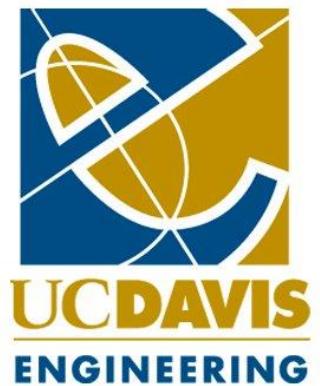
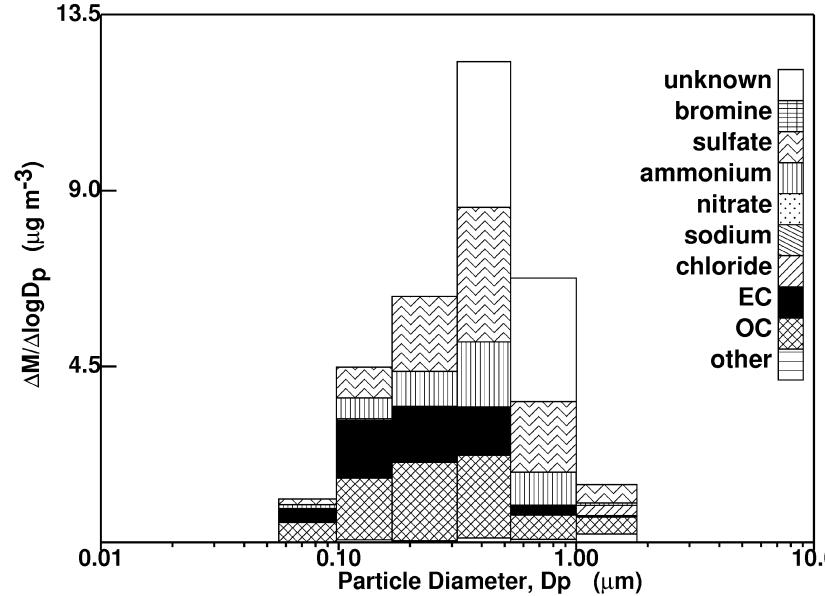
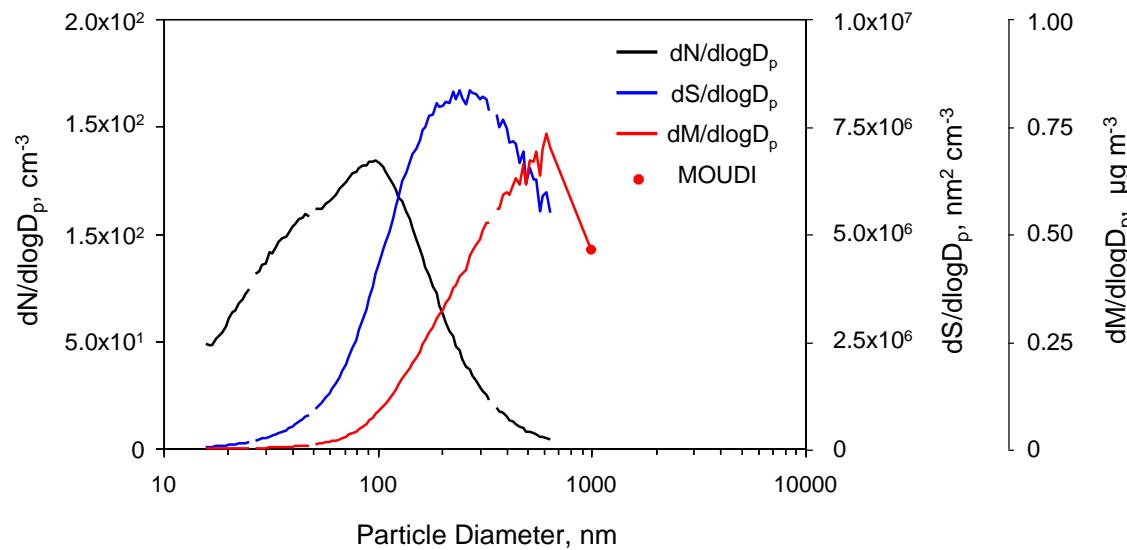
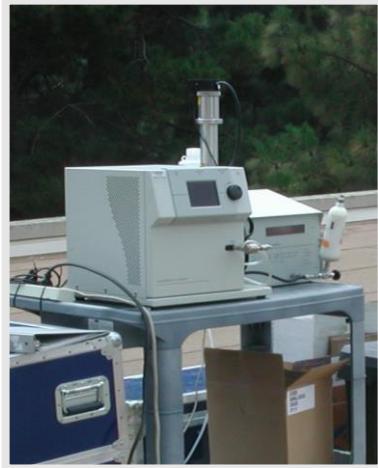


Exposure Assessment for Ambient Nano-Particles

Michael J. Kleeman, Department of Civil and Environmental
Engineering, University of California Davis

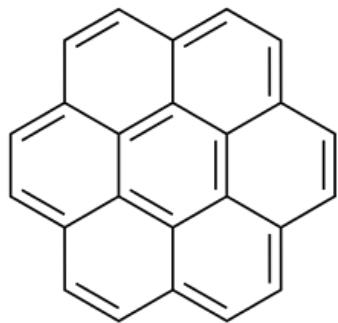


Typical Atmospheric Aerosol Size Distribution below 1 μm Measurements from Fresno CA

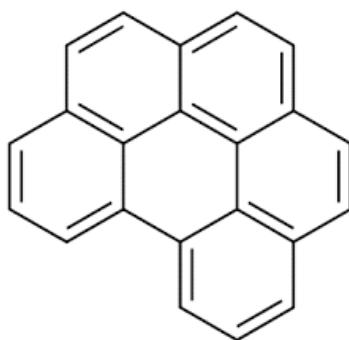


Molecular Markers for Particles < 100 nm

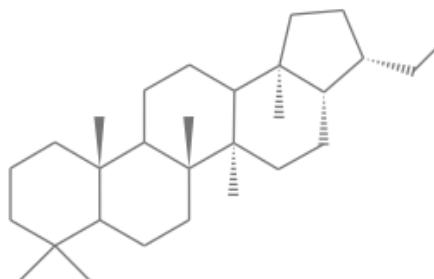
coronene



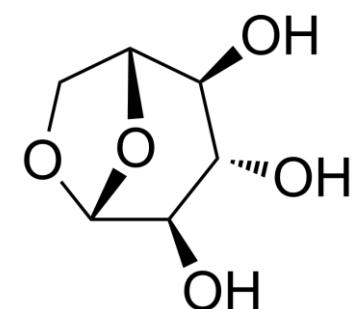
benzo(ghi)perylene



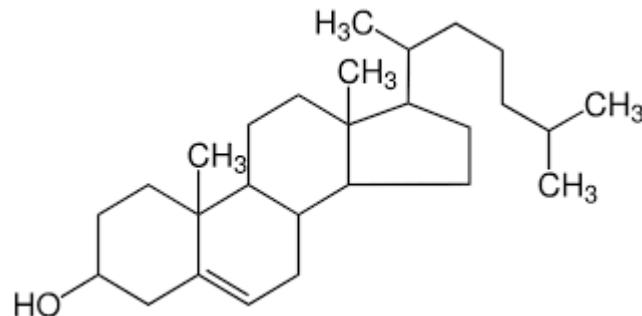
17 α 21 β -norhopane



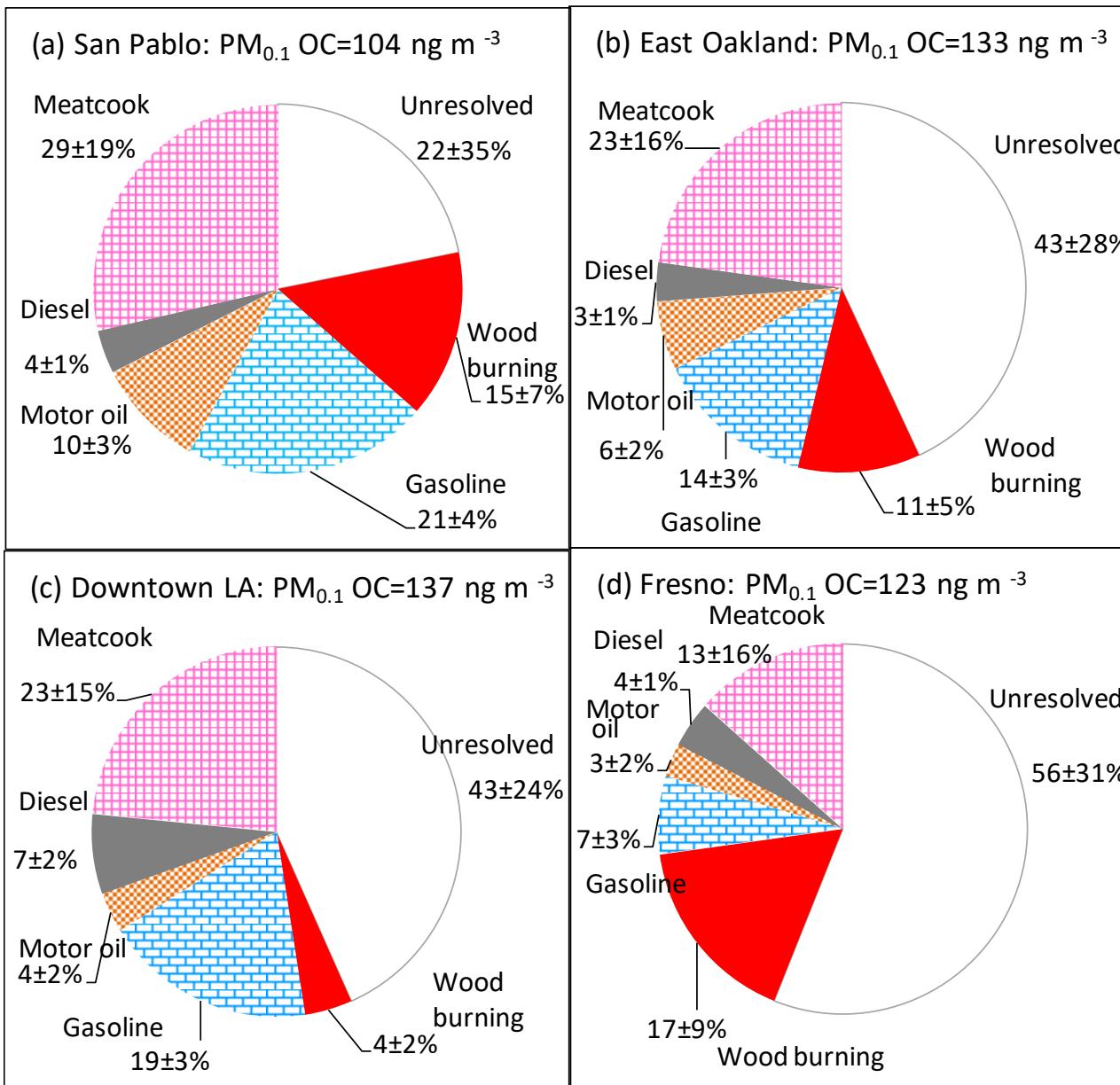
levoglucosan



cholesterol

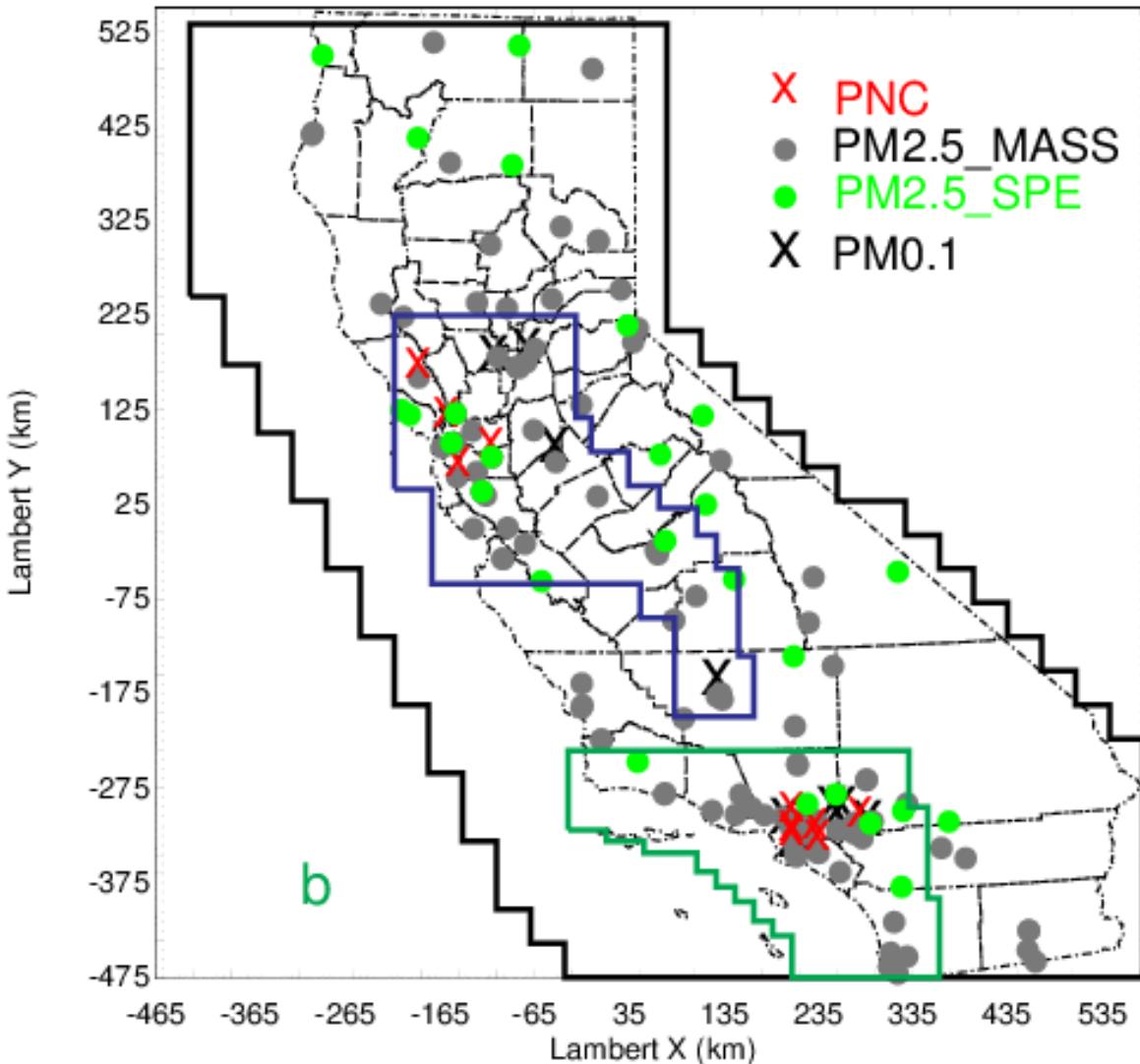


PM_{0.1} Chemical Mass Balance Source Apportionment Results in 2016



PM0.1 Regional Chemical Transport Models

$$\frac{\partial C_i}{\partial t} + \nabla \cdot u C_i = \nabla K \nabla C_i + E_i - S_i + R_i^{gas}(C) + R_i^{part}(C) + R_i^{phase}(C)$$

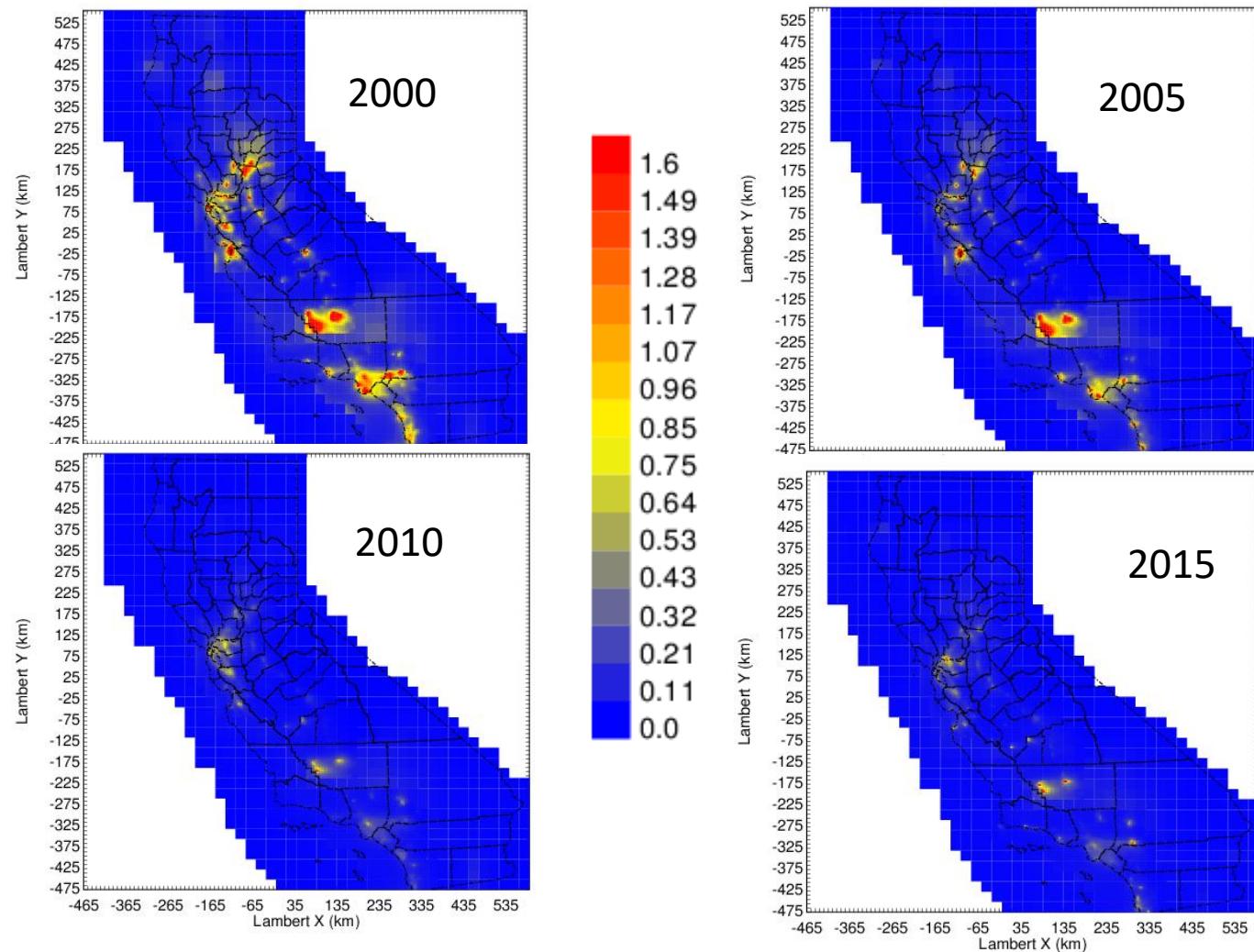


UCD/CIT air quality model
SAPRC11 chemistry
2-product SOA
ISORROPIA thermodynamics

WRF meteorology
CARB Emissions Inventory
MEGAN biogenic emissions
GFED wildfire emissions

2000-2016
4km spatial resolution
Hourly time resolution

PM_{0.1} OC (μgm^{-3})

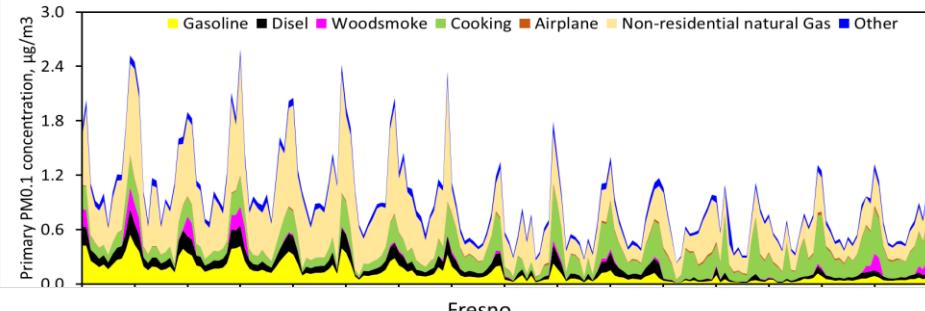


Predicted source contributions to PM_{0.1} and Particle Number Concentration from 2000-2016

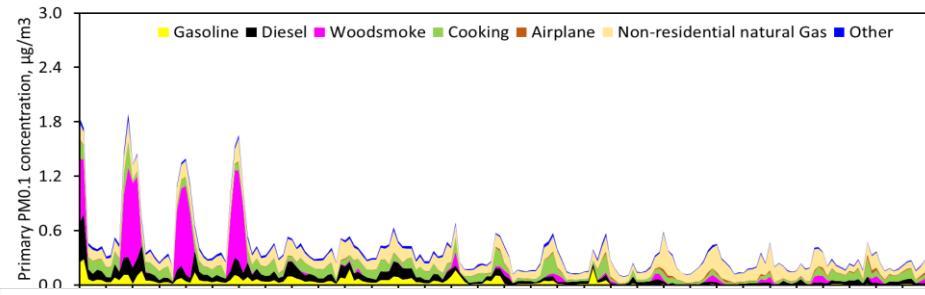
PM0.1 ($\mu\text{g m}^{-3}$)

PNC ($\text{k}\#\text{ cm}^{-3}$)

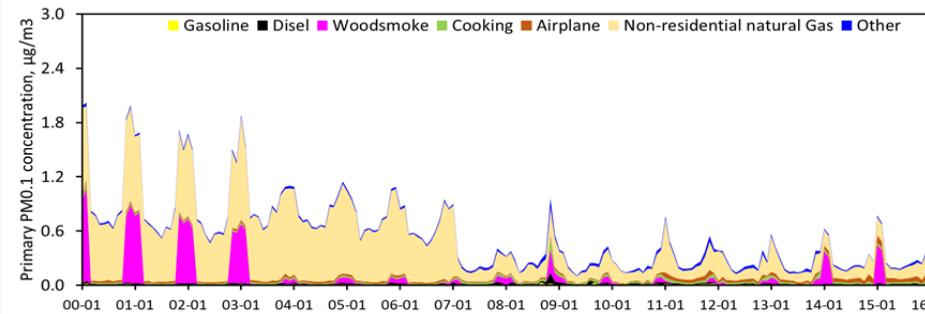
Los Angeles



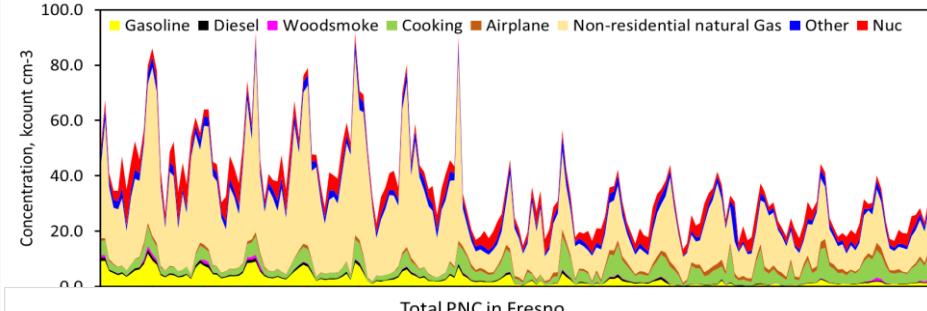
Fresno



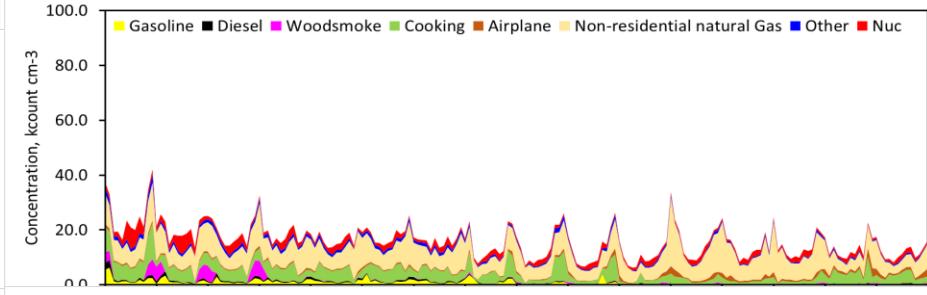
Sacramento



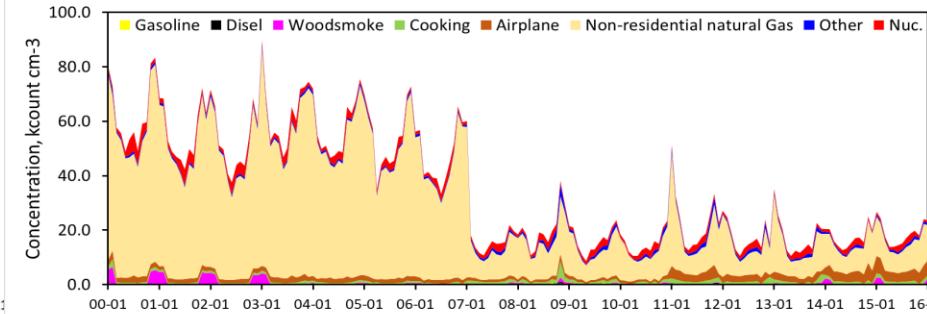
Total PNC in Los Angeles



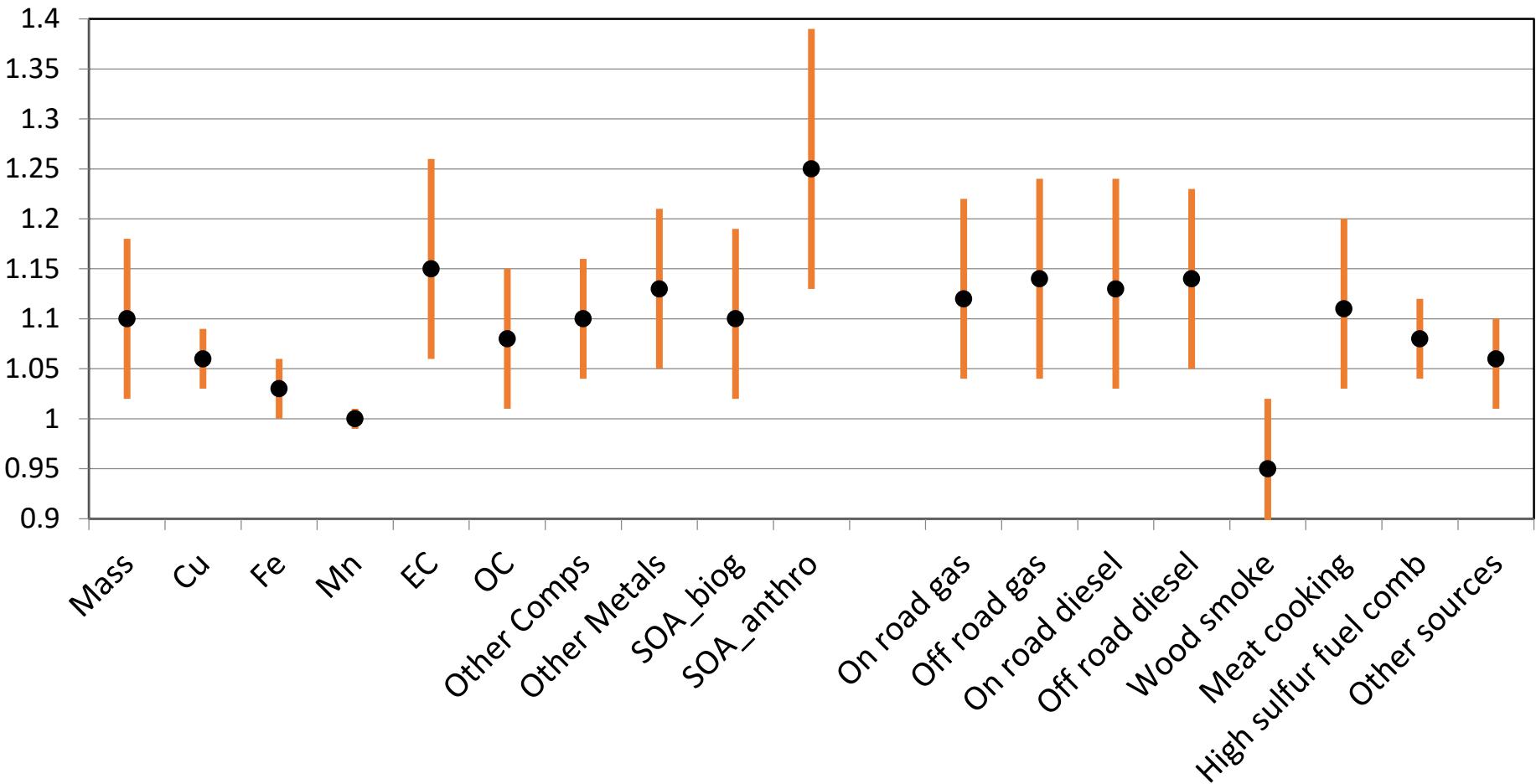
Total PNC in Fresno



Total PNC in Sacramento



Initial Epidemiological Results: Hazard ratios (HR) and 95% CI for IQRs of association of PM0.1 with Ischemic Heart Disease Mortality



Analysis also indicates that PM0.1 mass and each constituent and source provides better fit of the data than does corresponding PM2.5

Source: 2015 B. Ostro, J. Hu, D. Goldberg, P. Reynolds, A. Hertz, L. Bernstein, and M.J. Kleeman.

Long-term exposures to fine and ultrafine particles, species and sources: Results from the California Teachers Study Cohort. Environmental Health Perspectives, 123(6), pp549-556.