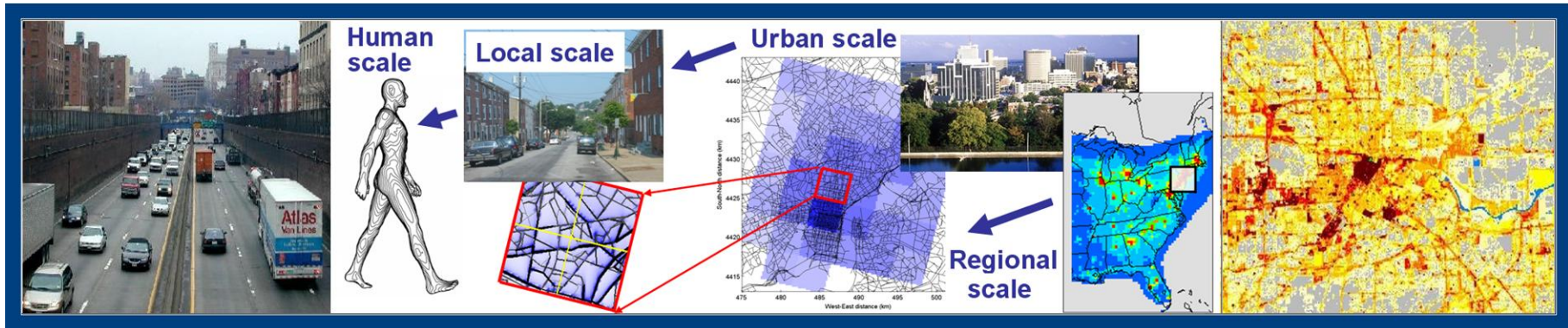


Using Dispersion Models to Downscale Satellite Based $PM_{2.5}$ Maps



Morteza Amini, Faraz Ahangar, Akula Venkatram
University of California, Riverside, CA
Frank Freedman, SJSU



Dispersion model

Satellite derived
input+regional model



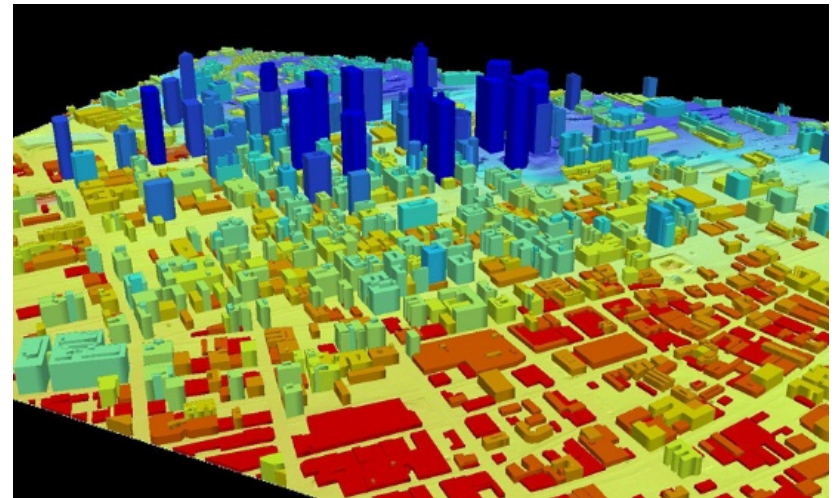
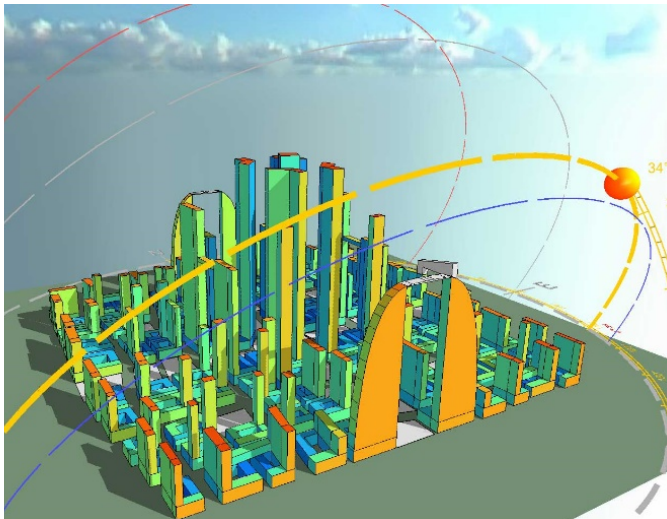
Role of Dispersion Models

1. Create Maps: Semi-empirical models fitted to data. Residuals between model estimates and observations interpolated using simple techniques such as Kriging
2. Estimate contributions of sources to pollutant concentrations at receptors

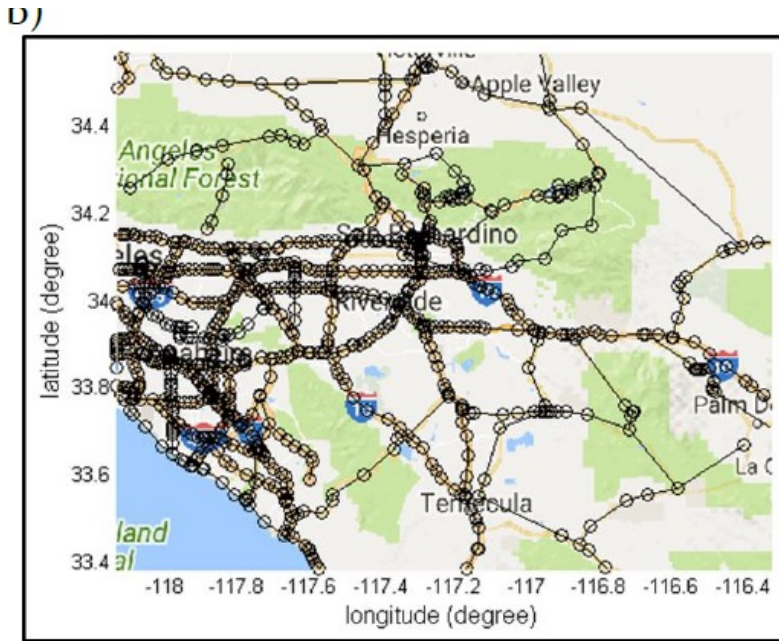
Models for Urban Areas

1. Highway models that account for the effects of roadside barriers, depressed and elevated roadways on dispersion
2. Street canyon models that account for the effects of buildings lining roads

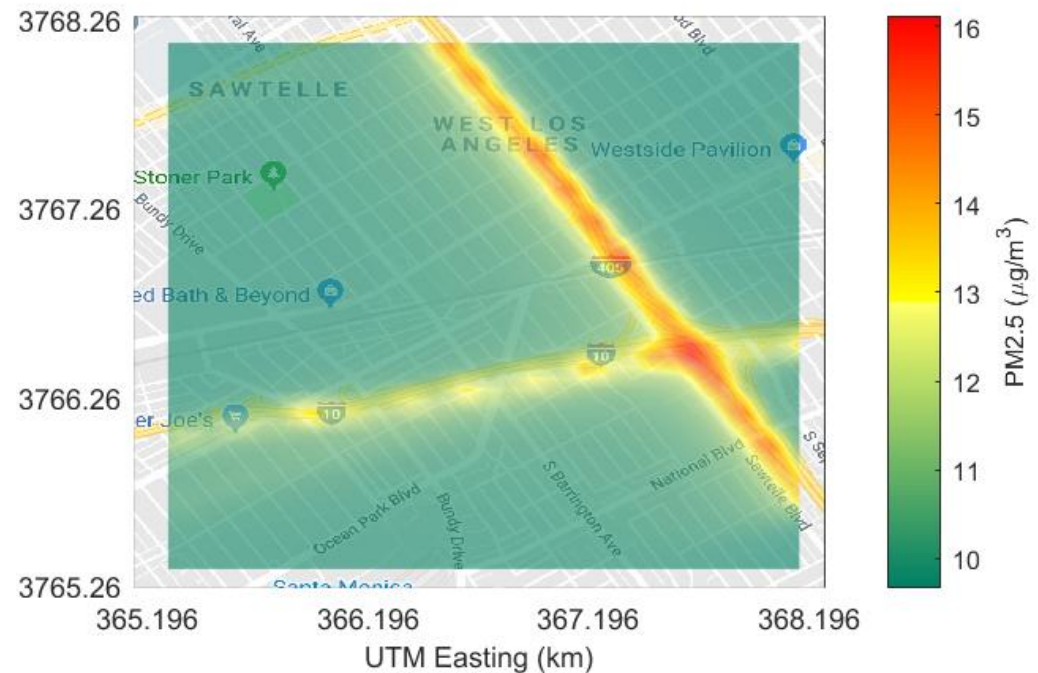
Models have to be evaluated with observations



Application of Dispersion Model

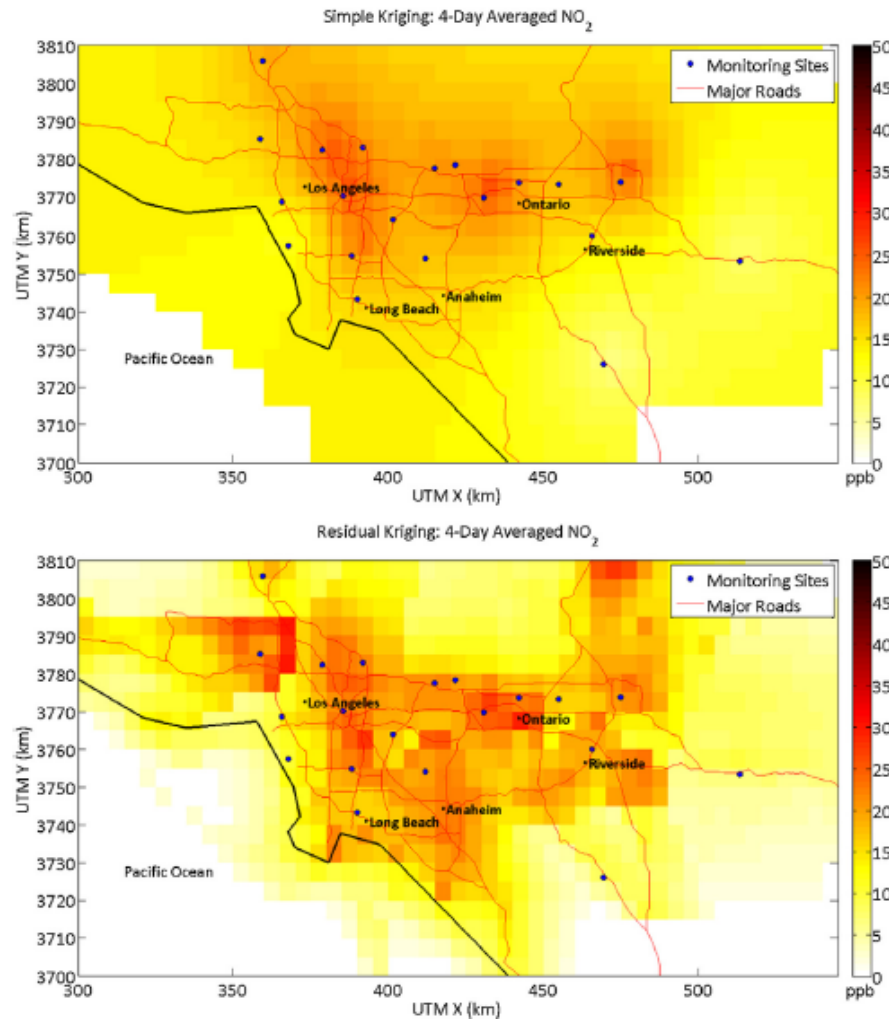


Highway dispersion model
used to estimate primary
 $PM_{2.5}$ concentrations



Mapping Data- Model Based Kriging

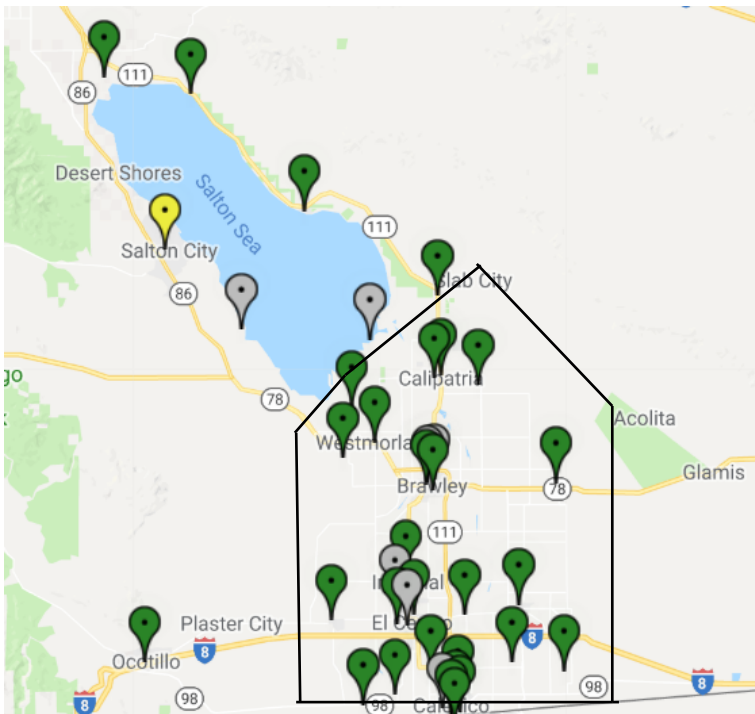
S. Pournazeri et al / Environmental Modelling & Software 52 (2014) 19–37



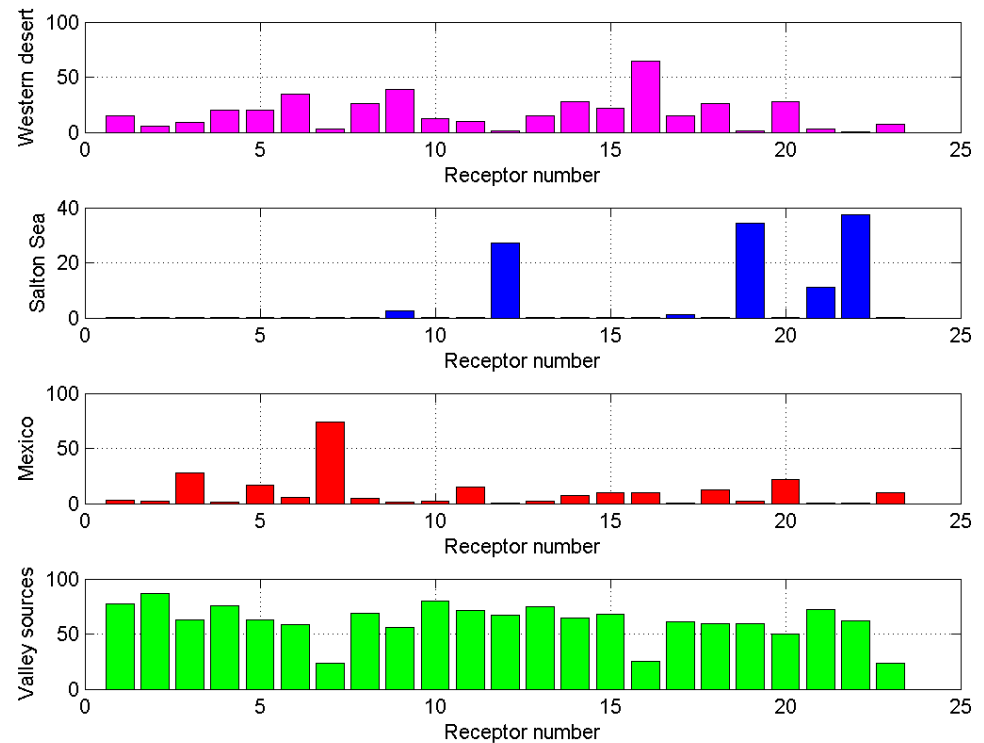
19. 4-Day average NO₂ concentration map in the SoCAB. Upper panel: Interpolated using Simple Kriging. Lower panel: Interpolated using residual Kriging.

IVAN System-Identifying Violations Affecting Neighborhoods

Modeled using line sources on boundaries and area sources within the valley



Contributions of source areas



Ongoing Work

1. Incorporating methods to account for road structures/ configurations and street canyons in dispersion models
2. Analyzing IVAN data through models to create model based maps of PM 2.5.
3. Exploring the use of satellite products to characterize surface characteristics required in dispersion models

