

**NUMERICAL-MODEL URBANIZATION-TECHNIQUES: POTENTIAL FOR AIR QUALITY FORECASTING****R. Bornstein***Meteorology, SJSU, San Jose, USA*

This paper summarizes the range of techniques used in numerical mesoscale models to include urban-area effects on simulated thermodynamic and dynamic fields to reproduce urban effects on air quality. Cities were first treated as “sand boxes,” whose radiative, thermal, and aerodynamic properties were specified in surface-energy and -moisture boundary conditions. Grid-averaged urban “building block” heights were next added to natural topographic height values. Porous-flow simulations have been recently attempted, in which atmospheric and building-material densities were weighted on a grid volume basis. Such models also include canyon radiative effects, wall-surface drag, and soil heat storage parameterizations, as well as satellite-derived spatial distributions of urban morphology, albedo, emissivity, vegetative index. Other current applications have linked numerical urban mesoscale models with CFD urban-neighborhood models. Such linkages use lower boundary values from mesomodels in the smaller scale models, and/or upper boundary values from the smaller scale models in the mesomodels. Examples are given for many of these techniques and applications, as are future possible applications to urban-scale air quality and emergency response.