Spatial Modeling of Atmospheric Pollutants

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Abstract

The 1990 Clean Air Act Amendments mandated reductions in emissions of a number of atmospherically transported pollutants. One of the responses to that was the setting up of the Clean Air Status and Trends Network (CASTNet), a network of rural stations on which, among other things, concentrations of sulfur dioxide and nitrogen species are measured. It is therefore of considerable interest to monitor long-term trends across this network, but the modeling of temporal trends should also reflect spatial inhomogeneities, requiring spatio-temporal analysis. More recently, in 1997 the Environmental Protection Agency proposed new standard for atmospheric particulate matter, based on the level PM2.5 (airborne particles of diameter 2.5 microns or less), which had not previously been monitored everywhere. Following this a new network of PM2.5 monitors was set up, from which it is of interest to establish where the proposed new standards are violated. The talk will describe ongoing research in the analysis of these pollution networks, including hierarchical models and nonstationary models for the underlying spatial processes.