



Statistical-Physical Estimation of Pollution Emission

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Air pollution is a good example of non-local dynamics, in which air quality at the site of interest is usually determined by transport of pollutants from distant pollution emission sources by atmospheric processes. To understand the underlying nature of pollution generation, it is crucial to employ a physical knowledge to account for the pollution transport by wind. However, in most cases, physics models require massive calibration due to incomplete information to determine model parameters. In this paper, we propose a method to estimate the pollution emission from the domain of interest, by using both the physical knowledge and observed data. The proposed method uses an efficient optimization algorithm to estimate the emission from each of the spatial locations, while incorporating the physics knowledge. The proposed approach is demonstrated through a real application.

Keywords: air pollution; inverse model; spatio-temporal analytics.