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Air pollution is driven by non-local dynamics, in which air quality at a site is determined by transport of pollutants from distant pollution emission sources to the site by atmospheric processes. In order 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, it is not possible to utilize the physics models to obtain useful information, as it requires massive calibration and computation. 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 simulation study that mimics the real application