Spatial Analysis of Fine Particulate Matter in Taiwan

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Abstract

Fine particulate matter (PM2.5) has gained increasing attention due to its adverse health effects to human. In Taiwan, it was conventionally monitored by large environmental monitoring stations of the Environmental Protection Administration. However, only a small number of 77 monitoring stations are currently established. Recently, a project using a large number of small sensing devices, called AirBoxes, was launched in March 2016 to monitor PM2.5 concentrations. Although thousands of AirBoxes have been deployed across Taiwan to give a broader coverage, they are mostly located in big cities, and their measurements are less accurate. In this research, we propose a spatial prediction method for these data using thin-plate splines and kriging. In addition, we develop a spatiotemporal control chart that monitors anomalous measurements.