



Evaluation about the Domain Representation of PM_{2.5} from single site Using a network observation

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Air pollution is serious and complicated in China. Using high spatial resolution surface PM_{2.5} observations over a region in North China from November 2015 to February 2016, this study examines the region representation of a single site observation. It first analyzes the temporal and spatial distribution of PM_{2.5} in detail, then the difference of PM_{2.5} characteristics in four sub-regions, third the contrast of PM_{2.5} of two sites which are close to each other, and finally the domain representativeness of a single site observation for different time-scales. It is shown that the severest pollutant period in this region is from the end of November, 2015 to the beginning of January, 2016. In this period, there were several serious polluted processes and the accumulation capacity of PM_{2.5} was also very strong, which can make value of PM_{2.5} increase 470 $\mu\text{g}/\text{m}^3$ in three days. The spatial heterogeneity of average PM_{2.5} increases gradually when time period averaged decreases. The correlation of two sites (one emission site, one region site) that are about 350m far away from each other changes largely in different regions, and the PM_{2.5} at emission site is on average 0.6%-11.3% larger than that at region site. The region representation of observations over a single site has been analyzed for different time scales and different spatial scales. The representation generally becomes better with increasing time scale while the representation of pollutant condition is better than that of clean condition. In remote areas far away from downtown representation is better with increasing radius in the range of 1500 meters, however the change rules of representation in downtown are very different. When the time scale is around four months, it is found that the observations from a single site has the best representation, which is for a region with radius around 6.3 km.