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A Data-Driven Approach for Studying the Washout Effects of Rain on Air Pollution

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Abstract : Air pollution is a serious environmental threat on a global scale and can cause harm to human health, morbidity and premature mortality. Reliable monitoring and control systems are therefore necessary to develop coping skills against the hazards associated with this phenomenon. However, existing environmental monitoring means often do not provide a sufficient response due to practical and technical limitations. Commercial microwave links that form the infrastructure for transmitting data between cell phone towers can be harnessed to map rain at high tempo-spatial resolution. Rainfall causes a decrease in the signal strength received by these wireless communication links allowing it to be used as a built-in sensor network to map the phenomenon. In this study, we point to the potential that lies in this system to indirectly monitor areas where air pollution is reduced. The relationship between pollutant wash-off and rainfall provides an opportunity to acquire important spatial information about air quality using existing cell-phone tower signals. Since the density of microwave communication networks is high relative to any dedicated sensor arrays, it could be possible to rely on this available observation tool for studying precipitation scavenging on air pollutants, for model needs and more.

Keywords : air pollution, commercial microwave links, rainfall, washout
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