## 1.102 Using a mobile laboratory and continue wavelet transform to evaluate vehicular emission in megacity Beijing.

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Abstract:

Vehicular emission is a major source of air pollutants in cities, especially in megacities, around the world. Due to the different energy profiles and developmental stages, the contribution of vehicular emission to the air pollution varies greatly in cities around the world. Beijing municipality government implements strict vehicular emission control policy to improve air quality. However, the policy effectiveness has been controversial. During the Asia-Pacific Economic Cooperation (APEC) Beijing 2014, the government adopted the strictest vehicular emission control policy, which provides a great opportunity to re-examine this issue. We used a mobile research platform to measure the main air pollutants, including $PM_{2.5}$, BC, $SO_2$, CO, NOx and $O_3$ on the 4th ring road of Beijing, combined with a continue wavelet transform method (CWT) to separate out “instantaneous emission” from passing vehicles, to more accurately evaluate the policy effectiveness. The daytime measurement concentrations (mean±1 SD) of $PM_{2.5}$, BC, $SO_2$ , CO, NOx and $O_3$ were 11.8 ± 5.3 μg $m^{-3}$, 1.2 ± 0.7 μg $m^{-3}$, 6.9 ± 4.9 ppb, 1.2 ± 0.6 ppm, 215.1 ± 61.1 ppb and 7.8 ± 5.2 ppb on the 4th ring road during APEC period, respectively. Our results suggested that the CWT method could effectively decompose the “instantaneous concentration” from on-road background concentration. The daytime vehicle emission of CO and NOx decreased by 28.1% and 16.3% during APEC period

relative to before APEC period, and by 39.3% and 38.5% relative to after APEC period. The nighttime vehicle emission of CO and NOx decreased by 56.0% and 60.7% during APEC period relative to after APEC period. Our results suggest vehicle emissions of NOx and CO contribute considerably to the total emission of air pollutants in Beijing, and the vehicle emission control is essential in the air quality improvement in megacity Beijing.