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Supplement of

Measurement report: A multi-year study on the impacts of Chinese New Year celebrations on air quality in Beijing, China

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1 SUPPLEMENTARY INFORMATION

Site name	Site name (eng)	Site abbreviation (eng)	Longitude	Latitude
东四	DongSi	DS	116.417	39.929
天坛	TianTan	TT	116.407	39.886
官园	GuanYuan	GY	116.339	39.929
万寿西宫	WanShouXiGong	WSXG	116.352	39.878
奥体中心	AoTiZhongXin	ATZX	116.397	39.982
农展馆	NongZhanGuan	NZG	116.461	39.937
万柳	WanLiu	WL	116.287	39.987
古城	GuCheng	GC	116.184	39.914
顺义	ShunYi	SY	116.655	40.127
昌平	ChangPing	CP	116.23	40.217
怀柔	HuaiRou	HR	116.628	40.328
定陵	DingLing	DL	116.22	40.292

Table S1: List of the 12 MEP (Ministry of Environmental Protection) sites in the Beijing metropolitan area, their translations and abbreviations in English, and their geographic locations.

Instrument	Manufacturer	Parameter measured	Time Resolution
Trace Gas Analyzer	42i-Y, 42i-TL, 43i-TLE, 48i-TLE, 49i, Thermo Fisher	NO_y, NO/NO_2, SO_2, CO, O_3	5 min
Weather station data acquisition system	Vaisala (AWS310, PWD22, CL51), Metcon	WS, WD, T, P, RH, Precipitation, Visibility, PBL, Cloud height, Cloud coverage, UVA, UVB, Global radiation, Diffusion radiation, Net radiation, J_{NO2}	1 min
Particle Size Distribution (PSD)	Custom made by Tsinghua University	3–10,000 nm particle size	5 min
Atmospheric Pressure Interface-Long Time-Of-Flight- Chemical Ionization Mass Spectrometer (API-LToF-CIMS)	Aerodyne	H_2SO_4, $(H_2SO_4)_n$, HOMs (m/z 1–1000 amu)	1 min
Aethalometer	AE33-7, Magee	Black Carbon	1 min

Table S2: List of instruments at BUCT-AHL used in this study, from Liu et al. (2020).

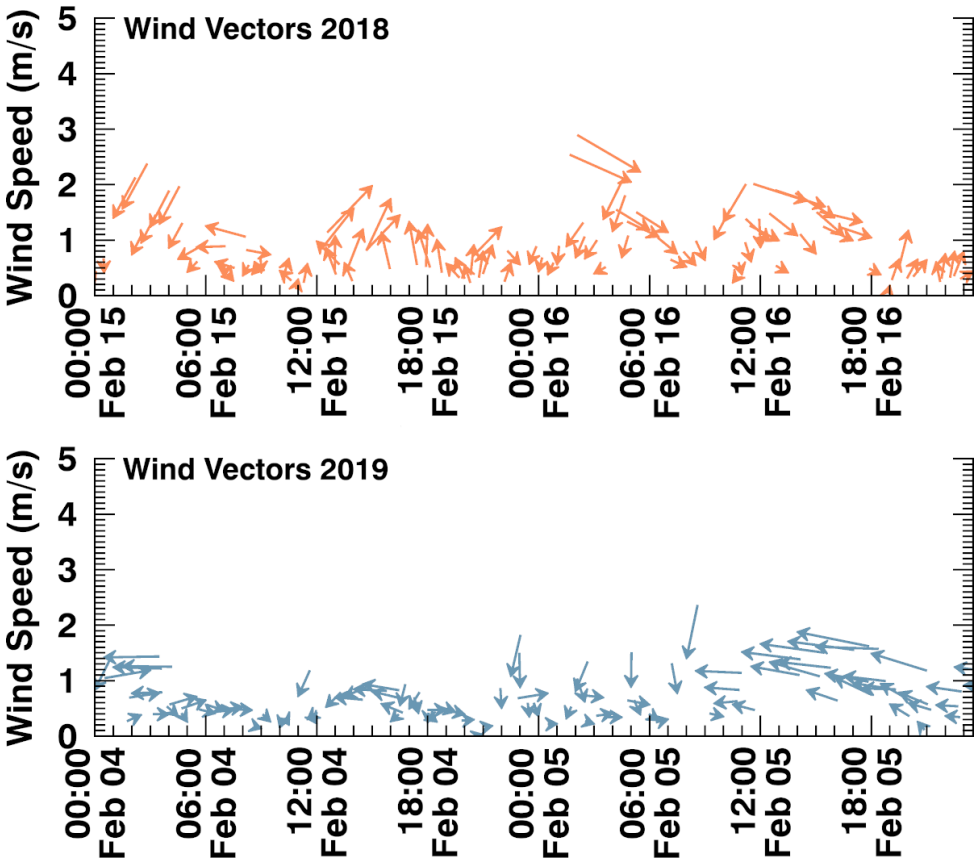

Figure S1: Wind vectors showing direction (arrows) and speed (length of arrows, and the y axis) before, during, and after the 2018 and 2019 CNY.

Figures S2-S13 show $PM_{2.5}$ inside and outside of the 5th Ring Road, which was the firework/firecracker prohibition area beginning in 2018 (Liu et al. 2019), and a comparison between the two in each respective year. From these figures, we can infer that there is more pollution inside this area than outside up through 2018. This can be expected because the population is much denser closer to the center of the city. In 2019, however, there was less $PM_{2.5}$ pollution inside this area than outside, which is presumably because of the prohibition. 2017 is not included in this set of figures because data was missing after the CNY midnight during that year, for an unknown reason. 2017 is omitted from these figures because data after 00:00 is missing, for an unknown reason.

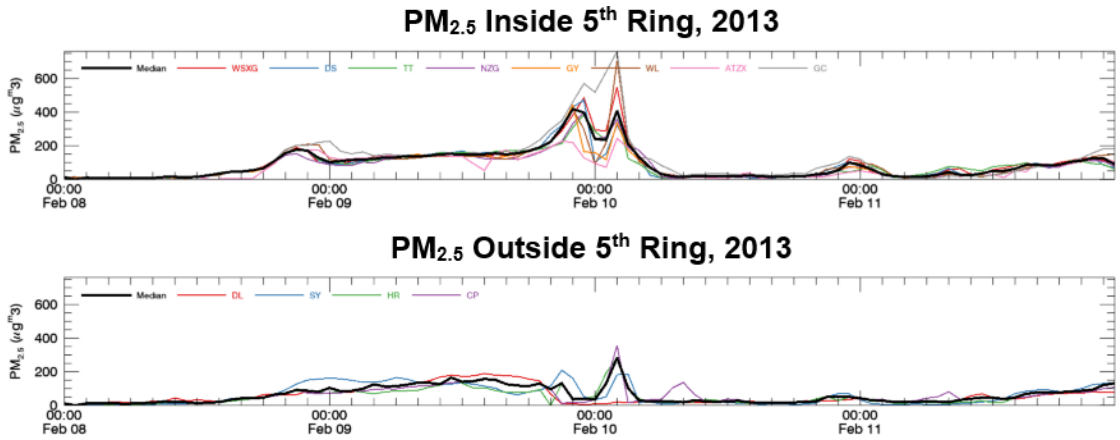

Figure S2: Timeseries of $PM_{2.5}$ measured at the 12 MEP stations 48 hours before through 48 hours after the CNY in 2013, inside the 5th Ring Road (top) and outside (bottom).

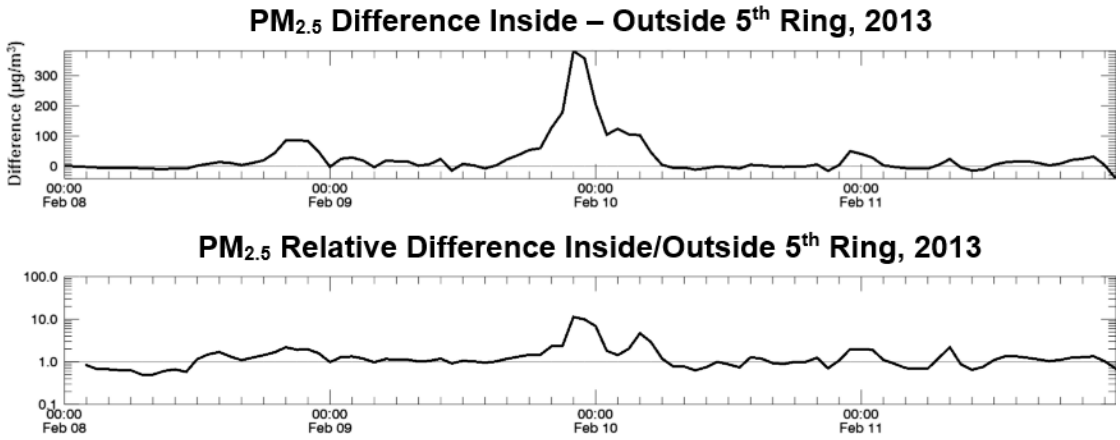

Figure S3: Timeseries of the $PM_{2.5}$ differences between the average of 8 MEP sites inside the 5th Ring Road and the average of the 4 stations outside the 5th Ring Road (top), and the respective relative differences (bottom), 48 hours before through 48 hours after the 2013 CNY.

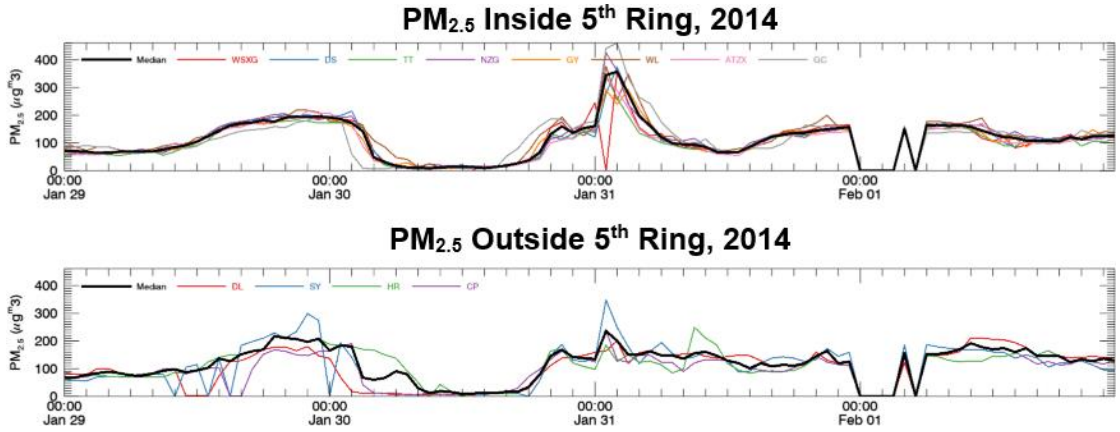

Figure S4: Timeseries of $PM_{2.5}$ measured at the 12 MEP stations 48 hours before through 48 hours after the CNY in 2014, inside the 5th Ring Road (top) and outside (bottom).

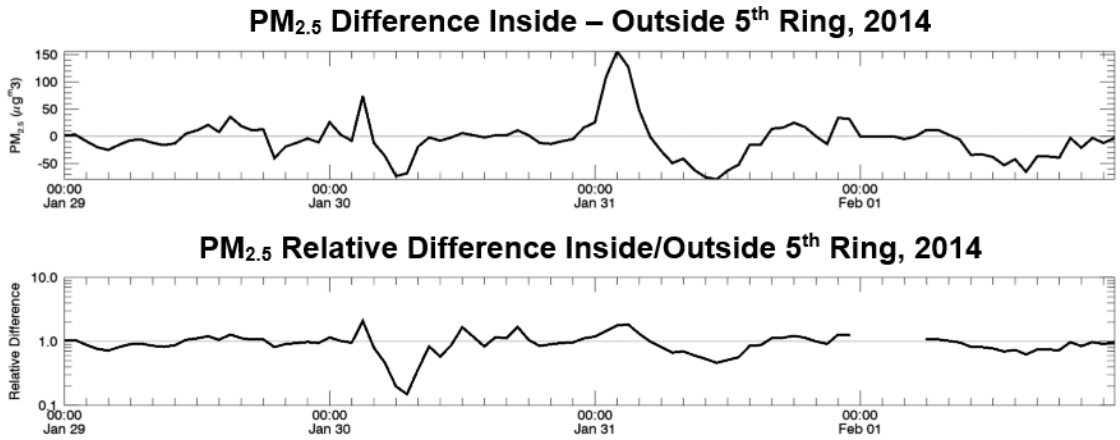

Figure S5: Timeseries of the $PM_{2.5}$ differences between the average of 8 MEP sites inside the 5th Ring Road and the average of the 4 stations outside the 5th Ring Road (top), and the respective relative differences (bottom), 48 hours before through 48 hours after the 2013 CNY.

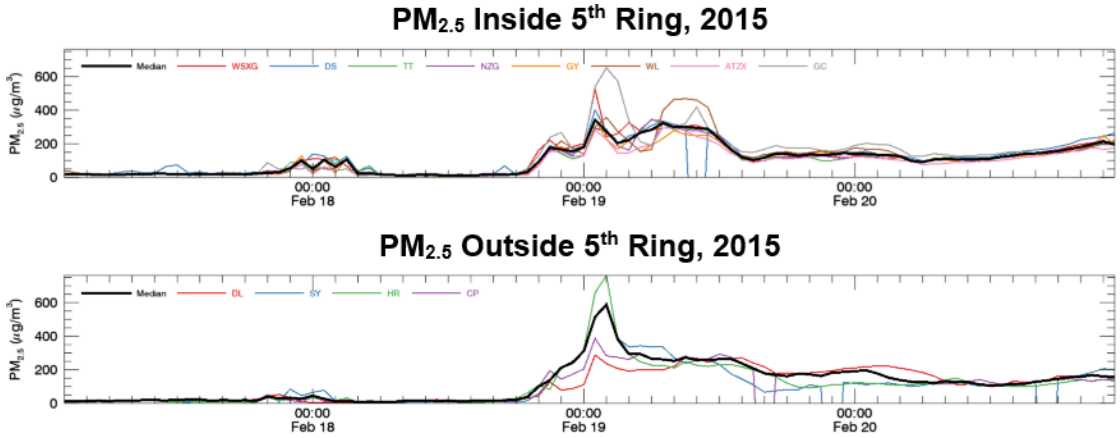

Figure S6: Timeseries of $PM_{2.5}$ measured at the 12 MEP stations 48 hours before through 48 hours after the CNY in 2015, inside the 5th Ring Road (top) and outside (bottom).

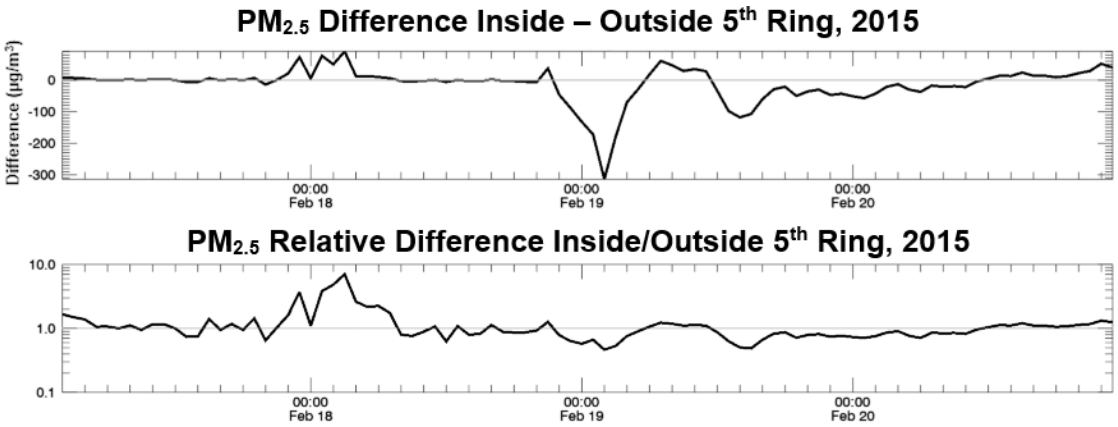

Figure S7: Timeseries of the $PM_{2.5}$ differences between the average of 8 MEP sites inside the 5th Ring Road and the average of the 4 stations outside the 5th Ring Road (top), and the respective relative differences (bottom), 48 hours before through 48 hours after the 2015 CNY.

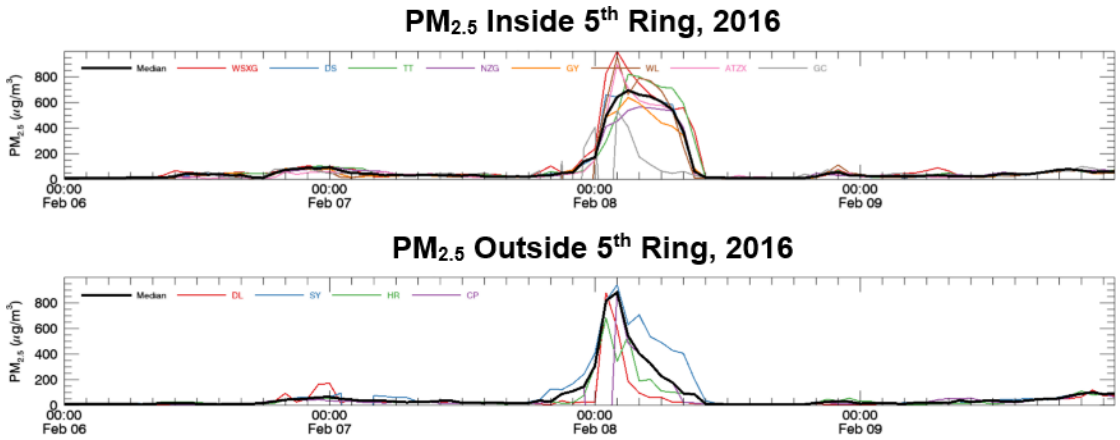

Figure S8: Timeseries of $PM_{2.5}$ measured at the 12 MEP stations 48 hours before through 48 hours after the CNY in 2016, inside the 5th Ring Road (top) and outside (bottom).

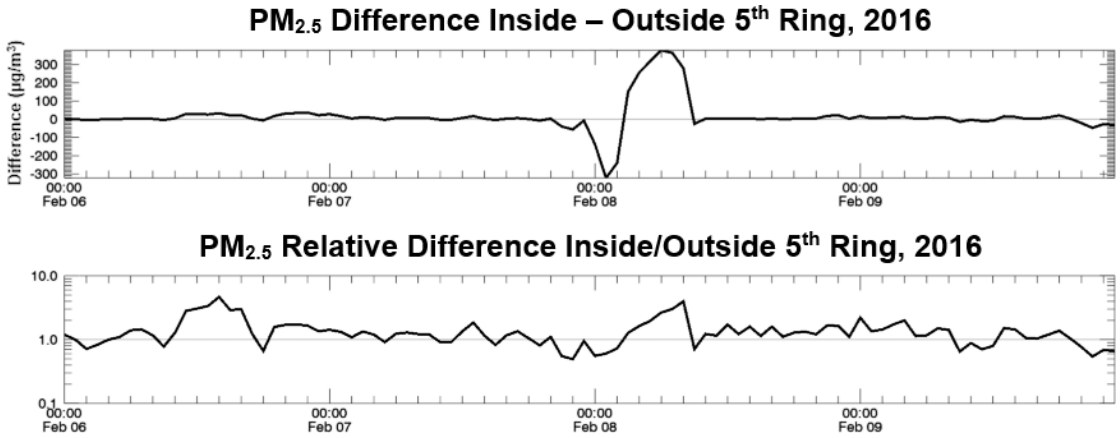

Figure S9: Timeseries of the $PM_{2.5}$ differences between the average of 8 MEP sites inside the 5th Ring Road and the average of the 4 stations outside the 5th Ring Road (top), and the respective relative differences (bottom), 48 hours before through 48 hours after the 2016 CNY.

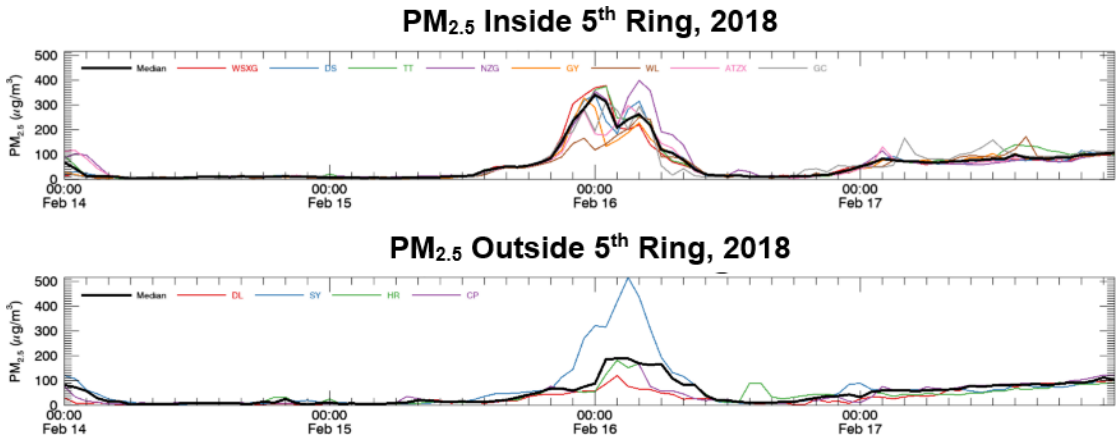

Figure S10: Timeseries of $PM_{2.5}$ measured at the 12 MEP stations 48 hours before through 48 hours after the CNY in 2018, inside the 5th Ring Road (top) and outside (bottom).

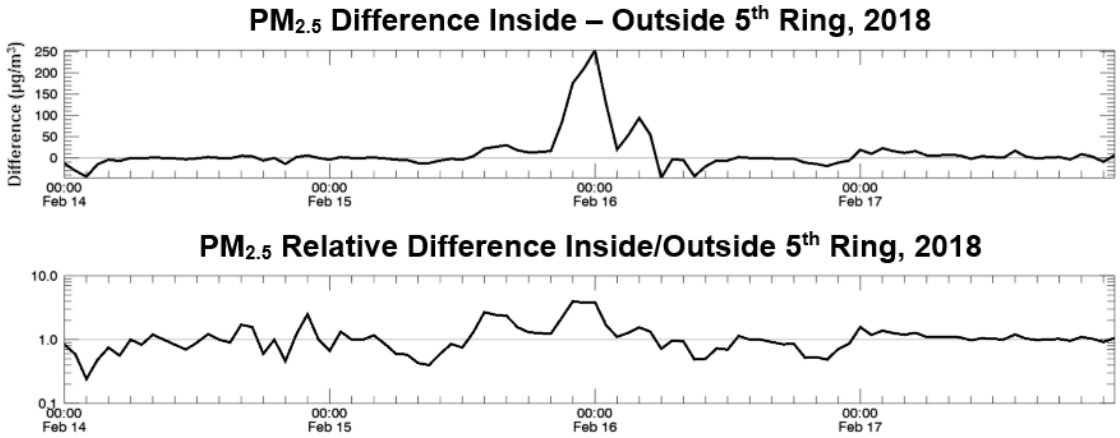

Figure S11: Timeseries of the $PM_{2.5}$ differences between the average of 8 MEP sites inside the 5th Ring Road and the average of the 4 stations outside the 5th Ring Road (top), and the respective relative differences (bottom), 48 hours before through 48 hours after the 2018 CNY.

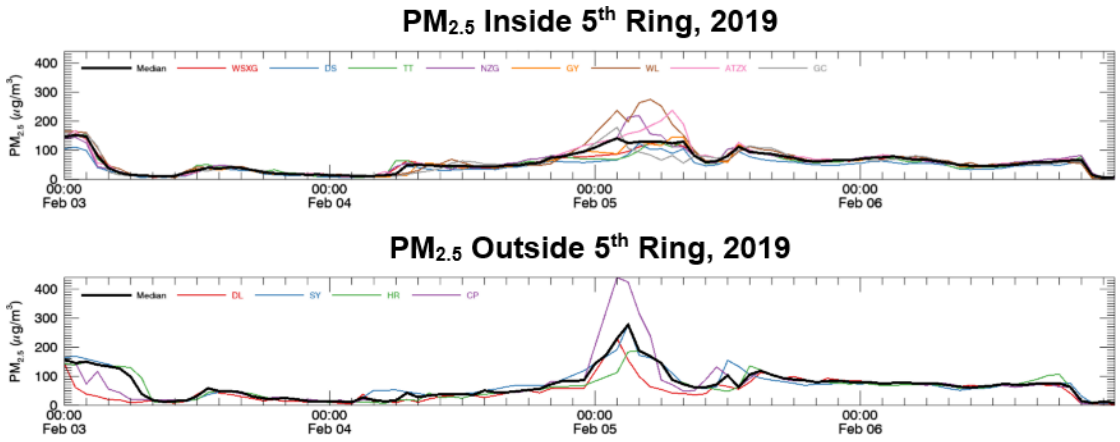

Figure S12: Timeseries of $PM_{2.5}$ measured at the 12 MEP stations 48 hours before through 48 hours after the CNY in 2019, inside the 5th Ring Road (top) and outside (bottom).

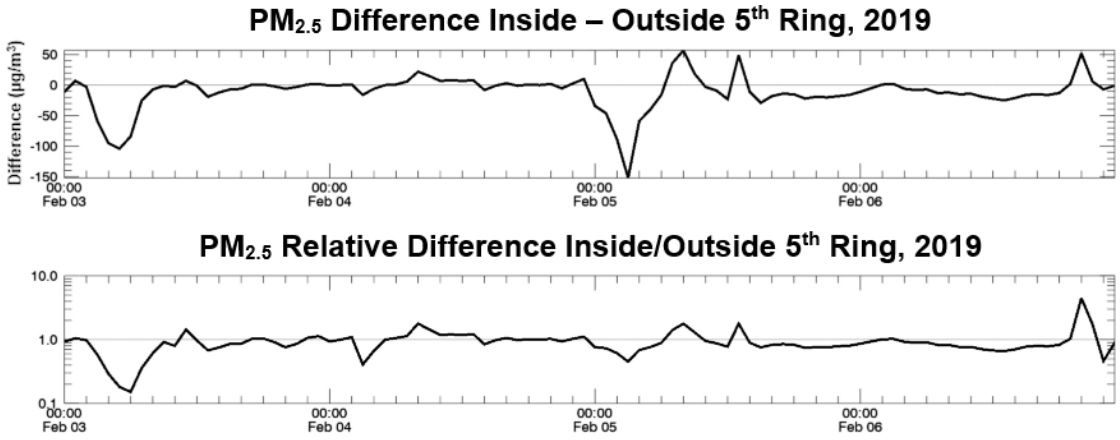

Figure S13: Timeseries of the $PM_{2.5}$ differences between the average of 8 MEP sites inside the 5th Ring Road and the average of the 4 stations outside the 5th Ring Road (top), and the respective relative differences (bottom), 48 hours before through 48 hours after the 2019 CNY.