Dear Dr. Liggio:

Please find below our itemized responses to the reviewer's comments. We have addressed the comments raised by both reviewers, and incorporated their comments / suggestions in the revised manuscript.

Thank you very much for your consideration.

Sincerely,

Xuejun Liu and Wen Xu

On behalf of all co-authors

Anonymous Referee #3

General comments

Air pollution in China, especially the North China, has drawn the world's attention in recent years. The Chinese government is capable of applying stringent and intensive emission control over a short period, during which an important event was held in Beijing or other major cities. This usually resulted in remarkably clean sky during the event. These manmade "control experiments" provide good opportunities to disentangle the complicated impacts of anthropogenic emissions and meteorological conditions on air quality. There have been quite a few published studies on the emission control periods of the 2008 Olympics, the 2014 APEC, and the 2015 Beijing Parade. This study distinguishes itself by analyzing wide spread monitoring sites both in Beijing and nation-wide(measurement network of $NO_2$and NH_3in Beijing and three NCP background sites is certainly a plus) and using a GEOS-Chem model to quantify the relative contributions of emission reduction and favorable meteorological conditions to air quality improvement. Generally, this manuscript provides useful observation datasets and insightful analyses on the emission-control policy. I recommend this manuscript to be accepted by ACP if the following concerns can be addressed.

Response: We thank the reviewer for the encouraging words and insightful comments. We believe that addressing the issues pointed out by the reviewer will considerably improve the manuscript. Please see our itemized responses below.

Major points:

1. At line 110, the authors stated that the previous studies did not systematically quantify the contribution of NH_3 from traffic sources to urban $PM_{2.5}$ and implied at they could address this question through their NH_3 observations. However, they only reported the concentration levels of NH_3 and stopped at the conclusion that on-road traffic is an important source of NH_3 in urban Beijing. It has long been demonstrated that on-road vehicles are major NH_3 sources for roadside sites. It is also obvious that reducing on-road vehicles during the emission control period will reduce NH_3 concentrations measured at these sites. It will require more analyses to extend from NH_3 concentrations measured at a few sites to $PM_{2.5}$ at the city scale. The authors brought up an important question about the linkage between NH_3 emission and $PM_{2.5}$ (which is one key reason why we care about NH_3), but did not really answer that. The authors should have the resources for further analyses, as the GEOS-Chem model can readily link the NH_3 emissions to $PM_{2.5}$.

Response: Thank you for your comment. A main objective of this study is to quantify the changes in air quality during the 2015 Beijing Parade Period as evidenced by our field measurements. The GEOS-Chem model simulation (with fixed anthropogenic emissions during the period) was used to provide an estimate of the relative role of meteorology. We do not include a detailed model analysis, since that should be done as a separate study that requires extensive work on evaluation of the model emissions and chemical mechanism.

To address the comment, we have made the following revisions: 1) we changed in the sentence "the contribution of ammonia (NH_3) from traffic sources to urban $PM_{2.5}$ pollution" to "the contribution of ammonia (NH_3) sources to urban $PM_{2.5}$ pollution"; 2) we examined the impacts of NH_3 emissions on urban $PM_{2.5}$ concentrations using GEOS-Chem model sensitivity simulations with perturbed anthropogenic NH_3 emissions in the Beijing-Tianjin-Hebei region. Linking NH_3 from traffic sources alone to $PM_{2.5}$ concentrations is a challenging task in the model, as a proper estimate of traffic NH_3 emission inventory is lacking. We have added and presented the model results in Sect. 4.3, as summarized below in addressing the comment #3.

2. Another innovative aspect of this study is characterizing the nonlinear response of pollutants to emission reduction (lines 111-112). The magnitude and spatial pattern of emission reductions are very important quantities, but they were assumed in a fairly arbitrary way (line 224). I think these assumptions need to be justified. In Fig. 13, one may argue that the response could be linear if the emission reductions are uncertain (say what assumed to be 5% reduction is really 10%). Are these emission reductions also used in GEOS-Chem simulation?

Response: In the revised manuscript, we now remove this part (discussion of non-linear response to emission reduction; including Figure 13 and several sentences in Sect. 4.3). This revision does not change the structure of the paper. We agree that characterizing the nonlinear response of air pollutants to emission reduction based on field measurements may have considerable uncertainties, and we think a detailed model investigation of this feature is beyond the scope of this study (but could be done in a future study).

3. The third innovation is quantifying the relative roles of emission reduction and favorable meteorology in air quality improvement (lines 112-113). The conclusion about this topic was drawn from the GEOS-Chem simulation, but I found that there is very limited information about this vital part of the analysis. What were the simulation time period and spatial coverage? What anthropogenic emission inventories were used? How were the emissions reduced in the model when simulating the Parade blue period? How did the simulation results compare with the rich observation datasets presented in Section 3?

Response: We examined the relative roles of emission reduction and meteorology in Section 4.3 by first presenting a comprehensive analysis of the meteorological conditions (temperature, RH, wind patterns, and precipitations) before/during/after the Parade Blue period, and then providing a quantitative estimate using the GEOS-Chem model simulation. In the revised manuscript we have added the following text to more fully describe and discuss the GEOS-Chem simulation:

“To further diagnose the impacts of meteorology on the surface air quality, we

conducted a simulation using the nested GEOS-Chem atmospheric chemistry model driven by the GEOS-FP assimilated meteorological fields at 1/4°×5/16° horizontal resolution covering East Asia (70°E-140°E, 15°N-55°N) (Zhang et al., 2015; 2016). Details of the model emissions and mechanisms have been described in Zhang et al. (2016), focusing on $PM_{2.5}$ concentrations in Beijing during the Asia-Pacific Economic Cooperation Summit (APEC; November 5-11) period. We used anthropogenic emissions from the Multi-Resolution Emission Inventory of China for the year 2010 (MEIC, 2015), except for NH_3 emissions that are taken from the Regional Emission in Asia (REAS-v2) inventory (Kurokawa et al., 2013) with an improved seasonality derived by Zhao et al. (2015)."

"We conducted a standard simulation with fixed anthropogenic emissions for the period of 1 August – 12 September 2015. By fixing anthropogenic emissions in the simulation, the model provides a quantitative estimate of the meteorological impacts alone before and during the Parade Blue period. For the pre-Parade period (1-19 August), the model simulated mean $PM_{2.5}$ concentration is 62 μg m^{-3} in Beijing, comparable to the measured values (59 μg m^{-3}), but simulated NH_3 concentrations are too low (3 μg m^{-3} vs. measured values of 8.2-31.7 μg m^{-3}), probably due to missing urban NH_3 sources and the coarse model resolution (1/4°×5/16°). Here we focus on the model simulated relative changes in pollutant concentrations before and during the Parade Blue period."

"We also conducted two sensitivity simulations ((1) with anthropogenic emissions of NH_3 reduced by 40% over Beijing and by 30% over Hebei and Tianjin; and (2) with all anthropogenic emissions including NH_3, SO_2, NO_x, CO, and primary aerosol reduced by 40% over Beijing and by 30% over Hebei and Tianjin) for the Parade Blue period (20 August-3 September 2015) to examine the responses of $PM_{2.5}$ concentrations to emission reductions. We find that the NH_3 emission reduction (by 40% over Beijing and by 30% over Hebei and Tianjin) could decrease the mean $PM_{2.5}$ concentration in Beijing by 12% for the period, compared with 31% simulated $PM_{2.5}$ reduction if all anthropogenic emissions were reduced by the same amount. This supports our findings on the effectiveness of emission controls during the Parade Blue

period as indicated in the measurements, and the high sensitivity of $PM_{2.5}$ concentration in Beijing to NH_3 sources."

Minor points:

1. Lines 91-92 and line 97: Is "North China" equivalent to the geographical extension of these six provinces or parts of them? The air mass and meteorology in parts of Inner Mongolia could be very different from the North China Plain.

Response: North China covers parts of these six provinces. According to the typical division of meteorological geographical areas in China, North China includes Beijing City, Tianjing City, the middle area of Inner Mongolia (i.e., Hohhot, Baotou, Ordos and Ulanchap Cities), Hebei, Shanxi, and Shandong provinces. To avoid misunderstanding, we deleted "North China" in line 90, and instead used "surrounding regions" and/or "emission control regions (excluding Beijing)" for related expressions throughout the entire revised manuscript.

2. Lines 139-141: Are these two sites (27 and 28) inside or outside the tunnel? NO_2concentration at site 27 seems extremely high for ambient measurements (Fig. 2B). Is that because it is in the tunnel?

Response: Yes, sites 27 and 28 were located, respectively, inside and outside the tunnel. We have revised the sentence (lines 139-141) and now it reads: "Sites 27 and 28 are located, respectively, inside (100 m from the exit) and outside (30 m from the entrance) the Badaling Highway Tunnel (1091.2 m long), which has two traffic tunnels with one lane in each."

The extremely high concentrations of NO_2 measured at site 27 were most likely due to enhanced NO_2 accumulation in the tunnel resulting from limited dispersion of pollutants. A similar phenomenon was also observed for NH_3 concentrations as reported by Chang et al. (2016).

3. Lines 201-202: Why was post-parade blue period not included in this dataset?

Response: We chose the pre-Parade Blue and Parade Blue periods for our comparison partly because the changes in concentrations of the pollutants between these two

periods can achieve the aims of the study. We now add the 24-h (daily) average concentrations of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO during the post-Parade Blue period in the revised manuscript, as shown in improved Figure 3 and also summarized in Tables S2-S6 in the Supplement. Accordingly, additional information during the post-Parade Blue period was also added in order to further improve the manuscript, including Air Quality Index (AQI), ratios of CO/SO_2, and $PM_{2.5}/CO$ (Figure 4), meteorological parameters (wind speed, wind direction and relative humidity) (Figure 6), sulfur oxidation ratio (SOR) and nitrogen oxidation ratio (NOR) (Figure S4 of the Supplement), correlations between $PM_{2.5}$ and gaseous pollutants (e.g. CO, NO_2, SO_2) (Figure S2 of the Supplement), and correlations between NH_4^+, SO_4^{2-}, and their sum (Figure S5 of the Supplement).

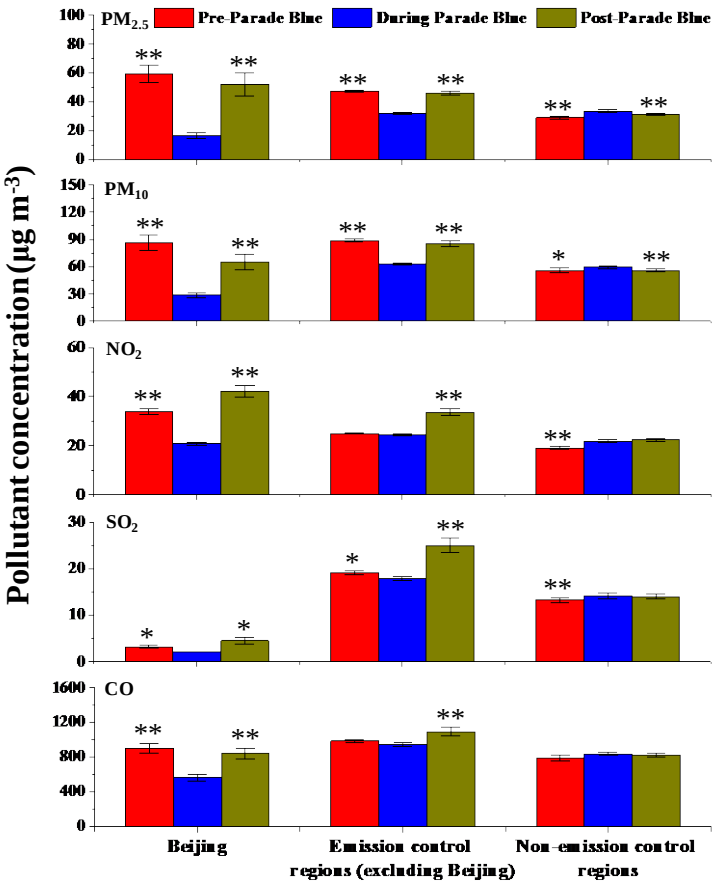

Figure 3. Comparison of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO concentrations between non-Parade Blue periods (the pre- and post-Parade Blue periods) and Parade Blue period at Beijing, cities in emission control regions (excluding Beijing) and other cities in non-emission control regions (one asterisk on bars denotes significant difference at $p<0.05$, two asterisks on bars denote significant difference at $p<0.01$).

4. Lines 258-260: It will be less confusing if the acronyms (SWR, SOI, SOB) are spelled out.

Response: We accept this suggestion and have spelled out the acronyms (SWR, SOI, SOB) in the revised paper.

5. Line 289: Please define WSI.

Response: WSI represents water-soluble ions. We have defined WSI in Line 118 where it first appears.

6. Line 441-442: Beijing actually has large agricultural sources, and its dominant NH_3 sources are still agriculture, at least according to the inventories. To argue that traffic is indeed an important NH_3 in Beijing, the authors need to provide more evidence on the roles of traffic emissions on $PM_{2.5}$ and/or on human/ecosystem exposures. See the first major comment point.

Response: Thank you for this suggestion, but we are skeptical about the reviewer's view that dominant NH_3 sources in Beijing are still agriculture. Recently, some studies have discussed the origin of atmospheric NH_3 in Beijing based on the $\delta^{15}N$ technique (Chang et al., 2016; Pan et al., 2016). Chang et al. (2016) identified that non-agricultural sources, merged with waste and traffic NH_3 emissions, collectively accounted for approximately 50% of ambient NH_3 in urban Beijing before and after APEC summit, of which more than 20% was sourced from traffic emissions. Pan et al. (2016) claimed that fossil fuel-based NH_3 emissions (including traffic, coal combustion and power plants) have overtaken agricultural emissions as the dominant source of atmospheric NH_3 during the hazy days in urban Beijing. Such results from those studies cannot be explained by previous emission inventories (e.g., Fu et al., 2013; Huang et al., 2011, 2012; Kuang et al., 2016; M. Li et al., 2015; Zhang et al., 2009, 2010). Thus the attribution of NH_3 sources in Beijing is still an open topic. In contrast to the studies of Chang et al. (2016) and Pan et al. (2016), the current study directly measured NH_3 and NO_2 concentrations at road sites. Our results show positive and significant relationships between NH_3 and NO_2 during different monitoring

periods, and average NH_3 concentrations for all three ring roads decreased significantly during the Parade Blue period when compared with the pre- and post-Parade Blue period. In addition, during the post-Parade Blue period the measured NH_3 concentrations on the three ring roads (28.3 ±6.4 μg m^{-3}) were twice those at the rural sites 29 and 30 (14.0 ± 1.6 μg m^{-3}) affected by intense agricultural NH_3 emissions. We think that the preceding discussion results (Section 4.2) are sufficient to confirm that traffic is indeed an important NH_3 source in Beijing.

The above discussions have been briefly summarized in the revised paper. In addition, we have conducted model sensitivity simulations to examine the impacts of anthropogenic NH_3 emissions on $PM_{2.5}$ concentration at Beijing, and presented the model results in the text, as described in the response to the first comment above.

7. Line 451: I want to bring it to the authors' attention that Chang et al. (2016)reported mileage-based NH_3 emission factor of 28 mg/km in Shanghai, one order of magnitude smaller than the emission factor used here. Note that one of the coauthors of this work is also on the author list of Chang et al. (2016).

Response: Thank you for this comment. The authors also found that the emission factor for vehicle-emitted NH_3 by Chang et al. (2016) was an order of magnitude smaller than that by Liu et al. (2014) which was used in the present study, but was similar to that estimated for the Gurbrist tunnel in Switzerland (31±4 mg km^{-1}) (Emmenegger et al., 2004) and the Caldecott tunnel in California (49±3 mg km^{-1}) (Kean et al., 2000). Different results obtained from those studies can be partially explained by differences in vehicle and fuel types, emission control technology, driving patterns and experimental methods (Keen et al., 2000, 2009; Baum et al., 2001; Heeb et al., 2006, 2008; Livingston et al., 2009). Therefore, we cannot judge the accuracy of existing emission factors of vehicle-emitted NH_3. In the revised paper, we assumed that NH_3 emission factors by Chang et al. (2016) and Liu et al. (2014) can both be representative for Beijing, and then used them to estimate a range for the amount of traffic-related NH_3 emissions during the Parade Blue period. For accurately determining NH_3 emissions, however, further study on NH_3 emission factors for

vehicles at the Badaling Tunnel is warranted.

8. Lines 452-456: These numbers do not mean that much, just multiplying literature emission factor and activity data. If the traffic NH_3 emission was reduced by a half, can it explain the observed reduction in NH_3 concentrations? Did NH_3 emission reduction play any role in the $PM_{2.5}$ reduction?

Response: We agree with the reviewer that the estimate of NH_3 emission based on a literature emission factor and activity data does not mean that much. However, we also think that it would be meaningful to give a quantitative formation for the reader, albeit with some uncertainty. As mentioned before (see response to Comment #7), our future work will address this issue based on realistic estimate of NH_3 emission factors for vehicles at the Badaling Tunnel and other tunnels.

According to NH_3 measurements in the present study, the mean NH_3 concentration at all sites within the 6th ring road in Beijing was significantly decreased (by 13%) during the Parade Blue period (when traffic load decreased by half) compared with the mean during the post-Parade Blue period without implementation of the odd-and-even car ban policy; further, on all three ring roads significant reductions (23 to 35%) of the mean during the Parade Blue period were also observed. Therefore, reduction of traffic NH_3 emission by half can partially explain the observed reduction in NH_3 concentrations, as emitted NH_3 in the atmosphere can be affected by many factors, such as acid gaseous (SO_2 and NO_2), meteorological conditions (e.g. wind speed, wind direction, precipitation) as well as regional transport (Meng et al., 2011; Behera et al., 2013).

Also for addressing the first three comments above, we have now discussed in the revised manuscript the impacts of NH_3 emissions on $PM_{2.5}$ concentrations using the GEOS-Chem sensitivity simulations.

9. Line 517: Why was Fig. 4 mentioned after Figs. 5–11?

Response: We incorrectly mentioned the Fig. 4, and we have re-ordered the Figures in the revised paper.

10. Figure 2: Please define the meaning of “*” and “**” in the caption.

Response: Suggestion has been implemented.

11. Figure 8: This figure is hard to read and seems redundant with Fig. 9 for the wind and pressure.

Response: We agree with this comment. In contrast to Figure 9, Figure 8 shows period-to-period changes in wind field, sea surface pressure and precipitation over the whole China, which is helpful to interpret corresponding changes in pollutant concentrations in non-emission control regions and crucial for the reader. Therefore, we decide to keep Figure 8 but move it to the Supplement (see Figure S6) to avoid repetitive description of wind and pressure over Beijing and emission controlled region in China.

12. Table S1 caption: Information on the “thirty-one” monitoring sites?

Response: Yes, we are sorry for this misspelling, and we have corrected in the revised version.

Anonymous Referee #1

General comments

Recommend publication as it is.

Response: We thank the reviewer's recommendation for publication.

Reference:

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acp-2016-591

Air Quality Improvement in a Megacity: Implications from 2015 Beijing Parade Blue Pollution-Control Actions

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Abstract:

The implementation of strict emission control measures in Beijing and surrounding regions during the 2015 China Victory Day Parade provided a valuable opportunity to investigate related air quality improvements in a megacity. We measured NH_3, NO_2 and $PM_{2.5}$ at multiple sites in and outside Beijing and summarized concentrations of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO in 291 cities across China from a national urban air quality monitoring network between August and September 2015. Consistently significant reductions of 12-35% for NH_3 and 33-59% for NO_2 in

different areas of Beijing city during the emission control period (referred to as the Parade Blue period) were observed compared with measurements in the pre- and post-Parade Blue periods without emission controls. Average NH_3 and NO_2 concentrations at sites near traffic were strongly correlated and showed positive and significant responses to traffic reduction measures, suggesting that traffic is an important source of both NH_3 and NO_x in urban Beijing. Daily concentrations of $PM_{2.5}$ and secondary inorganic aerosol (sulfate, ammonium, and nitrate) at the urban and rural sites both decreased during the Parade Blue period. During (after) the emission control period, ~~Concentrations~~ concentrations of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO from the national city-monitoring network showed the largest decrease (increase) ~~(~~of 34-72%~~)~~ (50-214%) in Beijing, a smaller decrease (a moderate increase) ~~(~~of 1-32% (16-44%) in ~~North China~~emission control regions (excluding Beijing), and an increase (decrease) ~~(~~of 6-16% (-2-7%) in ~~other~~ non-emission control regions of China ~~during the emission control period~~. Integrated analysis of modeling and monitoring results demonstrated that emission control measures made a major contribution to air quality improvement in Beijing compared with a minor contribution from favorable meteorological conditions during the Parade Blue period. These results show that controls of secondary aerosol precursors (NH_3, SO_2 and NO_x) locally and regionally are key to curbing air pollution in Beijing and probably in other mega cities worldwide.

Introduction

China's economy has made great advances over the last three decades. Its gross domestic production (GDP) ranked fifteenth in the world in 1978 but has risen to second place since 2010. During this period, environmental pollution has greatly increased, including soil, water and air pollution (Chan et al., 2008; Guo et al., 2010; Chen et al., 2014; Lu et al., 2015), which has become a major issue for the country. The Chinese government and people have grown particularly concerned about reducing air pollution since the large-scale haze pollution that occurred in China in

January 2013. This episode affected an area of approximately 1.3 million km^2 and 800 million people (Huang et al., 2014). It led to serious human health problems and forced the Chinese government to address the problem of very large exposures of the Chinese population to $PM_{2.5}$ (particulate matter ≤ 2.5 μm in aerodynamic diameter) pollution. For example, compared with a similar winter period without haze pollution (daily child patients < 600), more than 7000 daily child patients were reported in Beijing Children's Hospital during the smog period in January 2013 (http://qnck.cyol.com/html/2014-01/01/nw.D110000qnck_20140101_1-28.htm). In response to this the 'Atmospheric Pollution Prevention and Control Action Plan' was implemented by the Chinese government in September 2013, aiming to reduce $PM_{2.5}$ in Beijing by at least 25% from the 2012 level by 2017.

Many industrialized megacities have experienced severe air pollution, such as Los Angeles during the 1940s-1970s (Haagen-Smit, 1952; Parrish et al., 2011), Mexico city in the 1980s (Parrish et al., 2011), and London in the 1950s (Davis et al., 2002). In these megacities, however, enormous progress in improving air quality has been achieved with the implementation of various emission control strategies over recent decades, despite rapid population growth and urbanization. According to Parrish et al. (2011), first stage smog alerts in Los Angeles have decreased from some 200 per year in the 1970s to about 10 per year now, and concentrations of air pollutants in Mexico City have been reduced substantially over the past decades. Also, air quality is now much better in London, with mean annual PM_{10} levels (particulate matter ≤10 μm in aerodynamic diameter) closer to 30 μg m^{-3} than the 300 μg m^{-3} fifty years ago (and approx. 3000 μg m^{-3} in December 1952) (Davis et al., 2002).

Beijing, the capital of China, is one of the largest megacities in the world with 22 million inhabitants and an area of 16800 square kilometers. The city is enclosed by the Yanshan Mountains to the north and Taihang Mountains to the west. Its fan-shaped topography permits efficient southerly transport of pollutants to Beijing, which reduces air quality (Chen et al., 2015). A 70^{th} anniversary victory parade was held in Beijing on 3 September 2015 to commemorate the conclusion of the second

Sino-Japanese War and the end of World War II. The Chinese government imposed a series of strict and urgent air pollutant emission-reduction measures to improve air quality during what has been called the 'Parade Blue' period, from 20 August to 3 September 2015, in Beijing and surrounding regions ~~of North China~~ (including Tianjin City, ~~Hebei,~~ Inner Mongolia Autonomous Region, Hebei, Shandong, Shanxi, and Henan Provinces) to guarantee better air quality in the city. During this period, motor vehicles (except taxies and buses) with even or odd registration numbers were banned on alternate days, 1927 industrial enterprises had to limit production or were shut down, and hundreds of construction sites in Beijing were closed, reducing air pollutant emissions by 40% (http://gongyi.sohu.com/20150826/n419765215.shtml). ~~More broadly in North China~~For all seven of the cities, provinces and autonomous regions, air pollutant emissions during the Parade Blue period were decreased by 30% through a variety of reduction measures (http://news.sohu.com/20150819/n419198051.shtml). No additional pollution control measures were taken in other regions of China (outside Beijing and ~~North China~~surrounding regions) during this period.

Previous studies have attempted to quantify the role of short-term pollutant emission control measures in air quality improvement in Beijing during the 2008 Olympics (Wang et al., 2009, 2010; Shen et al., 2011) and the 2014 Asia-Pacific Economic Cooperation (APEC) meeting (Chen et al., 2015). In addition, Tang et al. (2015) reported that local emissions are the key factors determining the formation and development of air pollution in the Beijing area. Ianniello et al. (2010) inferred that traffic may be an important emission source of NH_3 in Beijing. However, the above studies did not systematically answer the three following questions: what were (1) the contribution of ammonia (NH_3) ~~from traffic~~ sources to urban $PM_{2.5}$ pollution; ~~(2) the response (linear or non-linear) of air pollutant (e.g. $PM_{2.5}$) concentrations to major pollutant emission reduction;~~ and (2~~3~~) the relative roles of pollution control measures and weather conditions in air quality improvement? The present study attempts to examine these important topics by taking advantage of the

implementation of emission controls for the 70th anniversary victory parade. We present results showing changes in concentrations of atmospheric pollutants (i.e., NH_3, NO_2, $PM_{2.5}$ and associated inorganic water-soluble ions (WSIs)) before, during, and after the Parade Blue period, obtained from *in situ* measurements at thirty-one sites in and outside Beijing. In addition, we compare the Chinese Ministry of Environmental Protection officially released daily concentrations of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO at 291 cities in China during the same period. The first results from the analysis of this extensive dataset reveal clear effects of the Parade Blue emission reduction measures on air quality improvement and provide a scientific basis for demonstrating the effectiveness of such control measures for air pollution in mega cities.

2 Materials and methods

2.1 Site selection and description

Thirty-one air pollution monitoring sites have been established in and outside Beijing municipality, with longitudes ranging from 115.02 ºE to 118.20 ºE and latitudes from 36.84 ºN to 40. 34 ºN (**Fig. 1**). The 28 monitoring sites in Beijing municipality are grouped into road and non-road sites to better distinguish the impacts of control measures on sites near traffic. A brief description of all the sites is given below. Detailed information, including specific sampling site, site type, and potential emission sources for each site, is listed in **Table S1** in the Supplement.

In Beijing: Sixteen roadside monitoring sites are homogeneously distributed at the edges of three major roads, including four sites each on the 3rd and 4th ring roads, and eight sites on the 5th ring road. Additional road sites (sites 26 to 28) are in northwest rural regions near the Yanshan mountains. Site 26 is located at the edge of the Badaling highway, about 46 km northwest of the center of Beijing. Sites 27 and 28 are located, respectively, inside (100 m from the exit) and outside (30 m from the entrance) ~~of~~ the Badaling Highway Tunnel (1091.2 m long), which has two traffic tunnels with one lane in each. The road sites were strongly and directly influenced by vehicle emissions. Nine non-road sites were chosen over a wide area, extending

from an urban area (site 1) near the city center, through suburban areas (sites 6, 11, 12 and 13) between the 3rd and 5th ring roads, and ending in rural areas (sites 22 to 25) between the northwest 5th and 6th ring roads. These are likely to be polluted by emissions from various sources, including dense housing, industry, cropland, small villages, etc.

Outside Beijing: Site 29 is located in a rural area of Yucheng city, Shandong province. Site 30 is located in Quzhou county, Hebei province, which is a typical rural agricultural site with a recently constructed industrial district. Site 31 is a regional background site located on Changdao island, Shandong province.

2.2 Sampling procedure and sample analysis

Atmospheric NH_3, NO_2 and $PM_{2.5}$ were measured from 3 August to 30 September 2015. The period can be divided into three phases: (1) 3-19 August (named pre-Parade Blue period), (2) 20 August-3 September (Parade Blue period), and (3) 4-30 September (post-Parade Blue period). The sampling durations, measured pollutants and number of samples for all the sites during each phase are summarized in **Table S1** in the Supplement. The measurements of NH_3, NO_2 and $PM_{2.5}$ were not concurrently made at most sites due to a shortage of manpower and samplers, but the corresponding sampling sites together covered the major emission sources of measured pollutants. Methods for sampling gases and $PM_{2.5}$ are briefly presented below. For further details of the methodology the reader is referred to relevant previous publications (Xu et al., 2014, 2015, 2016).

Gaseous NH_3 and NO_2: NH_3 samples were collected using ALPHA passive samplers (Adapted Low-cost High Absorption, provided by the Centre for Ecology and Hydrology, Edinburgh, UK) and NO_2 samples using Gradko diffusion tubes (Gradko International Limited, UK). At each site, three ALPHA samplers and/or three NO_2 tubes were deployed under a PVC shelter (2 m above the ground) to protect the samplers from rain and direct sunlight (Pictures for 4 selected road sites are shown in **Fig. S1** of the Supplement). The samplers were exposed for 7 to 14 days during the three study phases. NH_3 was extracted with high-purity water (18.2 MΩ) and analyzed

using a continuous-flow analyzer (Seal AA3, Germany). NO_2 samples, also extracted with high-purity water, were analyzed using a colorimetric method by absorption at a wavelength of 542 nm. More details of the passive samplers and their laboratory preparation and analysis can be found in Xu et al. (2014, 2015).

Airborne $PM_{2.5}$: 24-h $PM_{2.5}$ samples were collected on 90 mm quartz fiber filters (Whatman QM/A, Maidstone, UK) using medium-volume samplers (TH-150CIII, Tianhong Co., Wuhan, China), at a flow rate of 100 L min^{-1} (Xu et al., 2016). The $PM_{2.5}$ mass was determined using the standard gravimetric method, and one quarter of each $PM_{2.5}$ sample was ultrasonically extracted with 10 ml high-purity water for 30 min, with the extract being filtered by a syringe filter (0.45 μm, Tengda Inc., China). The water-soluble cations (NH_4^+, Na^+, Ca^{2+}, K^+, Mg^{2+}) and anions (NO_3^-, SO_4^{2-}, F^-, Cl^-) in the extract were analyzed using Dionex-600 and Dionex-2100 Ion Chromatographs (Dionex Inc., Sunnyvale, CA, USA), respectively (Zhang et al., 2011; Tao et al., 2014).

2.3 Quality assurance/ Quality control (QA/QC)

All samples were prepared and measured in the Key Laboratory of Plant-Soil Interactions, Chinese Ministry of Education, China Agricultural University, which has a complete and strict quality control system. Three field (travel) blanks were prepared for each batch of samples and analyzed together with those samples. All reported concentrations of gases and $PM_{2.5}$ mass and ion concentrations are corrected for the blanks. The detection limits were 0.01-0.02 mg L^{-1} for the measured ions. The measurement precisions were in the range of 5-10% for NH_3, NO_2, $PM_{2.5}$ mass and water soluble ion concentrations. Quality assurance was routinely (once every 15-20 samples) checked using standard (designed specific concentrations of various ions) samples during sample analysis.

2.4 Other data collection

The 24-h (daily) average concentrations of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO measured in 291 cities across China (including Beijing city, surrounding 63 cities in ~~North China~~ emission control regions (hereafter termed to emission control regions

(excluding Beijing)), and 227 cities in other regions of China (hereafter referred to as non-emission control regions) during the Pre-Parade Blue ~~period and the,~~ Parade Blue and post-Parade periods were downloaded from the Ministry of Environmental Protection (MEP) of China (http://www.mep.gov.cn). These data for each city are summarized in **Tables S2-6** in the Supplement. For Beijing city, each pollutant's daily individual Air Quality Index (AQI) during the above ~~two~~ three periods was calculated from the 24-h average concentration. The highest individual AQI was selected and used as the daily AQI. An AQI of 0-50, 51-100, 101-150, and 151-200 is classified as “excellent”, “good”, “slightly polluted” and “moderately polluted”, respectively. Details of the calculations of AQI and the associated classification of air quality are given in the Chinese Technical Regulations on AQI (MEPC, 2012).

Daily meteorological data in the above mentioned 291 cities ~~(1+63+227)~~ for wind speed (WS), temperature (*T*), and relative humidity (RH) during the Parade Blue period and non-Parade Blue periods (the pre- and post-Parade Blue periods ~~and/or the period of 8-19 September 2015~~) were obtained from Weather Underground (http://www.underground.com). The daily precipitation and half-hourly wind speed and direction were measured in Beijing city. The NCEP/NCAR global reanalysis meteorological data (including daily wind speed, wind direction, sea surface pressure and precipitation) during the same periods were provided by the NOAA/OAR/ESRL PSD, Boulder, Colorado, USA, from their website (http://www.esrl.noaa.gov/psd). The daily mean atmospheric mixing layer height (MLH) in Beijing during the period from 3 August to 30 September 2015 was calculated using the method described in Holzworth (1964, 1967). ~~For Beijing city, emission reductions of major investigated variables ($PM_{2.5}$, PM_{10}, NO_x and SO_2) resulting from the various control measures were uniformly assumed to be 0%, 25%, 30%, 40% and 5% during the periods 1-19 August, 20-24 August, 25-29 August, 30 August-3 September and 4-30 September 2015, respectively, because control measures began on 20 August 2015 and were more stringent during the period from 28 August to 4 September 2015 (http://china.caixin.com/2015-09-01/100845761.html). To assess the impacts of~~

~~changes in pollutant emissions on resulting ambient atmospheric concentrations, a linear or nonlinear fit was performed by using the aforementioned pollutant emission reductions and the mean ambient concentrations of relevant pollutants during the five periods (averaging from officially released daily concentrations of the pollutants for Beijing city).~~

2.5 Back trajectories and statistical analysis

The 72-h (3-day) backward trajectories arriving at Beijing were calculated four times a day (00:00, 06:00, 12:00, and 18:00 UTC) at 100 m height using the Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT-4, NOAA) 4.9 model (Draxler and Hess, 1997). Meteorological data with a resolution of 0.5° × 0.5° were input from the Global Data Assimilation System (GDAS) meteorological data archives of the Air Resource Laboratory, National Oceanic and Atmospheric Administration (NOAA). The trajectories were then grouped into four clusters during each period using cluster analysis based on the total spatial variance (TSV) method (Draxler et al., 2012). Values of NH_3, NO_2, $PM_{2.5}$ and ion concentrations per study phase at the sampling sites are shown as the mean ± standard error (SE). Temporal differences between study phases of concentrations of measured gases (NH_3 and NO_2) and the MEP of reported pollutants (i.e. $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO) were investigated using paired t-tests while those of measured $PM_{2.5}$ mass and associated ionic components were investigated using a non-parametric Mann-Whitney U test. All statistical analyses were performed using SPSS11.5 (SPSS Inc., Chicago, IL, USA). Statistically significant differences were set at $p < 0.05$ unless otherwise stated.

3. Results

3.1 Concentrations of gaseous NH_3 and NO_2

Ambient NH_3 concentrations varied greatly during the pre-Parade Blue, Parade Blue and post-Parade Blue periods, with values of 8.2-31.7, 7.8-50.7 and 7.4-40.2 μg m^{-3}, respectively (**Fig. 2A a**). The average NH_3 concentrations during the three periods

for the sites ~~within~~ inside the 6th ring road (~~abbreviated as SWR,~~ including road sites (RS) on the 3rd, 4th and 5th ring roads and non-road sites (NRS)), outside the 6th ring road but in Beijing ~~(SOI)~~ and outside Beijing ~~(SOB)~~, are shown in **Fig. 2A b and c**. The mean NH_3 concentration ~~at SWR~~inside the 6th ring road was significantly smaller (by 13%) during the Parade Blue period compared with the mean during the post-Parade Blue period (20.2 ± 1.2 μg m^{-3} versus 23.3 ± 1.8 μg m^{-3}); further, on all three ring roads reductions (23 to 35%) of the mean during the Parade Blue period were statistically significant while at the ~~NRS~~ non-road sites a small non-significant increase (15%) in the mean was observed (**Fig. 2A c**). The mean NH_3 concentration ~~at SOI~~outside the 6th ring road was 12% smaller in the Parade Blue period than in the post-Parade Blue period (21.4 ± 6.0 μg m^{-3} versus 24.3 ± 9.3 μg m^{-3}), whereas ~~at SOB~~outside Beijing, non-significant increases (on average 80%) in the mean occurred during the Parade Blue period (26.7 ± 12.6 μg m^{-3}) compared with those during the pre- and post-Parade Blue periods (19.9 ± 6.2 and 11.8 ± 2.3 μg m^{-3}, respectively).

Ambient NO_2 concentrations ranged from 21.5 to 227.7, 14.1 to 258.8, and 15.7 to 751.8 μg m^{-3} during the pre-Parade Blue, Parade Blue and post-Parade Blue periods, respectively (**Fig. 2B a**). The mean NO_2 concentrations at ~~SWR~~ the sites inside the 6th ring road (including road sites on the 5th ring road and NRS), ~~SOI~~ outside the 6th ring road and ~~SOB~~ outside Beijing during the three periods are shown in **Fig. 2B b and c**. ~~At SWR~~Inside the 6th ring road, the mean concentration during the Parade Blue period (78.7 μg m^{-3}) was 42% and 35% lower (p<0.01) than the means during the pre- and post-Parade Blue periods (135.7 ± 21.8 and 121.0 ± 16.5 μg m^{-3}, respectively). For the 5th ring ~~road sites~~RS and NRS, most reductions (33~42%) in the mean during the Parade Blue period were also highly significant (p<0.01). ~~At SOI~~Inside the 6th ring road, a large non-significant reduction (59%) in the mean concentration occurred during the Parade Blue period compared with the post-Parade Blue period (183.5 ± 49.1 versus 443.4 ± 173.3 μg m^{-3}). ~~At SOB~~Outside Beijing, the change in the mean during the Parade Blue period (23.7 ± 3.6 μg m^{-3}) was small and

297 non-significant when compared with the means during the pre- and post-Parade
298 periods (27.5 ± 4.5 and 18.5 ± 1.7 μg m^{-3}, respectively).
299
300 *3.2 Concentrations of $PM_{2.5}$ and its chemical components*
301 A statistical analysis of concentrations of $PM_{2.5}$ mass and associated inorganic WSIs
302 at sites 22, 29 and 30 in the three periods is presented in **Table 1**. Daily $PM_{2.5}$
303 concentrations ranged from 4.2 to 123.6, 15.4 to 116.0, and 12.4 to 170.7 μg m^{-3} at
304 sites 22, 29 and 30, respectively. At sites 22 and 29, mean $PM_{2.5}$ concentrations
305 during the Parade Blue period decreased significantly (by 49% and 40%,
306 respectively) compared with the means during the pre-Parade Blue period, and
307 increased again during the post-Parade Blue period (57% and 3%, respectively)
308 compared with the means during the Parade Blue period. At site 30, a 24% reduction
309 in mean $PM_{2.5}$ concentrations occurred during the Parade Blue period compared with
310 the pre-Parade Blue period and a 103% increase during the post-Parade Blue period.
311 Secondary inorganic aerosols (SIA) (sum of NH_4^+, NO_3^- and SO_4^{2-}) were major
312 components of $PM_{2.5}$, with average contributions of 24%, 41% and 32% to the daily
313 average $PM_{2.5}$ mass at sites 22, 29 and 30, respectively. As with $PM_{2.5}$
314 concentrations, concentrations of all the WSIs (except for Cl^-) at site 22 decreased
315 significantly during the Parade Blue period compared with the pre- and/or
316 post-Parade Blue periods. Analogous behavior also occurred at sites 29 and 30 for
317 concentrations of NO_3^-, NH_4^+ and SO_4^{2-} but not for those of most of other ions (e.g.
318 Ca^{2+}, K^+, F^-, Na^+).
319
320 *3.3 Daily mean pollutant concentrations from MEP*
321 Daily mean concentrations of the five major pollutants ($PM_{2.5}$, PM_{10}, NO_2, SO_2 and
322 CO) at 291 cities in China, divided into three groups of Beijing, cities in ~~North~~
323 ~~China (NC, area surrounding Beijing~~emission control regions (excluding Beijing)
324 and cities ~~in other regions of China~~non-emission control regions, are summarized in
325 **Fig. 3**. Average concentrations of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO during the Parade

Blue period were highly significantly (p<0.01) decreased in Beijing, with reductions of 72%, 67%, 39%, 34% and 39%, respectively, compared with the pre-Parade Blue period. $PM_{2.5}$ concentrations in Beijing, for example, remained below 20 μg m^{-3} for 14 consecutive days in the Parade Blue period (for comparison: the WHO and China's (first-grade) thresholds for daily $PM_{2.5}$ concentrations are 25 and 35 μg m^{-3}, respectively). The daily $PM_{2.5}$ concentrations in Beijing in the pre-Parade Blue period averaged 59 μg m^{-3}. Concentrations of $PM_{2.5}$, PM_{10} and SO_2 in the Parade Blue period were also significantly (p<0.05) decreased in cities in ~~north China~~emission control regions (excluding Beijing), with reductions of 32%, 29% and 7%, respectively, while concentrations of NO_2 and CO did not show statistically significant changes (p>0.05). After the Parade Blue period, concentrations of the five major pollutants in Beijing and surrounding regions rebounded quickly, with significant increases of 50-214%, and 16-44%, respectively. In cities in other regions, by contrast, where no additional emission reduction measures were taken, concentrations of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO remained stable or were significantly (p<0.05) higher during the Parade Blue period compared with the pre- and post-Parade Blue periods.

4. Discussion

4.1 Effect of emission controls on air quality

The statistical analyses (**Fig. 3**) show that, by taking regional emission controls during the Parade Blue period, daily concentrations of the five reported pollutants ($PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO) in Beijing city and surrounding other cities in ~~North China~~the six provinces were decreased by various but statistically significant amounts, in sharp contrast to increases in cities in other parts of China where no additional emission controls were imposed. This shows the effectiveness of the pollution controls and suggests that air quality improvement was directly related to the reduction intensities of pollutant emissions (e.g., air pollution control effects ranked by Beijing (largest reduction) > ~~North China~~emission control regions

surrounding Beijing (moderate reduction) > other regions (no reduction) in China). Another way of quantifying the effect of the additional control measures for Beijing uses the Air Quality Index (MEPC, 2012). On the basis of the calculated air quality index (AQI, **Fig. ~~5~~4**), defined "good" and polluted days (i.e. "slightly polluted" and "moderately polluted") altogether accounted for 89% ~~for the days of~~ during the pre-Parade Blue period, and 70% during the post-Parade Blue period ~~were classified as "good".~~, ~~and~~ ~~the~~ The primary pollutant was $PM_{2.5}$ for 82% and 63% of these days during the Pre- and post-Parade Blue periods, respectively. In contrast, almost all of the days during the Parade Blue period were defined as "excellent". Thus improved air quality-as represented by the AQI during the Parade Blue period was mainly attributed to the additional control of $PM_{2.5}$ precursors.

Results from the MEP of source apportionment of $PM_{2.5}$ for Beijing (http://www.bj.xinhuanet.com/bjyw/2014-04/17/c_1110289403.htm) showed that 64-72% of atmospheric $PM_{2.5}$ during 2012-2013 was generated by emissions from local sources, of which the biggest contributor was vehicle exhaust (31.1%), followed by coal combustion (22.4%), industrial production (18.1%), soil dust (14.3%) and others (14.1%). The contribution from vehicles had increased by 1.7 percentage points compared to 2010-2011. To examine the contribution of vehicles, power plants, and industries to $PM_{2.5}$ concentrations, $PM_{2.5}$ concentrations from these were compared with those of other primary pollutants such as NO_x ($NO+NO_2$), CO and SO_2 (Zhao et al., 2012). As shown in **Fig. S2a-d** in the Supplement, the linear correlations of $PM_{2.5}$ with each pollutant gas (CO, NO_2 and SO_2) and their sum were positive and highly significant (R=0.~~50~~40-0.88, p<0.05) during the study period, except for the relationship between $PM_{2.5}$ and NO_2 during the pre-Parade Blue period and that of $PM_{2.5}$ versus SO_2 during the Parade Blue period, both of which were positive but not significant (p>0.05). This finding is consistent with the source apportionment results that suggest traffic, power plants and industry are significant sources of $PM_{2.5}$ in Beijing. Given the importance of local vehicle emissions vs. more distant power plant and industrial emissions for Beijing's air

quality, the ratio of CO/SO_2 can be used as an indicator of the contribution of local emissions to air pollution, with higher ratios indicating higher local contributions (Tang et al., 2015). Ratios of CO/SO_2 decreased (on average by ~~22~~18%) from the pre-Parade Blue to Parade Blue period, and then increased abruptly on 4th September in the Post-Parade Blue period (**Fig. ~~5~~4**), further suggesting the decreased amount of pollutants from local contributions. Beijing has relatively little industry but numerous automobiles, and the emissions of SO_2 are small while those of CO and NO_x are much larger (Zhao et al., 2012). Thus, traffic emission is likely to be a determining factor influencing urban CO and NO_x levels. This, in combination with a strong positive and highly significant correlation of $PM_{2.5}$ versus $CO+NO_2$ during the study period (**Fig. S2e, Supplement**), and the weak correlation of $PM_{2.5}$ versus SO_2 noted above (**Fig. S2c, Supplement**), shows that traffic emission controls should be a priority in mitigating $PM_{2.5}$ pollution in the future.

Concentrations of $PM_{2.5}$ levels in Beijing are not only driven by primary emissions but are also affected by meteorology and atmospheric chemistry operating on the primary pollutants, leading to secondary pollutant formation (Zhang et al., 2015). To quantify the likely contribution of secondary pollutant formation of $PM_{2.5}$ as a contributor to the observed changes between the Parade Blue period and pre- and post-measurements, CO provides an excellent tracer for primary combustion sources (de Gouw et al., 2009). Daily ratios of $PM_{2.5}$/CO during the Parade Blue period decreased ~~(by 50%)~~ significantly on average by 50% and 40% relative to the pre- and post-Parade Blue periods, respectively~~during the Parade Blue period compared with those during the pre-Parade Blue period~~ (**Fig. ~~5~~4**), which suggests that the significant reduction of $PM_{2.5}$ concentrations during the Parade Blue period was not only due to less anthropogenic primary emissions but also due to reduced secondary pollutant formation. This is further supported by our measured results at urban site 22, where average SIA concentrations comprised 20-29% of average $PM_{2.5}$ mass over the three periods, and decreased significantly during the Parade Blue period compared with those during the pre- and post-Parade Blue periods (**Table 1**).

Significant reductions of concentrations of precursor gases (e.g. NO_2, SO_2 and NH_3) at the city scale is likely to be the major reason for such reduced secondary pollutant formation. In addition, lower concentrations of sulfate and nitrate during the Parade Blue period might also be caused by lower oxidation rates of SO_2 and NO_x. The sulfur oxidation ratio (SOR=$n{SO_4}^{2-}$/($n{SO_4}^{2-}$+nSO_2)) and the nitrogen oxidation ratio (NOR=$n{NO_3}^{-}$/($n{NO_3}^{-}$+nNO_2)) (*n* refers to the molar concentration) are indicators of secondary pollutant transformation in the atmosphere. Higher values of SOR and NOR imply more complete oxidation of gaseous species to sulfate- and nitrate-containing secondary particles (Sun et al., 2006). To understand the potential change in the degree of oxidation of sulfur and nitrogen, we used daily concentrations of ${SO_4}^{2-}$ and ${NO_3}^{-}$ measured at urban site 22 (located at west campus of China Agricultural University) and the MEP-reported concentrations of SO_2 and NO_2 at the Wanliu monitoring station to calculate the SOR and NOR values. This is because these two sites, only 7 km apart (**Fig. S3, Supplement**), experience similar pollution climates. The average values of SOR and NOR were 0.64 and 0.04 during the pre-Parade Blue period, ~~and~~ 0.47 and 0.03 during the Parade Blue period, and 0.48 and 0.07 during the Post-Parade Blue period, respectively. (**Fig. S4, Supplement**). Compared with the pre- and post-Parade Blue periods, ~~Slightly~~ slightly reduced values of SOR and NOR ~~from the pre-Parade Blue to~~during the Parade Blue period~~s~~ suggests a possible minor role for changes in the extent of photochemical oxidation in secondary transformation.

Ammonia is the primary alkaline trace gas in the atmosphere. In ammonia-rich environments, NH_4HSO_4 and $(NH_4)_2SO_4$ are sequentially formed, and the surplus NH_3 that does not react with H_2SO_4 can form NH_4NO_3 (Wang et al., 2005). In both the pre-Parade Blue and Parade Blue periods, ${NH_4}^{+}$ was strongly correlated with ${SO_4}^{2-}$ (**Fig. S5 a** and **c, Supplement**) and [${SO_4}^{2-}$+${NO_3}^{-}$] (**Fig. S5 b** and **d, Supplement**), and the regression slopes were both 0.87 during the pre-Parade Blue period, ~~and~~ 0.97 and 0.91~~, respectively,~~ during the Parade Blue period, and 1.13 and 0.79 during the post-Parade Blue period, respectively. These results indicate almost

complete neutralization of acidic species (HNO_3 and H_2SO_4) by NH_3 in $PM_{2.5}$ during these ~~two~~ three periods especially in the Parade Blue period. In this way, SIA concentrations from these sources could not be further reduced during the Parade Blue period unless NH_3 emissions were reduced more than those of SO_2 and NO_x.

4.2 Impact of traffic NH_3 emission on urban NH_3 concentration

The sources of NH_3 are dominated by agriculture, but it may also be produced by motor vehicles due to the over-reduction of NO in catalytic converters (Kean et al., 2000). The contribution of traffic to the total NH_3 emissions is estimated at approximately 2% in Europe (EEA, 2011) and 5% in the US (Kean et al., 2009). In China, NH_3 emissions from traffic rose from 0.005 Tg (contributing approximately 0.08% to total NH_3 emissions) in 1980 to 0.5 Tg (contributing approximately 5% to total emissions) in 2012 (Kang et al., 2016). As for Beijing city, recent studies have discussed the origin of atmospheric NH_3 in Beijing city based on the $\delta^{15}N$ technique (Chang et al., 2016; Pan et al., 2016). For example, Chang et al. (2016) identified that non-agricultural sources, merged with waste and traffic NH_3 emissions, collectively account for approximately 50% of ambient NH_3 in urban Beijing before and after APEC summit, of which more than 20% was sourced from traffic emissions. Traffic is therefore likely to make a very significant contribution to NH_3 concentrations in urban areas of Beijing, and a strong correlation of NH_3 with traffic-related pollutants was observed (NO_x and CO) at the urban sites (Ianniello et al., 2010; Meng et al., 2011). However, this relationship has a large uncertainty because the concentrations of pollutants used to establish the relationship were measured at 'background' urban sites some distance from major roads, and other urban sources such as decaying organic matter may contribute. In the present study, strong and significant correlations were observed between NH_3 and NO_2 concentrations measured on the 5^{th} ring road during all three periods (**Fig. ~~6~~5**). In addition, compared with the averages for the three ring roads during the pre- and/or post-Parade Blue periods, the average NH_3 concentrations during the Parade Blue period decreased significantly owing to traffic reduction measures (**Fig. 2A c**). These

results provide strong evidence that traffic is an important source of NH_3 in Beijing. In addition to period-to-period temporal changes, the mean NH_3 concentration at all road sites was 1.3 and 1.9 times that at all non-road sites during the Parade Blue period and post-Parade Blue period, respectively (**Fig. 2A**). Moreover, during the post-Parade Blue period the measured NH_3 concentrations on the three ring roads (28.3 ± 6.4 μg m^{-3}) were twice those at the rural sites 29 and 30 (14.0 ± 1.6 μg m^{-3}) affected by intense agricultural NH_3 emissions. These results, along with the fact that urban Beijing has a higher relative on-road vehicle density and almost no agricultural activity, suggest that NH_3 emission and transport from local traffic were the main contributors to high urban NH_3 concentrations. Based on a mileage-based NH_3 emission factors of 28 ± 5 (assumed as the lower limit, Chang et al., 2016) and 230 ± 14.1 mg km^{-1} (assumed as the upper limit, Liu et al., 2014) for light-duty gasoline vehicles ~~(Liu et al., 2014)~~, a population of 5.61 million vehicles (average mileage 21849 km $vehicle^{-1}$ yr^{-1}) in Beijing would produce approximately 3.4-28 kt NH_3 in 2015, which likely declined by up to 4.7-38 t NH_3 day^{-1} during the Parade Blue period, given that the traffic load decreased by half with the implementation of the odd-and-even car ban policy. For accurately determining NH_3 emissions, however, further study on NH_3 emission factors for vehicles and other sources is warranted.

4.3 Impact of meteorological conditions and long-range air transport

Meteorological conditions strongly regulate near-surface air pollutant concentrations (Liu et al., 2015), contributing the largest uncertainties to the evaluation of the effects of emission controls on pollutant reduction. Here we first compared the meteorological data obtained during the Parade Blue period with those from the pre- and/or post-Parade Blue periods in Beijing and other cities over North China. In Beijing, neither wind speed (WS) nor relative humidity (RH) differed significantly between non-Parade Blue (the pre- and post-Parade Blue) and the Parade Blue periods, while temperature (*T*) showed a significant but small decrease with time

(**Fig. ~~7~~6**). Similarly, there were small and non-significant changes in *T*, WS and RH between the pre-Parade Blue and Parade Blue periods for ~~North China~~emission control regions (excluding Beijing) and for ~~other cities~~non-emission control regions in China. These results suggest that the period-to-period changes in *T*, WS and RH may have only a minor impact on $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO concentrations in the emission control regions (**Fig. 3**). In contrast, a higher temperature during the Parade Blue period, compared to the post-Parade Blue period, can in part explain the corresponding higher NH_3 concentrations measured at NRS, due to increased NH_3 emissions from biological sources such as humans, sewage systems and organic waste in garbage containers (Reche et al., 2012).

Surface weather maps of China **(Fig. S6, Supplement)** and North China (**Fig~~s~~. ~~8~~7 ~~and 9~~**) showed an apparent change of wind field over Beijing and ~~North China~~its surrounding regions during the Parade Blue period compared with the other two periods. As shown in **Fig. ~~9~~7**, Beijing was located at the rear of a high pressure system within the southeast/south flow or in a high-pressure area when the wind was weak (< 3 m s^{-1}), and at the base of the Siberian high pressure system when influenced by a weak cold front and easterly wind (> 4 m s^{-1}) in the non-Parade (pre- or post-Parade) Blue and Parade Blue periods, respectively. The former weather condition (non-Parade Blue periods) was conducive to pollutant convergence and the latter (Parade Blue period) was conducive to pollutant dispersion. A further analysis of wind rose plots (**Fig. ~~10a~~8a**) showed that northerly winds, with similar wind speeds, dominated all three periods. Northerly/northwesterly winds in Beijing bring relatively clean air due to a lack of heavy industry in the areas north/northwest of Beijing. Winds during the pre- and post-Parade Blue periods were occasionally from the south, southeast and east of Beijing, where the regions (e.g. Hebei, Henan and Shandong provinces) are characterized by substantially higher anthropogenic emissions of air pollutants such as NH_3, NO_x, SO_2 and aerosols (Zhang et al., 2009, 2010; Gu et al., 2012). Also as mentioned earlier, the topography of the mountains to the West and North of Beijing effectively traps the polluted air over Beijing during

529 southerly airflow, suggesting that the southerly wind during non-Parade Blue periods
530 may enhance air pollution in Beijing. Wet scavenging from precipitation, although
531 often important in summer (Yoo et al., 2014), probably played a minor role in
532 changing the concentrations of pollutants given the low and comparable precipitation
533 over Beijing and surrounding areas during the study periods (**Fig. 8**). For example,
534 the total precipitation in Beijing was comparable between the pre-Parade Blue and
535 Parade Blue periods (38.9 versus 34.4 mm) (**Fig. ~~10b~~8b**). In addition, we compared
536 daily mean mixing layer height (MLH) in Beijing during the study period (**Fig.**
537 **~~11a~~9a**). The daily mean MLH in Beijing was approx. 37% higher during the Parade
538 Blue period (1777 m) than the pre-Parade (1301 m) and post-Parade (1296 m) Blue
539 periods (**Fig. ~~11b~~9b**, p = 0.08). Since the MLH during Parade Blue was higher than
540 that during non-Parade Blue periods, the horizontal and vertical diffusion conditions
541 during the Parade Blue period were better than the other two periods.
542 Changes in meteorological conditions often lead to changes in regional pollution
543 transport and ventilation. It has been shown that regional transport from neighboring
544 Tianjin, Hebei, Shanxi, and Shandong Provinces can have a significant impact on
545 Beijing's air quality (Meng et al., 2011; Zhang et al., 2015). Model calculations by
546 Zhang et al. (2015) suggested that about half of Beijing's $PM_{2.5}$ pollution originates
547 from sources outside of the city. Trajectory analysis in previous studies revealed that
548 the air mass from south and southeast regions of Beijing led to high concentrations
549 of NH_3, NO_x, $PM_{2.5}$ and secondary inorganic ions during summertime (Ianniello et
550 al., 2010; Wang et al., 2010; Sun et al., 2015). The 72-hour back trajectories during
551 the three measurement periods, shown in **Fig. ~~4~~10**, were classified into 4 sectors
552 according to air mass pathways: the west pathway over southern Mongolia, western
553 Inner Mongolia, and SinKiang, the north pathway over Inner Mongolia,
554 Heilongjiang and north Hebei Provinces, the east pathway mainly over northeast
555 Hebei province and Tianjin municipality, and the south sector over the south Hebei
556 and Shandong provinces. The results indicated that transport of regional pollution
557 from the south sector occurred during the pre-Parade Blue period (38%) and the

post-Parade Blue period (18% for $PM_{2.5}$ sampling days and 29% for NH_3 sampling days) but there was no transport of regional pollution during the Parade Blue period. As the south of Hebei province contains heavily polluting industry and intensive agriculture (Zhang et al., 2009; Sun et al., 2015), the absence of transport of air masses from the south sector is likely at least partly responsible for lower concentrations of the five reported pollutants ($PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO) during the Parade Blue period. As for NH_3, however, average concentration at NRS were slighter higher in the Parade Blue period than in the post-Parade Blue period (**Fig. 2A c**), indicating that surface levels of NH_3 were less influenced by southern air masses. Much of the airflow travelled over Tianjin municipality during the Parade Blue period (32%) compared to that during the post-Parade Blue period (19%) (**Fig. ~~4~~ 10 b**, **d**), which probably caused the high surface NH_3 concentrations in Beijing. This is because Tianjin, as one of the mega-cities in China, has high NH_3 emissions from livestock and fertilizer application (Zhang et al., 2010).

To further diagnose the impacts of meteorology on the surface air quality, we conducted a simulation using the nested GEOS-Chem atmospheric chemistry model driven by the GEOS-FP assimilated meteorological fields at 1/4°×5/16° horizontal resolution covering East Asia (70°E-140°E, 15°N-55°N) (Zhang et al., 2015; 2016). Details of the model emissions and mechanisms have been described in Zhang et al. (2016), focusing on $PM_{2.5}$ concentrations in Beijing during the Asia-Pacific Economic Cooperation Summit (APEC; November 5-11) period. We used anthropogenic emissions from the Multi-Resolution Emission Inventory of China for the year 2010 (MEIC, 2015), except for NH_3 emissions that were taken from the Regional Emission in Asia (REAS-v2) inventory (Kurokawa et al., 2013) with an improved seasonality derived by Zhao et al. (2015).

We conducted a standard simulation with fixed anthropogenic emissions for the period of 1 August – 12 September 2015. By fixing anthropogenic emissions in the simulation, the model provides a quantitative estimate of the meteorological impacts alone before and during the Parade Blue period. For the pre-Parade period (1-19

August), the model simulated mean $PM_{2.5}$ concentration is 62 μg m^{-3} in Beijing, comparable to the measured values (59 μg m^{-3}), but simulated NH_3 concentrations are too low (3 μg m^{-3} vs. 8.2-31.7 μg m^{-3}), likely due to missing urban NH_3 sources and the coarse model resolution (1/4°×5/16°). Here we focus on the model simulated relative changes in pollutant concentrations before and during the Parade Blue period. Model results showed that, without emission controls, the air pollutant concentrations at Beijing in the Parade Blue period relative to the pre-Parade period would be 29% lower for $PM_{2.5}$, 7% lower for NH_3, 17% lower for SO_2, 8% lower for CO and relatively no change for NO_2 (**Fig. ~~12a~~11a**), ~~which can be attributed to the~~as a result of the different meteorological conditions as discussed above. Thus, ~~Compared~~ compared with meteorological condition changes (MCC), air pollution control measures (PCM) made a greater contribution to air quality improvement (especially for $PM_{2.5}$, NO_x, and CO) in Beijing during the Parade Blue period (**Fig. ~~12b~~11b**).

We also conducted two sensitivity simulations ((1) with anthropogenic emissions of NH_3 reduced by 40% over Beijing and by 30% over Hebei and Tianjin; and (2) with all anthropogenic emissions including NH_3, SO_2, NO_x, CO, and primary aerosol reduced by 40% over Beijing and by 30% over Hebei and Tianjin) for the Parade Blue period (20 August-3 September) to examine the responses of $PM_{2.5}$ concentrations to emission reductions. We find that the NH_3 emission reduction (by 40% over Beijing and by 30% over Hebei and Tianjin) could decrease the mean $PM_{2.5}$ concentration in Beijing by 12% for the period, compared with 31% simulated $PM_{2.5}$ reduction if all anthropogenic emissions were reduced by the same amount. This supports our findings on the effectiveness of emission controls during the Parade Blue period as indicated in the measurements, and the high sensitivity of $PM_{2.5}$ concentration in Beijing to NH_3 sources. ~~Daily mean concentrations of $PM_{2.5}$ and PM_{10}, NO_2 and SO_2 appeared to decrease nonlinearly ($PM_{2.5}$ and PM_{10}) or linearly (NO_2 and SO_2) as a function of their respective pollutant emission reductions (**Fig. b**). This is because ambient particulate matter (including $PM_{2.5}$ and~~

~~PM_{10}) levels relative to ambient NO_x and SO_2 levels, were affected not only by emission sources but also by secondary aerosol formation, meteorological conditions and regional atmospheric transport (Sun et al., 2016).~~

4.4 Implications for regional air pollution control

Besides Tianjin, Beijing city is surrounded by four provinces, Hebei, Shandong, Henan and Shanxi, which all have major power plants and manufacturing industry. In the INTEX-B emission inventory, the total emissions from these four provinces accounted for 28.7%, 27.9%, 28.3%, and 25.0% of national emissions of $PM_{2.5}$, PM_{10}, SO_2, and NO_x, respectively (Zhang et al., 2009). The 'Parade Blue' experience demonstrates that, by taking appropriate but strict coordinated regional and local emission controls, air quality in megacities can be significantly and quickly improved. ~~Nevertheless, we observed nonlinear relationships between emission reductions and ambient $PM_{2.5}$ and PM_{10} levels, which were closely linked to variations of meteorological conditions and regional transport, suggesting that long-term and stricter regional emission controls are necessary for sustainable continuous improvement in air quality in megacities.~~

China is not the first country to use temporal emission control strategies. In 1996, the city of Atlanta, for example, adopted a series of actions to reduce traffic volume and significantly improved air quality during the Atlanta Olympic Games (Tian and Brimblecombe, 2008; Peel et al., 2010). We also should note that most of these emission control strategies have not been maintained after the Olympic Games. In the long term, temporary emission control strategies will not improve regional air quality conditions and we should seek better ways towards sustainable development. Integrated emission reduction measures are therefore necessary, but meteorological conditions also need to be considered for a sustainable solution, as in Urumqi, northwest China (Song et al., 2015). We therefore recommend further efforts to build on the Parade Blue experience of successful air quality improvement in Beijing and ~~North China~~the surrounding regions to improve air pollution control policies

645 throughout China and in other rapidly developing countries.

646 Chinese national SO_2 emissions have been successfully reduced by 14% from the
647 2005 level due to an SO_2 control policy (Wang et al., 2014), and nationwide controls
648 on NO_x emissions have been implemented along with the controls on SO_2 and
649 primary particles during 2011-2015. However, there is as yet no regulation or policy
650 that targets national NH_3 emissions. Future emission control policies to mitigate PM
651 and SIA pollution in China should, in addition to focusing on primary particles, NO_x
652 and SO_2, also address NH_3 emission reduction from both agricultural and
653 non-agricultural sectors (e.g. traffic sources) in particular when NH_3 becomes key to
654 $PM_{2.5}$ formation (Liu et al., 2013; Wu et al., 2016; Xu et al., 2016).

655

656 **Conclusions**

657 We have presented atmospheric concentrations of NH_3, NO_2, $PM_{2.5}$ and associated
658 inorganic water-soluble ions before, during, and after the Parade Blue period
659 measured at thirty-one *in situ* sites in and outside Beijing, and daily concentrations
660 of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO in 291 cities in China during the pre-Parade Blue
661 and Parade Blue periods released by the Ministry of Environmental Protection (MEP)
662 of China. Our unique study examines temporal variations at local and regional scales
663 across China and the relative role of the emission controls and meteorological
664 conditions, as well as the contribution of traffic, to NH_3 levels in Beijing based on
665 the first direct measurements of NH_3 and NO_2 concentrations at road sites. The
666 following major findings and conclusions were reached:

667 The concentrations of NH_3 and NO_2 during the Parade Blue period at the road sites
668 in different areas of Beijing decreased significantly by 12-35% and 34-59%
669 respectively relative to the pre-and post-Parade Blue measurements, while those at
670 the non-road sites showed an increase of 15% for NH_3 and reductions of 33% and
671 42% for NO_2. Positive and significant correlations were observed between NH_3 and
672 NO_2 concentrations measured at road sites. Taken together, these findings indicate
673 that on-road traffic is an important source of NH_3 in the urban Beijing. Daily

concentrations of $PM_{2.5}$ and secondary inorganic aerosols (sulfate, ammonium, and nitrate) at the urban and rural sites both decreased during the Parade Blue period, which was closely related to controls of secondary aerosol precursors (NH_3, SO_2 and NO_x) and/or reduced secondary pollutant formation.

During the Parade Blue period, daily concentrations of air pollutants ($PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO) in 291 cities obtained from the national air quality monitoring network showed large and significant reductions of 34-72% in Beijing, small reductions of 1-32% in emission control regions~~cities of North China~~ (excluding Beijing), and slight increases (6−16%) in non-emission control regions~~other cities outside North China~~ that in some cases were significant, which reflects the positive effects of emission controls on air quality and suggests that the extent of air quality improvement was directly associated with the reduction intensities of pollutant emissions.

A detailed characterization of meteorological parameters and regional transport demonstrated that the good air quality in Beijing during the Parade Blue period was the combined result of emission controls, meteorological effects and the absence of transport of air masses from the south of Beijing. Thus, the net effectiveness of emission controls was investigated further by excluding the effects of meteorology in model simulations, which showed that emission controls can contribute reductions of pollutant concentrations of nearly 60% for $PM_{2.5}$, 109% for NO_2, 80% for CO, 53% for NH_3 and 50% for SO_2. This result showed that emission controls played an dominant role in air quality improvement in Beijing during the Parade Blue period.

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Author Contributions

X.L. and F.Z. designed the research. X.L., W.X., W.S., Y.Z., D.Y., D.W. Z.W. and A.T. conducted the research (collected the data and performed the measurements). W.X., W.S., Z.L. and X.L. wrote the manuscript. All authors were involved in the discussion and interpretation of the data as well as the revision on the manuscript.~~of the study and D.F., J.L.C, K.G., J.W.E., L.Z. and Y.P. commented on the manuscript and interpretation of the data~~.

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Figure captions

Fig. 1. Maps showing the thirty-one monitoring sites, the Beijing municipality (the areas within the blue line, and the surrounding regions. Also shown are locations of Tiananmen, and the 3rd, 4th, 5th and 6th ring roads.

Fig. 2. Concentrations of NH_3 (**A**) and NO_2 (**B**) during the monitoring periods at different observation scales: concentrations at 31 (NH_3) or 17 (NO_2) sites (a), averaged concentrations for the sites ~~within~~ inside the 6th ring (R) road (~~SWR~~Rd), outside the 6th ring (R) road (Rd) ~~but in Beijing (SOI)~~ and outside Beijing ~~(SOB)~~ (b), averaged concentrations for the sites on the 3rd, 4th and/or 5th ring roads and non-road sites (NRS) (c) (one asterisk on bars denotes significant difference at $p<0.05$, two asterisks on bars denote significant difference at $p<0.01$).

Fig. 3. Comparison of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO concentrations between non-Parade Blue periods (the pre- and post-Parade Blue periods) and Parade Blue period~~s~~ at Beijing, cities in ~~North China~~emission control regions (excluding Beijing) and other cities in ~~China~~ non-emission control regions (one asterisk on bars denotes significant difference at $p<0.05$, two asterisks on bars denote significant difference at $p<0.01$).

~~**Fig. 4**. 72-h backward trajectories for 100 m above ground level in Beijing city during the pre-Parade Blue period (1 to 19 August 2015) (a), the Parade Blue period (20 August to 3 September 2015) (b), and the post-Parade Blue period (4 to 30 September 2015) (c), and for sampling duration of NH_3 (8 to 19 September 2015) in the post-Parade Blue period (d).~~

Fig. ~~5~~4. Daily values of AQI and daily ratios of CO to SO_2 concentrations and of $PM_{2.5}$ to CO concentrations in Beijing during the pre-Parade Blue ~~and~~, Parade Blue and post-Parade Blue periods.

Fig. ~~6~~5. Correlations between NO_2 and NH_3 concentrations measured on the 5th ring road in Beijing during the pre-Parade Blue, Parade Blue, and post-Parade Blue periods.

Fig. ~~7~~6. Comparison of wind speed (WS), relative humidity (RH) and temperature (*T*) between the Parade Blue period and non-Parade Blue periods (the pre-Parade Blue ~~period,~~ and ~~the~~ post-Parade Blue period~~s~~) in Beijing, ~~and between the Parade Blue and pre-Parade Blue periods in North China~~emission control regions (excluding Beijing) and other cities in ~~China~~ non-emission control regions (two asterisk on bars denotes significant difference at $p<0.01$).

~~**Fig. 8**. 10 m mean wind field and (vector) and sea surface pressure (white) plotted on the precipitation field during the pre-Parade Blue period (left), Parade Blue period (right) and post-Parade Blue period (below).~~

Fig. ~~9~~7. Mean sea level pressure (unit: hPa) and mean wind field at 10 m height (unit: m/s) during the pre-Parade Blue (a), Parade Blue (b) and post-Parade Blue (c) periods in Beijing and North China. The color bar denotes air pressure (unit: hPa) and arrows reflect wind vector (unit: m s^{-1}).

Fig. ~~10~~8. The frequency distributions of wind directions and speeds (color demarcation) (a), and daily precipitation amount (b) in Beijing city during the pre-Parade Blue, Parade Blue, and post-Parade Blue periods.

Fig. ~~11~~9. Dynamics of daily mean atmospheric mixing layer height (MLH) in Beijing from 3 August to 30 September 2015 (a) and comparison of MLH means during the pre-Parade Blue, Parade Blue and post-Parade Blue periods (b).

Fig. 10. 72-h backward trajectories for 100 m above ground level in Beijing city during the pre-Parade Blue period (1 to 19 August 2015) (a), the Parade Blue period (20 August to 3 September 2015) (b), and the post-Parade Blue period (4 to 30 September 2015) (c), and for sampling duration of NH_3 (8 to 19 September 2015) in the post-Parade Blue period (d).

Fig. ~~12~~.11 Effect of meteorological condition change (MCC, simulated by a GEOS-Chem chemical transport model) and pollution control measures (PEM, measured by monitoring stations) to relative concentrations of CO, NO_2, SO_2, NH_3 and $PM_{2.5}$ (~~A~~a) and relative contribution of MCC and PEC to major pollutant mitigation (~~B~~b) in Beijing during the Parade Blue period.

~~**Fig. 13**. The correlations between emission reductions and air concentrations for (a) $PM_{2.5}$; (b) PM_{10}; (c) NO_2; and (d) SO_2.~~

Figure 1

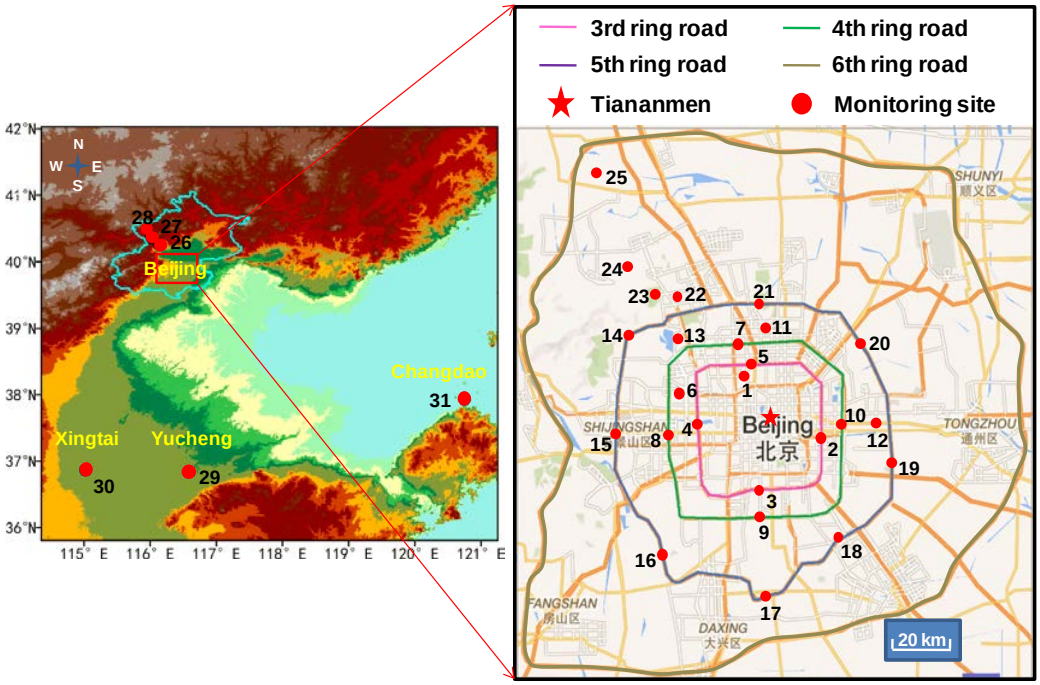
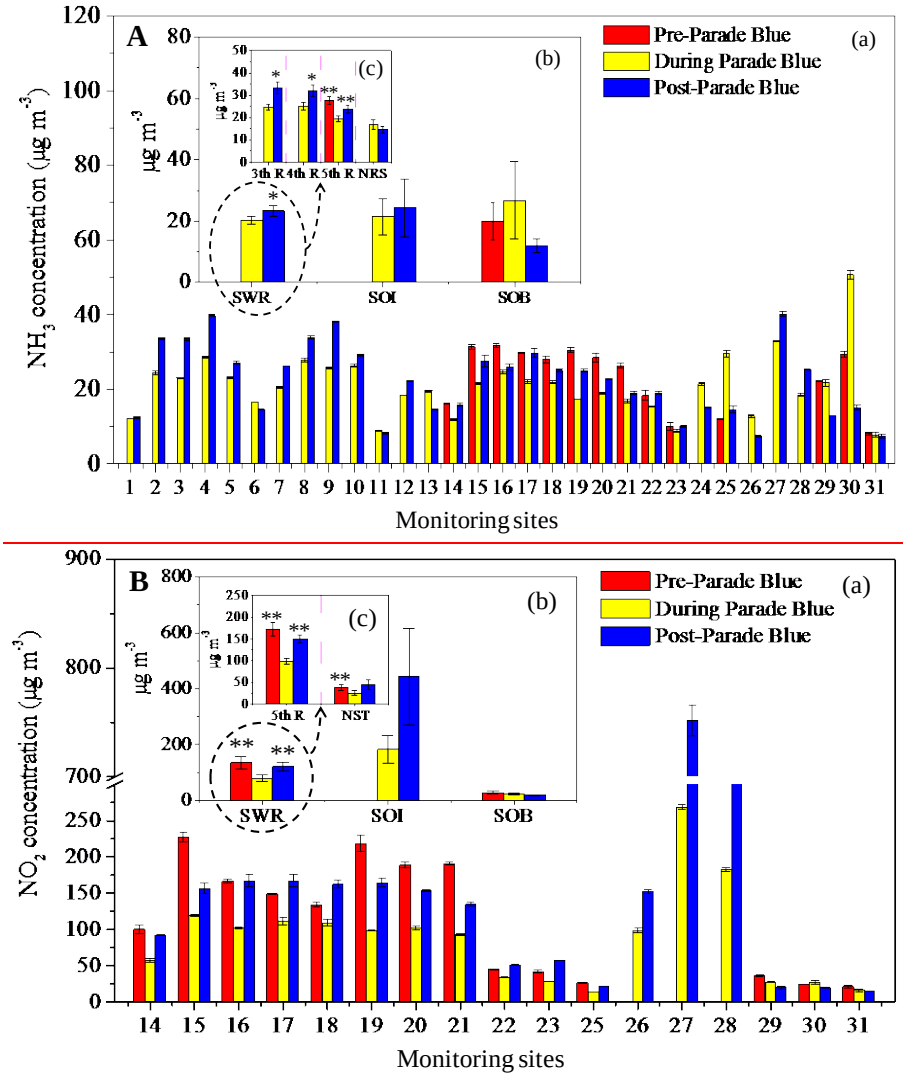

3rd ring road
4th ring road
5th ring road
6th ring road
Tiananmen
Monitoring site
Beijing
Changdao
Xingtai
Yucheng
SHUNYI
TONGZHOU
FANGSHAN
DAXING
20 km

Figure 2


A
(a)
(b)
(c)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
NH_3 concentration ($\mu g\ m^{-3}$)
$\mu g\ m^{-3}$
3th R 4th R 5th R NRS
SWR
SOI
SOB
Monitoring sites
B
(a)
(b)
(c)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
NO_2 concentration ($\mu g\ m^{-3}$)
$\mu g\ m^{-3}$
5th R
NST
SWR
SOI
SOB
Monitoring sites

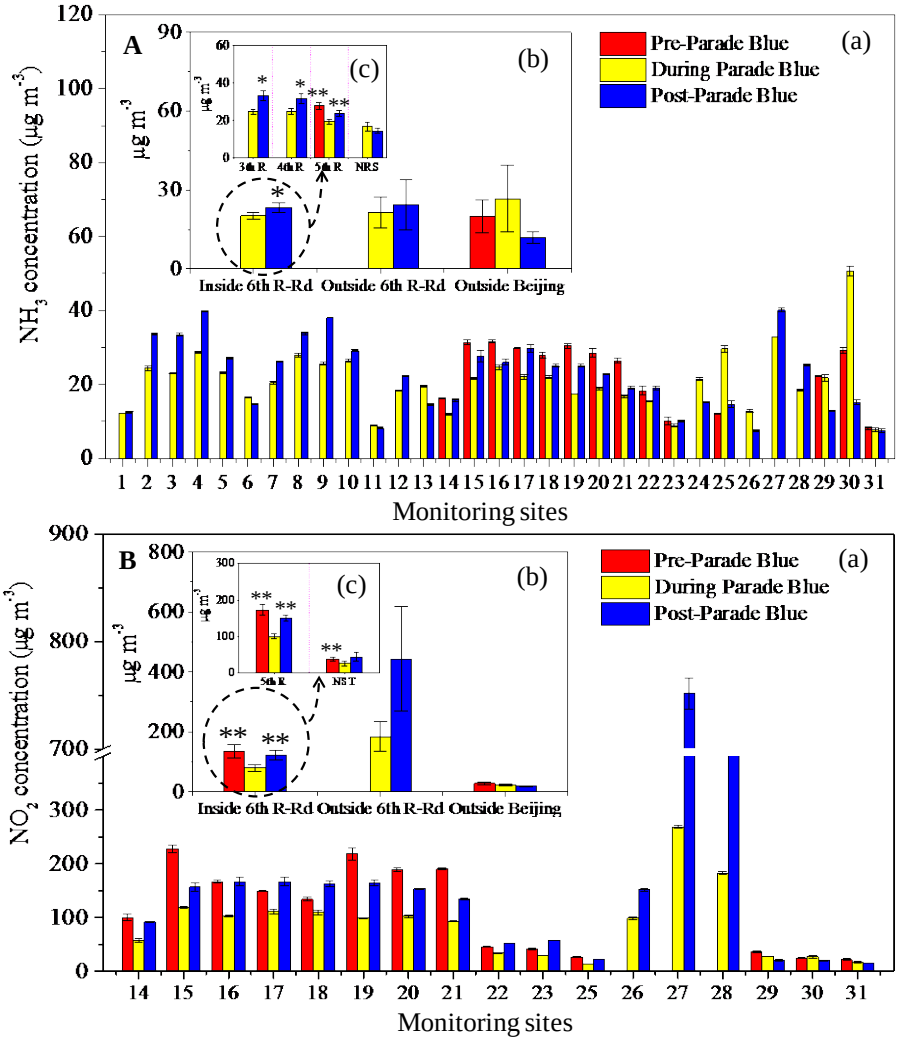
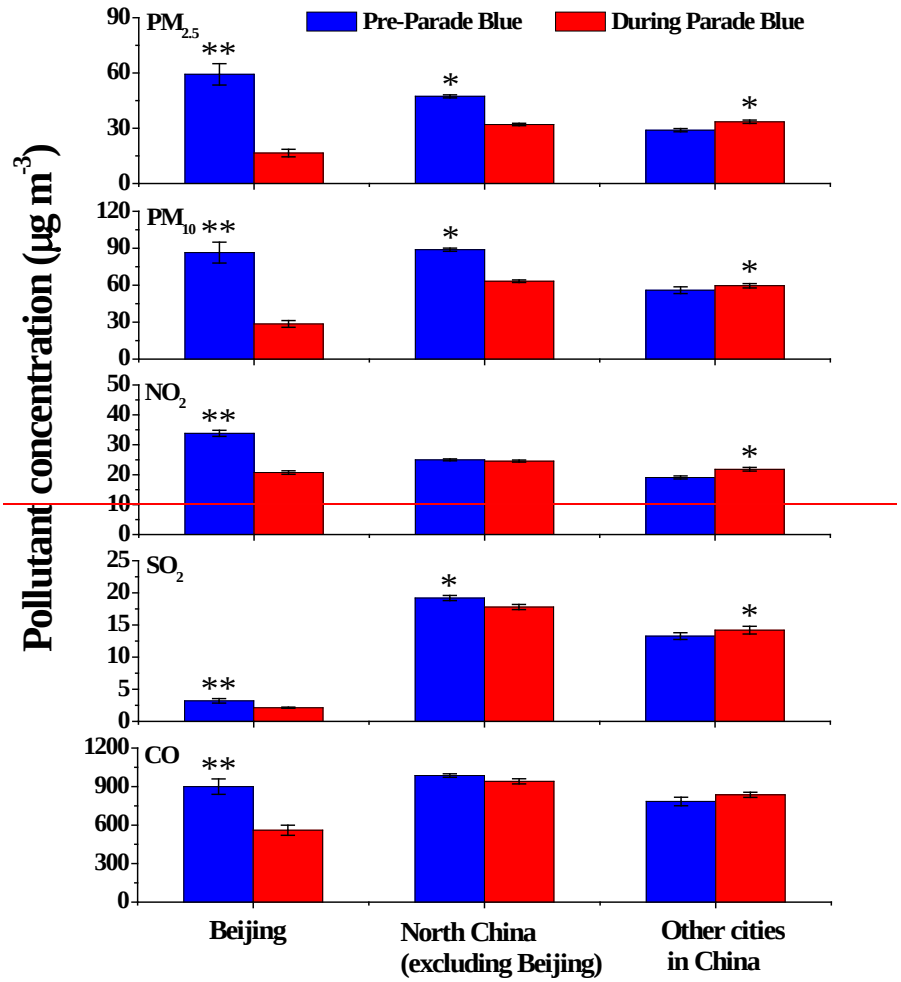
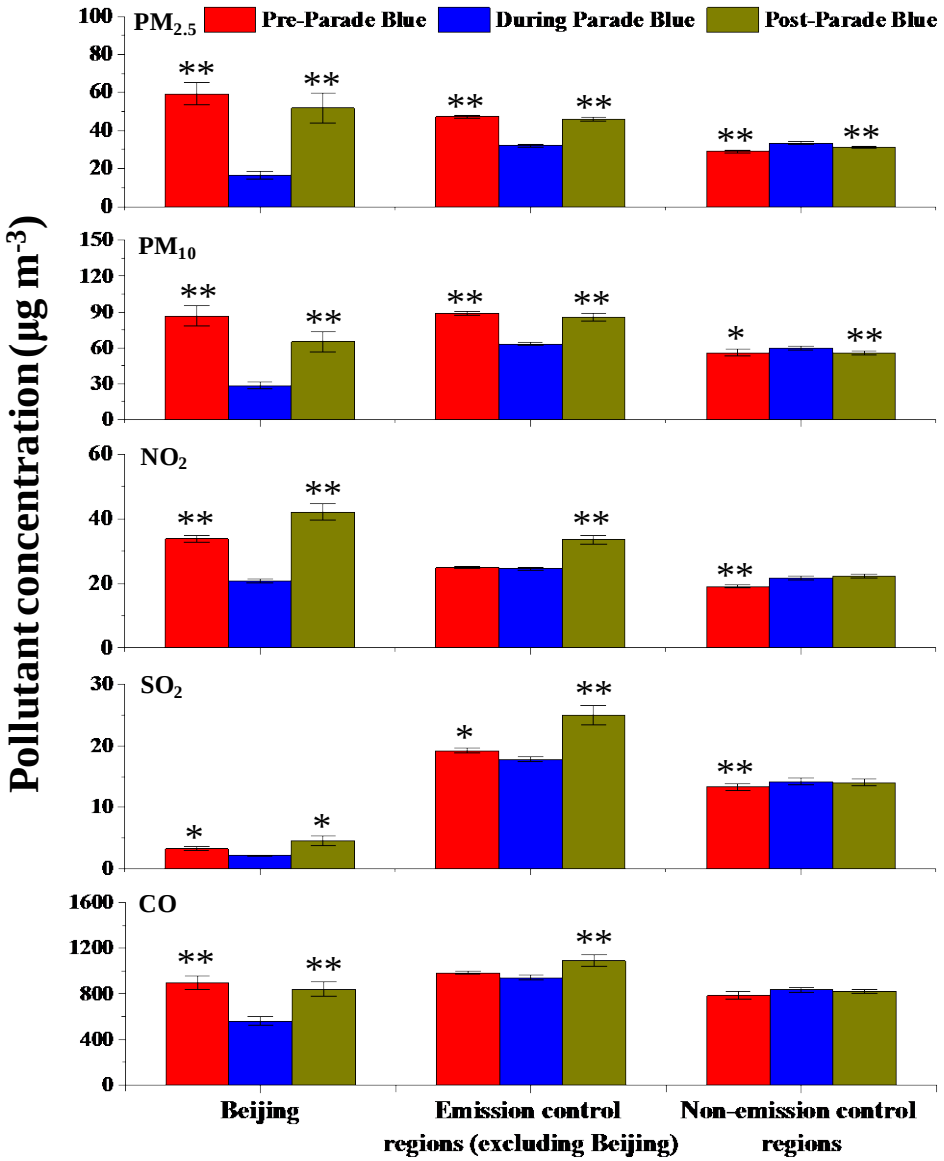

A
(a)
(b)
(c)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
NH_3 concentration ($\mu g\ m^{-3}$)
$\mu g\ m^{-3}$
Inside 6th R-Rd
Outside 6th R-Rd
Outside Beijing
3th R
4th R
5th R
NRS
Monitoring sites
B
(a)
(b)
(c)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
NO_2 concentration ($\mu g\ m^{-3}$)
$\mu g\ m^{-3}$
Inside 6th R-Rd
Outside 6th R-Rd
Outside Beijing
5th R
NST
Monitoring sites

Figure 3


Pollutant concentration (μg m-3)
PM2.5
Pre-Parade Blue
During Parade Blue
PM10
NO2
SO2
CO
Beijing
North China (excluding Beijing)
Other cities in China


Pollutant concentration (μg m-3)
PM2.5
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
PM10
NO2
SO2
CO
Beijing
Emission control regions (excluding Beijing)
Non-emission control regions

~~Figure 4~~

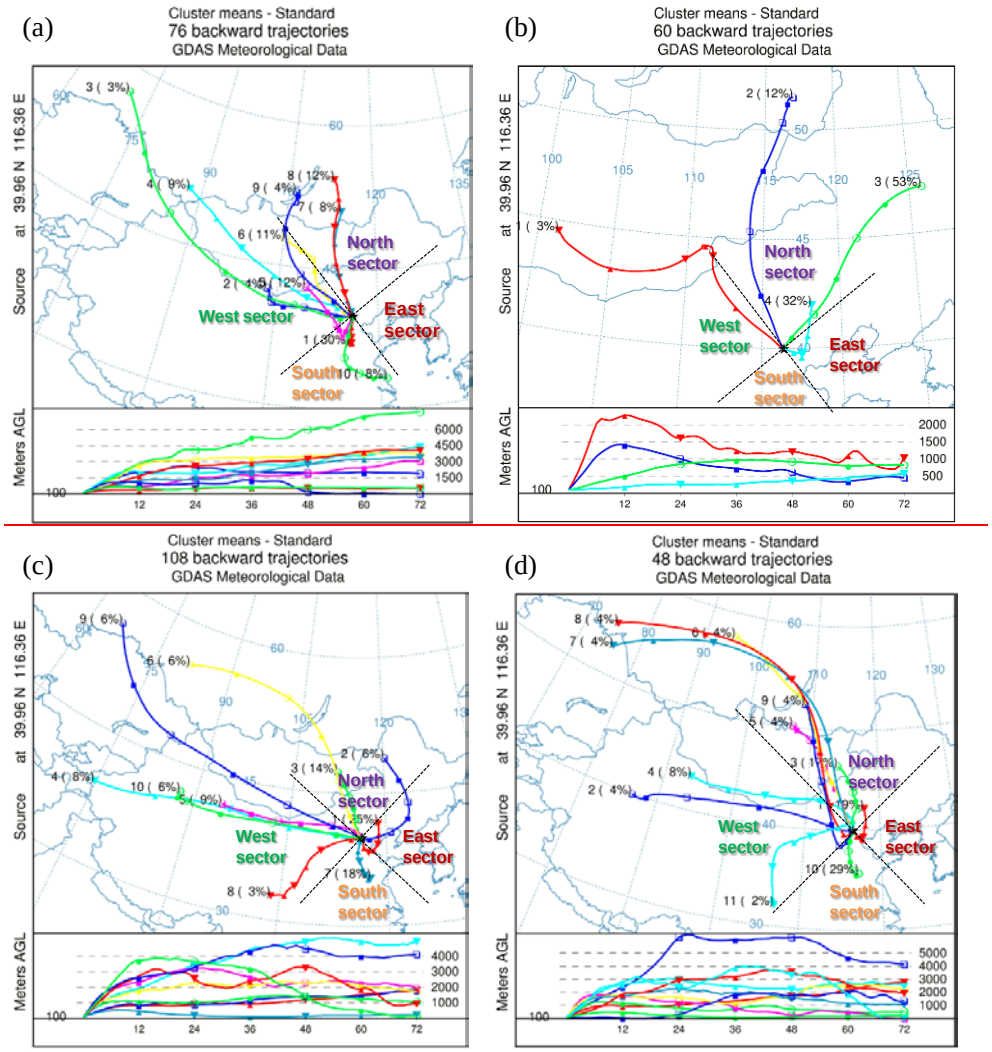
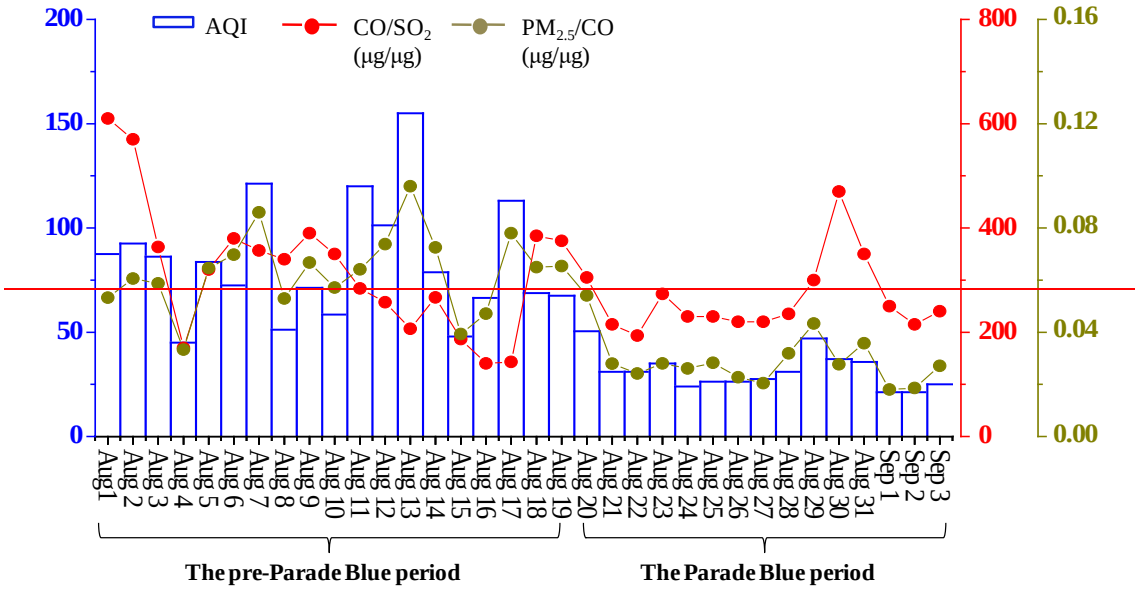

(a)
Cluster means - Standard
76 backward trajectories
GDAS Meteorological Data
(b)
Cluster means - Standard
60 backward trajectories
GDAS Meteorological Data
(c)
Cluster means - Standard
108 backward trajectories
GDAS Meteorological Data
(d)
Cluster means - Standard
48 backward trajectories
GDAS Meteorological Data
Source at 39.96 N 116.36 E
Meters AGL
North sector
West sector
East sector
South sector

Figure ~~54~~


AQI
CO/SO2 (μg/μg)
PM2.5/CO (μg/μg)
The pre-Parade Blue period
The Parade Blue period

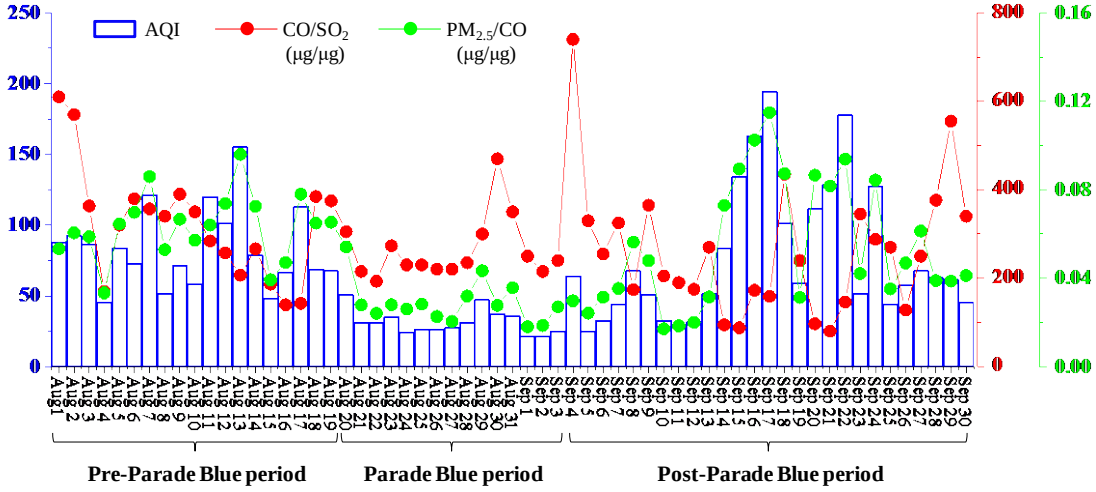

AQI
CO/SO2 (μg/μg)
PM2.5/CO (μg/μg)
Pre-Parade Blue period
Parade Blue period
Post-Parade Blue period

Figure ~~6~~5

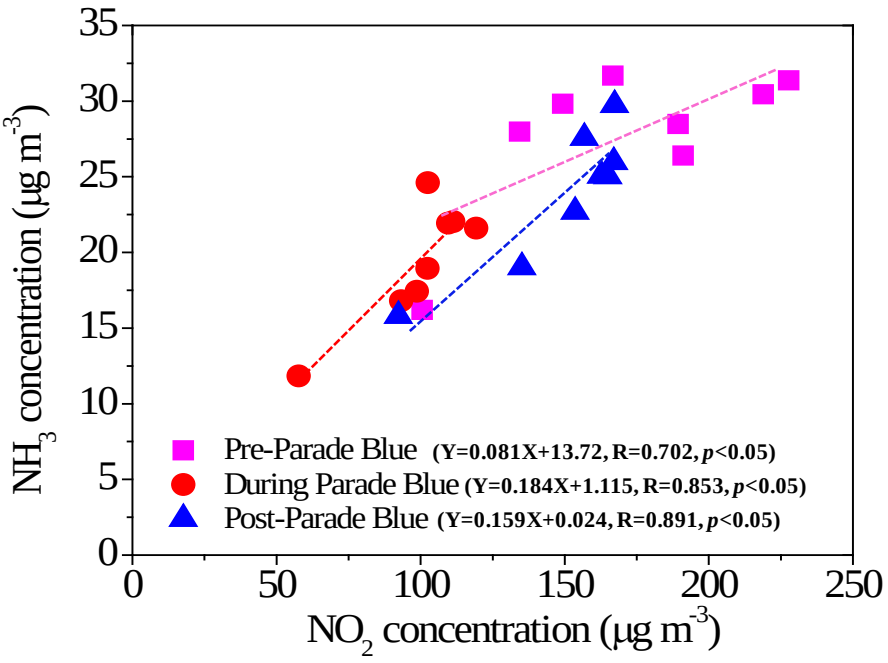
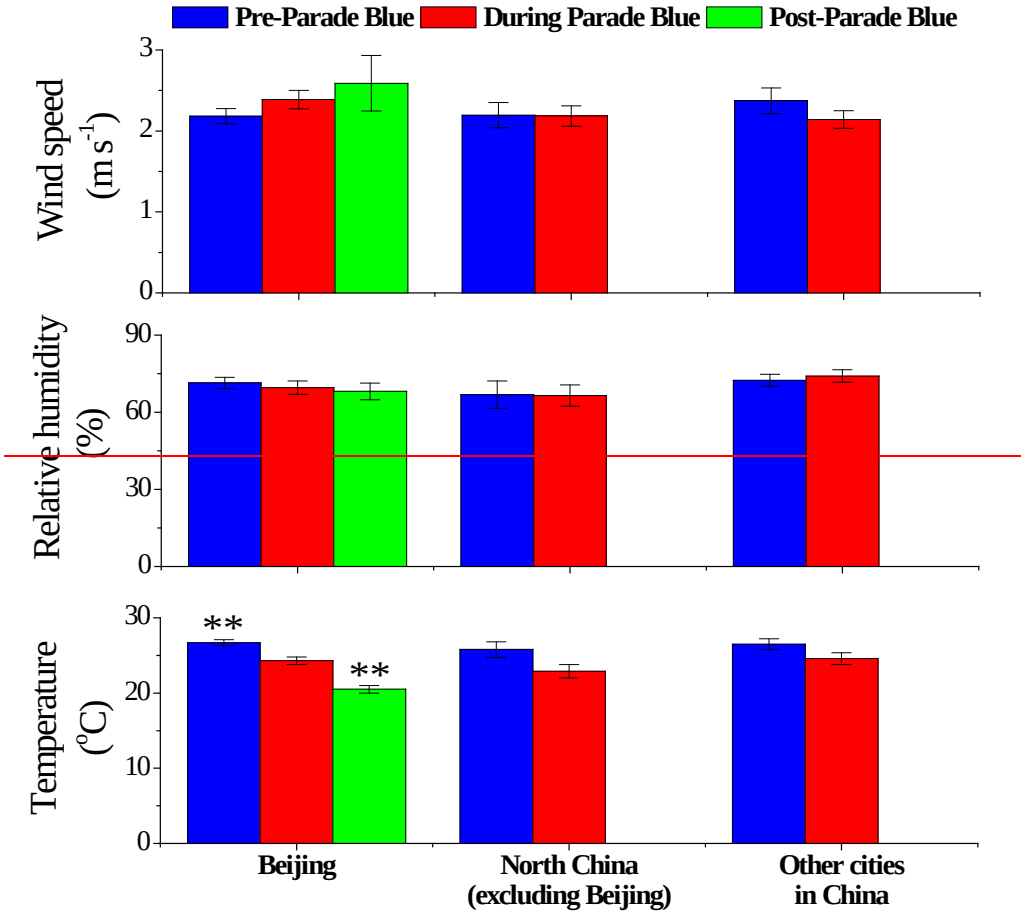
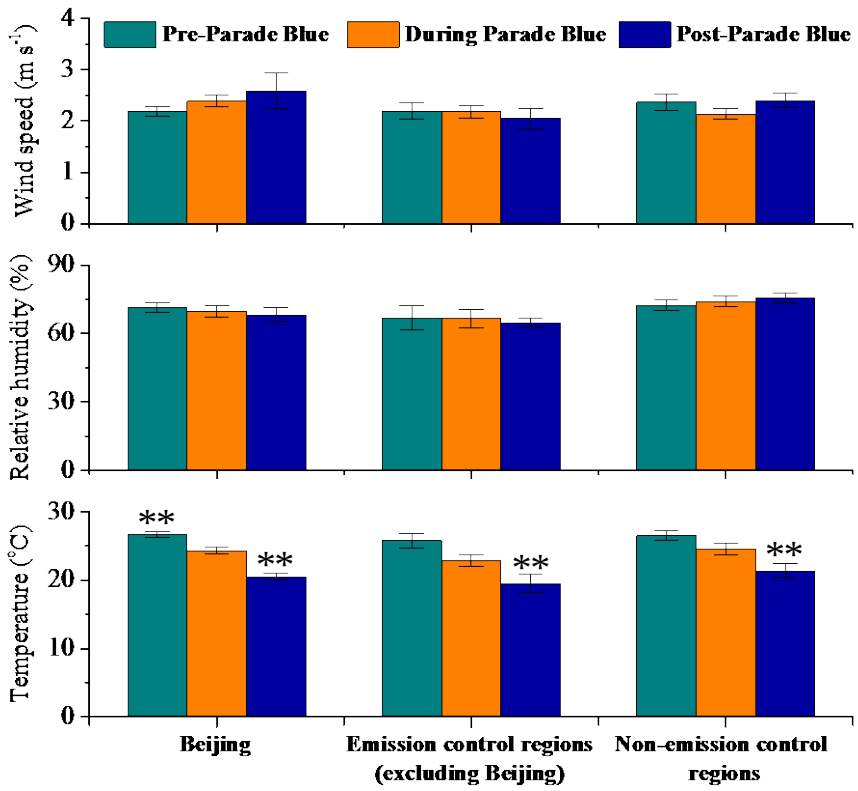

35
30
25
20
15
10
5
0
0
50
100
150
200
250
NH3 concentration (μg m-3)
NO2 concentration (μg m-3)
Pre-Parade Blue (Y=0.081X+13.72, R=0.702, p<0.05)
During Parade Blue (Y=0.184X+1.115, R=0.853, p<0.05)
Post-Parade Blue (Y=0.159X+0.024, R=0.891, p<0.05)

Figure ~~7~~6


Pre-Parade Blue
During Parade Blue
Post-Parade Blue
Wind speed (m s-1)
Relative humidity (%)
Temperature (°C)
**
**
Beijing
North China (excluding Beijing)
Other cities in China


Pre-Parade Blue
During Parade Blue
Post-Parade Blue
Wind speed (m s-1)
Relative humidity (%)
Temperature (°C)
**
Beijing
Emission control regions (excluding Beijing)
Non-emission control regions

~~Figure 8~~

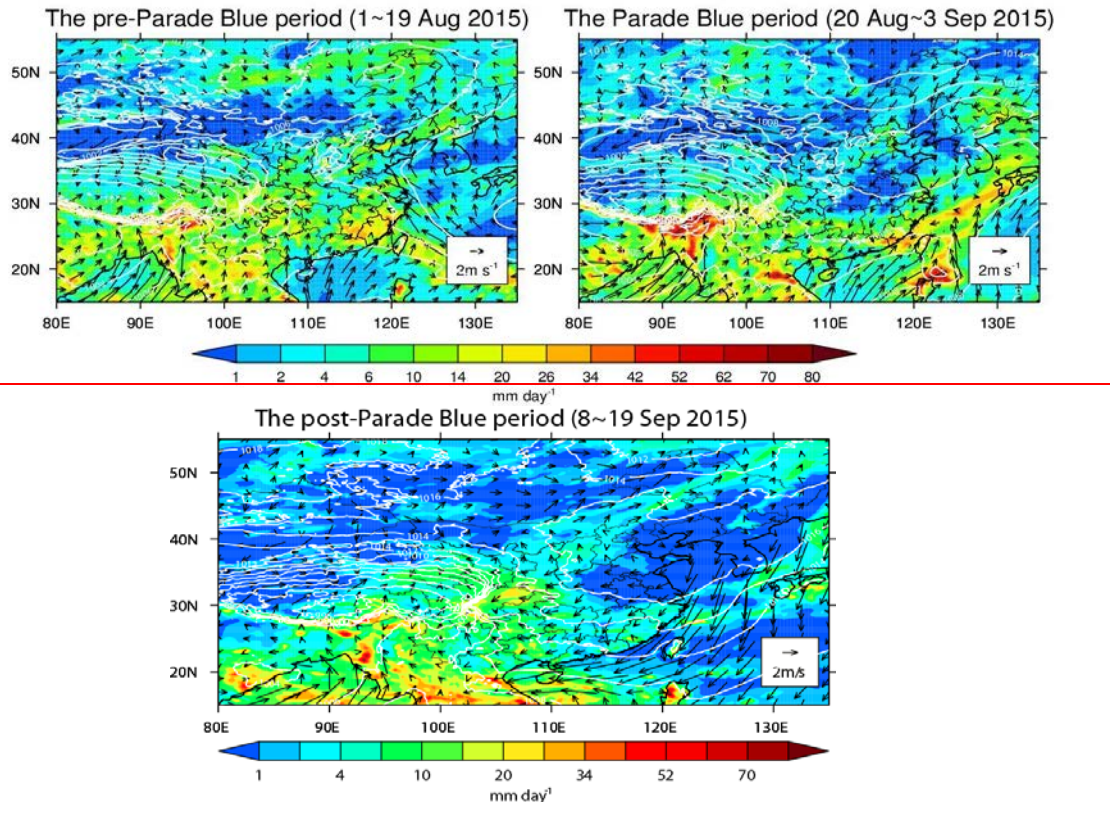

The pre-Parade Blue period (1~19 Aug 2015)
The Parade Blue period (20 Aug~3 Sep 2015)
The post-Parade Blue period (8~19 Sep 2015)
50N
40N
30N
20N
80E
90E
100E
110E
120E
130E
2m s-1
2m/s
mm day-1

Figure ~~9~~7

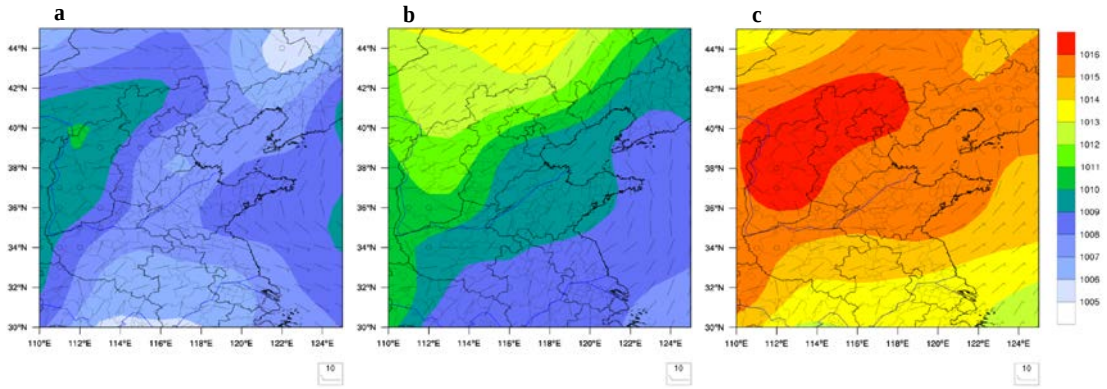

a
b
c
1016
1015
1014
1013
1012
1011
1010
1009
1008
1007
1006
1005

Figure ~~10~~8

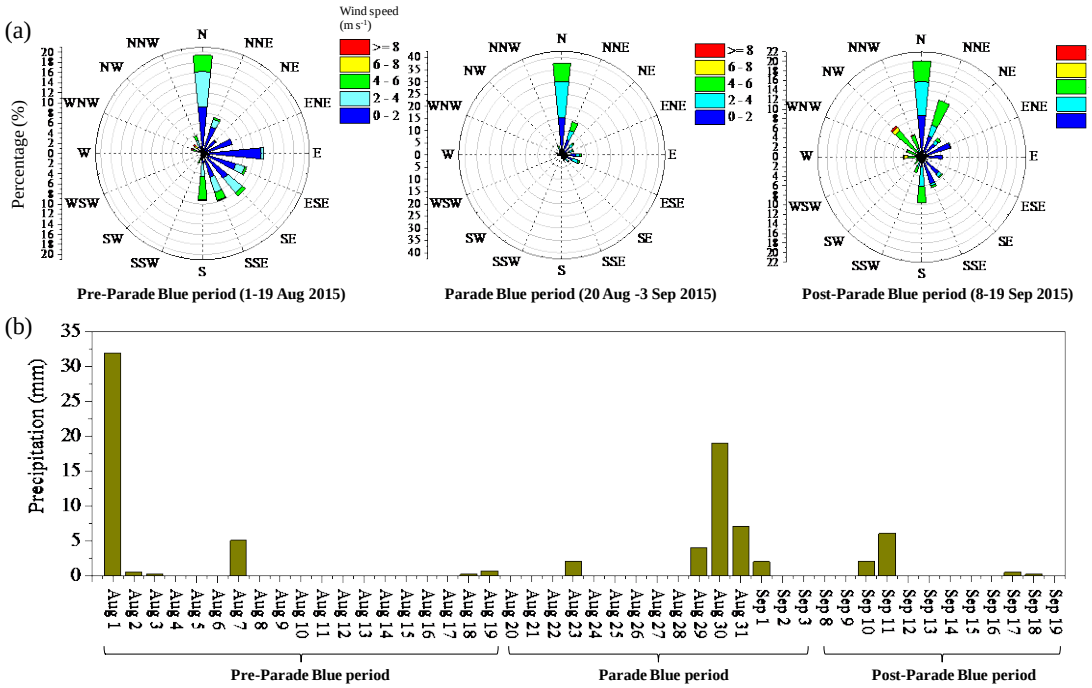

(a)
Wind speed (m s-1)
>= 8
6 - 8
4 - 6
2 - 4
0 - 2
Percentage (%)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
Pre-Parade Blue period (1-19 Aug 2015)
Parade Blue period (20 Aug -3 Sep 2015)
Post-Parade Blue period (8-19 Sep 2015)
(b)
Precipitation (mm)
Pre-Parade Blue period
Parade Blue period
Post-Parade Blue period

Figure ~~119~~

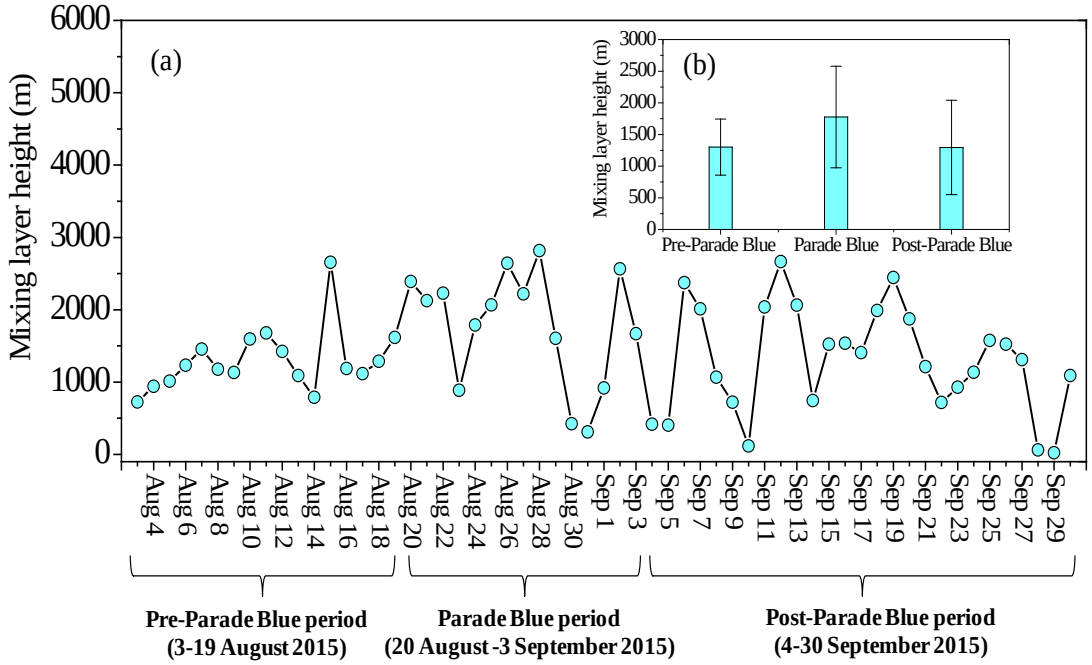

(a)
(b)
Mixing layer height (m)
6000
5000
4000
3000
2000
1000
0
3000
2500
2000
1500
1000
500
0
Pre-Parade Blue
Parade Blue
Post-Parade Blue
Aug 4
Aug 6
Aug 8
Aug 10
Aug 12
Aug 14
Aug 16
Aug 18
Aug 20
Aug 22
Aug 24
Aug 26
Aug 28
Aug 30
Sep 1
Sep 3
Sep 5
Sep 7
Sep 9
Sep 11
Sep 13
Sep 15
Sep 17
Sep 19
Sep 21
Sep 23
Sep 25
Sep 27
Sep 29
Pre-Parade Blue period
(3-19 August 2015)
Parade Blue period
(20 August -3 September 2015)
Post-Parade Blue period
(4-30 September 2015)

Figure 10

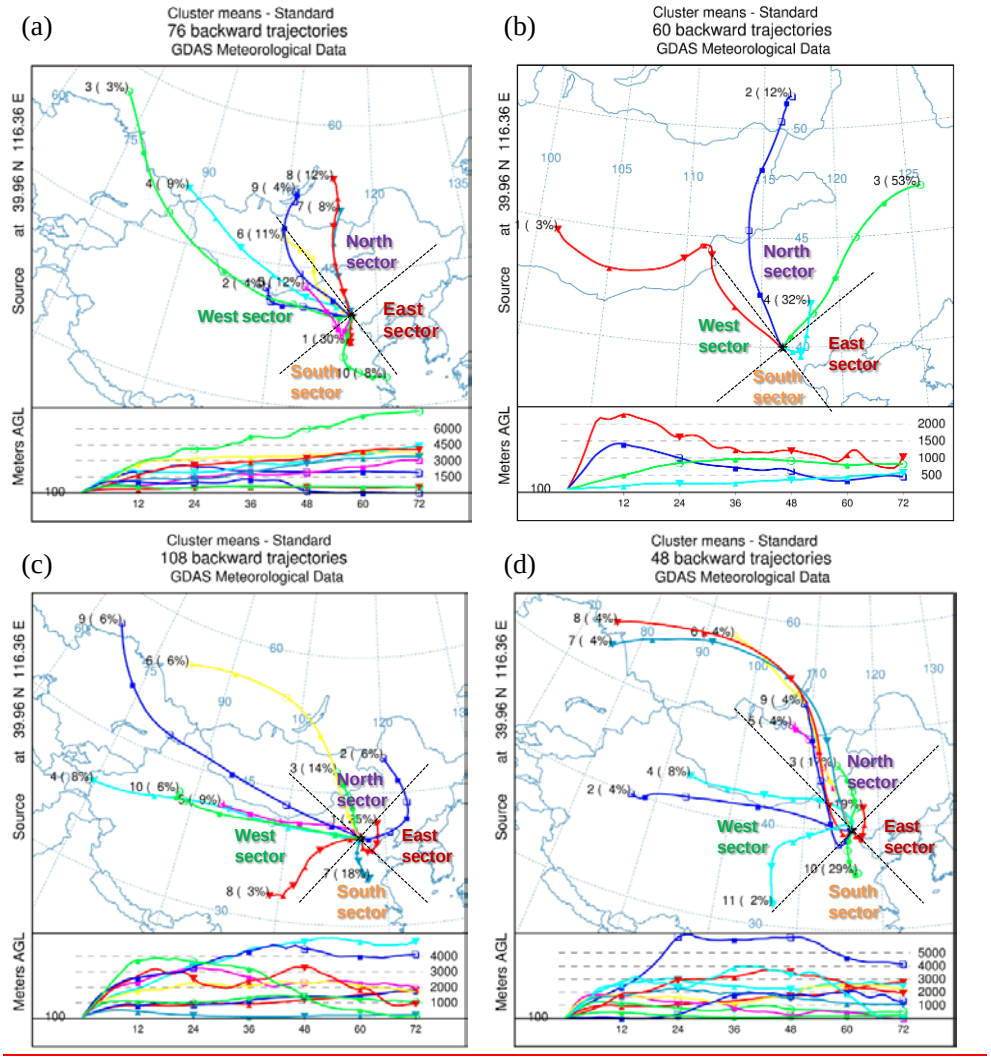
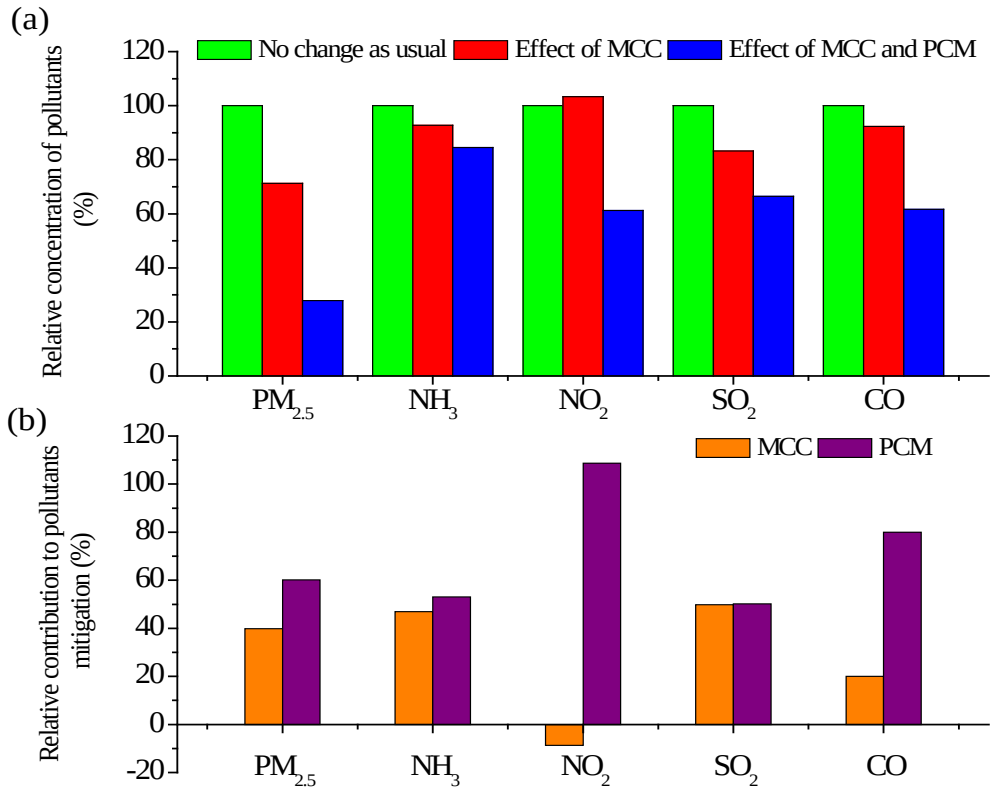
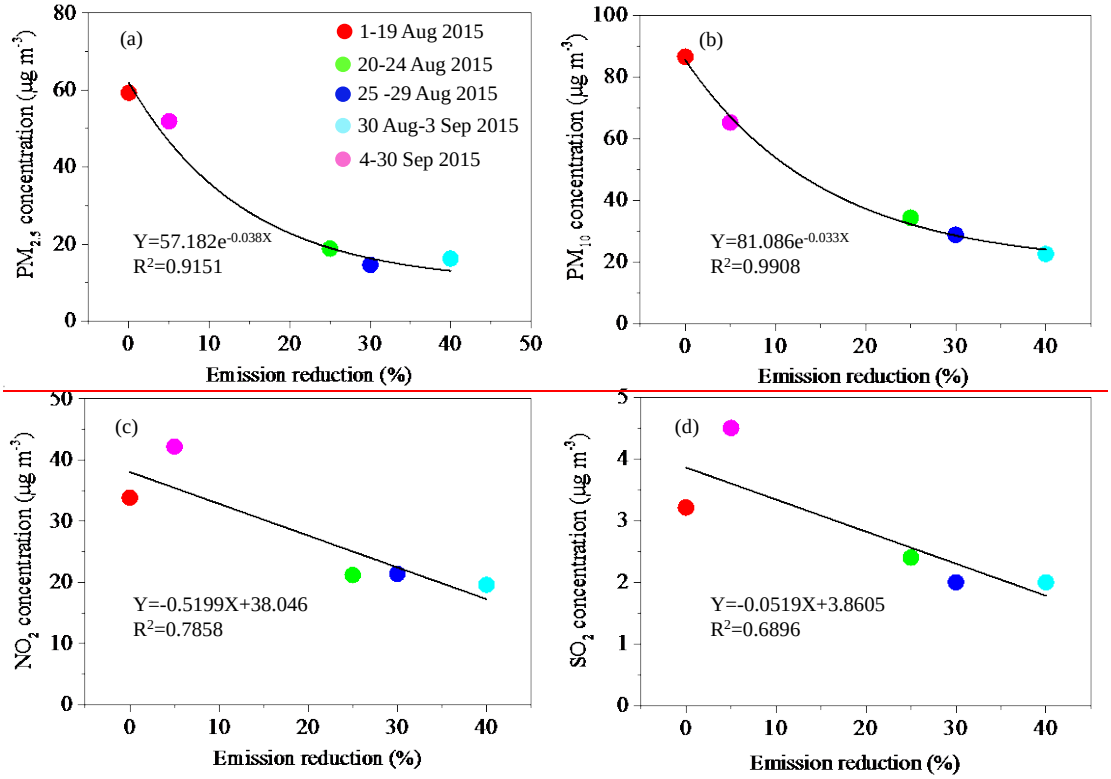

(a)
Cluster means - Standard
76 backward trajectories
GDAS Meteorological Data
(b)
Cluster means - Standard
60 backward trajectories
GDAS Meteorological Data
(c)
Cluster means - Standard
108 backward trajectories
GDAS Meteorological Data
(d)
Cluster means - Standard
48 backward trajectories
GDAS Meteorological Data
Source at 39.96 N 116.36 E
Meters AGL
North sector
West sector
East sector
South sector

Figure ~~12~~11


(a)
No change as usual
Effect of MCC
Effect of MCC and PCM
Relative concentration of pollutants (%)
120
100
80
60
40
20
0
PM2.5
NH3
NO2
SO2
CO
(b)
MCC
PCM
Relative contribution to pollutants mitigation (%)
120
100
80
60
40
20
0
-20
PM2.5
NH3
NO2
SO2
CO

~~Figure 13~~


(a)
1-19 Aug 2015
20-24 Aug 2015
25 -29 Aug 2015
30 Aug-3 Sep 2015
4-30 Sep 2015
Y=57.182e-0.038X
R2=0.9151
PM2.5 concentration (μg m-3)
Emission reduction (%)
(b)
Y=81.086e-0.033X
R2=0.9908
PM10 concentration (μg m-3)
Emission reduction (%)
(c)
Y=-0.5199X+38.046
R2=0.7858
NO2 concentration (μg m-3)
Emission reduction (%)
(d)
Y=-0.0519X+3.8605
R2=0.6896
SO2 concentration (μg m-3)
Emission reduction (%)

1199 **Table 1. Mean (SE) ambient concentrations of PM2.5 and associated ionic**

1200 **components at the urban and rural sites.**

	Urban site (Site 22) in Beijing			Rural site (Site 29) in Shandong			Rural site (Site 30) in Hebei		
	Pre-PBP (n=11)	PBP[a] (n=15)[b]	Post-PBP (n=15)	Pre-PBP (n=6)	PBP (n=5)	Post-PBP (n=10)	Pre-PBP (n=6)	PBP (n=5)	Post-PBP (n=8)
$PM_{2.5}$	72.37 (7.36)**	37.23 (5.37)	58.49 (7.99)	90.27 (8.53)*	53.84 (11.37)	55.30 (7.45)	38.73 (5.17)	29.44 (6.55)	59.73 (16.35)
NO_3^-	2.07 (0.60)	0.85 (0.15)	6.27 (1.72)**	4.21 (1.71)	1.22 (0.22)	5.56 (1.03)**	0.58 (0.22)	1.02 (0.05)	3.46 (0.81)*
SO_4^{2-}	13.26 (2.85)**	3.79 (0.69)	10.92 (2.94)	25.53 (3.36)*	11.55 (3.20)	14.80 (2.84)	9.57 (1.07)*	6.04 0.65	8.21 0.89
NH_4^+	4.62 (0.94)**	1.15 (0.26)	4.07 (1.25)	8.85 (0.91)*	3.49 (1.01)	4.32 (0.98)	2.41 (0.30)**	0.58 0.18	2.34 (0.40)**
Ca^{2+}	0.58 (0.04)**	0.38 (0.06)	0.51 (0.07)	0.29 (0.06)	0.29 (0.11)	0.23 (0.05)	0.19 (0.07)	0.12 (0.02)	0.09 (0.02)
K^+	0.30 (0.04)**	0.15 (0.02)	0.42 (0.08)**	0.76 (0.07)	0.50 (0.11)	0.99 (0.18)	0.20 (0.03)	0.18 (0.02)	0.24 (0.02)
F^-	0.17 (0.02)*	0.10 (0.01)	0.07 (0.02)	0.04 (0.03)	0.07 (0.03)	0.10 (0.04)	0.01 (0.00)	0.00 (0.00)	0.00 (0.00)
Cl^-	0.11 (0.01)	0.11 (0.01)	0.13 (0.03)	0.14 (0.03)	0.29 (0.14)	0.19 (0.06)	0.06 (0.03)	0.01 (0.00)	0.24 (0.09)*
Na^+	0.10 (0.02)	0.09 (0.02)	0.25 (0.05)**	0.25 (0.05)	0.45 (0.25)	0.42 (0.04)	0.35 (0.08)	0.52 (0.06)	0.26 (0.02)**
Mg^{2+}	0.08 (0.01)**	0.05 (0.01)	0.07 (0.01)	0.05 (0.01)	0.15 (0.12)	0.07 (0.01)	0.03 (0.00)**	0.04 (0.00)	0.04 (0.00)
SIA[c]	19.95 (3.83)**	5.78 (1.00)	21.26 (5.83)*	38.58 (3.75)**	16.26 (4.19)	24.68 (4.61)	12.56 (1.43)*	7.64 (0.81)	14.00 (1.97)*
$SIA/PM_{2.5}$ (%)	25.4 (3.2)	20.0 (4.2)	29.0 (4.8)	42.9 (2.3)	31.4 (3.7)	45.6 (4.7)	35.1 (5.2)	30.4 (5.6)	30.1 (4.4)

1201 [a] Parade Blue period. [b] Number of samples. [c] Secondary inorganic aerosol.

1202 *Significant at the 0.05 probability level. ** Significant at the 0.01 probability level.

Supporting Information (SI)

Figure captions

Figure S1. Pictures showing the sites #15 (a) and #20 (b) on the 5th ring road, site #2 on the 3rd ring road (c) and site #10 on the 4th ring road (d).

Figure S2. Correlations between daily average concentrations of $PM_{2.5}$ with those of CO (a), NO_2 (b), SO_2 (c), CO+NO_2+SO_2 (d) and CO+NO_2 (e).

Figure S3. Map showing the distance between sampling site #22 and the Wanliu monitoring station in Beijing (http://map.baidu.com/).

Figure S4. Daily average sulfur oxidation ratio (SOR) and nitrogen oxidation ratio (NOR) during the pre-Parade Blue, ~~and~~ Parade Blue and post-Parade Blue periods.

Figure S5. Correlations between NH_4^+ and SO_4^{2-}, SO_4^{2-} + NO_3^- (unit: μeq m^{-3}) during the pre-Parade Blue, ~~and~~ Parade Blue and post-Parade Blue periods.

Figure. S6. 10 m mean wind field and (vector) and sea surface pressure (white) plotted on the precipitation field during the pre-Parade Blue period (left), Parade Blue period (right) and post-Parade Blue period (below).

Figure S1

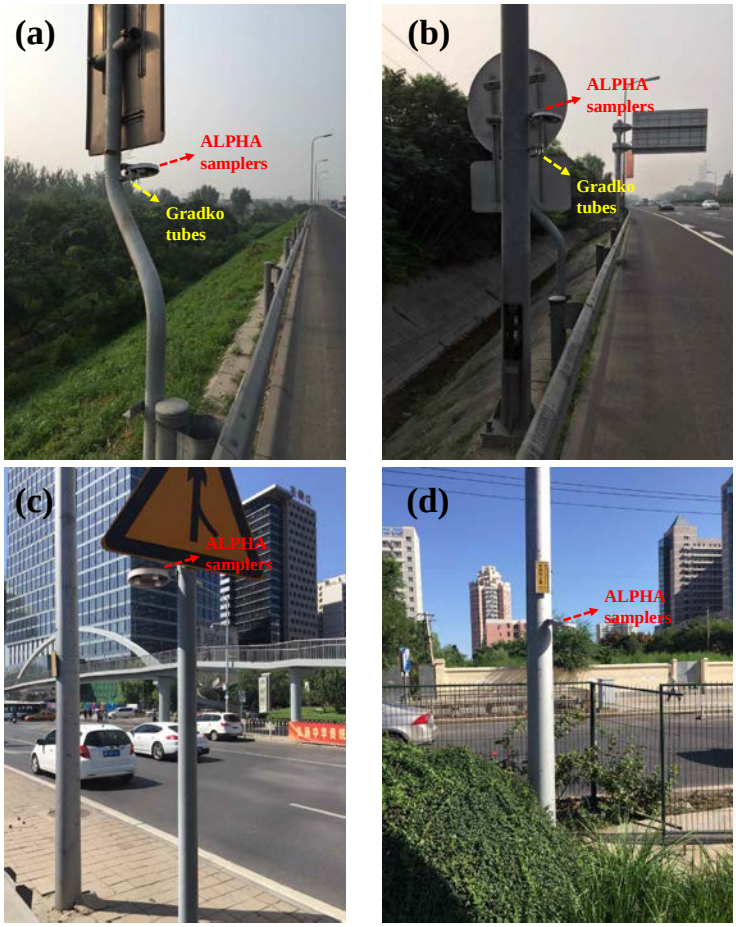
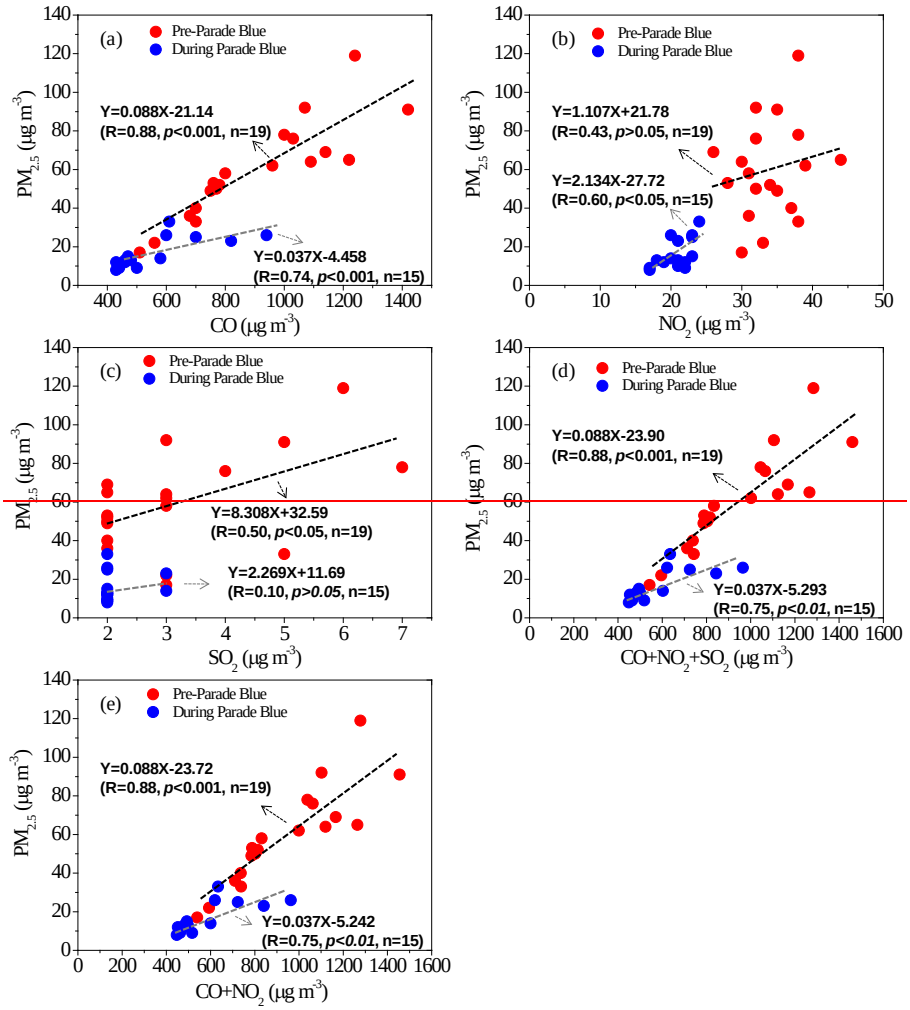

(a)
ALPHA samplers
Gradko tubes
(b)
ALPHA samplers
Gradko tubes
(c)
ALPHA samplers
(d)
ALPHA samplers

Figure S2


(a)
Pre-Parade Blue
During Parade Blue
Y=0.088X-21.14
(R=0.88, p<0.001, n=19)
Y=0.037X-4.458
(R=0.74, p<0.001, n=15)
PM2.5 (μg m-3)
CO (μg m-3)
(b)
Pre-Parade Blue
During Parade Blue
Y=1.107X+21.78
(R=0.43, p>0.05, n=19)
Y=2.134X-27.72
(R=0.60, p<0.05, n=15)
PM2.5 (μg m-3)
NO2 (μg m-3)
(c)
Pre-Parade Blue
During Parade Blue
Y=8.308X+32.59
(R=0.50, p<0.05, n=19)
Y=2.269X+11.69
(R=0.10, p>0.05, n=15)
PM2.5 (μg m-3)
SO2 (μg m-3)
(d)
Pre-Parade Blue
During Parade Blue
Y=0.088X-23.90
(R=0.88, p<0.001, n=19)
Y=0.037X-5.293
(R=0.75, p<0.01, n=15)
PM2.5 (μg m-3)
CO+NO2+SO2 (μg m-3)
(e)
Pre-Parade Blue
During Parade Blue
Y=0.088X-23.72
(R=0.88, p<0.001, n=19)
Y=0.037X-5.242
(R=0.75, p<0.01, n=15)
PM2.5 (μg m-3)
CO+NO2 (μg m-3)

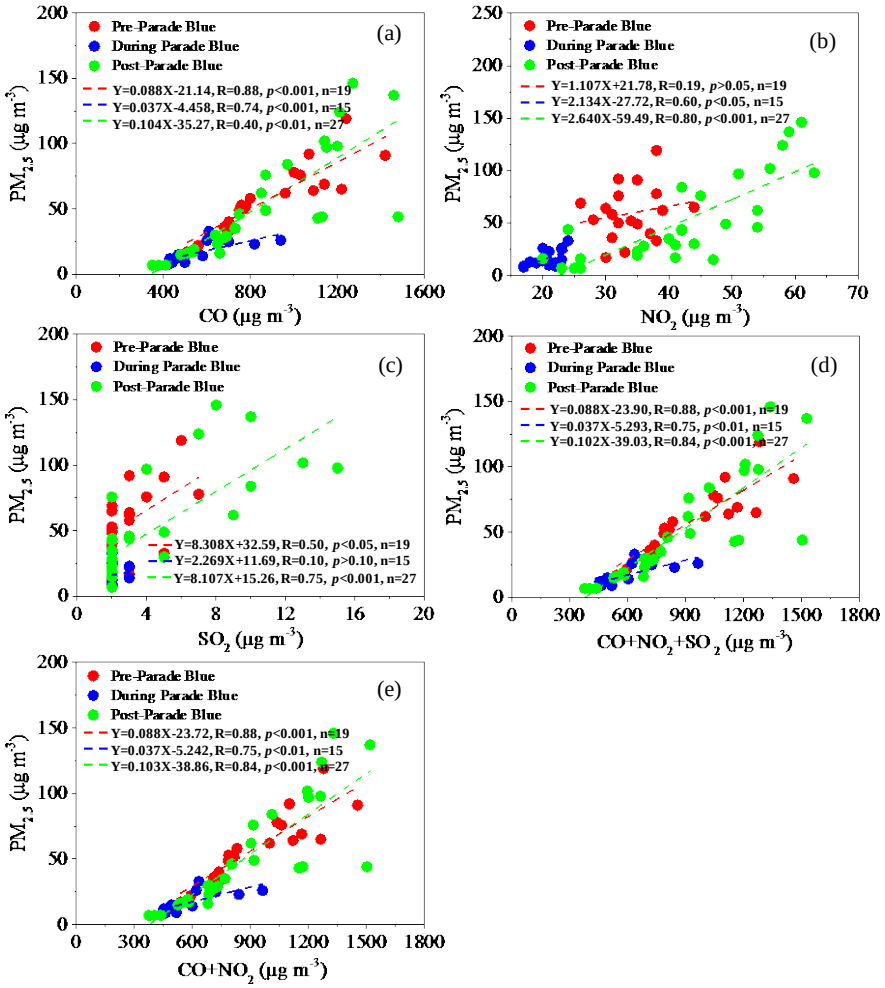
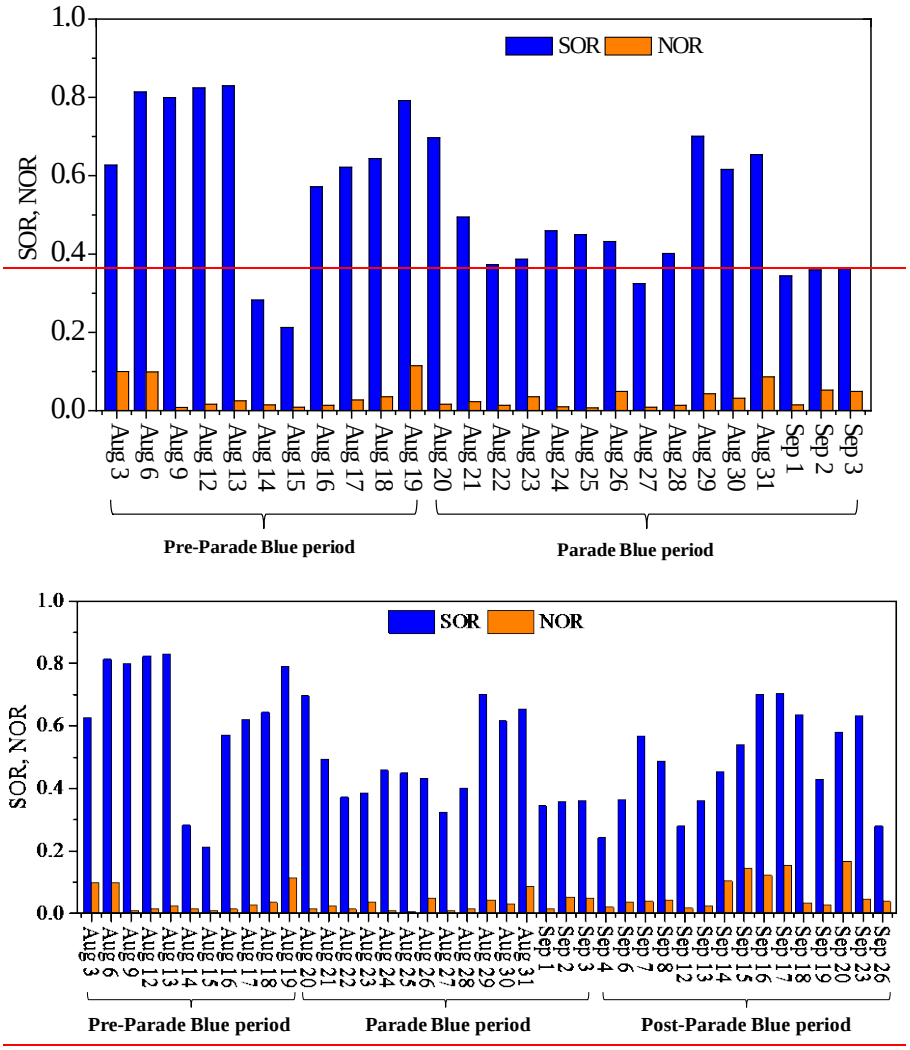

(a)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
Y=0.088X-21.14, R=0.88, p<0.001, n=19
Y=0.037X-4.458, R=0.74, p<0.001, n=15
Y=0.104X-35.27, R=0.40, p<0.01, n=27
PM2.5 (μg m-3)
CO (μg m-3)
(b)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
Y=1.107X+21.78, R=0.19, p>0.05, n=19
Y=2.134X-27.72, R=0.60, p<0.05, n=15
Y=2.640X-59.49, R=0.80, p<0.001, n=27
PM2.5 (μg m-3)
NO2 (μg m-3)
(c)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
Y=8.308X+32.59, R=0.50, p<0.05, n=19
Y=2.269X+11.69, R=0.10, p>0.10, n=15
Y=8.107X+15.26, R=0.75, p<0.001, n=27
PM2.5 (μg m-3)
SO2 (μg m-3)
(d)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
Y=0.088X-23.90, R=0.88, p<0.001, n=19
Y=0.037X-5.293, R=0.75, p<0.01, n=15
Y=0.102X-39.03, R=0.84, p<0.001, n=27
PM2.5 (μg m-3)
CO+NO2+SO2 (μg m-3)
(e)
Pre-Parade Blue
During Parade Blue
Post-Parade Blue
Y=0.088X-23.72, R=0.88, p<0.001, n=19
Y=0.037X-5.242, R=0.75, p<0.01, n=15
Y=0.103X-38.86, R=0.84, p<0.001, n=27
PM2.5 (μg m-3)
CO+NO2 (μg m-3)

Figure S3


N
China Agricultural University
7 km
The wanliu monitoring station
5公里
© 2016 Baidu - GS(2015)2650号 - Data © NavInfo & CenNavi - Image © GF-1 & Chinasiwei

Figure S4


SOR
NOR
SOR, NOR
1.0
0.8
0.6
0.4
0.2
0.0
Aug 3
Aug 6
Aug 9
Aug 12
Aug 13
Aug 14
Aug 15
Aug 16
Aug 17
Aug 18
Aug 19
Aug 20
Aug 21
Aug 22
Aug 23
Aug 24
Aug 25
Aug 26
Aug 27
Aug 28
Aug 29
Aug 30
Aug 31
Sep 1
Sep 2
Sep 3
Pre-Parade Blue period
Parade Blue period
SOR
NOR
SOR, NOR
1.0
0.8
0.6
0.4
0.2
0.0
Aug 3
Aug 6
Aug 9
Aug 12
Aug 13
Aug 14
Aug 15
Aug 16
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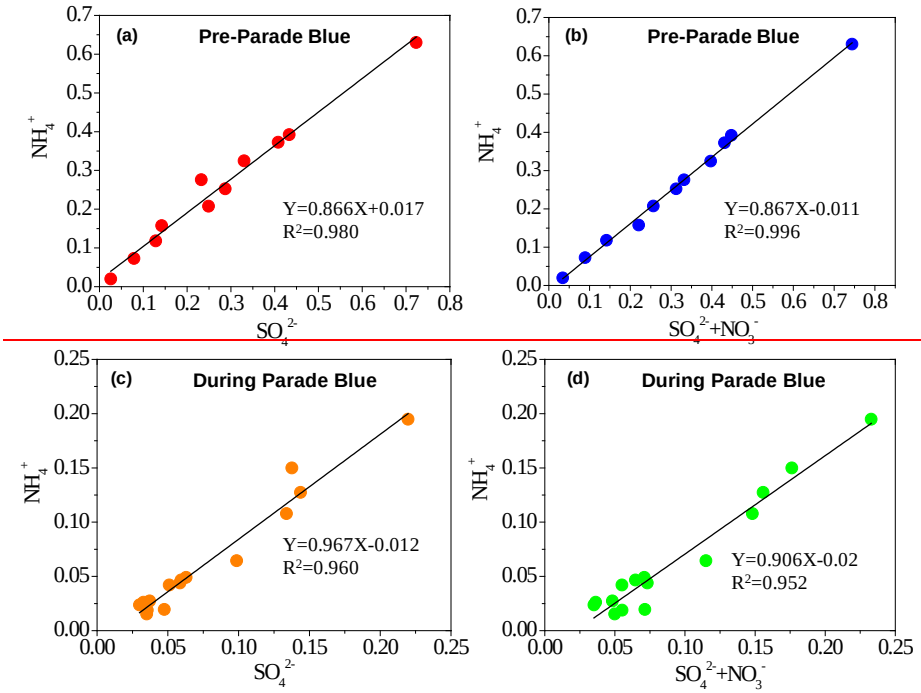
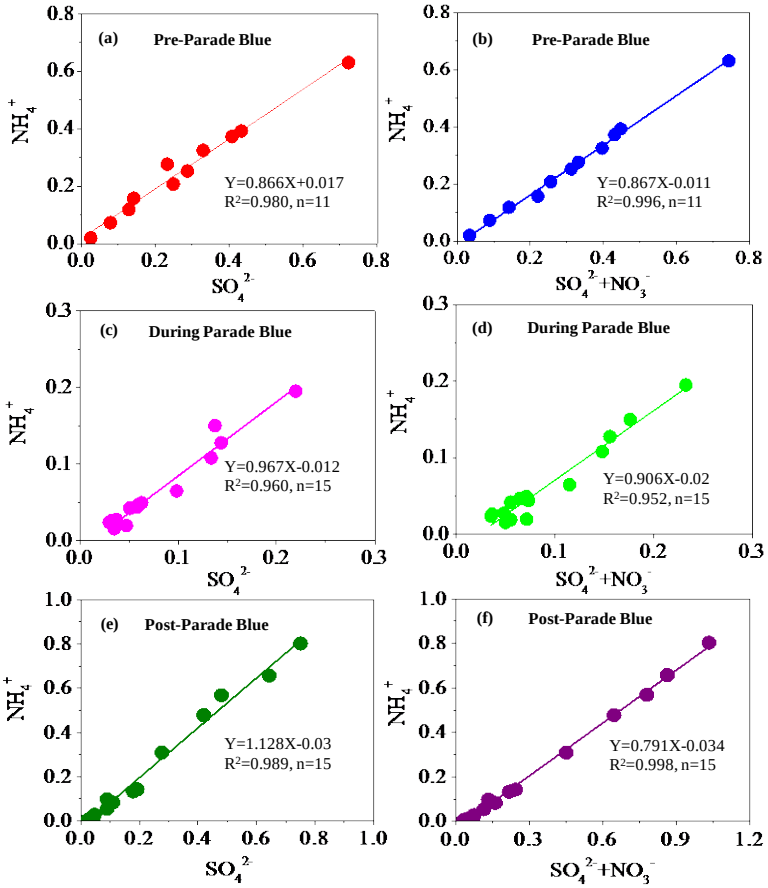
Aug 25
Aug 26
Aug 27
Aug 28
Aug 29
Aug 30
Aug 31
Sep 1
Sep 2
Sep 3
Sep 4
Sep 6
Sep 7
Sep 8
Sep 12
Sep 13
Sep 14
Sep 15
Sep 16
Sep 17
Sep 18
Sep 19
Sep 20
Sep 23
Sep 26
Pre-Parade Blue period
Parade Blue period
Post-Parade Blue period

Figure S5


(a)
Pre-Parade Blue
Y=0.866X+0.017
R²=0.980
NH4+
SO4 2-
(b)
Pre-Parade Blue
Y=0.867X-0.011
R²=0.996
NH4+
SO4 2-+NO3 -
(c)
During Parade Blue
Y=0.967X-0.012
R²=0.960
NH4+
SO4 2-
(d)
During Parade Blue
Y=0.906X-0.02
R²=0.952
NH4+
SO4 2-+NO3 -


(a) Pre-Parade Blue
Y=0.866X+0.017
R²=0.980, n=11
(b) Pre-Parade Blue
Y=0.867X-0.011
R²=0.996, n=11
(c) During Parade Blue
Y=0.967X-0.012
R²=0.960, n=15
(d) During Parade Blue
Y=0.906X-0.02
R²=0.952, n=15
(e) Post-Parade Blue
Y=1.128X-0.03
R²=0.989, n=15
(f) Post-Parade Blue
Y=0.791X-0.034
R²=0.998, n=15
NH4+
SO4 2-
SO4 2-+NO3-

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106 **Figure S6**

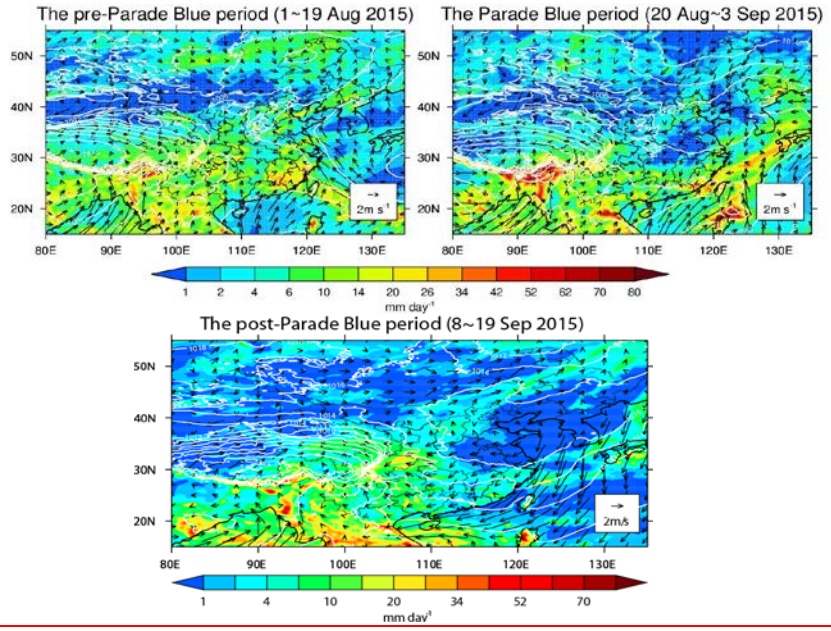

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Table S1. Information on the ~~third~~thirty-one monitoring sites.

Site code	Coordinate	Sampling place	Site type[a]	Measured pollutants	Sampling durations for each pollutant[b]			Numbers of samples[c]			Surrounding environment and possible emission sources
					NH_3	NO_2	$PM_{2.5}$	NH_3	NO_2	$PM_{2.5}$	
1	116.37°E, 39.95°N	At Beijing Normal University	NRS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Densely occupied residences, traffic roads
2	116.47°E, 39.91°N	On the 3rd ring road	RS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Traffic roads
3	116.39°E, 39.86°N	On the 3rd ring road	RS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Traffic roads
4	116.32°E, 39.92°N	On the 3rd ring road	RS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Traffic roads
5	116.38°E, 39.97°N	On the 3rd ring road	RS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Traffic roads
6	116.29°E, 39.95°N	At Beijing Academy of Agriculture and Forestry	NRS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Occupied residences, traffic roads
7	116.36°E, 39.99°N	On the 4~~rd~~th ring road	RS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Traffic roads
8	116.28°E, 39.91°N	On the 4~~rd~~th ring road	RS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Traffic roads
9	116.39°E, 39.84°N	On the 4~~rd~~th ring road	RS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Traffic roads
10	116.49°E, 39.92°N	On the 4~~rd~~th ring road	RS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Traffic roads
11	116.39°E, 40.01°N	Inside Olympic Park	NRS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Occupied residences, traffic roads
12	116.54°E, 39.92°N	~~Near~~ Outside a sewage treatment plant	NRS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Small villages, sewage treatment plant
13	116.29°E,40.00°N	Inside Summer Palace	NRS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Occupied residences,

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											traffic roads
14	116.22°E, 39.99°N	On the 5~~rd~~th ring road	RS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Traffic roads
15	116.22°E, 39.91°N	On the 5~~rd~~th ring road	RS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Traffic roads
16	116.27°E, 39.79°N	On the 5~~rd~~th ring road	RS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Traffic roads
17	116.40°E, 39.77°N	On the 5~~rd~~th ring road	RS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Traffic roads
18	116.49°E, 39.81°N	On the 5~~rd~~th ring road	RS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Traffic roads
19	116.56°E, 39.88°N	On the 5~~rd~~th ring road	RS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Traffic roads
20	116.52°E, 39.99°N	On the 5~~rd~~th ring road	RS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Traffic roads
21	116.39°E, 40.03°N	On the 5~~rd~~th ring road	RS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Traffic roads
22	116.29°E, 40.03°N	~~In~~ At China Agricultural University	NRS	NH_3, NO_2, $PM_{2.5}$	I, II, III	I, II, III	I, II, IV	3	3	41	Densely occupied residences, industry, small-scale urban agriculture, and traffic roads
23	116.26°E, 40.04°N	On the Baiwang hill	NRS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Small villages and roads
24	116.23°E, 40.07°N	~~Near~~ At a ~~refuse~~ landfill site	NRS	NH_3	II, III	n.m.	n.m.	2	n.d.	n.d.	Small villages, refuse landfill
25	116.19°E, 40.14°N	In Shangzhuang ~~Agricultural~~ Experiment Station	NRS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Small villages, croplands

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26	116.14°E, 40.26°N	On the high way	RS	NH_3, NO_2	II, III	II, III	n.m.	2	2	n.d.	Traffic roads
27	116.02°E, 40.36°N	Inside Badaling Highway Tunnel	RS	NH_3, NO_2	II, III	II, III	n.m.	2	2	n.d.	Traffic roads
28	116.01°E, 40.36°N	Near the exit of Badaling Highway Tunnel	RS	NH_3, NO_2	II, III	II, III	n.m.	2	2	n.d.	Traffic roads
29	116.58°E, 36.84°N	In Yucheng Agricultural Experiment Station	RS	NH_3, NO_2, $PM_{2.5}$	I, II, III	I, II, III	I, II, IV	3	3	21	Small villages, croplands
30	115.02°E, 36.87°N	In Quzhou Agricultural Experiment Station	RS	NH_3, NO_2, $PM_{2.5}$	I, II, III	I, II, III	I, II, IV	3	3	19	Small villages, croplands
31	120.75 º E, 37.93 º N	On Changdao island	BS	NH_3, NO_2	I, II, III	I, II, III	n.m.	3	3	n.d.	Almost no agricultural and industrial activities

[a] NRS, NR and BS denote non-road site, road site and background site, respectively.

[b] I, II, III, and IV denote the periods of 3-19 August 2015, 20 August-3 September 2015, 8-19 September 2015, and 4-30 September 2015, respectively; n.m. means no measurements.

[d] Values for NH_3 and NO_2 samples multiply by 3 to obtain the total numbers of samples; n.d. means no data.

Table S2. Summary statistical of daily average $PM_{2.5}$ concentrations ($\mu g\ m^{-3}$) during the pre-Parade Blue and Parade Blue periods in the 291 cities across China.

City	Province	Region[a]	The Pre-Parade Blue period				–	The Parade Blue period				Reduction or Increase[b]
			Mean	Standard Error	Min	Max	–	Mean	Standard Error	Min	Max	
Beijing	Municipality	NC	59	6	17	119		17	2	8	33	-72
Tianjing	Municipality	NC	62	5	20	116		32	4	15	77	-49
Baoding	Hebei	NC	88	7	29	148		35	4	16	75	-60
Cangzhou	Hebei	NC	59	6	17	119		17	2	8	33	-72
Chengde	Hebei	NC	31	4	11	73		14	0	11	17	-56
Handan	Hebei	NC	81	7	35	147		52	7	9	91	-36
Hengshui	Hebei	NC	91	7	33	159		47	5	25	92	-48
Langfang	Hebei	NC	69	6	17	113		24	4	5	78	-66
Qinhuangdao	Hebei	NC	45	6	10	92		7	1	4	23	-85
Shijiazhuang	Hebei	NC	78	7	20	128		35	5	6	77	-55
Tangshan	Hebei	NC	73	6	25	118		13	2	4	29	-83
Xingtai	Hebei	NC	83	7	30	144		45	7	8	101	-45
Zhangjiakou	Hebei	NC	29	3	17	66		18	1	9	27	-39
Changzhi	Shanxi	NC	59	5	22	96		39	3	25	55	-34
Datong	Shanxi	NC	26	2	13	59		16	1	12	22	-37
Jincheng	Shanxi	NC	41	3	11	69		37	3	19	70	-12
Jinzhong	Shanxi	NC	39	3	21	71		26	3	11	51	-34
Linfen	Shanxi	NC	32	2	19	44		27	2	17	43	-18
Lvliang	Shanxi	NC	46	4	17	88		29	2	18	40	-38

Shuozhou	Shanxi	NC	39	2	18	54	28	1	22	36	-29
Taiyuan	Shanxi	NC	44	3	26	73	23	3	9	55	-48
Xinzhou	Shanxi	NC	39	3	23	61	20	2	12	36	-48
Yangquan	Shanxi	NC	38	3	16	64	19	2	9	31	-49
Yuncheng	Shanxi	NC	58	3	29	78	48	3	29	69	-17
Binzhou	Shandong	NC	49	5	12	94	37	4	18	69	-24
Dezhou	Shandong	NC	89	6	25	133	44	4	23	85	-51
Dongying	Shandong	NC	65	7	21	123	43	4	21	80	-34
Jinan	Shandong	NC	59	5	21	87	50	4	30	82	-15
Jining	Shandong	NC	50	5	22	103	49	3	34	78	-1
Laiwu	Shandong	NC	54	6	19	98	65	5	40	101	21
Liaocheng	Shandong	NC	67	6	24	105	49	5	17	80	-27
Linyi	Shandong	NC	37	4	15	76	43	4	25	78	15
Qingdao	Shandong	NC	35	4	9	60	30	3	14	71	-15
Rizhao	Shandong	NC	39	4	8	75	40	5	16	74	4
Tai'an	Shandong	NC	42	4	21	76	40	3	20	67	-5
Weihai	Shandong	NC	38	4	19	74	22	2	7	31	-44
Weifang	Shandong	NC	51	6	17	102	55	7	25	115	8
Yantai	Shandong	NC	39	5	14	87	23	2	9	36	-40
Zaozhuang	Shandong	NC	45	5	16	83	51	3	40	74	14
Zibo	Shandong	NC	56	4	29	90	55	4	35	89	-2
Alxa League	Inner Mongolia	NC	38	3	18	66	33	1	22	40	-15
Bayannur	Inner Mongolia	NC	33	3	15	56	32	1	21	41	-3
Baotou	Inner Mongolia	NC	35	3	11	56	22	1	13	30	-37
Chifeng	Inner Mongolia	NC	22	2	10	47	13	1	11	18	-38
Ordos	Inner Mongolia	NC	22	3	5	40	12	1	8	18	-46

Hohhot	Inner Mongolia	NC	23	2	8	43	14	1	10	23	-37
Hulun Buir	Inner Mongolia	NC	28	2	18	48	26	2	16	38	-7
Tongliao	Inner Mongolia	NC	46	6	17	99	25	3	17	55	-45
Wuhai	Inner Mongolia	NC	42	4	18	85	30	2	18	44	-29
Hinggan League	Inner Mongolia	NC	27	2	15	37	21	1	15	28	-20
Anyang	Henan	NC	61	5	30	106	46	5	16	82	-25
Hebi	Henan	NC	50	4	26	76	31	4	10	61	-38
Jiaozuo	Henan	NC	40	3	13	61	41	4	12	63	0
Kaifeng	Henan	NC	45	4	21	81	38	4	17	69	-17
Luoyang	Henan	NC	56	6	20	95	41	3	21	56	-27
Luohe	Henan	NC	48	5	21	87	52	3	31	71	7
Nanyang	Henan	NC	49	4	22	84	56	4	31	85	14
Pingdingshan	Henan	NC	53	6	19	91	50	3	33	73	-5
Sanmenxia	Henan	NC	58	5	17	94	39	3	20	56	-32
Shangqiu	Henan	NC	41	4	19	88	40	4	18	79	-2
Xinyang	Henan	NC	29	4	13	67	40	3	22	61	36
Zhengzhou	Henan	NC	61	6	25	112	50	6	17	98	-18
Zhoukou	Henan	NC	36	3	22	60	42	3	21	58	15
Zhumadian	Henan	NC	41	4	16	76	41	3	16	59	0
Anshan	Liaoning	NE	42	5	14	72	43	2	30	59	2
Benxi	Liaoning	NE	34	3	17	72	30	2	12	45	-11
Chaoyang	Liaoning	NE	30	4	13	65	14	1	9	25	-54
Dalian	Liaoning	NE	41	5	13	97	23	3	11	52	-44
Dandong	Liaoning	NE	24	4	1	51	20	2	8	28	-13
Fushun	Liaoning	NE	27	3	12	63	18	2	6	28	-32
Fuxin	Liaoning	NE	44	6	11	97	18	2	9	34	-59

Huludao	Liaoning	NE	66	9	20	137	24	2	15	48	-64
Jinzhou	Liaoning	NE	58	8	23	125	19	2	10	44	-67
Liaoyang	Liaoning	NE	36	4	11	69	31	2	18	41	-15
Panjin	Liaoning	NE	41	6	13	93	18	2	10	43	-55
Shenyang	Liaoning	NE	36	4	16	66	23	2	11	35	-37
Tieling	Liaoning	NE	28	3	13	53	17	2	7	31	-40
Wafangdian	Liaoning	NE	48	6	19	103	27	1	21	38	-44
Yingkou	Liaoning	NE	25	3	11	45	23	3	9	51	-7
Baicheng	Jilin	NE	47	2	36	63	42	1	32	51	-10
Baishan	Jilin	NE	29	3	15	52	25	2	17	38	-16
Changchun	Jilin	NE	29	4	16	73	23	2	8	39	-23
Jilin	Jilin	NE	19	2	10	39	18	2	8	30	-7
Liaoyuan	Jilin	NE	36	5	13	76	36	6	14	81	0
Siping	Jilin	NE	35	5	15	89	23	2	12	38	-35
Songyuan	Jilin	NE	20	1	10	36	13	1	5	23	-33
Daqing	Heilongjiang	NE	30	2	17	51	21	1	15	33	-30
Daxinganling	Heilongjiang	NE	13	2	5	40	10	1	7	14	-21
Harbin	Heilongjiang	NE	25	2	15	38	18	2	11	35	-27
Hegang	Heilongjiang	NE	47	2	33	70	28	4	6	61	-40
Heihe	Heilongjiang	NE	33	1	26	44	27	1	18	34	-19
Jixi	Heilongjiang	NE	19	1	14	25	16	1	11	27	-19
Jiamusi	Heilongjiang	NE	15	1	6	24	13	1	7	29	-13
Mudanjiang	Heilongjiang	NE	20	1	16	27	22	1	14	33	10
Qitaihe	Heilongjiang	NE	22	1	17	32	21	1	14	33	-8
Qiqihar	Heilongjiang	NE	19	2	7	31	13	1	6	22	-29
Shuangyashan	Heilongjiang	NE	23	1	17	28	26	1	19	34	13

Suihua	Heilongjiang	NE	15	1	9	26	11	1	8	15	-23
Ankang	Shaanxi	NW	21	2	7	43	27	2	13	44	30
Baoji	Shaanxi	NW	38	5	11	78	34	4	11	68	-12
Hanzhong	Shaanxi	NW	27	3	10	60	32	2	18	40	20
Shangluo	Shaanxi	NW	28	3	9	65	27	2	14	42	-3
Tongchuan	Shaanxi	NW	36	4	12	71	32	2	14	45	-12
Weinan	Shaanxi	NW	36	3	8	58	34	3	17	52	-4
Xi'an	Shaanxi	NW	45	4	13	73	40	3	20	66	-11
Xianyang	Shaanxi	NW	38	4	10	60	35	3	19	55	-9
Yan'an	Shaanxi	NW	33	3	14	59	24	2	14	44	-27
Yulin	Shaanxi	NW	30	3	12	53	20	2	9	33	-32
Baiying	Gansu	NW	26	3	9	65	27	1	21	33	4
Dingxi	Gansu	NW	21	1	9	29	28	1	19	36	37
Gannan	Gansu	NW	17	1	9	33	26	3	15	53	54
Jiayuguan	Gansu	NW	23	5	10	86	26	3	12	58	16
Jiuquan	Gansu	NW	36	6	19	121	35	3	18	61	-2
Lanzhou	Gansu	NW	36	2	19	62	32	1	24	38	-12
Linxia	Gansu	NW	18	1	7	28	21	2	12	35	20
Pingliang	Gansu	NW	30	3	10	68	20	2	12	29	-33
Qingyang	Gansu	NW	22	3	7	57	20	2	11	31	-11
Tianshui	Gansu	NW	18	3	6	67	14	2	6	30	-22
Wuwei	Gansu	NW	27	4	14	77	27	2	11	44	-2
Zhangye	Gansu	NW	21	2	9	54	17	2	5	30	-17
Guyuan	Ningxia	NW	25	3	9	53	22	1	14	32	-11
Shizuishan	Ningxia	NW	30	3	13	51	23	1	12	31	-25
Wuzhong	Ningxia	NW	26	3	13	46	28	2	17	35	8

Yinchuan	Ningxia	NW	41	3	21	68	34	3	18	50	-16
Zhongwei	Ningxia	NW	27	3	13	74	26	2	17	36	-4
Aksu	Sinkiang	NW	99	16	22	281	52	6	28	95	-47
Hami	Sinkiang	NW	29	9	11	191	22	2	11	40	-26
Hotan	Sinkiang	NW	130	29	26	646	82	12	21	180	-37
Kashgar	Sinkiang	NW	103	20	25	329	45	10	10	141	-57
Karamay	Sinkiang	NW	20	1	15	35	16	1	12	20	-22
Kizilsu	Sinkiang	NW	59	13	7	209	20	5	0	65	-65
Shihezi	Sinkiang	NW	32	6	9	106	21	2	11	35	-33
Urumchi	Sinkiang	NW	32	3	10	58	30	3	15	56	-6
Wujiaqu	Sinkiang	NW	32	3	12	57	30	3	13	52	-4
Yili	Sinkiang	NW	26	2	11	35	26	2	10	37	-2
Ezhou	Hubei	SE	33	4	8	67	51	3	22	71	53
Huanggang	Hubei	SE	33	3	9	64	46	3	21	60	42
Jingmen	Hubei	SE	32	4	13	77	57	5	23	84	79
Shiyan	Hubei	SE	30	3	9	61	42	4	23	64	39
Wuhan	Hubei	SE	32	3	13	62	53	4	24	76	66
Xianning	Hubei	SE	31	3	10	62	57	3	25	69	85
Xiangyang	Hubei	SE	33	4	10	74	45	4	24	74	38
Xiaogan	Hubei	SE	36	3	19	61	57	3	31	76	58
Yichang	Hubei	SE	29	4	10	74	48	4	26	84	67
Anqing	Anhui	SE	38	3	14	58	35	3	14	58	7
Bengbu	Anhui	SE	41	4	12	71	55	4	18	76	34
Bozhou	Anhui	SE	34	3	19	63	63	5	28	103	84
Chuzhou	Anhui	SE	42	4	14	77	52	5	22	80	24
Fuyang	Anhui	SE	31	3	13	61	47	3	25	76	49

Hefei	Anhui	SE	35	4	8	60	43	4	13	65	23
Huaibei	Anhui	SE	37	4	14	86	41	2	22	51	10
Huainan	Anhui	SE	23	3	6	53	41	4	9	62	80
Huangshan	Anhui	SE	22	2	6	37	35	5	10	62	63
Lu'an	Anhui	SE	37	3	12	67	50	2	34	64	36
Ma'anshan	Anhui	SE	38	3	16	58	50	5	21	85	32
Suzhou	Anhui	SE	56	7	22	111	58	4	34	79	2
Tongling	Anhui	SE	42	4	14	80	54	5	24	85	28
Wuhu	Anhui	SE	30	3	10	52	44	4	17	70	49
Changzhou	Jiangsu	SE	31	3	11	67	40	5	8	61	29
Huaian	Jiangsu	SE	32	3	10	59	45	4	12	74	38
Lianyungang	Jiangsu	SE	33	4	9	64	42	5	13	90	30
Nanjing	Jiangsu	SE	29	3	7	47	39	4	13	63	36
Nantong	Jiangsu	SE	34	4	10	62	42	6	10	96	22
Suzhou	Jiangsu	SE	33	3	9	54	54	7	15	96	63
Suqian	Jiangsu	SE	37	3	12	67	45	3	18	71	23
Taizhou	Jiangsu	SE	36	4	10	68	38	4	13	62	7
Wuxi	Jiangsu	SE	35	3	12	59	52	6	15	90	50
Xuzhou	Jiangsu	SE	31	3	10	56	38	2	26	52	21
Yanchen	Jiangsu	SE	30	4	8	67	29	3	8	49	-4
Yangzhou	Jiangsu	SE	31	3	9	57	38	3	17	55	22
Zhenjiang	Jiangsu	SE	38	4	10	65	46	5	15	70	20
Shanghai	Municipality	SE	31	3	9	54	56	8	11	122	79
Hangzhou	Zhejiang	SE	32	3	9	63	43	5	12	74	32
Huzhou	Zhejiang	SE	31	2	17	54	49	5	20	77	55
Jiaxing	Zhejiang	SE	32	3	10	47	52	6	16	99	64

Jinhua	Zhejiang	SE	33	3	13	57	53	6	19	100	60
Lishui	Zhejiang	SE	23	2	6	33	30	3	14	45	33
Ningbo	Zhejiang	SE	23	2	9	37	36	5	10	73	57
Quzhou	Zhejiang	SE	33	3	13	57	52	6	19	81	58
Shaoxing	Zhejiang	SE	33	3	12	63	57	7	21	113	75
Taizhou	Zhejiang	SE	25	2	10	40	29	4	8	61	17
Wenjiang	Zhejiang	SE	30	2	15	42	30	3	12	47	1
Zhoushan	Zhejiang	SE	17	1	8	30	23	3	7	47	40
Fuzhou	Jiangxi	SE	28	2	15	50	44	4	16	74	57
Ganzhou	Jiangxi	SE	38	3	20	63	44	4	24	73	15
Ji'an	Jiangxi	SE	32	3	15	56	41	4	19	65	28
Jingdezhen	Jiangxi	SE	31	2	14	47	45	4	17	66	46
Jiujiang	Jiangxi	SE	31	3	9	49	48	4	24	69	57
Nanchang	Jiangxi	SE	23	2	8	36	40	4	10	68	74
Pingxiang	Jiangxi	SE	23	2	13	40	49	5	15	78	116
Shangrao	Jiangxi	SE	41	3	19	61	38	4	20	71	-8
Xinyu	Jiangxi	SE	25	2	10	36	38	4	15	59	54
Yichun	Jiangxi	SE	31	1	25	49	48	2	28	62	52
Yingtan	Jiangxi	SE	21	2	6	42	39	4	20	66	87
Changsha	Hunan	SE	27	2	14	49	59	4	21	86	117
Changde	Hunan	SE	22	2	6	43	31	2	11	43	39
Chenzhou	Hunan	SE	27	2	12	48	45	8	12	126	70
Huaihua	Hunan	SE	21	1	13	33	49	4	17	76	130
Loudi	Hunan	SE	28	2	15	40	54	3	21	71	90
Xiangtan	Hunan	SE	27	2	15	46	58	4	22	79	111
Yiyang	Hunan	SE	28	2	17	51	49	3	19	68	77

Yongzhou	Hunan	SE	37	2	25	55	44	3	22	63	19
Zhangjiajie	Hunan	SE	23	3	9	56	45	4	17	71	96
Zhuzhou	Hunan	SE	22	1	11	34	50	4	21	85	126
Dongguan	Guangdong	SE	26	2	11	45	35	3	16	57	34
Foshan	Guangdong	SE	34	3	20	59	44	4	18	75	31
Guangzhou	Guangdong	SE	34	2	17	47	39	3	19	63	16
Heyuan	Guangdong	SE	25	2	10	37	31	4	12	54	24
Huizhou	Guangdong	SE	22	2	10	39	25	4	7	44	15
Jiangmen	Guangdong	SE	19	2	10	39	36	5	12	67	85
Maoming	Guangdong	SE	19	3	5	56	28	6	4	65	47
Meizhou	Guangdong	SE	23	2	9	43	26	3	9	48	11
Qingyuan	Guangdong	SE	32	3	17	62	32	4	14	59	0
Shantou	Guangdong	SE	24	2	12	38	25	3	13	43	4
Shaoguan	Guangdong	SE	30	2	15	56	32	4	13	59	8
Shenzhen	Guangdong	SE	20	2	8	48	27	4	11	47	36
Zhujiang	Guangdong	SE	15	2	6	42	31	6	7	69	102
Zhaoqing	Guangdong	SE	30	2	15	53	40	4	17	73	35
Zhongshan	Guangdong	SE	19	3	7	56	28	5	7	59	46
Zhuhai	Guangdong	SE	17	3	6	55	26	5	7	57	53
Fuzhou	Fujian	SE	22	2	6	38	17	2	7	27	-25
Longyan	Fujian	SE	17	2	5	36	19	2	10	37	12
Nanping	Fujian	SE	18	2	3	37	18	3	9	37	-1
Ningde	Fujian	SE	21	2	7	35	17	2	7	30	-18
Putian	Fujian	SE	23	2	10	44	19	2	9	30	-19
Quanzhou	Fujian	SE	20	2	7	33	16	1	9	26	-23
Sanming	Fujian	SE	21	2	4	38	22	3	11	44	6

Xiamen	Fujian	SE	21	2	10	36	19	1	12	30	6
Zhangzhou	Fujian	SE	20	2	8	44	20	1	14	29	-2
Haikou	Hainan	SE	12	1	7	25	20	3	7	48	60
Sanya	Hainan	SE	10	0	6	13	11	1	6	19	18
Chongqing	Municipality	SW	34	3	11	64	53	3	24	71	53
Bazhong	Sichuan	SW	17	1	8	25	23	2	14	36	36
Chengdu	Sichuan	SW	33	4	9	75	54	4	30	78	63
Dazhou	Sichuan	SW	32	2	13	50	62	4	33	85	92
Deyang	Sichuan	SW	31	3	12	58	53	5	28	94	73
Guangyuan	Sichuan	SW	13	2	4	52	13	1	8	18	3
Leshan	Sichuan	SW	29	4	7	82	55	6	23	105	89
Luzhou	Sichuan	SW	36	5	6	84	57	8	13	111	60
Meishan	Sichuan	SW	32	4	8	63	51	6	25	100	58
Mianyang	Sichuan	SW	25	2	8	40	41	3	19	70	67
Nanchong	Sichuan	SW	36	3	15	59	50	3	28	65	40
Panzhihua	Sichuan	SW	22	1	12	32	28	2	17	40	28
Suining	Sichuan	SW	29	3	8	51	47	3	18	71	63
Ya'an	Sichuan	SW	15	2	6	36	16	1	10	25	4
Ziyang	Sichuan	SW	18	1	12	31	25	2	15	42	39
Zigong	Sichuan	SW	37	4	17	80	57	6	29	88	54
Baoshan	Yunnan	SW	20	1	13	34	18	1	14	23	-8
Chuxiong	Yunnan	SW	14	1	5	26	24	3	6	45	77
Dali	Yunnan	SW	13	2	4	31	13	1	9	24	0
Dehong	Yunnan	SW	21	1	13	33	19	1	12	32	-8
Honghe	Yunnan	SW	19	4	5	78	34	4	14	68	78
Kunming	Yunnan	SW	18	2	9	38	27	3	12	43	49

Lijiang	Yunnan	SW	15	0	14	22	16	0	14	19	3
Lincang	Yunnan	SW	15	1	8	26	17	1	14	24	14
Nujiang	Yunnan	SW	12	0	8	15	13	0	11	16	10
Qujing	Yunnan	SW	23	2	8	44	34	3	16	51	46
Wenshan	Yunnan	SW	27	2	17	48	40	2	28	53	50
Xishuangbanna	Yunnan	SW	7	1	2	13	16	1	5	23	122
Tuxi	Yunnan	SW	13	1	5	25	26	3	8	40	107
Zhaotong	Yunnan	SW	31	3	15	56	37	4	10	68	17
Anshun	Guizhou	SW	19	1	14	33	34	3	17	57	84
Bijie	Guizhou	SW	18	2	6	32	29	3	4	48	56
Guiyang	Guizhou	SW	19	2	7	42	41	3	10	60	115
Liupanshui	Guizhou	SW	26	3	11	52	42	5	11	67	61
Tongren	Guizhou	SW	15	0	13	16	19	1	14	29	29
Zunyi	Guizhou	SW	19	2	7	37	35	3	15	58	81
Baise	Guangxi	SW	28	3	7	63	37	4	6	59	30
Beihai	Guangxi	SW	16	2	6	42	24	5	5	59	53
Chongzuo	Guangxi	SW	20	2	5	38	29	5	7	63	48
Fangchenggang	Guangxi	SW	18	2	7	46	26	6	7	66	44
Guigang	Guangxi	SW	37	3	17	73	39	7	11	85	5
Guilin	Guangxi	SW	25	2	14	41	43	5	10	66	72
Hechi	Guangxi	SW	28	3	16	55	42	5	11	70	49
Hezhou	Guangxi	SW	31	2	20	44	37	6	10	72	22
Laibin	Guangxi	SW	34	3	15	70	39	6	11	80	16
Liuzhou	Guangxi	SW	34	3	16	68	45	7	14	83	34
Nanning	Guangxi	SW	27	4	8	62	37	7	7	70	37
Qinzhou	Guangxi	SW	22	3	10	47	29	6	7	69	32

Wuzhou	Guangxi	SW	32	3	19	56	36	5	13	60	10
Yulin	Guangxi	SW	30	3	11	53	32	5	13	65	6
Golog	Qinghai	TP	34	2	22	47	49	3	40	80	42
Haidong	Qinghai	TP	41	2	28	56	42	4	29	72	1
Xining	Qinghai	TP	33	2	15	62	33	2	25	48	-1
Ali	Tibet	TP	14	2	7	33	11	1	5	21	-19
Qamdo	Tibet	TP	17	1	9	35	14	1	8	18	-14
Lhasa	Tibet	TP	18	1	10	36	19	2	12	39	7
Nyingchi	Tibet	TP	8	0	5	12	6	0	5	8	-22
Naqu	Tibet	TP	35	4	16	77	40	4	26	68	12
Shigatse	Tibet	TP	16	2	5	37	13	1	7	26	-22
Lhoka	Tibet	TP	9	1	3	14	5	0	4	7	-43

[a] NC, NE, NW, SE, SW, TP represent north China, northeast China, northwest China, southeast China, southwest China, and the Tibetan Plateau, respectively.

[b] Negative values with red color mean significant (p<0.05 or 0.01) reduction, and positive values mean increase.

Table S2. Summary of daily average $PM_{2.5}$ concentrations (μg m^{-3}) during the pre-Parade Blue, Parade Blue and post-Parade Blue periods in the 291 cities across China.

City	Province	Region[a]	Pre-Parade Blue period[b]				Parade Blue period[b]				Post-Parade Blue period[b]			
			Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max
Beijing	Municipality	EC	59	6	17	119	17	2	8	33	52	8	7	146
Tianjing	Municipality	EC	62	5	20	116	32	4	15	77	47	5	9	116
Baoding	Hebei	EC	88	7	29	148	35	4	16	75	66	8	15	159
Cangzhou	Hebei	EC	59	6	17	119	17	2	8	33	39	5	9	88
Chengde	Hebei	EC	31	4	11	73	14	0	11	17	28	4	9	95

Handan	Hebei	EC	81	7	35	147	52	7	9	91	63	6	15	131
Hengshui	Hebei	EC	91	7	33	159	47	5	25	92	76	8	24	167
Langfang	Hebei	EC	69	6	17	113	24	4	5	78	54	7	4	132
Qinhuangdao	Hebei	EC	45	6	10	92	7	1	4	23	15	2	4	46
Shijiazhuang	Hebei	EC	78	7	20	128	35	5	6	77	45	5	11	98
Tangshan	Hebei	EC	73	6	25	118	13	2	4	29	43	5	8	91
Xingtai	Hebei	EC	83	7	30	144	45	7	8	101	60	5	17	103
Zhangjiakou	Hebei	EC	29	3	17	66	18	1	9	27	27	4	11	71
Changzhi	Shanxi	EC	59	5	22	96	39	3	25	55	47	3	15	79
Datong	Shanxi	EC	26	2	13	59	16	1	12	22	27	3	9	71
Jincheng	Shanxi	EC	41	3	11	69	37	3	19	70	37	4	8	104
Jinzhong	Shanxi	EC	39	3	21	71	26	3	11	51	43	4	8	88
Linfen	Shanxi	EC	32	2	19	44	27	2	17	43	40	3	11	63
Lvliang	Shanxi	EC	46	4	17	88	29	2	18	40	46	4	18	85
Shuozhou	Shanxi	EC	39	2	18	54	28	1	22	36	39	4	17	89
Taiyuan	Shanxi	EC	44	3	26	73	23	3	9	55	46	5	10	106
Xinzhou	Shanxi	EC	39	3	23	61	20	2	12	36	44	5	12	107
Yangquan	Shanxi	EC	38	3	16	64	19	2	9	31	36	4	6	70
Yuncheng	Shanxi	EC	58	3	29	78	48	3	29	69	38	2	16	68
Binzhou	Shandong	EC	49	5	12	94	37	4	18	69	51	6	12	139
Dezhou	Shandong	EC	89	6	25	133	44	4	23	85	72	8	22	159
Dongying	Shandong	EC	65	7	21	123	43	4	21	80	51	6	13	117
Jinan	Shandong	EC	59	5	21	87	50	4	30	82	72	5	23	118
Jining	Shandong	EC	50	5	22	103	49	3	34	78	58	4	21	101
Laiwu	Shandong	EC	54	6	19	98	65	5	40	101	62	5	19	122
Liaocheng	Shandong	EC	67	6	24	105	49	5	17	80	73	6	27	122

Linyi	Shandong	EC	37	4	15	76	43	4	25	78	45	6	13	133
Qingdao	Shandong	EC	35	4	9	60	30	3	14	71	25	3	9	71
Rizhao	Shandong	EC	39	4	8	75	40	5	16	74	37	5	7	93
Tai'an	Shandong	EC	42	4	21	76	40	3	20	67	51	4	20	92
Weihai	Shandong	EC	38	4	19	74	22	2	7	31	20	2	7	47
Weifang	Shandong	EC	51	6	17	102	55	7	25	115	50	7	17	170
Yantai	Shandong	EC	39	5	14	87	23	2	9	36	23	2	9	63
Zaozhuang	Shandong	EC	45	5	16	83	51	3	40	74	60	6	9	144
Zibo	Shandong	EC	56	4	29	90	55	4	35	89	68	6	26	135
Alxa League	Inner Mongolia	EC	38	3	18	66	33	1	22	40	36	2	21	60
Bayannur	Inner Mongolia	EC	33	3	15	56	32	1	21	41	39	3	22	71
Baotou	Inner Mongolia	EC	35	3	11	56	22	1	13	30	33	3	8	74
Chifeng	Inner Mongolia	EC	22	2	10	47	13	1	11	18	25	3	7	69
Ordos	Inner Mongolia	EC	22	3	5	40	12	1	8	18	22	3	6	61
Hohhot	Inner Mongolia	EC	23	2	8	43	14	1	10	23	27	3	5	64
Hulun Buir	Inner Mongolia	EC	28	2	18	48	26	2	16	38	22	1	15	36
Tongliao	Inner Mongolia	EC	46	6	17	99	25	3	17	55	27	3	13	74
Wuhai	Inner Mongolia	EC	42	4	18	85	30	2	18	44	51	5	18	109
Hinggan League	Inner Mongolia	EC	27	2	15	37	21	1	15	28	18	1	8	33
Anyang	Henan	EC	61	5	30	106	46	5	16	82	68	6	29	158
Hebi	Henan	EC	50	4	26	76	31	4	10	61	44	4	20	92
Jiaozuo	Henan	EC	40	3	13	61	41	4	12	63	37	3	15	70
Kaifeng	Henan	EC	45	4	21	81	38	4	17	69	54	5	20	124
Luoyang	Henan	EC	56	6	20	95	41	3	21	56	41	4	12	80
Luohe	Henan	EC	48	5	21	87	52	3	31	71	81	7	32	194
Nanyang	Henan	EC	49	4	22	84	56	4	31	85	55	4	33	97

Pingdingshan	Henan	EC	53	6	19	91	50	3	33	73	68	5	29	142
Sanmenxia	Henan	EC	58	5	17	94	39	3	20	56	36	3	8	66
Shangqiu	Henan	EC	41	4	19	88	40	4	18	79	47	4	18	102
Xinyang	Henan	EC	29	4	13	67	40	3	22	61	47	4	15	94
Zhengzhou	Henan	EC	61	6	25	112	50	6	17	98	70	6	31	162
Zhoukou	Henan	EC	36	3	22	60	42	3	21	58	68	6	26	146
Zhumadian	Henan	EC	41	4	16	76	41	3	16	59	60	6	20	130
Anshan	Liaoning	NEC	42	5	14	72	43	2	30	59	41	4	17	95
Benxi	Liaoning	NEC	34	3	17	72	30	2	12	45	31	3	11	61
Chaoyang	Liaoning	NEC	30	4	13	65	14	1	9	25	30	5	9	105
Dalian	Liaoning	NEC	41	5	13	97	23	3	11	52	24	2	8	59
Dandong	Liaoning	NEC	24	4	1	51	20	2	8	28	26	2	8	53
Fushun	Liaoning	NEC	27	3	12	63	18	2	6	28	28	3	6	54
Fuxin	Liaoning	NEC	44	6	11	97	18	2	9	34	32	3	10	83
Huludao	Liaoning	NEC	66	9	20	137	24	2	15	48	34	4	9	92
Jinzhou	Liaoning	NEC	58	8	23	125	19	2	10	44	34	4	10	85
Liaoyang	Liaoning	NEC	36	4	11	69	31	2	18	41	34	3	11	80
Panjin	Liaoning	NEC	41	6	13	93	18	2	10	43	26	3	7	59
Shenyang	Liaoning	NEC	36	4	16	66	23	2	11	35	36	4	10	77
Tieling	Liaoning	NEC	28	3	13	53	17	2	7	31	28	3	11	71
Wafangdian	Liaoning	NEC	48	6	19	103	27	1	21	38	38	3	13	84
Yingkou	Liaoning	NEC	25	3	11	45	23	3	9	51	22	3	5	66
Baicheng	Jilin	NEC	47	2	36	63	42	1	32	51	36	2	22	61
Baishan	Jilin	NEC	29	3	15	52	25	2	17	38	30	2	17	43
Changchun	Jilin	NEC	29	4	16	73	23	2	8	39	27	2	12	63
Jilin	Jilin	NEC	19	2	10	39	18	2	8	30	24	2	13	54

Liaoyuan	Jilin	NEC	36	5	13	76	36	6	14	81	36	3	17	79
Siping	Jilin	NEC	35	5	15	89	23	2	12	38	33	3	15	80
Songyuan	Jilin	NEC	20	1	10	36	13	1	5	23	19	2	8	41
Daqing	Heilongjiang	NEC	30	2	17	51	21	1	15	33	22	2	13	42
Daxinganling	Heilongjiang	NEC	13	2	5	40	10	1	7	14	13	1	4	29
Harbin	Heilongjiang	NEC	25	2	15	38	18	2	11	35	21	2	10	42
Hegang	Heilongjiang	NEC	47	2	33	70	28	4	6	61	11	1	5	27
Heihe	Heilongjiang	NEC	33	1	26	44	27	1	18	34	10	1	4	33
Jixi	Heilongjiang	NEC	19	1	14	25	16	1	11	27	19	1	9	32
Jiamusi	Heilongjiang	NEC	15	1	6	24	13	1	7	29	11	1	5	17
Mudanjiang	Heilongjiang	NEC	20	1	16	27	22	1	14	33	23	1	16	38
Qitaihe	Heilongjiang	NEC	22	1	17	32	21	1	14	33	25	1	13	39
Qiqihar	Heilongjiang	NEC	19	2	7	31	13	1	6	22	16	1	6	31
Shuangyashan	Heilongjiang	NEC	23	1	17	28	26	1	19	34	20	1	10	31
Suihua	Heilongjiang	NEC	15	1	9	26	11	1	8	15	16	1	10	29
Ankang	Shaanxi	NEC	21	2	7	43	27	2	13	44	37	3	13	63
Baoji	Shaanxi	NEC	38	5	11	78	34	4	11	68	35	4	8	71
Hanzhong	Shaanxi	NEC	27	3	10	60	32	2	18	40	32	2	9	58
Shangluo	Shaanxi	NEC	28	3	9	65	27	2	14	42	35	3	12	65
Tongchuan	Shaanxi	NEC	36	4	12	71	32	2	14	45	37	3	11	60
Weinan	Shaanxi	NEC	36	3	8	58	34	3	17	52	55	5	10	119
Xi'an	Shaanxi	NEC	45	4	13	73	40	3	20	66	38	3	11	77
Xianyang	Shaanxi	NEC	38	4	10	60	35	3	19	55	43	4	14	94
Yan'an	Shaanxi	NEC	33	3	14	59	24	2	14	44	36	4	12	70
Yulin	Shaanxi	NEC	30	3	12	53	20	2	9	33	31	3	5	75
Baiying	Gansu	NEC	26	3	9	65	27	1	21	33	26	2	9	47

Dingxi	Gansu	NEC	21	1	9	29	28	1	19	36	22	1	14	32
Gannan	Gansu	NEC	17	1	9	33	26	3	15	53	21	2	9	42
Jiayuguan	Gansu	NEC	23	5	10	86	26	3	12	58	17	2	7	48
Jiuquan	Gansu	NEC	36	6	19	121	35	3	18	61	26	1	17	51
Lanzhou	Gansu	NEC	36	2	19	62	32	1	24	38	35	2	18	57
Linxia	Gansu	NEC	18	1	7	28	21	2	12	35	23	1	13	31
Pingliang	Gansu	NEC	30	3	10	68	20	2	12	29	23	2	10	55
Qingyang	Gansu	NEC	22	3	7	57	20	2	11	31	20	2	5	39
Tianshui	Gansu	NEC	18	3	6	67	14	2	6	30	11	1	4	22
Wuwei	Gansu	NEC	27	4	14	77	27	2	11	44	19	1	8	32
Zhangye	Gansu	NEC	21	2	9	54	17	2	5	30	17	1	10	44
Guyuan	Ningxia	NEC	25	3	9	53	22	1	14	32	20	2	9	39
Shizuishan	Ningxia	NEC	30	3	13	51	23	1	12	31	32	3	7	71
Wuzhong	Ningxia	NEC	26	3	13	46	28	2	17	35	28	2	4	55
Yinchuan	Ningxia	NEC	41	3	21	68	34	3	18	50	32	2	11	54
Zhongwei	Ningxia	NEC	27	3	13	74	26	2	17	36	29	3	8	60
Aksu	Sinkiang	NEC	99	16	22	281	52	6	28	95	43	6	18	169
Hami	Sinkiang	NEC	29	9	11	191	22	2	11	40	18	1	9	36
Hotan	Sinkiang	NEC	130	29	26	646	82	12	21	180	61	8	19	215
Kashgar	Sinkiang	NEC	103	20	25	329	45	10	10	141	59	8	12	156
Karamay	Sinkiang	NEC	20	1	15	35	16	1	12	20	16	1	10	26
Kizilsu	Sinkiang	NEC	59	13	7	209	20	5	0	65	27	5	6	97
Shihezi	Sinkiang	NEC	32	6	9	106	21	2	11	35	28	6	8	155
Urumchi	Sinkiang	NEC	32	3	10	58	30	3	15	56	27	3	9	75
Wujiaqu	Sinkiang	NEC	32	3	12	57	30	3	13	52	32	4	5	90
Yili	Sinkiang	NEC	26	2	11	35	26	2	10	37	29	3	10	58

Ezhou	Hubei	NEC	33	4	8	67	51	3	22	71	49	2	18	72
Huanggang	Hubei	NEC	33	3	9	64	46	3	21	60	42	2	14	61
Jingmen	Hubei	NEC	32	4	13	77	57	5	23	84	66	4	21	120
Shiyan	Hubei	NEC	30	3	9	61	42	4	23	64	51	4	13	101
Wuhan	Hubei	NEC	32	3	13	62	53	4	24	76	47	2	19	64
Xianning	Hubei	NEC	31	3	10	62	57	3	25	69	44	2	18	61
Xiangyang	Hubei	NEC	33	4	10	74	45	4	24	74	55	4	19	94
Xiaogan	Hubei	NEC	36	3	19	61	57	3	31	76	53	3	30	85
Yichang	Hubei	NEC	29	4	10	74	48	4	26	84	48	4	10	79
Anqing	Anhui	NEC	38	3	14	58	35	3	14	58	39	2	11	57
Bengbu	Anhui	NEC	41	4	12	71	55	4	18	76	52	4	13	103
Bozhou	Anhui	NEC	34	3	19	63	63	5	28	103	61	4	16	114
Chuzhou	Anhui	NEC	42	4	14	77	52	5	22	80	48	3	27	87
Fuyang	Anhui	NEC	31	3	13	61	47	3	25	76	37	3	10	71
Hefei	Anhui	NEC	35	4	8	60	43	4	13	65	40	3	15	63
Huaibei	Anhui	NEC	37	4	14	86	41	2	22	51	45	4	16	85
Huainan	Anhui	NEC	23	3	6	53	41	4	9	62	40	4	7	89
Huangshan	Anhui	NEC	22	2	6	37	35	5	10	62	28	2	10	45
Lu'an	Anhui	NEC	37	3	12	67	50	2	34	64	40	2	11	55
Ma'anshan	Anhui	NEC	38	3	16	58	50	5	21	85	40	2	24	69
Suzhou	Anhui	NEC	56	7	22	111	58	4	34	79	58	6	16	151
Tongling	Anhui	NEC	42	4	14	80	54	5	24	85	34	2	19	51
Wuhu	Anhui	NEC	30	3	10	52	44	4	17	70	41	3	21	68
Changzhou	Jiangsu	NEC	31	3	11	67	40	5	8	61	29	2	16	63
Huaian	Jiangsu	NEC	32	3	10	59	45	4	12	74	29	2	10	60
Lianyungang	Jiangsu	NEC	33	4	9	64	42	5	13	90	31	4	6	85

Nanjing	Jiangsu	NEC	29	3	7	47	39	4	13	63	28	2	14	63
Nantong	Jiangsu	NEC	34	4	10	62	42	6	10	96	33	3	15	74
Suzhou	Jiangsu	NEC	33	3	9	54	54	7	15	96	36	3	13	78
Suqian	Jiangsu	NEC	37	3	12	67	45	3	18	71	37	4	8	103
Taizhou	Jiangsu	NEC	36	4	10	68	38	4	13	62	34	3	16	64
Wuxi	Jiangsu	NEC	35	3	12	59	52	6	15	90	38	2	18	77
Xuzhou	Jiangsu	NEC	31	3	10	56	38	2	26	52	36	4	14	84
Yanchen	Jiangsu	NEC	30	4	8	67	29	3	8	49	23	2	10	58
Yangzhou	Jiangsu	NEC	31	3	9	57	38	3	17	55	30	3	11	67
Zhenjiang	Jiangsu	NEC	38	4	10	65	46	5	15	70	37	3	17	80
Shanghai	Municipality	NEC	31	3	9	54	56	8	11	122	30	2	10	71
Hangzhou	Zhejiang	NEC	32	3	9	63	43	5	12	74	39	3	12	69
Huzhou	Zhejiang	NEC	31	2	17	54	49	5	20	77	34	2	17	78
Jiaxing	Zhejiang	NEC	32	3	10	47	52	6	16	99	37	3	13	85
Jinhua	Zhejiang	NEC	33	3	13	57	53	6	19	100	47	4	16	93
Lishui	Zhejiang	NEC	23	2	6	33	30	3	14	45	32	4	5	77
Ningbo	Zhejiang	NEC	23	2	9	37	36	5	10	73	31	2	14	62
Quzhou	Zhejiang	NEC	33	3	13	57	52	6	19	81	37	3	15	66
Shaoxing	Zhejiang	NEC	33	3	12	63	57	7	21	113	43	3	11	70
Taizhou	Zhejiang	NEC	25	2	10	40	29	4	8	61	30	2	16	67
Wenjiang	Zhejiang	NEC	30	2	15	42	30	3	12	47	31	2	15	52
Zhoushan	Zhejiang	NEC	17	1	8	30	23	3	7	47	19	2	11	48
Fuzhou	Jiangxi	NEC	28	2	15	50	44	4	16	74	41	2	15	60
Ganzhou	Jiangxi	NEC	38	3	20	63	44	4	24	73	44	2	28	67
Ji'an	Jiangxi	NEC	32	3	15	56	41	4	19	65	43	2	18	61
Jingdezhen	Jiangxi	NEC	31	2	14	47	45	4	17	66	32	2	13	54

Jiujiang	Jiangxi	NEC	31	3	9	49	48	4	24	69	35	2	10	51
Nanchang	Jiangxi	NEC	23	2	8	36	40	4	10	68	29	2	7	55
Pingxiang	Jiangxi	NEC	23	2	13	40	49	5	15	78	44	3	18	62
Shangrao	Jiangxi	NEC	41	3	19	61	38	4	20	71	32	2	17	65
Xinyu	Jiangxi	NEC	25	2	10	36	38	4	15	59	34	2	11	47
Yichun	Jiangxi	NEC	31	1	25	49	48	2	28	62	43	2	27	53
Yingtan	Jiangxi	NEC	21	2	6	42	39	4	20	66	39	3	11	62
Changsha	Hunan	NEC	27	2	14	49	59	4	21	86	48	3	15	89
Changde	Hunan	NEC	22	2	6	43	31	2	11	43	32	2	9	56
Chenzhou	Hunan	NEC	27	2	12	48	45	8	12	126	47	4	15	84
Huaihua	Hunan	NEC	21	1	13	33	49	4	17	76	45	4	14	101
Loudi	Hunan	NEC	28	2	15	40	54	3	21	71	44	3	15	90
Xiangtan	Hunan	NEC	27	2	15	46	58	4	22	79	49	3	15	92
Yiyang	Hunan	NEC	28	2	17	51	49	3	19	68	45	2	18	65
Yongzhou	Hunan	NEC	37	2	25	55	44	3	22	63	54	5	24	133
Zhangjiajie	Hunan	NEC	23	3	9	56	45	4	17	71	43	3	8	67
Zhuzhou	Hunan	NEC	22	1	11	34	50	4	21	85	40	2	13	58
Dongguan	Guangdong	NEC	26	2	11	45	35	3	16	57	39	2	19	68
Foshan	Guangdong	NEC	34	3	20	59	44	4	18	75	38	2	17	55
Guangzhou	Guangdong	NEC	34	2	17	47	39	3	19	63	41	2	23	63
Heyuan	Guangdong	NEC	25	2	10	37	31	4	12	54	38	2	14	59
Huizhou	Guangdong	NEC	22	2	10	39	25	4	7	44	24	2	6	48
Jiangmen	Guangdong	NEC	19	2	10	39	36	5	12	67	33	2	15	55
Maoming	Guangdong	NEC	19	3	5	56	28	6	4	65	25	3	9	52
Meizhou	Guangdong	NEC	23	2	9	43	26	3	9	48	35	2	14	62
Qingyuan	Guangdong	NEC	32	3	17	62	32	4	14	59	30	3	11	91

Shantou	Guangdong	NEC	24	2	12	38	25	3	13	43	29	2	16	50
Shaoguan	Guangdong	NEC	30	2	15	56	32	4	13	59	40	3	10	73
Shenzhen	Guangdong	NEC	20	2	8	48	27	4	11	47	30	2	14	54
Zhujiang	Guangdong	NEC	15	2	6	42	31	6	7	69	25	3	10	61
Zhaoqing	Guangdong	NEC	30	2	15	53	40	4	17	73	40	3	16	68
Zhongshan	Guangdong	NEC	19	3	7	56	28	5	7	59	31	3	11	62
Zhuhai	Guangdong	NEC	17	3	6	55	26	5	7	57	26	2	9	52
Fuzhou	Fujian	NEC	22	2	6	38	17	2	7	27	21	1	9	39
Longyan	Fujian	NEC	17	2	5	36	19	2	10	37	27	2	11	47
Nanping	Fujian	NEC	18	2	3	37	18	3	9	37	23	2	9	41
Ningde	Fujian	NEC	21	2	7	35	17	2	7	30	21	1	8	36
Putian	Fujian	NEC	23	2	10	44	19	2	9	30	25	1	11	39
Quanzhou	Fujian	NEC	20	2	7	33	16	1	9	26	23	1	10	39
Sanming	Fujian	NEC	21	2	4	38	22	3	11	44	25	2	7	41
Xiamen	Fujian	NEC	21	2	10	36	19	1	12	30	27	1	11	40
Zhangzhou	Fujian	NEC	20	2	8	44	20	1	14	29	26	1	9	45
Haikou	Hainan	NEC	12	1	7	25	20	3	7	48	16	2	4	41
Sanya	Hainan	NEC	10	0	6	13	11	1	6	19	12	1	4	21
Chongqing	Municipality	NEC	34	3	11	64	53	3	24	71	30	3	10	61
Bazhong	Sichuan	NEC	17	1	8	25	23	2	14	36	20	2	6	34
Chengdu	Sichuan	NEC	33	4	9	75	54	4	30	78	31	3	9	88
Dazhou	Sichuan	NEC	32	2	13	50	62	4	33	85	43	3	16	66
Deyang	Sichuan	NEC	31	3	12	58	53	5	28	94	27	2	9	65
Guangyuan	Sichuan	NEC	13	2	4	52	13	1	8	18	9	1	4	16
Leshan	Sichuan	NEC	29	4	7	82	55	6	23	105	32	3	12	96
Luzhou	Sichuan	NEC	36	5	6	84	57	8	13	111	27	2	9	52

Meishan	Sichuan	NEC	32	4	8	63	51	6	25	100	28	4	8	117
Mianyang	Sichuan	NEC	25	2	8	40	41	3	19	70	21	2	3	49
Nanchong	Sichuan	NEC	36	3	15	59	50	3	28	65	38	3	18	77
Panzhihua	Sichuan	NEC	22	1	12	32	28	2	17	40	24	1	9	35
Suining	Sichuan	NEC	29	3	8	51	47	3	18	71	30	3	10	71
Ya'an	Sichuan	NEC	15	2	6	36	16	1	10	25	19	2	7	49
Ziyang	Sichuan	NEC	18	1	12	31	25	2	15	42	16	1	11	34
Zigong	Sichuan	NEC	37	4	17	80	57	6	29	88	38	3	15	86
Baoshan	Yunnan	NEC	20	1	13	34	18	1	14	23	17	1	11	22
Chuxiong	Yunnan	NEC	14	1	5	26	24	3	6	45	12	1	4	24
Dali	Yunnan	NEC	13	2	4	31	13	1	9	24	11	0	8	15
Dehong	Yunnan	NEC	21	1	13	33	19	1	12	32	21	1	12	32
Honghe	Yunnan	NEC	19	4	5	78	34	4	14	68	21	2	10	46
Kunming	Yunnan	NEC	18	2	9	38	27	3	12	43	20	1	9	37
Lijiang	Yunnan	NEC	15	0	14	22	16	0	14	19	17	1	14	31
Lincang	Yunnan	NEC	15	1	8	26	17	1	14	24	19	1	13	31
Nujiang	Yunnan	NEC	12	0	8	15	13	0	11	16	13	0	8	16
Qujing	Yunnan	NEC	23	2	8	44	34	3	16	51	23	1	6	35
Wenshan	Yunnan	NEC	27	2	17	48	40	2	28	53	26	1	16	40
Xishuangbanna	Yunnan	NEC	7	1	2	13	16	1	5	23	16	1	6	28
Tuxi	Yunnan	NEC	13	1	5	25	26	3	8	40	17	1	7	31
Zhaotong	Yunnan	NEC	31	3	15	56	37	4	10	68	14	1	7	35
Anshun	Guizhou	NEC	19	1	14	33	34	3	17	57	21	1	14	40
Bijie	Guizhou	NEC	18	2	6	32	29	3	4	48	16	2	5	38
Guiyang	Guizhou	NEC	19	2	7	42	41	3	10	60	25	2	9	55
Liupanshui	Guizhou	NEC	26	3	11	52	42	5	11	67	21	2	8	38

Tongren	Guizhou	NEC	15	0	13	16	19	1	14	29	22	2	13	47
Zunyi	Guizhou	NEC	19	2	7	37	35	3	15	58	28	2	9	58
Baise	Guangxi	NEC	28	3	7	63	37	4	6	59	31	3	11	55
Beihai	Guangxi	NEC	16	2	6	42	24	5	5	59	22	2	9	53
Chongzuo	Guangxi	NEC	20	2	5	38	29	5	7	63	24	2	8	52
Fangchenggang	Guangxi	NEC	18	2	7	46	26	6	7	66	23	2	11	50
Guigang	Guangxi	NEC	37	3	17	73	39	7	11	85	31	2	14	52
Guilin	Guangxi	NEC	25	2	14	41	43	5	10	66	52	4	19	87
Hechi	Guangxi	NEC	28	3	16	55	42	5	11	70	35	4	6	86
Hezhou	Guangxi	NEC	31	2	20	44	37	6	10	72	31	2	9	46
Laibin	Guangxi	NEC	34	3	15	70	39	6	11	80	35	3	8	68
Liuzhou	Guangxi	NEC	34	3	16	68	45	7	14	83	42	4	17	77
Nanning	Guangxi	NEC	27	4	8	62	37	7	7	70	29	3	8	61
Qinzhou	Guangxi	NEC	22	3	10	47	29	6	7	69	26	3	11	55
Wuzhou	Guangxi	NEC	32	3	19	56	36	5	13	60	34	2	14	55
Yulin	Guangxi	NEC	30	3	11	53	32	5	13	65	29	2	14	50
Golog	Qinghai	NEC	34	2	22	47	49	3	40	80	23	3	3	53
Haidong	Qinghai	NEC	41	2	28	56	42	4	29	72	35	1	24	44
Xining	Qinghai	NEC	33	2	15	62	33	2	25	48	32	2	12	64
Ali	Tibet	NEC	14	2	7	33	11	1	5	21	14	1	7	21
Qamdo	Tibet	NEC	17	1	9	35	14	1	8	18	15	1	5	26
Lhasa	Tibet	NEC	18	1	10	36	19	2	12	39	17	1	11	28
Nyingchi	Tibet	NEC	8	0	5	12	6	0	5	8	6	0	4	13
Naqu	Tibet	NEC	35	4	16	77	40	4	26	68	47	2	27	65
Shigatse	Tibet	NEC	16	2	5	37	13	1	7	26	14	1	5	28
Lhoka	Tibet	NEC	9	1	3	14	5	0	4	7	8	0	3	14

[a] EC and NEC denote emission control and non-emission control regions, respectively, of which the latter means regions without implementation of emission control measures.

[b] The pre-Parade Blue, Parade Blue, and post-Parade Blue periods indicate the periods of 1-19 August, 20 August-3 September, and 4-30 September 2015, respectively.

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Table S3. Summary statistical of daily average PM_{10} concentrations ($\mu g\ m^{-3}$) during the pre-Parade Blue and Parade Blue periods in the 291 cities across China

City	Province	Region	The Pre-Parade Blue period				The Parade Blue period				Reduction or Increase
			Mean	Standard Error	Min	Max	Mean	Standard Error	Min	Max	
Beijing	Municipality	NC	87	8	44	176	29	3	13	51	-67
Tianjing	Municipality	NC	111	8	57	200	58	7	23	125	-48
Baoding	Hebei	NC	152	10	61	241	70	8	33	142	-54
Cangzhou	Hebei	NC	87	8	44	176	29	3	13	51	-67
Chengde	Hebei	NC	72	5	43	121	32	2	23	46	-55
Handan	Hebei	NC	157	11	84	245	104	14	23	194	-34
Hengshui	Hebei	NC	121	9	51	221	69	9	12	141	-43
Langfang	Hebei	NC	131	9	47	200	56	8	21	147	-57
Qinhuangdao	Hebei	NC	90	8	30	175	25	3	13	54	-73
Shijiazhuang	Hebei	NC	136	11	41	212	70	8	16	127	-48
Tangshan	Hebei	NC	124	9	52	187	35	4	14	68	-72
Xingtai	Hebei	NC	127	9	65	208	81	11	20	162	-36
Zhangjiakou	Hebei	NC	70	14	37	320	40	3	16	54	-44
Changzhi	Shanxi	NC	89	7	34	148	63	4	41	86	-29

Datong	Shanxi	NC	70	11	36	250	44	3	24	66	-36
Jincheng	Shanxi	NC	92	7	28	139	73	7	39	140	-21
Jinzhong	Shanxi	NC	64	5	32	117	52	4	29	86	-19
Linfen	Shanxi	NC	58	4	39	118	45	4	25	70	-24
Lvliang	Shanxi	NC	66	4	31	101	46	2	34	62	-30
Shuozhou	Shanxi	NC	91	7	47	169	64	4	39	96	-30
Taiyuan	Shanxi	NC	92	7	45	169	58	5	25	97	-38
Xinzhou	Shanxi	NC	67	4	45	118	42	2	30	51	-37
Yangquan	Shanxi	NC	74	5	36	120	49	4	25	68	-34
Yuncheng	Shanxi	NC	92	11	38	242	74	6	43	113	-19
Binzhou	Shandong	NC	86	7	27	144	59	6	32	118	-32
Dezhou	Shandong	NC	137	9	41	204	71	8	25	140	-48
Dongying	Shandong	NC	109	11	35	196	79	7	44	130	-28
Jinan	Shandong	NC	101	7	37	137	85	7	50	135	-16
Jining	Shandong	NC	80	8	42	154	85	6	52	131	6
Laiwu	Shandong	NC	91	9	40	153	96	7	57	156	5
Liaocheng	Shandong	NC	135	12	47	223	101	11	32	169	-25
Linyi	Shandong	NC	91	10	36	173	91	8	55	174	0
Qingdao	Shandong	NC	75	5	37	115	68	6	40	135	-10
Rizhao	Shandong	NC	69	6	24	123	70	7	29	128	1
Tai'an	Shandong	NC	85	9	39	163	85	7	46	140	0
Weihai	Shandong	NC	69	6	39	123	41	3	21	59	-40
Weifang	Shandong	NC	101	9	47	177	99	12	44	198	-1
Yantai	Shandong	NC	75	7	36	141	50	4	23	75	-33
Zaozhuang	Shandong	NC	92	8	46	148	98	5	69	135	7
Zibo	Shandong	NC	109	7	56	159	106	9	63	164	-2

Alxa League	Inner Mongolia	NC	96	9	56	195	67	4	33	93	-30
Bayannur	Inner Mongolia	NC	82	8	43	193	67	3	54	94	-17
Baotou	Inner Mongolia	NC	86	8	35	165	62	3	39	90	-28
Chifeng	Inner Mongolia	NC	59	7	34	156	35	2	24	49	-41
Ordos	Inner Mongolia	NC	54	7	20	148	36	2	28	51	-33
Hohhot	Inner Mongolia	NC	87	8	46	207	54	4	33	80	-39
Hulun Buir	Inner Mongolia	NC	53	7	16	127	65	5	36	99	23
Tongliao	Inner Mongolia	NC	95	8	56	165	62	4	46	99	-35
Wuhai	Inner Mongolia	NC	104	12	43	280	67	5	33	104	-35
Hinggan League	Inner Mongolia	NC	61	3	41	82	43	2	34	53	-30
Anyang	Henan	NC	100	7	49	169	82	9	39	151	-19
Hebi	Henan	NC	99	6	59	144	66	8	27	132	-34
Jiaozuo	Henan	NC	84	6	40	137	71	8	18	123	-16
Kaifeng	Henan	NC	76	5	46	131	68	7	35	130	-10
Luoyang	Henan	NC	96	11	34	223	72	5	31	101	-25
Luohe	Henan	NC	80	6	42	117	99	7	57	141	24
Nanyang	Henan	NC	93	6	48	140	109	7	67	148	17
Pingdingshan	Henan	NC	91	8	42	148	91	6	61	133	1
Sanmenxia	Henan	NC	100	12	29	255	72	5	42	112	-28
Shangqiu	Henan	NC	65	6	30	141	65	6	31	112	-1
Xinyang	Henan	NC	56	5	30	104	78	4	45	103	40
Zhengzhou	Henan	NC	107	9	44	187	97	12	37	193	-9
Zhoukou	Henan	NC	57	4	29	92	68	5	36	94	19
Zhumadian	Henan	NC	78	6	47	125	88	8	32	128	13
Anshan	Liaoning	NE	61	5	24	101	70	4	52	101	14
Benxi	Liaoning	NE	57	5	29	108	57	3	29	80	1

Chaoyang	Liaoning	NE	61	6	34	139	41	2	30	56	-34
Dalian	Liaoning	NE	67	8	25	141	46	4	22	81	-32
Dandong	Liaoning	NE	28	7	0	90	36	2	19	49	30
Fushun	Liaoning	NE	47	4	25	90	36	3	19	53	-24
Fuxin	Liaoning	NE	72	8	27	143	30	2	17	49	-58
Huludao	Liaoning	NE	94	12	31	191	45	3	33	75	-52
Jinzhou	Liaoning	NE	83	10	38	174	37	3	29	67	-56
Liaoyang	Liaoning	NE	60	5	21	103	64	3	44	82	5
Panjin	Liaoning	NE	63	8	23	141	33	3	25	69	-48
Shenyang	Liaoning	NE	62	5	30	99	46	3	30	69	-26
Tieling	Liaoning	NE	48	4	26	83	34	2	15	45	-29
Wafangdian	Liaoning	NE	57	6	21	93	45	3	25	69	-20
Yingkou	Liaoning	NE	54	5	23	109	44	7	14	122	-19
Baicheng	Jilin	NE	63	3	42	83	51	2	39	61	-19
Baishan	Jilin	NE	50	3	26	82	39	2	22	52	-21
Changchun	Jilin	NE	52	4	26	103	42	4	15	64	-19
Jilin	Jilin	NE	38	3	23	59	38	3	14	54	-1
Liaoyuan	Jilin	NE	46	6	21	91	48	8	18	103	5
Siping	Jilin	NE	59	5	27	118	40	3	18	54	-33
Songyuan	Jilin	NE	34	2	20	55	23	2	8	37	-32
Daqing	Heilongjiang	NE	47	2	33	75	38	2	26	48	-19
Daxinganling	Heilongjiang	NE	48	3	31	88	43	2	35	53	-9
Harbin	Heilongjiang	NE	45	2	26	59	32	2	15	47	-28
Hegang	Heilongjiang	NE	80	4	48	123	48	5	21	100	-40
Heihe	Heilongjiang	NE	56	3	32	81	41	2	30	56	-26
Jixi	Heilongjiang	NE	35	2	24	46	30	3	15	54	-12

Jiamusi	Heilongjiang	NE	29	2	16	43	26	2	14	44	-12
Mudanjiang	Heilongjiang	NE	38	1	27	53	45	2	31	59	16
Qitaihe	Heilongjiang	NE	36	2	21	56	32	3	14	51	-13
Qiqihar	Heilongjiang	NE	47	3	30	68	42	2	31	56	-10
Shuangyashan	Heilongjiang	NE	44	2	35	57	45	3	27	63	2
Suihua	Heilongjiang	NE	23	2	14	40	21	1	15	32	-6
Ankang	Shaanxi	NW	34	3	11	60	43	2	26	59	25
Baoji	Shaanxi	NW	87	14	31	286	73	5	42	113	-16
Hanzhong	Shaanxi	NW	42	5	19	126	50	2	33	58	20
Shangluo	Shaanxi	NW	53	10	18	213	45	3	28	57	-16
Tongchuan	Shaanxi	NW	75	9	35	178	64	2	46	82	-14
Weinan	Shaanxi	NW	79	11	16	219	74	4	46	102	-6
Xi'an	Shaanxi	NW	106	15	30	285	94	5	61	136	-11
Xianyang	Shaanxi	NW	79	10	22	189	78	4	43	104	-2
Yan'an	Shaanxi	NW	76	8	39	194	67	3	53	95	-11
Yulin	Shaanxi	NW	70	8	26	160	59	5	39	97	-15
Baiying	Gansu	NW	71	11	19	247	71	4	37	100	1
Dingxi	Gansu	NW	49	4	19	74	59	4	39	91	21
Gannan	Gansu	NW	42	4	19	80	68	7	43	140	62
Jiayuguan	Gansu	NW	85	22	31	421	82	11	38	212	-3
Jiuquan	Gansu	NW	126	39	45	662	96	8	49	180	-23
Lanzhou	Gansu	NW	90	10	36	237	81	6	45	117	-11
Linxia	Gansu	NW	46	3	20	82	44	2	34	57	-5
Pingliang	Gansu	NW	59	6	22	135	41	2	27	51	-31
Qingyang	Gansu	NW	54	10	14	186	40	2	27	54	-25
Tianshui	Gansu	NW	43	9	14	200	28	2	16	41	-35

Wuwei	Gansu	NW	80	13	39	284	74	7	34	129	-7
Zhangye	Gansu	NW	50	11	20	199	34	4	9	58	-31
Guyuan	Ningxia	NW	75	11	27	232	55	3	28	71	-26
Shizuishan	Ningxia	NW	86	12	40	258	64	5	39	90	-26
Wuzhong	Ningxia	NW	75	9	35	157	78	4	51	99	4
Yinchuan	Ningxia	NW	96	8	58	187	74	5	44	104	-22
Zhongwei	Ningxia	NW	65	8	30	168	63	4	29	79	-3
Aksu	Sinkiang	NW	255	46	46	804	118	18	48	231	-54
Hami	Sinkiang	NW	79	8	39	197	114	16	72	317	45
Hotan	Sinkiang	NW	485	117	77	2562	296	42	67	628	-39
Kashgar	Sinkiang	NW	295	63	97	1039	151	32	43	413	-49
Karamay	Sinkiang	NW	53	5	21	139	58	8	31	147	9
Kizilsu	Sinkiang	NW	213	46	21	757	97	24	23	291	-55
Shihezi	Sinkiang	NW	79	19	18	369	59	8	24	134	-25
Urumchi	Sinkiang	NW	95	9	30	209	102	15	38	208	7
Wujiaqu	Sinkiang	NW	86	11	26	225	95	18	21	229	11
Yili	Sinkiang	NW	64	4	27	97	66	9	17	127	2
Ezhou	Hubei	SE	61	5	16	98	79	5	36	110	30
Huanggang	Hubei	SE	48	4	18	87	63	3	29	83	31
Jingmen	Hubei	SE	58	6	20	135	90	6	44	122	56
Shiyan	Hubei	SE	48	4	21	85	63	5	38	92	32
Wuhan	Hubei	SE	66	6	13	116	103	8	42	158	57
Xianning	Hubei	SE	55	4	28	93	83	4	41	96	49
Xiangyang	Hubei	SE	59	5	26	112	80	5	51	115	34
Xiaogan	Hubei	SE	55	4	30	84	79	5	45	108	44
Yichang	Hubei	SE	58	6	21	117	85	5	55	131	47

Anqing	Anhui	SE	58	4	25	80	53	4	24	77	-9
Bengbu	Anhui	SE	64	5	19	102	85	6	32	136	32
Bozhou	Anhui	SE	60	4	37	98	85	6	48	114	42
Chuzhou	Anhui	SE	69	6	20	112	81	7	34	125	18
Fuyang	Anhui	SE	59	4	28	94	77	5	45	133	30
Hefei	Anhui	SE	67	5	14	99	79	6	26	120	17
Huaibei	Anhui	SE	66	7	27	129	63	4	42	84	-5
Huainan	Anhui	SE	53	4	32	85	78	6	35	118	47
Huangshan	Anhui	SE	30	2	14	43	46	5	19	83	51
Lu'an	Anhui	SE	58	4	20	96	79	4	48	103	35
Ma'anshan	Anhui	SE	60	4	20	84	79	7	34	120	32
Suzhou	Anhui	SE	72	8	29	142	85	6	45	119	17
Tongling	Anhui	SE	83	6	38	142	102	9	49	150	22
Wuhu	Anhui	SE	54	3	26	78	74	5	35	107	37
Changzhou	Jiangsu	SE	66	7	24	126	79	9	14	121	20
Huaian	Jiangsu	SE	57	5	18	100	72	6	20	120	26
Lianyungang	Jiangsu	SE	55	5	23	92	69	7	24	139	26
Nanjing	Jiangsu	SE	61	5	12	89	69	7	27	105	13
Nantong	Jiangsu	SE	56	5	21	91	59	8	15	136	5
Suzhou	Jiangsu	SE	60	5	26	92	76	8	23	125	26
Suqian	Jiangsu	SE	56	5	24	94	67	4	28	104	20
Taizhou	Jiangsu	SE	74	7	24	128	75	7	28	123	2
Wuxi	Jiangsu	SE	61	5	27	96	79	8	25	130	29
Xuzhou	Jiangsu	SE	62	5	25	109	78	4	53	104	26
Yanchen	Jiangsu	SE	56	6	19	104	51	4	16	81	-8
Yangzhou	Jiangsu	SE	64	6	20	112	63	5	30	82	-2

Zhenjiang	Jiangsu	SE	50	5	12	92	57	6	14	86	14
Shanghai	Municipality	SE	52	4	27	92	72	10	17	149	38
Hangzhou	Zhejiang	SE	53	5	24	96	64	7	20	107	21
Huzhou	Zhejiang	SE	48	4	21	80	64	7	19	99	33
Jiaxing	Zhejiang	SE	51	4	29	74	72	8	25	134	41
Jinhua	Zhejiang	SE	49	3	18	78	69	8	18	118	41
Lishui	Zhejiang	SE	39	3	12	59	47	3	26	66	20
Ningbo	Zhejiang	SE	38	2	24	65	51	6	17	101	33
Quzhou	Zhejiang	SE	49	3	18	78	70	8	18	110	42
Shaoxing	Zhejiang	SE	48	4	23	89	76	9	24	138	58
Taizhou	Zhejiang	SE	41	2	31	57	45	5	20	81	10
Wenjiang	Zhejiang	SE	48	3	29	73	48	4	24	71	-1
Zhoushan	Zhejiang	SE	28	1	22	44	34	5	11	72	20
Fuzhou	Jiangxi	SE	46	4	26	79	67	6	30	106	46
Ganzhou	Jiangxi	SE	60	5	33	102	61	5	32	99	1
Ji'an	Jiangxi	SE	51	4	23	89	57	6	24	100	12
Jingdezhen	Jiangxi	SE	53	5	20	85	71	6	31	99	35
Jiujiang	Jiangxi	SE	53	4	17	81	74	6	38	103	38
Nanchang	Jiangxi	SE	66	7	19	118	80	8	31	149	21
Pingxiang	Jiangxi	SE	47	3	29	79	83	7	33	124	77
Shangrao	Jiangxi	SE	54	4	23	77	62	6	30	108	15
Xinyu	Jiangxi	SE	53	3	26	79	70	5	35	99	31
Yichun	Jiangxi	SE	44	2	33	70	68	4	43	93	52
Yingtan	Jiangxi	SE	39	4	13	64	61	5	35	88	54
Changsha	Hunan	SE	47	3	15	72	85	6	31	124	82
Changde	Hunan	SE	41	3	17	62	59	4	25	80	43

Chenzhou	Hunan	SE	53	4	30	81	71	9	28	157	34
Huaihua	Hunan	SE	49	3	33	71	91	6	36	125	85
Loudi	Hunan	SE	52	3	28	88	87	6	41	117	69
Xiangtan	Hunan	SE	48	3	25	76	90	6	37	123	85
Yiyang	Hunan	SE	48	3	29	70	79	4	40	104	64
Yongzhou	Hunan	SE	57	3	40	88	69	5	37	100	20
Zhangjiajie	Hunan	SE	44	3	18	80	71	5	35	102	60
Zhuzhou	Hunan	SE	42	3	23	70	81	7	38	134	94
Dongguan	Guangdong	SE	39	2	21	63	50	4	27	78	30
Foshan	Guangdong	SE	52	3	35	83	63	6	27	105	20
Guangzhou	Guangdong	SE	55	2	34	75	57	5	31	93	3
Heyuan	Guangdong	SE	37	2	20	55	45	5	22	79	22
Huizhou	Guangdong	SE	44	3	24	72	45	5	19	76	2
Jiangmen	Guangdong	SE	33	3	16	58	52	7	18	94	58
Maoming	Guangdong	SE	34	4	13	81	46	8	9	94	36
Meizhou	Guangdong	SE	38	3	18	61	39	5	16	71	2
Qingyuan	Guangdong	SE	51	3	29	80	44	6	19	84	-14
Shantou	Guangdong	SE	42	3	20	66	42	5	25	74	-1
Shaoguan	Guangdong	SE	47	3	29	82	46	6	20	79	-2
Shenzhen	Guangdong	SE	37	4	20	78	44	6	20	77	18
Zhujiang	Guangdong	SE	33	3	13	64	50	8	16	99	55
Zhaoqing	Guangdong	SE	47	3	27	77	54	6	27	104	17
Zhongshan	Guangdong	SE	31	4	15	76	39	6	11	80	27
Zhuhai	Guangdong	SE	38	5	21	95	47	8	17	101	24
Fuzhou	Fujian	SE	44	4	11	86	38	3	19	55	-14
Longyan	Fujian	SE	33	3	10	65	34	4	17	58	3

Nanping	Fujian	SE	25	2	7	48	26	3	13	51	4
Ningde	Fujian	SE	35	3	10	59	31	2	20	43	-14
Putian	Fujian	SE	38	3	18	58	31	2	19	41	-19
Quanzhou	Fujian	SE	45	5	10	98	30	4	18	59	-33
Sanming	Fujian	SE	44	4	11	74	41	5	18	78	-6
Xiamen	Fujian	SE	37	3	21	65	32	2	21	51	-15
Zhangzhou	Fujian	SE	43	3	24	80	42	2	33	59	-1
Haikou	Hainan	SE	28	2	19	46	34	4	20	68	21
Sanya	Hainan	SE	21	1	16	30	24	2	15	33	12
Chongqing	Municipality	SW	58	5	21	104	82	5	42	106	40
Bazhong	Sichuan	SW	27	2	11	41	35	2	25	46	31
Chengdu	Sichuan	SW	62	7	15	134	88	8	42	139	42
Dazhou	Sichuan	SW	49	3	12	73	86	5	53	121	76
Deyang	Sichuan	SW	56	4	22	87	89	9	43	169	60
Guangyuan	Sichuan	SW	35	4	16	101	38	2	29	50	9
Leshan	Sichuan	SW	44	6	14	126	78	9	27	150	77
Luzhou	Sichuan	SW	49	7	14	113	80	9	32	145	64
Meishan	Sichuan	SW	54	5	14	84	79	8	38	136	46
Mianyang	Sichuan	SW	40	3	12	62	63	5	26	98	56
Nanchong	Sichuan	SW	54	5	20	93	71	4	41	97	33
Panzhihua	Sichuan	SW	44	3	22	69	53	4	34	81	19
Suining	Sichuan	SW	53	5	21	92	72	4	39	105	38
Ya'an	Sichuan	SW	30	3	12	57	35	2	24	58	15
Ziyang	Sichuan	SW	41	3	24	62	60	5	38	91	46
Zigong	Sichuan	SW	59	6	30	115	85	8	44	128	45
Baoshan	Yunnan	SW	37	2	27	51	37	1	29	46	-2

Chuxiong	Yunnan	SW	26	2	14	41	41	6	11	75	57
Dali	Yunnan	SW	15	1	4	27	18	2	8	37	19
Dehong	Yunnan	SW	34	2	19	51	30	2	23	46	-12
Honghe	Yunnan	SW	38	5	17	108	59	7	26	99	57
Kunming	Yunnan	SW	34	3	17	65	48	5	22	76	39
Lijiang	Yunnan	SW	30	1	24	37	33	1	29	43	11
Lincang	Yunnan	SW	27	1	19	40	27	1	22	38	1
Nujiang	Yunnan	SW	24	1	16	35	27	1	21	38	9
Qujing	Yunnan	SW	30	2	14	49	44	4	21	67	47
Wenshan	Yunnan	SW	26	3	7	68	45	3	24	64	72
Xishuangbanna	Yunnan	SW	22	1	10	31	29	2	15	40	33
Tuxi	Yunnan	SW	25	2	9	40	45	4	16	69	76
Zhaotong	Yunnan	SW	47	4	23	88	59	6	21	92	24
Anshun	Guizhou	SW	36	3	24	63	69	8	28	124	94
Bijie	Guizhou	SW	28	3	8	47	43	4	6	74	51
Guiyang	Guizhou	SW	34	4	16	79	63	6	13	97	82
Liupanshui	Guizhou	SW	51	5	24	94	74	7	25	120	46
Tongren	Guizhou	SW	27	1	25	35	41	2	28	54	52
Zunyi	Guizhou	SW	50	3	28	74	74	6	35	113	48
Baise	Guangxi	SW	46	4	17	85	51	5	12	83	10
Beihai	Guangxi	SW	34	3	16	63	41	8	12	87	22
Chongzuo	Guangxi	SW	42	4	11	73	53	7	13	96	26
Fangchenggang	Guangxi	SW	34	3	15	63	44	8	12	100	30
Guigang	Guangxi	SW	61	4	32	105	60	10	19	122	-1
Guilin	Guangxi	SW	43	3	26	63	58	6	17	86	34
Hechi	Guangxi	SW	47	4	30	79	61	6	16	98	28

Hezhou	Guangxi	SW	50	3	30	73	51	7	17	85	3
Laibin	Guangxi	SW	59	4	29	99	67	9	23	116	15
Liuzhou	Guangxi	SW	56	4	31	110	70	9	24	112	25
Nanning	Guangxi	SW	58	8	19	135	69	12	13	151	18
Qinzhou	Guangxi	SW	44	4	20	78	49	9	13	111	11
Wuzhou	Guangxi	SW	55	4	31	90	49	7	19	83	-12
Yulin	Guangxi	SW	45	4	23	78	45	7	17	91	2
Golog	Qinghai	TP	77	7	34	133	86	8	53	122	11
Haidong	Qinghai	TP	37	4	0	75	49	7	20	126	35
Xining	Qinghai	TP	84	14	36	326	72	4	40	97	-14
Ali	Tibet	TP	25	4	4	60	18	3	8	37	-28
Qamdo	Tibet	TP	37	4	12	98	38	4	18	81	3
Lhasa	Tibet	TP	44	4	24	99	44	3	25	72	-1
Nyingchi	Tibet	TP	15	1	6	30	12	1	7	22	-19
Naqu	Tibet	TP	84	11	19	166	110	16	48	241	30
Shigatse	Tibet	TP	24	2	11	53	23	2	13	41	-4
Lhoka	Tibet	TP	29	3	7	53	22	2	9	43	-23

[a] NC, NE, NW, SE, SW, TP represent north China, northeast China, northwest China, southeast China, southwest China, and the Tibetan Plateau, respectively.

[b] Negative values with red color mean significant (p<0.05 or 0.01) reduction, and positive values mean increase.

Table S3. Summary of daily average PM_{10} concentrations (μg m^{-3}) during the pre-Parade Blue, Parade Blue and post-Parade Blue periods in the 291 cities across China

City	Province	Region[a]	Pre-Parade Blue period[b]				Parade Blue period[b]				Post-Parade Blue period[b]			
			Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max
Beijing	Municipality	EC	87	8	44	176	29	3	13	51	65	9	11	163
Tianjing	Municipality	EC	111	8	57	200	58	7	23	125	78	7	23	148
Baoding	Hebei	EC	152	10	61	241	70	8	33	142	115	12	36	250
Cangzhou	Hebei	EC	87	8	44	176	29	3	13	51	70	8	17	152
Chengde	Hebei	EC	72	5	43	121	32	2	23	46	58	7	20	154
Handan	Hebei	EC	157	11	84	245	104	14	23	194	124	10	26	224
Hengshui	Hebei	EC	121	9	51	221	69	9	12	141	132	13	32	273
Langfang	Hebei	EC	131	9	47	200	56	8	21	147	106	12	23	229
Qinhuangdao	Hebei	EC	90	8	30	175	25	3	13	54	52	6	20	119
Shijiazhuang	Hebei	EC	136	11	41	212	70	8	16	127	91	8	29	181
Tangshan	Hebei	EC	124	9	52	187	35	4	14	68	87	8	27	163
Xingtai	Hebei	EC	127	9	65	208	81	11	20	162	120	10	42	219
Zhangjiakou	Hebei	EC	70	14	37	320	40	3	16	54	59	7	22	134
Changzhi	Shanxi	EC	89	7	34	148	63	4	41	86	75	5	32	133
Datong	Shanxi	EC	70	11	36	250	44	3	24	66	54	5	20	117
Jincheng	Shanxi	EC	92	7	28	139	73	7	39	140	75	6	24	179
Jinzhong	Shanxi	EC	64	5	32	117	52	4	29	86	66	6	19	126

Linfen	Shanxi	EC	58	4	39	118	45	4	25	70	60	4	23	94
Lvliang	Shanxi	EC	66	4	31	101	46	2	34	62	62	4	33	105
Shuozhou	Shanxi	EC	91	7	47	169	64	4	39	96	60	6	24	128
Taiyuan	Shanxi	EC	92	7	45	169	58	5	25	97	87	9	23	186
Xinzhou	Shanxi	EC	67	4	45	118	42	2	30	51	64	6	24	130
Yangquan	Shanxi	EC	74	5	36	120	49	4	25	68	69	6	18	128
Yuncheng	Shanxi	EC	92	11	38	242	74	6	43	113	55	3	26	102
Binzhou	Shandong	EC	86	7	27	144	59	6	32	118	89	9	25	215
Dezhou	Shandong	EC	137	9	41	204	71	8	25	140	113	11	32	238
Dongying	Shandong	EC	109	11	35	196	79	7	44	130	98	9	38	210
Jinan	Shandong	EC	101	7	37	137	85	7	50	135	135	9	53	217
Jining	Shandong	EC	80	8	42	154	85	6	52	131	100	6	52	185
Laiwu	Shandong	EC	91	9	40	153	96	7	57	156	103	8	41	200
Liaocheng	Shandong	EC	135	12	47	223	101	11	32	169	132	9	45	216
Linyi	Shandong	EC	91	10	36	173	91	8	55	174	101	11	29	262
Qingdao	Shandong	EC	75	5	37	115	68	6	40	135	63	4	35	141
Rizhao	Shandong	EC	69	6	24	123	70	7	29	128	71	7	24	158
Tai'an	Shandong	EC	85	9	39	163	85	7	46	140	103	8	44	196
Weihai	Shandong	EC	69	6	39	123	41	3	21	59	41	3	21	73
Weifang	Shandong	EC	101	9	47	177	99	12	44	198	100	9	39	253
Yantai	Shandong	EC	75	7	36	141	50	4	23	75	53	4	29	120
Zaozhuang	Shandong	EC	92	8	46	148	98	5	69	135	117	9	28	245
Zibo	Shandong	EC	109	7	56	159	106	9	63	164	129	10	49	241
Alxa League	Inner Mongolia	EC	96	9	56	195	67	4	33	93	57	7	10	160
Bayannur	Inner Mongolia	EC	82	8	43	193	67	3	54	94	72	5	37	155
Baotou	Inner Mongolia	EC	86	8	35	165	62	3	39	90	71	7	20	145

Chifeng	Inner Mongolia	EC	59	7	34	156	35	2	24	49	56	5	17	122
Ordos	Inner Mongolia	EC	54	7	20	148	36	2	28	51	46	4	18	97
Hohhot	Inner Mongolia	EC	87	8	46	207	54	4	33	80	73	8	16	154
Hulun Buir	Inner Mongolia	EC	53	7	16	127	65	5	36	99	54	5	19	115
Tongliao	Inner Mongolia	EC	95	8	56	165	62	4	46	99	65	6	31	154
Wuhai	Inner Mongolia	EC	104	12	43	280	67	5	33	104	97	8	38	216
Hinggan League	Inner Mongolia	EC	61	3	41	82	43	2	34	53	45	3	21	89
Anyang	Henan	EC	100	7	49	169	82	9	39	151	118	9	45	256
Hebi	Henan	EC	99	6	59	144	66	8	27	132	98	8	34	193
Jiaozuo	Henan	EC	84	6	40	137	71	8	18	123	66	5	33	123
Kaifeng	Henan	EC	76	5	46	131	68	7	35	130	101	7	33	186
Luoyang	Henan	EC	96	11	34	223	72	5	31	101	75	5	36	134
Luohe	Henan	EC	80	6	42	117	99	7	57	141	139	8	73	271
Nanyang	Henan	EC	93	6	48	140	109	7	67	148	104	7	57	176
Pingdingshan	Henan	EC	91	8	42	148	91	6	61	133	114	8	52	217
Sanmenxia	Henan	EC	100	12	29	255	72	5	42	112	71	5	24	112
Shangqiu	Henan	EC	65	6	30	141	65	6	31	112	83	7	40	158
Xinyang	Henan	EC	56	5	30	104	78	4	45	103	86	6	30	135
Zhengzhou	Henan	EC	107	9	44	187	97	12	37	193	135	10	50	255
Zhoukou	Henan	EC	57	4	29	92	68	5	36	94	103	7	48	193
Zhumadian	Henan	EC	78	6	47	125	88	8	32	128	100	8	32	196
Anshan	Liaoning	NEC	61	5	24	101	70	4	52	101	76	5	38	139
Benxi	Liaoning	NEC	57	5	29	108	57	3	29	80	67	4	27	112
Chaoyang	Liaoning	NEC	61	6	34	139	41	2	30	56	64	5	24	146
Dalian	Liaoning	NEC	67	8	25	141	46	4	22	81	49	4	22	97
Dandong	Liaoning	NEC	28	7	0	90	36	2	19	49	50	3	19	84

Fushun	Liaoning	NEC	47	4	25	90	36	3	19	53	60	5	19	98
Fuxin	Liaoning	NEC	72	8	27	143	30	2	17	49	54	4	22	117
Huludao	Liaoning	NEC	94	12	31	191	45	3	33	75	62	5	22	128
Jinzhou	Liaoning	NEC	83	10	38	174	37	3	29	67	60	4	28	114
Liaoyang	Liaoning	NEC	60	5	21	103	64	3	44	82	78	6	32	140
Panjin	Liaoning	NEC	63	8	23	141	33	3	25	69	44	3	22	78
Shenyang	Liaoning	NEC	62	5	30	99	46	3	30	69	69	5	27	130
Tieling	Liaoning	NEC	48	4	26	83	34	2	15	45	66	5	28	119
Wafangdian	Liaoning	NEC	57	6	21	93	45	3	25	69	55	4	18	92
Yingkou	Liaoning	NEC	54	5	23	109	44	7	14	122	39	5	8	106
Baicheng	Jilin	NEC	63	3	42	83	51	2	39	61	57	3	33	103
Baishan	Jilin	NEC	50	3	26	82	39	2	22	52	59	3	36	92
Changchun	Jilin	NEC	52	4	26	103	42	4	15	64	64	4	28	118
Jilin	Jilin	NEC	38	3	23	59	38	3	14	54	55	2	31	89
Liaoyuan	Jilin	NEC	46	6	21	91	48	8	18	103	53	3	30	96
Siping	Jilin	NEC	59	5	27	118	40	3	18	54	63	4	26	119
Songyuan	Jilin	NEC	34	2	20	55	23	2	8	37	40	3	14	71
Daqing	Heilongjiang	NEC	47	2	33	75	38	2	26	48	40	3	22	74
Daxinganling	Heilongjiang	NEC	48	3	31	88	43	2	35	53	44	3	25	84
Harbin	Heilongjiang	NEC	45	2	26	59	32	2	15	47	51	3	26	92
Hegang	Heilongjiang	NEC	80	4	48	123	48	5	21	100	26	3	7	57
Heihe	Heilongjiang	NEC	56	3	32	81	41	2	30	56	24	3	7	56
Jixi	Heilongjiang	NEC	35	2	24	46	30	3	15	54	50	3	21	87
Jiamusi	Heilongjiang	NEC	29	2	16	43	26	2	14	44	19	1	7	32
Mudanjiang	Heilongjiang	NEC	38	1	27	53	45	2	31	59	55	3	34	92
Qitaihe	Heilongjiang	NEC	36	2	21	56	32	3	14	51	52	3	32	99

Qiqihar	Heilongjiang	NEC	47	3	30	68	42	2	31	56	45	3	24	91
Shuangyashan	Heilongjiang	NEC	44	2	35	57	45	3	27	63	39	2	24	64
Suihua	Heilongjiang	NEC	23	2	14	40	21	1	15	32	30	2	13	57
Ankang	Shaanxi	NEC	34	3	11	60	43	2	26	59	53	3	20	92
Baoji	Shaanxi	NEC	87	14	31	286	73	5	42	113	69	5	18	122
Hanzhong	Shaanxi	NEC	42	5	19	126	50	2	33	58	45	3	12	75
Shangluo	Shaanxi	NEC	53	10	18	213	45	3	28	57	53	4	25	88
Tongchuan	Shaanxi	NEC	75	9	35	178	64	2	46	82	71	5	26	107
Weinan	Shaanxi	NEC	79	11	16	219	74	4	46	102	94	7	37	178
Xi'an	Shaanxi	NEC	106	15	30	285	94	5	61	136	80	5	24	123
Xianyang	Shaanxi	NEC	79	10	22	189	78	4	43	104	78	5	26	129
Yan'an	Shaanxi	NEC	76	8	39	194	67	3	53	95	73	5	21	119
Yulin	Shaanxi	NEC	70	8	26	160	59	5	39	97	63	5	19	133
Baiying	Gansu	NEC	71	11	19	247	71	4	37	100	73	8	18	192
Dingxi	Gansu	NEC	49	4	19	74	59	4	39	91	42	2	23	67
Gannan	Gansu	NEC	42	4	19	80	68	7	43	140	38	3	15	63
Jiayuguan	Gansu	NEC	85	22	31	421	82	11	38	212	87	21	15	535
Jiuquan	Gansu	NEC	126	39	45	662	96	8	49	180	82	15	27	458
Lanzhou	Gansu	NEC	90	10	36	237	81	6	45	117	80	6	24	163
Linxia	Gansu	NEC	46	3	20	82	44	2	34	57	40	2	26	57
Pingliang	Gansu	NEC	59	6	22	135	41	2	27	51	46	4	19	102
Qingyang	Gansu	NEC	54	10	14	186	40	2	27	54	36	3	12	63
Tianshui	Gansu	NEC	43	9	14	200	28	2	16	41	22	1	9	43
Wuwei	Gansu	NEC	80	13	39	284	74	7	34	129	51	4	15	115
Zhangye	Gansu	NEC	50	11	20	199	34	4	9	58	40	7	17	212
Guyuan	Ningxia	NEC	75	11	27	232	55	3	28	71	54	6	14	157

Shizuishan	Ningxia	NEC	86	12	40	258	64	5	39	90	81	9	31	252
Wuzhong	Ningxia	NEC	75	9	35	157	78	4	51	99	68	5	26	156
Yinchuan	Ningxia	NEC	96	8	58	187	74	5	44	104	69	4	30	107
Zhongwei	Ningxia	NEC	65	8	30	168	63	4	29	79	58	7	12	201
Aksu	Sinkiang	NEC	255	46	46	804	118	18	48	231	118	17	31	466
Hami	Sinkiang	NEC	79	8	39	197	114	16	72	317	81	7	34	176
Hotan	Sinkiang	NEC	485	117	77	2562	296	42	67	628	176	25	52	627
Kashgar	Sinkiang	NEC	295	63	97	1039	151	32	43	413	194	25	57	534
Karamay	Sinkiang	NEC	53	5	21	139	58	8	31	147	43	4	23	134
Kizilsu	Sinkiang	NEC	213	46	21	757	97	24	23	291	135	21	25	438
Shihezi	Sinkiang	NEC	79	19	18	369	59	8	24	134	55	6	11	139
Urumchi	Sinkiang	NEC	95	9	30	209	102	15	38	208	81	8	18	183
Wujiaqu	Sinkiang	NEC	86	11	26	225	95	18	21	229	68	9	9	200
Yili	Sinkiang	NEC	64	4	27	97	66	9	17	127	62	7	16	167
Ezhou	Hubei	NEC	61	5	16	98	79	5	36	110	78	3	32	106
Huanggang	Hubei	NEC	48	4	18	87	63	3	29	83	64	3	32	98
Jingmen	Hubei	NEC	58	6	20	135	90	6	44	122	98	6	41	165
Shiyan	Hubei	NEC	48	4	21	85	63	5	38	92	77	6	25	148
Wuhan	Hubei	NEC	66	6	13	116	103	8	42	158	85	5	27	143
Xianning	Hubei	NEC	55	4	28	93	83	4	41	96	67	3	34	87
Xiangyang	Hubei	NEC	59	5	26	112	80	5	51	115	91	6	32	142
Xiaogan	Hubei	NEC	55	4	30	84	79	5	45	108	81	4	47	138
Yichang	Hubei	NEC	58	6	21	117	85	5	55	131	77	5	24	131
Anqing	Anhui	NEC	58	4	25	80	53	4	24	77	49	2	21	70
Bengbu	Anhui	NEC	64	5	19	102	85	6	32	136	77	5	23	141
Bozhou	Anhui	NEC	60	4	37	98	85	6	48	114	92	5	29	164

Chuzhou	Anhui	NEC	69	6	20	112	81	7	34	125	77	5	50	145
Fuyang	Anhui	NEC	59	4	28	94	77	5	45	133	61	3	21	98
Hefei	Anhui	NEC	67	5	14	99	79	6	26	120	69	4	25	102
Huaibei	Anhui	NEC	66	7	27	129	63	4	42	84	85	7	23	168
Huainan	Anhui	NEC	53	4	32	85	78	6	35	118	75	4	35	130
Huangshan	Anhui	NEC	30	2	14	43	46	5	19	83	40	2	21	62
Lu'an	Anhui	NEC	58	4	20	96	79	4	48	103	70	3	23	98
Ma'anshan	Anhui	NEC	60	4	20	84	79	7	34	120	64	3	38	115
Suzhou	Anhui	NEC	72	8	29	142	85	6	45	119	87	7	26	203
Tongling	Anhui	NEC	83	6	38	142	102	9	49	150	69	3	39	96
Wuhu	Anhui	NEC	54	3	26	78	74	5	35	107	68	4	40	107
Changzhou	Jiangsu	NEC	66	7	24	126	79	9	14	121	67	5	37	127
Huaian	Jiangsu	NEC	57	5	18	100	72	6	20	120	56	4	17	103
Lianyungang	Jiangsu	NEC	55	5	23	92	69	7	24	139	56	5	17	121
Nanjing	Jiangsu	NEC	61	5	12	89	69	7	27	105	60	4	30	112
Nantong	Jiangsu	NEC	56	5	21	91	59	8	15	136	51	4	27	99
Suzhou	Jiangsu	NEC	60	5	26	92	76	8	23	125	57	4	23	107
Suqian	Jiangsu	NEC	56	5	24	94	67	4	28	104	64	6	17	165
Taizhou	Jiangsu	NEC	74	7	24	128	75	7	28	123	67	3	43	109
Wuxi	Jiangsu	NEC	61	5	27	96	79	8	25	130	63	4	30	114
Xuzhou	Jiangsu	NEC	62	5	25	109	78	4	53	104	77	6	27	155
Yanchen	Jiangsu	NEC	56	6	19	104	51	4	16	81	48	3	27	87
Yangzhou	Jiangsu	NEC	64	6	20	112	63	5	30	82	57	4	31	106
Zhenjiang	Jiangsu	NEC	50	5	12	92	57	6	14	86	50	4	24	112
Shanghai	Municipality	NEC	52	4	27	92	72	10	17	149	43	3	23	84
Hangzhou	Zhejiang	NEC	53	5	24	96	64	7	20	107	61	4	18	106

Huzhou	Zhejiang	NEC	48	4	21	80	64	7	19	99	50	3	25	109
Jiaxing	Zhejiang	NEC	51	4	29	74	72	8	25	134	55	3	24	117
Jinhua	Zhejiang	NEC	49	3	18	78	69	8	18	118	61	4	22	114
Lishui	Zhejiang	NEC	39	3	12	59	47	3	26	66	49	4	12	97
Ningbo	Zhejiang	NEC	38	2	24	65	51	6	17	101	49	3	20	83
Quzhou	Zhejiang	NEC	49	3	18	78	70	8	18	110	54	4	23	96
Shaoxing	Zhejiang	NEC	48	4	23	89	76	9	24	138	63	4	18	100
Taizhou	Zhejiang	NEC	41	2	31	57	45	5	20	81	48	2	30	85
Wenjiang	Zhejiang	NEC	48	3	29	73	48	4	24	71	51	2	29	78
Zhoushan	Zhejiang	NEC	28	1	22	44	34	5	11	72	31	2	17	65
Fuzhou	Jiangxi	NEC	46	4	26	79	67	6	30	106	61	4	21	99
Ganzhou	Jiangxi	NEC	60	5	33	102	61	5	32	99	61	3	33	93
Ji'an	Jiangxi	NEC	51	4	23	89	57	6	24	100	55	3	23	75
Jingdezhen	Jiangxi	NEC	53	5	20	85	71	6	31	99	51	3	19	81
Jiujiang	Jiangxi	NEC	53	4	17	81	74	6	38	103	55	3	13	80
Nanchang	Jiangxi	NEC	66	7	19	118	80	8	31	149	57	3	12	88
Pingxiang	Jiangxi	NEC	47	3	29	79	83	7	33	124	73	4	30	104
Shangrao	Jiangxi	NEC	54	4	23	77	62	6	30	108	55	3	30	95
Xinyu	Jiangxi	NEC	53	3	26	79	70	5	35	99	63	2	32	81
Yichun	Jiangxi	NEC	44	2	33	70	68	4	43	93	65	3	34	85
Yingtan	Jiangxi	NEC	39	4	13	64	61	5	35	88	57	3	21	85
Changsha	Hunan	NEC	47	3	15	72	85	6	31	124	72	5	25	124
Changde	Hunan	NEC	41	3	17	62	59	4	25	80	65	4	28	104
Chenzhou	Hunan	NEC	53	4	30	81	71	9	28	157	80	5	39	140
Huaihua	Hunan	NEC	49	3	33	71	91	6	36	125	84	6	30	149
Loudi	Hunan	NEC	52	3	28	88	87	6	41	117	73	5	26	139

Xiangtan	Hunan	NEC	48	3	25	76	90	6	37	123	79	5	32	150
Yiyang	Hunan	NEC	48	3	29	70	79	4	40	104	80	5	38	168
Yongzhou	Hunan	NEC	57	3	40	88	69	5	37	100	81	6	39	183
Zhangjiajie	Hunan	NEC	44	3	18	80	71	5	35	102	71	5	15	109
Zhuzhou	Hunan	NEC	42	3	23	70	81	7	38	134	69	4	28	104
Dongguan	Guangdong	NEC	39	2	21	63	50	4	27	78	55	3	31	93
Foshan	Guangdong	NEC	52	3	35	83	63	6	27	105	55	3	27	81
Guangzhou	Guangdong	NEC	55	2	34	75	57	5	31	93	65	3	37	100
Heyuan	Guangdong	NEC	37	2	20	55	45	5	22	79	55	3	24	89
Huizhou	Guangdong	NEC	44	3	24	72	45	5	19	76	43	4	20	82
Jiangmen	Guangdong	NEC	33	3	16	58	52	7	18	94	49	3	27	80
Maoming	Guangdong	NEC	34	4	13	81	46	8	9	94	43	4	20	83
Meizhou	Guangdong	NEC	38	3	18	61	39	5	16	71	50	3	24	86
Qingyuan	Guangdong	NEC	51	3	29	80	44	6	19	84	49	4	16	115
Shantou	Guangdong	NEC	42	3	20	66	42	5	25	74	48	2	30	77
Shaoguan	Guangdong	NEC	47	3	29	82	46	6	20	79	59	4	17	108
Shenzhen	Guangdong	NEC	37	4	20	78	44	6	20	77	47	3	28	79
Zhujiang	Guangdong	NEC	33	3	13	64	50	8	16	99	40	3	21	85
Zhaoqing	Guangdong	NEC	47	3	27	77	54	6	27	104	55	4	17	96
Zhongshan	Guangdong	NEC	31	4	15	76	39	6	11	80	43	3	21	81
Zhuhai	Guangdong	NEC	38	5	21	95	47	8	17	101	53	4	21	108
Fuzhou	Fujian	NEC	44	4	11	86	38	3	19	55	42	2	17	65
Longyan	Fujian	NEC	33	3	10	65	34	4	17	58	46	3	19	78
Nanping	Fujian	NEC	25	2	7	48	26	3	13	51	31	2	16	51
Ningde	Fujian	NEC	35	3	10	59	31	2	20	43	34	2	14	51
Putian	Fujian	NEC	38	3	18	58	31	2	19	41	40	2	21	56

Quanzhou	Fujian	NEC	45	5	10	98	30	4	18	59	46	3	22	92
Sanming	Fujian	NEC	44	4	11	74	41	5	18	78	48	4	11	81
Xiamen	Fujian	NEC	37	3	21	65	32	2	21	51	45	2	20	62
Zhangzhou	Fujian	NEC	43	3	24	80	42	2	33	59	52	2	24	84
Haikou	Hainan	NEC	28	2	19	46	34	4	20	68	30	2	12	65
Sanya	Hainan	NEC	21	1	16	30	24	2	15	33	23	1	10	35
Chongqing	Municipality	NEC	58	5	21	104	82	5	42	106	49	4	19	86
Bazhong	Sichuan	NEC	27	2	11	41	35	2	25	46	30	2	12	54
Chengdu	Sichuan	NEC	62	7	15	134	88	8	42	139	53	5	16	158
Dazhou	Sichuan	NEC	49	3	12	73	86	5	53	121	62	4	26	96
Deyang	Sichuan	NEC	56	4	22	87	89	9	43	169	49	4	19	96
Guangyuan	Sichuan	NEC	35	4	16	101	38	2	29	50	31	2	15	50
Leshan	Sichuan	NEC	44	6	14	126	78	9	27	150	47	4	23	126
Luzhou	Sichuan	NEC	49	7	14	113	80	9	32	145	43	3	14	71
Meishan	Sichuan	NEC	54	5	14	84	79	8	38	136	45	5	15	159
Mianyang	Sichuan	NEC	40	3	12	62	63	5	26	98	35	3	7	83
Nanchong	Sichuan	NEC	54	5	20	93	71	4	41	97	51	4	25	113
Panzhihua	Sichuan	NEC	44	3	22	69	53	4	34	81	53	2	22	71
Suining	Sichuan	NEC	53	5	21	92	72	4	39	105	50	4	25	110
Ya'an	Sichuan	NEC	30	3	12	57	35	2	24	58	29	2	14	69
Ziyang	Sichuan	NEC	41	3	24	62	60	5	38	91	37	2	23	87
Zigong	Sichuan	NEC	59	6	30	115	85	8	44	128	60	4	33	120
Baoshan	Yunnan	NEC	37	2	27	51	37	1	29	46	32	2	7	50
Chuxiong	Yunnan	NEC	26	2	14	41	41	6	11	75	23	2	11	38
Dali	Yunnan	NEC	15	1	4	27	18	2	8	37	17	1	10	25
Dehong	Yunnan	NEC	34	2	19	51	30	2	23	46	37	2	20	55

Honghe	Yunnan	NEC	38	5	17	108	59	7	26	99	32	2	16	59
Kunming	Yunnan	NEC	34	3	17	65	48	5	22	76	41	2	23	64
Lijiang	Yunnan	NEC	30	1	24	37	33	1	29	43	35	1	28	41
Lincang	Yunnan	NEC	27	1	19	40	27	1	22	38	28	1	23	60
Nujiang	Yunnan	NEC	24	1	16	35	27	1	21	38	26	1	20	34
Qujing	Yunnan	NEC	30	2	14	49	44	4	21	67	33	2	15	47
Wenshan	Yunnan	NEC	26	3	7	68	45	3	24	64	26	2	12	40
Xishuangbanna	Yunnan	NEC	22	1	10	31	29	2	15	40	40	2	20	57
Tuxi	Yunnan	NEC	25	2	9	40	45	4	16	69	30	2	14	57
Zhaotong	Yunnan	NEC	47	4	23	88	59	6	21	92	33	2	16	57
Anshun	Guizhou	NEC	36	3	24	63	69	8	28	124	38	3	24	76
Bijie	Guizhou	NEC	28	3	8	47	43	4	6	74	24	2	9	52
Guiyang	Guizhou	NEC	34	4	16	79	63	6	13	97	39	3	17	78
Liupanshui	Guizhou	NEC	51	5	24	94	74	7	25	120	39	2	15	59
Tongren	Guizhou	NEC	27	1	25	35	41	2	28	54	40	3	23	75
Zunyi	Guizhou	NEC	50	3	28	74	74	6	35	113	55	4	29	99
Baise	Guangxi	NEC	46	4	17	85	51	5	12	83	53	3	29	90
Beihai	Guangxi	NEC	34	3	16	63	41	8	12	87	36	3	18	79
Chongzuo	Guangxi	NEC	42	4	11	73	53	7	13	96	47	4	23	88
Fangchenggang	Guangxi	NEC	34	3	15	63	44	8	12	100	40	3	22	81
Guigang	Guangxi	NEC	61	4	32	105	60	10	19	122	48	3	17	85
Guilin	Guangxi	NEC	43	3	26	63	58	6	17	86	68	4	33	112
Hechi	Guangxi	NEC	47	4	30	79	61	6	16	98	55	5	17	139
Hezhou	Guangxi	NEC	50	3	30	73	51	7	17	85	46	4	7	79
Laibin	Guangxi	NEC	59	4	29	99	67	9	23	116	58	4	16	102
Liuzhou	Guangxi	NEC	56	4	31	110	70	9	24	112	66	5	28	116

Nanning	Guangxi	NEC	58	8	19	135	69	12	13	151	53	5	18	125
Qinzhou	Guangxi	NEC	44	4	20	78	49	9	13	111	44	4	24	91
Wuzhou	Guangxi	NEC	55	4	31	90	49	7	19	83	51	3	20	78
Yulin	Guangxi	NEC	45	4	23	78	45	7	17	91	41	3	12	78
Golog	Qinghai	NEC	77	7	34	133	86	8	53	122	53	5	16	120
Haidong	Qinghai	NEC	37	4	0	75	49	7	20	126	33	2	8	50
Xining	Qinghai	NEC	84	14	36	326	72	4	40	97	67	5	22	114
Ali	Tibet	NEC	25	4	4	60	18	3	8	37	16	1	1	32
Qamdo	Tibet	NEC	37	4	12	98	38	4	18	81	37	3	0	67
Lhasa	Tibet	NEC	44	4	24	99	44	3	25	72	46	3	27	77
Nyingchi	Tibet	NEC	15	1	6	30	12	1	7	22	14	1	8	25
Naqu	Tibet	NEC	84	11	19	166	110	16	48	241	105	5	68	159
Shigatse	Tibet	NEC	24	2	11	53	23	2	13	41	21	1	8	46
Lhoka	Tibet	NEC	29	3	7	53	22	2	9	43	26	2	12	52

[a] EC and NEC denote emission control and non-emission control regions, respectively, of which the latter means regions without implementation of emission control measures.

[b] The pre-Parade Blue, Parade Blue, and post-Parade Blue periods indicate the periods of 1-19 August, 20 August-3 September, and 4-30 September 2015, respectively.

Table S4. Summary statistical of daily average CO concentrations (mg m^{-3}) during the pre-Parade Blue and Parade Blue periods in the 291 cities across China

City	Province	Region	The Pre-Parade Blue period				–	The Parade Blue period				Reduction or Increase
			Mean	Standard Error	Min	Max	–	Mean	Standard Error	Min	Max	
Beijing	Municipality	NC	0.90	0.06	0.51	1.42		0.56	0.04	0.43	0.94	-38.4
Tianjing	Municipality	NC	0.97	0.05	0.67	1.40		1.04	0.08	0.61	1.79	6.9
Baoding	Hebei	NC	1.01	0.07	0.51	1.74		0.64	0.05	0.34	1.08	-36.6
Cangzhou	Hebei	NC	0.90	0.06	0.51	1.42		0.56	0.04	0.43	0.94	-38.4
Chengde	Hebei	NC	0.78	0.04	0.48	1.04		0.49	0.02	0.38	0.75	-37.5
Handan	Hebei	NC	0.99	0.07	0.48	1.51		1.51	0.23	0.67	3.55	52.3
Hengshui	Hebei	NC	1.09	0.03	0.85	1.33		1.00	0.04	0.74	1.36	-8.3
Langfang	Hebei	NC	1.13	0.08	0.65	1.92		0.79	0.10	0.38	1.81	-29.8
Qinhuangdao	Hebei	NC	1.38	0.15	0.38	2.46		0.63	0.10	0.36	1.87	-54.1
Shijiazhuang	Hebei	NC	0.66	0.05	0.36	1.17		0.57	0.05	0.24	0.95	-13.6
Tangshan	Hebei	NC	1.81	0.21	0.84	4.53		1.89	0.23	0.59	3.91	4.4
Xingtai	Hebei	NC	1.12	0.12	0.51	2.40		0.93	0.11	0.33	1.70	-16.3
Zhangjiakou	Hebei	NC	0.51	0.02	0.37	0.66		0.45	0.02	0.37	0.58	-10.5
Changzhi	Shanxi	NC	1.42	0.08	1.01	2.06		1.57	0.04	1.30	1.79	10.7
Datong	Shanxi	NC	0.79	0.01	0.69	0.88		0.87	0.02	0.77	1.00	10.6
Jincheng	Shanxi	NC	1.71	0.19	0.59	3.97		1.64	0.15	0.78	2.83	-4.1
Jinzhong	Shanxi	NC	0.88	0.05	0.61	1.31		0.59	0.03	0.36	0.82	-33.2
Linfen	Shanxi	NC	1.59	0.07	1.13	2.32		1.64	0.04	1.34	1.94	3.2

Lvliang	Shanxi	NC	1.73	0.04	1.47	2.13	1.85	0.03	1.63	2.00	6.9
Shuozhou	Shanxi	NC	1.26	0.04	0.84	1.51	1.11	0.02	1.01	1.27	-11.4
Taiyuan	Shanxi	NC	0.85	0.03	0.68	1.15	0.84	0.03	0.71	1.08	-1.1
Xinzhou	Shanxi	NC	1.00	0.03	0.70	1.31	1.84	0.43	0.84	7.71	82.9
Yangquan	Shanxi	NC	0.85	0.03	0.67	1.14	0.63	0.02	0.52	0.85	-25.7
Yuncheng	Shanxi	NC	2.11	0.05	1.77	2.49	2.30	0.15	1.02	3.17	9.2
Binzhou	Shandong	NC	1.71	0.08	1.17	2.32	1.45	0.07	1.12	2.24	-15.3
Dezhou	Shandong	NC	1.92	0.05	1.62	2.34	1.66	0.06	1.32	2.08	-13.6
Dongying	Shandong	NC	1.00	0.07	0.61	1.50	0.87	0.05	0.60	1.12	-13.0
Jinan	Shandong	NC	0.92	0.05	0.57	1.33	0.97	0.04	0.76	1.25	4.7
Jining	Shandong	NC	0.99	0.04	0.72	1.26	0.92	0.04	0.70	1.19	-6.4
Laiwu	Shandong	NC	1.28	0.06	0.91	1.60	1.47	0.06	1.09	1.85	15.0
Liaocheng	Shandong	NC	1.39	0.04	1.16	1.72	1.18	0.05	0.86	1.50	-14.9
Linyi	Shandong	NC	1.09	0.06	0.75	1.85	1.17	0.05	0.86	1.49	7.5
Qingdao	Shandong	NC	0.62	0.04	0.33	0.99	0.63	0.03	0.48	0.91	0.4
Rizhao	Shandong	NC	0.81	0.05	0.49	1.37	0.95	0.04	0.72	1.26	17.3
Tai'an	Shandong	NC	1.45	0.08	1.13	2.56	1.24	0.06	0.86	1.62	-14.0
Weihai	Shandong	NC	0.68	0.05	0.39	1.37	0.54	0.02	0.37	0.67	-20.4
Weifang	Shandong	NC	0.71	0.06	0.34	1.19	0.87	0.07	0.58	1.35	22.9
Yantai	Shandong	NC	0.70	0.05	0.41	1.28	0.49	0.02	0.34	0.62	-30.1
Zaozhuang	Shandong	NC	0.71	0.05	0.37	1.00	0.86	0.02	0.75	1.04	21.4
Zibo	Shandong	NC	1.91	0.09	1.41	2.63	2.11	0.10	1.53	2.78	10.3
Alxa League	Inner Mongolia	NC	0.71	0.04	0.43	1.05	0.75	0.04	0.57	1.07	5.8
Bayannur	Inner Mongolia	NC	0.47	0.06	0.19	1.18	0.36	0.02	0.27	0.54	-22.6
Baotou	Inner Mongolia	NC	1.01	0.06	0.60	1.54	0.98	0.06	0.60	1.39	-3.1
Chifeng	Inner Mongolia	NC	0.86	0.09	0.35	1.51	0.54	0.03	0.39	0.78	-37.5

Ordos	Inner Mongolia	NC	0.60	0.03	0.40	0.88	0.61	0.01	0.48	0.72	1.2
Hohhot	Inner Mongolia	NC	0.63	0.03	0.46	0.98	0.63	0.02	0.49	0.74	0.2
Hulun Buir	Inner Mongolia	NC	0.31	0.03	0.15	0.58	0.21	0.03	0.05	0.42	34.0
Tongliao	Inner Mongolia	NC	0.75	0.05	0.52	1.21	0.51	0.01	0.40	0.65	32.3
Wuhai	Inner Mongolia	NC	0.70	0.06	0.31	1.20	0.64	0.06	0.37	1.04	9.4
Hinggan League	Inner Mongolia	NC	0.69	0.04	0.51	1.31	0.49	0.02	0.40	0.66	29.9
Anyang	Henan	NC	1.41	0.08	0.75	2.10	1.63	0.10	1.24	2.44	16.2
Hebi	Henan	NC	0.99	0.06	0.66	1.54	1.18	0.14	0.52	2.25	19.2
Jiaozuo	Henan	NC	1.50	0.05	1.14	1.79	1.38	0.09	0.90	2.00	7.9
Kaifeng	Henan	NC	1.14	0.05	0.77	1.58	1.30	0.04	1.02	1.76	13.9
Luoyang	Henan	NC	1.67	0.06	1.19	2.25	1.36	0.04	1.12	1.57	18.7
Luohe	Henan	NC	0.66	0.04	0.46	1.00	0.74	0.03	0.53	1.00	12.1
Nanyang	Henan	NC	0.69	0.06	0.31	1.22	0.70	0.02	0.57	0.90	0.8
Pingdingshan	Henan	NC	0.90	0.04	0.56	1.10	0.87	0.04	0.64	1.13	3.6
Sanmenxia	Henan	NC	1.05	0.03	0.76	1.27	1.13	0.02	0.97	1.28	7.8
Shangqiu	Henan	NC	0.59	0.05	0.28	1.14	0.64	0.03	0.47	0.88	9.0
Xinyang	Henan	NC	0.86	0.03	0.54	1.04	0.76	0.02	0.59	0.89	11.5
Zhengzhou	Henan	NC	1.05	0.04	0.77	1.43	1.12	0.04	0.87	1.42	6.5
Zhoukou	Henan	NC	1.02	0.05	0.77	1.47	1.35	0.04	1.06	1.55	33.1
Zhumadian	Henan	NC	0.50	0.04	0.26	0.87	0.65	0.03	0.46	0.83	29.1
Anshan	Liaoning	NE	1.43	0.06	0.97	1.99	1.32	0.06	0.97	1.67	7.8
Benxi	Liaoning	NE	1.10	0.04	0.84	1.42	1.01	0.07	0.60	1.72	8.4
Chaoyang	Liaoning	NE	1.71	0.06	1.43	2.31	1.52	0.01	1.42	1.62	11.0
Dalian	Liaoning	NE	0.78	0.04	0.46	1.06	0.72	0.04	0.51	1.16	7.2
Dandong	Liaoning	NE	7.13	1.59	0.97	24.00	1.26	0.03	1.06	1.40	82.3
Fushun	Liaoning	NE	1.05	0.04	0.77	1.46	0.94	0.03	0.71	1.15	10.6

Fuxin	Liaoning	NE	0.86	0.08	0.45	1.51	0.55	0.03	0.44	0.88	-36.7
Huludao	Liaoning	NE	1.26	0.11	0.55	1.89	0.90	0.07	0.60	1.80	-28.9
Jinzhou	Liaoning	NE	1.17	0.09	0.68	1.95	0.65	0.04	0.47	1.08	-44.8
Liaoyang	Liaoning	NE	1.07	0.04	0.75	1.44	1.14	0.05	0.89	1.59	6.7
Panjin	Liaoning	NE	0.89	0.06	0.50	1.47	0.68	0.04	0.54	1.18	-23.6
Shenyang	Liaoning	NE	0.88	0.05	0.55	1.31	0.58	0.03	0.38	0.82	-34.3
Tieling	Liaoning	NE	0.72	0.06	0.38	1.13	0.71	0.03	0.55	0.97	-1.7
Wafangdian	Liaoning	NE	0.44	0.03	0.22	0.66	0.39	0.03	0.27	0.60	-11.3
Yingkou	Liaoning	NE	0.79	0.05	0.38	1.08	0.71	0.05	0.41	1.02	-10.5
Baicheng	Jilin	NE	0.39	0.02	0.26	0.56	0.39	0.03	0.20	0.62	1.1
Baishan	Jilin	NE	0.83	0.07	0.54	1.50	0.72	0.03	0.51	0.89	-13.4
Changchun	Jilin	NE	0.68	0.03	0.52	1.08	0.64	0.04	0.48	0.91	-5.8
Jilin	Jilin	NE	0.63	0.02	0.49	0.79	0.64	0.03	0.45	0.76	0.9
Liaoyuan	Jilin	NE	0.93	0.04	0.55	1.26	0.87	0.07	0.63	1.63	-6.7
Siping	Jilin	NE	0.74	0.08	0.16	1.65	0.40	0.05	0.11	0.84	-45.5
Songyuan	Jilin	NE	0.98	0.10	0.36	1.78	0.55	0.03	0.39	0.70	-43.1
Daqing	Heilongjiang	NE	0.55	0.02	0.40	0.66	0.40	0.02	0.27	0.58	-27.0
Daxinganling	Heilongjiang	NE	0.68	0.05	0.47	1.30	0.77	0.03	0.64	1.19	14.3
Harbin	Heilongjiang	NE	0.86	0.02	0.70	1.05	0.70	0.04	0.47	0.95	-18.3
Hegang	Heilongjiang	NE	1.15	0.11	0.49	2.09	0.59	0.03	0.39	0.79	-49.0
Heihe	Heilongjiang	NE	0.40	0.02	0.32	0.68	0.34	0.02	0.20	0.49	-16.4
Jixi	Heilongjiang	NE	0.51	0.02	0.39	0.73	0.52	0.04	0.25	0.86	2.6
Jiamusi	Heilongjiang	NE	0.81	0.02	0.70	0.96	0.67	0.03	0.53	0.93	-17.9
Mudanjiang	Heilongjiang	NE	0.45	0.01	0.36	0.54	0.42	0.02	0.30	0.55	-7.4
Qitaihe	Heilongjiang	NE	0.41	0.01	0.28	0.56	0.42	0.02	0.27	0.60	3.5
Qiqihar	Heilongjiang	NE	0.61	0.03	0.37	0.92	0.44	0.02	0.35	0.64	-28.4

Shuangyashan	Heilongjiang	NE	0.72	0.05	0.36	1.34	0.54	0.06	0.28	1.00	-24.5
Suihua	Heilongjiang	NE	0.36	0.03	0.18	0.60	0.32	0.02	0.24	0.46	-11.7
Ankang	Shaanxi	NW	0.56	0.02	0.39	0.77	0.63	0.01	0.57	0.75	13.5
Baoji	Shaanxi	NW	0.89	0.03	0.63	1.14	0.90	0.04	0.65	1.12	1.0
Hanzhong	Shaanxi	NW	1.10	0.04	0.78	1.43	1.53	0.03	1.30	1.72	38.3
Shangluo	Shaanxi	NW	1.06	0.04	0.80	1.43	1.51	0.06	1.17	1.93	41.7
Tongchuan	Shaanxi	NW	0.74	0.04	0.44	1.05	0.71	0.02	0.55	0.82	-4.1
Weinan	Shaanxi	NW	0.61	0.02	0.49	0.73	0.70	0.03	0.53	0.86	14.9
Xi'an	Shaanxi	NW	1.00	0.02	0.83	1.19	1.16	0.03	0.96	1.45	16.6
Xianyang	Shaanxi	NW	0.84	0.03	0.56	0.99	0.89	0.03	0.60	1.08	5.5
Yan'an	Shaanxi	NW	1.15	0.06	0.69	1.48	1.05	0.03	0.89	1.37	-9.3
Yulin	Shaanxi	NW	0.94	0.07	0.40	1.31	0.68	0.03	0.49	0.90	-27.3
Baiying	Gansu	NW	0.76	0.04	0.48	1.06	0.71	0.02	0.59	0.83	-6.7
Dingxi	Gansu	NW	0.53	0.04	0.30	1.02	0.43	0.03	0.30	0.64	-17.9
Gannan	Gansu	NW	0.64	0.05	0.10	1.02	0.62	0.04	0.34	0.91	-2.4
Jiayuguan	Gansu	NW	0.67	0.04	0.37	1.01	0.60	0.03	0.44	0.88	-10.3
Jiuquan	Gansu	NW	0.55	0.03	0.23	0.80	0.56	0.04	0.31	0.94	2.4
Lanzhou	Gansu	NW	0.89	0.04	0.56	1.18	1.05	0.04	0.81	1.26	18.2
Linxia	Gansu	NW	0.76	0.01	0.67	0.92	0.82	0.03	0.71	0.99	7.6
Pingliang	Gansu	NW	0.71	0.06	0.36	1.64	0.80	0.03	0.65	0.97	12.4
Qingyang	Gansu	NW	0.78	0.02	0.65	0.97	0.87	0.03	0.75	1.07	11.5
Tianshui	Gansu	NW	0.46	0.01	0.38	0.62	0.51	0.02	0.37	0.69	11.2
Wuwei	Gansu	NW	2.68	0.04	2.37	3.02	2.56	0.11	2.16	3.22	-4.6
Zhangye	Gansu	NW	0.42	0.03	0.28	0.82	0.41	0.02	0.29	0.51	-4.4
Guyuan	Ningxia	NW	0.60	0.02	0.48	0.81	0.59	0.04	0.39	0.85	-2.7
Shizuishan	Ningxia	NW	0.52	0.04	0.26	1.02	0.59	0.04	0.38	0.85	14.9

Wuzhong	Ningxia	NW	0.93	0.05	0.73	1.59	0.89	0.02	0.73	1.07	-4.1
Yinchuan	Ningxia	NW	0.83	0.04	0.52	1.12	0.87	0.03	0.69	1.10	4.1
Zhongwei	Ningxia	NW	1.02	0.01	0.95	1.19	1.07	0.04	0.84	1.34	4.3
Aksu	Sinkiang	NW	0.80	0.10	0.37	1.76	1.32	0.14	0.36	2.35	64.6
Hami	Sinkiang	NW	0.97	0.06	0.58	1.42	0.71	0.05	0.40	1.02	-27.3
Hotan	Sinkiang	NW	0.60	0.05	0.24	1.08	0.99	0.06	0.65	1.40	63.5
Kashgar	Sinkiang	NW	0.57	0.03	0.30	0.87	0.55	0.04	0.35	0.85	-4.2
Karamay	Sinkiang	NW	1.12	0.03	0.88	1.36	1.21	0.03	1.06	1.36	8.5
Kizilsu	Sinkiang	NW	1.06	0.06	0.61	1.56	1.23	0.12	0.59	1.79	16.0
Shihezi	Sinkiang	NW	0.67	0.05	0.44	1.27	0.84	0.04	0.61	1.11	25.2
Urumchi	Sinkiang	NW	0.74	0.03	0.51	1.03	0.66	0.03	0.47	0.93	-11.5
Wujiaqu	Sinkiang	NW	0.63	0.04	0.29	0.97	0.52	0.06	0.20	0.86	-17.8
Yili	Sinkiang	NW	1.16	0.03	0.87	1.39	1.34	0.06	0.89	1.74	15.7
Ezhou	Hubei	SE	1.03	0.06	0.77	1.79	1.10	0.03	0.95	1.29	6.8
Huanggang	Hubei	SE	0.87	0.05	0.36	1.18	1.05	0.03	0.75	1.15	21.2
Jingmen	Hubei	SE	0.65	0.04	0.44	1.07	0.82	0.02	0.65	0.96	27.5
Shiyan	Hubei	SE	0.94	0.04	0.65	1.39	0.86	0.05	0.53	1.30	-8.6
Wuhan	Hubei	SE	0.66	0.05	0.42	1.07	0.93	0.05	0.54	1.16	40.4
Xianning	Hubei	SE	1.10	0.05	0.74	1.48	1.44	0.03	1.11	1.63	30.6
Xiangyang	Hubei	SE	0.75	0.04	0.60	1.14	0.87	0.03	0.72	1.13	15.4
Xiaogan	Hubei	SE	1.40	0.06	1.11	1.92	1.72	0.05	1.40	2.14	23.2
Yichang	Hubei	SE	0.82	0.04	0.54	1.13	0.97	0.02	0.86	1.17	17.4
Anqing	Anhui	SE	0.45	0.05	0.16	0.78	0.62	0.03	0.43	0.81	37.8
Bengbu	Anhui	SE	0.65	0.04	0.30	0.92	0.85	0.03	0.69	1.10	31.1
Bozhou	Anhui	SE	0.48	0.04	0.25	0.78	0.88	0.04	0.60	1.15	84.4
Chuzhou	Anhui	SE	0.54	0.06	0.28	1.00	0.74	0.04	0.48	0.96	37.5

Fuyang	Anhui	SE	0.53	0.07	0.18	1.13	0.72	0.04	0.50	1.02	37.0
Hefei	Anhui	SE	0.75	0.04	0.45	1.06	0.85	0.04	0.66	1.15	12.9
Huaibei	Anhui	SE	0.85	0.05	0.57	1.24	1.20	0.03	1.01	1.44	39.9
Huainan	Anhui	SE	0.64	0.06	0.24	1.07	0.89	0.03	0.67	1.16	37.8
Huangshan	Anhui	SE	0.12	0.01	0.07	0.18	0.17	0.02	0.11	0.36	36.9
Lu'an	Anhui	SE	0.68	0.04	0.36	1.07	0.56	0.03	0.39	0.76	17.5
Ma'anshan	Anhui	SE	1.10	0.03	0.84	1.36	1.34	0.05	1.02	1.58	21.1
Suzhou	Anhui	SE	0.57	0.07	0.23	1.14	0.97	0.06	0.71	1.41	69.1
Tongling	Anhui	SE	0.82	0.05	0.53	1.23	1.05	0.06	0.76	1.53	28.1
Wuhu	Anhui	SE	0.65	0.05	0.33	1.00	0.81	0.04	0.63	1.19	24.6
Changzhou	Jiangsu	SE	0.80	0.03	0.59	1.15	0.85	0.06	0.43	1.18	6.5
Huaian	Jiangsu	SE	0.69	0.05	0.32	1.07	0.89	0.06	0.46	1.29	30.5
Lianyungang	Jiangsu	SE	0.62	0.04	0.30	0.96	0.87	0.05	0.52	1.24	41.9
Nanjing	Jiangsu	SE	0.69	0.04	0.40	0.98	0.84	0.05	0.50	1.19	20.6
Nantong	Jiangsu	SE	0.54	0.05	0.32	1.18	0.72	0.06	0.43	1.37	33.0
Suzhou	Jiangsu	SE	0.69	0.03	0.43	0.85	0.94	0.05	0.60	1.32	35.6
Suqian	Jiangsu	SE	0.64	0.04	0.33	0.97	1.01	0.05	0.68	1.46	58.3
Taizhou	Jiangsu	SE	0.84	0.05	0.52	1.30	0.92	0.04	0.66	1.16	9.3
Wuxi	Jiangsu	SE	0.84	0.03	0.66	1.32	1.18	0.05	0.96	1.65	40.5
Xuzhou	Jiangsu	SE	0.98	0.05	0.66	1.33	1.31	0.06	1.00	1.75	33.4
Yanchen	Jiangsu	SE	0.59	0.04	0.33	1.06	0.68	0.04	0.44	0.93	15.2
Yangzhou	Jiangsu	SE	0.62	0.05	0.26	1.01	0.60	0.03	0.39	0.74	2.8
Zhenjiang	Jiangsu	SE	0.74	0.03	0.47	1.05	0.80	0.04	0.52	1.00	9.1
Shanghai	Municipality	SE	0.65	0.02	0.50	0.76	0.89	0.05	0.67	1.26	36.9
Hangzhou	Zhejiang	SE	0.68	0.03	0.44	0.87	0.90	0.03	0.68	1.16	31.0
Huzhou	Zhejiang	SE	0.63	0.03	0.43	0.86	0.87	0.03	0.69	1.05	38.0

Jiaxing	Zhejiang	SE	0.56	0.02	0.39	0.74	0.76	0.04	0.47	1.02	36.7
Jinhua	Zhejiang	SE	0.67	0.03	0.47	0.85	0.85	0.07	0.63	1.45	26.7
Lishui	Zhejiang	SE	0.52	0.02	0.39	0.66	0.58	0.02	0.44	0.71	11.6
Ningbo	Zhejiang	SE	0.71	0.02	0.58	0.88	0.87	0.04	0.67	1.14	22.2
Quzhou	Zhejiang	SE	0.67	0.03	0.47	0.85	0.87	0.06	0.63	1.45	29.5
Shaoxing	Zhejiang	SE	0.64	0.04	0.42	0.92	0.86	0.05	0.54	1.23	34.3
Taizhou	Zhejiang	SE	0.61	0.02	0.41	0.82	0.70	0.04	0.46	0.88	14.9
Wenjiang	Zhejiang	SE	0.71	0.03	0.52	0.92	0.72	0.03	0.53	0.92	1.4
Zhoushan	Zhejiang	SE	0.50	0.03	0.34	0.82	0.64	0.04	0.42	0.93	29.3
Fuzhou	Jiangxi	SE	0.75	0.02	0.65	0.88	0.83	0.03	0.59	0.96	10.5
Ganzhou	Jiangxi	SE	1.22	0.02	1.06	1.32	1.29	0.04	1.09	1.53	5.6
Ji'an	Jiangxi	SE	0.69	0.02	0.52	0.82	0.89	0.02	0.75	1.05	28.3
Jingdezhen	Jiangxi	SE	0.59	0.02	0.41	0.75	0.75	0.04	0.52	1.09	27.7
Jiujiang	Jiangxi	SE	0.61	0.02	0.40	0.82	0.69	0.03	0.48	0.86	11.9
Nanchang	Jiangxi	SE	0.81	0.02	0.69	1.00	0.89	0.04	0.67	1.06	9.5
Pingxiang	Jiangxi	SE	0.60	0.04	0.40	1.10	0.95	0.07	0.58	1.76	58.2
Shangrao	Jiangxi	SE	0.49	0.04	0.31	0.74	0.48	0.04	0.33	0.81	-3.1
Xinyu	Jiangxi	SE	1.38	0.05	1.01	1.96	1.36	0.05	1.07	1.67	-1.3
Yichun	Jiangxi	SE	0.87	0.03	0.62	1.08	0.94	0.03	0.67	1.13	7.5
Yingtan	Jiangxi	SE	0.55	0.02	0.41	0.73	0.70	0.02	0.60	0.81	26.9
Changsha	Hunan	SE	0.64	0.02	0.53	0.78	0.82	0.03	0.63	1.02	27.0
Changde	Hunan	SE	1.15	0.05	0.60	1.52	1.16	0.04	0.87	1.42	0.8
Chenzhou	Hunan	SE	0.82	0.04	0.54	1.18	1.10	0.05	0.86	1.44	34.9
Huaihua	Hunan	SE	1.33	0.03	1.08	1.54	1.36	0.03	1.05	1.54	2.2
Loudi	Hunan	SE	1.20	0.08	0.65	1.75	1.76	0.05	1.49	2.09	47.4
Xiangtan	Hunan	SE	1.01	0.03	0.72	1.18	1.06	0.04	0.80	1.31	4.7

Yiyang	Hunan	SE	0.53	0.05	0.24	0.90	0.85	0.03	0.65	1.06	58.9
Yongzhou	Hunan	SE	0.46	0.02	0.33	0.62	0.63	0.03	0.37	0.74	37.2
Zhangjiajie	Hunan	SE	1.23	0.05	0.76	1.58	1.58	0.06	1.27	2.02	28.9
Zhuzhou	Hunan	SE	0.60	0.03	0.45	0.79	0.85	0.04	0.62	1.10	42.6
Dongguan	Guangdong	SE	0.68	0.02	0.55	0.95	0.82	0.01	0.72	0.94	21.5
Foshan	Guangdong	SE	0.75	0.02	0.63	0.96	0.86	0.02	0.72	1.00	15.7
Guangzhou	Guangdong	SE	0.83	0.02	0.62	0.98	0.90	0.02	0.75	0.98	8.8
Heyuan	Guangdong	SE	0.77	0.02	0.56	0.94	0.83	0.01	0.77	0.93	7.5
Huizhou	Guangdong	SE	0.72	0.02	0.60	0.86	0.78	0.03	0.62	0.97	8.2
Jiangmen	Guangdong	SE	0.78	0.02	0.62	0.98	0.99	0.04	0.80	1.26	27.5
Maoming	Guangdong	SE	0.79	0.02	0.67	0.96	0.93	0.04	0.73	1.18	16.7
Meizhou	Guangdong	SE	0.72	0.02	0.58	0.91	0.88	0.01	0.79	0.97	22.3
Qingyuan	Guangdong	SE	0.87	0.03	0.60	1.11	0.93	0.02	0.83	1.07	7.5
Shantou	Guangdong	SE	0.85	0.03	0.67	1.15	0.86	0.02	0.74	1.09	1.0
Shaoguan	Guangdong	SE	0.89	0.02	0.73	1.00	0.81	0.03	0.61	0.97	-8.9
Shenzhen	Guangdong	SE	0.83	0.02	0.69	0.95	0.82	0.03	0.67	1.01	-1.3
Zhujiang	Guangdong	SE	0.74	0.03	0.44	0.90	0.70	0.02	0.55	0.84	-5.6
Zhaoqing	Guangdong	SE	0.62	0.02	0.50	0.81	0.84	0.04	0.55	1.11	34.4
Zhongshan	Guangdong	SE	0.88	0.03	0.59	1.11	1.00	0.07	0.59	1.28	14.2
Zhuhai	Guangdong	SE	0.72	0.02	0.53	0.87	0.83	0.04	0.60	1.00	16.1
Fuzhou	Fujian	SE	0.57	0.02	0.43	0.80	0.62	0.03	0.41	0.79	9.3
Longyan	Fujian	SE	0.68	0.02	0.47	0.84	0.71	0.03	0.54	0.88	4.8
Nanping	Fujian	SE	0.78	0.02	0.60	0.92	0.77	0.01	0.67	0.84	-1.6
Ningde	Fujian	SE	0.65	0.04	0.27	1.08	0.60	0.05	0.34	0.85	-8.2
Putian	Fujian	SE	0.63	0.03	0.46	0.97	0.59	0.03	0.38	0.75	-7.6
Quanzhou	Fujian	SE	0.55	0.02	0.36	0.70	0.59	0.02	0.44	0.72	6.8

Sanming	Fujian	SE	1.17	0.05	0.82	1.46	1.04	0.06	0.74	1.41	11.2
Xiamen	Fujian	SE	0.44	0.02	0.31	0.64	0.56	0.03	0.33	0.72	26.7
Zhangzhou	Fujian	SE	0.55	0.02	0.37	0.71	0.57	0.02	0.45	0.64	3.7
Haikou	Hainan	SE	0.52	0.02	0.35	0.72	0.63	0.03	0.48	0.79	21.4
Sanya	Hainan	SE	0.57	0.02	0.44	0.75	0.64	0.04	0.46	0.89	13.8
Chongqing	Municipality	SW	0.84	0.04	0.57	1.12	1.11	0.03	0.86	1.28	31.1
Bazhong	Sichuan	SW	0.67	0.02	0.55	0.79	0.82	0.02	0.64	0.93	21.5
Chengdu	Sichuan	SW	0.84	0.03	0.52	1.06	1.07	0.05	0.79	1.44	27.2
Dazhou	Sichuan	SW	0.66	0.05	0.40	1.06	0.96	0.05	0.60	1.23	44.6
Deyang	Sichuan	SW	0.90	0.03	0.67	1.08	1.24	0.04	0.94	1.51	38.0
Guangyuan	Sichuan	SW	0.26	0.01	0.18	0.37	0.37	0.02	0.26	0.45	45.7
Leshan	Sichuan	SW	0.81	0.03	0.64	1.03	1.03	0.06	0.70	1.45	27.2
Luzhou	Sichuan	SW	0.52	0.03	0.32	0.82	0.66	0.03	0.42	0.90	27.3
Meishan	Sichuan	SW	0.46	0.02	0.29	0.63	0.67	0.03	0.43	0.90	45.7
Mianyang	Sichuan	SW	0.80	0.03	0.60	1.00	0.90	0.03	0.73	1.12	11.5
Nanchong	Sichuan	SW	0.64	0.03	0.48	0.92	0.73	0.02	0.59	0.88	14.0
Panzhihua	Sichuan	SW	1.43	0.05	1.12	1.83	1.47	0.06	1.13	1.93	2.4
Suining	Sichuan	SW	0.82	0.02	0.69	1.02	0.78	0.02	0.69	0.91	4.4
Ya'an	Sichuan	SW	0.65	0.03	0.50	0.98	0.74	0.02	0.56	0.89	13.7
Ziyang	Sichuan	SW	0.50	0.02	0.38	0.72	0.62	0.02	0.44	0.75	24.8
Zigong	Sichuan	SW	0.51	0.04	0.29	0.85	0.78	0.04	0.52	1.07	54.2
Baoshan	Yunnan	SW	0.71	0.02	0.59	0.94	0.88	0.04	0.67	1.16	24.5
Chuxiong	Yunnan	SW	0.70	0.03	0.53	0.94	0.83	0.04	0.57	1.13	17.7
Dali	Yunnan	SW	0.41	0.02	0.27	0.58	0.45	0.04	0.25	0.79	10.9
Dehong	Yunnan	SW	0.49	0.02	0.35	0.67	0.63	0.02	0.53	0.75	28.4
Honghe	Yunnan	SW	0.46	0.04	0.28	0.95	0.54	0.05	0.31	0.86	18.0

Kunming	Yunnan	SW	0.77	0.04	0.47	1.05	0.85	0.03	0.64	1.04	10.9
Lijiang	Yunnan	SW	0.98	0.03	0.71	1.17	0.84	0.02	0.72	0.97	14.7
Lincang	Yunnan	SW	0.30	0.04	0.11	0.91	0.49	0.02	0.36	0.63	61.4
Nujiang	Yunnan	SW	0.62	0.04	0.30	0.95	0.54	0.02	0.43	0.66	14.0
Qujing	Yunnan	SW	0.76	0.03	0.56	1.10	1.06	0.04	0.81	1.38	39.1
Wenshan	Yunnan	SW	0.57	0.02	0.40	0.82	0.58	0.02	0.49	0.73	1.4
Xishuangbanna	Yunnan	SW	0.59	0.02	0.47	0.82	0.64	0.02	0.54	0.79	8.7
Tuxi	Yunnan	SW	0.97	0.07	0.68	1.97	1.29	0.06	0.99	1.70	32.4
Zhaotong	Yunnan	SW	0.71	0.04	0.40	1.08	0.98	0.04	0.74	1.23	37.9
Anshun	Guizhou	SW	0.31	0.02	0.20	0.47	0.49	0.03	0.37	0.70	60.7
Bijie	Guizhou	SW	0.80	0.05	0.45	1.21	1.10	0.05	0.77	1.42	38.4
Guiyang	Guizhou	SW	0.53	0.02	0.39	0.73	0.71	0.02	0.63	0.89	34.9
Liupanshui	Guizhou	SW	0.46	0.06	0.14	1.30	0.61	0.04	0.41	0.98	33.8
Tongren	Guizhou	SW	0.48	0.02	0.33	0.68	0.67	0.01	0.60	0.72	37.4
Zunyi	Guizhou	SW	0.63	0.02	0.50	0.80	0.80	0.03	0.56	1.00	25.9
Baise	Guangxi	SW	1.00	0.03	0.75	1.20	0.48	0.03	0.31	0.78	51.9
Beihai	Guangxi	SW	0.81	0.03	0.63	0.99	1.08	0.03	0.87	1.25	34.3
Chongzuo	Guangxi	SW	0.76	0.02	0.62	0.93	0.87	0.03	0.68	1.04	14.6
Fangchenggang	Guangxi	SW	0.65	0.01	0.60	0.72	0.85	0.03	0.65	1.03	29.4
Guigang	Guangxi	SW	0.79	0.02	0.65	1.03	0.92	0.04	0.66	1.21	16.5
Guilin	Guangxi	SW	0.77	0.01	0.68	0.85	0.83	0.02	0.69	0.99	7.6
Hechi	Guangxi	SW	1.10	0.05	0.76	1.60	1.09	0.06	0.71	1.50	0.7
Hezhou	Guangxi	SW	1.06	0.09	0.60	2.33	0.84	0.04	0.43	1.09	20.8
Laibin	Guangxi	SW	0.82	0.02	0.65	0.98	0.94	0.04	0.76	1.17	14.8
Liuzhou	Guangxi	SW	0.91	0.02	0.77	1.11	0.98	0.03	0.75	1.15	7.4
Nanning	Guangxi	SW	0.77	0.02	0.58	0.96	0.89	0.03	0.71	1.02	15.4

Qinzhou	Guangxi	SW	1.16	0.04	0.87	1.57	1.11	0.03	0.90	1.39	-4.7
Wuzhou	Guangxi	SW	0.75	0.02	0.66	0.94	0.88	0.06	0.63	1.33	16.9
Yulin	Guangxi	SW	0.90	0.04	0.61	1.23	0.76	0.02	0.57	0.89	-15.8
Golog	Qinghai	TP	0.55	0.01	0.42	0.63	0.64	0.03	0.47	0.92	15.3
Haidong	Qinghai	TP	0.82	0.04	0.56	1.22	0.90	0.04	0.66	1.15	9.4
Xining	Qinghai	TP	1.08	0.04	0.82	1.54	1.09	0.05	0.80	1.46	1.4
Ali	Tibet	TP	0.35	0.01	0.23	0.42	0.20	0.03	0.13	0.63	-41.5
Qamdo	Tibet	TP	0.80	0.03	0.53	1.03	1.13	0.03	0.92	1.31	41.5
Lhasa	Tibet	TP	0.57	0.01	0.46	0.68	0.50	0.02	0.41	0.61	-12.6
Nyingchi	Tibet	TP	0.41	0.01	0.34	0.50	0.44	0.01	0.39	0.53	7.4
Naqu	Tibet	TP	0.96	0.04	0.60	1.22	1.41	0.02	1.30	1.56	46.9
Shigatse	Tibet	TP	0.40	0.02	0.27	0.55	0.34	0.01	0.29	0.41	-14.3
Lhoka	Tibet	TP	0.48	0.02	0.31	0.66	0.64	0.02	0.49	0.76	32.0

[a] NC, NE, NW, SE, SW, TP represent north China, northeast China, northwest China, southeast China, southwest China, and the Tibetan Plateau, respectively.

[b] Negative values with red color mean significant (p<0.05 or 0.01) reduction, and positive values mean increase.

Table S4. Summary of daily average NO_2 concentrations (μg m^{-3}) during the pre-Parade Blue, Parade Blue and post-Parade Blue periods in the 291 cities across China

City	Province	Region[a]	Pre-Parade Blue period[b]				Parade Blue period[b]				Post-Parade Blue period[b]			
			Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max
Beijing	Municipality	EC	34	1	26	44	21	1	17	24	42	2	20	63
Tianjing	Municipality	EC	26	2	14	45	21	2	12	33	25	2	11	41
Baoding	Hebei	EC	34	2	23	51	25	2	15	40	44	3	16	73

带格式的：下标

带格式表格

Cangzhou	Hebei	EC	34	1	26	44	21	1	17	24	41	3	21	87
Chengde	Hebei	EC	27	1	21	35	21	1	14	26	28	1	16	41
Handan	Hebei	EC	38	3	22	70	36	3	20	54	45	3	15	76
Hengshui	Hebei	EC	29	2	18	59	27	1	18	33	44	3	20	77
Langfang	Hebei	EC	42	1	30	55	36	2	21	55	54	3	26	89
Qinhuangdao	Hebei	EC	41	2	17	53	35	3	18	52	35	2	19	58
Shijiazhuang	Hebei	EC	29	2	15	56	22	3	7	37	48	4	9	79
Tangshan	Hebei	EC	44	2	32	76	45	4	10	74	58	3	23	96
Xingtai	Hebei	EC	50	2	34	63	38	4	14	74	54	3	22	81
Zhangjiakou	Hebei	EC	17	1	11	24	24	2	14	32	25	1	16	34
Changzhi	Shanxi	EC	25	2	10	41	31	1	22	41	27	2	12	55
Datong	Shanxi	EC	19	1	9	30	16	1	11	23	23	2	8	41
Jincheng	Shanxi	EC	29	2	10	46	29	2	15	38	30	2	11	43
Jinzhong	Shanxi	EC	22	1	15	31	20	1	12	29	24	1	11	36
Linfen	Shanxi	EC	20	1	14	25	19	1	12	32	23	1	12	35
Lvliang	Shanxi	EC	22	1	14	34	18	1	13	23	30	2	16	56
Shuozhou	Shanxi	EC	31	2	13	45	31	1	20	39	31	2	15	65
Taiyuan	Shanxi	EC	30	1	22	41	28	2	20	41	34	2	17	51
Xinzhou	Shanxi	EC	33	2	16	48	29	2	16	37	34	2	14	51
Yangquan	Shanxi	EC	24	1	12	32	23	2	11	32	31	1	17	45
Yuncheng	Shanxi	EC	13	2	4	30	20	2	10	33	21	2	8	46
Binzhou	Shandong	EC	27	2	16	49	28	3	15	55	35	2	14	59
Dezhou	Shandong	EC	29	2	19	46	30	2	16	42	40	3	17	66
Dongying	Shandong	EC	27	2	9	43	22	3	8	40	34	3	7	65
Jinan	Shandong	EC	35	2	20	49	41	2	26	54	54	3	34	85
Jining	Shandong	EC	31	2	13	50	37	3	24	67	43	2	25	83

Laiwu	Shandong	EC	29	2	12	47	38	2	23	54	46	2	24	68
Liaocheng	Shandong	EC	29	2	18	43	27	3	10	44	40	2	20	69
Linyi	Shandong	EC	33	2	16	54	39	3	27	62	41	3	18	80
Qingdao	Shandong	EC	19	1	11	35	28	1	16	36	29	2	12	50
Rizhao	Shandong	EC	20	2	5	39	28	3	16	44	33	3	7	65
Tai'an	Shandong	EC	30	2	17	47	38	2	22	50	38	2	22	62
Weihai	Shandong	EC	15	1	6	28	14	1	7	22	18	1	5	33
Weifang	Shandong	EC	25	2	14	41	33	2	22	48	33	2	14	68
Yantai	Shandong	EC	23	1	12	33	27	2	17	42	31	2	12	48
Zaozhuang	Shandong	EC	26	2	15	42	29	1	19	38	31	2	14	62
Zibo	Shandong	EC	52	2	31	68	55	3	38	70	60	3	38	97
Alxa League	Inner Mongolia	EC	7	0	5	10	8	1	4	11	17	1	9	27
Bayannur	Inner Mongolia	EC	19	1	14	24	22	2	13	39	21	1	13	34
Baotou	Inner Mongolia	EC	34	2	20	49	33	2	18	43	37	2	14	63
Chifeng	Inner Mongolia	EC	16	1	10	27	17	0	14	20	17	1	10	24
Ordos	Inner Mongolia	EC	19	1	9	30	18	1	12	26	18	1	9	36
Hohhot	Inner Mongolia	EC	32	1	21	43	32	2	18	42	34	3	13	62
Hulun Buir	Inner Mongolia	EC	20	2	7	37	19	1	11	27	17	1	7	29
Tongliao	Inner Mongolia	EC	16	1	10	25	13	1	8	20	20	1	7	29
Wuhai	Inner Mongolia	EC	17	1	11	24	17	1	11	24	25	2	9	54
Hinggan League	Inner Mongolia	EC	14	1	6	22	10	1	7	16	14	1	9	24
Anyang	Henan	EC	30	2	18	47	32	2	20	42	46	2	19	77
Hebi	Henan	EC	27	3	9	48	24	2	16	39	48	3	16	72
Jiaozuo	Henan	EC	29	2	21	47	30	2	17	40	36	2	16	55
Kaifeng	Henan	EC	25	2	15	49	24	2	14	36	36	2	19	59
Luoyang	Henan	EC	23	1	15	41	25	2	13	33	35	2	16	54

Luohe	Henan	EC	18	2	9	33	23	2	12	35	31	2	13	48
Nanyang	Henan	EC	16	1	8	25	21	1	14	28	22	2	8	41
Pingdingshan	Henan	EC	27	2	14	41	33	2	23	43	38	2	22	56
Sanmenxia	Henan	EC	23	2	15	43	23	3	14	49	28	1	16	42
Shangqiu	Henan	EC	16	1	8	31	21	2	11	39	28	2	14	65
Xinyang	Henan	EC	19	1	12	30	28	1	22	32	29	1	15	42
Zhengzhou	Henan	EC	39	3	23	73	45	3	24	69	56	3	26	86
Zhoukou	Henan	EC	11	1	7	17	13	1	8	19	18	1	9	36
Zhumadian	Henan	EC	22	2	8	34	24	1	16	32	25	1	13	46
Anshan	Liaoning	NEC	18	2	11	33	27	1	16	31	31	2	11	54
Benxi	Liaoning	NEC	19	1	11	30	25	1	14	34	36	2	17	60
Chaoyang	Liaoning	NEC	12	1	7	16	13	1	8	17	14	1	8	24
Dalian	Liaoning	NEC	20	1	14	25	23	1	17	31	30	1	15	40
Dandong	Liaoning	NEC	29	8	1	108	15	1	7	20	20	1	12	42
Fushun	Liaoning	NEC	15	1	10	22	18	1	8	24	30	2	12	50
Fuxin	Liaoning	NEC	28	1	18	38	25	1	15	35	31	1	15	42
Huludao	Liaoning	NEC	23	2	11	44	28	2	15	41	33	2	14	49
Jinzhou	Liaoning	NEC	26	1	18	36	28	1	21	36	34	1	20	44
Liaoyang	Liaoning	NEC	15	1	6	31	26	1	15	32	30	2	6	57
Panjin	Liaoning	NEC	13	2	4	32	24	1	17	32	27	2	13	51
Shenyang	Liaoning	NEC	31	2	20	49	35	2	27	48	44	2	25	63
Tieling	Liaoning	NEC	20	1	13	26	23	1	14	29	29	1	16	41
Wafangdian	Liaoning	NEC	17	1	11	24	21	1	15	33	31	1	18	46
Yingkou	Liaoning	NEC	16	1	8	27	22	1	15	33	30	2	16	61
Baicheng	Jilin	NEC	12	1	8	21	9	1	4	13	11	1	7	19
Baishan	Jilin	NEC	14	0	9	18	16	1	12	19	21	1	13	36

Changchun	Jilin	NEC	28	2	17	44	33	2	22	45	42	2	22	62
Jilin	Jilin	NEC	20	1	13	28	24	1	16	31	31	1	25	43
Liaoyuan	Jilin	NEC	15	2	3	30	15	1	8	24	26	1	11	37
Siping	Jilin	NEC	17	2	4	33	23	3	13	62	32	2	12	51
Songyuan	Jilin	NEC	16	1	9	24	14	1	6	22	26	2	10	42
Daqing	Heilongjiang	NEC	16	1	12	23	16	1	11	24	21	1	10	35
Daxinganling	Heilongjiang	NEC	11	1	8	15	15	1	10	20	11	1	6	18
Harbin	Heilongjiang	NEC	31	2	21	51	31	2	20	42	37	2	18	60
Hegang	Heilongjiang	NEC	6	1	3	10	4	0	2	6	9	1	4	17
Heihe	Heilongjiang	NEC	11	1	5	15	9	1	7	14	12	1	6	29
Jixi	Heilongjiang	NEC	16	1	11	21	13	1	8	19	18	1	9	34
Jiamusi	Heilongjiang	NEC	18	1	8	27	15	2	8	31	22	2	5	50
Mudanjiang	Heilongjiang	NEC	24	1	16	33	19	1	12	25	20	1	13	33
Qitaihe	Heilongjiang	NEC	12	0	10	16	11	1	7	15	13	1	5	19
Qiqihar	Heilongjiang	NEC	15	1	8	19	11	1	7	16	18	1	10	28
Shuangyashan	Heilongjiang	NEC	15	0	12	19	15	1	9	18	18	1	13	28
Suihua	Heilongjiang	NEC	20	2	10	41	15	1	10	24	15	1	7	30
Ankang	Shaanxi	NEC	6	1	3	11	7	1	3	11	10	1	5	18
Baoji	Shaanxi	NEC	23	1	16	34	28	1	16	33	28	1	17	39
Hanzhong	Shaanxi	NEC	15	1	9	22	22	1	13	27	23	1	10	31
Shangluo	Shaanxi	NEC	15	1	10	22	19	1	13	24	21	1	15	28
Tongchuan	Shaanxi	NEC	24	2	15	47	26	1	17	32	27	1	15	41
Weinan	Shaanxi	NEC	29	1	22	43	39	2	29	54	37	2	22	56
Xi'an	Shaanxi	NEC	36	2	24	55	44	2	29	57	38	2	21	56
Xianyang	Shaanxi	NEC	23	1	13	36	27	1	19	34	30	2	16	49
Yan'an	Shaanxi	NEC	35	1	23	40	40	1	33	53	35	1	27	44

Yulin	Shaanxi	NEC	27	2	12	43	33	3	14	56	26	2	15	48
Baiying	Gansu	NEC	25	2	12	40	28	3	4	42	22	2	6	50
Dingxi	Gansu	NEC	20	2	9	40	20	1	12	30	18	1	10	35
Gannan	Gansu	NEC	17	2	8	40	14	1	10	19	15	1	10	28
Jiayuguan	Gansu	NEC	25	1	13	37	19	1	13	29	28	1	15	42
Jiuquan	Gansu	NEC	23	2	8	37	25	2	12	38	26	1	14	42
Lanzhou	Gansu	NEC	38	2	20	53	42	3	25	59	42	2	23	72
Linxia	Gansu	NEC	26	2	12	49	31	2	20	49	25	2	7	40
Pingliang	Gansu	NEC	41	1	28	50	50	2	38	62	43	1	29	55
Qingyang	Gansu	NEC	10	1	5	16	14	1	9	20	14	1	7	21
Tianshui	Gansu	NEC	16	1	10	22	14	1	6	19	20	1	14	27
Wuwei	Gansu	NEC	22	1	13	36	23	2	14	35	21	2	11	46
Zhangye	Gansu	NEC	18	1	10	26	15	1	8	21	20	1	11	36
Guyuan	Ningxia	NEC	18	2	9	30	22	2	11	31	17	1	9	28
Shizuishan	Ningxia	NEC	17	1	12	33	20	1	13	30	23	1	11	44
Wuzhong	Ningxia	NEC	17	1	9	29	18	2	5	28	16	2	6	36
Yinchuan	Ningxia	NEC	27	2	13	48	29	3	16	45	25	2	10	44
Zhongwei	Ningxia	NEC	13	1	7	18	17	1	9	22	15	1	6	33
Aksu	Sinkiang	NEC	23	2	12	42	21	2	11	38	22	2	8	40
Hami	Sinkiang	NEC	11	1	4	21	9	1	4	19	12	1	5	29
Hotan	Sinkiang	NEC	21	2	11	35	18	2	10	29	23	2	11	39
Kashgar	Sinkiang	NEC	22	2	10	36	19	2	9	36	23	2	11	44
Karamay	Sinkiang	NEC	15	1	5	28	14	1	6	28	14	1	6	36
Kizilsu	Sinkiang	NEC	9	1	1	19	9	1	6	15	9	1	1	19
Shihezi	Sinkiang	NEC	28	3	7	64	22	3	6	38	26	2	10	63
Urumchi	Sinkiang	NEC	41	2	20	58	38	2	24	50	35	3	15	72

Wujiaqu	Sinkiang	NEC	30	3	9	53	24	3	10	49	21	2	4	56
Yili	Sinkiang	NEC	25	2	11	34	24	2	12	34	26	2	10	52
Ezhou	Hubei	NEC	13	1	8	24	19	1	11	30	21	1	10	37
Huanggang	Hubei	NEC	14	2	4	23	14	1	6	26	20	2	8	43
Jingmen	Hubei	NEC	18	1	12	38	27	2	17	38	25	2	13	43
Shiyan	Hubei	NEC	12	1	8	19	13	0	10	16	15	1	8	21
Wuhan	Hubei	NEC	27	2	11	52	41	4	18	64	40	3	19	86
Xianning	Hubei	NEC	12	0	9	16	15	1	11	19	16	1	9	24
Xiangyang	Hubei	NEC	17	1	10	34	23	1	16	31	30	2	16	60
Xiaogan	Hubei	NEC	5	1	2	12	9	1	4	20	17	2	6	41
Yichang	Hubei	NEC	24	1	19	32	26	1	23	32	33	1	23	46
Anqing	Anhui	NEC	21	2	12	37	21	2	14	46	21	1	14	35
Bengbu	Anhui	NEC	24	2	11	40	32	2	20	42	33	2	21	59
Bozhou	Anhui	NEC	33	1	24	45	46	2	35	72	41	2	27	80
Chuzhou	Anhui	NEC	29	2	18	41	22	1	11	30	22	2	12	38
Fuyang	Anhui	NEC	28	1	21	46	43	3	30	64	41	2	25	70
Hefei	Anhui	NEC	24	2	14	38	31	3	19	58	29	2	18	48
Huaibei	Anhui	NEC	19	1	14	25	24	1	18	32	28	2	18	54
Huainan	Anhui	NEC	18	1	11	29	20	1	13	26	23	1	14	34
Huangshan	Anhui	NEC	9	0	8	10	9	0	8	10	10	0	8	12
Lu'an	Anhui	NEC	15	1	8	27	15	1	9	21	15	1	7	26
Ma'anshan	Anhui	NEC	20	1	10	30	21	1	15	28	19	1	6	42
Suzhou	Anhui	NEC	18	0	15	21	19	1	16	26	21	1	16	35
Tongling	Anhui	NEC	25	2	15	35	31	2	18	47	30	1	18	42
Wuhu	Anhui	NEC	38	1	30	51	38	2	29	49	40	2	24	79
Changzhou	Jiangsu	NEC	33	3	16	70	34	3	15	51	33	2	20	67

Huaian	Jiangsu	NEC	12	1	3	22	15	2	5	30	16	1	6	33
Lianyungang	Jiangsu	NEC	17	1	9	27	24	1	16	32	25	2	10	39
Nanjing	Jiangsu	NEC	36	2	19	54	39	3	25	61	44	2	20	77
Nantong	Jiangsu	NEC	24	3	7	49	25	3	8	50	24	1	12	39
Suzhou	Jiangsu	NEC	31	2	18	46	42	2	32	57	42	2	27	59
Suqian	Jiangsu	NEC	26	2	8	38	27	1	20	39	30	2	10	57
Taizhou	Jiangsu	NEC	19	2	8	33	20	1	14	34	23	1	15	30
Wuxi	Jiangsu	NEC	27	2	15	51	34	1	27	48	31	1	18	42
Xuzhou	Jiangsu	NEC	26	2	12	43	33	2	21	48	35	2	18	74
Yanchen	Jiangsu	NEC	17	1	8	26	22	1	14	32	21	1	11	36
Yangzhou	Jiangsu	NEC	23	2	7	48	18	1	12	28	21	1	9	32
Zhenjiang	Jiangsu	NEC	27	2	16	44	35	2	18	49	29	1	18	41
Shanghai	Municipality	NEC	21	2	9	33	36	3	19	54	29	1	17	44
Hangzhou	Zhejiang	NEC	29	2	11	48	33	2	20	45	40	2	20	73
Huzhou	Zhejiang	NEC	25	2	9	40	32	2	22	49	30	3	12	74
Jiaxing	Zhejiang	NEC	19	2	6	30	29	2	19	51	33	2	15	61
Jinhua	Zhejiang	NEC	20	1	9	31	25	2	8	38	32	2	14	50
Lishui	Zhejiang	NEC	14	1	5	20	14	1	10	19	20	1	10	36
Ningbo	Zhejiang	NEC	21	2	8	38	29	2	14	42	36	3	13	66
Quzhou	Zhejiang	NEC	20	1	9	31	26	2	8	41	28	1	16	45
Shaoxing	Zhejiang	NEC	26	2	11	39	38	1	28	49	40	2	20	64
Taizhou	Zhejiang	NEC	11	1	1	20	15	2	7	25	18	1	4	28
Wenjiang	Zhejiang	NEC	25	3	2	44	29	3	10	45	34	2	12	55
Zhoushan	Zhejiang	NEC	11	1	3	24	14	1	5	20	13	1	5	23
Fuzhou	Jiangxi	NEC	10	1	5	14	12	1	6	19	13	1	7	22
Ganzhou	Jiangxi	NEC	13	1	7	18	15	1	10	20	16	1	11	22

Ji'an	Jiangxi	NEC	9	1	5	18	14	1	8	22	15	1	7	27
Jingdezhen	Jiangxi	NEC	12	1	5	32	12	1	6	18	13	1	8	23
Jiujiang	Jiangxi	NEC	15	1	8	25	19	1	12	29	20	1	11	31
Nanchang	Jiangxi	NEC	20	2	8	35	21	2	14	40	19	1	12	27
Pingxiang	Jiangxi	NEC	10	1	5	15	15	1	10	18	14	1	7	21
Shangrao	Jiangxi	NEC	14	1	8	21	18	1	12	28	21	1	13	28
Xinyu	Jiangxi	NEC	11	1	5	16	12	1	7	18	14	1	9	22
Yichun	Jiangxi	NEC	13	0	9	17	14	1	10	19	16	1	10	23
Yingtan	Jiangxi	NEC	10	0	6	14	13	1	9	18	18	1	9	22
Changsha	Hunan	NEC	19	1	9	31	27	1	16	33	26	2	15	48
Changde	Hunan	NEC	13	1	6	24	11	1	8	16	13	1	7	22
Chenzhou	Hunan	NEC	18	1	9	26	20	1	12	25	23	1	13	36
Huaihua	Hunan	NEC	8	1	4	14	14	1	5	22	12	1	4	21
Loudi	Hunan	NEC	11	1	6	16	12	1	8	18	10	0	4	15
Xiangtan	Hunan	NEC	24	1	13	34	30	2	17	42	31	2	16	53
Yiyang	Hunan	NEC	15	1	9	22	18	1	12	27	19	1	10	34
Yongzhou	Hunan	NEC	19	1	14	25	21	1	14	28	24	1	13	32
Zhangjiajie	Hunan	NEC	18	1	11	29	22	1	18	26	21	1	15	28
Zhuzhou	Hunan	NEC	17	1	12	25	25	1	18	30	27	1	17	39
Dongguan	Guangdong	NEC	31	2	20	45	31	2	24	49	28	2	4	46
Foshan	Guangdong	NEC	32	2	20	44	41	1	33	49	29	1	18	44
Guangzhou	Guangdong	NEC	35	1	23	47	38	2	28	48	41	2	21	60
Heyuan	Guangdong	NEC	18	1	10	27	19	1	11	26	20	1	13	39
Huizhou	Guangdong	NEC	19	1	10	27	17	1	13	25	20	2	8	39
Jiangmen	Guangdong	NEC	14	1	9	20	25	1	19	34	20	2	8	37
Maoming	Guangdong	NEC	10	1	6	14	12	1	9	15	10	0	6	15

Meizhou	Guangdong	NEC	15	1	10	19	16	1	11	25	19	1	12	28
Qingyuan	Guangdong	NEC	33	1	22	44	24	2	14	40	24	1	13	40
Shantou	Guangdong	NEC	16	1	10	26	16	1	12	19	13	1	7	22
Shaoguan	Guangdong	NEC	19	1	12	25	15	1	10	18	18	1	9	34
Shenzhen	Guangdong	NEC	34	2	22	47	33	2	24	48	30	1	21	45
Zhujiang	Guangdong	NEC	14	1	6	20	16	1	8	22	13	1	6	23
Zhaoqing	Guangdong	NEC	20	1	13	30	26	2	12	41	23	1	15	35
Zhongshan	Guangdong	NEC	15	1	8	31	24	2	14	33	19	1	9	31
Zhuhai	Guangdong	NEC	17	1	10	28	25	1	19	31	19	1	10	28
Fuzhou	Fujian	NEC	21	1	4	30	22	2	8	36	24	2	9	47
Longyan	Fujian	NEC	17	1	9	28	17	1	13	20	20	1	10	31
Nanping	Fujian	NEC	10	1	7	15	9	1	6	13	10	0	6	14
Ningde	Fujian	NEC	13	1	3	22	14	1	8	19	17	1	7	31
Putian	Fujian	NEC	15	1	3	23	13	1	5	19	13	1	4	20
Quanzhou	Fujian	NEC	18	2	2	27	14	1	6	23	16	1	8	34
Sanming	Fujian	NEC	22	1	12	29	20	1	11	31	23	1	15	33
Xiamen	Fujian	NEC	26	1	15	41	22	1	17	28	19	1	11	34
Zhangzhou	Fujian	NEC	18	1	10	22	19	1	16	24	22	1	13	38
Haikou	Hainan	NEC	13	1	8	21	16	1	12	21	12	1	5	26
Sanya	Hainan	NEC	11	1	7	19	14	1	9	20	13	1	4	21
Chongqing	Municipality	NEC	29	2	20	48	46	2	35	57	37	1	22	52
Bazhong	Sichuan	NEC	18	1	11	23	22	1	17	27	21	1	15	35
Chengdu	Sichuan	NEC	39	3	15	63	54	4	25	81	43	2	26	73
Dazhou	Sichuan	NEC	31	1	21	38	35	1	26	45	34	1	24	42
Deyang	Sichuan	NEC	25	2	9	39	30	2	17	48	24	2	9	45
Guangyuan	Sichuan	NEC	24	1	19	39	26	2	18	40	27	1	13	37

Leshan	Sichuan	NEC	23	1	15	35	28	2	17	42	24	1	17	37
Luzhou	Sichuan	NEC	20	1	11	30	28	2	12	41	23	1	10	34
Meishan	Sichuan	NEC	19	1	10	34	25	2	15	39	22	1	14	39
Mianyang	Sichuan	NEC	32	2	17	43	37	2	21	51	28	2	15	77
Nanchong	Sichuan	NEC	20	2	11	31	29	1	18	36	33	2	21	62
Panzhihua	Sichuan	NEC	25	1	21	35	27	1	23	35	24	1	18	30
Suining	Sichuan	NEC	11	1	4	19	16	1	7	27	14	1	5	23
Ya'an	Sichuan	NEC	22	1	16	35	21	1	16	23	24	1	16	30
Ziyang	Sichuan	NEC	13	1	9	23	20	1	15	29	16	1	10	23
Zigong	Sichuan	NEC	22	1	15	34	28	2	16	38	23	1	17	44
Baoshan	Yunnan	NEC	14	0	10	18	15	1	10	19	16	1	11	23
Chuxiong	Yunnan	NEC	16	1	8	22	23	2	7	34	14	1	7	22
Dali	Yunnan	NEC	11	1	6	19	12	1	4	20	10	1	6	16
Dehong	Yunnan	NEC	10	0	7	13	10	0	8	13	14	0	9	18
Honghe	Yunnan	NEC	10	1	5	19	14	1	10	20	8	1	3	15
Kunming	Yunnan	NEC	20	1	13	27	28	2	16	39	23	1	16	32
Lijiang	Yunnan	NEC	11	0	8	15	13	0	11	17	11	1	5	15
Lincang	Yunnan	NEC	10	0	7	15	11	1	9	17	10	1	4	15
Nujiang	Yunnan	NEC	7	0	5	11	9	0	7	11	9	0	7	12
Qujing	Yunnan	NEC	17	1	11	24	20	1	15	31	17	1	11	26
Wenshan	Yunnan	NEC	12	1	7	19	17	1	11	25	11	0	7	17
Xishuangbanna	Yunnan	NEC	9	0	7	14	11	1	7	14	12	1	6	18
Tuxi	Yunnan	NEC	15	1	8	21	19	1	14	25	14	1	9	20
Zhaotong	Yunnan	NEC	17	1	11	26	22	1	12	30	15	1	10	23
Anshun	Guizhou	NEC	9	1	4	24	15	2	5	29	10	1	5	21
Bijie	Guizhou	NEC	23	2	11	36	27	2	18	39	22	1	10	38

Guiyang	Guizhou	NEC	20	1	13	32	29	2	16	44	22	1	15	40
Liupanshui	Guizhou	NEC	23	1	16	40	31	2	19	49	23	1	18	35
Tongren	Guizhou	NEC	14	1	9	18	18	1	13	21	18	1	10	26
Zunyi	Guizhou	NEC	20	1	16	27	32	2	15	42	25	1	16	36
Baise	Guangxi	NEC	12	1	8	19	9	1	3	18	10	1	5	16
Beihai	Guangxi	NEC	10	1	6	16	9	1	6	14	10	1	6	18
Chongzuo	Guangxi	NEC	13	1	6	24	16	1	8	25	12	1	5	24
Fangchenggang	Guangxi	NEC	11	0	7	14	12	1	8	16	12	0	7	17
Guigang	Guangxi	NEC	20	1	13	25	20	1	12	27	18	1	9	29
Guilin	Guangxi	NEC	15	1	10	20	17	1	13	22	17	1	10	24
Hechi	Guangxi	NEC	13	1	9	21	15	1	9	21	20	1	13	34
Hezhou	Guangxi	NEC	9	0	5	13	8	1	5	14	8	1	4	13
Laibin	Guangxi	NEC	14	1	8	20	16	1	8	26	15	1	10	27
Liuzhou	Guangxi	NEC	19	1	13	30	18	1	9	27	19	1	11	30
Nanning	Guangxi	NEC	25	2	15	45	28	2	17	45	25	1	17	41
Qinzhou	Guangxi	NEC	15	1	8	22	16	1	11	24	16	1	12	26
Wuzhou	Guangxi	NEC	19	1	14	24	17	1	11	28	18	1	11	27
Yulin	Guangxi	NEC	15	1	9	25	17	1	10	27	17	1	11	25
Golog	Qinghai	NEC	32	1	22	40	38	1	30	49	30	1	21	45
Haidong	Qinghai	NEC	31	2	19	45	37	2	24	60	35	1	24	47
Xining	Qinghai	NEC	28	1	17	38	28	1	20	42	31	1	19	47
Ali	Tibet	NEC	3	0	2	5	4	0	3	7	6	1	2	11
Qamdo	Tibet	NEC	16	1	11	32	14	1	10	24	16	1	6	27
Lhasa	Tibet	NEC	20	1	13	32	18	1	12	23	18	1	10	29
Nyingchi	Tibet	NEC	6	0	3	8	6	0	4	8	6	0	3	14
Naqu	Tibet	NEC	12	0	9	16	14	1	10	19	15	1	10	26

Shigatse	Tibet	NEC	15	3	7	52	11	0	9	14	10	1	5	18
Lhoka	Tibet	NEC	8	0	3	10	9	1	5	14	8	0	4	13

[a] EC and NEC denote emission control and non-emission control regions, respectively, of which the latter means regions without implementation of emission control measures.

[b] The pre-Parade Blue, Parade Blue, and post-Parade Blue periods indicate the periods of 1-19 August, 20 August-3 September, and 4-30 September 2015, respectively.

Table S5. Summary statistical of daily average NO_2 concentrations ($\mu g\ m^{-3}$) during the pre-Parade Blue and Parade Blue periods in the 291 cities across China.

City	Province	Region	The Pre-Parade Blue period				—	The Parade Blue period				Reduction or Increase
			Mean	Standard Error	Min	Max	—	Mean	Standard Error	Min	Max	
Beijing	Municipality	NC	34	1	26	44		21	1	17	24	-39
Tianjing	Municipality	NC	26	2	14	45		21	2	12	33	-19
Baoding	Hebei	NC	34	2	23	51		25	2	15	40	-26
Cangzhou	Hebei	NC	34	1	26	44		21	1	17	24	-39
Chengde	Hebei	NC	27	1	21	35		21	1	14	26	-23
Handan	Hebei	NC	38	3	22	70		36	3	20	54	-5
Hengshui	Hebei	NC	29	2	18	59		27	1	18	33	-8
Langfang	Hebei	NC	42	1	30	55		36	2	21	55	-15

Qinhuangdao	Hebei	NC	41	2	17	53	35	3	18	52	-16
Shijiazhuang	Hebei	NC	29	2	15	56	22	3	7	37	-23
Tangshan	Hebei	NC	44	2	32	76	45	4	10	74	1
Xingtai	Hebei	NC	50	2	34	63	38	4	14	74	-24
Zhangjiakou	Hebei	NC	17	1	11	24	24	2	14	32	47
Changzhi	Shanxi	NC	25	2	10	41	31	1	22	41	25
Datong	Shanxi	NC	19	1	9	30	16	1	11	23	-16
Jincheng	Shanxi	NC	29	2	10	46	29	2	15	38	2
Jinzhong	Shanxi	NC	22	1	15	31	20	1	12	29	-12
Linfen	Shanxi	NC	20	1	14	25	19	1	12	32	-3
Lvliang	Shanxi	NC	22	1	14	34	18	1	13	23	-18
Shuozhou	Shanxi	NC	31	2	13	45	31	1	20	39	-1
Taiyuan	Shanxi	NC	30	1	22	41	28	2	20	41	-5
Xinzhou	Shanxi	NC	33	2	16	48	29	2	16	37	-14
Yangquan	Shanxi	NC	24	1	12	32	23	2	11	32	-5
Yuncheng	Shanxi	NC	13	2	4	30	20	2	10	33	56
Binzhou	Shandong	NC	27	2	16	49	28	3	15	55	4
Dezhou	Shandong	NC	29	2	19	46	30	2	16	42	2
Dongying	Shandong	NC	27	2	9	43	22	3	8	40	-18
Jinan	Shandong	NC	35	2	20	49	41	2	26	54	16
Jining	Shandong	NC	31	2	13	50	37	3	24	67	22
Laiwu	Shandong	NC	29	2	12	47	38	2	23	54	31
Liaocheng	Shandong	NC	29	2	18	43	27	3	10	44	-6
Linyi	Shandong	NC	33	2	16	54	39	3	27	62	21
Qingdao	Shandong	NC	19	1	11	35	28	1	16	36	43
Rizhao	Shandong	NC	20	2	5	39	28	3	16	44	38

Tai'an	Shandong	NC	30	2	17	47	38	2	22	50	27
Weihai	Shandong	NC	15	1	6	28	14	1	7	22	-5
Weifang	Shandong	NC	25	2	14	41	33	2	22	48	33
Yantai	Shandong	NC	23	1	12	33	27	2	17	42	19
Zaozhuang	Shandong	NC	26	2	15	42	29	1	19	38	12
Zibo	Shandong	NC	52	2	31	68	55	3	38	70	6
Alxa League	Inner Mongolia	NC	7	0	5	10	8	1	4	11	18
Bayannur	Inner Mongolia	NC	19	1	14	24	22	2	13	39	14
Baotou	Inner Mongolia	NC	34	2	20	49	33	2	18	43	-2
Chifeng	Inner Mongolia	NC	16	1	10	27	17	0	14	20	3
Ordos	Inner Mongolia	NC	19	1	9	30	18	1	12	26	-5
Hohhot	Inner Mongolia	NC	32	1	21	43	32	2	18	42	1
Hulun Buir	Inner Mongolia	NC	20	2	7	37	19	1	11	27	-4
Tongliao	Inner Mongolia	NC	16	1	10	25	13	1	8	20	-20
Wuhai	Inner Mongolia	NC	17	1	11	24	17	1	11	24	-1
Hinggan League	Inner Mongolia	NC	14	1	6	22	10	1	7	16	-25
Anyang	Henan	NC	30	2	18	47	32	2	20	42	5
Hebi	Henan	NC	27	3	9	48	24	2	16	39	-11
Jiaozuo	Henan	NC	29	2	21	47	30	2	17	40	6
Kaifeng	Henan	NC	25	2	15	49	24	2	14	36	-2
Luoyang	Henan	NC	23	1	15	41	25	2	13	33	8
Luohe	Henan	NC	18	2	9	33	23	2	12	35	31
Nanyang	Henan	NC	16	1	8	25	21	1	14	28	33
Pingdingshan	Henan	NC	27	2	14	41	33	2	23	43	19
Sanmenxia	Henan	NC	23	2	15	43	23	3	14	49	-1
Shangqiu	Henan	NC	16	1	8	31	21	2	11	39	29

Xinyang	Henan	NC	19	1	12	30	28	1	22	32	46
Zhengzhou	Henan	NC	39	3	23	73	45	3	24	69	15
Zhoukou	Henan	NC	11	1	7	17	13	1	8	19	11
Zhumadian	Henan	NC	22	2	8	34	24	1	16	32	11
Anshan	Liaoning	NE	18	2	11	33	27	1	16	31	49
Benxi	Liaoning	NE	19	1	11	30	25	1	14	34	33
Chaoyang	Liaoning	NE	12	1	7	16	13	1	8	17	2
Dalian	Liaoning	NE	20	1	14	25	23	1	17	31	18
Dandong	Liaoning	NE	29	8	1	108	15	1	7	20	-49
Fushun	Liaoning	NE	15	1	10	22	18	1	8	24	20
Fuxin	Liaoning	NE	28	1	18	38	25	1	15	35	-8
Huludao	Liaoning	NE	23	2	11	44	28	2	15	41	20
Jinzhou	Liaoning	NE	26	1	18	36	28	1	21	36	6
Liaoyang	Liaoning	NE	15	1	6	31	26	1	15	32	77
Panjin	Liaoning	NE	13	2	4	32	24	1	17	32	80
Shenyang	Liaoning	NE	31	2	20	49	35	2	27	48	11
Tieling	Liaoning	NE	20	1	13	26	23	1	14	29	19
Wafangdian	Liaoning	NE	17	1	11	24	21	1	15	33	27
Yingkou	Liaoning	NE	16	1	8	27	22	1	15	33	37
Baicheng	Jilin	NE	12	1	8	21	9	1	4	13	-27
Baishan	Jilin	NE	14	0	9	18	16	1	12	19	16
Changchun	Jilin	NE	28	2	17	44	33	2	22	45	19
Jilin	Jilin	NE	20	1	13	28	24	1	16	31	18
Liaoyuan	Jilin	NE	15	2	3	30	15	1	8	24	1
Siping	Jilin	NE	17	2	4	33	23	3	13	62	40
Songyuan	Jilin	NE	16	1	9	24	14	1	6	22	-14

Daqing	Heilongjiang	NE	16	1	12	23	16	1	11	24	0
Daxinganling	Heilongjiang	NE	11	1	8	15	15	1	10	20	44
Harbin	Heilongjiang	NE	31	2	21	51	31	2	20	42	2
Hegang	Heilongjiang	NE	6	1	3	10	4	0	2	6	-39
Heihe	Heilongjiang	NE	11	1	5	15	9	1	7	14	-18
Jixi	Heilongjiang	NE	16	1	11	21	13	1	8	19	-19
Jiamusi	Heilongjiang	NE	18	1	8	27	15	2	8	31	-13
Mudanjiang	Heilongjiang	NE	24	1	16	33	19	1	12	25	-21
Qitaihe	Heilongjiang	NE	12	0	10	16	11	1	7	15	-12
Qiqihar	Heilongjiang	NE	15	1	8	19	11	1	7	16	-24
Shuangyashan	Heilongjiang	NE	15	0	12	19	15	1	9	18	2
Suihua	Heilongjiang	NE	20	2	10	41	15	1	10	24	-26
Ankang	Shaanxi	NW	6	1	3	11	7	1	3	11	20
Baoji	Shaanxi	NW	23	1	16	34	28	1	16	33	19
Hanzhong	Shaanxi	NW	15	1	9	22	22	1	13	27	46
Shangluo	Shaanxi	NW	15	1	10	22	19	1	13	24	23
Tongchuan	Shaanxi	NW	24	2	15	47	26	1	17	32	10
Weinan	Shaanxi	NW	29	1	22	43	39	2	29	54	31
Xi'an	Shaanxi	NW	36	2	24	55	44	2	29	57	21
Xianyang	Shaanxi	NW	23	1	13	36	27	1	19	34	20
Yan'an	Shaanxi	NW	35	1	23	40	40	1	33	53	15
Yulin	Shaanxi	NW	27	2	12	43	33	3	14	56	21
Baiying	Gansu	NW	25	2	12	40	28	3	4	42	11
Dingxi	Gansu	NW	20	2	9	40	20	1	12	30	-3
Gannan	Gansu	NW	17	2	8	40	14	1	10	19	-15
Jiayuguan	Gansu	NW	25	1	13	37	19	1	13	29	-23

Jiuquan	Gansu	NW	23	2	8	37	25	2	12	38	9
Lanzhou	Gansu	NW	38	2	20	53	42	3	25	59	10
Linxia	Gansu	NW	26	2	12	49	31	2	20	49	16
Pingliang	Gansu	NW	41	1	28	50	50	2	38	62	23
Qingyang	Gansu	NW	10	1	5	16	14	1	9	20	46
Tianshui	Gansu	NW	16	1	10	22	14	1	6	19	-12
Wuwei	Gansu	NW	22	1	13	36	23	2	14	35	5
Zhangye	Gansu	NW	18	1	10	26	15	1	8	21	-19
Guyuan	Ningxia	NW	18	2	9	30	22	2	11	31	17
Shizuishan	Ningxia	NW	17	1	12	33	20	1	13	30	13
Wuzhong	Ningxia	NW	17	1	9	29	18	2	5	28	11
Yinchuan	Ningxia	NW	27	2	13	48	29	3	16	45	7
Zhongwei	Ningxia	NW	13	1	7	18	17	1	9	22	36
Aksu	Sinkiang	NW	23	2	12	42	21	2	11	38	-9
Hami	Sinkiang	NW	11	1	4	21	9	1	4	19	-16
Hotan	Sinkiang	NW	21	2	11	35	18	2	10	29	-16
Kashgar	Sinkiang	NW	22	2	10	36	19	2	9	36	-13
Karamay	Sinkiang	NW	15	1	5	28	14	1	6	28	-8
Kizilsu	Sinkiang	NW	9	1	1	19	9	1	6	15	4
Shihezi	Sinkiang	NW	28	3	7	64	22	3	6	38	-21
Urumchi	Sinkiang	NW	41	2	20	58	38	2	24	50	-9
Wujiaqu	Sinkiang	NW	30	3	9	53	24	3	10	49	-20
Yili	Sinkiang	NW	25	2	11	34	24	2	12	34	-6
Ezhou	Hubei	SE	13	1	8	24	19	1	11	30	49
Huanggang	Hubei	SE	14	2	4	23	14	1	6	26	2
Jingmen	Hubei	SE	18	1	12	38	27	2	17	38	45

Shiyan	Hubei	SE	12	1	8	19	13	0	10	16	3
Wuhan	Hubei	SE	27	2	11	52	41	4	18	64	50
Xianning	Hubei	SE	12	0	9	16	15	1	11	19	28
Xiangyang	Hubei	SE	17	1	10	34	23	1	16	31	35
Xiaogan	Hubei	SE	5	1	2	12	9	1	4	20	91
Yichang	Hubei	SE	24	1	19	32	26	1	23	32	11
Anqing	Anhui	SE	21	2	12	37	21	2	14	46	-2
Bengbu	Anhui	SE	24	2	11	40	32	2	20	42	29
Bozhou	Anhui	SE	33	1	24	45	46	2	35	72	41
Chuzhou	Anhui	SE	29	2	18	41	22	1	11	30	-24
Fuyang	Anhui	SE	28	1	21	46	43	3	30	64	52
Hefei	Anhui	SE	24	2	14	38	31	3	19	58	27
Huaibei	Anhui	SE	19	1	14	25	24	1	18	32	24
Huainan	Anhui	SE	18	1	11	29	20	1	13	26	11
Huangshan	Anhui	SE	9	0	8	10	9	0	8	10	0
Lu'an	Anhui	SE	15	1	8	27	15	1	9	21	6
Ma'anshan	Anhui	SE	20	1	10	30	21	1	15	28	5
Suzhou	Anhui	SE	18	0	15	21	19	1	16	26	3
Tongling	Anhui	SE	25	2	15	35	31	2	18	47	26
Wuhu	Anhui	SE	38	1	30	51	38	2	29	49	2
Changzhou	Jiangsu	SE	33	3	16	70	34	3	15	51	2
Huaian	Jiangsu	SE	12	1	3	22	15	2	5	30	19
Lianyungang	Jiangsu	SE	17	1	9	27	24	1	16	32	41
Nanjing	Jiangsu	SE	36	2	19	54	39	3	25	61	10
Nantong	Jiangsu	SE	24	3	7	49	25	3	8	50	4
Suzhou	Jiangsu	SE	31	2	18	46	42	2	32	57	35

Suqian	Jiangsu	SE	26	2	8	38	27	1	20	39	3
Taizhou	Jiangsu	SE	19	2	8	33	20	1	14	34	5
Wuxi	Jiangsu	SE	27	2	15	51	34	1	27	48	24
Xuzhou	Jiangsu	SE	26	2	12	43	33	2	21	48	26
Yanchen	Jiangsu	SE	17	1	8	26	22	1	14	32	29
Yangzhou	Jiangsu	SE	23	2	7	48	18	1	12	28	-24
Zhenjiang	Jiangsu	SE	27	2	16	44	35	2	18	49	27
Shanghai	Municipality	SE	21	2	9	33	36	3	19	54	69
Hangzhou	Zhejiang	SE	29	2	11	48	33	2	20	45	16
Huzhou	Zhejiang	SE	25	2	9	40	32	2	22	49	27
Jiaxing	Zhejiang	SE	19	2	6	30	29	2	19	51	57
Jinhua	Zhejiang	SE	20	1	9	31	25	2	8	38	23
Lishui	Zhejiang	SE	14	1	5	20	14	1	10	19	-3
Ningbo	Zhejiang	SE	21	2	8	38	29	2	14	42	39
Quzhou	Zhejiang	SE	20	1	9	31	26	2	8	41	32
Shaoxing	Zhejiang	SE	26	2	11	39	38	1	28	49	45
Taizhou	Zhejiang	SE	11	1	1	20	15	2	7	25	36
Wenjiang	Zhejiang	SE	25	3	2	44	29	3	10	45	18
Zhoushan	Zhejiang	SE	11	1	3	24	14	1	5	20	27
Fuzhou	Jiangxi	SE	10	1	5	14	12	1	6	19	17
Ganzhou	Jiangxi	SE	13	1	7	18	15	1	10	20	15
Ji'an	Jiangxi	SE	9	1	5	18	14	1	8	22	56
Jingdezhen	Jiangxi	SE	12	1	5	32	12	1	6	18	-2
Jiujiang	Jiangxi	SE	15	1	8	25	19	1	12	29	25
Nanchang	Jiangxi	SE	20	2	8	35	21	2	14	40	4
Pingxiang	Jiangxi	SE	10	1	5	15	15	1	10	18	57

Shangrao	Jiangxi	SE	14	1	8	21	18	1	12	28	25
Xinyu	Jiangxi	SE	11	1	5	16	12	1	7	18	2
Yichun	Jiangxi	SE	13	0	9	17	14	1	10	19	4
Yingtan	Jiangxi	SE	10	0	6	14	13	1	9	18	36
Changsha	Hunan	SE	19	1	9	31	27	1	16	33	38
Changde	Hunan	SE	13	1	6	24	11	1	8	16	-17
Chenzhou	Hunan	SE	18	1	9	26	20	1	12	25	11
Huaihua	Hunan	SE	8	1	4	14	14	1	5	22	66
Loudi	Hunan	SE	11	1	6	16	12	1	8	18	12
Xiangtan	Hunan	SE	24	1	13	34	30	2	17	42	26
Yiyang	Hunan	SE	15	1	9	22	18	1	12	27	17
Yongzhou	Hunan	SE	19	1	14	25	21	1	14	28	12
Zhangjiajie	Hunan	SE	18	1	11	29	22	1	18	26	23
Zhuzhou	Hunan	SE	17	1	12	25	25	1	18	30	45
Dongguan	Guangdong	SE	31	2	20	45	31	2	24	49	1
Foshan	Guangdong	SE	32	2	20	44	41	1	33	49	27
Guangzhou	Guangdong	SE	35	1	23	47	38	2	28	48	6
Heyuan	Guangdong	SE	18	1	10	27	19	1	11	26	7
Huizhou	Guangdong	SE	19	1	10	27	17	1	13	25	-10
Jiangmen	Guangdong	SE	14	1	9	20	25	1	19	34	82
Maoming	Guangdong	SE	10	1	6	14	12	1	9	15	17
Meizhou	Guangdong	SE	15	1	10	19	16	1	11	25	4
Qingyuan	Guangdong	SE	33	1	22	44	24	2	14	40	-26
Shantou	Guangdong	SE	16	1	10	26	16	1	12	19	-2
Shaoguan	Guangdong	SE	19	1	12	25	15	1	10	18	-22
Shenzhen	Guangdong	SE	34	2	22	47	33	2	24	48	-4

Zhujiang	Guangdong	SE	14	1	6	20	16	1	8	22	19
Zhaoqing	Guangdong	SE	20	1	13	30	26	2	12	41	31
Zhongshan	Guangdong	SE	15	1	8	31	24	2	14	33	61
Zhuhai	Guangdong	SE	17	1	10	28	25	1	19	31	46
Fuzhou	Fujian	SE	21	1	4	30	22	2	8	36	5
Longyan	Fujian	SE	17	1	9	28	17	1	13	20	-2
Nanping	Fujian	SE	10	1	7	15	9	1	6	13	-10
Ningde	Fujian	SE	13	1	3	22	14	1	8	19	6
Putian	Fujian	SE	15	1	3	23	13	1	5	19	-16
Quanzhou	Fujian	SE	18	2	2	27	14	1	6	23	-22
Sanming	Fujian	SE	22	1	12	29	20	1	11	31	-8
Xiamen	Fujian	SE	26	1	15	41	22	1	17	28	-15
Zhangzhou	Fujian	SE	18	1	10	22	19	1	16	24	10
Haikou	Hainan	SE	13	1	8	21	16	1	12	21	23
Sanya	Hainan	SE	11	1	7	19	14	1	9	20	30
Chongqing	Municipality	SW	29	2	20	48	46	2	35	57	55
Bazhong	Sichuan	SW	18	1	11	23	22	1	17	27	24
Chengdu	Sichuan	SW	39	3	15	63	54	4	25	81	37
Dazhou	Sichuan	SW	31	1	21	38	35	1	26	45	15
Deyang	Sichuan	SW	25	2	9	39	30	2	17	48	22
Guangyuan	Sichuan	SW	24	1	19	39	26	2	18	40	9
Leshan	Sichuan	SW	23	1	15	35	28	2	17	42	20
Luzhou	Sichuan	SW	20	1	11	30	28	2	12	41	39
Meishan	Sichuan	SW	19	1	10	34	25	2	15	39	33
Mianyang	Sichuan	SW	32	2	17	43	37	2	21	51	17
Nanchong	Sichuan	SW	20	2	11	31	29	1	18	36	43

Panzhihua	Sichuan	SW	25	1	21	35	27	1	23	35	7
Suining	Sichuan	SW	11	1	4	19	16	1	7	27	43
Ya'an	Sichuan	SW	22	1	16	35	21	1	16	23	-6
Ziyang	Sichuan	SW	13	1	9	23	20	1	15	29	48
Zigong	Sichuan	SW	22	1	15	34	28	2	16	38	27
Baoshan	Yunnan	SW	14	0	10	18	15	1	10	19	9
Chuxiong	Yunnan	SW	16	1	8	22	23	2	7	34	39
Dali	Yunnan	SW	11	1	6	19	12	1	4	20	10
Dehong	Yunnan	SW	10	0	7	13	10	0	8	13	5
Honghe	Yunnan	SW	10	1	5	19	14	1	10	20	44
Kunming	Yunnan	SW	20	1	13	27	28	2	16	39	36
Lijiang	Yunnan	SW	11	0	8	15	13	0	11	17	17
Lincang	Yunnan	SW	10	0	7	15	11	1	9	17	13
Nujiang	Yunnan	SW	7	0	5	11	9	0	7	11	21
Qujing	Yunnan	SW	17	1	11	24	20	1	15	31	19
Wenshan	Yunnan	SW	12	1	7	19	17	1	11	25	48
Xishuangbanna	Yunnan	SW	9	0	7	14	11	1	7	14	12
Tuxi	Yunnan	SW	15	1	8	21	19	1	14	25	32
Zhaotong	Yunnan	SW	17	1	11	26	22	1	12	30	28
Anshun	Guizhou	SW	9	1	4	24	15	2	5	29	65
Bijie	Guizhou	SW	23	2	11	36	27	2	18	39	19
Guiyang	Guizhou	SW	20	1	13	32	29	2	16	44	40
Liupanshui	Guizhou	SW	23	1	16	40	31	2	19	49	35
Tongren	Guizhou	SW	14	1	9	18	18	1	13	21	32
Zunyi	Guizhou	SW	20	1	16	27	32	2	15	42	55
Baise	Guangxi	SW	12	1	8	19	9	1	3	18	-24

Beihai	Guangxi	SW	10	1	6	16	9	1	6	14	9
Chongzuo	Guangxi	SW	13	1	6	24	16	1	8	25	17
Fangchenggang	Guangxi	SW	11	0	7	14	12	1	8	16	6
Guigang	Guangxi	SW	20	1	13	25	20	1	12	27	0
Guilin	Guangxi	SW	15	1	10	20	17	1	13	22	9
Hechi	Guangxi	SW	13	1	9	21	15	1	9	21	14
Hezhou	Guangxi	SW	9	0	5	13	8	1	5	14	5
Laibin	Guangxi	SW	14	1	8	20	16	1	8	26	11
Liuzhou	Guangxi	SW	19	1	13	30	18	1	9	27	8
Nanning	Guangxi	SW	25	2	15	45	28	2	17	45	11
Qinzhou	Guangxi	SW	15	1	8	22	16	1	11	24	9
Wuzhou	Guangxi	SW	19	1	14	24	17	1	11	28	11
Yulin	Guangxi	SW	15	1	9	25	17	1	10	27	11
Golog	Qinghai	TP	32	1	22	40	38	1	30	49	18
Haidong	Qinghai	TP	31	2	19	45	37	2	24	60	20
Xining	Qinghai	TP	28	1	17	38	28	1	20	42	2
Ali	Tibet	TP	3	0	2	5	4	0	3	7	37
Qamdo	Tibet	TP	16	1	11	32	14	1	10	24	12
Lhasa	Tibet	TP	20	1	13	32	18	1	12	23	10
Nyingchi	Tibet	TP	6	0	3	8	6	0	4	8	10
Naqu	Tibet	TP	12	0	9	16	14	1	10	19	21
Shigatse	Tibet	TP	15	3	7	52	11	0	9	14	30
Lhoka	Tibet	TP	8	0	3	10	—	9	1	5	14	14

[a] NC, NE, NW, SE, SW, TP represent north China, northeast China, northwest China, southeast China, southwest China, and the Tibetan Plateau, respectively.

[b] ~~Negative values with red color mean significant (p<0.05 or 0.01) reduction, and positive values mean increase.~~

Table S5. Summary of daily average SO_2 concentrations (μg m^{-3}) during the pre-Parade Blue, Parade Blue and post-Parade Blue periods in the 291 cities across China.

City	Province	Region[a]	Pre-Parade Blue period[b]				Parade Blue period[b]				Post-Parade Blue period[b]			
			Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max
Beijing	Municipality	EC	3	0	2	7	2	0	2	3	5	1	2	15
Tianjing	Municipality	EC	10	1	4	16	10	1	4	23	13	1	4	27
Baoding	Hebei	EC	17	1	11	25	10	1	6	16	15	1	8	27
Cangzhou	Hebei	EC	3	0	2	7	2	0	2	3	32	3	11	80
Chengde	Hebei	EC	9	1	5	18	6	1	3	18	8	1	3	20
Handan	Hebei	EC	28	2	16	48	34	5	9	62	25	2	8	58
Hengshui	Hebei	EC	17	1	10	23	12	1	3	20	22	2	7	52
Langfang	Hebei	EC	9	1	4	19	4	0	2	8	10	2	2	40
Qinhuangdao	Hebei	EC	32	3	17	48	18	2	10	46	18	2	10	46
Shijiazhuang	Hebei	EC	19	2	7	39	13	1	6	19	30	3	7	52
Tangshan	Hebei	EC	29	3	12	64	29	4	13	68	39	3	16	73
Xingtai	Hebei	EC	25	4	8	74	18	4	3	45	32	4	4	71
Zhangjiakou	Hebei	EC	12	1	7	19	12	1	9	22	12	1	5	24
Changzhi	Shanxi	EC	32	2	18	59	28	3	10	50	25	2	9	51

Datong	Shanxi	EC	20	2	12	37	18	1	12	28	22	2	9	58
Jincheng	Shanxi	EC	29	2	14	46	25	2	12	38	31	3	9	65
Jinzhong	Shanxi	EC	13	3	3	37	16	2	7	29	31	4	6	74
Linfen	Shanxi	EC	17	1	7	32	14	1	8	23	16	2	3	37
Lvliang	Shanxi	EC	43	2	31	56	24	2	13	42	33	3	11	75
Shuozhou	Shanxi	EC	39	3	18	60	37	3	17	52	27	2	11	45
Taiyuan	Shanxi	EC	21	2	9	43	18	1	11	24	25	2	10	55
Xinzhou	Shanxi	EC	41	3	23	58	32	1	21	39	36	3	13	69
Yangquan	Shanxi	EC	24	2	7	36	21	2	7	35	30	3	7	79
Yuncheng	Shanxi	EC	19	1	9	34	45	6	20	101	43	4	15	119
Binzhou	Shandong	EC	30	4	9	87	26	3	11	60	38	3	14	89
Dezhou	Shandong	EC	18	2	5	35	21	2	11	41	30	3	11	70
Dongying	Shandong	EC	45	3	21	81	31	3	16	57	33	3	10	69
Jinan	Shandong	EC	21	1	12	32	20	2	12	33	28	2	14	51
Jining	Shandong	EC	36	3	21	88	43	3	21	66	50	3	25	82
Laiwu	Shandong	EC	22	3	6	46	32	2	15	42	38	3	16	61
Liaocheng	Shandong	EC	20	2	7	36	21	2	12	45	34	2	15	53
Linyi	Shandong	EC	15	2	5	42	20	1	13	32	24	2	7	49
Qingdao	Shandong	EC	17	1	12	28	20	1	14	33	20	1	13	27
Rizhao	Shandong	EC	13	1	8	23	16	1	11	26	18	1	9	41
Tai'an	Shandong	EC	20	2	8	34	28	2	14	46	31	2	13	55
Weihai	Shandong	EC	10	1	3	20	13	1	8	18	14	1	6	29
Weifang	Shandong	EC	19	2	11	38	27	3	13	62	26	2	13	68
Yantai	Shandong	EC	11	1	5	18	12	1	7	15	13	1	8	23
Zaozhuang	Shandong	EC	36	3	14	57	60	3	43	82	53	5	10	136
Zibo	Shandong	EC	54	6	21	94	61	8	22	114	62	5	27	111

Alxa League	Inner Mongolia	EC	5	1	1	11	7	1	2	13	5	0	2	10
Bayannur	Inner Mongolia	EC	12	1	5	21	18	1	10	27	13	1	4	30
Baotou	Inner Mongolia	EC	25	2	11	37	20	2	9	29	23	2	8	41
Chifeng	Inner Mongolia	EC	14	1	9	25	12	1	8	18	15	1	7	24
Ordos	Inner Mongolia	EC	11	1	4	22	14	1	7	26	14	1	5	36
Hohhot	Inner Mongolia	EC	12	1	9	18	8	0	5	12	12	1	5	24
Hulun Buir	Inner Mongolia	EC	2	0	1	4	3	0	1	7	3	0	2	8
Tongliao	Inner Mongolia	EC	12	1	6	19	8	1	4	15	12	1	5	21
Wuhai	Inner Mongolia	EC	48	7	6	122	34	7	4	95	57	11	3	178
Hinggan League	Inner Mongolia	EC	5	0	2	9	3	0	2	6	7	1	3	17
Anyang	Henan	EC	14	2	5	31	26	3	13	40	32	2	10	59
Hebi	Henan	EC	18	1	12	30	17	2	9	28	28	2	11	46
Jiaozuo	Henan	EC	20	2	5	33	23	2	10	37	28	3	9	65
Kaifeng	Henan	EC	13	1	10	19	16	1	10	28	18	1	7	32
Luoyang	Henan	EC	24	3	7	50	20	2	8	30	25	1	7	37
Luohe	Henan	EC	13	1	7	30	16	1	12	21	28	3	11	84
Nanyang	Henan	EC	22	1	10	33	22	1	15	29	19	2	8	37
Pingdingshan	Henan	EC	32	2	15	49	32	2	23	46	34	2	15	57
Sanmenxia	Henan	EC	18	1	8	28	25	2	13	42	26	2	10	45
Shangqiu	Henan	EC	10	1	5	15	18	1	13	22	20	1	11	34
Xinyang	Henan	EC	17	1	9	25	16	1	11	21	17	1	8	26
Zhengzhou	Henan	EC	5	1	2	12	9	1	5	15	16	1	5	32
Zhoukou	Henan	EC	7	0	6	9	9	0	6	11	12	1	7	20
Zhumadian	Henan	EC	26	2	7	45	45	8	16	141	28	2	10	61
Anshan	Liaoning	NEC	14	1	7	25	19	1	12	26	21	1	11	36
Benxi	Liaoning	NEC	7	0	6	12	12	1	7	18	18	1	10	28

Chaoyang	Liaoning	NEC	9	1	4	13	10	1	7	15	14	1	8	26
Dalian	Liaoning	NEC	8	1	3	16	10	1	6	16	11	1	6	19
Dandong	Liaoning	NEC	7	0	5	9	9	1	7	13	12	0	8	15
Fushun	Liaoning	NEC	7	1	3	12	8	1	5	13	14	1	5	25
Fuxin	Liaoning	NEC	29	3	12	64	30	2	22	49	32	2	15	60
Huludao	Liaoning	NEC	20	3	7	56	29	2	20	43	28	2	10	52
Jinzhou	Liaoning	NEC	25	1	18	39	17	1	12	27	27	2	14	42
Liaoyang	Liaoning	NEC	8	1	4	13	13	1	8	22	18	1	7	35
Panjin	Liaoning	NEC	12	1	6	21	18	1	13	27	18	1	9	31
Shenyang	Liaoning	NEC	12	1	4	24	10	1	6	16	18	2	5	34
Tieling	Liaoning	NEC	10	1	5	19	10	1	6	13	13	1	5	23
Wafangdian	Liaoning	NEC	2	0	1	4	3	0	2	7	6	1	1	16
Yingkou	Liaoning	NEC	11	1	6	16	11	1	8	18	14	1	7	30
Baicheng	Jilin	NEC	6	0	4	12	6	0	2	9	11	1	5	17
Baishan	Jilin	NEC	10	1	5	23	8	1	4	12	16	2	4	36
Changchun	Jilin	NEC	6	0	3	8	6	1	4	10	8	0	3	14
Jilin	Jilin	NEC	10	1	7	19	14	1	9	26	17	2	9	41
Liaoyuan	Jilin	NEC	6	1	4	23	9	1	4	18	14	1	7	22
Siping	Jilin	NEC	10	2	3	43	6	1	1	12	11	1	3	23
Songyuan	Jilin	NEC	5	1	2	26	2	0	1	4	5	0	2	11
Daqing	Heilongjiang	NEC	9	1	7	15	9	1	7	16	9	1	5	17
Daxinganling	Heilongjiang	NEC	15	1	10	24	14	0	12	17	18	1	12	38
Harbin	Heilongjiang	NEC	5	0	3	7	5	0	4	6	7	0	4	11
Hegang	Heilongjiang	NEC	2	0	1	3	2	0	1	5	4	0	1	8
Heihe	Heilongjiang	NEC	10	0	8	12	12	1	8	24	11	0	7	14
Jixi	Heilongjiang	NEC	8	1	4	14	15	0	13	20	13	1	7	22

Jiamusi	Heilongjiang	NEC	7	1	3	23	5	0	3	7	5	0	3	9
Mudanjiang	Heilongjiang	NEC	7	0	5	10	8	0	5	10	6	0	3	10
Qitaihe	Heilongjiang	NEC	18	0	16	21	17	1	14	29	15	0	9	18
Qiqihar	Heilongjiang	NEC	13	2	8	32	5	1	1	11	4	0	2	8
Shuangyashan	Heilongjiang	NEC	14	1	9	31	10	1	6	18	10	1	6	17
Suihua	Heilongjiang	NEC	9	1	3	18	9	1	4	14	8	1	2	24
Ankang	Shaanxi	NEC	11	1	3	23	11	1	6	16	14	1	8	20
Baoji	Shaanxi	NEC	3	0	2	4	5	0	3	7	5	0	2	9
Hanzhong	Shaanxi	NEC	7	0	3	10	10	1	3	13	7	0	3	11
Shangluo	Shaanxi	NEC	21	4	4	61	19	3	5	44	21	3	5	55
Tongchuan	Shaanxi	NEC	4	0	2	7	9	1	6	14	8	1	2	19
Weinan	Shaanxi	NEC	10	1	4	15	13	1	6	23	10	1	4	15
Xi'an	Shaanxi	NEC	7	0	2	10	13	1	8	18	12	1	5	19
Xianyang	Shaanxi	NEC	11	0	8	16	14	1	7	20	11	1	4	17
Yan'an	Shaanxi	NEC	7	0	6	9	10	0	8	12	8	0	6	10
Yulin	Shaanxi	NEC	5	1	2	10	8	1	3	11	6	1	1	14
Baiying	Gansu	NEC	24	5	3	97	71	12	14	161	38	5	3	111
Dingxi	Gansu	NEC	8	2	3	33	7	1	3	10	5	0	3	8
Gannan	Gansu	NEC	9	2	3	33	7	0	5	9	7	0	3	12
Jiayuguan	Gansu	NEC	21	2	11	39	11	2	6	31	21	2	3	43
Jiuquan	Gansu	NEC	9	1	3	27	7	2	2	24	6	0	3	13
Lanzhou	Gansu	NEC	12	1	6	23	11	1	5	17	13	1	7	22
Linxia	Gansu	NEC	8	1	2	12	10	0	8	13	9	1	2	14
Pingliang	Gansu	NEC	9	1	3	23	9	1	1	15	11	2	3	50
Qingyang	Gansu	NEC	5	0	3	8	6	0	2	9	4	0	1	7
Tianshui	Gansu	NEC	8	0	5	14	6	0	4	9	5	0	3	7

Wuwei	Gansu	NEC	7	0	5	10	9	0	7	13	8	0	5	12
Zhangye	Gansu	NEC	13	0	10	16	15	1	11	20	14	1	6	25
Guyuan	Ningxia	NEC	7	1	3	13	8	1	3	15	4	0	2	10
Shizuishan	Ningxia	NEC	55	4	27	90	37	4	12	62	33	3	13	81
Wuzhong	Ningxia	NEC	11	2	2	24	18	2	3	30	8	1	2	21
Yinchuan	Ningxia	NEC	15	2	3	29	21	2	5	30	16	2	4	43
Zhongwei	Ningxia	NEC	11	2	5	27	18	2	2	29	8	1	3	17
Aksu	Sinkiang	NEC	6	1	1	13	5	1	2	15	5	1	1	28
Hami	Sinkiang	NEC	6	1	1	16	5	1	1	14	5	1	1	13
Hotan	Sinkiang	NEC	38	4	9	74	27	4	8	55	31	3	8	69
Kashgar	Sinkiang	NEC	10	1	5	16	9	1	6	14	12	1	6	26
Karamay	Sinkiang	NEC	7	0	4	11	9	1	4	20	7	0	5	11
Kizilsu	Sinkiang	NEC	5	2	0	27	6	1	2	16	2	0	1	4
Shihezi	Sinkiang	NEC	9	1	2	25	8	1	2	14	9	1	3	18
Urumchi	Sinkiang	NEC	10	1	2	18	9	1	2	15	10	1	3	23
Wujiaqu	Sinkiang	NEC	9	3	1	56	13	3	4	44	7	1	2	21
Yili	Sinkiang	NEC	7	0	4	9	7	0	4	10	7	1	2	20
Ezhou	Hubei	NEC	16	2	5	34	15	1	9	25	21	2	6	43
Huanggang	Hubei	NEC	10	2	1	29	7	1	3	15	18	3	2	50
Jingmen	Hubei	NEC	14	1	7	27	17	1	10	21	19	2	6	51
Shiyan	Hubei	NEC	18	1	10	23	22	1	15	33	18	1	10	29
Wuhan	Hubei	NEC	12	1	8	18	14	1	9	18	17	1	11	29
Xianning	Hubei	NEC	14	1	9	22	14	1	10	19	12	1	5	22
Xiangyang	Hubei	NEC	10	1	3	20	12	1	7	18	14	1	6	32
Xiaogan	Hubei	NEC	5	1	1	23	6	1	2	19	6	1	0	14
Yichang	Hubei	NEC	9	1	5	24	11	1	8	19	10	0	6	15

Anqing	Anhui	NEC	14	1	10	18	15	0	13	17	18	1	11	35
Bengbu	Anhui	NEC	14	1	5	23	18	1	14	23	22	1	13	34
Bozhou	Anhui	NEC	40	2	27	59	40	3	15	61	34	2	14	59
Chuzhou	Anhui	NEC	16	1	12	22	12	1	6	18	11	1	6	18
Fuyang	Anhui	NEC	16	1	13	23	19	1	14	34	20	1	15	27
Hefei	Anhui	NEC	8	1	6	14	7	0	4	9	9	1	5	14
Huaibei	Anhui	NEC	28	2	18	48	25	1	16	34	27	3	14	73
Huainan	Anhui	NEC	9	1	5	16	9	0	6	12	11	0	6	15
Huangshan	Anhui	NEC	7	0	5	8	8	0	7	9	8	0	7	11
Lu'an	Anhui	NEC	21	5	5	68	10	0	9	13	12	0	9	16
Ma'anshan	Anhui	NEC	14	2	5	31	19	2	11	29	14	2	5	41
Suzhou	Anhui	NEC	9	1	5	14	11	1	7	18	14	1	9	22
Tongling	Anhui	NEC	29	3	10	69	36	3	18	64	28	1	12	42
Wuhu	Anhui	NEC	22	1	17	31	18	1	14	24	19	1	14	28
Changzhou	Jiangsu	NEC	22	2	10	36	23	2	10	36	24	2	12	47
Huaian	Jiangsu	NEC	20	2	8	41	13	1	8	18	14	1	5	27
Lianyungang	Jiangsu	NEC	12	1	5	21	19	1	12	27	22	1	10	36
Nanjing	Jiangsu	NEC	14	2	5	26	12	1	7	18	14	1	8	25
Nantong	Jiangsu	NEC	25	2	12	43	25	3	9	46	23	1	14	44
Suzhou	Jiangsu	NEC	14	1	6	21	18	2	9	39	17	1	8	29
Suqian	Jiangsu	NEC	12	2	3	35	15	1	5	24	16	1	5	28
Taizhou	Jiangsu	NEC	17	1	11	28	18	1	12	24	19	1	12	29
Wuxi	Jiangsu	NEC	19	1	11	29	24	1	16	36	27	1	14	41
Xuzhou	Jiangsu	NEC	26	1	20	41	34	3	18	57	29	2	17	52
Yanchen	Jiangsu	NEC	14	2	5	27	14	1	10	18	17	1	7	26
Yangzhou	Jiangsu	NEC	25	3	8	58	19	1	13	23	17	1	8	28

Zhenjiang	Jiangsu	NEC	22	2	10	35	19	1	10	25	20	2	10	41
Shanghai	Municipality	NEC	11	1	6	17	13	1	8	24	11	1	7	18
Hangzhou	Zhejiang	NEC	11	1	6	17	11	1	7	19	14	1	7	20
Huzhou	Zhejiang	NEC	10	1	4	18	14	2	4	31	12	1	4	20
Jiaxing	Zhejiang	NEC	11	1	3	19	18	2	8	34	16	1	3	32
Jinhua	Zhejiang	NEC	15	2	3	32	16	1	9	26	18	1	8	37
Lishui	Zhejiang	NEC	6	1	1	12	10	1	2	21	7	1	2	22
Ningbo	Zhejiang	NEC	10	1	6	16	13	1	9	20	14	1	7	20
Quzhou	Zhejiang	NEC	15	2	3	32	18	2	9	34	17	1	8	28
Shaoxing	Zhejiang	NEC	13	1	6	24	23	2	14	37	28	2	14	43
Taizhou	Zhejiang	NEC	6	1	1	11	6	1	3	11	7	0	3	12
Wenjiang	Zhejiang	NEC	8	1	2	12	9	1	5	13	8	1	2	13
Zhoushan	Zhejiang	NEC	5	1	2	15	6	0	3	9	7	0	5	14
Fuzhou	Jiangxi	NEC	14	1	3	23	18	3	6	37	18	2	7	40
Ganzhou	Jiangxi	NEC	17	2	10	33	20	2	10	37	26	2	13	48
Ji'an	Jiangxi	NEC	23	3	8	43	24	2	11	40	30	2	6	47
Jingdezhen	Jiangxi	NEC	7	1	2	17	10	1	2	20	8	0	4	12
Jiujiang	Jiangxi	NEC	40	1	27	52	39	2	29	49	37	1	26	48
Nanchang	Jiangxi	NEC	26	2	12	50	26	1	20	33	24	1	8	34
Pingxiang	Jiangxi	NEC	20	2	12	47	25	2	14	33	22	2	10	40
Shangrao	Jiangxi	NEC	44	4	10	72	44	5	20	99	33	2	14	54
Xinyu	Jiangxi	NEC	25	3	5	53	22	2	8	30	19	1	6	30
Yichun	Jiangxi	NEC	11	1	5	21	15	1	9	19	17	1	8	36
Yingtan	Jiangxi	NEC	21	2	13	41	26	3	15	48	37	3	14	85
Changsha	Hunan	NEC	14	1	8	20	14	1	7	20	13	1	4	24
Changde	Hunan	NEC	17	1	6	22	14	1	10	20	14	1	5	20

Chenzhou	Hunan	NEC	11	1	7	19	17	2	9	35	17	1	8	30
Huaihua	Hunan	NEC	11	1	4	24	13	1	6	22	13	1	3	29
Loudi	Hunan	NEC	29	1	16	37	33	1	26	42	29	1	15	40
Xiangtan	Hunan	NEC	14	1	6	22	16	1	9	29	20	2	7	44
Yiyang	Hunan	NEC	17	1	8	25	23	1	17	31	24	1	13	39
Yongzhou	Hunan	NEC	39	2	17	57	27	2	9	41	31	2	12	51
Zhangjiajie	Hunan	NEC	6	0	4	9	6	0	4	7	6	0	2	9
Zhuzhou	Hunan	NEC	17	2	8	36	18	1	7	27	19	1	10	28
Dongguan	Guangdong	NEC	11	1	6	19	11	1	7	17	13	1	7	20
Foshan	Guangdong	NEC	16	1	11	22	17	1	9	26	14	1	7	21
Guangzhou	Guangdong	NEC	12	0	8	17	11	1	6	17	10	1	5	16
Heyuan	Guangdong	NEC	7	0	4	12	7	1	3	13	8	0	4	13
Huizhou	Guangdong	NEC	10	1	7	14	9	1	7	16	9	0	6	15
Jiangmen	Guangdong	NEC	12	1	9	17	18	1	8	28	15	1	10	24
Maoming	Guangdong	NEC	12	2	5	33	16	2	9	30	10	1	2	20
Meizhou	Guangdong	NEC	7	0	5	9	6	0	4	8	8	0	5	11
Qingyuan	Guangdong	NEC	18	1	12	25	10	1	5	15	12	1	6	22
Shantou	Guangdong	NEC	14	1	9	18	13	1	8	18	12	1	8	23
Shaoguan	Guangdong	NEC	19	1	11	28	16	1	9	24	16	1	7	24
Shenzhen	Guangdong	NEC	9	0	6	13	8	1	6	12	7	0	5	13
Zhanjiang	Guangdong	NEC	9	1	5	14	6	1	2	9	5	1	1	10
Zhaoqing	Guangdong	NEC	19	1	10	28	17	2	9	28	21	1	12	34
Zhongshan	Guangdong	NEC	7	1	4	17	8	1	4	17	9	1	4	19
Zhuhai	Guangdong	NEC	5	1	2	14	8	1	3	15	7	1	3	17
Fuzhou	Fujian	NEC	5	0	3	6	4	0	3	6	4	0	2	5
Longyan	Fujian	NEC	7	1	3	12	6	0	4	9	9	1	5	16

Nanping	Fujian	NEC	12	0	8	15	15	1	11	21	15	1	11	27
Ningde	Fujian	NEC	2	0	1	5	3	0	1	5	3	0	1	7
Putian	Fujian	NEC	5	1	2	11	4	0	2	7	5	0	3	8
Quanzhou	Fujian	NEC	13	1	3	25	9	1	6	17	9	1	4	24
Sanming	Fujian	NEC	13	1	4	19	10	1	4	19	12	1	6	23
Xiamen	Fujian	NEC	9	1	3	16	6	1	2	12	6	0	2	9
Zhangzhou	Fujian	NEC	9	1	5	16	11	1	7	19	11	1	5	17
Haikou	Hainan	NEC	5	0	3	10	5	0	3	8	4	0	2	8
Sanya	Hainan	NEC	3	0	2	7	2	0	2	3	3	0	2	4
Chongqing	Municipality	NEC	10	1	4	16	12	1	7	16	10	1	4	23
Bazhong	Sichuan	NEC	2	0	1	5	2	0	1	5	2	0	1	4
Chengdu	Sichuan	NEC	13	1	7	20	15	1	7	24	12	1	6	25
Dazhou	Sichuan	NEC	15	1	6	31	12	1	7	19	10	1	4	26
Deyang	Sichuan	NEC	17	1	7	30	14	1	4	23	8	1	2	22
Guangyuan	Sichuan	NEC	17	1	12	22	16	1	13	23	12	0	7	17
Leshan	Sichuan	NEC	14	1	6	25	19	3	6	38	13	1	6	27
Luzhou	Sichuan	NEC	12	1	6	20	15	2	6	27	11	1	5	19
Meishan	Sichuan	NEC	15	1	8	26	13	2	2	30	8	1	2	20
Mianyang	Sichuan	NEC	10	1	4	21	11	1	5	18	10	1	5	23
Nanchong	Sichuan	NEC	12	1	5	18	10	1	5	22	9	1	5	22
Panzhihua	Sichuan	NEC	23	2	12	44	30	2	19	44	35	2	16	76
Suining	Sichuan	NEC	10	1	3	19	7	1	4	17	7	1	3	17
Ya'an	Sichuan	NEC	14	2	6	56	8	0	6	10	10	0	6	14
Ziyang	Sichuan	NEC	21	2	12	36	22	1	17	30	16	1	9	28
Zigong	Sichuan	NEC	16	1	9	27	19	1	11	27	17	1	10	31
Baoshan	Yunnan	NEC	12	1	2	22	5	1	1	10	9	1	3	24

Chuxiong	Yunnan	NEC	23	2	12	42	27	3	12	56	19	2	10	44
Dali	Yunnan	NEC	6	0	4	9	6	1	3	10	5	0	3	7
Dehong	Yunnan	NEC	20	2	6	32	12	2	2	19	15	1	5	32
Honghe	Yunnan	NEC	19	4	4	66	31	7	9	97	22	4	6	96
Kunming	Yunnan	NEC	13	1	6	20	16	2	7	38	12	1	7	22
Lijiang	Yunnan	NEC	11	1	5	17	8	0	6	11	8	0	3	12
Lincang	Yunnan	NEC	17	3	4	50	18	3	3	43	22	2	11	48
Nujiang	Yunnan	NEC	8	1	4	13	7	0	5	9	7	1	3	16
Qujing	Yunnan	NEC	20	2	9	35	24	2	17	37	17	1	10	33
Wenshan	Yunnan	NEC	10	1	3	23	8	1	4	14	7	1	2	20
Xishuangbanna	Yunnan	NEC	10	1	6	19	8	0	6	10	8	0	2	12
Tuxi	Yunnan	NEC	13	1	6	18	17	1	9	26	13	1	9	23
Zhaotong	Yunnan	NEC	32	5	4	60	47	7	15	103	27	2	11	52
Anshun	Guizhou	NEC	25	2	13	51	32	4	18	69	20	2	11	43
Bijie	Guizhou	NEC	10	1	3	17	11	1	7	16	10	0	4	15
Guiyang	Guizhou	NEC	7	0	5	13	8	1	4	12	7	0	5	12
Liupanshui	Guizhou	NEC	10	1	6	19	13	1	7	22	11	1	6	18
Tongren	Guizhou	NEC	7	1	3	16	8	1	5	16	7	0	3	10
Zunyi	Guizhou	NEC	7	1	2	15	6	1	2	9	6	0	2	10
Baise	Guangxi	NEC	10	1	5	18	7	0	5	10	12	1	5	18
Beihai	Guangxi	NEC	8	1	5	16	9	1	6	14	9	0	6	15
Chongzuo	Guangxi	NEC	8	1	5	14	14	2	5	24	10	1	4	21
Fangchenggang	Guangxi	NEC	4	0	2	7	3	0	2	6	4	0	2	8
Guigang	Guangxi	NEC	22	2	6	42	17	2	7	30	18	1	10	28
Guilin	Guangxi	NEC	18	2	9	32	19	2	10	32	22	1	10	39
Hechi	Guangxi	NEC	33	5	9	77	31	4	5	57	21	3	6	69

Hezhou	Guangxi	NEC	15	1	11	22	20	1	13	30	16	1	8	23
Laibin	Guangxi	NEC	25	4	6	68	14	2	5	32	20	2	7	54
Liuzhou	Guangxi	NEC	20	2	10	36	26	2	12	37	24	2	10	41
Nanning	Guangxi	NEC	11	1	8	18	13	1	8	21	11	0	8	17
Qinzhou	Guangxi	NEC	13	1	8	18	14	1	8	21	14	1	9	24
Wuzhou	Guangxi	NEC	16	1	9	22	15	1	7	23	13	1	8	23
Yulin	Guangxi	NEC	15	2	6	36	15	2	6	34	22	4	4	107
Golog	Qinghai	NEC	23	1	18	26	16	1	12	26	25	1	15	33
Haidong	Qinghai	NEC	21	2	7	44	34	2	25	51	33	3	13	69
Xining	Qinghai	NEC	17	2	7	38	26	2	9	37	18	2	5	36
Ali	Tibet	NEC	13	0	7	15	9	0	8	11	8	0	2	11
Qamdo	Tibet	NEC	4	0	3	5	4	0	3	4	5	0	4	7
Lhasa	Tibet	NEC	7	0	5	9	7	0	5	9	10	0	8	14
Nyingchi	Tibet	NEC	3	0	2	3	3	0	3	3	3	0	3	4
Naqu	Tibet	NEC	25	0	21	29	27	0	24	30	26	1	20	31
Shigatse	Tibet	NEC	6	0	3	7	6	0	6	7	6	0	3	7
Lhoka	Tibet	NEC	4	0	3	5	3	0	3	4	3	0	3	5

[a] EC and NEC denote emission control and non-emission control regions, respectively, of which the latter means regions without implementation of emission control measures.

[b] The pre-Parade Blue, Parade Blue, and post-Parade Blue periods indicate the periods of 1-19 August, 20 August-3 September, and 4-30 September 2015, respectively.

Table S6. Summary statistical of daily average SO_2 concentrations ($\mu g\ m^{-3}$) during the pre-Parade Blue and Parade Blue periods in the 291 cities across China.

City	Province	Region	The Pre-Parade Blue period				The Parade Blue period				Reduction or Increase
			Mean	Standard Error	Min	Max	Mean	Standard Error	Min	Max	
Beijing	Municipality	NC	3	0	2	7	2	0	2	3	-34
Tianjing	Municipality	NC	10	1	4	16	10	1	4	23	-2
Baoding	Hebei	NC	17	1	11	25	10	1	6	16	-41
Cangzhou	Hebei	NC	3	0	2	7	2	0	2	3	-34
Chengde	Hebei	NC	9	1	5	18	6	1	3	18	-27
Handan	Hebei	NC	28	2	16	48	34	5	9	62	21
Hengshui	Hebei	NC	17	1	10	23	12	1	3	20	-32
Langfang	Hebei	NC	9	1	4	19	4	0	2	8	-56
Qinhuangdao	Hebei	NC	32	3	17	48	18	2	10	46	-43
Shijiazhuang	Hebei	NC	19	2	7	39	13	1	6	19	-33
Tangshan	Hebei	NC	29	3	12	64	29	4	13	68	1
Xingtai	Hebei	NC	25	4	8	74	18	4	3	45	-27
Zhangjiakou	Hebei	NC	12	1	7	19	12	1	9	22	0
Changzhi	Shanxi	NC	32	2	18	59	28	3	10	50	-12
Datong	Shanxi	NC	20	2	12	37	18	1	12	28	-9
Jincheng	Shanxi	NC	29	2	14	46	25	2	12	38	-12

Jinzhong	Shanxi	NC	13	3	3	37	16	2	7	29	21
Linfen	Shanxi	NC	17	1	7	32	14	1	8	23	-14
Lvliang	Shanxi	NC	43	2	31	56	24	2	13	42	-45
Shuozhou	Shanxi	NC	39	3	18	60	37	3	17	52	-3
Taiyuan	Shanxi	NC	21	2	9	43	18	1	11	24	-13
Xinzhou	Shanxi	NC	41	3	23	58	32	1	21	39	-22
Yangquan	Shanxi	NC	24	2	7	36	21	2	7	35	-11
Yuncheng	Shanxi	NC	19	1	9	34	45	6	20	101	140
Binzhou	Shandong	NC	30	4	9	87	26	3	11	60	-15
Dezhou	Shandong	NC	18	2	5	35	21	2	11	41	13
Dongying	Shandong	NC	45	3	21	81	31	3	16	57	-31
Jinan	Shandong	NC	21	1	12	32	20	2	12	33	-2
Jining	Shandong	NC	36	3	21	88	43	3	21	66	19
Laiwu	Shandong	NC	22	3	6	46	32	2	15	42	46
Liaocheng	Shandong	NC	20	2	7	36	21	2	12	45	6
Linyi	Shandong	NC	15	2	5	42	20	1	13	32	33
Qingdao	Shandong	NC	17	1	12	28	20	1	14	33	16
Rizhao	Shandong	NC	13	1	8	23	16	1	11	26	20
Tai'an	Shandong	NC	20	2	8	34	28	2	14	46	42
Weihai	Shandong	NC	10	1	3	20	13	1	8	18	29
Weifang	Shandong	NC	19	2	11	38	27	3	13	62	41
Yantai	Shandong	NC	11	1	5	18	12	1	7	15	15
Zaozhuang	Shandong	NC	36	3	14	57	60	3	43	82	66
Zibo	Shandong	NC	54	6	21	94	61	8	22	114	14
Alxa League	Inner Mongolia	NC	5	1	1	11	7	1	2	13	45
Bayannur	Inner Mongolia	NC	12	1	5	21	18	1	10	27	46

Baotou	Inner Mongolia	NC	25	2	11	37	20	2	9	29	-22
Chifeng	Inner Mongolia	NC	14	1	9	25	12	1	8	18	-15
Ordos	Inner Mongolia	NC	11	1	4	22	14	1	7	26	26
Hohhot	Inner Mongolia	NC	12	1	9	18	8	0	5	12	-30
Hulun Buir	Inner Mongolia	NC	2	0	1	4	3	0	1	7	45
Tongliao	Inner Mongolia	NC	12	1	6	19	8	1	4	15	-29
Wuhai	Inner Mongolia	NC	48	7	6	122	34	7	4	95	-29
Hinggan League	Inner Mongolia	NC	5	0	2	9	3	0	2	6	-32
Anyang	Henan	NC	14	2	5	31	26	3	13	40	87
Hebi	Henan	NC	18	1	12	30	17	2	9	28	-7
Jiaozuo	Henan	NC	20	2	5	33	23	2	10	37	15
Kaifeng	Henan	NC	13	1	10	19	16	1	10	28	24
Luoyang	Henan	NC	24	3	7	50	20	2	8	30	-15
Luohe	Henan	NC	13	1	7	30	16	1	12	21	22
Nanyang	Henan	NC	22	1	10	33	22	1	15	29	3
Pingdingshan	Henan	NC	32	2	15	49	32	2	23	46	1
Sanmenxia	Henan	NC	18	1	8	28	25	2	13	42	41
Shangqiu	Henan	NC	10	1	5	15	18	1	13	22	74
Xinyang	Henan	NC	17	1	9	25	16	1	11	21	-7
Zhengzhou	Henan	NC	5	1	2	12	9	1	5	15	73
Zhoukou	Henan	NC	7	0	6	9	9	0	6	11	21
Zhumadian	Henan	NC	26	2	7	45	45	8	16	141	70
Anshan	Liaoning	NE	14	1	7	25	19	1	12	26	35
Benxi	Liaoning	NE	7	0	6	12	12	1	7	18	60
Chaoyang	Liaoning	NE	9	1	4	13	10	1	7	15	15
Dalian	Liaoning	NE	8	1	3	16	10	1	6	16	22

Dandong	Liaoning	NE	7	0	5	9	9	1	7	13	28
Fushun	Liaoning	NE	7	1	3	12	8	1	5	13	15
Fuxin	Liaoning	NE	29	3	12	64	30	2	22	49	4
Huludao	Liaoning	NE	20	3	7	56	29	2	20	43	42
Jinzhou	Liaoning	NE	25	1	18	39	17	1	12	27	-30
Liaoyang	Liaoning	NE	8	1	4	13	13	1	8	22	58
Panjin	Liaoning	NE	12	1	6	21	18	1	13	27	51
Shenyang	Liaoning	NE	12	1	4	24	10	1	6	16	-18
Tieling	Liaoning	NE	10	1	5	19	10	1	6	13	6
Wafangdian	Liaoning	NE	2	0	1	4	3	0	2	7	51
Yingkou	Liaoning	NE	11	1	6	16	11	1	8	18	3
Baicheng	Jilin	NE	6	0	4	12	6	0	2	9	-1
Baishan	Jilin	NE	10	1	5	23	8	1	4	12	-25
Changchun	Jilin	NE	6	0	3	8	6	1	4	10	8
Jilin	Jilin	NE	10	1	7	19	14	1	9	26	41
Liaoyuan	Jilin	NE	6	1	4	23	9	1	4	18	51
Siping	Jilin	NE	10	2	3	43	6	1	1	12	-35
Songyuan	Jilin	NE	5	1	2	26	2	0	1	4	-46
Daqing	Heilongjiang	NE	9	1	7	15	9	1	7	16	8
Daxinganling	Heilongjiang	NE	15	1	10	24	14	0	12	17	-6
Harbin	Heilongjiang	NE	5	0	3	7	5	0	4	6	1
Hegang	Heilongjiang	NE	2	0	1	3	2	0	1	5	7
Heihe	Heilongjiang	NE	10	0	8	12	12	1	8	24	21
Jixi	Heilongjiang	NE	8	1	4	14	15	0	13	20	88
Jiamusi	Heilongjiang	NE	7	1	3	23	5	0	3	7	-39
Mudanjiang	Heilongjiang	NE	7	0	5	10	8	0	5	10	18

Qitaihe	Heilongjiang	NE	18	0	16	21	17	1	14	29	-1
Qiqihar	Heilongjiang	NE	13	2	8	32	5	1	1	11	-61
Shuangyashan	Heilongjiang	NE	14	1	9	31	10	1	6	18	-28
Suihua	Heilongjiang	NE	9	1	3	18	9	1	4	14	5
Ankang	Shaanxi	NW	11	1	3	23	11	1	6	16	2
Baoji	Shaanxi	NW	3	0	2	4	5	0	3	7	78
Hanzhong	Shaanxi	NW	7	0	3	10	10	1	3	13	50
Shangluo	Shaanxi	NW	21	4	4	61	19	3	5	44	-8
Tongchuan	Shaanxi	NW	4	0	2	7	9	1	6	14	144
Weinan	Shaanxi	NW	10	1	4	15	13	1	6	23	36
Xi'an	Shaanxi	NW	7	0	2	10	13	1	8	18	95
Xianyang	Shaanxi	NW	11	0	8	16	14	1	7	20	20
Yan'an	Shaanxi	NW	7	0	6	9	10	0	8	12	35
Yulin	Shaanxi	NW	5	1	2	10	8	1	3	11	41
Baiying	Gansu	NW	24	5	3	97	71	12	14	161	193
Dingxi	Gansu	NW	8	2	3	33	7	1	3	10	-21
Gannan	Gansu	NW	9	2	3	33	7	0	5	9	-24
Jiayuguan	Gansu	NW	21	2	11	39	11	2	6	31	-45
Jiuquan	Gansu	NW	9	1	3	27	7	2	2	24	-20
Lanzhou	Gansu	NW	12	1	6	23	11	1	5	17	-2
Linxia	Gansu	NW	8	1	2	12	10	0	8	13	29
Pingliang	Gansu	NW	9	1	3	23	9	1	1	15	0
Qingyang	Gansu	NW	5	0	3	8	6	0	2	9	26
Tianshui	Gansu	NW	8	0	5	14	6	0	4	9	-21
Wuwei	Gansu	NW	7	0	5	10	9	0	7	13	28
Zhangye	Gansu	NW	13	0	10	16	15	1	11	20	17

Guyuan	Ningxia	NW	7	1	3	13	8	1	3	15	21
Shizuishan	Ningxia	NW	55	4	27	90	37	4	12	62	33
Wuzhong	Ningxia	NW	11	2	2	24	18	2	3	30	62
Yinchuan	Ningxia	NW	15	2	3	29	21	2	5	30	41
Zhongwei	Ningxia	NW	11	2	5	27	18	2	2	29	64
Aksu	Sinkiang	NW	6	1	1	13	5	1	2	15	20
Hami	Sinkiang	NW	6	1	1	16	5	1	1	14	6
Hotan	Sinkiang	NW	38	4	9	74	27	4	8	55	30
Kashgar	Sinkiang	NW	10	1	5	16	9	1	6	14	12
Karamay	Sinkiang	NW	7	0	4	11	9	1	4	20	19
Kizilsu	Sinkiang	NW	5	2	0	27	6	1	2	16	8
Shihezi	Sinkiang	NW	9	1	2	25	8	1	2	14	8
Urumchi	Sinkiang	NW	10	1	2	18	9	1	2	15	6
Wujiaqu	Sinkiang	NW	9	3	1	56	13	3	4	44	48
Yili	Sinkiang	NW	7	0	4	9	7	0	4	10	11
Ezhou	Hubei	SE	16	2	5	34	15	1	9	25	9
Huanggang	Hubei	SE	10	2	1	29	7	1	3	15	28
Jingmen	Hubei	SE	14	1	7	27	17	1	10	21	18
Shiyan	Hubei	SE	18	1	10	23	22	1	15	33	25
Wuhan	Hubei	SE	12	1	8	18	14	1	9	18	17
Xianning	Hubei	SE	14	1	9	22	14	1	10	19	0
Xiangyang	Hubei	SE	10	1	3	20	12	1	7	18	21
Xiaogan	Hubei	SE	5	1	1	23	6	1	2	19	3
Yichang	Hubei	SE	9	1	5	24	11	1	8	19	17
Anqing	Anhui	SE	14	1	10	18	15	0	13	17	10
Bengbu	Anhui	SE	14	1	5	23	18	1	14	23	28

Bozhou	Anhui	SE	40	2	27	59	40	3	15	61	-2
Chuzhou	Anhui	SE	16	1	12	22	12	1	6	18	-24
Fuyang	Anhui	SE	16	1	13	23	19	1	14	34	17
Hefei	Anhui	SE	8	1	6	14	7	0	4	9	-18
Huaibei	Anhui	SE	28	2	18	48	25	1	16	34	-11
Huainan	Anhui	SE	9	1	5	16	9	0	6	12	8
Huangshan	Anhui	SE	7	0	5	8	8	0	7	9	19
Lu'an	Anhui	SE	21	5	5	68	10	0	9	13	-50
Ma'anshan	Anhui	SE	14	2	5	31	19	2	11	29	37
Suzhou	Anhui	SE	9	1	5	14	11	1	7	18	32
Tongling	Anhui	SE	29	3	10	69	36	3	18	64	26
Wuhu	Anhui	SE	22	1	17	31	18	1	14	24	-17
Changzhou	Jiangsu	SE	22	2	10	36	23	2	10	36	4
Huaian	Jiangsu	SE	20	2	8	41	13	1	8	18	-33
Lianyungang	Jiangsu	SE	12	1	5	21	19	1	12	27	60
Nanjing	Jiangsu	SE	14	2	5	26	12	1	7	18	-18
Nantong	Jiangsu	SE	25	2	12	43	25	3	9	46	1
Suzhou	Jiangsu	SE	14	1	6	21	18	2	9	39	31
Suqian	Jiangsu	SE	12	2	3	35	15	1	5	24	28
Taizhou	Jiangsu	SE	17	1	11	28	18	1	12	24	8
Wuxi	Jiangsu	SE	19	1	11	29	24	1	16	36	29
Xuzhou	Jiangsu	SE	26	1	20	41	34	3	18	57	30
Yanchen	Jiangsu	SE	14	2	5	27	14	1	10	18	-3
Yangzhou	Jiangsu	SE	25	3	8	58	19	1	13	23	-25
Zhenjiang	Jiangsu	SE	22	2	10	35	19	1	10	25	-15
Shanghai	Municipality	SE	11	1	6	17	13	1	8	24	24

Hangzhou	Zhejiang	SE	11	1	6	17	11	1	7	19	0
Huzhou	Zhejiang	SE	10	1	4	18	14	2	4	31	44
Jiaxing	Zhejiang	SE	11	1	3	19	18	2	8	34	74
Jinhua	Zhejiang	SE	15	2	3	32	16	1	9	26	8
Lishui	Zhejiang	SE	6	1	1	12	10	1	2	21	63
Ningbo	Zhejiang	SE	10	1	6	16	13	1	9	20	25
Quzhou	Zhejiang	SE	15	2	3	32	18	2	9	34	22
Shaoxing	Zhejiang	SE	13	1	6	24	23	2	14	37	77
Taizhou	Zhejiang	SE	6	1	1	11	6	1	3	11	-6
Wenjiang	Zhejiang	SE	8	1	2	12	9	1	5	13	10
Zhoushan	Zhejiang	SE	5	1	2	15	6	0	3	9	10
Fuzhou	Jiangxi	SE	14	1	3	23	18	3	6	37	33
Ganzhou	Jiangxi	SE	17	2	10	33	20	2	10	37	13
Ji'an	Jiangxi	SE	23	3	8	43	24	2	11	40	4
Jingdezhen	Jiangxi	SE	7	1	2	17	10	1	2	20	29
Jiujiang	Jiangxi	SE	40	1	27	52	39	2	29	49	-3
Nanchang	Jiangxi	SE	26	2	12	50	26	1	20	33	0
Pingxiang	Jiangxi	SE	20	2	12	47	25	2	14	33	27
Shangrao	Jiangxi	SE	44	4	10	72	44	5	20	99	0
Xinyu	Jiangxi	SE	25	3	5	53	22	2	8	30	-11
Yichun	Jiangxi	SE	11	1	5	21	15	1	9	19	33
Yingtan	Jiangxi	SE	21	2	13	41	26	3	15	48	26
Changsha	Hunan	SE	14	1	8	20	14	1	7	20	-1
Changde	Hunan	SE	17	1	6	22	14	1	10	20	-18
Chenzhou	Hunan	SE	11	1	7	19	17	2	9	35	55
Huaihua	Hunan	SE	11	1	4	24	13	1	6	22	18

Loudi	Hunan	SE	29	1	16	37	33	1	26	42	16
Xiangtan	Hunan	SE	14	1	6	22	16	1	9	29	10
Yiyang	Hunan	SE	17	1	8	25	23	1	17	31	38
Yongzhou	Hunan	SE	39	2	17	57	27	2	9	41	-30
Zhangjiajie	Hunan	SE	6	0	4	9	6	0	4	7	-5
Zhuzhou	Hunan	SE	17	2	8	36	18	1	7	27	4
Dongguan	Guangdong	SE	11	1	6	19	11	1	7	17	3
Foshan	Guangdong	SE	16	1	11	22	17	1	9	26	4
Guangzhou	Guangdong	SE	12	0	8	17	11	1	6	17	-8
Heyuan	Guangdong	SE	7	0	4	12	7	1	3	13	-5
Huizhou	Guangdong	SE	10	1	7	14	9	1	7	16	-4
Jiangmen	Guangdong	SE	12	1	9	17	18	1	8	28	55
Maoming	Guangdong	SE	12	2	5	33	16	2	9	30	32
Meizhou	Guangdong	SE	7	0	5	9	6	0	4	8	-11
Qingyuan	Guangdong	SE	18	1	12	25	10	1	5	15	-44
Shantou	Guangdong	SE	14	1	9	18	13	1	8	18	-10
Shaoguan	Guangdong	SE	19	1	11	28	16	1	9	24	-18
Shenzhen	Guangdong	SE	9	0	6	13	8	1	6	12	-11
Zhanjiang	Guangdong	SE	9	1	5	14	6	1	2	9	-33
Zhaoqing	Guangdong	SE	19	1	10	28	17	2	9	28	-8
Zhongshan	Guangdong	SE	7	1	4	17	8	1	4	17	20
Zhuhai	Guangdong	SE	5	1	2	14	8	1	3	15	45
Fuzhou	Fujian	SE	5	0	3	6	4	0	3	6	-19
Longyan	Fujian	SE	7	1	3	12	6	0	4	9	-6
Nanping	Fujian	SE	12	0	8	15	15	1	11	21	23
Ningde	Fujian	SE	2	0	1	5	3	0	1	5	17

Putian	Fujian	SE	5	1	2	11	4	0	2	7	-15
Quanzhou	Fujian	SE	13	1	3	25	9	1	6	17	-36
Sanming	Fujian	SE	13	1	4	19	10	1	4	19	-20
Xiamen	Fujian	SE	9	1	3	16	6	1	2	12	-38
Zhangzhou	Fujian	SE	9	1	5	16	11	1	7	19	23
Haikou	Hainan	SE	5	0	3	10	5	0	3	8	10
Sanya	Hainan	SE	3	0	2	7	2	0	2	3	-15
Chongqing	Municipality	SW	10	1	4	16	12	1	7	16	16
Bazhong	Sichuan	SW	2	0	1	5	2	0	1	5	5
Chengdu	Sichuan	SW	13	1	7	20	15	1	7	24	10
Dazhou	Sichuan	SW	15	1	6	31	12	1	7	19	-19
Deyang	Sichuan	SW	17	1	7	30	14	1	4	23	-16
Guangyuan	Sichuan	SW	17	1	12	22	16	1	13	23	-5
Leshan	Sichuan	SW	14	1	6	25	19	3	6	38	36
Luzhou	Sichuan	SW	12	1	6	20	15	2	6	27	25
Meishan	Sichuan	SW	15	1	8	26	13	2	2	30	-17
Mianyang	Sichuan	SW	10	1	4	21	11	1	5	18	13
Nanchong	Sichuan	SW	12	1	5	18	10	1	5	22	-17
Panzhihua	Sichuan	SW	23	2	12	44	30	2	19	44	29
Suining	Sichuan	SW	10	1	3	19	7	1	4	17	-27
Ya'an	Sichuan	SW	14	2	6	56	8	0	6	10	-46
Ziyang	Sichuan	SW	21	2	12	36	22	1	17	30	2
Zigong	Sichuan	SW	16	1	9	27	19	1	11	27	20
Baoshan	Yunnan	SW	12	1	2	22	5	1	1	10	-61
Chuxiong	Yunnan	SW	23	2	12	42	27	3	12	56	17
Dali	Yunnan	SW	6	0	4	9	6	1	3	10	-1

Dehong	Yunnan	SW	20	2	6	32	12	2	2	19	-39
Honghe	Yunnan	SW	19	4	4	66	31	7	9	97	62
Kunming	Yunnan	SW	13	1	6	20	16	2	7	38	21
Lijiang	Yunnan	SW	11	1	5	17	8	0	6	11	-23
Lincang	Yunnan	SW	17	3	4	50	18	3	3	43	7
Nujiang	Yunnan	SW	8	1	4	13	7	0	5	9	-3
Qujing	Yunnan	SW	20	2	9	35	24	2	17	37	25
Wenshan	Yunnan	SW	10	1	3	23	8	1	4	14	-14
Xishuangbanna	Yunnan	SW	10	1	6	19	8	0	6	10	-25
Tuxi	Yunnan	SW	13	1	6	18	17	1	9	26	34
Zhaotong	Yunnan	SW	32	5	4	60	47	7	15	103	48
Anshun	Guizhou	SW	25	2	13	51	32	4	18	69	30
Bijie	Guizhou	SW	10	1	3	17	11	1	7	16	15
Guiyang	Guizhou	SW	7	0	5	13	8	1	4	12	9
Liupanshui	Guizhou	SW	10	1	6	19	13	1	7	22	38
Tongren	Guizhou	SW	7	1	3	16	8	1	5	16	25
Zunyi	Guizhou	SW	7	1	2	15	6	1	2	9	-9
Baise	Guangxi	SW	10	1	5	18	7	0	5	10	-32
Beihai	Guangxi	SW	8	1	5	16	9	1	6	14	5
Chongzuo	Guangxi	SW	8	1	5	14	14	2	5	24	62
Fangchenggang	Guangxi	SW	4	0	2	7	3	0	2	6	-14
Guigang	Guangxi	SW	22	2	6	42	17	2	7	30	-23
Guilin	Guangxi	SW	18	2	9	32	19	2	10	32	9
Hechi	Guangxi	SW	33	5	9	77	31	4	5	57	-6
Hezhou	Guangxi	SW	15	1	11	22	20	1	13	30	30
Laibin	Guangxi	SW	25	4	6	68	14	2	5	32	-43

Liuzhou	Guangxi	SW	20	2	10	36	26	2	12	37	31
Nanning	Guangxi	SW	11	1	8	18	13	1	8	21	18
Qinzhou	Guangxi	SW	13	1	8	18	14	1	8	21	8
Wuzhou	Guangxi	SW	16	1	9	22	15	1	7	23	-7
Yulin	Guangxi	SW	15	2	6	36	15	2	6	34	4
Golog	Qinghai	TP	23	1	18	26	16	1	12	26	-28
Haidong	Qinghai	TP	21	2	7	44	34	2	25	51	65
Xining	Qinghai	TP	17	2	7	38	26	2	9	37	51
Ali	Tibet	TP	13	0	7	15	9	0	8	11	-31
Qamdo	Tibet	TP	4	0	3	5	4	0	3	4	6
Lhasa	Tibet	TP	7	0	5	9	7	0	5	9	-4
Nyingchi	Tibet	TP	3	0	2	3	3	0	3	3	3
Naqu	Tibet	TP	25	0	21	29	27	0	24	30	8
Shigatse	Tibet	TP	6	0	3	7	6	0	6	7	9
Lhoka	Tibet	TP	4	0	3	5	—	3	0	3	4	-16

[a] NC, NE, NW, SE, SW, TP represent north China, northeast China, northwest China, southeast China, southwest China, and the Tibetan Plateau, respectively.

[b] Negative values with red color mean significant (p<0.05 or 0.01) reduction, and positive values mean increase.

Table S6. Summary of daily average CO concentrations (mg m^{-3}) during the pre-Parade Blue, Parade Blue and post-Parade Blue periods in the 291 cities across China.

City	Province	Region[a]	Pre-Parade Blue period[b]				Parade Blue period[b]				Post-Parade Blue period[b]			
			Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max
Beijing	Municipality	EC	0.90	0.06	0.51	1.42	0.56	0.04	0.43	0.94	0.84	0.06	0.35	1.48
Tianjing	Municipality	EC	0.97	0.05	0.67	1.40	1.04	0.08	0.61	1.79	0.89	0.06	0.39	1.88
Baoding	Hebei	EC	1.01	0.07	0.51	1.74	0.64	0.05	0.34	1.08	0.81	0.06	0.26	1.39
Cangzhou	Hebei	EC	0.90	0.06	0.51	1.42	0.56	0.04	0.43	0.94	0.94	0.07	0.39	1.98
Chengde	Hebei	EC	0.78	0.04	0.48	1.04	0.49	0.02	0.38	0.75	0.65	0.05	0.30	1.25
Handan	Hebei	EC	0.99	0.07	0.48	1.51	1.51	0.23	0.67	3.55	1.20	0.13	0.58	3.63
Hengshui	Hebei	EC	1.09	0.03	0.85	1.33	1.00	0.04	0.74	1.36	1.37	0.06	0.78	1.96
Langfang	Hebei	EC	1.13	0.08	0.65	1.92	0.79	0.10	0.38	1.81	1.08	0.08	0.25	1.74
Qinhuangdao	Hebei	EC	1.38	0.15	0.38	2.46	0.63	0.10	0.36	1.87	1.16	0.13	0.35	2.45
Shijiazhuang	Hebei	EC	0.66	0.05	0.36	1.17	0.57	0.05	0.24	0.95	1.03	0.08	0.40	1.96
Tangshan	Hebei	EC	1.81	0.21	0.84	4.53	1.89	0.23	0.59	3.91	1.99	0.19	0.49	4.76
Xingtai	Hebei	EC	1.12	0.12	0.51	2.40	0.93	0.11	0.33	1.70	1.27	0.09	0.49	2.17
Zhangjiakou	Hebei	EC	0.51	0.02	0.37	0.66	0.45	0.02	0.37	0.58	0.63	0.03	0.33	1.03
Changzhi	Shanxi	EC	1.42	0.08	1.01	2.06	1.57	0.04	1.30	1.79	1.57	0.05	1.18	2.44
Datong	Shanxi	EC	0.79	0.01	0.69	0.88	0.87	0.02	0.77	1.00	1.14	0.04	0.79	1.49
Jincheng	Shanxi	EC	1.71	0.19	0.59	3.97	1.64	0.15	0.78	2.83	1.25	0.08	0.67	2.64
Jinzhong	Shanxi	EC	0.88	0.05	0.61	1.31	0.59	0.03	0.36	0.82	1.03	0.05	0.42	1.45
Linfen	Shanxi	EC	1.59	0.07	1.13	2.32	1.64	0.04	1.34	1.94	2.07	0.05	1.45	2.66
Lvliang	Shanxi	EC	1.73	0.04	1.47	2.13	1.85	0.03	1.63	2.00	2.48	0.05	1.97	2.90
Shuozhou	Shanxi	EC	1.26	0.04	0.84	1.51	1.11	0.02	1.01	1.27	1.24	0.04	0.88	1.76
Taiyuan	Shanxi	EC	0.85	0.03	0.68	1.15	0.84	0.03	0.71	1.08	1.17	0.03	0.71	1.51

Xinzhou	Shanxi	EC	1.00	0.03	0.70	1.31	1.84	0.43	0.84	7.71	1.21	0.05	0.82	1.73
Yangquan	Shanxi	EC	0.85	0.03	0.67	1.14	0.63	0.02	0.52	0.85	0.95	0.05	0.34	1.50
Yuncheng	Shanxi	EC	2.11	0.05	1.77	2.49	2.30	0.15	1.02	3.17	1.61	0.06	1.16	2.31
Binzhou	Shandong	EC	1.71	0.08	1.17	2.32	1.45	0.07	1.12	2.24	1.46	0.06	0.88	2.29
Dezhou	Shandong	EC	1.92	0.05	1.62	2.34	1.66	0.06	1.32	2.08	1.76	0.08	1.11	2.65
Dongying	Shandong	EC	1.00	0.07	0.61	1.50	0.87	0.05	0.60	1.12	0.94	0.05	0.50	1.31
Jinan	Shandong	EC	0.92	0.05	0.57	1.33	0.97	0.04	0.76	1.25	1.16	0.06	0.50	1.66
Jining	Shandong	EC	0.99	0.04	0.72	1.26	0.92	0.04	0.70	1.19	0.97	0.05	0.59	1.50
Laiwu	Shandong	EC	1.28	0.06	0.91	1.60	1.47	0.06	1.09	1.85	1.28	0.06	0.70	1.95
Liaocheng	Shandong	EC	1.39	0.04	1.16	1.72	1.18	0.05	0.86	1.50	1.50	0.06	0.92	2.30
Linyi	Shandong	EC	1.09	0.06	0.75	1.85	1.17	0.05	0.86	1.49	1.17	0.07	0.52	2.13
Qingdao	Shandong	EC	0.62	0.04	0.33	0.99	0.63	0.03	0.48	0.91	0.61	0.03	0.41	1.07
Rizhao	Shandong	EC	0.81	0.05	0.49	1.37	0.95	0.04	0.72	1.26	0.98	0.05	0.61	1.74
Tai'an	Shandong	EC	1.45	0.08	1.13	2.56	1.24	0.06	0.86	1.62	1.09	0.05	0.65	1.53
Weihai	Shandong	EC	0.68	0.05	0.39	1.37	0.54	0.02	0.37	0.67	0.47	0.02	0.24	0.73
Weifang	Shandong	EC	0.71	0.06	0.34	1.19	0.87	0.07	0.58	1.35	0.88	0.06	0.40	1.65
Yantai	Shandong	EC	0.70	0.05	0.41	1.28	0.49	0.02	0.34	0.62	0.56	0.03	0.35	0.87
Zaozhuang	Shandong	EC	0.71	0.05	0.37	1.00	0.86	0.02	0.75	1.04	0.87	0.04	0.46	1.55
Zibo	Shandong	EC	1.91	0.09	1.41	2.63	2.11	0.10	1.53	2.78	1.89	0.09	1.18	3.10
Alxa League	Inner Mongolia	EC	0.71	0.04	0.43	1.05	0.75	0.04	0.57	1.07	0.69	0.02	0.52	0.93
Bayannur	Inner Mongolia	EC	0.47	0.06	0.19	1.18	0.36	0.02	0.27	0.54	0.41	0.03	0.19	0.89
Baotou	Inner Mongolia	EC	1.01	0.06	0.60	1.54	0.98	0.06	0.60	1.39	0.99	0.04	0.58	1.62
Chifeng	Inner Mongolia	EC	0.86	0.09	0.35	1.51	0.54	0.03	0.39	0.78	0.67	0.05	0.34	1.42
Ordos	Inner Mongolia	EC	0.60	0.03	0.40	0.88	0.61	0.01	0.48	0.72	0.66	0.03	0.43	1.01
Hohhot	Inner Mongolia	EC	0.63	0.03	0.46	0.98	0.63	0.02	0.49	0.74	0.68	0.03	0.43	1.08
Hulun Buir	Inner Mongolia	EC	0.31	0.03	0.15	0.58	0.21	0.03	0.05	0.42	0.23	0.03	0.08	0.87

Tongliao	Inner Mongolia	EC	0.75	0.05	0.52	1.21	0.51	0.01	0.40	0.65	0.57	0.04	0.26	1.07
Wuhai	Inner Mongolia	EC	0.70	0.06	0.31	1.20	0.64	0.06	0.37	1.04	0.80	0.06	0.24	1.42
Hinggan League	Inner Mongolia	EC	0.69	0.04	0.51	1.31	0.49	0.02	0.40	0.66	0.57	0.03	0.40	1.12
Anyang	Henan	EC	1.41	0.08	0.75	2.10	1.63	0.10	1.24	2.44	1.77	0.14	0.91	4.78
Hebi	Henan	EC	0.99	0.06	0.66	1.54	1.18	0.14	0.52	2.25	1.25	0.07	0.47	1.93
Jiaozuo	Henan	EC	1.50	0.05	1.14	1.79	1.38	0.09	0.90	2.00	1.40	0.05	0.87	2.13
Kaifeng	Henan	EC	1.14	0.05	0.77	1.58	1.30	0.04	1.02	1.76	1.38	0.06	0.89	1.95
Luoyang	Henan	EC	1.67	0.06	1.19	2.25	1.36	0.04	1.12	1.57	1.75	0.05	1.18	2.45
Luohe	Henan	EC	0.66	0.04	0.46	1.00	0.74	0.03	0.53	1.00	0.81	0.04	0.49	1.42
Nanyang	Henan	EC	0.69	0.06	0.31	1.22	0.70	0.02	0.57	0.90	1.03	0.05	0.68	1.71
Pingdingshan	Henan	EC	0.90	0.04	0.56	1.10	0.87	0.04	0.64	1.13	1.02	0.04	0.65	1.61
Sanmenxia	Henan	EC	1.05	0.03	0.76	1.27	1.13	0.02	0.97	1.28	1.15	0.03	0.81	1.40
Shangqiu	Henan	EC	0.59	0.05	0.28	1.14	0.64	0.03	0.47	0.88	0.69	0.04	0.34	1.33
Xinyang	Henan	EC	0.86	0.03	0.54	1.04	0.76	0.02	0.59	0.89	0.85	0.03	0.56	1.15
Zhengzhou	Henan	EC	1.05	0.04	0.77	1.43	1.12	0.04	0.87	1.42	1.30	0.05	0.83	1.95
Zhoukou	Henan	EC	1.02	0.05	0.77	1.47	1.35	0.04	1.06	1.55	1.27	0.05	0.76	1.66
Zhumadian	Henan	EC	0.50	0.04	0.26	0.87	0.65	0.03	0.46	0.83	0.68	0.04	0.34	1.17
Anshan	Liaoning	NEC	1.43	0.06	0.97	1.99	1.32	0.06	0.97	1.67	1.18	0.06	0.74	2.01
Benxi	Liaoning	NEC	1.10	0.04	0.84	1.42	1.01	0.07	0.60	1.72	1.04	0.07	0.52	1.83
Chaoyang	Liaoning	NEC	1.71	0.06	1.43	2.31	1.52	0.01	1.42	1.62	1.80	0.07	1.27	2.77
Dalian	Liaoning	NEC	0.78	0.04	0.46	1.06	0.72	0.04	0.51	1.16	0.71	0.03	0.45	1.04
Dandong	Liaoning	NEC	7.13	1.59	0.97	24.00	1.26	0.03	1.06	1.40	1.34	0.02	1.12	1.59
Fushun	Liaoning	NEC	1.05	0.04	0.77	1.46	0.94	0.03	0.71	1.15	0.98	0.05	0.51	1.57
Fuxin	Liaoning	NEC	0.86	0.08	0.45	1.51	0.55	0.03	0.44	0.88	0.80	0.05	0.41	1.46
Huludao	Liaoning	NEC	1.26	0.11	0.55	1.89	0.90	0.07	0.60	1.80	1.12	0.08	0.65	2.06
Jinzhou	Liaoning	NEC	1.17	0.09	0.68	1.95	0.65	0.04	0.47	1.08	0.94	0.05	0.55	1.69

Liaoyang	Liaoning	NEC	1.07	0.04	0.75	1.44	1.14	0.05	0.89	1.59	1.06	0.06	0.54	1.50
Panjin	Liaoning	NEC	0.89	0.06	0.50	1.47	0.68	0.04	0.54	1.18	0.79	0.04	0.53	1.48
Shenyang	Liaoning	NEC	0.88	0.05	0.55	1.31	0.58	0.03	0.38	0.82	0.81	0.06	0.32	1.42
Tieling	Liaoning	NEC	0.72	0.06	0.38	1.13	0.71	0.03	0.55	0.97	0.68	0.04	0.39	1.02
Wafangdian	Liaoning	NEC	0.44	0.03	0.22	0.66	0.39	0.03	0.27	0.60	0.47	0.04	0.16	0.82
Yingkou	Liaoning	NEC	0.79	0.05	0.38	1.08	0.71	0.05	0.41	1.02	0.82	0.08	0.31	1.93
Baicheng	Jilin	NEC	0.39	0.02	0.26	0.56	0.39	0.03	0.20	0.62	0.41	0.03	0.24	1.16
Baishan	Jilin	NEC	0.83	0.07	0.54	1.50	0.72	0.03	0.51	0.89	0.90	0.04	0.61	1.34
Changchun	Jilin	NEC	0.68	0.03	0.52	1.08	0.64	0.04	0.48	0.91	0.70	0.04	0.40	1.10
Jilin	Jilin	NEC	0.63	0.02	0.49	0.79	0.64	0.03	0.45	0.76	0.68	0.03	0.42	0.98
Liaoyuan	Jilin	NEC	0.93	0.04	0.55	1.26	0.87	0.07	0.63	1.63	0.94	0.03	0.64	1.20
Siping	Jilin	NEC	0.74	0.08	0.16	1.65	0.40	0.05	0.11	0.84	0.88	0.09	0.01	2.17
Songyuan	Jilin	NEC	0.98	0.10	0.36	1.78	0.55	0.03	0.39	0.70	1.13	0.11	0.51	2.16
Daqing	Heilongjiang	NEC	0.55	0.02	0.40	0.66	0.40	0.02	0.27	0.58	0.43	0.02	0.28	0.70
Daxinganling	Heilongjiang	NEC	0.68	0.05	0.47	1.30	0.77	0.03	0.64	1.19	0.85	0.05	0.65	1.68
Harbin	Heilongjiang	NEC	0.86	0.02	0.70	1.05	0.70	0.04	0.47	0.95	0.82	0.02	0.58	1.05
Hegang	Heilongjiang	NEC	1.15	0.11	0.49	2.09	0.59	0.03	0.39	0.79	0.73	0.04	0.46	1.18
Heihe	Heilongjiang	NEC	0.40	0.02	0.32	0.68	0.34	0.02	0.20	0.49	0.30	0.02	0.17	0.54
Jixi	Heilongjiang	NEC	0.51	0.02	0.39	0.73	0.52	0.04	0.25	0.86	0.57	0.04	0.21	0.97
Jiamusi	Heilongjiang	NEC	0.81	0.02	0.70	0.96	0.67	0.03	0.53	0.93	0.79	0.03	0.57	1.27
Mudanjiang	Heilongjiang	NEC	0.45	0.01	0.36	0.54	0.42	0.02	0.30	0.55	0.46	0.02	0.32	0.74
Qitaihe	Heilongjiang	NEC	0.41	0.01	0.28	0.56	0.42	0.02	0.27	0.60	0.33	0.02	0.15	0.58
Qiqihar	Heilongjiang	NEC	0.61	0.03	0.37	0.92	0.44	0.02	0.35	0.64	0.54	0.02	0.35	0.81
Shuangyashan	Heilongjiang	NEC	0.72	0.05	0.36	1.34	0.54	0.06	0.28	1.00	0.56	0.03	0.34	0.89
Suihua	Heilongjiang	NEC	0.36	0.03	0.18	0.60	0.32	0.02	0.24	0.46	0.37	0.03	0.17	0.75
Ankang	Shaanxi	NEC	0.56	0.02	0.39	0.77	0.63	0.01	0.57	0.75	0.76	0.02	0.51	0.97

Baoji	Shaanxi	NEC	0.89	0.03	0.63	1.14	0.90	0.04	0.65	1.12	0.80	0.03	0.51	1.11
Hanzhong	Shaanxi	NEC	1.10	0.04	0.78	1.43	1.53	0.03	1.30	1.72	0.97	0.06	0.57	1.85
Shangluo	Shaanxi	NEC	1.06	0.04	0.80	1.43	1.51	0.06	1.17	1.93	2.09	0.05	1.61	2.69
Tongchuan	Shaanxi	NEC	0.74	0.04	0.44	1.05	0.71	0.02	0.55	0.82	0.86	0.04	0.48	1.27
Weinan	Shaanxi	NEC	0.61	0.02	0.49	0.73	0.70	0.03	0.53	0.86	1.01	0.05	0.64	1.53
Xi'an	Shaanxi	NEC	1.00	0.02	0.83	1.19	1.16	0.03	0.96	1.45	1.18	0.04	0.82	1.65
Xianyang	Shaanxi	NEC	0.84	0.03	0.56	0.99	0.89	0.03	0.60	1.08	0.94	0.04	0.68	1.31
Yan'an	Shaanxi	NEC	1.15	0.06	0.69	1.48	1.05	0.03	0.89	1.37	1.19	0.04	0.94	1.60
Yulin	Shaanxi	NEC	0.94	0.07	0.40	1.31	0.68	0.03	0.49	0.90	0.82	0.03	0.48	1.18
Baiying	Gansu	NEC	0.76	0.04	0.48	1.06	0.71	0.02	0.59	0.83	0.91	0.04	0.73	1.38
Dingxi	Gansu	NEC	0.53	0.04	0.30	1.02	0.43	0.03	0.30	0.64	0.41	0.02	0.31	0.67
Gannan	Gansu	NEC	0.64	0.05	0.10	1.02	0.62	0.04	0.34	0.91	0.82	0.05	0.11	1.52
Jiayuguan	Gansu	NEC	0.67	0.04	0.37	1.01	0.60	0.03	0.44	0.88	0.52	0.03	0.28	0.89
Jiuquan	Gansu	NEC	0.55	0.03	0.23	0.80	0.56	0.04	0.31	0.94	0.60	0.03	0.40	1.08
Lanzhou	Gansu	NEC	0.89	0.04	0.56	1.18	1.05	0.04	0.81	1.26	1.03	0.04	0.76	1.50
Linxia	Gansu	NEC	0.76	0.01	0.67	0.92	0.82	0.03	0.71	0.99	0.84	0.03	0.61	1.11
Pingliang	Gansu	NEC	0.71	0.06	0.36	1.64	0.80	0.03	0.65	0.97	0.64	0.03	0.31	0.96
Qingyang	Gansu	NEC	0.78	0.02	0.65	0.97	0.87	0.03	0.75	1.07	0.85	0.03	0.59	1.18
Tianshui	Gansu	NEC	0.46	0.01	0.38	0.62	0.51	0.02	0.37	0.69	0.57	0.03	0.34	0.90
Wuwei	Gansu	NEC	2.68	0.04	2.37	3.02	2.56	0.11	2.16	3.22	1.20	0.17	0.33	2.51
Zhangye	Gansu	NEC	0.42	0.03	0.28	0.82	0.41	0.02	0.29	0.51	0.57	0.08	0.26	2.30
Guyuan	Ningxia	NEC	0.60	0.02	0.48	0.81	0.59	0.04	0.39	0.85	0.49	0.02	0.29	0.72
Shizuishan	Ningxia	NEC	0.52	0.04	0.26	1.02	0.59	0.04	0.38	0.85	0.66	0.05	0.29	1.36
Wuzhong	Ningxia	NEC	0.93	0.05	0.73	1.59	0.89	0.02	0.73	1.07	0.66	0.03	0.39	1.10
Yinchuan	Ningxia	NEC	0.83	0.04	0.52	1.12	0.87	0.03	0.69	1.10	0.87	0.04	0.53	1.31
Zhongwei	Ningxia	NEC	1.02	0.01	0.95	1.19	1.07	0.04	0.84	1.34	0.77	0.07	0.30	1.41

Aksu	Sinkiang	NEC	0.80	0.10	0.37	1.76	1.32	0.14	0.36	2.35	0.88	0.14	0.00	2.49
Hami	Sinkiang	NEC	0.97	0.06	0.58	1.42	0.71	0.05	0.40	1.02	0.88	0.07	0.36	1.82
Hotan	Sinkiang	NEC	0.60	0.05	0.24	1.08	0.99	0.06	0.65	1.40	0.68	0.05	0.24	1.23
Kashgar	Sinkiang	NEC	0.57	0.03	0.30	0.87	0.55	0.04	0.35	0.85	0.66	0.05	0.28	1.14
Karamay	Sinkiang	NEC	1.12	0.03	0.88	1.36	1.21	0.03	1.06	1.36	1.28	0.04	0.98	1.65
Kizilsu	Sinkiang	NEC	1.06	0.06	0.61	1.56	1.23	0.12	0.59	1.79	1.14	0.10	0.12	1.85
Shihezi	Sinkiang	NEC	0.67	0.05	0.44	1.27	0.84	0.04	0.61	1.11	0.71	0.04	0.38	1.07
Urumchi	Sinkiang	NEC	0.74	0.03	0.51	1.03	0.66	0.03	0.47	0.93	0.72	0.04	0.45	1.37
Wujiaqu	Sinkiang	NEC	0.63	0.04	0.29	0.97	0.52	0.06	0.20	0.86	0.63	0.05	0.30	1.48
Yili	Sinkiang	NEC	1.16	0.03	0.87	1.39	1.34	0.06	0.89	1.74	0.94	0.06	0.52	1.71
Ezhou	Hubei	NEC	1.03	0.06	0.77	1.79	1.10	0.03	0.95	1.29	1.20	0.04	0.89	1.58
Huanggang	Hubei	NEC	0.87	0.05	0.36	1.18	1.05	0.03	0.75	1.15	1.28	0.03	0.99	1.65
Jingmen	Hubei	NEC	0.65	0.04	0.44	1.07	0.82	0.02	0.65	0.96	0.79	0.03	0.47	1.05
Shiyan	Hubei	NEC	0.94	0.04	0.65	1.39	0.86	0.05	0.53	1.30	1.26	0.05	0.87	1.94
Wuhan	Hubei	NEC	0.66	0.05	0.42	1.07	0.93	0.05	0.54	1.16	0.93	0.02	0.61	1.14
Xianning	Hubei	NEC	1.10	0.05	0.74	1.48	1.44	0.03	1.11	1.63	1.30	0.03	1.07	1.60
Xiangyang	Hubei	NEC	0.75	0.04	0.60	1.14	0.87	0.03	0.72	1.13	0.97	0.03	0.72	1.44
Xiaogan	Hubei	NEC	1.40	0.06	1.11	1.92	1.72	0.05	1.40	2.14	1.41	0.10	0.54	2.81
Yichang	Hubei	NEC	0.82	0.04	0.54	1.13	0.97	0.02	0.86	1.17	1.07	0.03	0.69	1.45
Anqing	Anhui	NEC	0.45	0.05	0.16	0.78	0.62	0.03	0.43	0.81	0.65	0.03	0.39	0.93
Bengbu	Anhui	NEC	0.65	0.04	0.30	0.92	0.85	0.03	0.69	1.10	0.76	0.04	0.49	1.36
Bozhou	Anhui	NEC	0.48	0.04	0.25	0.78	0.88	0.04	0.60	1.15	0.93	0.04	0.54	1.45
Chuzhou	Anhui	NEC	0.54	0.06	0.28	1.00	0.74	0.04	0.48	0.96	0.72	0.03	0.49	1.09
Fuyang	Anhui	NEC	0.53	0.07	0.18	1.13	0.72	0.04	0.50	1.02	0.64	0.05	0.34	1.36
Hefei	Anhui	NEC	0.75	0.04	0.45	1.06	0.85	0.04	0.66	1.15	0.86	0.02	0.68	1.15
Huaibei	Anhui	NEC	0.85	0.05	0.57	1.24	1.20	0.03	1.01	1.44	0.99	0.05	0.58	1.53

Huainan	Anhui	NEC	0.64	0.06	0.24	1.07	0.89	0.03	0.67	1.16	0.81	0.04	0.44	1.39
Huangshan	Anhui	NEC	0.12	0.01	0.07	0.18	0.17	0.02	0.11	0.36	0.13	0.01	0.08	0.18
Lu'an	Anhui	NEC	0.68	0.04	0.36	1.07	0.56	0.03	0.39	0.76	0.53	0.02	0.39	0.77
Ma'anshan	Anhui	NEC	1.10	0.03	0.84	1.36	1.34	0.05	1.02	1.58	1.33	0.05	0.94	2.00
Suzhou	Anhui	NEC	0.57	0.07	0.23	1.14	0.97	0.06	0.71	1.41	0.93	0.08	0.46	2.09
Tongling	Anhui	NEC	0.82	0.05	0.53	1.23	1.05	0.06	0.76	1.53	0.97	0.03	0.67	1.25
Wuhu	Anhui	NEC	0.65	0.05	0.33	1.00	0.81	0.04	0.63	1.19	0.72	0.03	0.50	1.08
Changzhou	Jiangsu	NEC	0.80	0.03	0.59	1.15	0.85	0.06	0.43	1.18	0.71	0.03	0.46	1.19
Huaian	Jiangsu	NEC	0.69	0.05	0.32	1.07	0.89	0.06	0.46	1.29	0.69	0.03	0.50	0.95
Lianyungang	Jiangsu	NEC	0.62	0.04	0.30	0.96	0.87	0.05	0.52	1.24	0.71	0.04	0.32	1.11
Nanjing	Jiangsu	NEC	0.69	0.04	0.40	0.98	0.84	0.05	0.50	1.19	0.73	0.03	0.55	1.09
Nantong	Jiangsu	NEC	0.54	0.05	0.32	1.18	0.72	0.06	0.43	1.37	0.54	0.03	0.36	0.93
Suzhou	Jiangsu	NEC	0.69	0.03	0.43	0.85	0.94	0.05	0.60	1.32	0.75	0.03	0.57	1.04
Suqian	Jiangsu	NEC	0.64	0.04	0.33	0.97	1.01	0.05	0.68	1.46	0.90	0.05	0.46	1.73
Taizhou	Jiangsu	NEC	0.84	0.05	0.52	1.30	0.92	0.04	0.66	1.16	0.87	0.03	0.67	1.25
Wuxi	Jiangsu	NEC	0.84	0.03	0.66	1.32	1.18	0.05	0.96	1.65	1.07	0.02	0.83	1.31
Xuzhou	Jiangsu	NEC	0.98	0.05	0.66	1.33	1.31	0.06	1.00	1.75	1.14	0.06	0.71	2.36
Yanchen	Jiangsu	NEC	0.59	0.04	0.33	1.06	0.68	0.04	0.44	0.93	0.57	0.02	0.41	0.89
Yangzhou	Jiangsu	NEC	0.62	0.05	0.26	1.01	0.60	0.03	0.39	0.74	0.70	0.03	0.35	0.94
Zhenjiang	Jiangsu	NEC	0.74	0.03	0.47	1.05	0.80	0.04	0.52	1.00	0.66	0.03	0.50	1.05
Shanghai	Municipality	NEC	0.65	0.02	0.50	0.76	0.89	0.05	0.67	1.26	0.67	0.03	0.48	1.00
Hangzhou	Zhejiang	NEC	0.68	0.03	0.44	0.87	0.90	0.03	0.68	1.16	0.78	0.02	0.54	1.01
Huzhou	Zhejiang	NEC	0.63	0.03	0.43	0.86	0.87	0.03	0.69	1.05	0.74	0.02	0.55	1.09
Jiaxing	Zhejiang	NEC	0.56	0.02	0.39	0.74	0.76	0.04	0.47	1.02	0.56	0.03	0.30	0.95
Jinhua	Zhejiang	NEC	0.67	0.03	0.47	0.85	0.85	0.07	0.63	1.45	0.80	0.02	0.53	0.99
Lishui	Zhejiang	NEC	0.52	0.02	0.39	0.66	0.58	0.02	0.44	0.71	0.62	0.02	0.44	0.85

Ningbo	Zhejiang	NEC	0.71	0.02	0.58	0.88	0.87	0.04	0.67	1.14	0.83	0.02	0.67	1.05
Quzhou	Zhejiang	NEC	0.67	0.03	0.47	0.85	0.87	0.06	0.63	1.45	0.76	0.02	0.57	0.97
Shaoxing	Zhejiang	NEC	0.64	0.04	0.42	0.92	0.86	0.05	0.54	1.23	0.79	0.03	0.53	1.09
Taizhou	Zhejiang	NEC	0.61	0.02	0.41	0.82	0.70	0.04	0.46	0.88	0.72	0.02	0.54	0.94
Wenjiang	Zhejiang	NEC	0.71	0.03	0.52	0.92	0.72	0.03	0.53	0.92	0.69	0.02	0.52	0.95
Zhoushan	Zhejiang	NEC	0.50	0.03	0.34	0.82	0.64	0.04	0.42	0.93	0.55	0.03	0.38	0.92
Fuzhou	Jiangxi	NEC	0.75	0.02	0.65	0.88	0.83	0.03	0.59	0.96	1.00	0.03	0.65	1.24
Ganzhou	Jiangxi	NEC	1.22	0.02	1.06	1.32	1.29	0.04	1.09	1.53	1.26	0.02	1.11	1.57
Ji'an	Jiangxi	NEC	0.69	0.02	0.52	0.82	0.89	0.02	0.75	1.05	0.90	0.02	0.70	1.18
Jingdezhen	Jiangxi	NEC	0.59	0.02	0.41	0.75	0.75	0.04	0.52	1.09	0.62	0.01	0.46	0.83
Jiujiang	Jiangxi	NEC	0.61	0.02	0.40	0.82	0.69	0.03	0.48	0.86	0.65	0.01	0.56	0.79
Nanchang	Jiangxi	NEC	0.81	0.02	0.69	1.00	0.89	0.04	0.67	1.06	0.69	0.02	0.51	0.89
Pingxiang	Jiangxi	NEC	0.60	0.04	0.40	1.10	0.95	0.07	0.58	1.76	0.77	0.03	0.55	1.04
Shangrao	Jiangxi	NEC	0.49	0.04	0.31	0.74	0.48	0.04	0.33	0.81	0.39	0.02	0.31	0.69
Xinyu	Jiangxi	NEC	1.38	0.05	1.01	1.96	1.36	0.05	1.07	1.67	1.27	0.02	1.10	1.71
Yichun	Jiangxi	NEC	0.87	0.03	0.62	1.08	0.94	0.03	0.67	1.13	0.86	0.02	0.66	1.06
Yingtan	Jiangxi	NEC	0.55	0.02	0.41	0.73	0.70	0.02	0.60	0.81	0.70	0.02	0.48	0.89
Changsha	Hunan	NEC	0.64	0.02	0.53	0.78	0.82	0.03	0.63	1.02	0.80	0.02	0.60	1.00
Changde	Hunan	NEC	1.15	0.05	0.60	1.52	1.16	0.04	0.87	1.42	1.26	0.04	0.91	1.75
Chenzhou	Hunan	NEC	0.82	0.04	0.54	1.18	1.10	0.05	0.86	1.44	1.08	0.03	0.79	1.41
Huaihua	Hunan	NEC	1.33	0.03	1.08	1.54	1.36	0.03	1.05	1.54	1.19	0.03	0.94	1.55
Loudi	Hunan	NEC	1.20	0.08	0.65	1.75	1.76	0.05	1.49	2.09	1.28	0.05	0.70	1.61
Xiangtan	Hunan	NEC	1.01	0.03	0.72	1.18	1.06	0.04	0.80	1.31	0.96	0.03	0.73	1.24
Yiyang	Hunan	NEC	0.53	0.05	0.24	0.90	0.85	0.03	0.65	1.06	0.89	0.02	0.66	1.06
Yongzhou	Hunan	NEC	0.46	0.02	0.33	0.62	0.63	0.03	0.37	0.74	0.67	0.03	0.36	0.96
Zhangjiajie	Hunan	NEC	1.23	0.05	0.76	1.58	1.58	0.06	1.27	2.02	1.88	0.08	1.11	2.55

Zhuzhou	Hunan	NEC	0.60	0.03	0.45	0.79	0.85	0.04	0.62	1.10	0.76	0.02	0.56	1.00
Dongguan	Guangdong	NEC	0.68	0.02	0.55	0.95	0.82	0.01	0.72	0.94	0.72	0.02	0.59	1.02
Foshan	Guangdong	NEC	0.75	0.02	0.63	0.96	0.86	0.02	0.72	1.00	0.86	0.02	0.65	1.07
Guangzhou	Guangdong	NEC	0.83	0.02	0.62	0.98	0.90	0.02	0.75	0.98	0.88	0.02	0.66	1.04
Heyuan	Guangdong	NEC	0.77	0.02	0.56	0.94	0.83	0.01	0.77	0.93	0.93	0.02	0.76	1.13
Huizhou	Guangdong	NEC	0.72	0.02	0.60	0.86	0.78	0.03	0.62	0.97	0.56	0.02	0.42	0.77
Jiangmen	Guangdong	NEC	0.78	0.02	0.62	0.98	0.99	0.04	0.80	1.26	0.89	0.03	0.66	1.13
Maoming	Guangdong	NEC	0.79	0.02	0.67	0.96	0.93	0.04	0.73	1.18	0.77	0.02	0.55	1.03
Meizhou	Guangdong	NEC	0.72	0.02	0.58	0.91	0.88	0.01	0.79	0.97	1.00	0.02	0.79	1.17
Qingyuan	Guangdong	NEC	0.87	0.03	0.60	1.11	0.93	0.02	0.83	1.07	0.96	0.02	0.75	1.29
Shantou	Guangdong	NEC	0.85	0.03	0.67	1.15	0.86	0.02	0.74	1.09	0.85	0.02	0.68	1.24
Shaoguan	Guangdong	NEC	0.89	0.02	0.73	1.00	0.81	0.03	0.61	0.97	1.04	0.03	0.86	1.32
Shenzhen	Guangdong	NEC	0.83	0.02	0.69	0.95	0.82	0.03	0.67	1.01	0.76	0.02	0.62	0.96
Zhujiang	Guangdong	NEC	0.74	0.03	0.44	0.90	0.70	0.02	0.55	0.84	0.71	0.02	0.57	0.94
Zhaoqing	Guangdong	NEC	0.62	0.02	0.50	0.81	0.84	0.04	0.55	1.11	0.87	0.02	0.66	1.18
Zhongshan	Guangdong	NEC	0.88	0.03	0.59	1.11	1.00	0.07	0.59	1.28	0.87	0.03	0.56	1.20
Zhuhai	Guangdong	NEC	0.72	0.02	0.53	0.87	0.83	0.04	0.60	1.00	0.74	0.02	0.56	0.99
Fuzhou	Fujian	NEC	0.57	0.02	0.43	0.80	0.62	0.03	0.41	0.79	0.69	0.02	0.50	1.06
Longyan	Fujian	NEC	0.68	0.02	0.47	0.84	0.71	0.03	0.54	0.88	0.85	0.02	0.65	1.14
Nanping	Fujian	NEC	0.78	0.02	0.60	0.92	0.77	0.01	0.67	0.84	0.81	0.02	0.67	1.02
Ningde	Fujian	NEC	0.65	0.04	0.27	1.08	0.60	0.05	0.34	0.85	0.70	0.03	0.49	1.22
Putian	Fujian	NEC	0.63	0.03	0.46	0.97	0.59	0.03	0.38	0.75	0.61	0.03	0.38	1.01
Quanzhou	Fujian	NEC	0.55	0.02	0.36	0.70	0.59	0.02	0.44	0.72	0.59	0.02	0.43	0.95
Sanming	Fujian	NEC	1.17	0.05	0.82	1.46	1.04	0.06	0.74	1.41	1.09	0.04	0.80	1.52
Xiamen	Fujian	NEC	0.44	0.02	0.31	0.64	0.56	0.03	0.33	0.72	0.60	0.02	0.45	0.80
Zhangzhou	Fujian	NEC	0.55	0.02	0.37	0.71	0.57	0.02	0.45	0.64	0.60	0.02	0.44	0.85

Haikou	Hainan	NEC	0.52	0.02	0.35	0.72	0.63	0.03	0.48	0.79	0.58	0.02	0.40	0.87
Sanya	Hainan	NEC	0.57	0.02	0.44	0.75	0.64	0.04	0.46	0.89	0.71	0.02	0.59	0.88
Chongqing	Municipality	NEC	0.84	0.04	0.57	1.12	1.11	0.03	0.86	1.28	1.11	0.02	0.77	1.35
Bazhong	Sichuan	NEC	0.67	0.02	0.55	0.79	0.82	0.02	0.64	0.93	0.81	0.02	0.56	1.02
Chengdu	Sichuan	NEC	0.84	0.03	0.52	1.06	1.07	0.05	0.79	1.44	0.96	0.03	0.77	1.32
Dazhou	Sichuan	NEC	0.66	0.05	0.40	1.06	0.96	0.05	0.60	1.23	0.82	0.03	0.52	1.18
Deyang	Sichuan	NEC	0.90	0.03	0.67	1.08	1.24	0.04	0.94	1.51	0.90	0.03	0.66	1.26
Guangyuan	Sichuan	NEC	0.26	0.01	0.18	0.37	0.37	0.02	0.26	0.45	0.43	0.01	0.28	0.59
Leshan	Sichuan	NEC	0.81	0.03	0.64	1.03	1.03	0.06	0.70	1.45	0.92	0.02	0.71	1.37
Luzhou	Sichuan	NEC	0.52	0.03	0.32	0.82	0.66	0.03	0.42	0.90	0.47	0.03	0.18	0.83
Meishan	Sichuan	NEC	0.46	0.02	0.29	0.63	0.67	0.03	0.43	0.90	0.55	0.03	0.34	0.92
Mianyang	Sichuan	NEC	0.80	0.03	0.60	1.00	0.90	0.03	0.73	1.12	0.79	0.02	0.57	0.99
Nanchong	Sichuan	NEC	0.64	0.03	0.48	0.92	0.73	0.02	0.59	0.88	0.61	0.02	0.44	0.81
Panzhihua	Sichuan	NEC	1.43	0.05	1.12	1.83	1.47	0.06	1.13	1.93	1.34	0.03	1.02	1.67
Suining	Sichuan	NEC	0.82	0.02	0.69	1.02	0.78	0.02	0.69	0.91	0.92	0.02	0.80	1.17
Ya'an	Sichuan	NEC	0.65	0.03	0.50	0.98	0.74	0.02	0.56	0.89	0.77	0.03	0.53	1.04
Ziyang	Sichuan	NEC	0.50	0.02	0.38	0.72	0.62	0.02	0.44	0.75	0.62	0.02	0.43	0.80
Zigong	Sichuan	NEC	0.51	0.04	0.29	0.85	0.78	0.04	0.52	1.07	0.68	0.03	0.37	0.90
Baoshan	Yunnan	NEC	0.71	0.02	0.59	0.94	0.88	0.04	0.67	1.16	0.61	0.04	0.27	1.03
Chuxiong	Yunnan	NEC	0.70	0.03	0.53	0.94	0.83	0.04	0.57	1.13	0.70	0.02	0.55	0.84
Dali	Yunnan	NEC	0.41	0.02	0.27	0.58	0.45	0.04	0.25	0.79	0.30	0.01	0.21	0.40
Dehong	Yunnan	NEC	0.49	0.02	0.35	0.67	0.63	0.02	0.53	0.75	0.66	0.02	0.41	0.86
Honghe	Yunnan	NEC	0.46	0.04	0.28	0.95	0.54	0.05	0.31	0.86	0.46	0.02	0.29	0.79
Kunming	Yunnan	NEC	0.77	0.04	0.47	1.05	0.85	0.03	0.64	1.04	0.84	0.03	0.65	1.19
Lijiang	Yunnan	NEC	0.98	0.03	0.71	1.17	0.84	0.02	0.72	0.97	0.75	0.03	0.41	1.07
Lincang	Yunnan	NEC	0.30	0.04	0.11	0.91	0.49	0.02	0.36	0.63	0.58	0.03	0.39	1.12

Nujiang	Yunnan	NEC	0.62	0.04	0.30	0.95	0.54	0.02	0.43	0.66	0.64	0.02	0.44	0.77
Qujing	Yunnan	NEC	0.76	0.03	0.56	1.10	1.06	0.04	0.81	1.38	0.92	0.03	0.62	1.22
Wenshan	Yunnan	NEC	0.57	0.02	0.40	0.82	0.58	0.02	0.49	0.73	0.50	0.02	0.31	0.63
Xishuangbanna	Yunnan	NEC	0.59	0.02	0.47	0.82	0.64	0.02	0.54	0.79	0.64	0.02	0.47	0.79
Tuxi	Yunnan	NEC	0.97	0.07	0.68	1.97	1.29	0.06	0.99	1.70	1.12	0.06	0.80	1.99
Zhaotong	Yunnan	NEC	0.71	0.04	0.40	1.08	0.98	0.04	0.74	1.23	0.96	0.04	0.60	1.35
Anshun	Guizhou	NEC	0.31	0.02	0.20	0.47	0.49	0.03	0.37	0.70	0.41	0.02	0.23	0.69
Bijie	Guizhou	NEC	0.80	0.05	0.45	1.21	1.10	0.05	0.77	1.42	0.91	0.03	0.61	1.19
Guiyang	Guizhou	NEC	0.53	0.02	0.39	0.73	0.71	0.02	0.63	0.89	0.62	0.02	0.41	0.84
Liupanshui	Guizhou	NEC	0.46	0.06	0.14	1.30	0.61	0.04	0.41	0.98	0.52	0.03	0.29	0.85
Tongren	Guizhou	NEC	0.48	0.02	0.33	0.68	0.67	0.01	0.60	0.72	0.51	0.02	0.20	0.73
Zunyi	Guizhou	NEC	0.63	0.02	0.50	0.80	0.80	0.03	0.56	1.00	0.84	0.02	0.54	1.11
Baise	Guangxi	NEC	1.00	0.03	0.75	1.20	0.48	0.03	0.31	0.78	0.60	0.02	0.37	0.88
Beihai	Guangxi	NEC	0.81	0.03	0.63	0.99	1.08	0.03	0.87	1.25	1.04	0.02	0.85	1.23
Chongzuo	Guangxi	NEC	0.76	0.02	0.62	0.93	0.87	0.03	0.68	1.04	0.90	0.03	0.67	1.15
Fangchenggang	Guangxi	NEC	0.65	0.01	0.60	0.72	0.85	0.03	0.65	1.03	0.77	0.03	0.48	1.13
Guigang	Guangxi	NEC	0.79	0.02	0.65	1.03	0.92	0.04	0.66	1.21	1.00	0.03	0.73	1.47
Guilin	Guangxi	NEC	0.77	0.01	0.68	0.85	0.83	0.02	0.69	0.99	1.04	0.02	0.83	1.25
Hechi	Guangxi	NEC	1.10	0.05	0.76	1.60	1.09	0.06	0.71	1.50	1.19	0.06	0.65	2.18
Hezhou	Guangxi	NEC	1.06	0.09	0.60	2.33	0.84	0.04	0.43	1.09	0.94	0.05	0.56	1.32
Laibin	Guangxi	NEC	0.82	0.02	0.65	0.98	0.94	0.04	0.76	1.17	0.93	0.03	0.67	1.24
Liuzhou	Guangxi	NEC	0.91	0.02	0.77	1.11	0.98	0.03	0.75	1.15	1.02	0.03	0.73	1.36
Nanning	Guangxi	NEC	0.77	0.02	0.58	0.96	0.89	0.03	0.71	1.02	0.92	0.02	0.73	1.13
Qinzhou	Guangxi	NEC	1.16	0.04	0.87	1.57	1.11	0.03	0.90	1.39	1.01	0.02	0.75	1.22
Wuzhou	Guangxi	NEC	0.75	0.02	0.66	0.94	0.88	0.06	0.63	1.33	0.94	0.03	0.71	1.26
Yulin	Guangxi	NEC	0.90	0.04	0.61	1.23	0.76	0.02	0.57	0.89	0.98	0.03	0.76	1.29

Golog	Qinghai	NEC	0.55	0.01	0.42	0.63	0.64	0.03	0.47	0.92	0.78	0.08	0.44	1.89
Haidong	Qinghai	NEC	0.82	0.04	0.56	1.22	0.90	0.04	0.66	1.15	0.93	0.04	0.63	1.51
Xining	Qinghai	NEC	1.08	0.04	0.82	1.54	1.09	0.05	0.80	1.46	1.16	0.05	0.80	1.82
Ali	Tibet	NEC	0.35	0.01	0.23	0.42	0.20	0.03	0.13	0.63	0.33	0.02	0.20	0.57
Qamdo	Tibet	NEC	0.80	0.03	0.53	1.03	1.13	0.03	0.92	1.31	1.39	0.05	0.95	2.15
Lhasa	Tibet	NEC	0.57	0.01	0.46	0.68	0.50	0.02	0.41	0.61	0.64	0.02	0.44	0.77
Nyingchi	Tibet	NEC	0.41	0.01	0.34	0.50	0.44	0.01	0.39	0.53	0.47	0.02	0.32	0.61
Naqu	Tibet	NEC	0.96	0.04	0.60	1.22	1.41	0.02	1.30	1.56	1.20	0.05	0.76	1.76
Shigatse	Tibet	NEC	0.40	0.02	0.27	0.55	0.34	0.01	0.29	0.41	0.38	0.01	0.23	0.51
Lhoka	Tibet	NEC	0.48	0.02	0.31	0.66	0.64	0.02	0.49	0.76	0.40	0.03	0.27	0.86

[a] EC and NEC denote emission control and non-emission control regions, respectively, of which the latter means regions without implementation of emission control measures.

[b] The pre-Parade Blue, Parade Blue, and post-Parade Blue periods indicate the periods of 1-19 August, 20 August-3 September, and 4-30 September 2015, respectively.