General Comments:

Overall, this study applied the observational data and air quality model to study how emission control can improve the air quality in Zhengzhou. I think it can be published after the authors address and fix some issues.

Response: Thank you for your careful reading of our paper and the valuable comments and constructive suggestions. Below are the point-to-point responses to all the comments (The comments are marked in black font and the responses are marked in dark blue font). The major changes that have been made according to these responses were marked in yellow color in the highlighted copy of the revised manuscript. And our own minor changes were marked in red font. Note that the following line numbers are shown in the corrected version.

Specific Comments:

1. "ppbv" and "$\mu g/m^3$" are both used in the manuscript, it is better to use the consistent unit either "ppbv" or "$\mu g/m^3$."

   Response: Thank you for your suggestions. The units have been homogenized into ug/cm^3. For the record, some thresholds are obtained by referring to previous references, and their units are fixed. Therefore, when studying the specific ratios (*i/n*-pentane, T/B and VOCs/NOx), the unit used in this paper is still ppbv rather than ug/cm^3.

2. Line 249-251: "The highest hourly…respectively." Please confirm that the max hourly NOx is 357 $\mu g/m3$ and the VOC concentration is 238ppb during the pre-NMG, and explain when they happened because I didn't see the NOx concentration is higher than 357 $\mu g/m3$, and the VOC concentration is not higher than 120 ppbv in Figure 1.

Response: Sorry for the misunderstanding. The max hourly NOx has been confirmed, and NOx concentration is the sum of NO and NO_2. As for VOC concentration in Fig.1, the Y-axis was wrong and has been corrected. It should be noted that the VOC

concentration in Figure 1 has been updated from ppbv to μg/m^3.
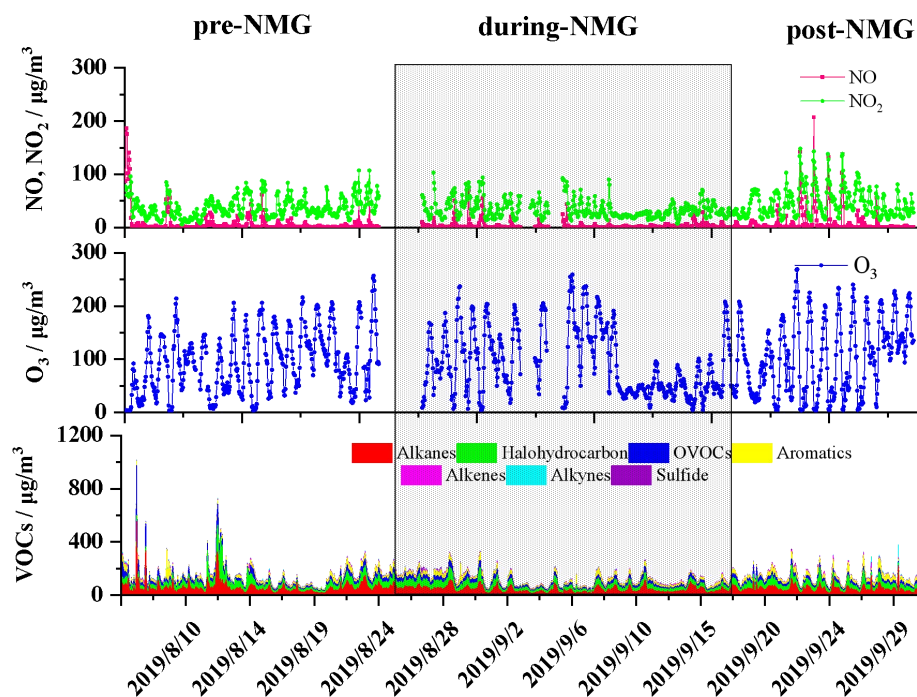
Fig. 1 Time series of VOCs and trace gases during the sampling period in Zhengzhou.

3. Line 254-255, "the O3 precursor concentrations decreased significantly…NOx", It is hard to identify the NOx and VOC time series data change significantly; the T-test or box plots can be used to explain they are different.

Response: Thanks for your suggestions. The box plots have been used to explain the difference in the O$_3$ precursor concentrations. During the control period, the mean concentrations of VOCs and NOx were reduced by about 19% and 11%, therefore, the description of Line 254-255 has been corrected to "the O$_3$ precursor concentrations showed a decreasing trend".
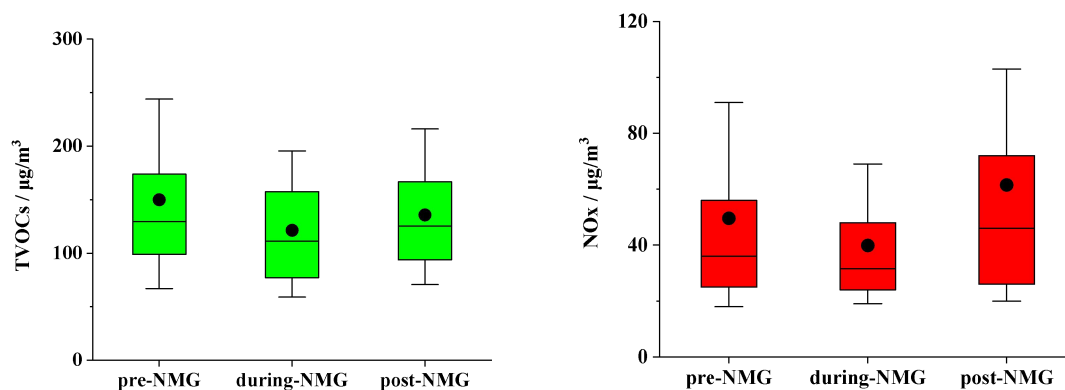
Fig. S4 The box plots for NOx and TVOCs in Zhengzhou during the three periods.

4. Line 257 "levelsaccounted," typo.

Response: Sorry for the mistake. We have corrected it. (L 262)

5. Why 2019/08/26-2019/09/08 have high ozone and NOx, but in the same NMG period 2019/09/10-2019/09/15, ozone and NOx level decrease a lot??

Response: During the pre-NMG period, NOx emission intensity is high due to the lack of control. Combined with appropriate meteorological conditions, O_3 concentration is high.

During the NMG period, emission reduction leads to lower NOx concentration, and more rainfall leads to lower mean concentrations of NOx and O_3.

6. Line 308, "As illustrated in Fig. 2", I think it is Fig. 1. Typo.

Response: Sorry for the mistake. We have corrected it. (L 314)

7. In Table1, the total VOC concentration or sum of the top 20 VOCs can be presented in the bottom row.

Response: Thanks for your suggestions. The sum of the top 20 VOCs has been presented in the bottom row. And the units ($\mu g/cm^3$) have been homogenized.

8. Line 331, why discuss isoprene here? The isoprene is not in the top 20 VOCs.

Response: Considering that isoprene is a typical biogenic tracer, its characteristics

need to be investigated. However, the isoprene is not in the top 20 VOCs. Therefore, the description of isoprene has been removed.

9. Line 367, why the chloromethane continually increases a lot?

Response: Fig. S11 shows the hotspots diagram of Zhengzhou and its surrounding areas during the observation period, and the number of fire spots in September was significantly higher than that in August. And chloromethane is a tracer of biomass burning. Therefore, the chloromethane continually increases a lot during the control period.

10. Figure 4. In the x-axis "m," typo.

Response: Sorry for the mistake. We have corrected it. (Figure 4)

11. Figure 5, the time series plot is hard to compare the data pattern in those three periods; the box plot or range plot for each period may be a better way to present.

Response: Thanks for your suggestions. The box plots have been supplemented.
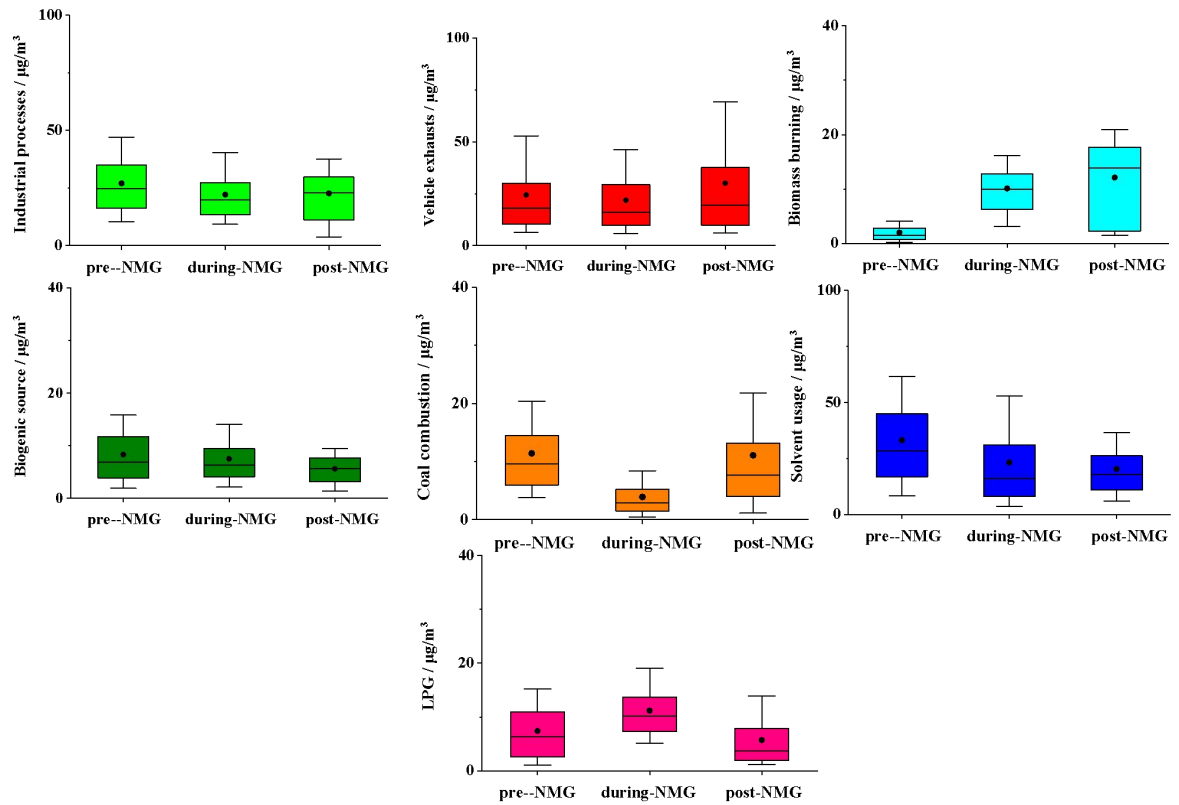
Fig. S10 The box plots for each identified source during the three periods.

12. Figure 8, the three panels are not the same size.

Response: Thanks for your suggestions. We have corrected it. (Figure 8)

13. Table list, Table 2 OFP contributions ("$\mu g/cm^3$"), please confirm it is correct. Please confirm all units are consistent.

Response: Table 2 OFP contributions ("$\mu g/cm^3$") has been confirmed, and all units have been consistent.

14. Figure S10 should provide the data in the support document.

Response: As shown in Table S6, the data has been provided in the support document.

Table S6 The concentrations of VOCs groups to the total OFP

	Alkanes	Alkenes	Aromatics	Halohydrocarbons	OVOCs	Sulfide	Alkyne
pre-NMG	48.5	30.5	98.7	2.8	56.2	0.1	2.9
during-NMG	36	21.9	91.2	2.8	30	0.2	1.3
post-NMG	41.5	21.4	124.6	3.5	27.7	0.2	2.7

15. Line 510 "However…..ozone", following this sentence, the following section should connect with ozone sensitivity study, but the next section is "3.4.2 Risk assessment of individual VOC species". This may confuse the readers.

Response: Sorry for the misunderstanding. In subsection 3.4, the atmospheric environmental implications of VOCs were discussed by calculating the values of OFP and risk assessment. We have interchanged the order of 3.4.1 and 3.4.2 to ensure logical consistency.

16. Line 565-568, should be in the method section.

Response: Thanks for your suggestions. We have corrected it.