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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Scattered coal is the largest source of ambient volatile organic compounds during the heating season in Beijing" *by* Yuqi Shi et al.

Anonymous Referee #1

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General comments

Shi et al. present VOC mixing ratios recorded in Beijing. Using positive matrix factorisation they identify coal burning as the largest contributor to VOC emissions prior to emissions controls being imposed. A decrease in scattered coal burning was a major factor in the observed decrease in VOC emissions and therefore secondary organic aerosol formation potential after controls were imposed. The impact of emission controls on air quality are currently of great interest. I recommend publication once the specific comments outlined below have been addressed.

Specific comments

The winter haze in Beijing is often driven by meteorology (e.g. Jia et al., 2008). Given the two month measurement period I would not expect this to have a great effect but a short discussion of the meteorology in each measurement period would demonstrate that the drop in mixing ratio observed in the control period was not caused by different meteorological conditions.

The authors report "total VOC", when referring to sum measured VOC. When this term is first used some discussion of the limitations of the measurement technique and which VOC species may not be included here is required (e.g. methanol and ethanol).

"Mixing ratio" and "concentration" are used interchangeably throughout (e.g. lines 226 and 229). Where referring to values in ppb "mixing ratio" should be used.

Line 2: Define "heating season" in the abstract

Line 85: Figure S1 does not do much to allow the reader to learn more about the site location. I suggest zooming in further on the right hand image and adding details to the map.

Line 91: Describe the "rigorous" QA and QC procedures applied

Line 102: What was the signal to noise threshold for the compounds not included and why was this value chosen?

Line 106: By what criteria were VOCs categorised as "bad"

Line 113: Systematic literature reviews generally follow a clearly defined protocol. I suggest defining the criteria used in the review or deleting "systematic"

Line 129: When stating "Many studies" please provide citations

Line 202: Add citation for the reduction of civil SC in Beijing exceeding 2 million tons or describe where this figure is from.

Figs 1 and 2: Where are these data from?

Line 214: Define “designed size enterprise”

Fig 2: Does the industrial added value refer to just the designed size enterprises and high pollution enterprises or is this a Beijing total?

Section 3.2. A discussion of the VOC mixing ratios recorded in this study at the start of this section would provide context for the % reductions reported. Without knowing how high mixing ratios were it’s hard for the reader to interpret the % reductions. This could be achieved by adding mixing ratios to table 1.

Fig 3. See earlier comment, which VOCs are included in this figure? If reporting pbb suggest changing the “concentration” to “mixing ratio” in the caption

Fig 4: Add names and citations for previous studies shown.

Minor comments:

Line 62: Suggesting changing “400$\times$104” to “4$\times$106”

Figure S4: Label figure to show control and non-control periods (i.e. which is top and which is bottom).

Lines 204 – 207: This sentence isn’t very clear, suggest rewording

Line 212: Suggest changing “part” to “number”

Line 251: “top 20 most decreased VOC species” is a slightly confusing term. This term is used throughout this section. I suggest changing to “the 20 VOC species which declined the most following emissions controls”.

Line 252: Suggest adding “mixing ratios of the” after “period,”

References

Jia Y.T., Rahn K.A., He K.B., Wen T.X., and Wang Y.S.: A novel technique for quantifying the regional component of urban aerosol solely from its sawtooth cycles, Journal of Geophysical Research-Atmospheres, 113, D21309, 2008.

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