

Interactive comment on “Trends of non-methane hydrocarbons (NMHC) emissions in Beijing during 2002–2013” by M. Wang et al.

Anonymous Referee #1

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This is a useful paper to refine knowledge about VOC emissions in China. Bottom-up emission inventories have had difficulty assembling data for VOC, due to lack of knowledge about the many individual source components of VOC in China (see, e.g., Klimont et al., 2002). This paper circumvents that difficulty by relying on observations of NMHC and their trends, and using PMF to connect back to sources. The priorities of some important source types are changed as a result of this work. The methodology seems sound and I recommend the paper be published after attending to some details.

(1) It is clear that industry is an important source of NMHC. In fact it is the second largest source, according to Figure 1. Yet there is no mention of this source category in the analysis. Because it is so large (and potentially increasing according to Figure 1), there is the possibility of confounding the PMF analysis, if some of the same NMHC

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species are emitted from industry as from, say, vehicles or paints. Industrial sources of NMHC need to be discussed in the text at minimum. If no analysis can be included for them, then at least the paper should reassure the reader that industrial sources cannot compromise the analysis performed here. (2) It seems to me that the paper should discuss the implications of the fact that there is only one monitoring location. This is worrying, as it will only give a representation of NMHCs in the source configuration relative to that site. Can the authors say a little more about the site itself and its proximity to highways, factories, etc.? Is this important?—do we expect spatial differences in NMHC around the city? What would be the implication for the results of having two or several monitoring sites around the city? (3) Point 4 on Page 19012 is interesting. I can understand that this is not an air modeling study, but it might be of value to discuss trends in summertime ozone or even summertime high temperatures. Does this explain any of the deviations from year-to-year in reactive species or the sources that emit the most reactive species? It is also implied that there might have been a systematic trend in the oxidizing capacity of the Beijing atmosphere. That would definitely skew the trend of reactive species. I think this issue is worthy of further discussion or presentation of other trends, even if no atmospheric modeling can be done. (4) I understand the point that tightening of emission standards has driven down VOC emissions from vehicles, but this presumably only applies to newly purchased vehicles. Please say something about the persistence of older vehicles in Beijing and the (nighttime?) influx of poorly controlled vehicles from outside the city. Minor points: • Too much use of the word “obvious” in describing trends. The reader can judge for him/herself how clear the trends are. • Page 19000, first line: “It is a challenge to obtain. . .” • Page 19000, line 12, I think it should be “2000 to 2007.” • In a couple of places, not “to preliminary investigate.” Preliminary is an adjective. Either say “to first investigate” or “to preliminarily investigate” (the first option is best).