

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

### **Anonymous Referee #2**

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Using NMHC data taken during selected time frames in summertimes of the years 2002–2013 the authors infer decreasing trends of NMHC emissions in Beijing which contrasts the assumptions made in the emission inventory. Overall, this paper is well written and shows some valuable material and associated discussion. It also mentions various limitations of this study. After addressing the issues lined out below I would recommend the publication of this manuscript in ACP.

Major issues:

1) Figure 3 suggests that at least in 2003, 2004, 2005, 2006 and 2007 NMHC concentrations were different at two different sites in Beijing. How representative is PKU for entire Beijing for the entire timeframe 2002–2013?

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2) For some years the MEIC database has monthly emissions available. I think for those years the authors should compare their specific summertime data with the corresponding months in the inventory.

3) On page 19004, line 25, the authors mention that "During the summer main source of acetylene and alkenes emissions is vehicle exhaust". The authors should point out what other seasons changes in emissions pattern might occur in Beijing, like the use of different fuel. What would be the seasonal variation of NMHC evaporation processes?

4) Page 19012, section 4, lines 3–8: The authors could provide upper and lower ranges for their estimates in their paper. In particular the authors could differentiate among day- and nighttime data.

5) The findings shown in Figure 10 are not easy to compare with inventory data shown in Figure 2.

Other comments:

Page 18998, line 6: Would suggest to replace "...during summers..." by "...during selected summer periods".

Page 18998, lines 9–10: Would suggest to use the same time periods concerning the NMHC growth rates.

Page 19001, lines 21–22: The first sentence refers to C5–C8 NMHCs, while the second sentence refers to C4–12 NMHCs. This looks inconsistent.

Page 19003, line 1: Would suggest to replace "The 9 year measurement data..." by "The data obtained in selected summer periods over 9 years....".

Page 19004, line 19–23: I would suggest to remove the July/August 2008 data from Figure 10 as it may be biased.

Page 19006, section 3.2.3: Benzene, toluene, ethylbenzene and xylenes are also known to be emitted by traffic. How do the authors account for that?

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Page 19007, lines 12-19: I think this discussion is not very helpful as I doubt that an increase of northern hemispheric NMHC levels would be relevant to the Beijing case. The increase of background ethane of about 50 pptv from 2006-2010 will hardly be detected in Beijing.

Page 19007, lines 25-26: This is a very vague statement. I assume this could be supported by inventory data. Is transportation an important emission source for ethane and propane in Beijing?

Page 19011, line 2: "long-term" needs to be removed, as these measurements only covered a few weeks during summertime of each year.

Page 19011, lines 23-27: I am not sure, if a any statement about a potential decrease of NMHCs can be made as this interpretation is only determined by one measurement period taken at the end of this decade and any supporting data in between 2002 and 2012 are not available. The only statement which can be made is that the 2012 NMHC data shows lower values than in 2001 and 2002.

Figures 1, 4, 5, 6, 7, 8, 9: Scales and legends are hard to read. Would suggest to use larger fonts.

Figures 3, 4, 5, 6, 7, 9, 10, 11 : The way these figures are presented they suggest that data was obtained throughout the entire year. All these figures and the figure captions should indicate that a selected time frame in the summer is shown.

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