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Discussions

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Interactive comment on "Source apportionment of NMVOCs in the Kathmandu Valley during the SusKat-ABC international field campaign using positive matrix factorization" *by* Chinmoy Sarkar et al.

Anonymous Referee #2

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General comment:

The manuscript shows results of a source apportionment study of NMVOCs measured by PTR-TOF-MS in the Kathmandu Valley in Nepal during winter 2013. Positive matrix factorization analysis was conducted to identify possible emission sources for 37 m/z measured by PTR-MS. The sources were identified from the chemical fingerprint of each PMF factor and their diurnal profiles. Conditional probability functions plots were used to determine the directions of the sources and attribute the chemical emissions to specific spatial areas in the region and specific activities. The sources found by

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Discussion paper

the authors through PMF were compared with the results of current emission inventories used for Nepal, which, in contrast to the authors results, rely on sources emission factors measured in other regions of the world and are not supported by in-situ collected measurements. Sources and species contributions differ among the authors results and the current inventories as well as between different inventories. Finally, the atmospheric impact as daytime ozone production and SOA formation based on the measured compounds and PMF sources contributions is briefly discussed. I found the manuscript very interesting, of high quality and of high impact as it presents several new findings which can help mitigating the emissions in the region under study. The presented topic also follows in the scope of ACP. The article is overall well written, and results are presented clearly with figures and tables. I highly recommend the manuscript publication, once these specific comments have been addressed:

Specific comments:

-It is a bit confusing how the methods section is presented. There should be a small section introducing the measurement site, the PTR-MS data used, and the grab samples, before any PMF discussion. This would be helpful to follow better section 2.2 and support the nudging tool. Could you list the m/z from PTR-MS you used for implementing the PMF and why? Could you also provide some references of the nudging procedure?

-PTR-TOF-MS usually provides an unambiguous identification of chemical species, however, it would be interesting to know briefly, the operational settings of PTR-MS, which m/z were selected for running the PMF and how the m/z were attributed to the chemical compounds. Were the grab samples measured with the same PTR-MS? Could you provide some information about these data: m/z selected and how the compounds were identified. Line 331, could you provide the standard deviation for the signal stability?

-It would be interesting to provide some details about the calculations for ozone and

SOA formation, you could do this with a short section in the methods after section 2.4.

-Figure 2. The contribution of propyne compared to isoprene for the biogenic factor is quite high, can you comment it?

-Figure 3. How do you explain the higher background and general higher peaks during the first part of the campaign? L. 370: Could you provide more information about isoprene emission from traffic? Could you have any interference on the PTR-MS m/z attributed to isoprene?

-Could be there a connection between oxidation products of traffic emission and the unresolved industrial emissions, as for mixed daytime emissions as oxidation products from biogenic emissions?

-Why biogenic emissions are higher during the first part of the campaign? Were temperature and solar radiation also higher for this part of the campaign?

-Section 3.2 would be easier to follow with a map of the measurement site and mentioned cities, industrial areas and forests.

-Section 3.3, The differences between the current inventories used in Nepal are briefly mentioned in the text, however, it would be interesting to write a few lines at the beginning of this section to introduce the inventories and on which data and assumptions they are based on. Is EDGAR v4.2 also considered for the winter season?

- Lines 786-808, Did you compare your NMVOCs data with the wind directions? How was the wind direction affecting the sources emissions captured at the measurements site?

-Line 815 and 840, please give the equations used for O3 and SOA formation with respective references. It is not easy to understand figure 18 without any specification on the compounds used for each pie chart. Were the measured data used for pie b) the same data sets used to run the PMF?

-Line 828-832, much information is provided, please rephrase the period. Conclusions: Please include a short summary of the main findings here.

Technical comments: -Some acronyms are not explained, or only explained once in the whole manuscript. Could you also provide the extended form of all acronyms used for tables and figures in their captions?

-L. 698, ca. 30%.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-1139, 2017.