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Interactive comment on "Benzene and Toluene in the surface air of North Eurasia from TROICA-12 campaign along the Trans-Siberian railway" *by* Andrey I. Skorokhod et al.

Anonymous Referee #1

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General The manuscript of "Benzene and Toluene in the surface air of North Eurasia from TROICA-12 campaign along the Trans-Siberian railway" by Skorokhod et al. presented benzene and toluene levels measured by PTR-MS on a mobile laboratory aboard the Trans-Siberian train. In the manuscript the sources of benzene and toluene along the Trans-Siberian railway were investigated mainly using the T/B ratios, and propene-equivalents and OFPs were also discussed. As emission sources of benzene and toluene include not only motor vehicle exhaust and industry emission, but also biomass burning, coal burning and gasoline evaporation, the source attribution need consider contributions from sources other than vehicle exhaust and industry emission. For the comparisons of aromatics' ozone formation relative to isoprene in the rural and

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urban areas, it should be noted that aromatic hydrocarbons are quite different from isoprene in reactivity and atmospheric lifetimes, and in their source regions and emission patterns, therefore it is important to figure out new understandings and new findings other than somewhat common senses like larger contributions of benzene and toluene to ozone formations in the urban areas.

Details

1. Page 3, the authors should give more details about where the mobile laboratory was located, in the front of the train or in the end or elsewhere? How to eliminate the interferences from emission inside the train or human activities in the train? 2. Page 4, the calibration method and frequencies for measuring VOCs by PTR-MS and APHA-360 should be stated. 3. Page 8, lines 17 -20 were repeating lines 13-16. 4. Page 8, reference Karl et a., 2009 was not listed in the reference. 5. Page 8, section 3.2, as the benzene and toluene data were measured along the Trans-Siberian railway instead of at a fixed station, the discussions about diurnal variations of benzene and toluene should be careful. It is difficult to say whether emission sources, photochemistry or meteorological conditions had led to the variations. I'd like to suggest deleting this section. 6. Page 9, The correlations coefficients (R) between benzene, toluene, NMHC, CO, NOx, and SO2 were all less than 0.6, that means their R2 were all lower than 0.36. I don't think these can suggest the high or significant correlations between them. Section 3.3 should be rearranged. 7. Table 5 and Table 6, I think the authors wanted to list C7H8 (Toluene) instead of C5H8 (isoprene) as they discussed in section 3.3. 8. Figures 3a, 3b and 8 in the manuscripts are really hard to read. I suggest plotting them in a different way.

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