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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Multi-year (2004–2008) record of nonmethane hydrocarbons and halocarbons in New England: seasonal variations and regional sources" *by* R. S. Russo et al.

Anonymous Referee #2

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This paper presents a unique high resolution four-year record of high quality speciated VOC measurements collected at a New England location. These data are analyzed to yield useful seasonal, as well as long-term trend and emission information. The paper is in general well written, with clear, concise and adequate tables, figures and references. It is suitable for publication in ACP with minor revisions. The following details some suggestions for additions/clarification of certain points.

Page 1086 beginning line 3 "Previous research. . ." The authors may wish to make clear exactly what new data are presented here and what (if any) has been published previously.

There are many instances where LPG emissions are referred to in the text, but it seems that most (all?) of the references used for comparison of emission ratios for LBG comprise studies of LPG from cities outside the USA (Mexico City, Santiago and China – see eg Page 1099, line 10). Are there any data for LPG source emission ratios for New England? This would be very useful, particularly as "non-vehicular exhaust emissions such as residential use of natural gas or LPG" . . . are suggested to be "important sources of ethyne and benzene" (Page 1100, line 13-14). In the next paragraph, I am confused by the statement that the ethyne/benzene ratio at TF is consistent with measurements throughout the US, and if it is, what does this imply for LPG (etc) being "important sources" of regional ethyne and benzene? Moreover, I find the discussion of decreasing benzene/ethyne ratios is awkwardly worded – especially in light of the conclusion that there has been no change in the ratio, either observed or estimated. Do the authors mean that the reduction of benzene emissions observed in the mid-90s has now stabilized?

Going back to the impact of LPG on the TF measurements, the authors state that the propane emission rate is 1-2 orders of magnitude larger than the other NMHCs. (Page 1105, line 7. . .). These emission rates are again compared to those for Mexico City and Santiago, but not for other regions of the US. I am very interested in whether this high emission rate for propane is a local phenomenon (right around the TF site?), or is representative of S NH or S New England? Since it has already been stated that the TF site has been characterized as representative of the region (page 1086), some of these previous findings maybe could be outlined here to support this question for the TF site? It would also be interesting if the NEI comparison in section 5.2 included a comparison of the estimated and observed emissions for propane. Is this information available?

Section 5.2, Page 1106, paragraph 2, I suggest the authors clarify why +- 20% is "good" agreement for benzene, ethylbenzene and xylenes, while 20-30% is an "overestimate" for toluene. I recommend that the authors address emission uncertainties.

ACPD

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Later in this paragraph, the discussion of emissions from fireplaces and woodstoves being reduced by 70% in the NEI is awkwardly worded (to my mind). Do the authors mean to imply that wood and fireplace emissions actually were reduced from 2002 to 2005? (I do not think so.) And I assume that most VOC emissions from fireplaces and woodstoves are assumed to be in the form of ethyne? (since the other nonpoint emission estimates in Table 4 are not reduced nearly so much from 2002 to 2005). Please clarify this paragraph.

Page 1107, line 15 – Is the lower benzene/ethyne ratio for the 2002 NEI compared to the 1996 and 1999 NEI estimates a reflection of the trend reported by Parrish, or maybe a reflection of it? Please clarify how the NEI values are arrived at. Also reconciliation of the NEI comparison of the ethyne/benzene ratio in the context of the LPG source mentioned earlier would be useful.

Typos: Page 1096, line 15 “used” should be “use” Page 1100, line 6 should be “source of”

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 1083, 2010.