

Interactive comment on “Instrumentation and Measurement Strategy for the NOAA SENEX Aircraft Campaign as Part of the Southeast Atmosphere Study 2013” by C. Warneke et al.

Anonymous Referee #2

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This paper presents a detailed overview of experimental information connected with the SENEX aircraft campaign. It describes the aircraft itself, the instruments fitted for this campaign along with some inter-comparisons of duplicate measurements and some examples of initial results. It is a reasonably well written paper, presenting important information that will no doubt be used and cited in numerous other publications connected with the SENEX project. It seems ideally suited to AMT and I would recommend it for publication subject to the comments listed below.

Major comments: This is maybe one for the editor to decide but I was surprised to find all the detail on the instruments to be in the supplementary information. I realise moving it to the main text would make the paper considerably longer, however I found

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it quite difficult to follow, especially the section on instrument comparisons, without having the instrumental descriptions directly to hand in the main text.

Section 2: One thing I found obviously missing from any description is details of the inlets. The authors should explain how the air is sampled into the aircraft cabin and how does this differ from instrument to instrument? Also, has any characterisation work been carried out on the inlet systems, even if it is cited work from other sources? This is particularly important for the aerosol instrumentation and instruments measuring more reactive or ‘sticky’ compounds (e.g. reactive nitrogen compounds) and would no doubt be of interest to readers of the manuscript. Also for the gas phase measurements, the section on instrument comparisons would be strengthened by knowing that instruments had the same (or at least similar) inlets and losses were minimized. I realise some of this information is in the SI included in the information on individual instruments, however a summary of the inlets and maybe including the type of inlet in the instrument table would be beneficial.

Section 5, line 217: The authors talk about comparison between the iWAS/GCMS and PTR-MS VOC measurements and state that the PTR-MS data are averaged over an interval 10s before to 10s after the WAS sampling period. I do not really understand why they have done this. Surely averaging over the full WAS period would make more sense. In the PTR-MS instrumental description it is stated that it has a time resolution of 1s so I would have thought using, for example, the middle 5 s of the Was period would have been better. Could the authors further explain their reasoning here?

Section 5, line 270: Why are the organic nitrates derived from isoprene or monoterpene oxidation not measured by the total NO_y instrument? I would have thought that these compounds would also degrade to NO on the heated gold catalyst.

Section 6.3: why have the authors chose NO_y as a compound for the example comparison with the FLEXPART model. They state that the FLEXPART model does not contain any chemistry so surely a more specific and inert species such as CO or CO₂

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would provide a better initial comparison, as appose to something as complex as total reactive nitrogen.

Minor comments: Section 2: The authors should also mention the speed that the aircraft travels. This is an important factor, especially when considering the type of data the project is interested in (emissions using mass balance and eddy covariance calculations). Figure 8: change the colour scale of density Figure 9: Unit of isoprene emissions? Figure 11: Could a different (may logarithmic) colour scale be used for NO_y to show the features that are no doubt in the data flying over the city? Figure 12: Make the CO₂ colour scale font smaller so the individual numbers can be seen.

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