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Interactive comment on "Investigation of a potential HCHO measurement artifact from ISOPOOH" *by* Jason M. St. Clair et al.

Anonymous Referee #2

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General comments

ISOPOOH isomers have been identified to be the major oxidation products of photochemically induced isoprene degradation under low NOx conditions. ISOPOOH has been found to be prone to decomposition to carbonyl compounds on instrument surfaces. This paper discusses possible formaldehyde measurement artifacts caused by an ISOPOOH conversion for the ISAF HCHO measurement instrument. The influence of different sampling conditions (humidity, temperature, sampling line surfaces) were addressed. The manuscript is well written and the results are presented well. The experimental data are of high quality and the interpretation of the results is appropriate. The paper proofs the suitability of the ISAF instrument for HCHO measurements under the investigated conditions. It provides valuable findings for possible positive biases of formaldehyde measurements in isoprene rich environments and can be published

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Discussion paper

considering the following comments.

Specific comments

Page 4, lines 19 – 20 and figure S1: A possible ISOPOOH to HCHO conversion upstream of the instrument is inferred and corrected for. Figure S1: Shows an example of such a possible ISOPOOH to HCHO conversion and the respective corrected time series. The difference of the pre-corrected and post-corrected values of ISOPOOH and HCHO should reflect the conversion factor of ISOPOOH to HCHO. At t=0 the initial difference of ISOPOOH is approximately (10 – 8) ppb = 2 ppb (Figure S1 states pptv!!!) whereas the respective HCHO difference is (2.2 – 0.8) ppb = 1.5 ppb. How can this conversion factor (1.5 ppb/2 ppb) $\approx$ 0.75 be explained? Is this conversion factor dependent on the residence time within the sampling tube?

Page 5, line 30 and table 2: Uncertainties are provided for the conversion fraction. Please explain what this estimate is based on (Error of the fit parameter?).

Page 6, paragraph 3.4 and figure 3: More data is required for the conversion fraction with stainless steel at temperatures below 80°C to determine the applicability of stainless steel tubing for HCHO sampling under high ISOPOOH concentrations.

Page 7, last paragraph and figure 5: A long term HCHO from ISOPOOH conversion has been estimated for sampling conditions as observed during a flight campaign. The data used for that model has been measured during ascents and descents of the airplane over several kilometers altitude. Which influence on the long term ISOPOOH to HCHO conversion is expected from the respective pressure change in the sampling line?

Technical corrections

Supplement page 1, figure S1, bottom panel; the title of the y-axis states ISOPOOH (pptv); Change to ppbv.

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