Report #1:

Specific Suggestions:

Lines 95, 137 - Please specify type and pore size of the molecular sieve (e.g., 5 A pore size Zeolite molecular sieve)

> The suggested change is reflected in lines 136-138: “The system is equipped to sample from either DNPH (Supelco LpDNPH S10L), DR (Drierite, 8 mesh, >98% CaSO4, <2% CoCl2), or DR+MS (Sigma Aldrich molecular sieve, 3 A pore size zeolite beads to regularly monitor and correct the instrument’s baseline.”

Line 150 - Please specify how the Tofwerk zero air generator works. Is it a heated catalytic scrubber (temperature? Catalyst?), does it remove water vapor, etc.

> The referee’s comment has been incorporated in lines 151-152: “The ZA generator uses a platinum catalyst heated to 400 °C and requires a DR column as it does not remove water vapor.”

Line 150 - Ultra ZA - Please specify the purity of "Ultra ZA"

> We’ve included the manufacturer of the zero-air cylinder in the updated description. Product descriptions can be found on the manufacturer website.
>
> The description of the cylinder has been updated on lines 149-151: “Two trials were performed to quantify the impact of humidity on G2307 measurements. HCHO-free air was provided by either a zero-air (ZA) generator (Tofwerk) with DR column (trial 1) or an Airgas ultra zero grade cylinder (trial 2).”

Line 152 – “Milli-Q” is a brand that produces a range of water purities. Please specify the purity of water used (e.g., Type 1, 18.2 Mohm-cm resistivity, < 5 ppb TOC, etc.)

> The description of the high purity water used for the humidity-dependence calibration has been updated on lines 152-153: “A portion of the ZA stream was humidified by using a bubbler containing high purity water (Barnstead Genpure Pro,18.2 MOhm cm resistivity, <5 ppb total organic carbon).”

Line 153 - I'm assuming you mean volume mixing ratios when talking about H2O "concentrations" but you should probably specify this.

> We’ve specified units on lines 153-154: “The fraction of ZA humidified was varied using a mass flow controller such that the measured water vapor volume mixing ratios ranged from 0.05-1.7%.”

Line 184 - I believe you mean "therefore" instead of "therefor"

> This grammatical error has been updated on lines 185-186: “Data was further screened to exclude points where scrubbers were exhausted and therefore unreliable.”

Line 243 - Please specify how you come up with 10% uncertainty in ambient measurements. Given the +/- 10% uncertainty in the calibration gas (independent of precision, drift, etc.), it seems like the expanded uncertainty in ambient measurements should be larger than 10%.

> The relative uncertainty used for Picarro G2307 ambient measurements is expected to be dominated by the 10% uncertainty associated with our calibration standard and does not incorporate any additional terms related to precision or baseline corrections.

Line 355 - Define KI (potassium iodide?)

> We've incorporated the reviewer's suggestion in lines 358-360**: "**Ambient air was drawn at a rate of 0.9 – 1.1 L/min through a potassium iodide-coated copper inlet heated to 50°C to remove O_3 before passing through a DNPH-coated cartridge (Supelco LpDNPH S10) which collected carbonyls in their non-volatile, carbonyl-hydrazone derivative form."

Line 376 - Define "Allan-Werle curve" and / or cite the relevant literature (e.g., Werle et al...)

> A reference to the description of Allan variance has been added on lines 378-380: "First, the instruments' inlets were overflowed using a ZA source for 24 h and precision was calculated via an Allan-Werle curve (Allan, 1966), as in prior instrument characterization studies (Shutter et al., 2019; Glowania et al., 2021)."

Line 396 - Define "Allan variance" and / or cite the relevant literature.

> This comment is addressed in the one above.

Lines 423 - 425 - How do you get the 3 minute / 10 minute / hourly zeroing intervals from your measurements? Does this assume particular threshold values for accuracy, precision, or drift? It's not clear how you came up with these values.

> These recommended sampling times were determined through visual inspection as discussed in Sect. 2.2.2. We've updated the manuscript to clarify how we arrived at these sampling intervals.
>
> Lines 426-429: "From our observations, we determined that the Pico should be zeroed at least every 3 min and the Ultra every 10 min under typical indoor-deployment configurations as the instrument-reported HCHO signals do not consistently remain stable at longer intervals. For the G2307, observations of the instrument baseline drift obtained using DR suggest that hourly zeroing is sufficient."

Line 448 - Specify filter type (e.g., 1 micron pore size PTFE filters) and filter holder material (e.g., Savillex PFA filter holders).

> We have altered the manuscript to include these distinctions.
>
> Lines 452-453: "1µm PTFE particulate filters (PFs) in Savillex PTFE holders were used, and inlets were shielded by PTFE funnels covered with PTFE mesh."
>
> Lines 479-480: "As before, a 1µm PTFE PF in a Savillex PTFE filter holder was attached, the inlet shielded with a PTFE funnel, and indoor tubing insulated to prevent condensation from forming. The Aeris instruments solely used the DNPH-scrubbing method for zeroing."

Line 484 - Define / describe and/or cite the York regression (e.g., York et al...)

A reference to the York regression technique is provided.

Lines 157-159: “Data were averaged to 5 minutes and each regime fitted using a York regression (York et al., 2004) with standard deviations of the measurements used as uncertainty.”

Line 486 to end of section - I'm assuming you are referring to York regression slopes and intercepts in this discussion, but that should be stated or clarified.

Ther description for Fig. 8 description has been expanded to note that the slopes and intercepts result from application of the York regression technique.

Lines 506-509: “Figure 8 – Comparison of ambient observations from the three HCHO monitors assessed in this work. (a) Pico and G2307 observations taken at SDK in 2022 and 2023, (b) Pico and Ultra with 2022 measurements taken at GT in 2022 and SDK in 2023 (c) Ultra and G2307 observations at SDK 2023. Slopes and intercepts result from applying the York regression technique which incorporates the respective uncertainties of each instrument.”

Figure 9 - The error bars on the TO-11A DNPH measurements seem way too small. You state earlier the uncertainty in the calibration standard is 15% (Line 367), so the total uncertainty in the measurement must be larger than this. As per the PAMS Technical Assistance Document, precision for collocated samples needs to be +/- 20%, so it's unlikely the uncertainty in the DNPH measurements will be below this. Double check the uncertainty in the DNPH measurements and correct the error bars accordingly.

We now ascribe an uncertainty of 20% to the DNPH measurements per section 13.4 of the TO-11A compendium. We have recalculated Fig. 9 accordingly and updates to the manuscript reflecting the new values can be found below:

Lines 369-371: “Method TO-11A requires that collocated DNPH-samples produce observations within 20 %, which is vindicated through EPA historical data (U.S. EPA, 1999). As such, an uncertainty of 20 % is assumed for TO-11A observations in this work.”

Lines 514-516: “Fig. 9 compares G2307 observations from June-Aug. 2022 with those from co-located TO-11A measurements. 1 min integrated G2307 concentrations are averaged to the 8 h TO-11A sampling window. We find moderate correlation ($r = 0.75$) and a -52 % NMB of TO-11A observations relative to the G2307 (slope = 0.35 ± 0.02).”

Lines 534-535: “Figure 9 – 8 h TO-11A DNPH observations compared to Picarro G2307 observations at the SDK site from June through August 2022. Error bars represent the 10 % and 20 % uncertainty associated with the G2307 and TO-11A measurements.”

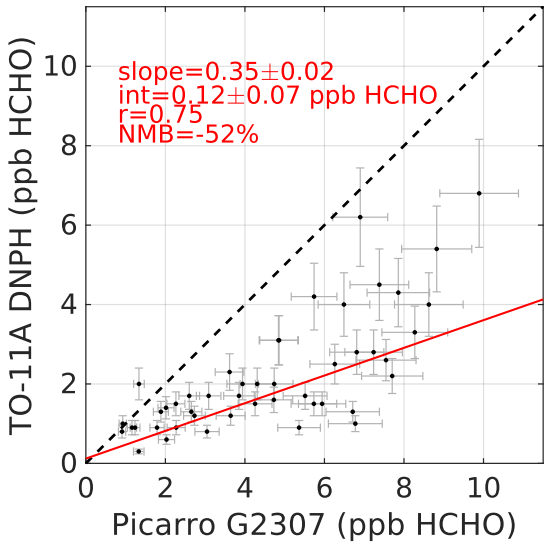

Figure 9 – 8 h TO-11A DNPH observations compared to Picarro G2307 observations at the SDK site from June through August 2022. Error bars represent the 10 % and 20 % uncertainty associated with the G2307 and TO-11A measurements.

General Comment - A lot of abbreviations are used in this manuscript (HCHO, DR, MS, HO, ACN, NMB, etc.). I recommend the authors consider whether the paper is easier to read and understand using these abbreviations or if writing out some of the words would make the text easier to comprehend. This is a stylistic consideration the authors should think about, not a recommendation for one way or the other.

> We appreciate the referee's suggestion. The acronym for acetonitrile has been removed as it only appears in one paragraph throughout the manuscript. Otherwise, we opt to keep the existing acronyms.
>
> Lines 362-367: "The cartridges were then eluted with 10 mL of acetonitrile and the eluent analyzed via a Waters HPLC-UV system with a temperature stabilized (25 ± 1°C), reversed phase C18-coated silica gel (1.7 µm particle size) column (Bridged ethyl hybrid, 2.1 mm x 50 mm ID) at 360 nm wavelength. The eluents used in the HPLC process were deionized H2O and acetonitrile. The HPLC system was calibrated before each use with known concentrations of HCHO and field samples are analyzed in comparison to blank cartridges."

Report #2:

Just a few minor technical corrections after reading through the resubmitted manuscript:

Line 56: 'all of which a proton-transfer-reaction mass spectrometer should read 'all of which employ a proton-transfer-reaction mass spectrometer.'

> We thank the referee for catching this grammatical mistake and have updated the text accordingly.
>
> Lines 52-57: “While other studies have demonstrated the feasibility for continuous measurements via various spectroscopy-based methods (Yokelson et al., 1999; Cardenas et al., 2000; Dasgupta et al., 2005; Hak et al., 2005; Spinei et al., 2018; St Clair et al., 2019; Dugheri et al., 2021), the number of multi-month, ground-based, continuous, in-situ HCHO measurements is limited to a handful of studies, all of which employ a proton-transfer-reaction mass spectrometer (Warneke et al., 2013; Hansen et al., 2014; Coggon et al., 2021).”

Line 76: HDO line is at 2831.8413 cm-1 and not 2931.8413 cm-1.

> We’ve corrected the manuscript to include the appropriate value where the instrument searches for the HDO line.
>
> Lines 75-76: “The Aeris MIRA technique relies on a HDO line (located at 2831.8413 cm^{-1}) for spectral referencing.”

Line 184: Typo in therefor.

> This grammatical error has been updated on lines 185-186: “Data was further screened to exclude points where scrubbers were exhausted and therefore unreliable.”

Line 269: Missing word: Mention what remained consistently stable.

> This grammatical error has been corrected on lines 270-271: “We found 180 s to be the longest length of time between zeroes that either unit achieved where the instrument-reported HCHO signal remained consistently stable.”

Line 404: It seems like there is better precision with the corrected Aeris Allan-Werle curves at longer integration times (Fig 4), so why does the text say 'lower precisions'?

> “Lower” in this context was used in a quantitative sense as it described the numerical values of precision. We have updated the manuscript to describe the precisions achieved by the instruments more qualitatively to avoid future confusion.
>
> Lines 407-408: “The corrected Aeris Allan-Werle curves trend similarly to the G2307’s, achieving better precisions with longer integration times.”

Fig 2: Mention what was being sampled in the caption of Figure 2. Was it ambient air?

> We have updated the description in Fig. 2 to clarify what was being sampled.
>
> Lines 209-210: "Figure 2 – Picarro G2307 baselines determined using the DR, DR+MS, or DNPH scrubbing methods. Each data point represents a consecutive, 4.5-min averaged DNPH and DR baseline measurement while sampling ambient air."

Fig 4: Some of the dashed lines are only partially dashed in subplots (b) and (c). Should not the whole line be dashed to correspond with the caption and text?

> We're unsure in which manuscript version this error has been found. We have regardless double-checked Fig. 4 to make sure the plots are consistent in what they're describing.