

This article is about the customization and operation of the Carbon monOxide Measurement from Ames (COMA) instrument onboard NASA's high-altitude WB-57 research aircraft. The paper is well within the scope of AMT. In a good wording, the authors describe a novel technology created to further provide important stratospheric measurements of CO and N₂O for altitudes above ~ 12 km that cannot be reached by more traditional research aircraft used in field campaigns or commercial aircraft. This technology was deployed in operation during the ACCLIP experiment and presents a unique opportunity to bring to the science community original results on the pollution transport processes within the Asian summer monsoon. I recommend publication with minor revisions to address the questions below:

Response:

Line 68: Please, confirm that COMA is based on the ABB Ltd GLA251 Series instrument. I cannot find any reference on their commercial website. Please, provide a reference for the original instrument specifications.

Response: You are right this is very hard to find on the ABB website. I checked the operating manual we have for the original instrument and confirm it is 'GLA251-NO2CM' is the model number we were given for the original N2O/CO analyzer. I assume this model number has been retired/updated as the current model number for a similar instrument is GLA351-N2OCM which can be found on the ABB website.

Figure 1: Could you make it bigger? Please, specify the units for the length 17.81 and 12. Also, avoid shortened words if they are not described earlier e.g "cal gas", "Pallet Cross Sect.", "Structure to CL Dist.", etc ... Does "regulators (2)", Sample Gas pumps (2)" means that there are 2 regulators (of what) and 2 pumps? In "Clearance below Pallet #4 (6 in.)", for what stands #4? Maybe, you should add more details in the description paragraph below the Figure 1 to better understand what we see.

Response: We have added more context to the legend of Figure 1, adding additional details on the layout and dimensions of COMA within the WB-57 payload bay. We have also increased the size of Figure 1.

Section 2.1.2 Flow system: I find the paragraph too minimalist and seems to me incomplete. Please, describe the need of the exhaust diaphragm pump and the internal pump, where goes the air after sampling? What is the required flow for the measurement cell? Do you monitor it?

Response: We have added more details to this section. With regard to flow rate - Flow rate is not measured/recorded by COMA, other measurements which are indicative of operation/flow are measured including sample cell pressure which is used as a primary indicator of instrument operation (i.e. some deviations in cell pressure were observed on some descents as the instrument was cold-soaked and if the instrument descended into particularly humid conditions this would causing icing within the lines, which would block flow, impacting the cell pressure and as we used this variable in our post flight analysis, this data would be flagged and subsequently removed from the final dataset).

Figure 4: It is difficult to see where the arrows point on the photo. Can you make the photo bigger?

Response: We have increased the line thickness on the arrows to make this easier to identify.

Figure 9: You should plot the ratio or the relative difference of concentrations rather than the absolute concentration time-series. Do you get consistent results for the other flight missions? If not, what could explained it? Were they connected to separate intake inlet?

Response: We have re-plotted Figure 9 to include a comparison of COMA with COLD2 and ACOS instruments during the entire ACCLIP flight data, which shows a more thorough comparison of the different instruments. By doing this we have had to remove the timeseries plot as there is not a constructive way of showing this when the entire dataset is used. We feel the ratio plot is the best method to display the intercomparison of ACCLIP flight data from the three independent instruments.

Conclusion: Please, add more results details. Summary the technical challenges that were solve to successfully operates the COMA instrument up to 18 km.

Response: We have updated this section to include a more detailed summary of this study.

Line 247 : In the abstract, you wrote 5.9 ppb at (200 ppb) ...

Response: 5.6 is correct, we updated this in the abstract. Thank you for spotting this typo.