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Atmospheric Measurement Techniques Discussions

Interactive comment on "Comparison of cavity enhanced optical–feedback laser spectroscopy and gas chromatography for ground-based and airborne measurements of atmospheric CO concentration" *by* Irène Ventrillard et al.

Anonymous Referee #2

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Ventrillard et al. presented the comparison results of CO measurements that were made on the ground and on the aircraft using a cavity enhanced optical-feedback laser spectrometer and a GC. The comparison results are interesting; however, as almost all development of the OF-CEAS instrumentation has been published previously, the technical aspect of the manuscript is quite thin. The performance shown in the manuscript is excellent, but it is hard for a reader to judge because the needed information is often not provided. The manuscript will need a major revision to be considered for publication at AMT.

General comments:

1. The detailed setup of the OF-CEAS is missing, especially for the deployment on the aircraft. How was the flow rate controlled? It is mentioned somewhere else that no calibration gas was provided during flight. This could be better shown with a flow diagram.

2. How was humidity correction made to derive dry mole fractions of CO? It was simply mentioned that the effect is small, but without any supporting evidence.

Detailed comments:

P2/L12: change "in which is coupled a laser source" to "in which a laser source is coupled" P3/L10: change "during two steps" to "in two steps" P3/L10: specify that "cooling trap" is the cryogenic cooler P5/L7-10: what is the cavity temperature? Please mention that the response time means 1/e exchange time. P5/L28-35: These are not scientific. Remove them all or write it in a scientific way with proper references. P6/L7-8: what assertion? P6/L17-18: Please elaborate on what has caused the 10% overestimation? As line intensity is well defined within 1% in the HITRAN database. The relative uncertainties on temperature and pressure are also small terms. What else? P6/L32: How is the reproducibility derived? Note that this is often larger than the minimum values derived from the Allan variance. P7/L11-13: How is humidity rate accounted for? Details are needed to judge whether it is properly done. P8/L22: what is the typical vertical distance? P8/L27: you mean "surface", instead of "soilborne", right? P8/32: change "flux to" to "flow of", how is constant flow is maintained? P8/L34: why averaged to 2 second? Note that the response time is much larger now as the flow rate is only 50 sccm. P9/L14: change "been" to "be" P9/L28: what is the exact cavity volume? 20 cm3 or 18 cm3 on P5/L7 P9/L31: it makes no sense to mention the response time when flow rate information is not given. P10/L7: compatible or comparable?