

Interactive comment on “H₂S interference on CO₂ isotopic measurements using a Picarro G1101-i cavity ring-down spectrometer” by K. Malowany et al.

Anonymous Referee #2

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This manuscript is simple straightforward, well prepared, and easy to read. It documents a useful investigation of cavity ringdown analyzer performance in a application environment for which it was not natively designed, which is to measure the carbon isotope ratio of carbon dioxide in the high hydrogen sulfide settings. The paper is useful obviously to anyone working in volcanic environments, and also in any sour oil and gas environment.

The manuscript is in almost perfectly good shape to go as is, I feel. It's very rare that I would say this the first time seeing a paper, but experiments are clear, well done. It's well-written with a good level of detail. Figures were quite useful, particularly the last

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one. It was good to see that the authors limited the time between standard prep and measurement, as it's not only an issue for carbon dioxide, but also hydrogen sulfide in Tedlar.

There is one thing that I feel would help the paper, as a discussion item. It was an early generation older instrument used here, known to have some some limitations. It was the first of its kind on the market, and delivered before the research community, and maybe even the manufacturer, really understood the importance of compensating for overlapping spectral lines. But, this became evident as users would take these analyzers into strange places, and to the manufacturer's credit they did a very good job of reacting to improve the instrument continuously. For example, on the early 1101s, many were brought back to the factory to install a secondary laser to correct for methane. I'm curious if that was done for this instrument, for example. It shouldn't matter for these tests, but it is part of the same discussion. Not having used the same instrument for a little while, I can't remember for what background species this particular analyzer was correcting? That would be another useful detail. I also know that the range of compensations has also expanded over time, and from looking at superuser data files, I think that hydrogen sulfide compensations have become embedded in successor products. And, I'm curious about this issue, because it affects the applicability of this paper to people with more modern analyzers. To my knowledge the 1101 does not compensate for H₂S internally, but this is done in some (but I think not all) of the successor carbon isotope instruments. Maybe those improvements were made as a consequence of this study. Anyways, I do have some questions about this particular instrument's configuration, which is easy to address. Then, I also wonder about the likely magnitude of the same effect in successor products. For example, my own 1101 is already out of service. I use the successor product, and I wonder how severe this issue is for me. So, I think it's worth expanding the discussion to make it applicable to researchers using the more modern variants. Is this isotope issue still a problem in units that may be hydrogen sulfide compensated? Which models now include this compensation, if any?

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