Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC2
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Comment on amt-2021-276

Anonymous Referee #2

Referee comment on "IRIS analyser assessment reveals sub-hourly variability of isotope ratios in carbon dioxide at Baring Head, New Zealand's atmospheric observatory in the Southern Ocean" by Peter Sperlich et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-276-RC2, 2021

The authors tested the performance of an Isotope Ratio Spectrometer to measure CO2, δ13C and δ18O in CO2 in the lab and field. The authors also developed a calibration method for the DR system. This is a carefully done study. The result will be very important to the manufacturer and users.

General comments

- Although the careful and precise style is important for scientific papers, the thrifty compactness of construction is more necessary, this manuscript is too long.
- The order of the figure numbers should be adjusted as the content. At the same time, there are too many figures in the manuscript and some of them are repeated.
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Specific comments

- Line149, you mean you applied directly one-point calibration scheme with Q1, and assessed the instrument fluctuations with the results of Q2 and Q3 as target? Did you do some tests with two-point calibration?
- Line170-172, Please explain how you decided the flush time and injection time, and add the time resolution of the DR

- Line306, as the basic introduction of the station, section 5.1 should be brief and general.
- Line347, if possible, section 5.2 can be combined with section 7.2 to help readability.
- Line 392 and Fig. 6, didn't you try to change another test gas? Afterall, Q2 is very important in your scheme with notablydifferent CO_2 mole fraction and isotope ratio from Q1 and Q3.
- Line714, the authors need to provide suitable references or test data for "δ13C-CO2 measurements using air from glass flasks showed that 13C-CO2 was drifting with lowering pressure in the flask".
- Fig.4, the authors should provide legends in the figure.
- Fig.10, the middle and bottom panels sent the same information
- Fig.16, the bottom panel of the time series is unnecessary.