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Comment on amt-2022-243

Wiebke Scholz (Referee)

Referee comment on "Development of an International System of Units (SI)-traceable transmission curve reference material to improve the quantitation and comparability of proton-transfer-reaction mass-spectrometry measurements" by David R. Worton et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-243-RC1, 2022

The manuscript by Worton et al. describes the production and evaluation of several multi-component gaseous primary reference materials (PRM) with the aim to allow PTR-MS users to better constrain the transmission curves of their respective instruments. The manuscript discusses the challenges of including low-volatility compounds but manages well to reproduce their concentrations in the different PRMs with uncertainties typically below 10%.

The quantitative addition of such high-mass low-volatility molecules to gas standards will be of great use for the PTR-MS user community in general and is also important for atmospheric measurements. Challenges in quantifying several compounds were overcome by using a combination of GC-MS and GC-FID and in some cases Cryo-GC-FID.

The PRMs described were prepared following standardized procedures and evaluation results are presented in great detail and with particular dedication to precision and uncertainty analysis in a well-structured manner. However, the manuscript was partly difficult to understand on the first read, because abbreviations were used excessively and partly confusing.

The paper gives insight into the reproducibility and stability of gas standards that will be very valuable to end users. Transmission-curve constrainment with one single reference material can simplify the lives of many PTR-MS users around the world and enhance data comparability and quantification.

Therefore, I suggest that the manuscript be published in AMT after some minor comments have been addressed. Please find the details in the appended pdf file.

Please also note the supplement to this comment:
https://amt.copernicus.org/preprints/amt-2022-243/amt-2022-243-RC1-supplement.pdf