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Atmospheric Measurement Techniques Discussions

Interactive comment on "An Automated Method for Preparing and Calibrating Electrochemical Concentration Cell (ECC) Ozonesondes" *by* Francis J. Schmidlin and Bruno A. Hoegger

Anonymous Referee #2

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This is a worthwhile paper, and should be published. I have a number of minor concerns that the authors may wish to address first, however.

Pg. 4, lines 92-101: Some mention of the efforts of the O3S-DQA initiative (Smit et al., 2012; Smit and ASOPOS panel, 2014) would be appropriate here. Perhaps even some of the recent re-evaluation papers (Tarasick et al., 2016; Van Malderen et al., 2016; Witte et al., 2018; 2019; Sterling et al., 2018) would not be out of place. The references Barnes (1982) and Barnes et al (1985) for sonde accuracy are rather old, and there are better ones, which the authors know as they co-authored some of them. There is a good summary in the forthcoming ASOPOS-2 report, also published as a

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paper in review for Earth and Space Science (Tarasick et al., 2019).

Pg. 4, line 97: “whether measured”. Might insert “it is” to make comprehension easier for non-native speakers.

Pg. 4, line 98: “the use of the appropriate potassium iodide (KI) concentration”. While the KI concentration does have an effect, the uncertainty really lies with the stoichiometry of the KI reaction with ozone, as well as unwanted side reactions with the phosphate buffer. Losses of ozone and/or iodine in various ways should be included in this list, and motor speed might also be so included, since motors have changed in recent years.

Pg. 6, lines 159-167: What is the uncertainty of the automated flow rate measurement? This discussion seems to treat it as zero! The volumetric bubble flow method is quite accurate (and as a method traceable to physical constants, is typically used to calibrate automatic devices). Operator uncertainty is about 0.1-0.3% (Tarasick et al., 2016), less than 1/10 of what the authors suggest; the automated Gilibrator is only slightly better (if used properly).

Pg. 8, line 230: Insert “Measuring the. . .” before “Response”. Line 242: “hacked” is slang; moreover it’s not clear what is meant.

Pg. 9, line 271: Text missing here?

Pg. 10, lines 276-278: Should cite Johnson et al. (2002) here.

Pg. 11, lines 325-326: On the other hand, it’s explained in great detail in Johnson et al. (2002). Why not refer to that?

Pg. 13, lines 369-370: Good question. The variation shown suggests a variability of about 5%, at least for the 0.5% solution. That is rather large, and serious investigation of it might add a lot to current understanding of ECC uncertainties, since, as the authors point out, such investigations are much easier to do than experiments at the World Ozone Calibration facility at Jülich.

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