

Interactive comment on “A statistical approach to quantify uncertainty in carbon monoxide measurements at the Izaña global GAW station: 2008–2011” by A. J. Gomez-Pelaez et al.

Anonymous Referee #1

Received and published: 1 November 2012

1) General comments:

The manuscript presents a detailed statistical study of various contributions to the uncertainty associated with the continuous CO measurements at the station Izaña. The approach goes beyond the usually estimated uncertainties of measurement results. As such, it is very informative, and the paper presents new insights. The calculations would be applicable to other stations, notably within the GAW network. Therefore the paper might be of interest to a wider readership, notably readers working in the field of high-quality trace gas monitoring.

C2735

The paper is well structured and clearly organized. The outcome is well summarized. The abstract covers all relevant findings. The style of tables and figures is appropriate. Nonetheless, there are a number of details, mostly technical in nature, which should be improved. These are specified below.

In summary, the paper should be accepted for publication after minor revisions have been made.

2) Specific comments

page 6953, line 6: The diameter and length of the columns should be given.

p 6953, l 22: Delete "primary". According to the recommended GAW terminology a laboratory standard is the standard of the highest rank at a GAW station.

p 6955, lines 7 and 22: While the CO mole fractions are known to drift in high-pressure cylinders, the usually observed drift is rather slow. Here the authors observe negative drifts ranging from 0.58 to 1.63 nmol/mol per month (!) and a positive drift of 2.75 nmol/mol per month (!). Could the authors comment on the reasons for this rapid drift?

p 6959, paragraph from line 12 to line 19: This is a very important paragraph with its reference to Fig. 5 and Table 3. Here major results are summarized, which demonstrate the success of improved analytical quality.

p 6959, l 10: "peak baseline": Is this really a well-known expression? You probably mean the imaginary baseline connecting peak start and peak end.

p 6962, l 4: Could the authors give a short explanation why u_{par} behaves as random for the annual means in contrast to the other averaging periods?

p 6962, l 22: CCGG stands for Carbon Cycle Greenhouse Gases Group (see website).

p 6969, l 15–17: Have the changes in sampling time been accounted for in NOAA's analyses of the time series?

C2736

p 6976, Table 3: This is indeed an important Table, which nicely shows the different contributions to the uncertainty and the progress achieved for the analytical quality.

3) Technical corrections

Hyphenation (entire manuscript): There are a number of cases where hyphens are lacking according to the rules of grammar, which contrasts with the correct use in many cases. Examples for missing hyphen: p 6952, l 27. Should read: 300-ml glass flask p 6953, l 10: Should read "High-purity synthetic air" p 6954, l 3: Should read: "high-pressure tanks" p 6955, l 5: Should read: "The time-dependent response ..." and several similar cases.

page 6950, line 3: The abbreviation GAW should be spelled out when used for the first time.

p 6950, l 6 and same word on other pages: Remove "'s" from "Izana's"

p 6950, l 14/15: Remove plural "s" from "parameters"

p 6951, l 5: Replace "role on the cycles" with "role in the cycles" (or "for")

p 6951, l 5: Consider writing "hydroperoxy radical (HO₂)"

p 6951, l 22, p 6958: l 5: Typo, remove space from "can not" (cannot)

p 6952, l 24: Consider replacing "a.g.l." with "above ground level"

p 6952, l 26-27: The order should be rearranged to yield: "... general inlet to the analytical system using a KNF ..."

p 6953, l 10: Should better read "We used a stainless ..."

p 6953, l 12: Should better read "positions of the valve, ..."

p 6953, l 14: Style, should be rephrased to, for example: "...chromatogram, where the H₂ peak appears first, followed by the CO peak"

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p 6954, l 5: Rephrase to "... the procedure for conditioning described by Lang ..."

p 6954, l 14: Rephrase to "... are obtained by fitting ..."

p 6955, l 28: One should better say: "We begin by considering ..."

p 6958, l 19 and similar cases: Should read: "... these parameters with respect to ..."

p. 6960, l 23: Style. rather say "... the exact value of ...does not matter."

p. 6968, l 11: Style; rather say: "... increased by 4.0 ..."

p. 6968, l 16: Style, rather say: "... is in the middle of August." or "... is in mid-August."

p 6969, l 15: Style, better say: "... at Izana in late 1991, ..."

p 6971, l 2: Style, rather say: "... are highly biased with respect to ..."

p 6971, l 21: You might consider just saying: "... Zellweger for advice during ...".

p 6975, Table 2, header: It should read "Residuals with respect to ..."

p. 6982, Fig. 2, caption. Style, rather say. "The fit is plotted ..." or "The fitting curve ..."

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 6949, 2012.

C2738