

Interactive comment on “Local and regional scale measurements of CH₄, δ¹³CH₄, and C₂H₆ in the Uintah Basin using a mobile stable isotope analyzer” by C. W. Rella et al.

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This is an interesting paper, that reports important and topical work. However I wish to make some criticisms of an editorial nature in order to expedite the process of revision for consideration for publication in AMT. The paper has many colloquial usages of English which need to be made more formal, and in addition, the fact that the authors are from the company which made the instrument shows through - and I think detracts from the value of the paper.

My specific comments are below and the line numbers pertain to the original version

C1982

of the manuscript which I believe the authors have. These comments may be made redundant by the response(s) to the referees, but should be borne in mind when making those responses.

General comments

a) The words innovative and novel are overused. This should be reduced to just two (at most) usages; I'd suggest once in the abstract and once in the conclusion - and no more.

b) Section 2 should be broken up with the CRDS in one section (#2) and the results from the Uintah basin in another (#3). This would be more consistent with the title of the paper.

Abstract

L19; the words "highly precise" are redundant

L23,24; "... and a novel onboard gas storage and playback system." This text seems to be repeated in the second to last sentence of the abstract. I don't think this is the case, but it should be made clear that there are two playback systems.

L29; the concept of a "signal present in the ground" is too vague.

Main body of manuscript

L36,37 grammatical problem (production ... WAS ... viable)

L37 the word "there" is missing

L63 "these OTHER emission" ???

L74,75; grammatical singular/plural problem

L82; do you mean "firn" or "fern" ? I think the former!

L133; what are "end member populations"?

C1983

L142; by THIS instrument

Section 2.1; You seem not to make the connection between ringdown time and molecular absorbance.

L174-176; It is unclear as to whether the species CH₄, CO₂ & H₂O are analytes or "other key atmospheric constituents"

L184; grammar - "are" not "is"

L188 - 191; There are words missing from this sentence

L200; is the word "spectra" missing in the first sentence?

L200; delete "experimental" - it's redundant

L203; the word "only" is repeated unnecessarily

L205; it's puzzling as to why you need to refer to the HITRAN version in 2010

L207; grammatical singular/plural problem

L211,212; rephrase this to be less colloquial

L216; in what sense does CO₂ have amplitude?

L220; "purpose OF"??

L232; what is a "stronger dynamic range"?

L239; You measure something but not the bottle! (Similarly L272 - what is the "accuracy of a tank"?)

L246,248; This seems to be unnecessarily repetitive (see §2.1)

L263; linear relationship with what?

L270; the footnote doesn't really explain ppb/cm as a unit of loss - is something that can be better supported by a suitable reference?

C1984

L285; why mention just water here - wouldn't this apply also to dilution by the likes of O₂ or Ar?

L288; the expression "net lineshape effect between the two species" is too vague

L296; please decide if this is to be an in-line equation or not

L309; Is this not a peak height ratio rather than a loss ratio?

L329,330; it is unclear which are the standard calibration constants give the specific symbols.

L339; " four standards" should be " four isotop ratio standards"

L360,361; What is a drift in the wavelength axis?

L367; similarly, what is nonlinearity in the absorbance axis?

L376; $c_0(t)$ should be defined here, and not just in the supplementary material.

L377 - 379; this should be turned into proper text.

L386,387; missing word in this sentence

L399; this paragraph confuses the reader as to whether this is two or three bottle testing

L429; perhaps a sentence here, cross referenced to §2.3, which clarifies the relationship between the two Allan variation graphs presented.

L460 - 462; please consider rephrasing this - the use of English is a little colloquial in the first half of the sentence and is likely to confuse a non-English speaker.

L462 - 464; this sentence reads more like an equipment manual - suggest replacing "it is recommended" with "we find that"

L476; this is where section 3 should start (with 3 becoming 4 etc.)(having this breakpoint at L551 is also a possibility.)

C1985

L522; was the vehicle stopped?

L542 - 544; this sentence appears to contradict one two sentences later (L545 - 548)

L542: what is C2/C1?

L561; is the effective dilution factor not a function of E_c?

L571; the background here is surely the concentration of methane in the air entering, rather than the air itself

L583; it should be stated here which region the study of Karion et al was located in. There's also an "of" missing.

L596,599; please be consistent in what you call r_s

L600; word missing, which will fix the grammar

L603; this equation is orphaned and needs text around it

L606; This is as subsidiary goal rather than a goal? Also put in "Uintah"

L612; No vehicle in the figure!

L613; the word "also" should be slipped in

L647; on what basis then is D chosen if there are no free parameters

L653; replacing "optimizing" with "minimizing" would be clearer

L687; these are regional values, rather than just values?

L688; this sentence is a bit unclear - what is a functional correspondence?

L708; spelling

L739-741; "The 2013 numbers" is too colloquial. But in any case the way this sentence is written raises red flags, and you might consider rephrasing.

C1986

L790; A researcher can be highly confident, but a lower bound cannot!

Figures

light gray is not a good choice of colour for reproduction on paper - it's hardly visible in Fig 14. Consider a black dashed or dot-dashed line. The same comment applies to fig 15.

Fig. 15 it needs to be made explicit that the color bar refers to delta. An inset that gives the reader an idea of how symbol area corresponds to concentration, would be very helpful

Fig 16 please explain the inset ("0201" etc.)

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 4859, 2015.

C1987