Atmos. Meas. Tech. Discuss., 6, C3919–C3922, 2014
www.atmos-meas-tech-discuss.net/6/C3919/2014/

Atmospheric Measurement Techniques Discussions

Interactive comment on "The detectability of nitrous oxide mitigation efficacy in intensively grazed pastures using a multiple plot micrometeorological technique" *by* A. M. S. McMillan et al.

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Received and published: 8 January 2014

Response to Anonymous Referee Comments 1 (RC C3286) to MS No. amt-2013-231: "The detectability of nitrous oxide mitigation efficacy in intensively grazed pastures using a multiple plot micrometeorological technique" by McMillan et al. in Atmos. Meas. Tech. Discuss., 6, 8959–9003, 2013.

We thank the two anonymous referees for their encouraging comments and helpful suggestions for improving this paper. We respond to each of the reviewers on a point-

by-point basis in the following: (Anonymous referee comments in italics, our responses in regular font, relevant text from the current or revised manuscript in bold)

Referee 1.

The only minor criticism is the authors have not stuck to the structure of methods, results and discussion. While the paper has these sections, new methods are introduced in both the results and especially the discussion sections, and many results are first introduced in the discussion. In spite of this, the logic and flow in the paper still makes sense and reads well.

We acknowledge Ref 1 in that we haven't strictly adhered to the methods, results and discussion format, but because the nature of the paper was an assessment of a particular technique, we wanted to clearly separate the description of the methods of the technique from the methods in which we used to assess that technique, and after several iterations of the organisation of the paper found that the current structure provided the best readability. Since the reviewer remarks "the logic and flow of the paper still makes sense and reads well" we have left the current structure intact, and trust that this will be satisfactory for publication.

Page 8965, line 14: I am sure there is a more formal reference that could be used here, even using the reference in the Di and Cameron paper (Hewitt AE (1998) New Zealand soil classification, 2nd edn. Manaaki Whenua, Lincoln, Canterbury, NZ.)

We have now inserted that reference.

Page 8966, line 20: Not really important by perhaps it should be (minus) -5KPa

We interpret this comment as the reviewer being unsure of whether we were referring the pressure being an absolute value or relative to atmospheric (gauge) pressure. We have changed the sentence from: **"Throughout the measurement sequence vacuum in the TDLAS measurement cell was maintained at 5 kPa."** to: **"Throughout the measurement sequence the TDLAS measurement cell was maintained at an**

absolute pressure of 5 kPa." So that it is clear we are referring to an absolute measurement of pressure.

Page 8968, line 15 to 20: This paragraph is probably not needed to make the case in this paper.

The reviewer is referring to the paragraph: **"In principle, if we had the ability to create two calibration tanks that have very small differences in N2O mole fraction we could test this directly. However, in practice, making and calibrating gas mixtures with small mole fraction differences (below 1 ppb) level is laborious. Further, even if this was achieved, the large flow requirement of the sampling system (3.1 L min^{-1}) would mean that any such tanks, once created, would be rapidly exhausted."** This paragraph was included to rationalise the alternative approach to a standard calibration method. The practical difficulties of formulating two tanks with very slightly different mole fractions may not be obvious to those unexperienced with the preparation of calibration gases. We have chosen to retain this paragraph for clarity.

Page 8970, line 11: The term 'excellent' is probably a bit subjective for a paper. Would it not be better to say the correspondence was highly significant, then add a signifcance term to the correlation coefficient?

We take the reviewer's advice on this point and have adjusted the text as suggested.

Page 8972, line 10: Should there be a section at the end of the Methods describing the statistical methods used?

We have taken the approach of explaining the various statistical techniques we have used as they become relevant to the issue being discussed, so that the reader need not refer back but, rather the techniques are described in line.

Page 8973, line 25: 'many degrees of freedom' - Rather specify the degrees of freedom?

We take the reviewer's advice on this point and have adjusted the text as suggested.

Page 8975, line 16: Perhaps include reference to Fig 6B in the parenthesis?

The revised manuscript now contains a reference for 6B on this line.

Fig 3 – Capital letters appearing on new lines.

Sentence case is now used for the text in this figure

Fig 8 - The legend is quite difficult to see.

We have increased the size of the legend for this figure

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 8959, 2013.