This manuscript describes a comparison of two fast-response optical methane analyzers, particularly for the micrometeorological application of eddy covariance. It is an excellent paper and should be published with minor revisions. The paper is well-written, appropriate for the journal, and the citations and figures are appropriate. The experimental verification of eddy covariance with a controlled trace gas release is highly novel, as is the discussion of pressure broadening due to water vapor in the context of the WPL density corrections (at least for this application.) Concerning AMTD's principal criteria for evaluations, this paper has excellent scientific significance, scientific quality, and presentation quality.

Minor comments:

Cross-sensitivity, cross-talk, and pressure broadening are all used somewhat interchangeably, this should be reworded to be more clear

"concentration" should be replaced with "mole fraction" (preferred) or "mixing ratio" throughout the manuscript as the latter are what is presented in the figures

P 2962 L 22: "at the global scale" and "at the landscape level" are awkwardly used together in this sentence

P 2963 L 5: tens of m2 may be appropriate in an agricultural setting, but not when measurements are made higher from the surface

P2963 L 22: omit "propose to" since you have obviously already done this

P 2964 L 6: define FMA and QCLAS here with the analyzers so it's clear

P 2964 L 20: replace "minimum still-detectable" with "minimum detectable"

P2964 and 2965: some of this will be lost on a micrometeorological audience but in my opinion this is probably appropriate amount of detail for the spectroscopy in this paper

P 2966 L 6-7: "While the FMA is stated to be calibrated by the manufacturer, the QCLAS requires calibration by the user." All scientific instruments require calibration, regardless of the ridiculous claims by some of these optical analyzer manufacturers (I have heard this from them as well). I suggest changing the wording to acknowledge this.

P2966: "intensively managed" and "extensively managed" grassland appears in Figure 1, this should probably be elaborated on in section 2.2

P2911: use SI units for pressure (kPa)

P 2911 L 4: what brand sonics, and were they the same?

P2911 L 8 "large overlap" is vague

P 2911 L 17: "sL min-1", presumably you mean standard liters per minute but this notation is a bit vague

Some instrument manufacturers have the company listed (the FMA and QCLAS) but others do not – be consistent and adhere to journal standards – also some part numbers are missing (eg Swagelok sintered filter)

P 2969 L 15-20: I would argue that a 16h test does not characterize "long-term stability" – if you let this run for a month or a year do you feel this is adequate?

P 2971 L 16: "CMDL scale" is inappropriate for 2 reasons, first, the WMO is the appropriate organization that defines the scale, and second, the Climate Monitoring and Diagnostics Lab at NOAA has changed it's name – see http://www.esrl.noaa.gov/gmd/ccl/ccl.html

P 2972: the dilution correction is in fact a part of the WPL considerations, since the mixing ratios are expressed in the WPL paper relative to dry air – as the authors are probably well aware, this correction can be applied to the raw time series or to the fluxes and different WPL formulations apply to these cases – your eqn 6 is appropriate only if the raw time series are with respect to moist air

P 2974: "small but real" is awkward – even your artificially applied fluxes were "real"

P2975: lines 5 and 6: the definition of sigma is awkwardly inserted into the text

P2976 L 10: "are sensitive"

P 2978 L 25-27: but you have just explained the importance of water vapor (WPL and pressure broadening) so this is not acceptable for eddy covariance without appropriate corrections

P 2980 L 12: "suffering" should be replace with "poor" – also, the verb tense in this section is often present, but most of the manuscript is in past tense (as is appropriate)

P 2982: define "cw-QCL"

Fig 2: units needed on top axis

Fig 3: caption does not indicate which CH4 instrument is shown in top panel (also Fig 5)

Fig 4 caption: "when water vapour fluxes were high" (insert the word "vapour")

Fig 5 caption: illustrating two situations (plural)

Fig 7: latent energy (heat) flux would have units of W m-2, the molar units used are a water vapor flux

Fig 7 caption: "proportion contributed by" (omit "of")

Fig 7 caption: explain the meaning of the boxplot features (25%-tile, mean, etc)

Fig 7 caption: "the applied flux" is better than "the issued flux"