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Atmospheric Measurement Techniques Discussions

Interactive comment on "Characterization of anthropogenic methane plumes with the Hyperspectral Thermal Emission Spectrometer (HyTES): a retrieval method and error analysis" *by* L. Kuai et al.

F. Prata (Referee)

fp@nicarnicaaviation.com

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This paper is admirably brief and describes a CH4 retrieval methodology with some results for the HyTES airborne instrument. The paper is generally well written, although some grammar needs correcting (an edited version of the paper has been sent to the lead author). The results demonstrate that point source CH4 concentrations can be retrieved within a small spectral interval where CH4 absorbs strongly. A comparison with airborne in situ and ground based measurements show that the retrieval accuracy is around 20% for column abundance. Apart from some minor corrections (indicated on

an annotated m/s sent to the author) there are just a few items that could be included in a minor technical correction:

1. A discussion of the correlation between adjacent spectral channels would be nice to see. The use of a diagonal covariance matrix, while common needs some elaboration.

2. The effect of the thermal contrast between the surface and the boundary layer atmosphere has an important effect on the retrieval. A paragraph on the optimal time for making such measurements is needed. For example, how do the retrievals change if there is a boundary layer temperature inversion?

3. The authors state that they made measurements on three different dates, but only one date is provided. Also, there is mention of emission rates but none are provided nor is there any discussion of how these could be determined by HyTES.

Overall the paper should be accepted subject to some minor corrections and consideration of the above items.

Please also note the supplement to this comment:
http://www.atmos-meas-tech-discuss.net/amt-2015-402/amt-2015-402-RC2-supplement.pdf

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