

Interactive comment on “Global stratospheric measurements of the isotopologues of methane from the Atmospheric Chemistry Experiment Fourier Transform Spectrometer” by E. M. Buzan et al.

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We thank the referee for their constructive comments and offer our responses below.

In the general comments, the referee suggests additional discussion of the reasons for spectral parameter adjustment. In the paper we mention new microwindows for CH₄ added between 40 and 50 km and below 25 km. The explicit reason for this has been added: it greatly reduced the horizontal bands present at 12, 20, and 40 km. Such banding is also present at different altitudes in recently-published retrievals of

C5125

$\delta^{13}\text{C-CO}$ (Beale et al., 2015). The pre-adjustment retrievals of CH₄ are available as part of the version 3.5 ACE data set. In this paper we present the effects of the new adjustments made.

In the specific comments, the referee suggests the use of averaging kernels to determine what features are artifacts. Unfortunately, since the retrieval process for ACE uses a least squares fitting rather than optimal estimation, no averaging kernels are produced. However, we have commented on other artifacts using other evidence. A reference to bands seen in ACE $\delta^{13}\text{C-CO}$ retrievals has been added. In addition, we improved the discussion of the comparison of δD from ACE and Röckmann et al. to further comment on the spike above 30 km seen by ACE.

REFERENCES

Beale, C. A., Buzan, E. M., Boone, C. D. and Bernath, P. F.: Near-global distribution of CO isotopic fractionation in the Earth's atmosphere, *J. Mol. Spectrosc.*, 1–8, doi:10.1016/j.jms.2015.12.005, 2015.

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C5126