**Atmospheric
Measurement
Techniques
Discussions**

Interactive comment on "HDO/H$_2$O ratio retrievals from GOSAT" *by* H. Boesch et al.

Anonymous Referee #2

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This paper describes the retrieval algorithm of column-averaged HDO/H2O ratio and its error analysis. Since water vapor plays an important role in the climate system, details about water cycle should be investigated. HDO observation is expected to resolve some part of the water cycle studies. The paper is well written, and I think the objective of this paper is relevant for AMT. I recommend it to be published after the following comments are addressed.

1. Section 2.2

Since you retrieved the scaling factors of H2O and HDO independently, the error in the retrieved δD depends on errors of H2O and HDO. How large are the random/systematic errors of H2O as a fraction of those of δD? Also, it might be helpful to show the degree of freedom for signals of H2O and HDO when you discussed about the systematic

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errors.

2. Section 3, p.6654, l.19-p.6655, l.11

I think you have to take special care when you compare GOSAT data with other data under the small spatial co-location criterion. Smaller criterion becomes meaningless, because GOSAT observes same observation point repeatedly with a distance between adjacent observation points of ∼150 km (Kuze et al., 2009). GOSAT observes TCCON sites by specific observation mode for validation, but there might be only one or two observation points within a 100 km distance from each TCCON site. It is helpful to add figures which show the observation locations of the coincident data.

3. Section 3, p.6655, l.24-l.26

The retrieved δD changed 50 ‰ by changing the retrieval spectral window. How change did H2O and HDO? Also, it is helpful to show difference in the degree of freedom for signals.

4. Table 1

wavelength range => wavenumber range

5. Figs. 1, 2, 4, 5, and 9

Please unify the unit of horizontal axis of these figures. (wavenumber is preferable)

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