

## ***Interactive comment on “A method for colocating satellite $X_{\text{CO}_2}$ data to ground-based data and its application to ACOS-GOSAT and TCCON” by H. Nguyen et al.***

**Anonymous Referee #1**

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With unprecedented precision requirements on CO<sub>2</sub> total column measurements, validation of satellite remote sensing data through a reliable ground-based network is an ever important task. Part of this task is developing and improving on validation methods. In this paper, a robust validation method has been presented and applied to ACOS-GOSAT total column CO<sub>2</sub> retrievals. This method will likely be a precursor to future validation efforts. The presentation and quality of this work is excellent. I recommend its publication in AMT but I would like to first make a few comments below.

Specific comments:

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1. The method presented here is similar to a contemporary work that has been recently published in IEEE by Zeng et al., (2014). Although this current AMTD version may have been published before Zeng et al., (2014), I recommend that the authors cite Zeng et al., (2014) in the final version.

A Regional Gap-Filling Method Based on Spatiotemporal Variogram Model of CO<sub>2</sub> Columns

Published in: Geoscience and Remote Sensing, IEEE Transactions on (Volume:52 , Issue: 6 ) Date of Publication: June 2014 Digital Object Identifier : 10.1109/TGRS.2013.2273807 Date of Publication : 07 August 2013 Date of Current Version : 03 March 2014 Issue Date : June 2014 <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6576182>

2. Regarding interpolation error: I would have liked to see the magnitude of the interpolation errors according to equation (7) and compare them to the TCCON errors. For example, a plot of the interpolated GOSAT XCO<sub>2</sub> with the error bars against the TCCON XCO<sub>2</sub> would be interesting to see. This does not have to be done for all stations.

Minor comments:

3. Figure 3 needs a legend. Why is there discontinuity in the black curves?

4. Figure 5 shows very important results but it is too small. It could be stretched more and the fonts increased in size. Also, the legend on the lowest panel seems to be covering the results for Ny Alesund.

5. page 1500, Chapter 2, 2nd paragraph, first sentence: change "projected" → "project"

6. page 1504, line 4: change "tends" → "tend"