

## ***Interactive comment on “Calibration of TCCON column-averaged CO<sub>2</sub>: the first aircraft campaign over European TCCON sites” by J. Messerschmidt et al.***

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Received and published: 24 August 2011

General:

This paper describes the comparisons of ground-based CO<sub>2</sub> total column measurements at five European and one mobile sites of TCCON with in-situ profiles measured by aircraft. The improvement of the accuracy of TCCON measurements is important to validate the satellite measurement of greenhouse gases and to estimate emission and sink of them. The paper is well described and it should be published after some revisions. As for the uncertainties, I agree with Dr. Griffith's comment.

Major comment:

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In the calibration process, two values to be compared should be derived independently. But the authors compared the CO<sub>2</sub> total columns observed by TCCON analyzed using aircraft profiles with those integrated from aircraft profiles first. Then, they compared the CO<sub>2</sub> total columns observed by TCCON analyzed using standard GFIT a priori profiles with those integrated from aircraft profiles. The first two CO<sub>2</sub> values aren't independent. Fortunately, the difference between the results analyzed using aircraft profiles and those analyzed using standard GFIT a priori profiles is small in this case, but the comparison using standard GFIT a priori profiles should be set for main result because aircraft profiles can't be used in usual analysis.

Minor comments and questions:

3.2 (p14550-14551) Can you describe the accuracies of NDIRs at Bialystok and Orleans?

3.3 p14551, l8: What is 'WMO targets'?

3.4 p14552, l3 & l6: Is 'the standard a priori profiles of the FTS retrieval' and 'the standard GFIT a priori CO<sub>2</sub> profile' same?

5 p14560, l20: Where '0.8 ppm' come from (0.02%?)? There is no description in previous sections.

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 14541, 2011.