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Interactive comment on “ECHAM5-wiso water vapour isotopologues simulation and its comparison with WS-CRDS measurements and retrievals from GOSAT and ground-based FTIR spectra in the atmosphere of Western Siberia” by K. Gribanov et al.

K. Gribanov et al.

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Dear Reviewer,

Thank you very much for your review and useful remarks. We improved the text of our paper in accordance with your remarks and criticism where it was possible. Please find answers to your questions below in this letter.

C7150

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You recommended to eliminate the FTIR and GOSAT data to concentrate on investigating the nuances of the difference between ground based point source measurements and model simulations.

We fully removed all discussion on GOSAT data and the retrieval of some atmospheric parameters from these data as it was reported by J. Gero et al. in their report "GOSAT TIR Band Inter-calibration with Satellite Infrared Sensors" on 5th GOSAT PI Meeting (May 27, 2013, Yokohama, Japan), TIR Band of TANSO-FTS is badly calibrated. This calibration has explicit dependence on spectral coordinate and, probably, each spectral line has wrong shape. This circumstance makes retrieval of HDO (and especially δD) not feasible and, probably, explains our unsatisfying results. GOSAT officials reported to release new corrected version of data products, but this version (V160.160) will be obtained after reprocessing of the data obtained only after spring of 2013. So, retrieval of HDO (delta values) from thermal infrared spectra of TANSO-FTS will be presented in a future paper once the work that we will conduct using new corrected GOSAT data will produce reliable δD retrievals.

We did not eliminate FTIR data because we added more data and improve the comparison. As for nuances of differences between point measurements and ECHAM5-wiso model. The main purpose of the project and this paper is to check the feasibility of ECHAM5-wiso use for the future studies of regional climate changes and to check the methods of validation of model results using different types of measurements. Unfortunately we are not able partially to focus on differences between point measurements and model results because of different scale of compared values. Grid box of the ECHAM5-wiso model has size of $1.9^\circ \times 1.9^\circ$ which is much much greater than the point of Picarro measurements at Kourouka observation site. This grid box is located in our case above relatively complicated terrain with altitude differences about 400 m and a number of small lakes and rivers. This is a subject of another study.

“Does solar zenith angle come into play?”

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Solar zenith angle in FTIR measurements was not greater than 72° and we did not find noticeable influence of this angle.

“Why are FTIR data not compared with Picarro data since they are collocated?”

In revised version of the paper we made the comparison of FTIR and Picarro data. Please see Fig. 11 in the revised version.

As for structure of manuscript, we rearrange its structure in revised version in accordance with your criticism. Descriptions of data sets now are placed before description of the model and comparisons.

We use “in situ” in revised version of paper only regarding Picarro point measurements. And, finally, we cleaned the revised version of paper from incorrect use of “isotopes” and use correct word “isotopologues”.

Sincerely yours, Konstantin Gribanov

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/13/C7150/2013/acpd-13-C7150-2013-supplement.pdf>

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 2599, 2013.

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