Atmos. Chem. Phys. Discuss., 8, S71–S73, 2008
www.atmos-chem-phys-discuss.net/8/S71/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Technical Note: New ground-based FTIR measurements at Ile de LaRéunion: observations, error analysis, and comparisons with independentdata" *by* C. Senten et al.

T. Borsdorff

Tobias.Borsdorff@imk.fzk.de

Received and published: 31 January 2008

Dear C. Senten et al.,

I found that you made reference to our paper on interference errors in infrared remote sounding (Sussmann and Borsdorff, 2007) in this discussion. As an author I want to help to correct some misunderstandings about interference errors made in your work. For clarity I will address some of your statements that are not acceptable.

1.) "...Since we have found that for all considered target species, the cross state error

is an error source of minor importance ..."

This finding disagrees with our work (Sussmann and Borsdorff, 2007). We demonstrate that interference errors are of major importance for CO retrievals from solar FTIR spectrometry. Figure 11 of Sussmann and Borsdorff (2007) shows that interference errors can actually exceed the smoothing error. Therefore, variations of the interfering species can be falsely classified as variations of the target molecule.

2.) "... the interfering species is represented as a scalar parameter, and the variability of the interfering species' vertical distribution, which is a second order effect, is neglected ..."

This approach may explain your finding, that interference errors would be of minor importance. Section 2.2.2 of Sussmann and Borsdorff (2007) shows that representing the interfering species by a scalar parameter leads to a significant underestimation of the interference error. Our paper demonstrates that it is essential to calculate the interference error on a fine altitude-resolved grid to avoid this underestimation.

3.) "What we have called the forward model parameter error corresponds to Worden's cross state error, because it refers to the errors induced on the retrieved target parameter by the model parameters that are fitted together with the target parameter."

Your interference error calculation is not in line with your retrieval setting. The error estimation in your section 3.4.2 is for the case that the interference species are not retrieved. But you have to calculate the interference errors for your case where the interference species are fitted jointly with the target molecule. You can see in in Fig. 11 of Sussmann and Borsdorff (2007) that the interference errors differ noticeably between these two cases.

I hope that these notes will help to estimate the interference errors for your retrieval correctly.

Kind regards, Tobias Borsdorff

ACPD
8, S71–S73, 2008

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 827, 2008.

ACPD

8, S71–S73, 2008

Interactive Comment