

## ***Interactive comment on “Interference errors in infrared remote sounding of the atmosphere” by R. Sussmann and T. Borsdorff***

**R. Sussmann and T. Borsdorff**

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Dear Anu,

you are welcome: we are certainly willing to include your paper and the others you mentioned into our reference list.

Initially, we were a bit surprised that you as an expert started commenting by mixing up "your" case (unretrieved interfering species), which can be done by the well known formalism of model parameter errors ( $2^{nd}$  term in equation 3.16, Rodgers, 2000) with "our" case (retrieved interfering species), which requires a different formulation, which is not contained in any of the four terms of classical error analysis (Rodgers, 2000; equation 3.16).

But finally, we are happy again with your last paragraph, where you switch over to an

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acknowledgement of this very difference, saying:

*"... your approach is the theoretically optimum one of simultaneously retrieving \*everything\* that could possibly affect your target species, whereas those faced with having to construct a practical retrieval algorithm for operational satellite measurements have opted for the approach of retrieving relatively few parameters and selecting the microwindows so as to minimise (but still quantify) the error contributions from unretrieved parameters, which are mostly the interfering gas lines."*

- and we perfectly agree with this comment.

So, all in all, it is interesting to pursue this kind of “inter-community” dialog (ground-based versus satellite): As you say, in operational satellite retrievals, the interfering species have historically often not been retrieved due to computation power limitations. However, we might forecast a tendency that - as computation power increases in the future - more and more satellite retrievals will be able to utilize our optimum strategy of jointly retrieving profiles of all interfering species with weak (minimized) regularization, since this practically eliminates the interference effect. Furthermore, in so doing, the issue of microwindow selection will become much less critical as we have shown in the revised paper. This is because a weakly regularized profile retrieval of interfering species represents an interference-species selective deweighting of the retrieval. This automatically takes the actual strength of the spectral feature of the interfering species into account, e.g., depending on tangent altitude. Therefore, there will be less need for extensive microwindow cutting in future satellite retrievals and the information content for the target species will increase at the same time.

We have included part of these considerations into the revised paper. In this sense we like to thank you for a stimulating comment.

All the best and kind regards  
Ralf

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