

## ***Interactive comment on “Inelastic scattering in ocean water and its impact on trace gas retrievals from satellite data” by M. Vountas et al.***

**M. Vountas et al.**

Received and published: 9 September 2003

**We would like to thank the referee#2 for his inputs.**

### **1. Comment 1.**

We avoided to show explicit differences and residuals at this stage for the sake of brevity. We believed (and still believe) that it is sufficient (as a motivation and validation of this study) to show that the spectral structures modelled can be 'found' by DOAS not only from GOME but also from specifically measured swimming-pool spectra.

We could show that there is significant spectral difference between Ring and VRS (Fig. 3 by visual inspection), implying that the fit result cannot be attributed to uncompen-

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

sated Ring.

A direct comparison of the fit results of GOME and the swimming-pool spectra will not be possible, as the latter are not results of retrieval (from an OD) but a spectral decomposition.

We cannot see a weak point in our methodology and would like to keep the corresponding sections as they are.

## 2. Comment 2.

We understand the problem referee#2 had interpreting the plot but it is based on a misunderstanding. Let us explain the matter in a simplified way: If we would fit two scale factors 'a' and 'b' in the following expression:

$$||OD - ax - by|| - > min$$

a residual 'r' can be defined after the fit:

$$OD - ax - by = r$$

Neglecting the term 'a x' would lead to:

$$OD - by = r1(= r + ax)$$

or neglecting the term 'y x' would lead to:

$$OD - ax = r2(= r + by)$$

thus other residuals 'r1' or 'r2' would be the result. Widespread, in the DOAS community is to compare such an 'r1' with 'a x' and 'r2' with 'b y'. This is what we have done.

In the manuscript we have defined the quantities 'r1' and 'r2' as 'corresponding residuals'. Which are not identical to the overall residual 'r' but the sum of 'r' and 'a x' or sum of 'r' and 'b y'. The difference between the curves in each plot is 'r'!

=> We have added a note to clarify this point

'Figure ... shows the comparison of the fitted result for both spectra – VRS and RRS – and the *corresponding* residuals of the experimental spectrum. The difference between the fitted result and *corresponding* residual results into the overall residual.'

### 3. Comment 3.-4.

We agree with referee#2 (and #1) and have made substantial changes to this section. Originally, we tried to show limits of the impact.

=> Therefore we have set the values of Chlorophyll-a concentration to extreme values. However, for the sake of generalization of the results we agree with referee#2 and have therefore repeated computations for other values of C. We have also completed the computations for all combinations of C and SZA (see below). The radiative transfer model has been set up in a slightly different way compared to the original computations (the old setup has been lost in a computer crash). This led to slight difference in the SC values originally computed and the corresponding new ones. Of course, the trend remained the same.

Taking into account the comments of referee#1 and referee#2 on section 7 we decided to re-structure the whole section:

1. We have focussed on BrO (and only briefly discussed results for HCHO and other gases)
2. Instead of dealing with 6 cases only the first (true SC) and the second (neglecting VRS) remained.
3. Instead of dealing only with  $C=0.01$ ,  $0.001 \text{ mg/m}^3$  we have added scenarios with  $0.1 \text{ mg/m}^3$ . All computations have been repeated for 30, 50 and 70 deg SZA.
4. We have set up a new (tabular) table (as part of the text) and removed the eps-file originally containing the table.
5. As the theoretical results now agree better with the results for BrO retrieval from GOME (due to lower values of C) we have noted it in section 8 "BrO retrieval from GOME" and in the "Conclusions". Also a slight change in the "Abstract" has been necessary.

Overall, we find a consistent picture: If we increase C to 0.1 we see less impact on BrO for all SZA considered. The whole results in Tab. 1 show a consistent picture of what we have expected from our model.

We hope that this important section improved by focussing on VRS impact only.

---

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 2931, 2003.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)