

## ***Interactive comment on* “Total ozone retrieval from GOME UV spectral data using the weighting function DOAS approach” by M. Coldewey-Egbers et al.**

### **Anonymous Referee #1**

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The authors present an improved method to retrieve total ozone from GOME. Their innovation is to do the DOAS fit with weighting functions. Further, an effective ground height and the Ring effect are included in the retrieval. A sensitivity study with respect to the Ring effect and an overall error analysis is presented. Their retrieval results are compared to standard GOME retrieval. The authors demonstrate their results match better a ground measurement series. Further, they tested two case studies. I suggest publishing this interesting and concise paper within ACP after clarification of the points below.

Major points:

(1) Make it easier for the reader to evaluate your results with respect to standard GOME

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(is Ring effect considered there similarly? How is effective height treated there?) Due to which of your improvements (weighting function fit, Ring effect or effective heights) you mainly get the improved results? Fig. 4 and 8 might be fused to discuss this. Including the ground-standard GOME comparison to Fig. 7 might improve the comparability of results.

(2) More information is necessary in the Himalaya case study, or this section should be omitted completely. Fig. 6 is not sufficient to realize how ozone depends on effective height, as altitude is also a function of latitude. Thus, either latitude has to be fixed in the comparison or in the text it should be explained which conclusions can be drawn despite the latitude effect. I suggest to estimate the amount of total ozone which is expected to decrease above the Himalaya due to the height effect and to relate this number to the observed results.

Minor points:

- a) Abstract: please address major point 1. Due to which of your improvements (weighting function fit, Ring effect or effective heights) you mainly get the improved results?
- b) Introduction: 4918-14 motivate section 5 (which is not well integrated in the paper anyway)
- c) Algorithm description: 4918-5ff As weighting functions are essential to your paper, mark them in the formula (or add to the parameter description) to pick easily for less involved readers. SCD should be written full once, explain  $\Pi$
- d) 4920-8-10 is unclear at this point. Suggestion: “ In the actual retrieval the lower boundary is chosen according to ground height, cloud height and cloud fraction (see Sect. 3.1)”
- e) Fig. 1 can be excluded and the figure caption fused with the text without loss of information. If the authors choose to keep Fig. 1, clarity should be improved.
- f) 4922-14 “ Effective altitude” -> should be “effective height”

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- g) 4924-10-12 why? Give reference or more explanation
  - h) 4927-6 What about the rather low ozone values at low altitudes (0-1 km?)
  - i) Fig. 3 improve axis description. RAZ =? Choose better y-label.
  - j) Fig. 7 caption "Hohenpeissenberg" instead "Hpeissenberg"
  - k) Fig. 6 y-label "WFM" not used in this paper, use "WFDOAS"
- end -

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Interactive comment on Atmos. Chem. Phys. Discuss., 4, 4915, 2004.

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