CLOUD INFORMATION CONTENT ANALYSIS OF MULTI-ANGULAR MEASUREMENTS IN THE OXYGEN A-BAND : APPLICATION TO 3MI AND MSPI

G. Merlin, J. Riedi, L. C.-Labonnote, C. Cornet, A. B. Davis, P. Dubuisson, M. Desmons , N. Ferlay, and F. Parol

The authors would like to thanks Dr. Loyola for his comments and interest in the paper. Please find hereafter our responses to comments and suggested corrections.

GENERAL COMMENT

- sections 4.2 and 4.3
In the paper from Schuessler et al. we show that, in agreement with this paper, in general it is not possible to simultaneously retrieve CTOP and CGT. Furthermore, in the paper from Schuessler et al. we also show that CTOP and COT can be retrieved simultaneously form mono-angle (nadir) O2 A-band measurements. As the main focus of this paper is multi-angular measurements, it will be interesting to know what is the gain in information content for the retrieval of CTOP and COT using multi-angle O2 A-band measurements.

We would like to clarify that the conclusion that simultaneous retrieval of CTOP and CGT is not possible in general only stands for single view measurements. From our study, we clearly establish that the retrieval of CTOP and CGT is feasible in many cases from multi-angular measurement in the O2 A-band contrary to the paper from Schuessler et al, who.do not use the same type of measurement (hyperspectral/multi-angular).
This being stated, we fully agree that, the A-Band measurements are also sensitive to COT but our present work does not aims to study the retrieval of COT which is treated here as a known parameter within a given range of uncertainty.
However Dr. Loyola raises a very interesting question which the authors are currently investigating as a follow-on study to the present paper. In practice, the gain of information on COT and CTOP using multi-angle O2 A-band measurements, compared to single view, can only be clearly evaluated once one takes into account the vertical distribution of the cloud extinction which in turn implies accounting simultaneously for cloud geometrical thickness. Therefore this problem becomes largely under-constrained for single view observations (safe maybe for hyperspectral measurements). Hence, it is quite difficult to establish a strategy to evaluate the gain on CTOP and COT without simultaneous consideration of CGT and such a comprehensive study is currently undergoing as part of the lead author's PhD work.

DETAIL COMMENTS

- page 4, line 19
Besides SCIAMACHY, the O2 A band is used for the operational retrieval of cloud properties from the GOME and GOME-2 sensors, see:
Loyola, D., Thomas, W., Livschitz, Y., Ruppert, T., Albert, P., and Hollmann, R.: Cloud Properties Derived From GOME/ERS-2 Backscatter Data for Trace Gas Retrieval., IEEE T. Geoscience and Remote Sensing, 45, 2747–2758, 2007.

l.59 : + Loyola et al. (2007) also exploited GOME and GOME-2 sensors hyperspectral measurements to retrieve CTOP.

We have added the reference to Loyola et al (2007).

- page 15, line 18
A reference to the paper from Schuessler et al. on information content could be added here.

The reference has been added.

- page 30, line 3
The correct reference is "Schuessler, O., Loyola, D., Doicu, A., and Spurr, R." instead of "Schuessler, O., Rodriguez, D. G. L., Doicu, A., and Spurr)

The reference has been corrected as obviously the author knows best how to be cited. However we would to point out that the DOI for that paper taken from the journal website provides the following reference to be cited (from http://ieeexplore.ieee.org/xpl/downloadCitations) :
O. Schuessler, D. G. L. Rodriguez, A. Doicu and R. Spurr, "Information Content in the Oxygen A-Band for the Retrieval of Macrophysical Cloud Parameters," in *IEEE Transactions on Geoscience and Remote Sensing*, vol. 52, no. 6, pp. 3246-3255, June 2014. doi: 10.1109/TGRS.2013.2271986