First of all, we would like to thank the authors on the successful creation of the new FM3 ozone absorption cross sections. Just as the authors mentioned in the paper, using the absorption cross sections measured with the satellite spectrometer in the trace gas retrieval can significantly reduce the fit residuals.

DLR currently uses GOME FM cross section reconvolved with the GOME-2 slit function for the GOME-2/MetOp-A ozone retrieval algorithm GDP 4.6 (Loyola, D. G., et al. 2011) because of the poor quality of old GOME-2 FM3 cross sections. We tested the new FM3 ozone absorption cross sections (provided by the authors) with GDP. The GDP algorithm employs the two-step Differential Optical Absorption Spectroscopy (DOAS) method, with slant column fitting in the 325- 335 nm spectral window followed by an iterative Air Mass Factor (AMF) conversion to the vertical column density. One difficulty in retrieving total ozone in Huggins bands is the temperature dependence of O3 cross sections. In GDP 4.x, we use an approach fitting a linear combination of two O3 cross sections. We assume that the temperature dependent cross sections can be linearly expanded as follows:

$$\sigma o3(Teff) \approx \sigma o3(T0) + \partial \sigma o3/\partial T * \Delta T$$

The detail can be found in Van Roozendael M. et al., 2002. As long as the assumption of linear dependency in temperatures is satisfied, the retrieval should in principle be independent of choice of the temperatures selected for use in the DOAS fitting procedure. Therefore, we tested the respective behavior of the GOME FM98 reconvolved with the GOME-2 slit function (202K, 221K, 241K, 273K), FM3(203K, 223K, 243K, 273K) and Brion (218K, 228K, 243K, 273K) data sets. We selected one pixel (orbit: 20392 15/04/2012, pixel: 8500) as example. Additionally we tested the quadratic parametrisation of the ozone cross section as done in the WFDOAS retrieval used in the paper. Four parameters have been used for analysis: the RMS, the percent change in O3 slant column relative to the column obtained using FM98 241-221K combination (GDP 4.x settings), the retrieved effective temperature and the O3 cross section shift. Results (seeFigure 1) obtained with the FM98 and Brion show stability in the sense that the values retrieved for each test parameter are independent of the

couple of cross sections selected for processing. In contrast, results obtained with the FM3 show a much larger variability. Difference in O3 slant columns as large as 4% can be obtained depending on the combination of cross sections selected for retrieval, mostly as a result of the instability of the derived temperature. We also noticed that the large difference is always related to cross section in 223K. **Is it something wrong with the measurements at this temperature? The authors should clarify this in the manuscript.**

If the FM3 quadratic parametrisation is used instead of the original FM3 cross sections, the scatter of the results is naturally decreased and the comparisons are consistent with the results of the authors (about 1% ozone difference between using FM98 and FM3). **Therefore, the authors should clearly mention that the FM3 quadratic parametrisation should be used instead of the original cross-sections in the GOME-2 ozone retrieval or other application.**

Reference:

Van Roozendael, M., V. Soebijanta, C. Fayt, and J.-C. Lambert (2002), Investigation of DOAS issues affecting the accuracy of the GDP version 3.0 total ozone product, in ERS-2 GOME GDP 3.0 implementation and Delta validation, edited by J.-C. Lambert, Rep. ERSE-DTEX-EOAD-TN-020006, pp. 97– 129, Eur. Space Res. Inst., Eur. Space Agency, Frascati, Italy.

Loyola, D. G., et al. (2011), The GOME-2 total column ozone product: Retrieval algorithm and ground-based validation, J. Geophys. Res., 116, D07302, doi:10.1029/2010JD014675.

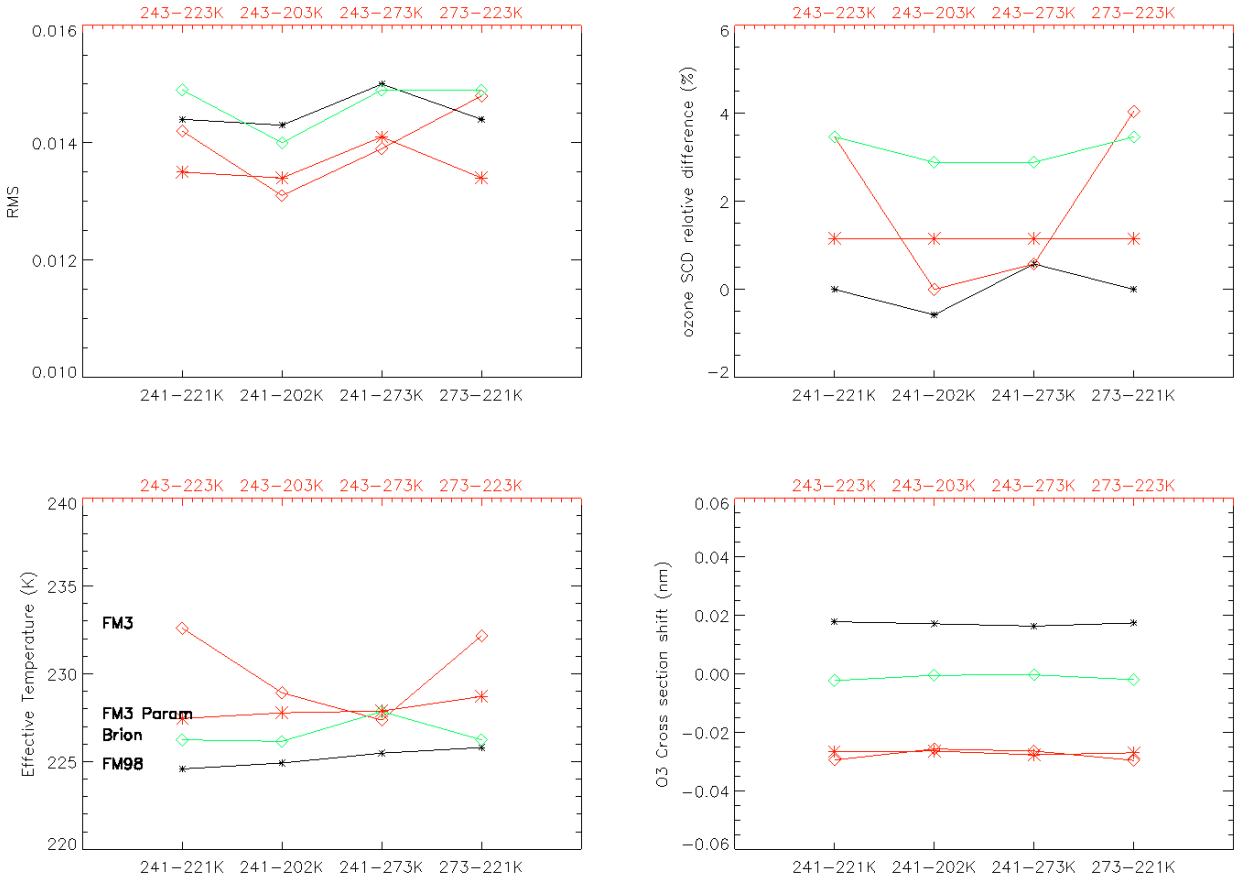

Figure 1 RMS fit residuals, O3 slant column relative differences, effective temperatures and O3 cross section shift after DOAS retrieval of the pixel 8500 of the GOME-2/MetOP-A orbit 20392, using different combinations of O3 absorption cross-section data sets.