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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A Multi-sensor Upper Tropospheric Ozone Product (MUTOP) based on TES ozone and GOES water vapor: derivation" *by* S. R. Felker et al.

Anonymous Referee #2

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This is an interesting paper on expanding the coverage of TES along-track ozone measurements using a regression method that combines high resolution fields of H2O and PV to estimate high resolution fields of UT ozone. The derived data product may be potentially useful for studying STE effects on the budget of tropospheric ozone. The paper is well written with good content and it should be published, but there remains an important issue regarding the regression model which is key to this paper.

In equations 2-4 a simple regression model is invoked involving three derived constants (a, b, c). It would be important to include values (in main text or maybe in a table) for the computed one-sigma or two-sigma statistical uncertainties for these derived constant

coefficients which one can get from the three diagonal elements of the derived covariance matrix. The off-diagonal elements of the covariance matrix would also provide information of covariance/correlation between H2O and PV which may be substantial especially in NH spring withing the analyzed region. Equations 3 and 4 list the coefficients to four or five significant digits, but their actual uncertainties could possibly be as large in magnitude as the derived coefficient numbers themselves.

Does the Moody et al. paper (manuscript in preparation) on ozonesonde validation of this MUTOP product cover several years and with global extent? If so, does basic seasonal variability tend to agree between the MUTOP product and ozonesondes? It is difficult to properly evaluate a new data product with just one month of measurements over one sector of the globe – ideally the evaluation should cover many years with global extent to investigate basic features such as seasonal variability. There is also something somewhat circular in the validation of the MUTOP product in the current paper - a regression model is used which combines H2O and PV with TES ozone and then compares with TES ozone.

The conclusions section 6 mentions a future plan to evaluate the method over a longer record than the one month of INTEX-B in this study. As the authors point out, STE effects are greatest in the NH in spring months and the constant coefficients could be very different over the analyzed GOES West region during other times of the year. It is possible that for the one month of measurements in this study that the regression coefficients would have a significant spatial variability over the analyzed region. Have the authors tried partitioning the analyzed region, perhaps into two or three sub-regional latitude bands to improve the regression results?

Figures - some of the figures have axes labeling which is too small to be read (e.g., especially Figures 3, 4, and 7).

Typo – In the main text and also references section, Ziemke is misspelled.

The paper again is well written with good content and should be published, but requires

some further analysis mostly regarding the statistical evaluation. For the most part these modifications are straightforward and minor.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 30055, 2010.