**Atmospheric
Chemistry
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Discussions**

Interactive
Comment

Interactive comment on "Comparison and evaluation of modelled and GOME measurement derived tropospheric NO$_2$ columns over Western and Eastern Europe" *by* I. B. Konovalov et al.

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General Comments

This is an important and relevant paper which presents the first comparison of GOME tropospheric NO2 columns to modelled values from a regional CTM. It also develops a useful statistical approach for comparisons of NO2 columns between models and satellite observations. It would however would benefit from some restructuring and additional explanation in section 6.2 (see specific comments) and some minor langauge issues should be addressed before final publication (see technical corrections)

specific comments

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page 6513, line 11. Please state here how many stations were excluded from the analysis by this process and whether or not there was any areas where a large proportion of the stations were removed.

page 6527 "It is seen that the errors are rather significant for both regions, and that they are larger when compared with the standard deviations than with the means of GOME derived data, especially for Eastern Europe. The last observation means that variations of the NO_2 columns in space are more uncertain than their absolute values." I do not follow this point - surely all that this tells you is that the standard deviations of the columns are smaller than the mean values?

page 6528. After introducing the model of errors and before discussing any results for the running evaluations of $E^{0.5}$ it would be useful to explain the methodology which will be used to extract information from these plots. I found this very important section to be somewhat confusing and would benefit from more explanation of the methods used. In particular on page 6531 it states "The slopes of the linear fits give estimates of the upper limit of the mean relative (multiplicative) error of the respective data, and the origin of the fits on the axis of ordinates give estimates of mean additive error." This should be mentioned at the start of this section. See also the following 2 comments.

page 6529 2nd paragraph. "The results of the analysis of such artificial errors are presented in Fig. 8." Please explain in more detail which 2 datasets were used to calculate E in each case and which set of NO_2 columns this is plotted against for each of the plots.

page 6529 3rd paragraph "our analysis allows us to evaluate the upper limits of the relation of the standard deviation of the multiplicative random errors (r) to the factor of the systematic multiplicative error (s) as the magnitudes of the slopes of the best linear fits shown in Fig. 7. The same magnitudes, evidently, give an estimate of the random part of the mean relative error, as the latter represents (by the common definition) the mean ratio of an absolute error to the measured (or theoretically specified) value of

the quantity considered, rather than to the unknown true value." Please explain these statements in more detail and justify them

Figure 3 - please use consistent units for these concentrations (either ppb or micrograms/m3)

Figure 4 - If it is possible it would be much easier to follow this plot if it was all on one page in a 2x2 format.

Figure 9 legend - fragments -> a subsection

technical corrections

pg 6504 line 5 distinctive -> distinct line 10 data of ground -> data from ground

pg 6505 line 23 out from more than 100 ones in -> out of more than 100 in line 27 as soon as -> as far as

pg 6506 line 16 on a degree -> on the degree line 18 which take an important part in variability of -> which play an important part in the variability of

pg 6507 line 17 up to our knowledge, -> to the best of our knowledge the line 22 best -> well line 23 in-detail -> detailed

pg 6508 line 6 uncertainties (distinctive from -> uncertainties (as distinct from line 7 pixel -> pixels

pg 6509 line 13 Description of -> A description of line 18 Therefore, only those features are mentioned below, which are most important in the context of the given study or specific to our extended version of CHIMERE. -> Therefore, only those features which are the most important in the context of the given study or specific to our extended version of CHIMERE are mentioned below.

pg 6510 line 7 to compensate this too -> to compensate for this too line 13 fixed at 500 hPa -> fixed at the 500 hPa line 14 of the most part -> of most line 17 as it is argued

-> as is argued line 22 Delete Besides

page 6511 line 18 splitted -> split

page 6512 line 16 suit best -> are best suited

page 6513 line 10 with the data -> with data line 13-14 done to involve -> made to include line 16 at Russian -> in the Russian line 20 Up to our -> To the best of our line 24 of surface -> of the surface line 28 to be most -> to be the most

page 6515 line 25 percents -> percent

page 6516 line 1 percents -> percent line 4 percents -> percent line 17 -> total Eastern Europe -> whole of line 18 on the very -> on a very line 24 in this remote -> at this remote

page 6517 line 11 levels, on the average with -> equals on average line 16 delete 'data of'

page 6520 line 13 Besides -> also line 18 to simulate -> of simulating

page 6530 line 14 also the fragments of the corresponding dependences -> also the corresponding section of the curve line 22 level of NO2 pollution are situated usually in vicinity -> levels of NO2 pollution are usually situated in the vicinity

page 6533 line 21 percents - > percent line 24 estimations for -> estimation of

page 6535 line 25 dominating -> dominant

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 6503, 2004.

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