

Interactive comment on “Comparison and evaluation of modelled and GOME measurement derived tropospheric NO₂ columns over Western and Eastern Europe” by I. B. Konovalov et al.

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First of all, we would like to thank the reviewer for the positive evaluation of our paper, constructive comments and helpful linguistic corrections.

The major criticism of the reviewer concerns the way of presentation in section 6.2. We agree with this criticism. This section is restructured, and additional mathematical formulations/justifications is added in the revised version of the paper. More detail explanation of the results shown in Fig.7 and Fig.8 is added in the text and the respective figure captions.

We cannot completely agree with the comment to p. 6527. In fact, the ratios of RMSE

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to the mean and to the standard deviation address different characteristics of random spatial fields (as in our case) or stochastic time series. The first ratio characterizes an uncertainty of absolute values, while the second one characterizes uncertainties in relative changes of a considered quantity from one point to another. Obviously, both kinds of uncertainties may be very different. In particular, one can easily imagine a hypothetical situation when the uncertainties of absolute values predicted, e.g., by a model approach zero, but the spatial variability of the same values is nevertheless absolutely meaningless. However, as we see that the commented statement is not understood quite unambiguously, the sentence “The last observation means that variations of the NO₂ columns in space are more uncertain than their absolute values” is replaced by more “neutral” sentence “The ratio of RMSE to the standard deviation (it is sometimes referred to as the root relative squared error) characterizes, in our case, uncertainties in spatial variability of NO₂ columns”.

We agree that it would be preferable to use “consistent” units for concentrations (either ppb or micrograms/m³) in Fig.3. The problem is that EMEP data are provided in micrograms/m³, but the data from two Russian scientific stations are in ppb. Therefore, in order to present the results for all stations in the same units, we have to transform the measurement data using values of air density from our model. Taking into account that insufficient spatial resolution of our meteorological data may lead to noticeable inaccuracies in air density (especially in mountainous regions), we do not think that such transformation of the experimental data would be legitimate. Nevertheless, in order to explain the reader why we use different units for different stations, we have added a special comment to the legend to Fig.3.

The plot 4 was in 2x2 format in the original manuscript, but the publisher made the change, which, unfortunately, we did not notice during the proofread stage. We hope that it will be possible to return this plot to the initial format in the final version of the paper.

We accept all other comments and corrections, and have made necessary changes in

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the revised manuscript.

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