

## ***Interactive comment on “Comparison and evaluation of modelled and GOME measurement derived tropospheric NO<sub>2</sub> columns over Western and Eastern Europe” by I. B. Konovalov et al.***

### **Anonymous Referee #1**

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#### General Comments

The paper provides a useful comparison between observed NO<sub>2</sub> columns from GOME in the troposphere and modelled concentration fields. In my opinion, a few clarifications would be in place, see the comments below.

#### Specific Comments

In section 3 a short evaluation of the model performance for ozone is given which should give confidence in the model as a whole. Admittedly, good performance for

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ozone is such an indication. But at the same time it is argued that models such as the CHIMERE model do not very well capture ground level NO<sub>2</sub> concentrations. To my opinion the paper would benefit from an additional explanation why this fact does not (or only to a limited extent) hamper the comparison with the GOME data. In other words, it would strengthen the paper if it could be made plausible that simulated column values of NO<sub>2</sub> are not really affected by the model's inability to simulate near-ground NO<sub>2</sub> levels. In addition it would be nice if some comparisons for NO<sub>2</sub> with ground level measurements could be shown.

The authors observe a difference in model performance for Western and Eastern Europe. At the same time they identify different NO<sub>2</sub> "regimes", both in the GOME values and in the modelled concentrations. Since they also state that CHIMERE has been developed for polluted conditions in Western Europe, could it be that the analysis is hampered by the fact that CHIMERE performs worse for chemical regimes as they appear to be present in Eastern Europe? A comment on this would be in place.

The above is also relevant for the suggestion by the authors on the emission strengths. If the model responds in an inappropriate way to emission changes, the suggestion on the possibly to large change in 2001 compared to 1997 in the NO<sub>x</sub> emissions as provided by EMEP is not in place. In the other hand, if the model outcome can be made plausible, it strengthens the suggestion. Although on page 6522 the authors state that "this is beyond the scope of this paper", on page 6523 this suggestion is repeated without this restriction.

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

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