

Interactive comment on “The nitrate aerosol field over Europe: simulations with an atmospheric chemistry-transport model of intermediate complexity” by M. Schaap et al.

Anonymous Referee #2

Received and published: 28 January 2004

Review of the paper

Title: *“The nitrate aerosol field over Europe: simulations with an atmospheric chemistry-transport model of intermediate complexity”*.

Authors: M. Schaap, M. van Loon, H. M. ten Brink, F. J. Dentener and P. J. H. Builtjes

General remarks

The paper is in general divided into three parts: 1) A short description of the applied LOTOS model, 2) a model results and validation part and 3) a part concerning optical depth and radiative forcing. The parts 2) and 3) are handling issues interesting to the scientific community both within air pollution modelling and within climate change.

It seems, however, that the authors could not decide whether the paper is a model validation paper or a paper on radiative forcing?

The title of the paper suggests that the main focus of the paper is nitrate aerosols over Europe. This does not really cover the real contents of the paper, which also includes other important species. Furthermore, the title does not suggest in which context the nitrate is interesting (is it air pollution/human health or climate change?). Also the abstract is not consistent with the title and with the contents of the paper. From the reviewer's point of view, the authors try to focus on too many things at the same time. This requires that the issues handled in the paper are treated in a very systematic way and that the authors choose the main focus of the paper or that the paper is split into two.

The paper focuses partly on a multi-species validation of the LOTOS model, which is fine. In contrast to the title and abstract, the authors include nitrate, sulphate and ammonium both in the validation part and in the radiative forcing part. Furthermore, the effect from nitrate on radiative forcing seems to be smaller than the effect from sulphate as stated in the paper, which suggests that the nitrogen is less interesting compared to e.g. sulphate.

The paper is also very long and, I am sorry to say a little boring to read. It is hard to keep the focus of the paper in mind during the many and very detailed discussions. Many of these discussions could be shortened considerably.

In general, I recommend that the paper should be published, after some revision. Especially the title, the abstract and the structure of the paper should be reconsidered. The authors should consider splitting the paper into two papers with a clear focus in both papers. This requires, however, that the radiative forcing should be extended with more calculations and validations with satellite data.

Specific major remarks

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

Section 2.1: The authors state that the LOTOS model is a 3D model. I would suggest that it is changed to the phrase: "semi-3D model", since only three vertical layers are included, which is not comparable to the full 3D state-of-the-art models with more than 20 layers.

The text below figures 7-10 does not correspond to the contents of the figures.

In figures 1, 3 and 13, it is very hard to see which figure corresponds to which species or season.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 5919, 2003.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)