**Atmospheric
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Comment

Interactive comment on "Direct radiative effect of aerosols emitted by transport: from road, shipping and aviation" *by* Y. Balkanski et al.

Anonymous Referee #2

Received and published: 12 March 2010

The manuscript presents the direct aerosol radiative forcing of aeosol and aerosol precursor emissions from traffic, separately for road traffic, ship and aviation emissions. Two atmosphere models and different radiation codes are used to estimate the range of possible forcings. There are only few studies estimating the climatic impacts of traffic emissions, in particular that from road traffic. Thus, this study certainly warrants publication. Following few comments, which should be taken into account:

1. Table 1. Compare the AOD from traffic emissions to the total anthropogenic AOD as for instance reported in Schulz et al

2. Please, add to table 1 the atmospheric residence time of the aerosol components.

3. P 1667-1670: Please, describe the radiation schemes in a way, which makes clearer

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what the differences are. E.g. the Reading radiation code follows the two-stream delta-Eddington approximation; what about the INCA code?

4. According to the figure caption, Figure 4 displays the radiative forcing separately for each of the chemical aerosol components assuming internal mixture of BC, OC, SO4 and water. Please, explain the method to separate the forcings. The assumptions about the mixture affect the hygroscopicity and the radiative forcing. Is it really meaningful to quantify a fictional forcing of the chemical components, which add very likely in a non-linear way?

5. P 1672, ln 1-4: "The much higher value obtained in the case of the UiO model can mainly be explained by the higher burden". The normalized radiative forcing of aviation as calculated by the UiO model is higher by a factor of two compared to the other models. This indicates also differences in the assumptions about hygroscopicity and/or optical properties. Why are the normalized forcings between the models and the emitters that different?

6. Chapter 3.2: Two factors contribute to the negative forcing of ship emissions, the higher amount of SO2 emissions compared to road traffic emissions and the low surface albedo over sea. Is it possible to separate these effects?

7. Traffic accounts for more than 10% of all greenhouse gas emissions. It would be very instructive to contrast the greenhouse gas effect of traffic emissions with the aerosol effects.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 1659, 2010.

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