**Atmospheric
Chemistry
and Physics**
Discussions

Open Access

Interactive
Comment

Interactive comment on "Vehicular emissions in China in 2006 and 2010" *by* N. Chao et al.

Anonymous Referee #3

Received and published: 27 May 2014

This paper focuses on an important topic of China's vehicular emissions. The authors calculated China's vehicular emissions and allocated the emissions to various spacial grids based on road network information. The policy impacts on the emissions were also discussed. The authors tried to discuss many aspects of China's vehicular emissions in one paper, but they seem not very familiar with these topics. In general, there is lacking novelty in the methodology or important findings in this paper. Therefore, I don't think this paper is suitable to be published in ACP in current form. Several major concerns about this paper are listed below.

Line 25, page 4912 to line 3, page 4913: The populations of MCs and RVs are presented in the statistical yearbooks for some provinces (e.g. Jiangsu). The authors could apply the existed data to validate their calculations.

Equation (2), Page 4913: where could you find the new registered vehicles for various

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

fleets in each province? Did you consider the scrapped vehicles each year? Your classification of vehicles is not consistent with that in China's statistical yearbook. How did you merge the statistical data of vehicle population into your classifications? These issues should be clearly addressed in the paper, because they are important to evaluate your results.

Line 22, page 4913: the authors applied VMT data of various fleets from one single literature (Liu et al., 2008) to calculate vehicle emissions of different provinces in China. On one hand, there are great differences of VMT data existing among various studies, which could have greater uncertainties comparing with emission factors. On the other hand, the average VMT data of each vehicle fleet are different among various provinces. Actually, China's first pollution source census has already indicated that the VMT in various regions are very different.

Line 3, page 4914: the author determined China's vehicular emission factors by vehicle fleets, fuel types and emission standards based on several researches, which usually focused on some specific regions (e.g. Beijing) or China national level. However, the emission factors could be influenced by many local characteristics other than emission standards, such as temperature, altitude, driving characteristics, and etc. Local vehicle age (or accumulated VMT) distributions could also influenced the average emissions factors of a specific vehicle fleet (e.g. LDGV_EURO 1). The author should clarify these local impacts and improve the quality of their vehicular emission factors by comprehensively reviewing the references, especially some local measurement results.

Line 4, page 4915: where could you find the vehicle population of each city in China? What is the problem to allocate provincial emissions, which including emissions from RVs and MCs, to various cities using the proportion of vehicles in each cities as proxy? Why do you apply the values of secondary and tertiary industries as proxy? Are there any results indicating local vehicle populations are closely related to the values of secondary and tertiary industries?

Equation (3), page 4915: Please provide the units of each parameter. What's the mean of $P_{m,k}$? Please clearly define it.

Equation (4), page 4916: what's the mean of SF? How did you calculate SF? Please provide more information about it. The emissions are not only related to the road traffic volume, but also relate to the traffic flow compositions (e.g. the proportion of HDDV). This kind of information is important to the traffic emissions.

Line 10, page 4916 to line 18, page 4917: the authors allocated vehicular emissions based on the road traffic information, which could also introduce problems. For example, RVs vehicles are mainly operated in rural area, heavy duty trucks and long-distance buses are mainly operate on the roads among various cities (e.g. highway, national road), cars are usually operated on the roads in urban areas. . . It would be a big improvement if these factors were considered in this study.

Line 27, page 4920: "All eight pollutants . . .." This result would be changed if you considered the various compositions of traffic flow in different kinds of roads.

Line 18 to line 23, page 4921: authors could not draw the conclusion that their results are more reasonable. You should verify your results with other objective data, e.g. monitoring data. . ..

Line 24, page 4921: the comparison with other studies are superficial. The author should further analyzing the key factors (e.g. emission factors, VMT..) causing those differences but not simply list the differences.

Section 4.2, page 4923: the authors analyzed the relationship between vehicular emissions and oil consumptions in China. I am not sure what kinds of oil were included here. Except gasoline, most of other oils (e.g. diesel, kerosene, etc.) were not consumed by vehicles in China.

Section 4.3, page 4924: except the urban area of some megacities (e.g. Beijing, Shanghai), the major NOX sources are still power plants and industries, which is dif-

ferent from USA and European countries. Therefore, satellite data of NO2 is not that suitable to verify China's vehicular emissions.

Section 4.4, page 4925: the scenario analysis of policy impact on vehicular emissions is weak in this study. I am not sure whether it could be deleted, because it looks less related to the major contents of this paper.

Line 14, page 4927: the authors should provide the detailed probability functions of the key input parameters (e.g. emission factors, VMT and even vehicle population). Otherwise, readers could not evaluate the reliability of the uncertainty analysis.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 4905, 2014.