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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Quantifying the uncertainties of a bottom-up emission inventory of anthropogenic atmospheric pollutants in China" *by* Y. Zhao et al.

Anonymous Referee #1

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With the rapid growth of economy and coal-dominated energy consumption, large amounts of air pollutants have been released into the atmosphere, leading to severe negative impacts on human health and environment. During the past years, emission inventories for different air pollutants (such as SO2, NOx, PM, VOCs, etc.) and different scales have been developed for the purpose of quantifying the emission status and air quality modeling. However, large discrepancies have been often found between the inventories and the results from satellite, aircraft, or surface observations. Thus, quantitative uncertainties assessment is required for better understanding of the real situations. The study conducted by Zhao and coauthors provides a Monte Carlo simulation method to quantify the uncertainties of a bottom-up emission inventory of an-

thropogenic atmospheric pollutants in China, in terms of 3 key criterion air pollutants, 7 dominant economy sectors, and national scope. Within the reviewer's knowledge, this paper is one of a limited number of studies on quantitative uncertainties assessment of emission inventory, especially for simultaneously 3 key pollutants and detailed sectors allocation discussions in China.

Reliability and accuracy of an emission inventory depend on data certainties of source activities, sulfur and ash contents in different kinds of fuels, the original unabated emission factors for different sub-groups of emitting sources in different regions, as well as the removal efficiency of dust collectors and FGD systems. For each parameter related to emission factors or activity-level calculations, the uncertainties, represented as probability distributions, are either statistically fitted using results of domestic field tests or, when these are lacking, estimated based on foreign or other domestic data. Particularly, the uncertainties from power plants sectors have been reduced by using detailed activity data and domestic emission factors on unit levels. Such efforts have made this study more reliable and complete compared to others previously reported.

Overall, the reviewer believes that this paper is of good quality, and of the great interest of the journal of Atmospheric Chemistry and Physics (ACP). Thus, I recommend publishing this paper with minor revisions in response to the following questions and comments.

1.Page 29081, Section 2.1, line 15, equation (4): the confirmation of VMT for different types of vehicles in different province is very crucial for the fuel consumption as well as for pollutants emissions. The reviewer suggests the authors give some discussion of the correlation between the calculated fuel consumption and the official statistical data.

2.Page 29084, Section 2.3: the fraction of emission sources is of great significance for the reliable activities and emission factors, especially for the sub-sectors in industrial sectors. The reviewer suggests the authors explore more detailed sources allocation for different provinces in their future work.

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3.Page 29086, Section 3.1: Some of the unabated emission factors are selected from SEPA literature in 1996 to estimate the emission in 2005. Some discussions are required to describe how valid this assumption is.

4.Page 29088, Para.4: For the transportation sector, the enforcement period of emission standard of Stage I and II is different Between Beijing and other provinces, does the authors considered the difference?

5.Page 29098, Para.2: Since the different scale of discrepancies by regions and seasons between emission inventories and the results from satellite, aircraft, or surface observations. The reviewer suggests that the authors conduct further research on province or region-specific uncertainty assessment for emission factors and activity levels, and seasonal distribution parameters.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 29075, 2010.

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Interactive Comment