

Interactive comment on “High-resolution inventory of technologies, activities, and emissions of coal-fired power plants in China from 1990 to 2010” by F. Liu et al.

Anonymous Referee #1

Received and published: 3 August 2015

Interactive comments on “High-resolution inventory of technologies, activities, and emissions of coal-fired power plants in China from 1990 to 2010” by F. Liu et al.

On the basis of the CPED database, including the detailed information of over 7600 individual coal-fired power plants and supplements with aggregated data, the authors developed a comprehensive and high resolution emission inventory for SO₂, NO_x, PM_{2.5} and CO₂ from China’s coal-fired power plants during the period 1990 to 2010. Undoubtedly, emission inventories for SO₂, NO_x, PM_{2.5} and CO₂ in this study, which are characterized by higher spatial resolution and more accurate temporal profile due to the extensive use of unit-based data, are necessary data for improvement the per-

C5542

formances of regional air quality modelling by using chemical transport models (e.g., WRF-CMAQ, WRF-CHEM, etc.) and policymaking for their emission control.

In general, the present manuscript is well written and presented with good quality, and I recommend the publication acceptance of the manuscript. However, some minor revision comments and suggestions should be addressed before the manuscript can be accepted for final publication.

Specific comments:

(1) Compared to previous emission inventories, the values of emissions from China’s coal-fired power plants estimated by authors are deemed to be much higher reliability on accounting of extensive use of underlying data at unit level. Nevertheless, the detailed activity data using in equation 1, 2 and 3 obtained from MEP-database is unpublished data. Therefore, in order to further convince the international readers of ACP, I recommend the authors supply some much more detailed information about parameters using in the emission calculation, especially for the data in 2010, such as provincial data of P, H, SCC, AC, etc.

(2) With the replacement of small plants with large and high-efficiency units and the continuously increasing application rate of advanced technologies, dynamic emission factors are applied in this study to estimate the historical emission inventory for SO₂, NO_x, PM_{2.5} and CO₂ during 1990-2010. The authors are recommended to make the verification for historical emissions by using of valid index, such as ground-level or satellite based ambient concentrations of above pollutants in China.

(3) Presently, the research results about emissions from China’s coal-fired power plants are one of the most comprehensive emission inventories in China. Based on the emission inventories, the authors are recommended to add some related discussion about integrated control suggestions for minimizing diminish the final stack discharges from coal-fired power plants of China, such as promotion of ultra-low emission units, which will be interesting to the international reader of ACP and policy makers.

C5543

(4) With regard to PM_{2.5} emissions, the spray slurry in scrubber of wet FGD system can scrubber part of PM, however, some of gypsum produced of SO₂ removal can be emitted as gypsum rain from the stack, which is a concern for many of units installed with limestone-gypsum FGD. I recommend this point should be properly addressed when considering the effects of FGD on PM_{2.5} emissions.

(5) Line 10-12 on 18789: What are the sources of these air pollutant emissions? The references citation should be cited clearly.

(6) Line 8 on Page 18792: how did the parameter "f" determine for each unit? It is critical for obtaining the monthly profiles of air pollutants for each unit, which should be clearly stated to make it more clarity.

(7) Line 10-16 on Page 8795: it might be true that some of SCR were not put into operation before 2010 owing to poor inspection. However, since most of these units are built in Beijing, YRD, and PRD regions, to improve the regional air quality where some large-scale international activities have been hold, such as 2008 Beijing Olympic, 2010 Shanghai Expo and 2010 Guangzhou Asia Games. Thus, assuming all of these DE-NOX devices are not put into operation may overestimate the emissions. This point is recommended to be considered for the uncertainties analysis.

(8) The uncertainties of historical emissions of these four species are recommended to give more detailed discussion.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 18787, 2015.