



## **An Emission Inventory of Polycyclic Aromatic Hydrocarbons in China**

Xilong Mu (1), Xianlei Zhu (1), and Xuesong Wang (2)

(1) College of Geosciences, China University of Petroleum, Beijing, Beijing 102249, China (zhuxl@cup.edu.cn), (2) State Key Joint Laboratory of Environmental Simulation and Pollution Control, College of Environmental Sciences and Engineering, Peking University, Beijing 100871, China (xswang@pku.edu.cn)

### **Abstract**

Polycyclic Aromatic Hydrocarbons (PAHs) are among the most dangerous compounds due to their high carcinogenic and mutagenic character. Emission inventory provides the primary data to account for the sources of ambient PAHs and serve as a necessary database for effective PAHs pollution control. China is experiencing fast economic growth and large energy consumption, which might result in a large amount of PAHs anthropogenic emissions. Therefore, based on the previous studies and combined recently field emission measurements as well as socio-economic activity data, the development of a nationwide PAHs emission inventory is needed.

In this work, the emission inventory of 16 PAHs listed as U.S. Environmental Protection Agency priority pollutants in China in the year 2012 is compiled. The emission amounts of PAHs were estimated as annual rates of emission-related activities multiplied by respective emission factors. The activities such as fuel consumption, including fossil fuel and biofuel, and socio-economic statistics were obtained from yearbook released by Chinese central government and/or provincial governments, as well as related industry reports. Emission factors were derived from the related literature. Recently reported emission factors from local measurements were used. The total emissions of PAHs were 120611 ton in 2012. In China, PAHs were emitted predominantly from domestic combustion of coal and biofuel, coking industry and motor vehicles, accounting for 72% of the total amount. PAHs emission profiles were significantly different between China and the other countries. The emission profile in China featured a relatively higher portion of high molecular weight species with carcinogenic potential due to large contributions of domestic combustion and coking industry. Domestic combustion of straw, coal and firewood emitted 19464 ton, 8831 ton, and 5062 ton of PAHs, respectively, which were much higher than those in other countries. Emission per capita showed geographical variations. In general, the southeastern provinces of China were characterized by higher emission per capita. The PAHs emissions were higher in the winter than those in the summer.

In the following work, the above emission inventory will be used as an input to Chemical Transport Model to simulate the ambient PAHs concentrations in China, and the uncertainty of the inventory will be assessed based on the comparisons between simulated concentrations and available observations.

### **Acknowledgement**

This work was financially supported by the Natural Science Foundation of China (Grant No. 41175102).

Corresponding author: Xuesong Wang