

Global Emission Inventories of Air Pollutants from Combustion Sources

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Abstract : Based on a global fuel consumption data product (PKU-FUEL-2007) compiled recently and a series of databases for emission factors of various sources, global emission inventories of a number of greenhouse gases and air pollutants, including CO₂, CO, SO₂, NO_x, primary particulate matter (total, PM₁₀, and PM_{2.5}), black carbon, organic carbon, mercury, volatile organic carbons, and polycyclic aromatic hydrocarbons, from combustion sources have been developed. The inventories feature high spatial and sectorial resolutions. The spatial resolution of the inventories are 0.1 by 0.1 degree, based on a sub-national disaggregation approach to reduce spatial bias due to uneven distribution of per person fuel consumption within countries. The finely resolved inventories provide critical information for chemical transport modeling and exposure modeling. Emissions from more than 60 sources in energy, industry, agriculture, residential, transportation, and wildfire sectors were quantified in this study. With the detailed sectorial information, the inventories become an important tool for policy makers. For residential sector, a set of models were developed to simulate temporal variation of fuel consumption, consequently pollutant emissions. The models can be used to characterize seasonal as well as inter-annual variations in the emissions in history and to predict future changes. The models can even be used to quantify net change of fuel consumption and pollutant emissions due to climate change. The inventories have been used for model ambient air quality, population exposure, and even health effects. A few examples of the applications are discussed.

Keywords : air pollutants, combustion, emission inventory, sectorial information

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