

A Global Fuel Combustion Data Product and Its Application

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Abstract : High-resolution mapping of fuel combustion is essential for reducing uncertainties in assessments of greenhouse gases and air pollutant emissions. Such inventories provide valuable information for inferring carbon sinks, modeling pollutant transport, and developing control strategies. Previous inventories included only a few fuel types and were derived using national population proxies which may distort the geographical variation within countries. In this study, a global 0.1 degree by 0.1 degree geo-referenced inventory of fuel combustion (PKU-FUEL-2007) was developed for 64 fuel sub-types along with uncertainty analysis for the year 2007. Sub-national fuel consumption of large countries and major power-station locations were used. The disaggregation error can be reduced significantly by using the sub-nationally energy data, because the uneven distribution of per-capita fuel consumption within countries is taken into consideration. The PKU-FUEL was used to generate global emission inventories of CO₂ (PKU-CO₂-2007), polycyclic aromatic hydrocarbons (PKU-PAHs-2007), and black carbons (PKU-BC-2007). Atmospheric transport modeling and exposure assessment were conducted for BC and PAHs based on the inventory.

Keywords : fuel, emission, BC, PAHs, atmospheric transport, exposure

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