

Multi model analysis of motor vehicle source emission in Beijing

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By the end of 2016, there were 5718 thousands vehicles in Beijing. The emission from motor vehicles is the main source of air pollutants and their precursors in Beijing. In order to assess motor vehicle emissions more accurately, we use Multi-Model integration (MOVES2010b-SMOKE-CMAQ) to study the air pollution in Beijing. MOtor Vehicle Emission Simulator (MOVES) is developed by U.S. Environmental Protection Agency (EPA), which has a default database and users can custom its model to define separate zones, with separate Vehicle Miles Travelled (VMT) and some other activity inputs on MOVES Worker. In MOVES, there are 13 types motor vehicle, and 5 types of road, according to the distribution laws of the Vehicle Miles Travelled (VMT) of motors, the ratio of the Vehicle Miles Travelled of the motor vehicle is different. The proportion of light-duty-vehicle in rural unrestricted access is 36 percent, and the urban is 43 percent; and the fraction of the light-duty-vehicle on weekday is 76 percent, on weekend is 24 percent, in order to have a more accurate result in simulating the situation in Beijing, we have done some investigations and are adjusting the fraction. The Emission inventory and Emission Rates in the MOVES is generated by custom domain options. The Sparse Matrix Operator Kernel Emissions (SMOKE) is an emission processing system, and use to generate an emission inventory from mobile-source activity data, using emission factors from the MOVES model. SMOKE-MOVES integration tool relies on the “reference county”, MOVES generates key emission rates for each county group, includes rate-per-distance, rate-per-vehicle and rate-per-profile, and then these emission rates treated in individual sectors in SMOKE. The attempt of the essay is that we utilizes the SMOKE-MOVES integration tool, we can have a precisely on-roadway emissions and off-network emissions to input the CMAQ Model, then analyze the vehicle emissions contribution and forecast the air quality in Beijing.