

Simulation of Air Pollution Severity Caused by Traffic in Nakhon Ratchasima Municipality, Thailand

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Abstract: Protection of human health and the environment from traffic pollutant effects is the primary goal of all air pollution control programs. In order to evaluate the direct and indirect effects caused by emissions from air pollution sources. The purpose of the study is to generate traffic air pollution severity map using mathematical model and geographic information system (GIS). The pollutants analyzed were CO and NO_x which can be harmful to people living in the area. The 3 steps of mapping process were performed in GIS environment using the vehicle emission and pollutant dispersion model. First, pollutant concentrations were calculated using Caline4, a tool with Gaussian dispersion model. The model parameters include emission rate, wind directions and speeds, ambient temperature and observed pollutant concentration, and atmospheric stability during dry season of 2010 and 2011. This resulted in concentrations of many receptor points along links of the road network. Second, distributions of pollution concentrations were generated by means of the spatial interpolation of those from receptors. Third, The results of pollution raster-based maps varied with wind directions and time instants were then used to determine the severity defined by frequency of pollution concentration more than its own pollutant (mean added positive standard deviation) of every time instant in each alternative (cell). The results can be used as helpful basic data for efficient traffic and transportation planning.