The Assessment of Particulate Matter Pollution in Kaunas Districts

Authors : Audrius Dedele, Aukse Miskinyte

Abstract : Air pollution is a major problem, especially in large cities, causing a variety of environmental issues and a risk to human health effects. In order to observe air quality, to reduce and control air pollution in the city, municipalities are responsible for the creation of air quality management plans, air quality monitoring and emission inventories. Atmospheric dispersion modelling systems, along with monitoring, are powerful tools, which can be used not only for air quality management, but for the assessment of human exposure to air pollution. These models are widely used in epidemiological studies, which try to determine the associations between exposure to air pollution and the adverse health effects. The purpose of this study was to determine the concentration of particulate matter smaller than 10 µm (PM10) in different districts of Kaunas city during winter season. ADMS-Urban dispersion model was used for the simulation of PM10 pollution. The inputs of the model were the characteristics of stationary, traffic and domestic sources, emission data, meteorology and background concentrations were entered in the model. To assess the modelled concentrations of PM10 in Kaunas districts, geographic information system (GIS) was used. More detailed analysis was made using Spatial Analyst tools. The modelling results showed that the average concentration of PM10 during winter season in Kaunas city was 24.8 µg/m3. The highest PM10 levels were determined in Zaliakalnis and Aleksotas districts with are the highest number of individual residential properties, 32.0±5.2 and 28.7±8.2 µg/m3, respectively. The lowest pollution of PM10 was modelled in Petrasiunai district (18.4 µg/m3), which is characterized as commercial and industrial neighbourhood.

Keywords : air pollution, dispersion model, GIS, Particulate matter
Conference Title : ICAPC 2017 : International Conference on Air Pollution and Control
Conference Location : London, United Kingdom
Conference Dates : May 25-26, 2017