Abstract

Assessment and Mapping of PM High-risk Region in Seoul Metropolitan Area

With the recent increase in social interest in particulate matter, a paradigm focused on reducing health risks by air pollution is being emphasized. From a reducing of health risk perspective, exposure assessments of major air pollutants such as fine particle, nitrogen oxides and ozone can be used in various policy-making perspectives, such as setting air environment management goals, prioritizing air quality management measures, and utilizing environmental health indicators.

This study evaluates the exposure population by the health risk level of major air pollutants in the Seoul metropolitan area, including entire Gyeonggi-do, based on previous studies on the health effects of fine particle. By analyzing the socio-economic factors related to health vulnerable population, the air pollution sensitive areas were identified and mapped. Based on the results, we reviewed and recommended air pollution management measures that reflect regional characteristics.

Results show that more than half of the metropolitan population is exposed to serious-level of air pollution. About 15% population of the metropolitan area was treated for air pollution-related diseases with bronchitis, rhinitis, asthma, and cardio-vascular disease in many orders.

As a result of classifying air pollution vulnerable areas, Pyeongtaek-si, Anseong-si were the weakest based on PM10. Icheon-si and Anseong-si were analyzed as vulnerable to PM2.5. NO_2 vulnerable

areas were traffic concentrated regions such as Gwangmyeong-si and Namdong-gu, Incheon. And O_3 vulnerable areas were Dongducheon-si, Yangju-si, Uijeongbu-si and Pocheon-si, the northern regions of Gyeonggi-do.

The correlations between air pollutants and the incidence of environmental diseases were found in the order of PM10 > PM2.5 > NO_2 > O_3, but the direct correlation was not significant. In the air pollution vulnerable areas, air quality needs to be improved according to the reducing of emissions from the region specific sources. In areas where PM10 and PM2.5 are high-level, priority should be given to the management of the industrial facilities and biomass burning in open field.

Keyword PM in Seoul Metropolitan Area, PM dose population, PM management