Diesel Particulate Matter (PM) Air Toxics

Two EnviroAtlas national map layers show 2014 estimates of regional ambient diesel exhaust particulate matter concentrations in micrograms per cubic meter ($\mu g/m^3$) and respiratory risk (expressed as a hazard quotient) by census tract for the conterminous U.S. These maps use data from USEPA's 2014 National Air Toxic Assessment (NATA).

Why is diesel particulate matter in our air important?

Diesel fuel powers autos, trucks, and heavy on-road and off-road equipment. Diesel emissions represent the bulk of the sooty elemental carbon particulates that form the matrix of urban smog. Diesel emissions have declined since the early 2000s because of increased regulations and older vehicle retrofitting, but diesel particulate matter still represents a significant threat to air quality and human health. Diesel particulate emissions may become chemically active and adhere to metallic particles and toxic polyaromatic hydrocarbons (PAHs) such as benzene and naphthalene.

Fine diesel particulates allow toxic compounds to penetrate deeply into lung tissue, transfer through the circulatory system to other organs, and contribute to cardiovascular disease. Research indicates that diesel exhaust is carcinogenic to humans and associated with an increased risk of lung cancer. More research is needed, but evidence also suggests that diesel emissions contribute to chronic obstructive pulmonary disease (COPD), asthma, respiratory allergies, and bladder cancer.

Diesel PM air toxics (typically PAHs) adhere to particulates and may enter the terrestrial environment as wet or dry deposition. PAH deposition is ubiquitous in surface waters, sediments, and vegetation from deposition. PAHs may also enter groundwater to affect drinking water. PAHs do accumulate in the tissues of aquatic organisms, but they tend to decrease through higher trophic levels in the food chain as larger organisms metabolize the compounds. Overall, diesel PM air toxics contribute to the degradation of ecosystem services related to air and water quality. More volatile PAHs may react in photochemical reactions with other compounds to create gases implicated in global warming.

How can I use this information?

These two EnviroAtlas national map layers provide screening-level information for regional ambient concentration and respiratory risk for diesel emissions by

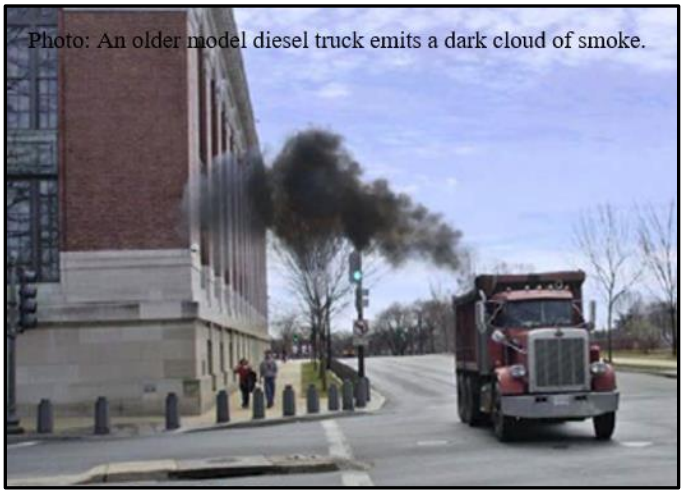

Photo: An older model diesel truck emits a dark cloud of smoke.

census tract for the conterminous U.S. for 2014. The respiratory risk hazard quotient is defined in more detail in the EnviroAtlas interactive map. These maps may be overlaid and compared with other EnviroAtlas maps depicting demographic distributions, vulnerable populations, and the physical locations of other air pollution point sources (see EnviroAtlas EPA Regulated Facilities) to assess overall public exposure to air pollutants in general and diesel particulate matter air toxics specifically. EnviroAtlas users can access NATA information through the Compare My Area tool found in the interactive map. The tool generates summary information for a selected area of interest and compares it to the surrounding county and state.

What are the limitations of these data?

NATA data is best used as a screening tool for broad areas rather than specific places and applied to larger groups of people. More detailed information on proper data use may be found on the NATA limitations website.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. The entire 2014 NATA database can be accessed from the NATA Assessment Results website.

Where can I get more information?

For additional information on the data creation process, access the metadata found in the layer list drop-down menu on the interactive map and visit the NATA Assessment methods discussion. To ask specific questions about these data, contact the EnviroAtlas Team.