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SMOG IS A SERIOUS RISK TO HUMAN HEALTH

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Abstract

Smog is air pollution that reduces visibility. The term "smog" was first used in the early 1900s to describe a mix of smoke and fog. The smoke usually came from burning coal. Smog was common in industrial areas, and remains a familiar sight in some cities today. Smog is unhealthy to humans and animals, and it can kill plants. Smog is also ugly. It makes the sky brown or gray. Smog is common in big cities with a lot of industry and traffic.

Keywords: Pollution, problem, smoke, sulphur, nitrogen, carbon oxides, high concentration.

Introduction

Smog is a widespread environmental problem affecting both urban and rural areas across the globe. But what is smog exactly, and why is it so concerning? The definition of smog refers to a type of air pollution that combines smoke and fog, creating a dense, often toxic haze. Understanding what causes smog is crucial to combating its harmful effects. Smog is typically caused by a combination of industrial emissions, vehicle exhaust, and natural factors like weather patterns. The effects of smog are far-reaching, impacting human health, the environment, and even the economy.

The word "smog" is a combination of the English words "smoke" and "fog". This combination of words has spread throughout the world, perfectly describing the phenomenon. What is the definition of smog? It can be stated that smog is just such an artificial fog that was created in an unnatural way as a result of human activities and certain unfavourable circumstances of nature.

Many people do not know what smog is. There are two main types of smog, distinguished according to the place and conditions of formation. The first one is Los Angeles smog, which is formed primarily in the summer months and can be found mainly in subtropical zones, and the second one is so-called London smog, more characteristic of the temperate climatic zone and forming mainly from November to January (sometimes March). These 2 types of smog also differ in composition. London smog is primarily a mixture of various particulate matters, enriched with sulphur, nitrogen or carbon oxides, but also with soot. Los Angeles smog consists mainly of gases, including carbon oxides, nitrogen oxides and hydrocarbons.

London smog – Sulfurous smog. London smog usually appears in colder months. Therefore, cities located close to the equator or in the subtropical sphere are not affected by it. This type of air pollution emerges as a result of burning coal, the accumulation of particulate matter from industrial

activity and a drop in temperature. The polluting particles mix with the cold air to form a thick fog that significantly worsens overall air quality. Sulfurous smog is characterized by a high concentration of sulfur dioxides, nitrogen dioxides, and dust.

Los Angeles smog – Photochemical smog. This type of smog is typical of the subtropical sphere, but there are some exceptions. Interestingly, it often appears in Polish cities like Kraków and Warsaw, which have been known to suffer from sulfurous smog. It forms mainly in the summer months when temperatures reach high levels. Los Angeles smog consists mainly of carbon oxides, nitrogen oxides, and hydrocarbons. Contrary to sulfurous smog, photochemical smog originates from exhaust fumes and industrial emissions.

Smog, formed mainly above urban centres, is composed mainly of tropospheric ozone (O3); primary particulate matter such as pollen and dust; and secondary particulate matter such as sulphur oxides, volatile organic compounds, nitrogen oxides (NOx) and ammonia gas. The severity of smog in an urban area is usually assessed by measuring ground-level ozone. Tropospheric ozone (O3) is found as a ground-level polluting gas. This article focused only tropospheric ozone, not to be confused with stratospheric ozone, which forms a layer around the earth, protecting it from the rays of the sun. Tropospheric ozone is produced by the action of light and the chemical bonding of volatile organic compounds (VOCs) and nitrogen oxides (NOx). In normal concentrations, sulphur dioxide (SO2) is not toxic; however, the acid pollutants into which it is chemically changed do have negative effects on health. Sulphur dioxide is found in the atmosphere as a result of the combustion of fossil fuels, the production of electricity, and the smelting of sulphur-containing ores (see table above). Winds then carry away sulphur dioxide, sometimes over long distances. After mixing with water vapour and undergoing complex changes including oxidation, sulphur dioxide turns into sulphuric acid (H2SO4) and sulphate ions or sulphates (SO42-). When these changes take place, some pollutants form acid precipitation, while others remain suspended in the air as dust or droplets. Sulphates account for a considerable proportion of all particulate matter in the air smaller than three microns (μ m).

Smog is formed by mixing air with pollutants and exhaust gases resulting from human activities. The factors which are responsible for this include factories, an increasing number of cars, burning coal, wood and other solid fuels in stoves. Its formation is also determined by the weather, climate and general conditions of the area. It will be much more difficult to get rid of pollutants when a city is in a valley and the windless weather prevents them from being spread and thinned out, making them hang over the city. Unfortunately, the phenomenon of spreading pollutants to other areas, i.e. the so-called inflow smog, is also present. Certainly, this is how the air is purified in one place, but it becomes more polluted in another. It is also worth knowing that the smog present in Poland is not only London smog, but also Los Angeles smog, resulting from traffic pollution.

The effects of smog are very noticeable – thick smoke hanging over the city is easily noticed and inhabitants should not breathe polluted air. The results of air pollution, however, are much more far-reaching than some people think – it has a significant impact on human health, with long exposure leading to:

- 1. the development of allergies and asthma
- 2. the induction of respiratory failure
- 3. decreased immunity of the body



- 4. the induction of circulatory system and heart diseases
- 5. the development of neoplastic diseases.

The smog effects can also be experienced indirectly, for example by eating plants or meat from animals that were exposed to such conditions. This is because aggressive chemical factors affect not only people, but animals, plants, and materials as well (including building materials). The effects of air pollution are sometimes delayed, but in other cases visible immediately. The best example is the famous Great London Smog in 1952. While it lasted for only 5 days, it caused 4,000 deaths related to respiratory complications. A further 8,000 people died in the following weeks. The effects of the smog were so catastrophic that to this day, governments wrestle with how to reduce its impact.

All in all, even so, smog in its various forms remains a problem for many cities around the world. While it's true that the numbers of most major air pollutants have been trending downward since the turn of the millennium, it's clear that environmental experts — and the rest of us — can't breathe easy just yet.

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