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Sulfur Dioxide (SO₂) Pollution

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What is SO₂ and how does it get in the air?

What is SO₂?

EPA's national ambient air quality standards for SO₂ are designed to protect against exposure to the entire group of sulfur oxides (SO_x). SO₂ is the component of greatest concern and is used as the indicator for the larger group of gaseous sulfur oxides (SO_x). Other gaseous SO_x (such as SO₃) are found in the atmosphere at concentrations much lower than SO₂.

Control measures that reduce SO₂ can generally be expected to reduce people's exposures to all gaseous SO_x. This may have the important co-benefit of reducing the formation of particulate sulfur pollutants, such as fine sulfate particles.

Emissions that lead to high concentrations of SO₂ generally also lead to the formation of other SO_x. The largest sources of SO₂ emissions are from fossil fuel combustion at power plants and other industrial facilities.

How does SO₂ get in the air?

The largest source of SO₂ in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities. Smaller sources of SO₂ emissions include: industrial processes such as extracting metal from ore; natural sources such as volcanoes; and locomotives, ships and other vehicles and heavy equipment that burn fuel with a high sulfur content.

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What are the harmful effects of SO₂?

SO₂ can affect both health and the environment.

What are the health effects of SO₂?

Short-term exposures to SO₂ can harm the human respiratory system and make breathing difficult. Children, the elderly, and those who suffer from asthma are particularly sensitive to effects of SO₂.

SO₂ emissions that lead to high concentrations of SO₂ in the air generally also lead to the formation of other sulfur oxides (SO_x). SO_x can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter (PM) pollution: particles may penetrate deeply into sensitive parts of the lungs and cause additional health problems.

- [Learn more about particulate matter](#)

What are the environmental effects of SO₂ and other sulfur oxides?

At high concentrations, gaseous SO_x can harm trees and plants by damaging foliage and decreasing growth.

SO₂ and other sulfur oxides can contribute to acid rain which can harm sensitive ecosystems.

- [Learn more about acid rain](#)

Visibility

SO₂ and other sulfur oxides can react with other compounds in the atmosphere to form fine particles that reduce visibility (haze) in parts of the United States, including many of our treasured national parks and wilderness areas.

- [Learn more about visibility and regional haze](#)

Deposition of particles can also stain and damage stone and other materials, including culturally important objects such as statues and monuments.

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What is being done to reduce SO₂ pollution?

EPA's national and regional rules to reduce emissions of SO₂ and pollutants that form sulfur oxides (SO_x) will help state and local governments meet the Agency's national air quality standards.

- [Learn about how air quality standards help reduce SO₂](#)

EPA identifies areas where the air quality does not meet EPA SO₂ standards. For these areas, state, local, and tribal governments develop plans to reduce the amount of SO₂ in the air.

- [Learn more about SO₂ air quality designations and state implementation plans \(SIPs\)](#)

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