

Denver Colorado



Visibility and air quality is reduced by particulate matter and other pollutants in the atmosphere



Air Pollution

- Solid, liquid or gas
- 91% (by weight) produced by industry
- Particulate (solid)
 - Dust, soot (organic material), smoke, pollen, lead, pesticides, iron, copper, etc.
- Gas
 - Carbon Monoxide (CO) from burning coal and oil
 - Sulfur Dioxide (SO₂) from burning coal and oil
 - Nitrogen Oxides (NO_x) from burning oil (gasoline)
 - Volatile Organic Carbon (VOCs) including methane and other hydrocarbons
 - Tropospheric Ozone (photolysis of NO_x from combustion)
- Liquid
 - Acid Rain (hydrolized NO_x and SO₂ from burning coal and oil)

Estimates of emissions of the primary air pollutants in the United States on a per weight basis and their sources

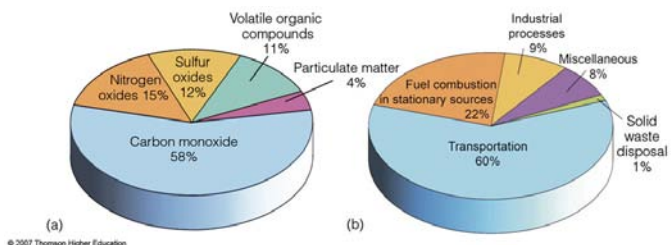


Fig. 18-2, p. 492

Emission estimates of six pollutants in the United States from 1940 -1998

US Clean Air Act passed in 1963, with major amendment in 1970

•CO
(fossil fuel combustion)

•Lead (gasoline)

•SO₂ (coal combustion)

•NO_x
(fossil fuel combustion)

•VOC (industry)

•Particulate matter
(fossil fuel and biomass burning)

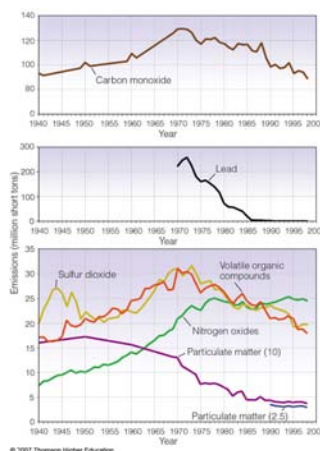
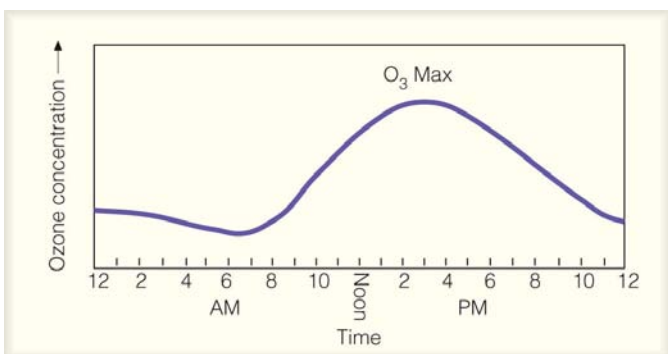


Fig. 18-9, p. 499

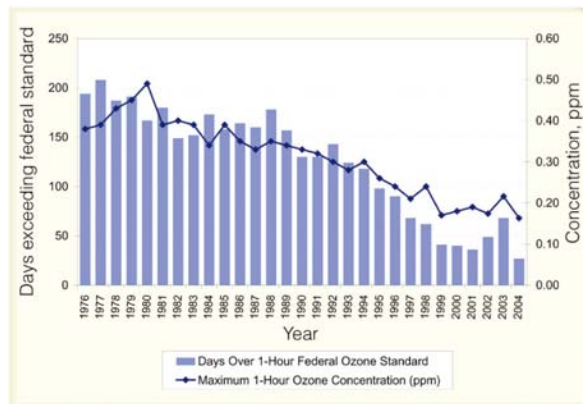
Tropospheric Ozone (bad) from automobile combustion



NO_x from auto combustion and oxidized in sunlight

Fig. 18-6, p. 496

Los Angeles and surrounding areas



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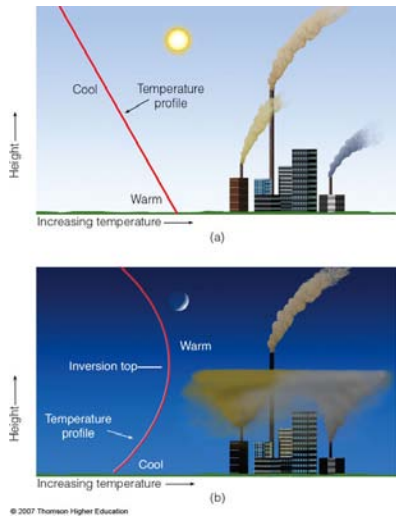


Fig. 5, p. 510

Severe Pollution is associated with long-lived inversions associated with High Pressure Systems

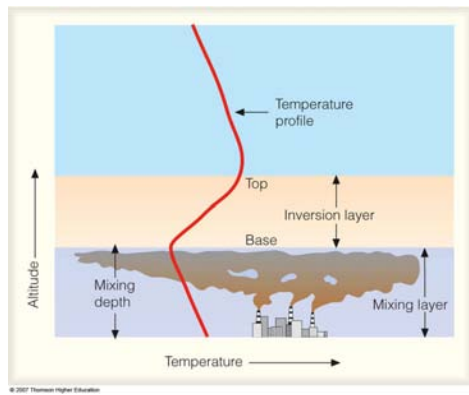


Fig. 18-14, p. 507

Average pH of precipitation (pristine rain is 5.5)

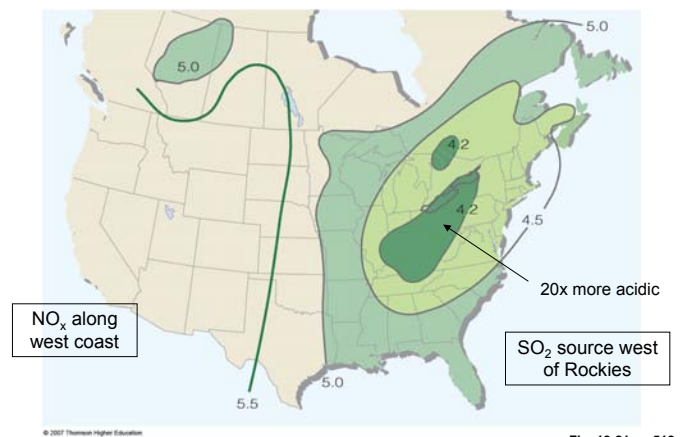


Fig. 18-21, p. 512