

# Winter ozone levels a concern

By [Todd Hartman](#), Rocky Mountain News ([Contact](#))

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A surprising discovery from Boulder-based scientists shows high levels of ozone pollution - usually associated with hot summer days in the city - can develop around remote natural gas fields in wintertime.

The finding suggests the hazards of ozone pollution could be more widespread, both geographically and seasonally, than previously thought.

Scientists at the National Oceanic and Atmospheric Administration studied ozone levels around two major natural gas fields in southwestern Wyoming and found the pollutant formed quickly on cold February days when three factors converged.

Chemicals produced from gas drilling combined with a temperature inversion that trapped air - and the chemicals - close to the ground. The extensive snow cover reflected enough sunlight to start the chemical reactions needed to form ozone.

Take a basin with oil and gas-drilling, cover it with stable, cold air, "throw in the snow and the sunlight, and it's like throwing a match in a gas tank," said Russell Schnell, lead author of a paper on the matter published Sunday in the journal *Nature Geosciences*.

Previously, scientists believed chemicals needed sunlight and hot weather to bake various emissions into ozone, a pollutant that can cause, or worsen, respiratory illnesses.

The finding means parts of Colorado - with heavy natural gas and oil development in its northwest and southwest regions, as well as the eastern plains - could be experiencing the same phenomenon.

"Rapid production of wintertime ozone is probably occurring in other regions of the western United States, in Canada, and around the world," Schnell said. "Wintertime ozone could be forming wherever gaseous fossil fuels are being extracted in conditions similar to the Wyoming site."

In recent years, regulators and energy companies have puzzled over EPA findings of ozone levels exceeding public health standards in sparsely populated southwestern Wyoming, near Pinedale.

Schnell said some people thought the ozone was somehow being transported there from high in the stratosphere, where ozone exists naturally and protects us from dangerous ultraviolet light.

Now, the findings by Schnell and his colleagues advance another possible reason.

Wintertime ozone is "an emerging issue we have to look more at," said Carl Daly, an air pollution specialist at the Environmental Protection Agency's regional office in Denver.

Should more analysis show high cold-weather ozone levels to be more than a freak occurrence, regulators and energy companies - acting under mandates of the Clean Air Act - may have to take more steps to limit the emissions from gas fields that create the pollution.

Schnell said the wintertime ozone levels in the Wyoming gas fields can fast reach levels more than twice the 75 parts per billion that the EPA has set as a health threshold, leaping from 30 ppb to as high as 160 ppb in just four hours. The levels are far higher than typically seen in metro Denver on a high-ozone summer day.

"It's unbelievable," Schnell said. "It just goes straight up as the sun comes up."

### **Understanding the problem**

\* **Ozone** is a pollutant formed from a reaction that occurs when sunlight mixes with emissions from burning fuels and vapors released from certain chemical products.

\* **Elevated levels** of ozone can make breathing more difficult; it mostly affects children, seniors and those with respiratory problems such as asthma or emphysema.

\* **Denver** experiences higher ozone levels from May to September, when hot, clear weather leads to ideal conditions for its formation.

\* **The EPA** has designated Denver and the northern Front Range out of compliance with health limits for the pollutant. Regulators are seeking more ways to reduce ozone-forming emissions from cars, natural gas fields, industrial sites and commercial products.