

Deseret Morning News (Salt Lake City)

December 31, 2008 Wednesday

Scientist dissects Utah's murky winter air

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LENGTH: 638 words

Utah's greatest snow on earth is sometimes tainted by the dreary condition of the air around it but a **Utah State University** scientist is working to abate the frequent inversion problem.

Nearly every year, inversions settle into various valleys along the Wasatch Front, giving everything a greyish hue. Whether it be wind-blown dust, vehicle exhaust or chemical compounds condensing in the atmosphere, the murky air is taking a toll on human health, visibility and the bigger climate change phenomena, according to Phil Silva, **USU** professor of analytical chemistry.

"Northern Utah is a great place to live nine or 10 months of the year," he said. "But in January and February, we often get hit with a high amount of inversion days that are not only depressing to look at, but that are also bad for our health."

Silva has spent the past few years looking at ways to clear up the state's chronic inversion problems, identifying specific conditions that lead to inversions and what people can do to correct the problem.

"In order to reduce pollution, you have to understand what the sources are," he said. "By figuring out the chemical makeup of the pollution, you can identify triggers and come up with solutions on how to reduce the problem from the source."

When Silva first came to Utah, he believed fireplace smoke would've been a big contributor to Utah's pollution levels. After studying air quality at different locations in northern Utah, he has determined that ammonium nitrate is to blame for 50 percent to 70 percent of the state's dirty air.

Ammonium nitrate, an oxidating chemical compound, comes from agricultural sources, such as dairy and livestock farms, which are prevalent in many northern Utah communities.

Inversions can and do happen all year long, but are most likely in January, said National Weather Service meteorologist Monica Traphagan. She said population growth throughout the state makes inversions, with increasing levels of trapped pollution in the atmosphere, more likely.

"Inversions happen all over the state," she said. "Even in the rural areas, but there isn't the levels of pollution where you can see it." Pollution, she said, gets trapped under a warm air mass, which basically means dirty air isn't leaving the immediate atmosphere and it isn't being replaced with fresh air either.

"It has no where to go," Traphagan said. "It stagnates and stays over the valley, producing this haze that we see." Snow on the valley floors lowers the overall temperature, which can exacerbate the problem.

Cache Valley currently holds the record for the lowest air quality rating in the nation.

Nitrate is produced by many industrial processes as well as vehicle emissions. Burning fossil fuels, such as gasoline, in power plants and vehicles, Silva said, results in the production of nitric acid and ammonia as air pollution.

"Utah is vulnerable to ammonium nitrate pollution because it is traditionally an agricultural area that is rapidly becoming more urban," he said. The remaining percentage of air pollution is believed to come from organic carbon, which includes several sources such as diesel emissions, fireplace smoke and barbecue grilling.

Natural gas products being made by manufacturers are helping to lower the emissions as is using propane instead of charcoal for cookouts. Silva's research focuses on organic carbon emissions and is being used by policymakers statewide to address pollution issues.

The U.S. Environmental Protection Agency tightened standards on air pollutants in October 2006. Many states have had to come up with methods to reduce pollution, which is where the chemical research plays a big part. Silva said that once a good policy is in place, the next step will be to provide information to the public so everyone can do their part to lower pollution. E-mail: wleonard@desnews.com

LOAD-DATE: December 31, 2008

LANGUAGE: ENGLISH

PUBLICATION-TYPE: Newspaper

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