

UV rays strengthening in North America

Grab your hat and maybe some sunblock too. Researchers report they have detected an increase in levels of harmful ultraviolet (UV) radiation in at least one part of North America during the last four years.

As chlorofluorocarbons and other chemical pollutants eat away the stratospheric ozone layer, scientists have been expecting to see a strengthening in the intensity of UV rays reaching Earth's surface. But evidence of any UV changes has proved elusive, both because measuring radiation is extremely difficult and because clouds and pollution can absorb such rays, masking any trends. James B. Kerr and C. Thomas McElroy of Environment Canada in Downsview, Ontario, now report the first signs of a UV increase in North America.

In the Nov. 12 *SCIENCE*, the two researchers announced that total levels of UV radiation in the Toronto area climbed 35 percent per year during winter and 7 percent per year during summer between 1989 and 1993. Kerr and McElroy believe that ozone erosion caused part of these upswings because the UV levels rose most dramatically at shorter wavelengths, a part of the spectrum strongly absorbed by ozone molecules. Longer wavelengths of UV light, which pass through the atmosphere unaffected by ozone, did not intensify much during the four years. Ozone concentrations above Toronto dipped 4.1 percent annually in winter and 1.8 percent in summer during the four-year study.

To determine the health significance of their findings, Kerr and McElroy calculated the changes in the specific bands of UV light that cause sunburns. Levels of this radiation climbed 5.3 percent per year in winter and 1.9 percent per year in summer.

The new findings play into a debate launched by some conservative commentators who downplay the importance of ozone depletion. Pointing to the paucity of evidence of UV trends, they suggest that the planet does not face any threat from ozone loss. The measurements from Toronto show that UV levels have, in fact, climbed there and most likely have increased over other regions where ozone concentrations are dropping, Kerr says. "This question is no longer disputable. It's more or less what we expected to observe."

This doesn't mean the people of Toronto should lock themselves indoors. The greatest increase in ultraviolet light has occurred in winter, when UV radiation levels are naturally lowest. The city also sits at a latitude of 44°N, where it receives much less ultraviolet light than do areas closer to the tropics. "People can cover up, they can take precautions," says Kerr. "But for vegetation it's a more serious problem. [Plants] are outside all day long and don't have a choice. There's a lot of uncertainty involved, but it's possible that they won't be able to cope with increases in UV intensity."

Parkfield jolt triggers quake alert

After a mild tremor shook the San Andreas fault in central California last week, seismologists issued an alert announcing that the predicted Parkfield earthquake might finally occur. But the three-day alert expired without incident.

The Parkfield segment of the San Andreas has spawned major quakes about every 22 years, with the last shock in 1966. Recognition of this pattern in 1985 led U.S. Geological Survey scientists to predict a 95 percent chance that a magnitude 6 quake would strike the tiny town of Parkfield before the end of 1992.

The quake did not occur last year, but a magnitude 4.7 temblor shook the fault in October 1992, causing California to issue an A-level alert—signifying a one-in-three chance that the quake would hit in three days. This was the first time the state had ever issued a quake alert. Last week's alert, issued after a magnitude 4.8 shock, also proved to be a false alarm.

Integrity of Alaska pipeline questioned

Since 1977, the Alyeska Trans-Alaska Pipeline has carried oil from Prudhoe Bay to the port of Valdez, an 800-mile trek. Except for one 1978 sabotage episode, the pipeline has served as a reliable conduit for some 378 billion gallons of North Slope crude. Hidden behind this good track record, however, is a transport system riddled with technical and managerial problems, according to a safety audit commissioned by the Bureau of Land Management, which has regulatory oversight of the pipeline. Indeed, this study charges, the pipeline may be an accident waiting to happen.

Since construction, Alyeska's quality assurance programs have been "dysfunctional," the audit found. Moreover, it maintains, there are no reasonable guarantees that the pipeline was even built properly, much less maintained in a way that protects public safety and the environment.

Though the study rated the crews who operate the pipeline from day to day as "very knowledgeable and proficient," it faulted mid-level managers for failing most safety-oriented responsibilities—from recognizing regulatory requirements to developing procedures for coping with potential problems.

Safety surveillance has been so lax and internal audits so superficial that actual risk cannot be estimated at this time, the study found. However, it warns, the "serious deficiencies" identified in pipeline hardware, record keeping and retrieval, safety-control programs, and inspection activities all suggest that "resultant risks can be serious or even catastrophic."

For instance, it found "massive violations" of the National Electrical Code—rules for limiting the risk of fires and electrocution. Also posing "an imminent threat," it says, were hundreds of places where the pipe rests directly on its vertical supports. The entire length of pipeline is supposed to rest freely within a supporting "saddle" to permit some flexing or movement during tremors—a serious worry in this seismically active region of the world.

Officers of the seven oil companies that created Alyeska Pipeline Service Co. to run the pipeline testified at a Nov. 10 congressional hearing. They announced that some 1,000 of the more than 20,000 identified electrical code problems have been corrected. The rest should be completed next year. They vowed to begin addressing other technical problems shortly. Fully remedying the pervasive management deficiencies, however, may take at least three years, the owners testified.

Identifying a new indoor air threat

Researchers taking a white glove to nine office buildings around the country where workers reported symptoms such as sore throat and dizziness have uncovered a new indoor air pollutant. The culprit is mineral fibers, such as fiberglass, often used in thermal and acoustic insulation in ventilation systems and ceilings, report Alan Hedge and his colleagues at Cornell University in Ithaca, N.Y., in *PROCEEDINGS OF INDOOR AIR '93*, published in November.

The extent of the problem is unknown, but the fibers get loose "very easily," hang out in dust, and irritate people's eyes and throats, Hedge says. Installing an air filtration system solved the problem, he adds.

Exposure to the fibers, primarily silicon oxide or calcium oxide, was known to cause breathing and other problems, the researchers write. But the fibers had not been linked to "sick building syndrome," in which people complain that their office environment is making them ill, says Hedge.

Of the six pollutants the researchers studied, including nicotine, only the amount of fibers in the dust correlated with workers' complaints. Previous research has tied sick building syndrome to poor ventilation and excessive amounts of volatile organic compounds, such as benzene, in the air, Hedge says.