

Wildfires' smoke causes problems for thousands

FAIRBANKS — Where there's fire, there's smoke. With fires raging on more than a million acres of Alaska, smoke is causing thousands of people both physical and psychological aggravation.

It's also providing several scientists at the University of Alaska Fairbanks Geophysical Institute an excellent opportunity to study the effects of smoke on atmospheric chemistry, according to UAF.

"This is another case where Alaska presents us with a natural laboratory," said Dr. Glenn Shaw. "Because little is known about the atmospheric effects of wildfire smoke, Dan Jaffe and I decided last spring to begin a pilot study on its fundamental atmospheric chemistry."

Shaw is a professor of geophysics and atmospheric science at the Geophysical Institute and the UAF College of Natural Sciences. Jaffe is an assistant professor of chemistry at the institute and college.

"With the exception of sulfuric acid, the air around Fairbanks right now has the same ingredients as the Los Angeles smog," Jaffe said. "When trees burn, hot combustion produces carbon dioxide and nitrogen oxides, while incomplete combustion produces carbon (soot) and other organic molecules.

"This, in turn, affects photochemical processes — nitrogen oxides and hydrocarbons interact with sunlight to produce nitric acid and tropospheric ozone."

Shaw and Jaffe are interested in how atmospheric gases and particles affect basic atmospheric processes, as well as global patterns of weather and climate. One source of these constituents is biomass burning — either through naturally occurring wildfires or deliberate fires such as those being set to clear the rain forest in South America.

To study the airborne smoke particles and gases from this summer's Alaska wildfires, Jaffe, Shaw and several colleagues set up instruments on the eighth-floor deck of the Geophysical Institute's Elvey Building on the main UAF campus, as well as at the institute's Poker Flat Research Range north of Fairbanks.

"We've called this the Alaska Photochemical Experiment," Shaw said. "It's a small-scale, independent effort that may provide the groundwork for further research."

The experiment will compare three types of air masses: a natural Interior background, local Fairbanks pollution and forest fire emission plumes. It relates to scientific questions such as the effects of air quality on human health, the role of tropospheric ozone and soot in the climate and the cycles of tropospheric ozone, hydrocarbons, nitrogen oxides and aerosols.