RESEARCH TRACKS ARCTIC WARMING’S CORRELATION TO ‘DIRTY SNOW’

By PAT BRENNAN

As much as a third of the warming trend in arctic regions is caused by "dirty snow," not by greenhouse gases, UC Irvine researchers say, a finding that could have implications for pollution control efforts across the Northern Hemisphere.

In a study published in a science journal in June, 2007, climate researcher Charlie Zender and his team say that Arctic snow is being darkened by soot from tailpipe exhaust, smokestacks and forest fires. Because darker surfaces absorb more heat from sunshine, Zender said, soot is making a significant contribution to Arctic warming, which is melting permafrost, increasing spring runoff and causing a variety of woes for the people who live in these regions. Better control of pollution sources that emit large amounts of soot – coal-fired power plants in China, for example – could be a relatively easy way to reduce arctic warming, he said.

While greenhouse gas emissions often come with soot, soot can be targeted separately for control, depending on choices made by air-quality regulators.

"It's simpler to tackle those problems than the global problem of climate change," Zender said. "Reducing all greenhouse gases is very difficult. People need energy and gasoline. But perhaps reducing sources of soot to these regions is more tractable."

The scientists spent three years synthesizing data from previous studies of Arctic snow and combining them with their own climate model of the "lifecycle of snow," as Zender called it – "defining how snow ages."

"It's born when it falls from the atmosphere and lands on the ground," he said. "That is when it's at its brightest."

As it ages, however, it accumulates soot from the atmosphere.

Because of the model devised by graduate student Mark Flanner and Zender, he said, "We now no longer treat snow as perennially young and bright. Now we can account for the effects of aging."

Another advantage to controlling Arctic soot is that, while it probably accounts for a relatively small portion of overall global climate change, warming a patch of Arctic ground triggers more climate change than warming a comparable patch of ground that isn't covered by snow.

"If you can keep a relatively small region of the poles from warming by a few degrees, it will keep climate more stable than keeping a
similar-size region of the tropics from warming," he said.

Regulators in nations that encircle the Arctic, including the United States, Canada and Russia, could get more bang for the buck by reducing soot in the Arctic than by reducing greenhouse gases elsewhere.

"Keeping the poles cold is a great place to start," Zender said. "Preserving the climate in the poles is very important now relative to any other piece of real estate on the planet."