Researchers to study environmental, human impacts of nuclear war

Brian Toon

The continued nuclear arms race between the developing countries of India, Pakistan and North Korea has prompted scientists at CU Boulder and Rutgers to revisit a 1980s’ study that examined the effects of a nuclear war. Called a “nuclear winter,” the study shows that such a war would plunge the world into a cold darkness of famine and death, says CU Boulder’s Brian Toon.

CUT 1 “At that time we concluded that a war between Russia and the United States and Europe and China would kill hundreds of millions of people directly but it probably would kill almost everybody on the planet indirectly because the burning cities from the weapons would produce endless smoke that goes into the upper atmosphere, (:18) which would absorb sunlight and drop the temperature of the planet to temperatures which are below those of the last ice age. And the main effect of that would be to prevent people from being able to grow any food.” (:30)

Toon, Rutgers’ Alan Robock, and a number of researchers that included Carl Sagan

published the nuclear winter theory in 1983. This time Toon says they are calculating environmental and human impacts of a potential nuclear war using the most sophisticated scientific tools available.

CUT 2 “In the early 1980’s computers were so primitive that people considered it to be climate modeling if you could run a model that had no ocean, had no upper atmosphere and you could only run it for, what, 20 days. (:14) And so computer models are just much more advanced now because of the speed of the computers and so we’ve been able to develop physics over 20 or 30 years and put it all into these big models and so we can simulate these things with much greater detail now.” (:30)

But even with advanced computer technology and climate models Toon doesn’t expect the outcome will be much different than the early 80s.

CUT 3 “I’m anticipating that we will again find that there’s huge amounts of smoke that go into the upper atmosphere and it drops the surface temperature to ice age conditions and it destroys the ozone layer so that people would be bathed in harsh ultraviolet radiation because there’s no protective shield in the upper atmosphere to keep harsh ultraviolet light from the sun from reaching the ground.”

(:27)

Even a limited nuclear war would spell disaster for much of the planet, says Toon. In the mid-2000s Toon and some colleagues studied the effects of such a conflict between India and Pakistan where 100 nuclear warheads of the size that fell on Hiroshima were detonated between the two countries.

CUT 3 “It wouldn’t cause ice age conditions but it would cool the planet off and found that it would reduce the productivity of agriculture in the United States and China and places in Europe by tens of percent for a decade. (:13) In fact, on the current Earth there’s only enough food to feed the world for about 60 days. In fact, in most cities there’s only enough food to feed the people in the cities for about seven days. Probably most of the people on the Earth would die from starvation from such a scenario.” (:27)

As part of the effort the team will model fires in cities initiated by nuclear blasts, and they will use several state-of-the-art aerosol and climate models to study where the smoke from the fires winds up, said Toon. He says based on current scientific knowledge, some of the smoke could end up in the stratosphere, some 10 to 30 miles above Earth’s surface that could remain aloft for years or even decades.