

New model agrees with old: Nuclear war between US and Russia would result in nuclear winter

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A team of researchers with Rutgers University, the National Center for Atmospheric Research and the University of Colorado has found that a new climate model agrees with an older climate model—a nuclear war between the U.S and Russia would result in a nuclear winter. They have published their findings in the *Journal of Geophysical Research: Atmospheres.*

Most people who lived through the nuclear age have heard of nuclear winter, in which global cooling would result from a major nuclear war. Early fears of such an outcome have been bolstered by sophisticated computer models that showed what would happen if a large number of nuclear bombs were detonated in large urban areas. The planet would grow colder due to the huge amount of smoke generated by fires ignited by the atomic blasts—the smoke would cover the entire planet for years, blocking the sun.

In this new effort, the researchers analyzed a large number of variables, such as estimated number of bombs, their strength, where they would blow up, and the amount of smoke that might be generated by each of them. In their analysis, they chose to look at the <u>worst-case scenario</u>, in which all of the atomic weapons held by both countries were used in an all-out nuclear war. In such a scenario, the researchers assumed that all of the bombs would land in either the U.S. or Russia.

The new <u>model</u> used by the researchers is called the Community Earth System Model-Whole Atmosphere Community Climate Model—version 4. All results from the model were compared to those found with the



Goddard Institute for Space Studies ModelE run back in 2007.

The researchers report that both models showed a nuclear winter (with a global temperature drop of approximately 9K) resulting from such a war. Both models produced a nuclear winter lasting several years. They also showed a 30 percent global reduction in precipitation over the first few months following such a war. They further report that there were also differences in predictions—the earlier model predicted a collapse in the monsoon season and major changes to the El Niño events. And the new model predicted that the worldwide smoke coverage would last longer than the older model's results. And while there were some differences in the timing, both showed the progression of smoke coverage starting in the impacted areas, spreading over the northern hemisphere, and eventually making its way to the southern hemisphere.

Neither model was designed to provide predictions of what a major <u>nuclear war</u> would mean for the fate of humanity—past theories have suggested such a war would result in human extinction, along with most other species. More recent predictions suggest that might not be the case, however. The researchers with this new effort found, for example, that the amount of soot making its way into the atmosphere would be far less than that released when the Chicxulub asteroid struck the planet, wiping out the dinosaurs—but not all life on the planet.

More information: Joshua Coupe et al. Nuclear Winter Responses to Nuclear War Between the United States and Russia in the Whole Atmosphere Community Climate Model Version 4 and the Goddard Institute for Space Studies ModelE, *Journal of Geophysical Research: Atmospheres* (2019). DOI: 10.1029/2019JD030509

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