This is the print version of the Skeptical Science article 'Nuclear testing is causing global warming', which can be found at http://sks.to/nuclear.

Human-caused warming dwarves energy from nuclear testing

What The Science Says:
Atmospheric CO2 is accumulating more than ten thousand times as much energy in a year that the entire combined nuclear weapons program of the world has generated.

Climate Myth: Nuclear testing is causing global warming
"Could it be that what we are experiencing now is merely the blowback from a nuclear testing policy carried out by the USA, Soviet Union, UK, Australia, China, France and Germany and others between 1945 [and] 1993?"
(Source: djpauledge.com)

A reasonable estimate indicates that the total energy released by nuclear explosions in the twentieth century amounts to six hundred megatons TNT equivalent of energy, or 2.5 billion, billion Joules (2.5×10^{18} J). That estimate is larger than the five hundred and thirty megatons TNT equivalent estimated by UNSCEAR (also), so it can be considered a conservative estimate. Divided over the five hundred and ten million, million square meters of the Earth's surface (510×10^{12} m^2), and over the two decades of peak testing, that represents eight millionth of a Watt per square meter (8×10^{-6} W m^{-2}) of power. For comparison, the 1.8 Watts per square meter (1.8 W m^{-2}) of CO2 radiative forcing as of 2011 generates approximately twenty nine billion, trillion Joules of energy (29×10^{21} J) over the Earth's surface in a single year, or more than ten thousand times as much energy in a year that the entire combined nuclear weapons program of the world has generated.

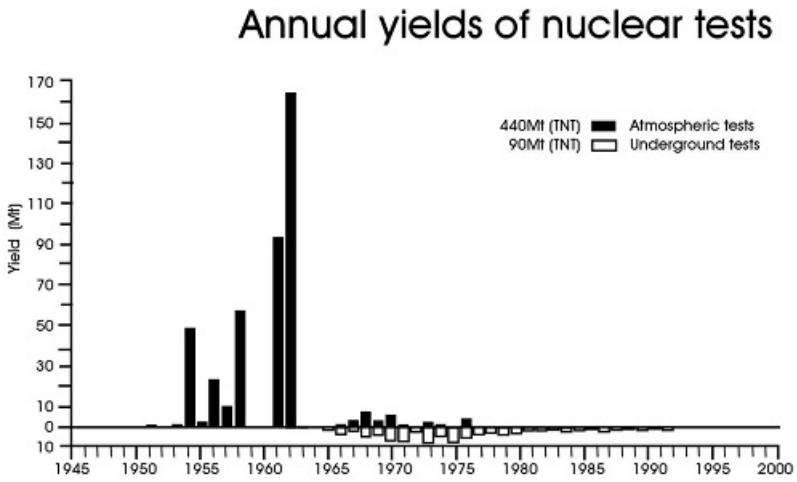

Figure 2. Annual yields of tests of nuclear weapons in the atmosphere and underground

That is not the whole story. Many nuclear tests kick up a lot of dust, which reflects sunlight, thereby cooling the Earth. Indeed, according to Turco et al, 1983, that is the dominant effect of nuclear explosions on climate. The result is that nuclear testing is likely to have reflected more energy form the Sun than they generated. That is, nuclear testing is likely to have been a net cooling factor.

Let us ignore that possibility, and the large proportion of energy released to space as radiation. In that case, during the period of maximum nuclear testing it may have contributed 0.62 millionth of a degree Centigrade (0.62×10^{-6} C) to temperature increase, a contribution too small to notice, and likely to have entirely dissipated since the reduction in nuclear testing in the 1990s. The peak contribution was in 1962, when nuclear testing may have contributed as much as one hundred and seventy megatons TNT equivalent of energy in 1962. Averaged over the year and the Earth's surface, that represents forty-four millionths of a Watt (44×10^{-6} W m^{-2}), for a warming contribution, ignoring dust effects, of around thirty-five millionths of a degree Centigrade ($35 * 10^{-6}$ C), still too small to notice.

(Source)

The Skeptical Science website by Skeptical Science is licensed under a Creative Commons Attribution 3.0 Unported License.

Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a college textbook on climate change and the book Climate Change Denial: Heads in the Sand. Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.

The Skeptical Science website by Skeptical Science is licensed under a Creative CommonsAttribution 3.0 Unported License.