

## ATMOSPHERIC SCIENCE

# Knowing when to stand down and when to stand up

**W**e live in an era when important policy decisions are increasingly made in haste and without due consideration of consequence. Many such decisions prove to be poor later on, but few are likely to be as immediately catastrophic as a decision to start a nuclear war. Unlike the days of the Cold War when a very small number of countries were capable of starting a nuclear war, nine countries now have a total of nearly 14,000 nuclear warheads according to the Federation of American Scientists. It has long been understood that nuclear war between Russia and the United States—the two nations, which together hold more than 90% of the world’s nuclear weapons—would lead to a devastating ecological disaster that lasts well after the immediate human tragedy of conflict: nuclear winter. As burning cities and massive forest fires inject soot into the upper atmosphere, temperatures would drop rapidly. With the sun obscured, many of our planet’s ecosystems would likely collapse, causing widespread famine.

While nuclear war between the United States and Russia may be less likely than it once was, the proliferation of nuclear-capable states increases the likelihood of regional, so-called “limited” nuclear war. Recent events in Kashmir have led to a deteriorating relationship between India and Pakistan – two nations that have already gone to war four times since the countries were established. As a consequence, south Asia is a potential flashpoint for nuclear conflict. In a new paper in *Science Advances*, Toon and colleagues explore the potential social and

environmental consequences of an India-Pakistan nuclear war. Based on plausible war scenarios, empirical understanding of the effects of aerosols in the atmosphere, and state-of-the-art community climate models, the authors predict global—not simply regional—disaster, with global temperatures dropping to levels “not seen on Earth since the middle of the last Ice Age.”

Studies like that of Toon and colleagues remind us why heeding the results of scientific inquiry is so critical for effective governing. In some circles, the limited use of nuclear weapons may be the subject of political debate, but the scientific case against limited use is very clear. Both the regional and global risks are simply too high for nuclear powers to do anything but stand down. The scientific case that our global climate is changing drastically for the worse is even more indisputable, and there is clear and strengthening consensus among scientists that human activities are major contributing factors. Those governments that refuse to stand up and call for emergency action based on the science imperil their citizens and, indeed, all citizens of the world. Regardless of whether the best response to a particular crisis is to stand down or to stand up, the nations of the world would be wise to base their policies on sound science, not political expediency.

– Kip Hodges

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