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Interactive comment on “Atmospheric effects and societal consequences of regional scale nuclear conflicts and acts of individual nuclear terrorism”

by O. B. Toon et al.

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We appreciate the time that the reviewers spent considering our manuscript. Several of these issues will be treated in detail in our revised paper. Here are some direct responses to the reviewer.

Reviewer 2. (reviewer comments in quotes)

"This paper evaluates the potential effects of hypothetical nuclear conflicts on the emissions of smoke and associated particulates into the atmosphere. There are many assumptions made in the paper, but the authors provide a strong basis for the choices made. The paper is well written and should be published. However, since this is really the first major work on nuclear war effects since the "nuclear winter" studies made by

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many researchers in the 1980s, I think it would be valuable to add a short review of those earlier studies and how the picture has changed since then, both in terms of the type of likely conflicts as inferred in this paper and in terms of the estimates of the smoke and particles emitted."

The last review of these issues was by Turco et al (1990; science). Since that time little work has been conducted on "nuclear winter". I don't think this is the right time for a review of nuclear winter studies. There are a number of papers in the preparation related to ours, and many of them have very surprising results based on new capabilities. Hence a review of "nuclear winter" at this time will be quickly superseded.

A vast amount of work has been done on many of the aspects involved such as GCMs, volcano modeling and pyroconvection. We have added further references to the paper in the various sections to bring out newer studies and reviews of special topics. For instance we added a section to the paper about smoke optical properties in which we quoted several review papers on the topic. However, it is not practical to review the literature in each of these fields.

"The results of this paper are used as the basis for the companion paper by Robock et al. that examines the resulting effects on climate. This paper stops at the emissions of smoke and particles - I wish it were extended to provide more discussion on the resulting loading and distribution of the smoke and other particles in the atmosphere, as well as any other potential impacts on the chemistry in the atmosphere. While this would perhaps make the paper too long, it would provide more of a sense of completeness before going to the claimt effects in the companion paper."

Unfortunately describing the distribution of smoke and the chemical response is beyond the scope of the paper, as the reviewer notes it would make the paper much longer. At the Fall 2006 AGU meeting we organized a special session on the topic of regional nuclear conflicts. Several papers were contributed on these topics. We expect that in coming months several papers will appear that will address the reviewers concerns.

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