Atmos. Chem. Phys. Discuss., 13, C3835–C3837, 2013
www.atmos-chem-phys-discuss.net/13/C3835/2013/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Climate and chemistry effects of a regional scale nuclear conflict" *by* A. Stenke et al.

O. Toon

toon@lasp.colorado.edu

Received and published: 18 June 2013

I have reviewed the paper by Stenke et al. "Climate and chemistry effects of a regional scale nuclear conflict". Generally this is a very well written paper that describes an independent study of the potential climate and ozone perturbations that might result from a nuclear conflict using a modest number of low yield weapons. The calculations are explained well, and the conclusions drawn are carefully made and defended. There are a few places where additional information might be helpful to others interested in this problem. For example, the authors might include a graph of the latitude and time dependent zonally averaged soot optical depth so that others could compare numbers on this important quantity. For the ozone loss calculations it would be useful to describe

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

the optical calculations. For example, was multiple scattering by the soot particles included directly in the photorate calculations?

On minor comments On page 12093, line 5-12. The 6.6 Tg of lofted soot in Toon et al. (2007) included the 20% removal due to initial rain out. Therefore they thought 6.6 Tg is the amount lofted to the upper troposphere. Mills et al. did not "assume" anything about the amount of soot rained out in the first 10 days. Rather their model computed a rainout rate based on the abundance of rain. Robock et al. (2007a) assumed soot would be hydrophobic for part of the first day, while Mills et al did not assume the soot was ever hydrophobic. This is likely one reason that Mills et al have slightly less soot in the stratosphere, than does Robock et al after the first few days.

On page 12097 line 26. Did you mean "sceanario" instead of "sceanarion"? Fig. 1 caption. "dashed" is misspelled. On page 12098 Line 12 "initial" is misspelled. On page 12100 line6 "lead" should be "led", or better "caused". Line 16 insert "particles" after soot. On pg 12104 line 26 "warmer" than what, "less" than what? Line 6 to end of section. Here you present some data/other models on sea ice responses to volcanic clouds. I was not clear what you concluded from this, or how it applied to your simulations. Can you add some sentences or a paragraph where you interpret what the observations suggest about your calculations?

Fig. 8/Fig. 9 are not very informative. All the figures look about the same, and the color bar only shows one color. Perhaps it would be more useful to plot the change in sea ice cover.

Pg 12105-Fig. 11 is rather confusing. From Fig2 we see that the soot burden changes almost linearly in time, so I think this figure is about the response time of the system to the perturbation. However, it could appear to the reader that the response is not linear in soot loading, since for example 2 and 6 Tg yield the same temperature change. I would change the horizontal axis to time instead of soot to be clearer. At least you need to explain the graph to the reader, and explain what the odd dependency on soot

ACPD

13, C3835–C3837, 2013

loading means. Pg 12106 line 1. The sentence is confusing. Replace the word “it” with words that say what “it” is. Line 4. Did you include the soot in the photorate calculations (Mills et al did not)

Pg 12110 line 7 “temperature” is misspelled.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 12089, 2013.